DATAMATION 85

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APPLICATIONS SOFTWARE SURVEY

ENVIRONMENTAL COMPUTING STRATEGIES

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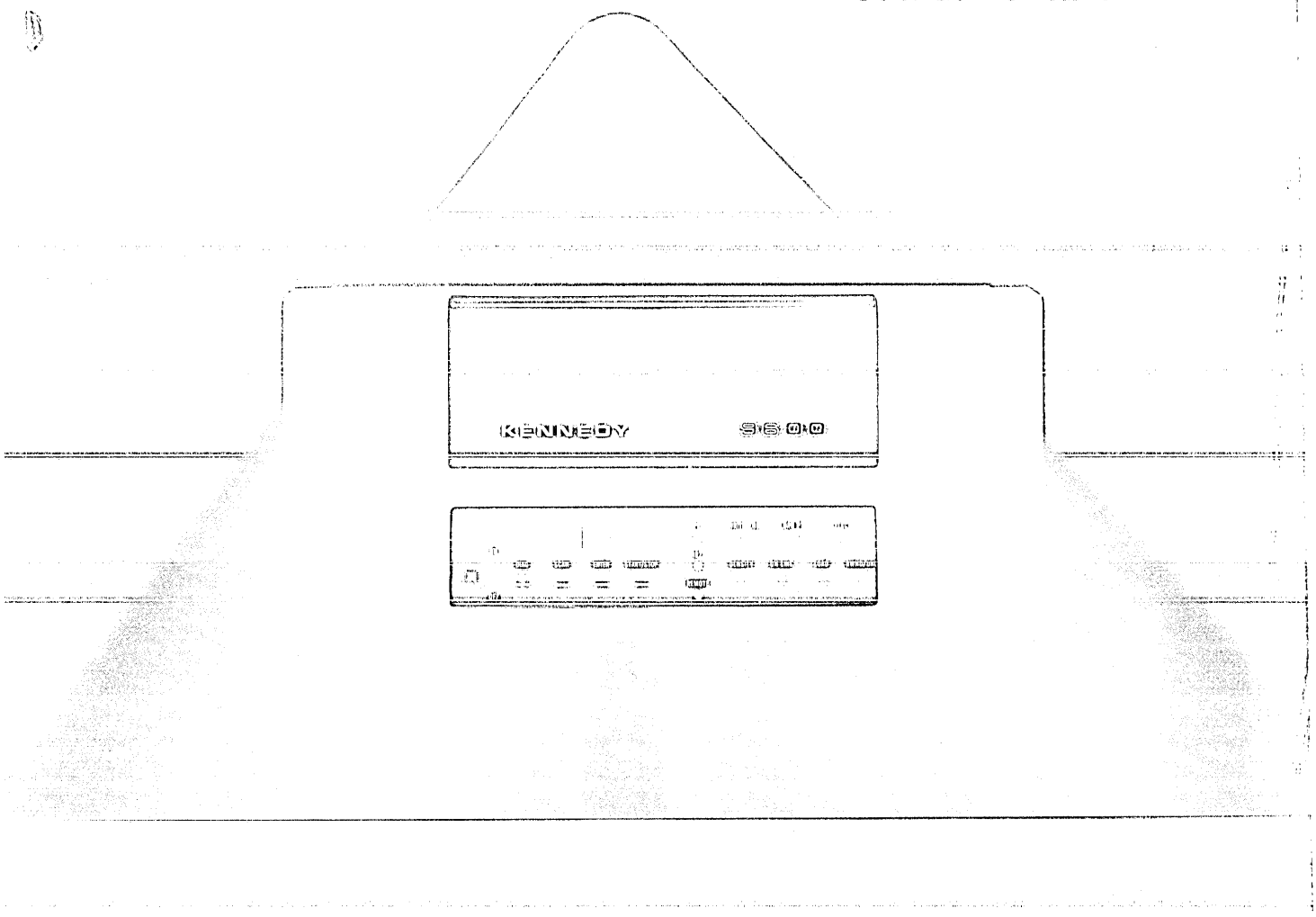

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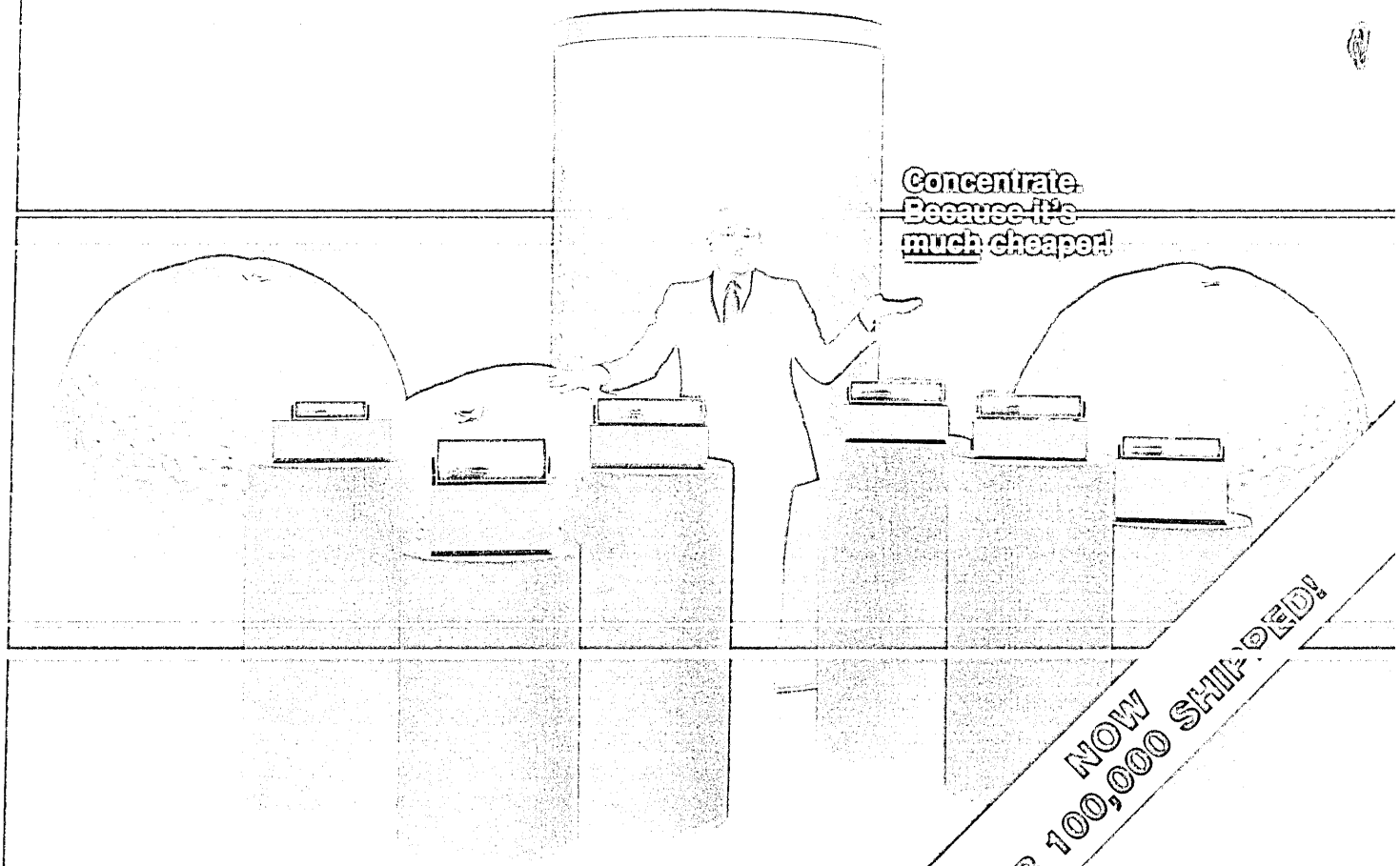
And still another reason is that concentrators are only one family of MICOM products. Now we can be the only source you need for minicomputer data communications products from modems to data PABXs to local networks. Thanks to you, we're big in those fields too!



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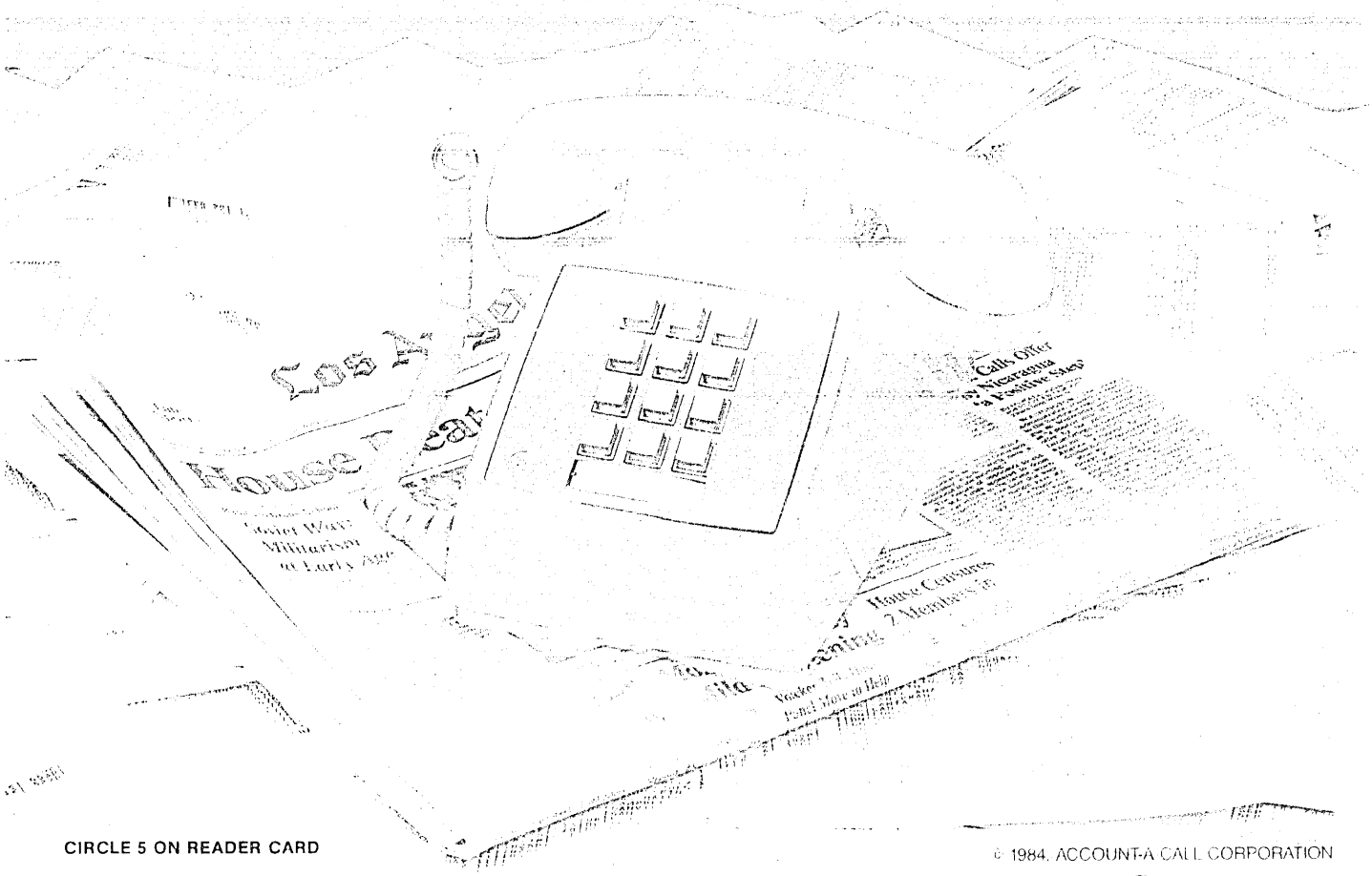

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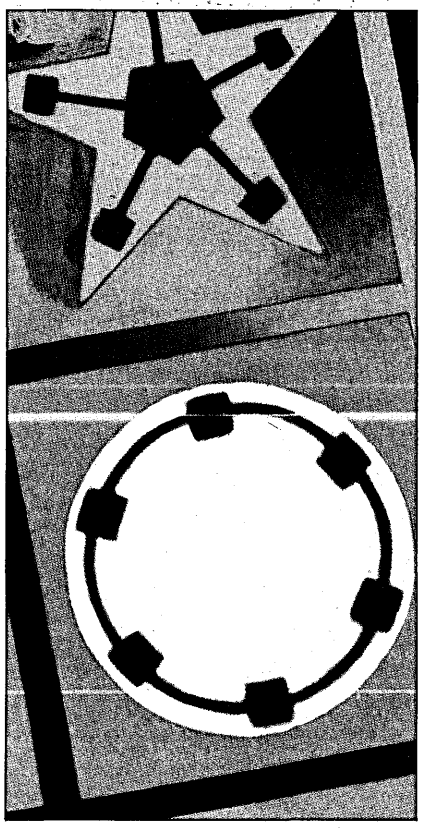

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3-D COVER ILLUSTRATION BY KATHY JEFFERS/PHOTOGRAPH BY WALTER WICK

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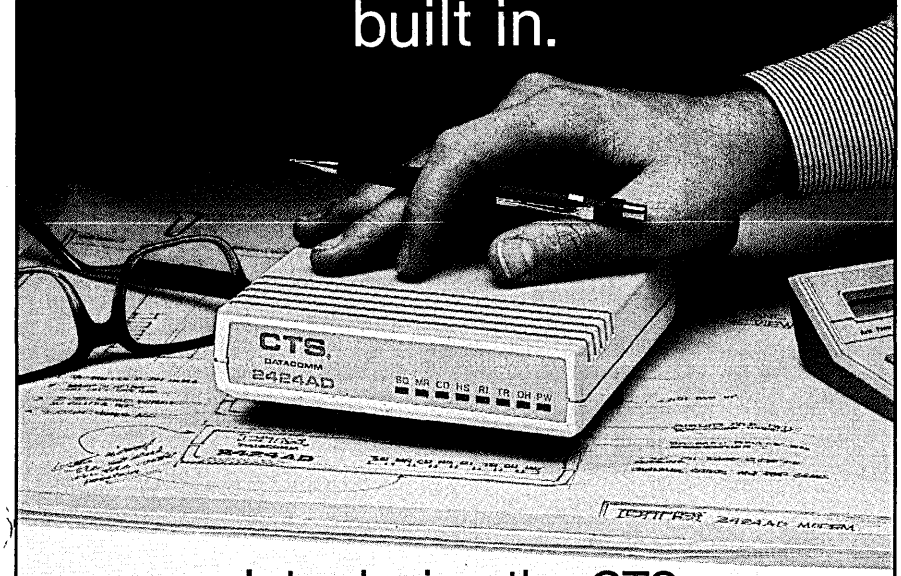

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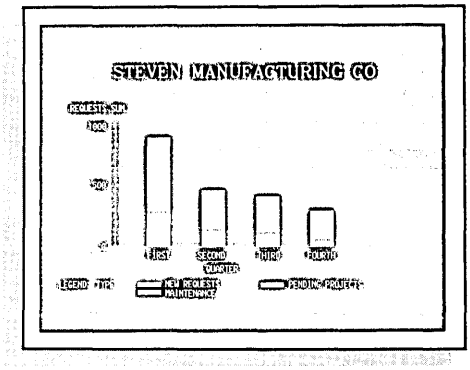

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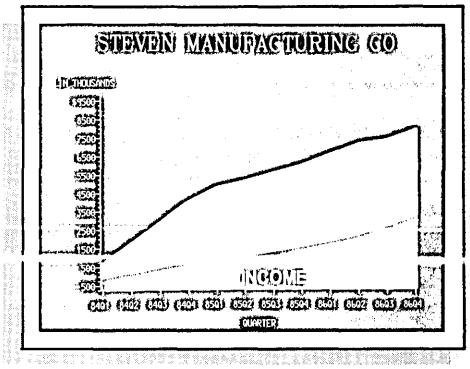

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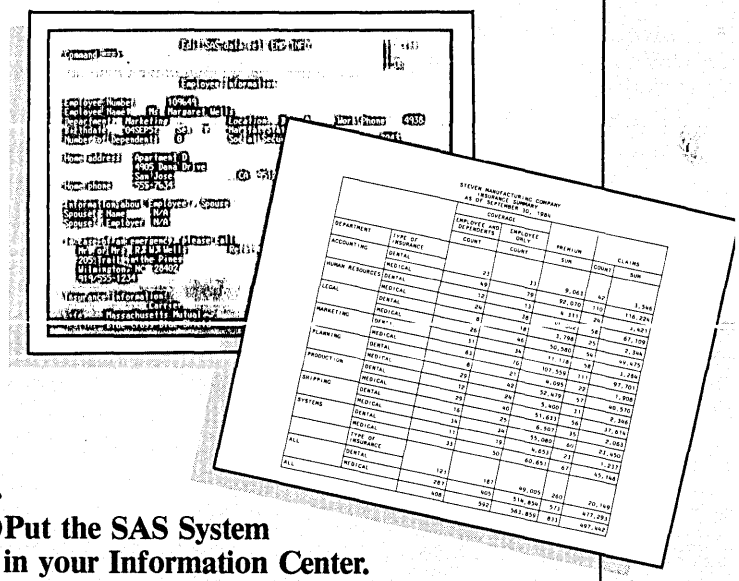

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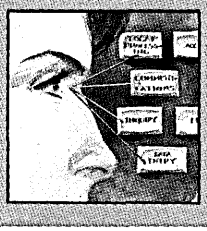
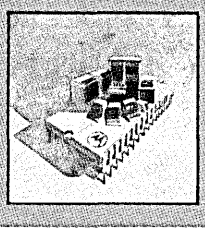


1977 Four-Phase introduces VISION software for the 4000 Series of office information systems. A first in the industry, this high-functionality, interactive data entry software enables users to select features appropriate to their applications, and to perform data entry and central inquiry simultaneously.



1982 Four-Phase Systems joins Motorola, Inc. Now, we are one of the few companies in the world to provide vertical integration of electronic technology. Together, we offer the most advanced family of microprocessors powering a range of complete office systems.

Anything less than a complete solution is no solution at all.

So why use anything less than Motorola/Four-Phase?

One third of the Fortune 500 relies on office information systems from Motorola/Four-Phase. When these companies need office information systems, they can't settle for partial solutions. They demand it all—hardware, software, service, leadership. All vital elements of the complete system solution. Few suppliers can meet that demand, year after year. Motorola/Four-Phase can.

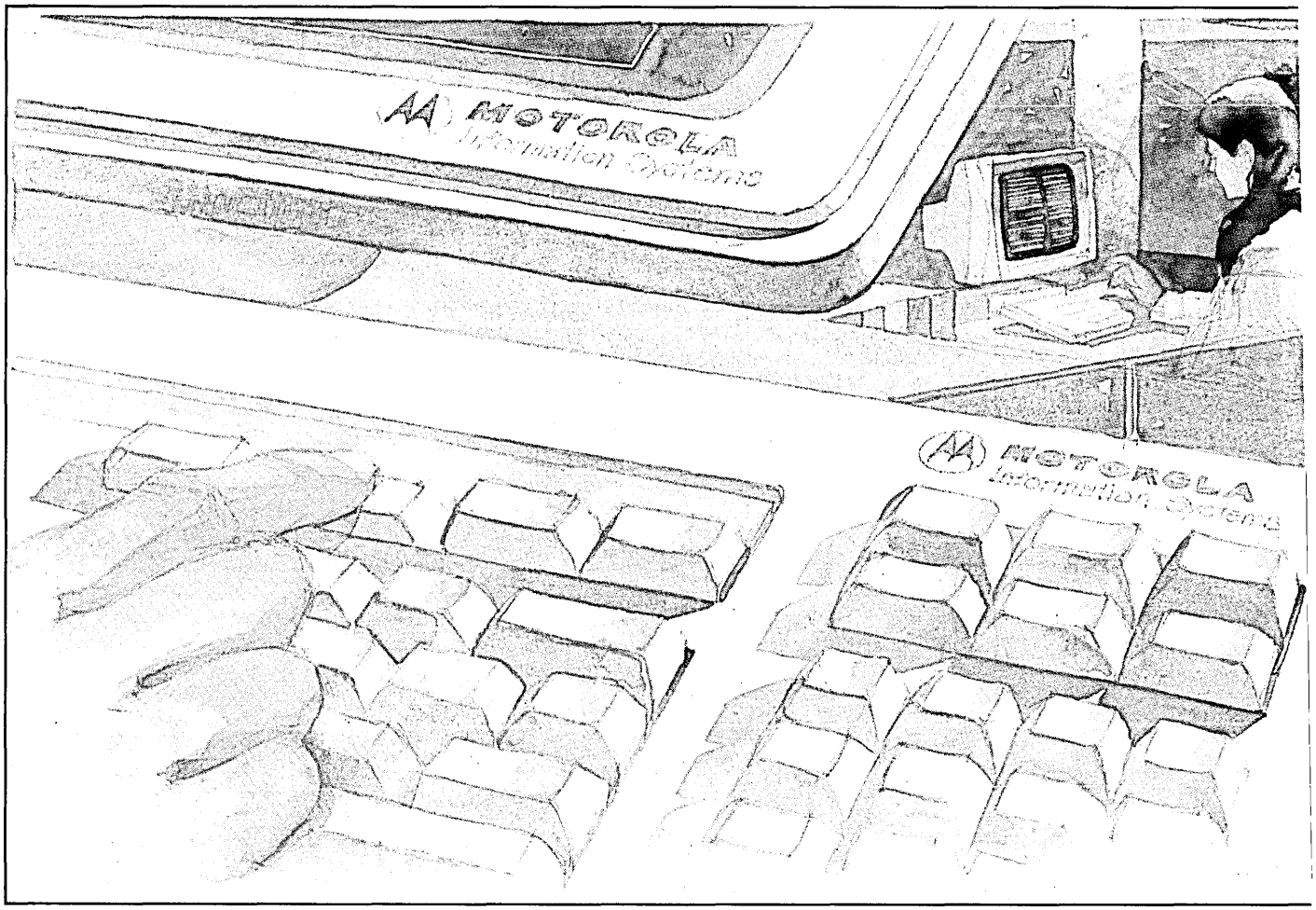
Solution Part One: Hardware

Motorola/Four-Phase has been setting milestones in advanced hardware development for over 15 years.

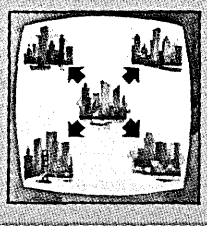
We pioneered distributed data processing in 1971 when we introduced the first all-LSI computer. Now, with our new 2000 and 6000 Series, we're among the first to incorporate the powerful Motorola MC68010 microprocessor. We provide complete systems—processors, workstations, communications and peripherals.

Solution Part Two: Software

We've invested the necessary resources to bring you one of the largest software product lines in the industry—a multitude of tools, languages, and applications programs. Software designed to provide reliable, high-performance solutions, like advanced interactive processing provided by VISION®; and user-friendly access



1983 Motorola/Four-Phase establishes one of the first comprehensive hardware and software service organizations. A phone call to our centralized Customer Support Center will put one of our highly trained field engineers at your service. Anywhere, seven days a week, day or night.



1984 Motorola/Four-Phase continues to provide hardware/software advances with enhancements to the 2000 Series of communicating desktop computers. The Series now features UNIX, the 68010 MPU, SNA and new high-capacity Winchester disks, making it ideal for large companies with data networks at remote office sites.

provided by our UNIX*-based UNIVIEW.™ We've designed our software to help you make maximum use of our systems.

Solution Part Three: Service

Other office system suppliers have tried to emulate our award-winning Customer Support Operation. That's understandable. It's a centralized service, communications and dispatching facility that operates 24-hours a day, every day of the year. We give you hardware *and* software technical support with one phone call. You can expect quick hands-on help from any of our 1400 customer support specialists located throughout the country.

Solution Part Four: Leadership

Motorola is a world leader in advanced electronic technology. Businesses of all kinds depend on our long-term commitment to provide innovations in microprocessors, electronic communications equipment and office information systems. We meet your information processing needs today—and tomorrow, with increasingly sophisticated solutions.

Nothing less than a complete systems solution.

Before you decide on your next office information system, consider the difference between a complete solution and no solution at all. Contact Motorola/Four-Phase today at 1-800-528-6050, ext. 1599. In Arizona, call 1-800-352-0458, ext. 1599. Or write us at 10700 North De Anza Blvd., M/S 52-3B1, Dept. S, Cupertino, CA 95014.

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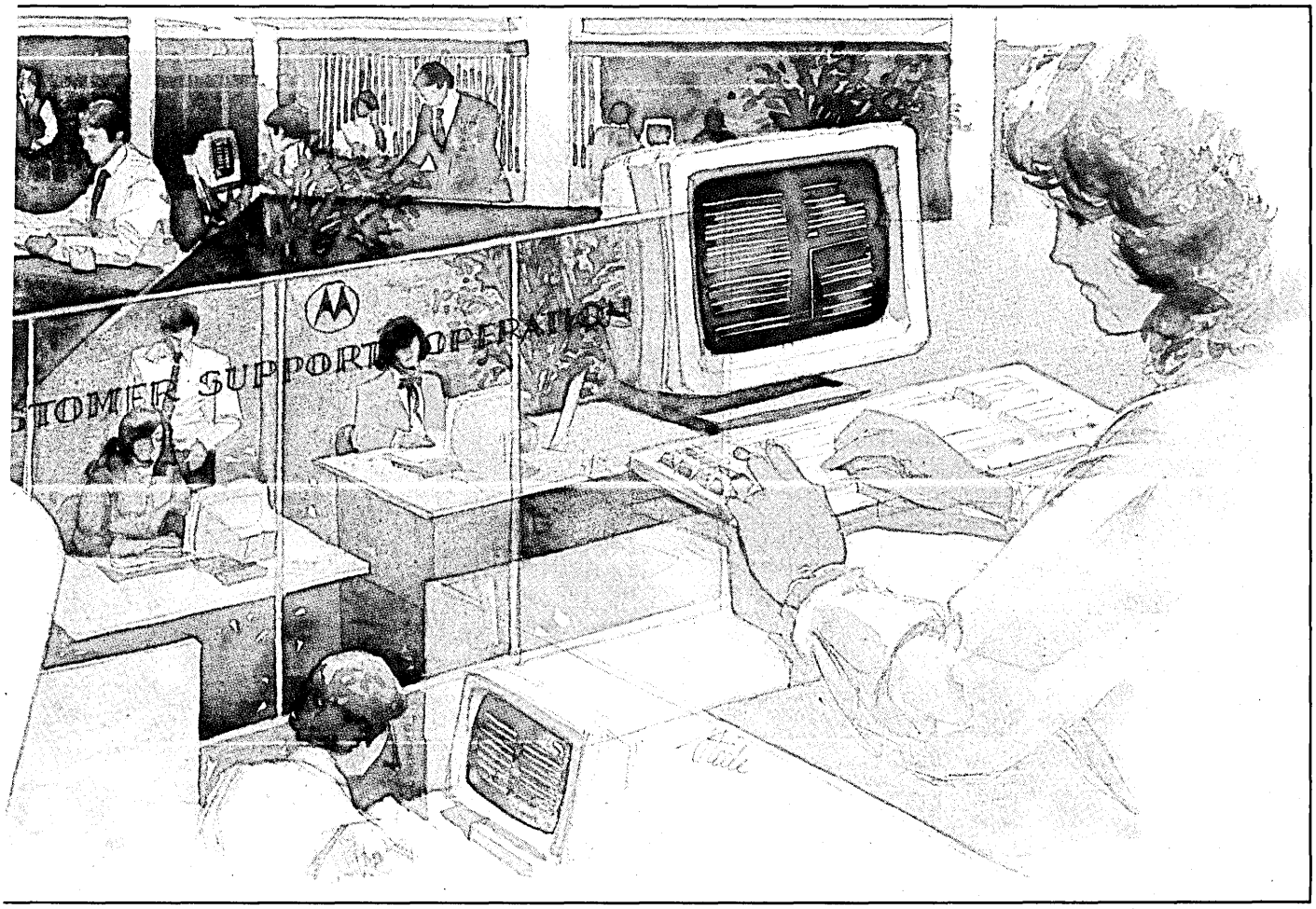

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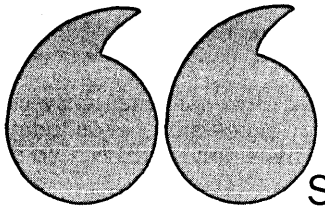
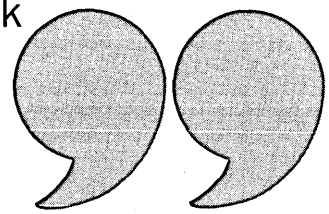


In short, System W is a mature, well-rounded product supported by years of experience in the decision support field and by a company whose reputation is above reproach. Therefore, without hesitation, we would recommend that anyone in the market for a state-of-the-art decision support system not overlook System W in their evaluation.



— Data Decisions, Cherry Hill, New Jersey, September, 1984.

More than 100 top corporations chose Comshare's System W decision support software in the last 18 months. Teamed with IBM mainframes, System W untangles the information management challenges that face business professionals. Especially the big payoff ones like performance reconciliations, problem analysis, forecasting and electronic management reporting.

Data Decisions, an independent research and publishing firm, has evaluated System W, too. And it says that companies seeking a competitive edge in business planning and analysis should put System W to the test.

You should read the *Data Decisions* evaluation before your company makes a major investment in decision support software.

For your *free* copy of the full *Data Decisions* report, call Chris Kelly at Comshare toll free: 1-800-922-SYSW (in Michigan call: 313-994-4800). Or mail your business card to: Comshare, P.O. Box 1588, Ann Arbor, Michigan 48106.

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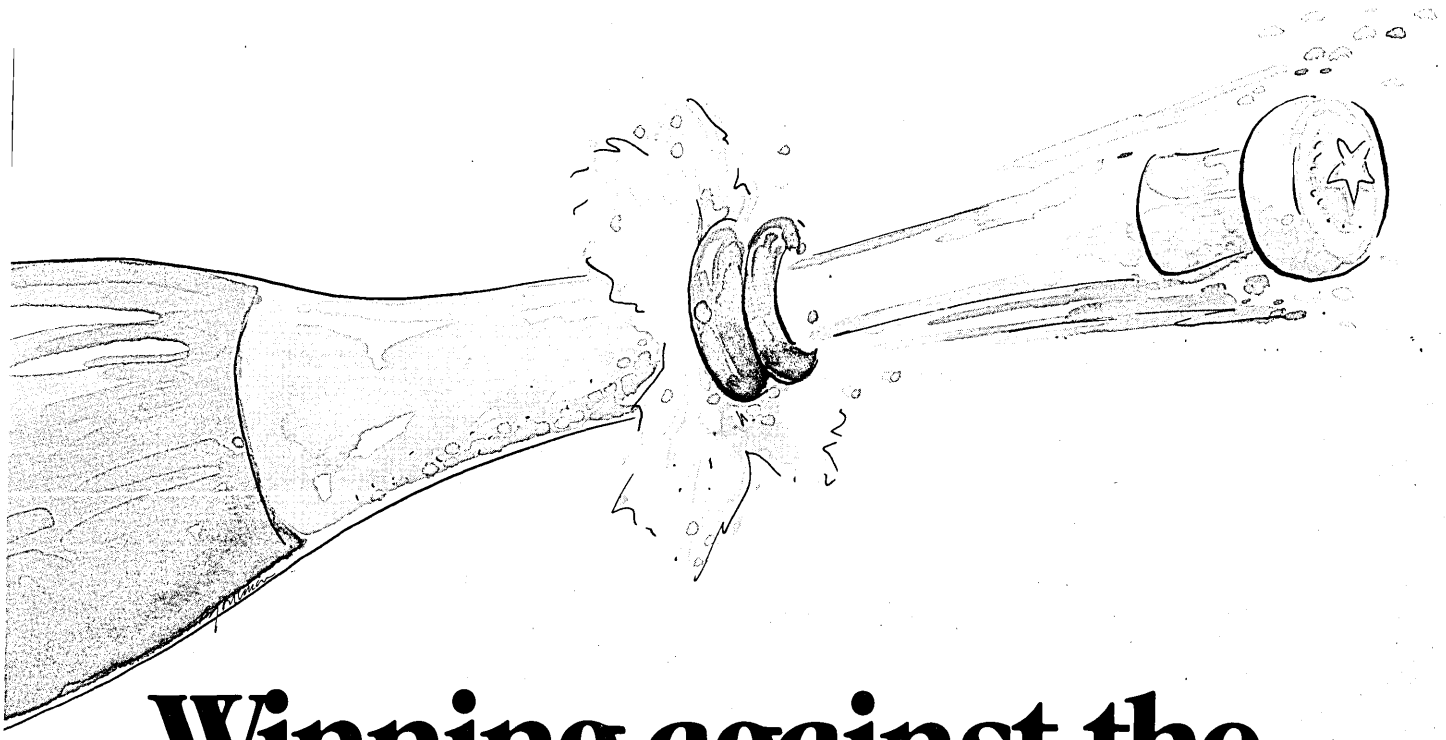
LOOK AHEAD

WANG WOES WORSEN	Following in the wake of the serious sales and earnings shortfall at Wang comes the management reshuffling and finger pointing that will further damage the company's marketing efforts. Several senior-level officials, including senior vp Robert Doretti and product planning vp Sam Gagliano, have new jobs or new bosses as cofounder An Wang and president John Cunningham turn the company upside down in hopes of shaking out more business in the critical office automation wars. We hear that founder Wang is not happy with the new abrasive ad campaign against IBM. To mend fences with angered data processing managers, Cunningham has instituted a series of breakfast meetings to try to smooth relations. This may not be enough, however, to help the shell-shocked sales organization.
CULLINET, ADR TO GAIN MARKET	Cullinet and ADR appear to be the big winners in the DBMS sweepstakes. Both companies are expected to increase their shares in the market for mainframe DBMS for IBM hardware, according to a new DATAMATION/Cowen & Co. survey of 4,400 users. Over the next two years Cullinet's market share for IDMS and IDM/R will increase seven percentage points, to 24%, while IBM's share, including IMS, DL/1, DL/2, and SQL, will decline from 41% to 33%. ADR's Datacom/DB will attract 17% of the responding 3033/308X sites over the next two years, up from 4% now. Software AG's ADABAS will lose market share over the next few years, going to 2% from 5%.
CRAY-LIKE CPU WITH GA AS CHIPS	Another Crayette has been conceived. Development of a 64-bit, high-speed computer with Cray-like supercomputer performance is under way. An early 1986 introduction date is slated by Camarillo, Calif., startup company Vitesse Electronics Corp. The first machine will use silicon, but Vitesse's ultimate goal is to produce a gallium arsenide chip-based superbox and release it in the latter part of 1986. The company has $30 million in funding from military contractor Norton Co.
IS DOD STEALING SOFTWARE . . .	The American military is making illicit copies of microcomputer software at a level that would make the general public look as pure as Eliot Ness & Co., contends a source at a major vendor. Attorneys are investigating evidence that 4,000 pc users at one military base are using copied software. Vendors report that users of the pilfered software at military bases are adding insult to injury by calling the software help lines for assistance. Their calls led to the investigation.

LOOK AHEAD

. . . AS ADAPSO FUNDS DWINDLE?	ADAPSO's antipiracy case and campaign are taking their toll on the organization's treasury just when the going is getting tougher. More than $240,000 has been spent to date on the case and now the organization is aggressively soliciting other member companies who have not yet contributed. Meanwhile, the combatants in the piracy case against American Brands' Wilson Jones are getting down and dirty. Defenders claim that the company honestly purchased the copies of Micro-Pro's WordStar, but failed to mail in the registration forms for them. Plaintiffs claim that they have hard evidence to the contrary.
NOSE CANDY SOURS DP MARKET	There's a new item for the list of explanations for the declining state of the Silicon Valley computer industry: cocaine. Already on the list are the economy, a closed Japanese market, and the overvalued U.S. dollar. Californians are consuming five tons of cocaine annually, and approximately 30% of the valley's work force goes to work stoned each day, contends a San Jose police veteran. The plague of on-the-job drug use may also help explain the frequent occurrence of dead-on-arrival chips, disk drives, and other components. Dick Hesenflow, formerly of the Santa Clara County sheriff's office and now head of corporate drug rehabilitation company Special Management Assistance Inc., San Jose, says a valley company president requested he accompany him while walking through his factory because he was afraid of violent behavior on the part of his work force.
FREE ACCESS TO CRAY, 3084-QX	The new supercomputer centers funded by the National Science Foundation are rolling out the red carpet for users. Free time on their Crays, IBM 3084-QXs, and Floating Point Systems processors is being offered for pure research projects at the Unviersity of Illinois, Cornell, Princeton, and the University of California at San Diego. Insiders report that some data processing vendors are donating equipment in order to get in line for time, alongside manufacturers and others with heavy-duty, number-crunching research projects. Among the companies lining up to suck megaflops are Amoco, General Electric, Control Data, Xerox, Kodak, Conoco, and a host of other firms in the automotive, motion picture, and military equipment businesses. There are still several problems that have to be overcome, though. Currently the computer centers lack high-speed data communications systems. In the case of the University of Illinois center, for example, only 1,200 baud is available, which will put quite a crimp in the action. Fiber-optic data links and satellite transponders are being looked at to possibly solve the problem, but those alternatives are many months away.



Winning against the HP3000 isn't everything.

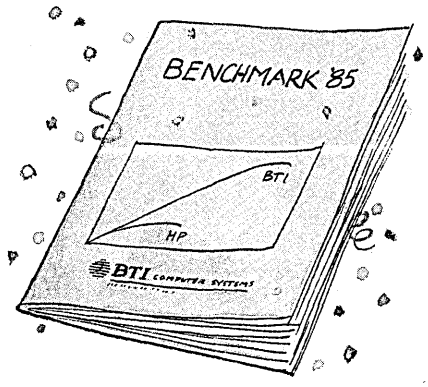
When we recently benchmarked the BTI8000 against HP's top-of-the-line Model 3000/68, we had cause to celebrate. Because the independently-audited test results proved we could outperform HP by more than three to one.

The benchmark simulated up to 250 busy interactive COBOL users, doing typical transaction-oriented DP tasks. More than 400 tests were run using several different equipment configurations, and over one million response times were recorded.

The result? With 200 active on-line users, the BTI8000's average response time was *one second*. That's more than three times the performance of the HP3000. Are there any other superminis that can demonstrate that kind of response? If so, we'd like to know about them.

But performance is only half the BTI8000 success story. The other half is its competitive pricing. At a low base price of $79,950, the BTI8000 gives you a cost-effective starting point for building just the right configuration.

Now we're ready to take on the DEC 8600, Prime 9955 and DG MV10000.



With its modular design, you can start with one 32-bit CPU. Then, as your needs grow, you can expand to eight CPUs, 24 megabytes of main memory, and 8 gigabytes of mass storage. All by just plugging in extra resource modules—rather than having to buy a new computer.

Naturally, you can also have a full range of languages, utilities, and data management software with the system—whichever configuration you choose. Plus our 15 years' experience in supporting over 3,000 BTI computers in the U.S., Canada and Europe.

But don't take our word for the BTI8000's performance. Write for your own copy of *Benchmark '85*, which includes a comprehensive report by KMG Main Hurdman, the international consulting and accounting firm. Just send your request to: BTI Computer Systems, 870 West Maude Avenue, Sunnyvale, CA 94086; (408) 733-1122. In Europe: BTI Computer Systems (UK), Ltd., Birmingham B13 8NG, England; (021) 449-8000.

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BTI8000
32-bit Multiprocessor System

The supermini that's hard to outgrow.

CIRCLE 10 ON READER CARD

IBM ON TELECOMMUNICATIONS

Q. IF A MODEM IS A MODEM IS A MODEM, DOES IT REALLY MAKE A DIFFERENCE WHICH ONE I BUY?

A. The fact is, all modems are not created equal. For example, some modems are better signal processors than others. And these superior modems can make an important difference in your total network performance. A difference that can lead to important savings in telecommunications costs.

Q. How can a modem make a difference in my telecommunications costs?

A. The primary purpose of a network is to move information to and from end users and thereby improve their productivity. And a superior modem can improve the performance of your network in at least four areas: It can make your network more reliable. Give your end users faster response times. Minimize the time you and your people spend on network management. And a superior modem can also save you money in line charges.

Q. What makes a superior modem?

A. As you know, a modem converts a data stream into a signal that can be sent (usually over a phone line) from Point A to Point B.

Now that may sound simple enough, but there are a number of variables in that seemingly simple scenario. Such as, what's the distance between Points A and B? What's the line between the points? What's the condition and stability of the line? And many, many more. The point is, each variable carries technical implications that affect the design of the modem. And simply stated, a superior modem enjoys a superior design.

Q. Be specific. How can a superior modem save my company money?

A. Let's face it, modems are not the most expensive part of your telecommunications network. Chances are, line charges are. If you design a modem that can send data more reliably, then that modem can begin to affect your line charges. Every time a modem has a "hit," or an unsuccessful transmission of data, the data must be retransmitted, slowing down response time. The net effect is a reduction in the amount of information carried by the network.

If you use superior modems that give fewer hits, you'll have lower line costs per data unit transmitted and better throughput. Better throughput translates into time and cost savings.

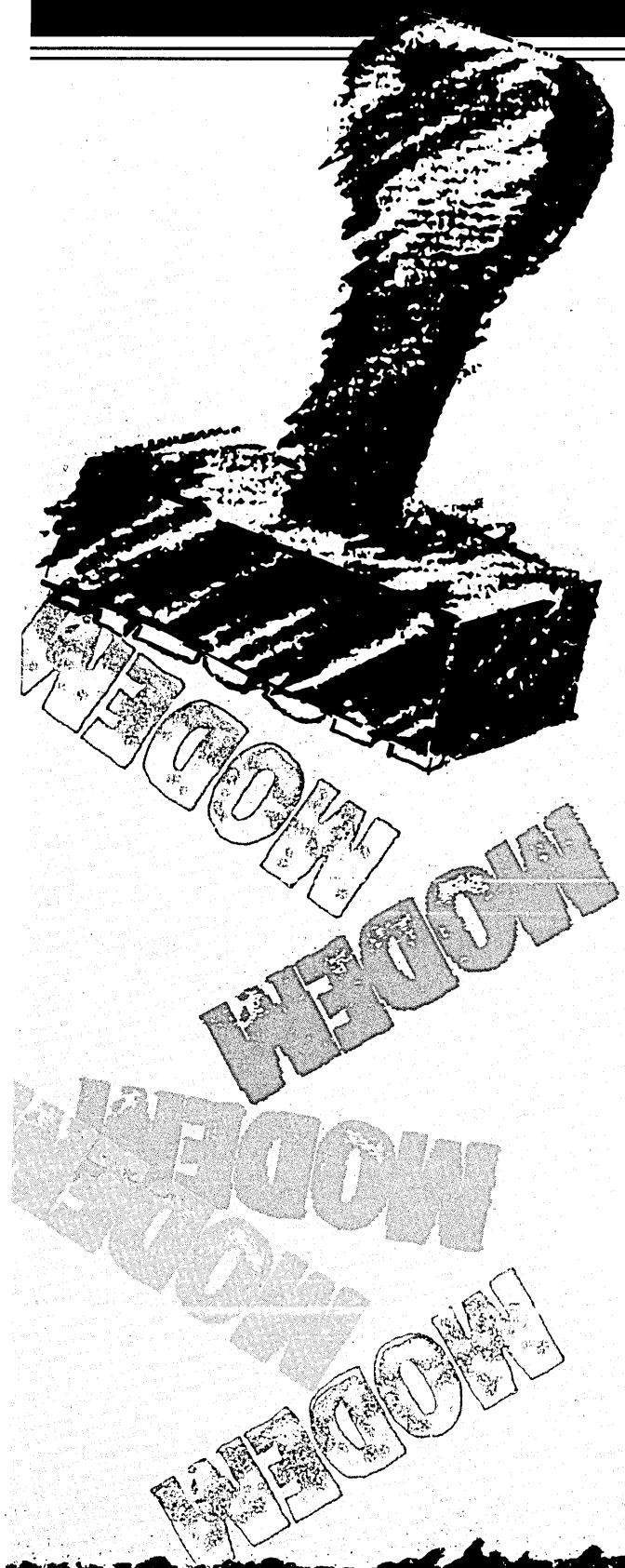
Q. Can a superior modem correct the problem of faulty lines?

A. A superior modem can go a long way toward compensating for poor line conditions—and thus make marked improvements in the hit rate.

Take the IBM 3865 Modem, for example. It contains a custom microprocessor with an advanced algorithm that in effect enlarges the target area of acceptable transmissions. The result is that this reliable 9,600 bps modem can operate very effectively over unconditioned lines. Now imagine all the line conditioning charges you won't have to pay your common carrier.

Q. How can I go about proving the superiority of IBM modems?

A. Take your most troublesome line and put IBM modems on it. We believe you'll see an



impressive improvement. Which leads us to another benefit of superior modems—you'll spend less time troubleshooting your network simply because line conditions that once were considered problems aren't really problems any more.

There are a number of other good reasons why you should consider IBM's line of 2,400, 4,800 and 9,600 bps stand-alone and rack-mounted modems. Not the least of which is that we've recently announced two new modems—the IBM 3833 and 3834—which feature lower prices, smaller packaging and improved serviceability. And like all IBM modems, they can fully utilize IBM's Communication Network Management capability.

The New IBM Modems

	IBM 3833	IBM 3834
Transmission Speed (bps)	2400 (full speed) 1200 (half speed)	4800 (full speed) 2400 (half speed)
Compatibility	3833, 3863-1,* 3868-1	3834, 3864-1,* 3868-2
LED Diagnostic Indicators	standard	standard
Communication Facilities	4-wire, point-to-point or multipoint	

Both modems operate over nonswitched telephone lines that can be leased (common carrier or PTT) or private.

*Must be in native mode. For full diagnostic capability, must be equipped with the Extended Diagnostic feature.

What's more, we've also recently lowered the prices of the IBM 3863, 3864, 3865 and 3868 Modems by as much as 29 percent. And there are also volume discounts available. If you're looking for modems that offer reliability, can improve end user productivity and are competitively priced, talk to your IBM marketing representative.

If you would like to receive a free brochure on IBM modems, call 1 800 IBM-2468, Ext. 82. Or use the coupon below. After all, it pays to be informed, because not all modems are created equal.

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☐ Please send me a free brochure on IBM modems.
☐ Please have an IBM marketing representative call me.

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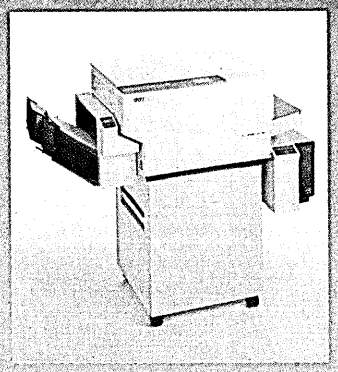
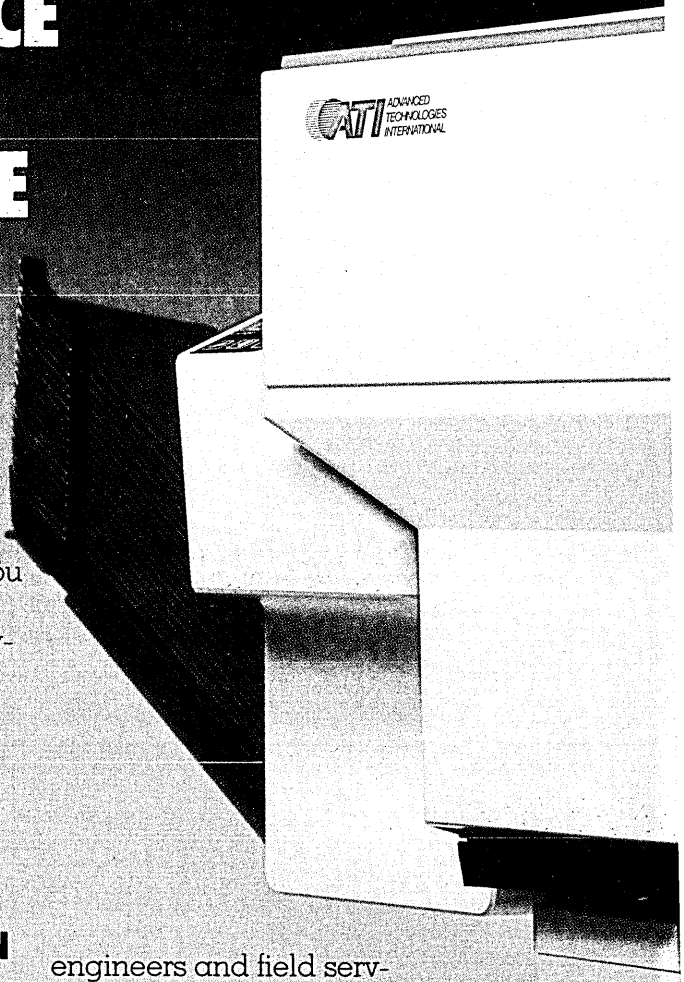
CIRCLE 11 ON READER CARD

LaserPRINT™ 2670 FROM ATI.

AT $12,900, IT'S THE MOST AFFORDABLE ADVANCE IN QUALITY AND COMPATIBILITY SINCE THE WHEEL.





If your printer has become a computer productivity bottleneck, unplug it.

And plug-in a new ATI LaserPRINT 2670. Within minutes you can go on-line with the crisp letter quality and proven reliability of state-of-the-art laser printing.

That's because LaserPRINT 2670 is fully plug-compatible with your IBM, DEC, and other major computer systems.

LaserPRINT 2670. IT COULD BE THE MOST COST EFFECTIVE WAY EVER DEVISED TO GET MORE OUT OF YOUR COMPUTER.

From the moment you plug it in, you get more out. The LaserPRINT 2670 gives you laser-sharp text up to **26 pages a minute.** (That's 20 times faster than most daisywheels.)

And LaserPRINT 2670 gives you something that no daisy-wheel can—detailed graphics, instant forms merged with variable data—even customized signatures and logos.

HERE'S THE MOST GRAPHIC COMPARISON OF ALL—THE PRICE.

You can get a LaserPRINT 2670 for a surprisingly low $12,900. That's thousands less than any comparably equipped laser printer on the market.

For a little extra you can upgrade your printer with custom typefaces, add-on graphics, and high-volume paper feeding and sorting attachments.

When you buy a LaserPRINT 2670, you're plugged-in to the ATI customer service network. Our staff of application engineers and field service technicians have only one job—to keep your system up and running.

So call ATI now and ask us for all the details on the new LaserPRINT 2670.

And stop spinning your wheel.

(408) 748-1688. In California (800) 421-7403.

ATI

Advanced Technologies International

2041 Mission College Boulevard
Santa Clara, CA 95054

CIRCLE 12 ON READER CARD

LETTERS

A COMPLIMENT

Every now and then you folks at DATAMATION turn out a whiz-bang issue. Such was your Feb. 15 issue. It was a delight—filled with, among other things, the genius of Dijkstra (p. 86), the lucidity of David Dee on the dynamo that drives the pc revolution (p. 112), and the sharp wit of the anonymous author of "DISOSS: The True Path to Enlightenment" (p. 120). I haven't laughed so hard in years.

The highest compliment I can pay you for this continued editorial excellence is that I allocate time to read your magazine. I am sure that others who care about this field and its future do also.

THOMAS F. DEAHL
Proprietor and Principal Consultant
MICRODOC
Philadelphia, Pennsylvania

OFF BALANCE

I was appalled at the article that appeared in the Feb. 15 issue (p. 64), "Bean Counters Attack!" The article not only made no attempt at balance but was factually incorrect in covering the accounting issue facing the computer software and service industry.

First, to suggest as the author does that a position taken by the ADAPSO membership for 10 years and widely publicized during that time period (including articles in DATAMATION) was not representative of the industry's desire and interests is ludicrous. ADAPSO's policies are developed by the membership and carried out by the staff. Our position on this issue has been repeatedly confirmed by the overall ADAPSO Board, representing a cross section of industry interests, the board of ADAPSO's Software Products Section, and the ADAPSO Financial Practices Committee. ADAPSO took methodical steps to solicit comments from the industry through the entire process. Your reporter was made aware of this in his interview with our director of research.

Second, the article stated that 60% of the response received by the Financial Accounting Standards Board "opposed capitalization." To the contrary, many of the responses were opposed only to the specific implementation embodied in the FASB Draft Paper, not capitalization per se.

Third, Cullinet's assertion that capitalization for accounting purposes will spread to federal taxation may be its opinion, but it is not necessarily fact. Virtually all industries are allowed to capitalize certain development costs for accounting purposes while taking those same development costs as a current expense for tax purposes.

Finally, the article contains editorial comments such as "since the association presumably speaks for its members" and "the dispute has damaged ADAPSO's relations with the industry." These inflammatory remarks do a disservice to the effort to develop a responsible industry position in a complex and important area.

The computer software and services industry wants to have a simple fact recognized—software is an asset.

JEROME L. DREYER
President
ADAPSO
Arlington, Virginia

UNDERSTANDING MISUNDERSTANDINGS

Some people make excellent careers based on "misunderstandings" ("Fruits of Misunderstanding," Feb. 15, p. 86), According to Dr. Edsger W. Dijkstra:

- "It is a long history of castles in the sky . . . ."
- "The brutal fact is that a large part of the history of computing can be written in terms of multimillion dollar projects that failed."
- "There is a further aspect in which computing science, when regarded as a branch of mathematics, differs from most of the precomputer mathematics."

Thus these few quotations taken from your window dressing of EWD compound the average reader's "misunderstanding" of programming. To an analytical computer designer, however, EWD is underwhelming.

Yes, indeed, we are building castles in the sky—with the help of computers. Soon, they will be complete manufacturing plants. A "failed" project is *never* literally a failure, because it leads to new projects that correct the errors previously made. While EWD feels frustrated with the iterative mode of design, other thoughtful designers incorporate it into CAD, CAM, and CAE to facilitate our thinking (but not replace it). This even applies to strictly programming work, i.e., development of expert systems with precisely designed artificial intelligence. This is made possible by use of real intelligence, and no matter how much Barnum-type advertising may have clouded the credibility of expert systems, they are in the forefront of rapid development of AI. This is being done simply by applying a lot of hard work to formulate specific knowledge domains with real intelligence. Misunderstandings and mistakes are taken care of in due course.

FREDERICK MARICH
Consultant
Amdahl Corp.
San Mateo, California

I compose this letter with hesitation, not wishing to question the considered opinion of such an authority as Dr. Dijkstra in anything but a positive way.

I must, however, take exception to some of his ideas. He states that "a program is not subject to wear and tear, and requires no maintenance." This is difficult to accept. Certainly, it is true that programs physically won't wear out, but they usually do require "informational" maintenance to keep them current with the environment in which they operate. As an example, tax rates change and some changes must be made in tax data embedded in programs or associated tables. An analog to this is the need for a lubrication and an oil change for an automobile.

Dr. Dijkstra also appears off-base to me in his assertion that a program, "being abstract, its production is subsumed in its design." While this might be true if the programmer uses the old meth-

LETTERS

od of "designing on the coding pad," today we accept a normative programming procedure that requires design before coding. Hence, using classical flowcharting, pseudocode, or other design techniques, the programmer produces a design before writing the program in a programming "language." Dr. Dijkstra explains his position by stating, "A program is like a poem: you cannot write a poem without writing it." My interpretation of this statement is that he considers creative writing to be an inspired activity, requiring no forethought or planning. Perhaps that's true for many, but I suspect that most poets, indeed most creators of the "abstract," require some plan in order to conceive of the finished "product" before they produce it.

Finally, I must question Dr. Dijkstra's assertion that "higher quality, greater reliability, greater precision, etc., always induce higher cost." This is not always true in a physical product, nor is it true in an abstract "product" like a computer program. The fallacy in his statement lies in its lack of explicit indentification of the type of cost he is referring to in this statement. Economists (and accountants) identify two basic types of costs when assets (or "products") are involved. These are the acquisition cost and the operating cost. While it may be true that higher quality, etc., costs more to acquire, ofttimes higher-quality products will cost less to operate. One analog should suffice here. If I buy a Mercedes Benz, I will probably experience lower overall operating costs than if I buy a Volkswagen, assuming both are run until they are worn out.

Let me finish by stating that I enjoy the writings of Dr. Dijkstra. His contributions are without peer in the area of computing thought. However, from the viewpoint of one who both teaches and practices in the commercial dp world, some of his ideas need to be further explained and clarified lest another revolution go unheeded by practitioners.

FRANK M. WHITE
Chairman
Computer Information Systems
Catonsville Community College
Baltimore County, Maryland

ON OUR WAY

Congratulations on your article "Dp and the Disabled" (Jan. 1, p. 22). Many of us have always felt that there are quite a few opportunities in the information processing industry for physically handicapped people, but, as you point out, there are still impediments to full realization of that promise.

As far as training and placing the handicapped in data processing, in addition to Disabled Programmers Inc. (which you mentioned) and several others, I'd like to call to your attention a very unique program called Business Information Processing Education for the Disabled (BIPED) in Stamford, Conn., and White Plains, N.Y. It is a nonprofit company that conducts a one-year training course in programming for severely disabled, funded purely by corporate and individual donations and managed by executives of the supporting companies. BIPED accepts absolutely no public funds. It has been in operation for four years and graduates 20 to 25 students a year. Our primary source of funds, computing power, data transmission facilities, equipment, and management expertise are provided by sponsors, which include several of the major companies in the data processing business.

Although our industry has some way to go yet to fully tap the talent resource represented by the physically handicapped, we can certainly be proud of BIPED and similar efforts to accomplish this goal.

GEORGE J. HEFFERON
Director, Corporate Computing
& Telecommunications
Perkin-Elmer Corp.
Wilton, Connecticut

WEDDED BLISS

Regarding your story titled "It's EDS vs. Xerox at GM," (Feb. 1, p. 32), I'd like to point out that over the past months, we at Xerox Computer Services had the opportunity to work firsthand with Electronic Data Systems in a large, complicated selling situation at General Motors Delco Remy. We found the EDS staff to be, first and foremost, concerned about servicing its customer, Delco Remy. The EDS people we met are tough, hard negotiators, but fair in every respect. It has been a pleasure working with them. Had we not received the order, it would not have been because they didn't give us a fair shot at the business.

We're looking forward to a long and mutually successful relationship with EDS.

WILLIAM V. FELLO
President
Xerox Computer Services
Los Angeles, California

NO DOUBT ABOUT IT

In your World Watch column (Feb. 15, p. 81) under the heading "Reykjavik, Iceland," you put a question mark on IBM's sincere interest in implementing the Icelandic character set on the IBM PC.

The selling of the IBM PC started in Iceland in April 1984 with full Icelandic character set. Compared to its reception in Europe and even the U.S., the IBM PC has been very well received in Iceland. We hope this will relieve your doubt about IBM's interest in the Icelandic character set and language.

GUDMUNDUR HANNESSON
Marketing Manager
IBM
Reykjavik, Iceland

POLITICS ASIDE

Nice going, DATAMATION! That sure was a nifty article all about helping our good friends in Nicaragua use computers (Feb. 15, "Message from Managua," p. 127). Maybe next month you could do a neat article about helping the Soviet troops in Afghanistan decide which village to gas next with the help of IBM Personal Computers.

WILLIAM F. ZACHMANN
Corporate Vice President, Research
International Data Corp.
Framingham, Massachusetts

Allow me to express my surprise and disgust. I'm referring to the article "Message from Managua" by Marcy Darnovsky. Over 90% of the article consists of propaganda in favor of the "social experiment" promulgated by the new, but again just another totalitarian regime in Nicaragua and their friends at TECNICA. Haven't we seen identical "social experiments" elsewhere?

I don't think that the majority of DATAMATION readers look to your magazine for that type of journalism.

L.J. FANTA
Orlando, Florida

I found the article "Message From Managua" very interesting. I commend you for choosing to publish an article on such a controversial subject.

JOSEPH SCHOENBERG
New York, New York

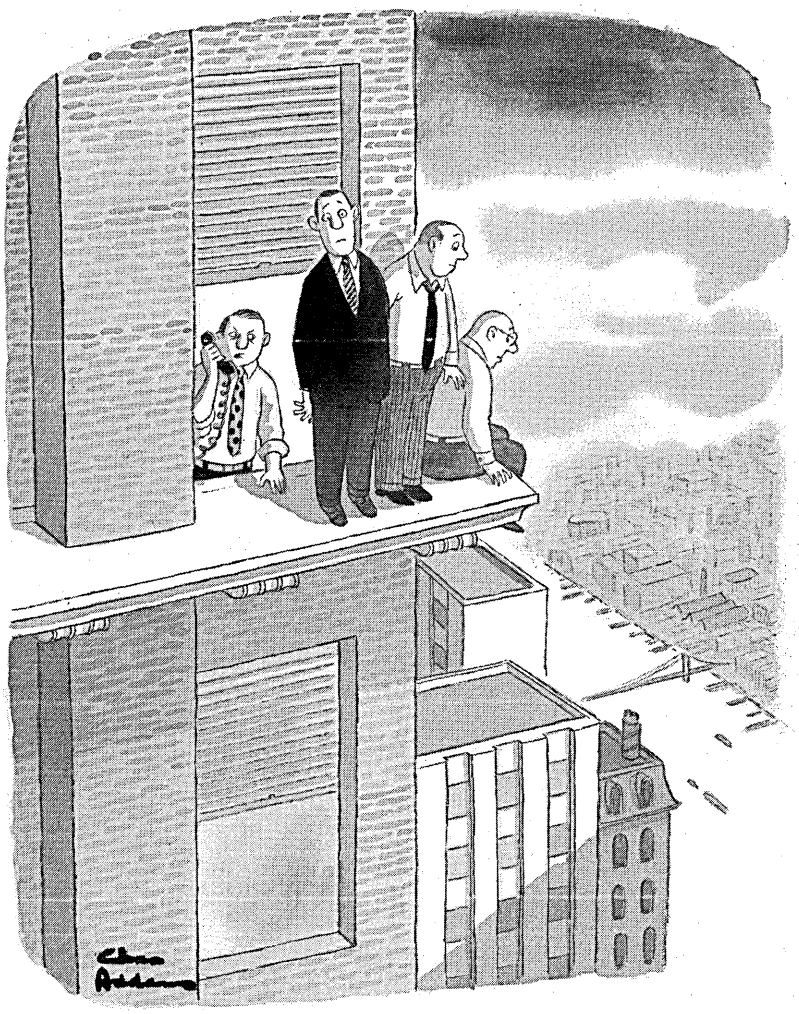
CLARIFICATION

In reponse to "Last Chance for NT" by Karen Gullo (Feb. 15, p. 60), your readers may appreciate some elaboration and clarification on our Meridian DV-1 Data Voice System.

A typical Meridian DV-1 system costs $47,000. It includes 8 Meridian M4020 workstations with integrated voice, data, text, and graphic capabilities. It is a system comprised of shared minicomputers in small cabinets as well as desktop terminals.

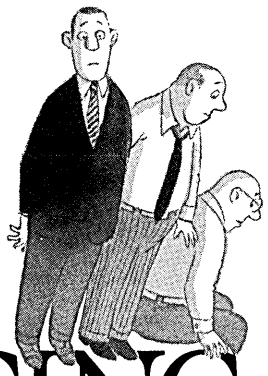
As always, success in the marketplace will tell the tale. Northern Telecom is confident that our new Meridian line of products will be a dramatic success.

DAVID A. TWYVER
Vice President
Terminal Systems
Northern Telecom
Minneapolis, Minnesota



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

ADR® ANNOUNCES THE AUTOMATION OF THE AWESOME CONVERSION PROCESS.



INTRODUCING THE ADR/DL1 TRANSPARENCY.™

THE BRIDGE OUT OF DL/1.

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

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

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

That's why we invented Migration Software.

ADR MIGRATION SOFTWARE. MOVE AHEAD WITHOUT FALLING HOPELESSLY BEHIND.

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

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ADR TEACHES YOUR OLD DATA NEW TRICKS.

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

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

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With the ADR/DL1 TRANSPARENCY, ADR begins a new era—software that allows your system to evolve with new technology.

So, if you've been using DL/1 or IMS/DB and have been waiting to take advantage of the new relational technology, but were concerned with the overwhelming problems of replacing all your old data and applications, mail us the coupon. Or call 1-800-ADR-WARE.

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Computer Equipment_____

DM 5/1/85

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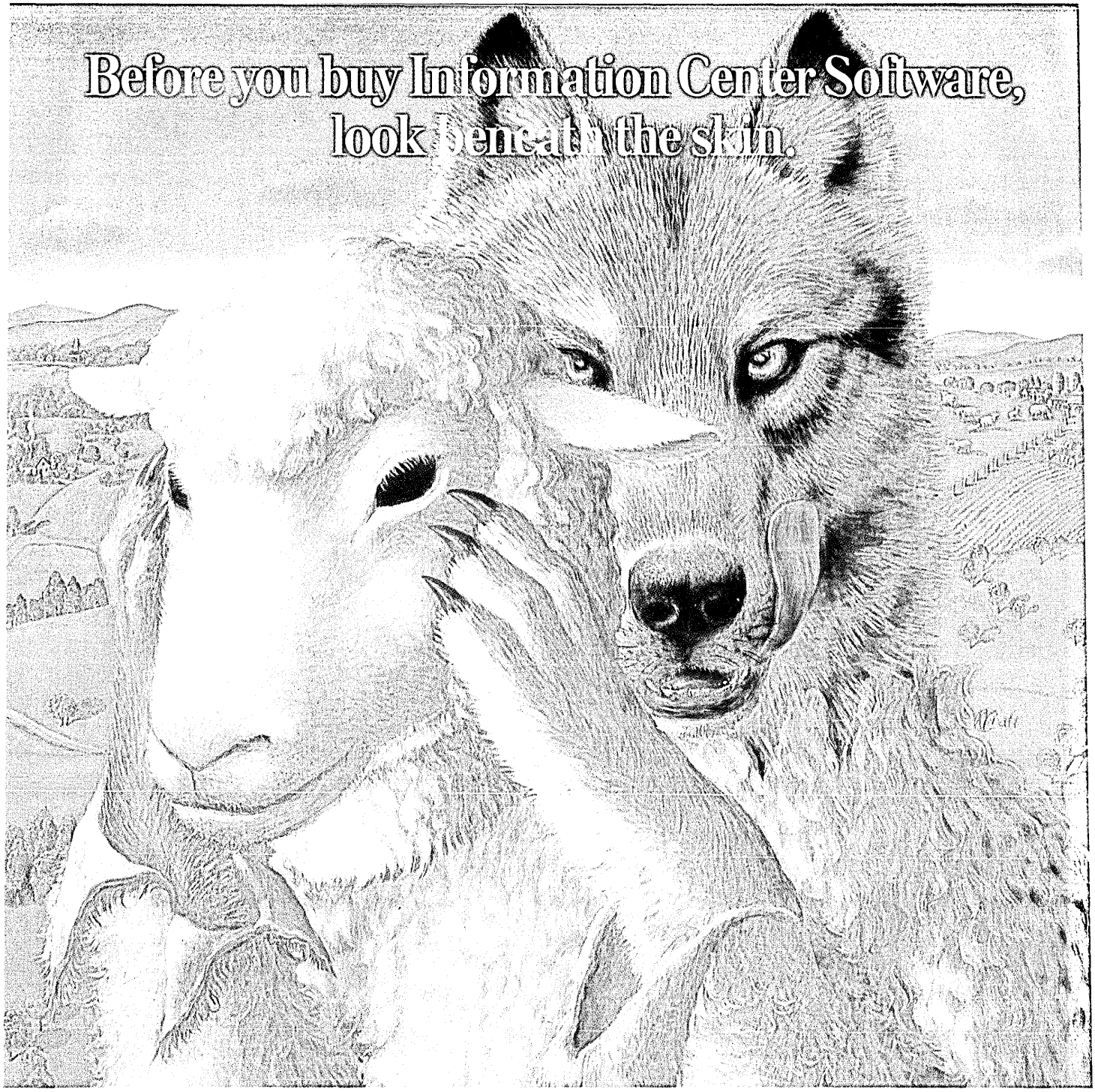
CIRCLE 13 ON READER CARD

Before you buy Information Center Software, look beneath the skin.



INQUIRE®/Information Center:
The long-term software solution.

Information Center software always promises to help you, not hurt you.

But the reality is that this kindness is killing a lot of users.

In some cases, the software seems gentle as a lamb at the beginning, but murders you with inefficiency as soon as you add users or share data.

In others, the language alone is so complicated that it scares off end users before they start.

But with INQUIRE/Information Center, you can have the best of both worlds: a fast, smooth start. And steady, easy growth.

INQUIRE/Information Center offers a powerful, integrated set of tools for both beginning end users and MIS professionals. Beginning users create their own reports through simple fill-in-the-blanks screens—without having to learn a language. MIS professionals use more advanced facilities for specialized application development.

And beyond meeting immediate needs, INQUIRE/Information Center can expand into a comprehensive system encompassing text management and multi-user relational DBMS for both mainframes and PCs—the kind of system that makes an Information Center a true corporate resource.

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For more information call or write Infodata Systems Inc. 205 Leesburg Pike, Falls Church, Virginia 22041. (800) 336-4939. In Virginia call (703) 578-3430.

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CIRCLE 14 ON READER CARD

Rebecca S. Barna, Editor

EDITORIAL

OUTFITTING THE ORGANIZATION

ILLUSTRATION BY DORIS ETTLINGER

In these days of high fashion even the most expensive designer suit will end up gathering cobwebs in a closet if it isn't the right fit. Getting the right fit for the right functions is even more crucial in the high-tech realm, where until recently the industry and not the user has dictated the fashion to be followed.

Somewhere out there in hardwareland there are indeed systems that suit the user's needs. More thought is going into tailoring technology to meet the individual needs of individual user departments. Still more thought, however, is needed to get a better fit between the organization and the technological environment it must, by necessity, operate in.

The market is jam-packed with a plethora of products purporting to solve the departmental dp problem. The market battle that's brewing around those products in today's companies is over the desktops in those departments—what wares should go where and what should connect to what.

Two main factions have emerged in this battle for the desktop, as Omri Serlin points out in "Departmental Computing: A Choice of Strategies" on p. 86. First there is the "one person, one computer" camp that advocates locally networked personal computers. Then there's the multi-user system approach, which usually translates into dumb terminals linked to a central computer. And of course there are also middle-of-the-road alternatives that claim to deliver the best of both worlds.

But that best world should be determined by the departmental users themselves. "Users," notes Serlin, "are beginning to appreciate that the selection of one or the other approach is not merely a technical issue. It is principally a strategic decision that should be guided mainly by the type of applications and the nature of the computing environment that the buying organization expects to maintain in the foreseeable future."

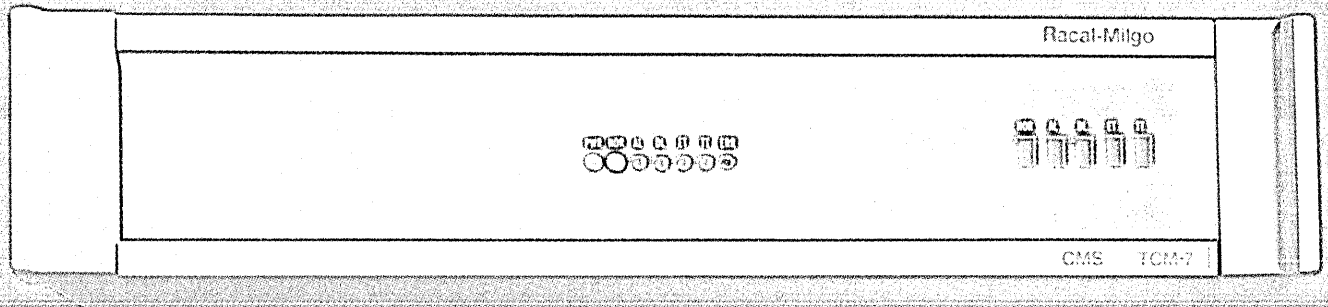
The starting point, then, for making the decision about workstation wares should be at the applications level. The fanciest terminal with the fanciest functions will merely gather dust on the desktop if actual applications needs are not addressed. These application needs are inextricably intertwined with the end user's work patterns and requirements. The overall organizational structure must also be taken into account if the efficiency payoffs promised by information processing are to be realized.

The way an organization works determines the way technology works inside that organization. Too often it's been the other way around. As a result, some end users have ended up with throwaway technology that is of no use to them or the companies they work for. There's no room for retrofits when it comes to implementing technological solutions in today's business world.

In many ways, the personal computer was the catalyst that spurred demand for departmental computing. Pcs have in fact pushed processing power further out in the organization. Now the nouveau knowledgeable are willing to tackle whatever technological solution will allow them to connect up to their cohorts and to corporate databases. What that solution is depends on many factors, not the least of which is the organization's existing investment in equipment and software.

Departmental computing must serve three separate but interrelated clients: the organization as a whole, which wants to improve productivity; the department, which wants to get its functions under control; and the individual end user, who sees the new technological tools as a way to improve personal effectiveness and career prospects.

When it comes to technology, there is no one-size-fits-all solution. To dress for success, the organization must outfit its departments in a style that best suits their needs. It's the technology, not the organization, that must be tailored. ◉



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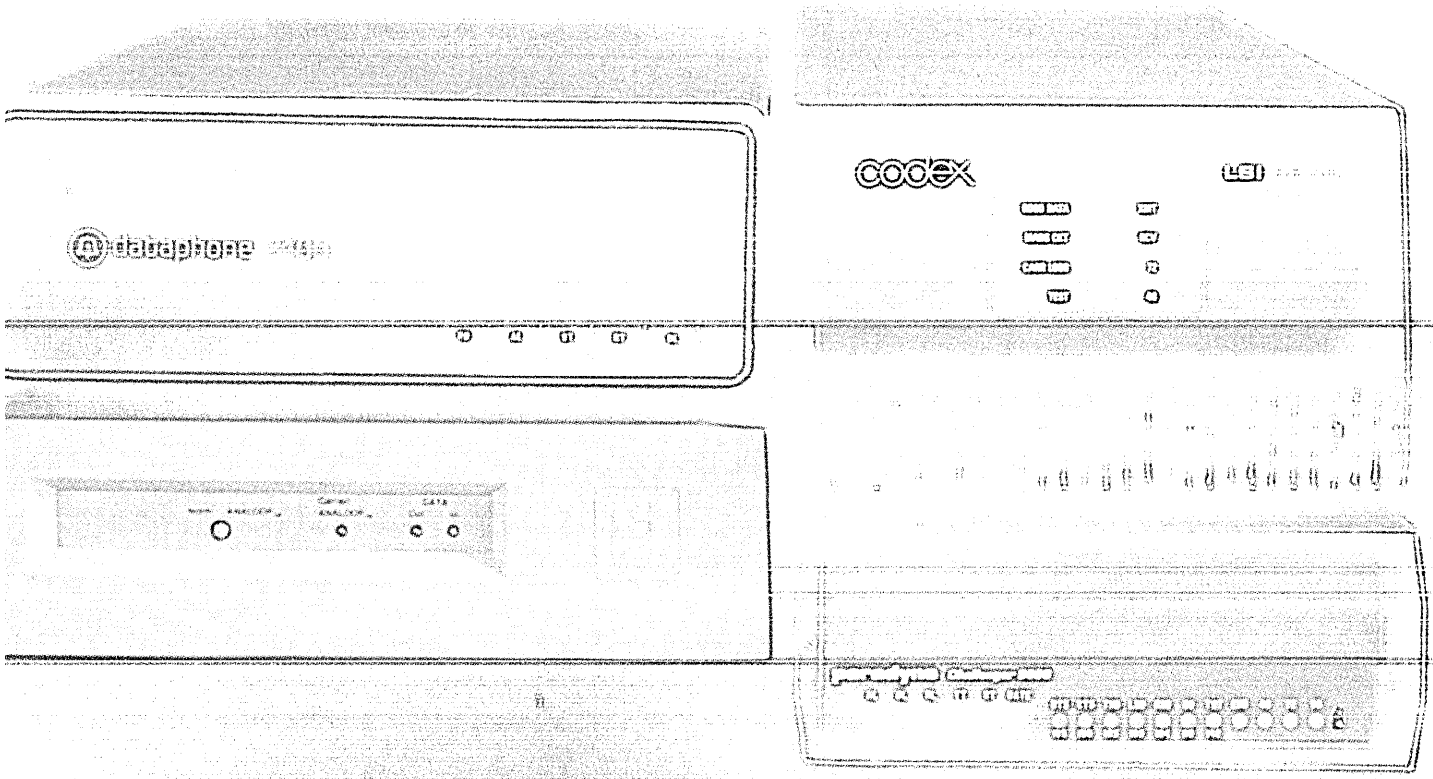

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CIRCLE 15 ON READER CARD

IN FOCUS

WISH BOOK WONDERS

Buy anything from a catalog lately? Mail order is the rage these days, and the industry spends heavily for on-line systems.

by Jessica Schwartz

Whether it's the call of the wild—mountain gear—or the call of the future—the latest electronic widget—that beckons, mail-order firms provide it. The mail-order customers just put their feet up on coffee tables by firesides all across the country, lazily leaf through catalogs, make their selections, and telephone or mail their orders. No need even to move from the overstuffed living room chair.

It makes a cozy picture. While for the customer it may be that simple, for the mail-order houses it is a complex and challenging task. It is a business that could not exist without computers. Individual mail-order houses process thousands of orders daily. In the pre-Christmas season that begins as early as July and peaks in December, most mail-order or catalog companies run their computers 24 hours a day, seven days a week. And the result is approximately 3% of total U.S. retail sales.

According to the Direct Marketing Association in New York, in 1983 those orders poured in from an estimated 30% to 50% of U.S. households, in response to the 6.7 million pieces mailed out that year. During that time, the consumer sales segment of the direct mail industry alone reached the $44.4 billion mark, and an industry spokesperson estimates that figure was expected to increase by about 10% for 1984. Final figures for 1984 haven't been tallied.

That gain is due largely to a shifting society; more women are working outside their homes, creating both an increase in household income and a decrease in available leisure or shopping time.

Also, gasoline prices have risen, making the traditional shopping venture more expensive. The high cost of labor, moreover, has forced some retail outlets to trim their staffs, so the quality of customer service has deteriorated, making the efficiency of mail order even more attractive.

On the business side of things, the proliferation of small- and medium-sized businesses and the decentralization within the business environment has challenged the economics of traditional selling practices. When business-to-business mail-order sales in 1983 were combined with the consumer figures, total sales climbed to $63.5 billion, a whopping 80% increase over 1977's sales of $35 billion.

In this past year alone, about 6,500 companies provided catalogs, compared with 4,000 in 1981, according to the *Directory of Mail Order Catalogs* from Greyhouse Publishing, Sharon, Conn. Many of those companies produce several catalogs annually.

Competition is steep, and computerization of the industry has defined both its growth and direction. The mail-order houses depend on their cpus for their livelihood; they consider their computer operations to be their strategic weapons and zealously protect their fishbowls from outside eyes. Many major catalog companies, such as the fast-growing preppy haven Land's End, in Dodgeville, Wis., and the venerable L.L. Bean, in Freeport, Maine, refuse to discuss their dp operations at all. Others were quite guarded in their comments.

A measure of the importance of computers to the industry comes from Leo Yochim, president of the Direct Marketing Computer Assn., Hillsdale, N.J., and of Printronic Corp., New York. He estimates that the typical mail-order firm spends 15% to 20% of revenues for computer operations, as compared with the 1% to 5% for other industries.

Computers allow marketers to target specific niches in the marketplace, and zero in on opportunities, in addition to the more mundane accounting and inventory functions. Demographic information, customer buying habits, income levels, and so on, are easily tracked, enabling mail-order houses to focus their merchandise and efforts on those most likely to become paying customers. Snowshoes may be a coveted item in Maine, but they have slim appeal in Miami.

Mail-order houses depend on their cpus for their livelihood; they consider their computer operations to be strategic weapons and zealously protect their fishbowls from outside eyes.

Markline Co. Inc., based in Waltham, Mass., is well aware of the situation as a mail-order firm using dp and as a software developer selling its package to others. The electronics equipment mail-order house, which did $32 million in sales in 1983, not only runs its own mail-order business on its internally developed software, but runs other mail-order com-

ILLUSTRATION BY RICHARD EGIELSKI

R. Egielski

panies on it as well; meat packer George A. Hormel Co. and spreadsheet training filmmaker Arthur Young Business Systems are clients. The firm markets its software to several other prestigious houses like Laura Ashley, Sharper Image, Patagonia, and Allied Stores. The company also has two retail stores in the Boston area.

The privately held Markline uses all IBM equipment to run its business. "We started with the IBM System/32 in 1975 and moved to the System/34 in 1976," says Mark Lightbody, national marketing manager. "Then we had a big decision in 1980. We needed to restructure, and evaluated the Hewlett-Packard 3000, the Digital Equipment Corp. VAX, and the IBM System/38. We went with IBM because of its track record, especially for service and support; we have fixed response time for service from IBM of about one hour. Still, it was a risk to some degree, because the state-of-the-art architecture was in its infancy."

Another reason the company stayed with IBM was that Commercial Systems Inc., the Dedham, Mass.-based company that helped Markline develop its in-house software and, in a joint venture, licenses the software to other mail-order houses, uses IBM equipment.

Markline's System/38 has 4MB of main memory with two 3370s totaling 1.2GB, and uses "IBM's own relational database system, and it's very powerful," says Lightbody. Markline runs 45 workstations off it, as well as two system printers (600 lines per minute each), two tabletop matrix printers (200 lines per minute, used in customer service and accounting services), and tape drives for backup. Lightbody estimates the hardware's price tag at between $225,000 and $250,000.

Markline has been licensing the software program, called the Markline

The typical mail-order firm spends 15% to 20% of revenues for computer operations.

Mail Order Computer System, for three years; it is available for either the System/36 or 38. Although figures are somewhat hazy, since development costs do not include management time, Lightbody estimates the package cost about $500,000 to develop. "Right now, we're past the developing stage and into the refining stage," he explains.

"We developed the package because we, as a mail-order company, needed a solution to our problems," says Lightbody. The company started out in 1973 as a retail marketer of electronic goods. By 1977, the firm expanded its operations and began offering some of its merchandise by mail, through seasonal catalogs. In 1983, a more upscale selection of items was offered in a Beacon Hill catalog.

In addition to the consumer electronics and business-to-business electronics, e.g., calculators and the like, that it originally retailed, the company presently sells sophisticated office products and microcomputer supplies. "We mail 10 million catalogs a year," boasts Lightbody. "There are six to eight consumer catalogs and two business-to-business catalogs a year, in addition to solo mailings for segmented channels, such as watches. Our focus is to target a market and match a product to it.

"The number one criterion for control in our business is to get the orders into the system," he explains. Fully 90% of Markline's business is catalog-based, and orders come in at a rate of 3,000 to 4,000 a day. Nearly half the orders are received over the phone lines.

"Our on-line entry capability is strong," says Lightbody. A wealth of information is entered into the system. Source codes track where the order came from—magazine or mailing list. After tracking how the caller's name was obtained, customer information such as address and zip code is put on-line. This information is not only critical for fulfilling orders but for furthering marketing aims as well. For example, a customer's one-year ordering history can easily be accessed. Later, that customer's mailbox will be inundated with more brochures, since mail-order firms find that their biggest source of new revenues is from their existing customer base of proven purchasers. Due in part to great pressure from government regulators, the firms must have a top-notch order and inventory tracking system. "We have 10 ways to find an order—even if a customer doesn't know his own last name, we can find him!" Lightbody exclaims.

The front-end investment in keying in all that data delivers big dividends throughout the typical mail-order firm's operation. Credit card numbers are validated, sales tax is charged if necessary, and inventory control is monitored on-screen, up to the minute. "As soon as an item is keyed in, the machine shows automatically if that item is in stock," says Lightbody. "We also 'upscale' right then and there, while the customer is on the phone. When the order entry goes into the file, the screen brings up a list of appropriate accessories for the item ordered. For example, batteries and an adapter might be needed for a piece of merchandise—a calculator might need a dust cover. We've got that all right there, immediately. It's a great way to increase sales."

Because of the seasonal nature of the business, anywhere from five to 30 people perform Markline's order entries. These employees also track all the credit checks. The software handles accounts receivable and will hold orders pending credit card authorization. The system communicates to the credit card clearing services on a dial-up line. For orders that cannot be filled, the system automatically generates refund checks.

Sales forecasting is also based on the inventory tracking system. "We can see what's there, what we need, and make sales projections from our system," explains Lightbody. After the credit clearance, and once the appropriate item is found in stock, the order moves to the

"We have 10 ways to find an order—even if a customer doesn't know his own last name, we can find him!"

warehousing end of the operation. If an item is not found in stock, however, the software automatically back-orders the remaining portion of an order until new inventory arrives. The warehouse is on-line, and order information generated by the order-taking is gathered there.

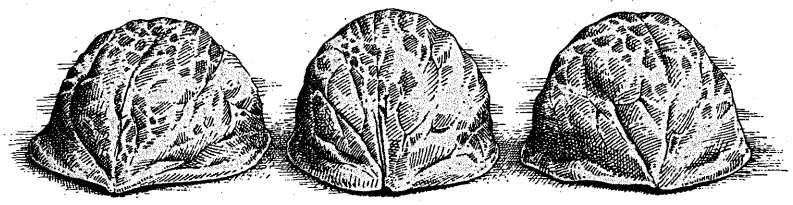
In addition to these procedures, the software aids in generating sales journals and invoices, thereby keeping track of customer accounts. At the end of each day, says Lightbody, a report ties together the day's activities, such as incoming orders, outgoing shipments, cash, inventory, and the number of management reports generated, of which there are about 300. "We do list and source analysis, catalog item analysis, and division sales reports," Lightbody notes. "We know just what went out the door, how much money we made, and we do profit analyses. Accounts receivable, accounts payable, and general ledger are all integrated into the system."

Markline's software also allows the firm to run other companies' businesses for them. "We do orders, customer service, and so on for others," says Lightbody. "Our software allows us to identify which company we want information for, and we just tap into different data files."

While Markline caters to a specialized clientele interested exclusively in electronics equipment, Speigel Inc. of Chicago, one of the largest mail-order companies in the country, offers a vast range of consumer products designed to appeal to a broader-based public.

Until about eight years ago, when its new president, Henry Johnson, took the reins, Spiegel appealed less to the designer-label enthusiasts and more to the polyester crowd. But the company has undergone a successful transformation,

OF THE BIG THREE IN BUSINESS SOFTWARE, WHO'S THE REAL NUMBER ONE?



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CIRCLE 16 ON READER CARD

and upscale fashion apparel, home furnishings, and gourmet cookware now line the pages of its telephone book-sized catalogs.

The 120-year-old company, which started as a family-owned retail store, estimates total revenues in 1984 at about $750 million, up from $611 million in 1983. "We are the largest pure catalog company in the U.S.," boasts Ken Bochenski, vice president of information services. "Well, possibly we are tied with Fingerhut," he concedes, referring to one of the leading catalog companies, based in Minneapolis. "At any rate," says the enthusiastic executive, "our computers track everything from the time of the day to how many dimples there are on a doll."

"Our computers track everything from the time of the day to how many dimples there are on a doll."

For the most part, Spiegel is a centralized organization, with all corporate offices, warehouse facilities, and customer service operations based in Chicago. Orders are taken in Reno, Philadelphia, and Atlanta. A new 55,000-square-foot data center, which opened in July 1984, is in the Windy City.

Spiegel uses primarily two systems, the IBM 3081 and 3033, to support all applications and peripherals. Though the company likes Big Blue equipment, Bochenski notes, "I'm not saying it's the best." Generally, however, he feels the support is there. Another advantage of going with IBM, Bochenski points out, is that since it controls such a large portion of the market, it is easier to hire programmers and analysts familiar with the equipment and the software.

According to Bochenski, the 3081 has 32MB and 24 channels. The machines run in a multiprocessing-type environment and have shared I/O for peripherals: 55 tape drives, 40 disk drives, and 1,800 on-line terminals are supported. Of the drives, six are IBM 3380s, and 20 are Storage Technology 8380s, each with 2.5GB. The company has 125 modems running at 9,600 baud for its leased lines and two Hyperchannel data pipes from Network Systems Inc., Brooklyn Park, Minn., moving data at 1.5Mbps.

The IBM machines "do everything," says Bochenski. With their software, they track all the billing, merchandising, inventory control, and warehouse distribution, as well as run all credit support systems, customer services, financial systems, and personnel and payroll systems. To complete their tasks, the machines run 24 hours a day, seven days a week, all year long. Three hundred employees work in the information services area. Of the 40,000 orders received every day, 70% to 75% are phoned in.

According to Bochenski, Spiegel's software is primarily developed in-house, but packages from outside vendors are occasionally used as well, and then customized. The company uses McCormack & Dodge's financial reporting software for that segment of the business, for example, and employs Cullinet's IDMS for management of its customer and credit information sectors, the latter of which tracks almost 2.5 million Spiegel credit-card customers. Add to that those who charge with Visa, Mastercard, and American Express, and the total customer file encompasses 7 million individuals who have, at some time within the last three and a half years, bought an item from Spiegel. About 120 million catalogs a year (that's 40 to 50 distinct books) are sent out, says Bochenski.

Spiegel's inventory control system tracks more than 75,000 "stock-keeping units." A stock-keeping unit is an item with specific characteristics—the combination of a red blouse in size 10, for example. The system monitors the amount of inventory on order, the amount sold, and shows the amount left to be sold, for reorder considerations.

In addition to the IBM models, a DEC PDP-11 is tied into the warehouse distribution system, for use in the order assembly area. The system is timed so that when a customer puts in an order for more than one piece of merchandise, all the pieces of that order "hit the same spot" at the same time and are assembled together as one order. This also ensures that billing is complete. Turnaround for an order, including shipment by UPS, is six to nine days. During peak season, there are as many as 60,000 orders coming in daily, according to Bochenski.

The warehouse segment, the oldest part of the process, was just replaced with a new $25 million integrated warehouse system from a variety of vendors and integrated by the company's West German parent, Otto Versand. The new systems are reflective of Spiegel's relationship with its parent, according to Bochenski. Otto Versand, the world's second largest catalog retailer (behind Sears Roebuck), bought Spiegel in January 1982.

"They have a sophisticated warehouse distribution system in Germany, where they are a Univac shop, one of the largest installations in Europe," says Bochenski. "We are their first American venture. They can use our strengths and expertise in marketing, credit reporting, and customer services systems, and we will use their warehouse distribution system. We will now marry the two, taking the best of each. Spiegel plans to use the Otto Versand warehouse distribution system by making major modifications to it for the American environment."

Bochenski says Spiegel will tolerate no finger pointing in the direction of service. "We give space to the maintenance people in our data center and we work closely with them," he says. "Test equipment and supplies are all there. We have three to five planners working full-time, too. They do the equipment layouts, take care of the service issues, and evaluate and implement plans."

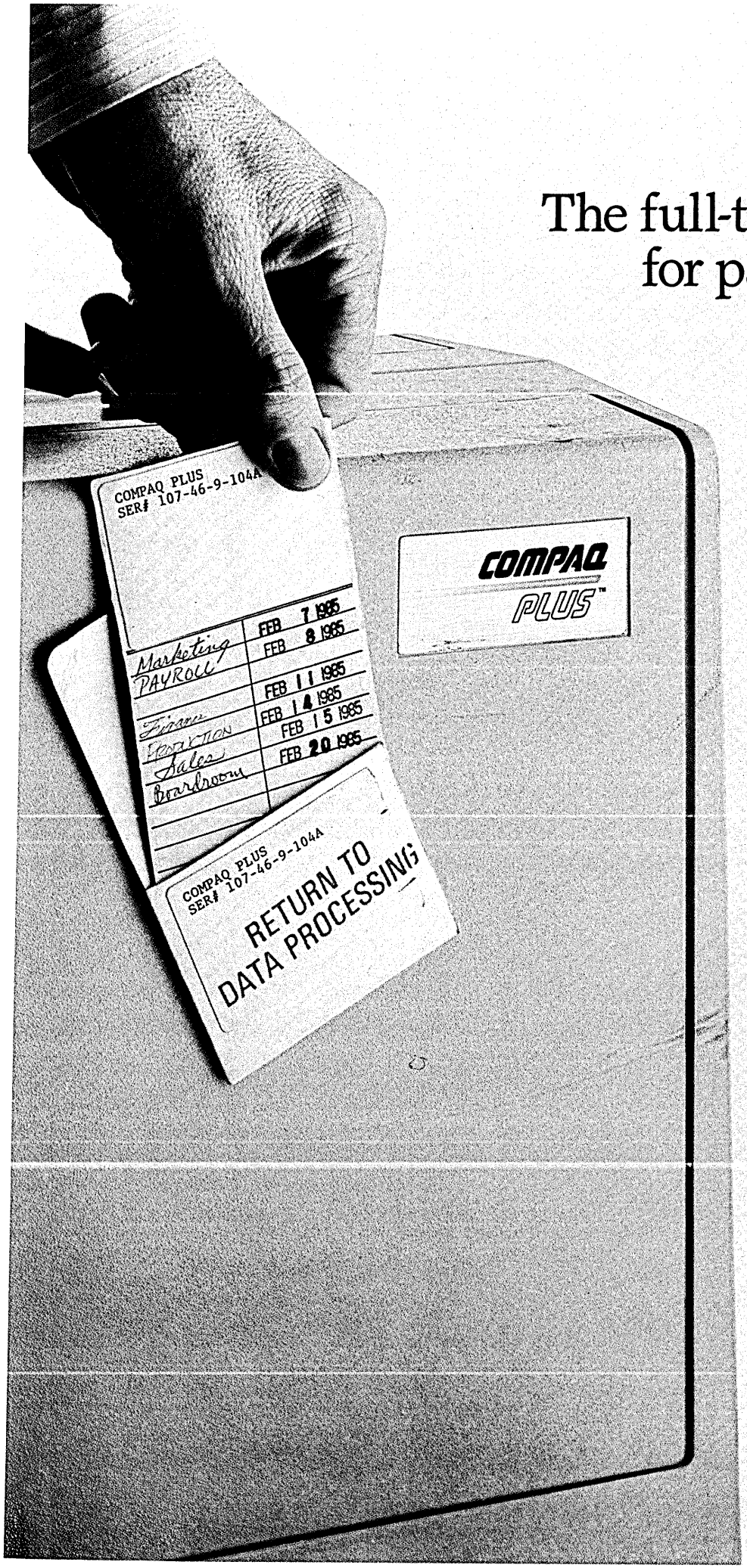
Not every mail-order business is quite the behemoth Spiegel is. Like the smaller, select group of electronics buffs to which Markline appeals, Eddie Bauer's clientele consists of the adventurous outdoorsy buyer.

Founded in 1920 as a sporting goods shop, the company now sells outdoor apparel and equipment as well as its private label line of goosedown sleeping bags, jackets, parkas, and vests. About 20 catalog editions are sent out each year. Bought by General Mills in 1971, Eddie Bauer has a chain of retail stores in addition to its mail-order business. Sales, which totaled $110 million in 1983, are 60% retail and 40% mail order, with catalog sales generating approximately $47 million in that year. Nearly 70% of revenues are garnered during peak season, which begins in July.

Bauer's major computer facility is in Redmond, Wash., outside Seattle, and there is also a satellite facility in Toronto. Operations went electronic in the late '60s, according to Jack Randall, data processing operations manager of General Motors' Electronic Data Systems, which has provided Eddie Bauer's dp services under a facilities management contract basis since March 1984. Explaining the relationship between the two, Randall says, "It's the same equipment used by the same [60] people; EDS just picked up the dp staff. This was a way to get a long-term fix on dp costs."

"While the customer is on the phone, the order entry goes into the file, and the screen brings up a list of appropriate accessories for the item ordered. It's a great way to increase sales."

A small mainframe, the Honeywell 1015, kept business moving until 1972, when a Honeywell 6000 took over. In 1977, a DEC PDP-11/70 was added, and is still used for order entries. The Honeywell 6000 was replaced in 1980 by the Honeywell DPS-8, which is used for order processing for the mail-order business. "We do final order validation and corrections in batch mode processing on it, and all order invoicing and distribution for



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the mail-order division as well as all the rest of Eddie Bauer's business functions," explains Randall.

The DPS-8 handles virtually all the batch processing, which primarily maintains master files and generates large reports. Bauer's general business users also employ a timesharing function for ad hoc reports for one-time use. The 308X-class DPS-8 has 20 to 25 remote users; in-house and dial-up terminals are in operation. The shop has nine disk drives with 156MB each, and four with 624MB each.

DEC's PDP-11/70 supports 40 on-site terminals. Programming is supplied by a turnkey on-line interactive software package from Cortex, of Boston. "Cortex maintains the Inform software itself, and Eddie Bauer maintains the applications, written in the Inform language," says Randall. "Bauer gets periodic updates from Cortex by telephone, and dp staff just work under their direction. Cortex rarely visits the facilities."

All Honeywell hardware and software maintenance is provided on a year-to-year open-ended basis. Honeywell provides preventative maintenance once a week. A field service person comes in daily to review any error reports on the diagnostic software. "We are very pleased with Honeywell," says Randall. "The relationship is very successful."

The PDP-11/70 is maintained by DEC and a contract is renewed yearly. "We are not nearly as impressed with DEC's service as we are with Honeywell's," says Randall. Since the machine "is almost out of gas," it is scheduled to be replaced by the second quarter in 1985 with an IBM 4381 equipped with 16MB main memory and two 3080 disk drives, which will initially support 150 terminals.

Everything for the mail-order side of the business is handled by the Honeywell system, except for the actual order

Eddie Bauer is replacing a DEC PDP-11/70 with an IBM 4381 for order entry.

entries, which are handled by the DEC machine. Telephone calls or mail-in orders are entered in the PDP-11/70; inventory is checked automatically. "We are accurate within 24 hours on inventory," says Randall. After hours, orders are extracted from the DEC system on magnetic tape and loaded into the Honeywell system for batch processing. Orders are rechecked for complete information, and merchandise is reserved on the inventory file.

The Honeywell system then creates an invoice and picking document, which is sent to the warehouse. At that point, the information is added to the mailing list file for future marketing purposes. The information on the invoice is then taken from the Honeywell and put back into the DEC, so the status of the merchandise and its delivery date is compiled, back orders are noted, and shipment is tracked.

Between 6,000 and 7,000 orders are put into the systems each day during an eight-hour shift. Some of the information tracked is used by Eddie Bauer as a forecasting device and for future mailings, bringing the operations full circle.

The dp managers of the catalog firms gaze over their private universes of automation and feel some satisfaction in their state-of-the-art systems. As far as the part of the process that is within their power, that is. One hitch remains in this otherwise streamlined market of the future. The distribution system, i.e., the U.S. Postal Service, is not within their control. And the automation of the U.S. Postal Service proceeds at a snail's pace. All the dpers can do is wish and wait and hope. Just like their customers. ◉

Jessica Schwartz is a Boston-based free-lance writer who specializes in technical and business subjects.

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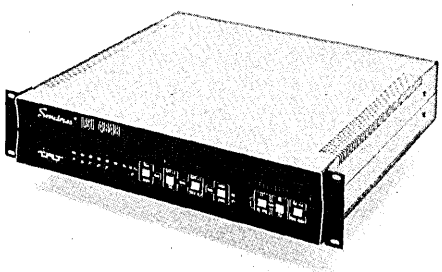

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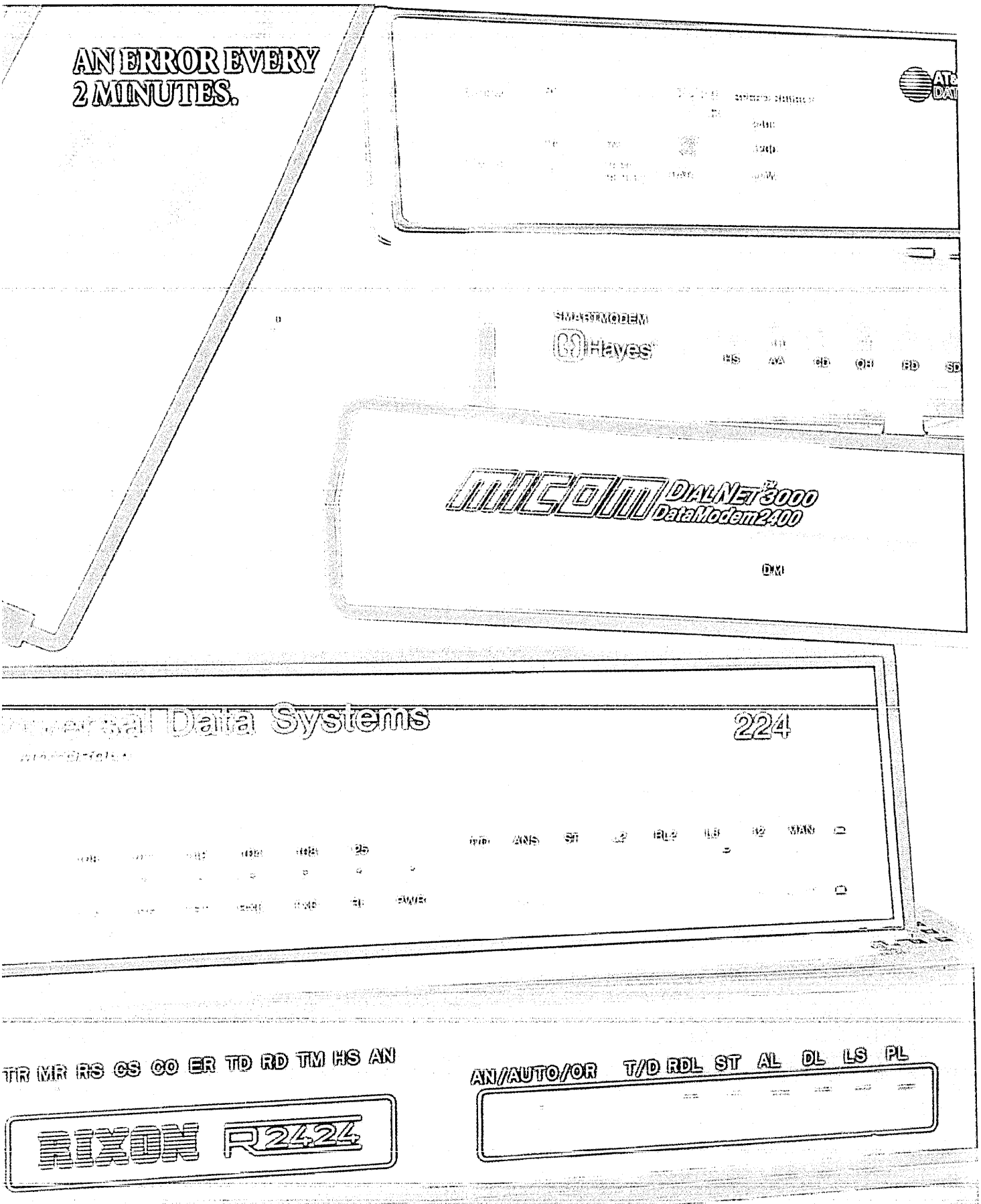
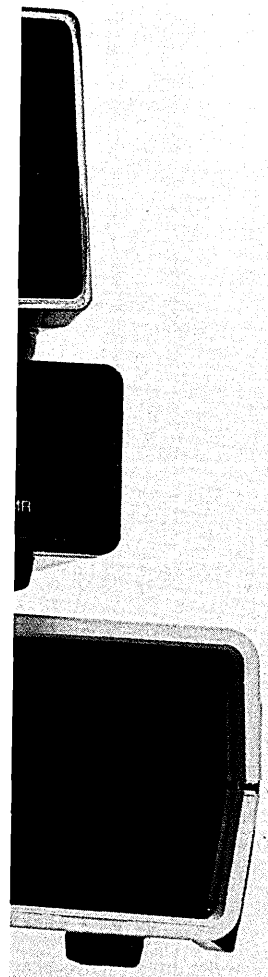
AN ERROR EVERY 2 MINUTES.



*Computation based upon transmission at 2400 bps on dial-up telephone lines that meet the transmission parameters as outlined in the ATT "Technical Reference PUB 41008." Assumed modem usage 4 hrs. per business day.



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NEWS IN PERSPECTIVE

SOFTWARE

DISSENT IN THE RANKS

Schisms are fracturing major user groups as large installations learn to live with IBM's Object Code Only policy.

by R. Emmett Carlyle

"United we stand; divided we fall." That has always been the paramount rule for customers dealing with IBM; but it's also apparently the hardest to follow. The company's two-year-old policy of withholding source code for selected program products is just beginning to bite at installations around the world, and already a deep polarization in the IBM user community is evident.

The polarization is pronounced within IBM's primary user groups, SHARE and GUIDE. SHARE recently handed IBM representatives a task force paper that tries to build a case for retaining source code availability; another—and wholly contradictory—paper from the same organization sees OCO (object code only) as "inevitable" and calls for greater dialog between users and IBM to implement the policy painlessly.

SHARE president Fred Jenkins stresses that the task group papers are not collectively endorsed by SHARE. "There is no consensus on this issue, and no winning position."

Deep divisions also exist within dp shops, with managers pitted against systems programmers. Some managers privately say that they have been held to ransom for too long by their technical staffs. They welcome OCO as a big step toward a simpler, programmerless environment. The technical staffs for their part claim that IBM wants to impose a 1980s approach on 1960s and '70s technology, which was designed for support by systems programmers.

When it comes to the emotionally loaded issue of OCO, there seem to be as many views as there are mouths to utter them; this is nowhere more apparent than within SHARE, whose committee papers constitute the first orchestrated response by users to IBM's initiative.

The flavor of one paper from SHARE's VM group is best expressed by its cover, sources reveal, which depicts a goose sitting alongside a golden egg. The goose is labeled "Source," and the egg is the VM operating system. The authors claim that IBM has benefited (and will continue to benefit) by making source available to its users. VM is the product it is today, they say, in part because of the expertise and innovation that users have helped build into it.

The authors conclude that if IBM "kills its goose" there could be unintended and unexpected repercussions for the company, such as slower growth and lost business opportunities due to hindered software development and maintenance.

The feeling at many VM shops is that IBM won't know how many bugs in its software customers have already helped to fix—something customers can't do without source—until their OCO policy begins to result in an increased maintenance burden for the computer giant.

The VM paper also isolates six areas where customers have such conflicting and divergent needs that even supplying a profusion of user exits with OCO won't do away with the need for source. Chief among these is the accounting sector. For 10 years customers have pressed for improved VM accounting software—particularly in the charge-back area. Until it comes, they say, accounting will remain a heavily modified area.

The VM users also point to access control/security and device support as areas that are often significantly modified. The feeling among these users is that until IBM gets its own software house in order, OCO is premature and dangerous.

Another paper from SHARE's predominantly MVS-based operating systems division creates an entirely different picture. Here the emphasis is on working with IBM to create user exits, and trying to create an environment in which OCO would work and source would be unnecessary.

"One thing that puzzles me is why everybody is in such a flap over OCO. I wonder whether mods made at other shops were really necessary."

But even with this paper there is a sense of an underlying urgency, prompted by a negative response to IBM's most recent examples of OCO products. "It's true that the OCO versions of PROFS and ISPF weren't well received," SHARE president Jenkins says. "There have been complaints that the documentation was not improved and that the user exits are inadequate."

One explanation for the apparent inadequacy, Jenkins says, could be that IBM had begun development of the two products before finalizing its new OCO policy. "It is to be hoped that from now on our committees can work with IBM

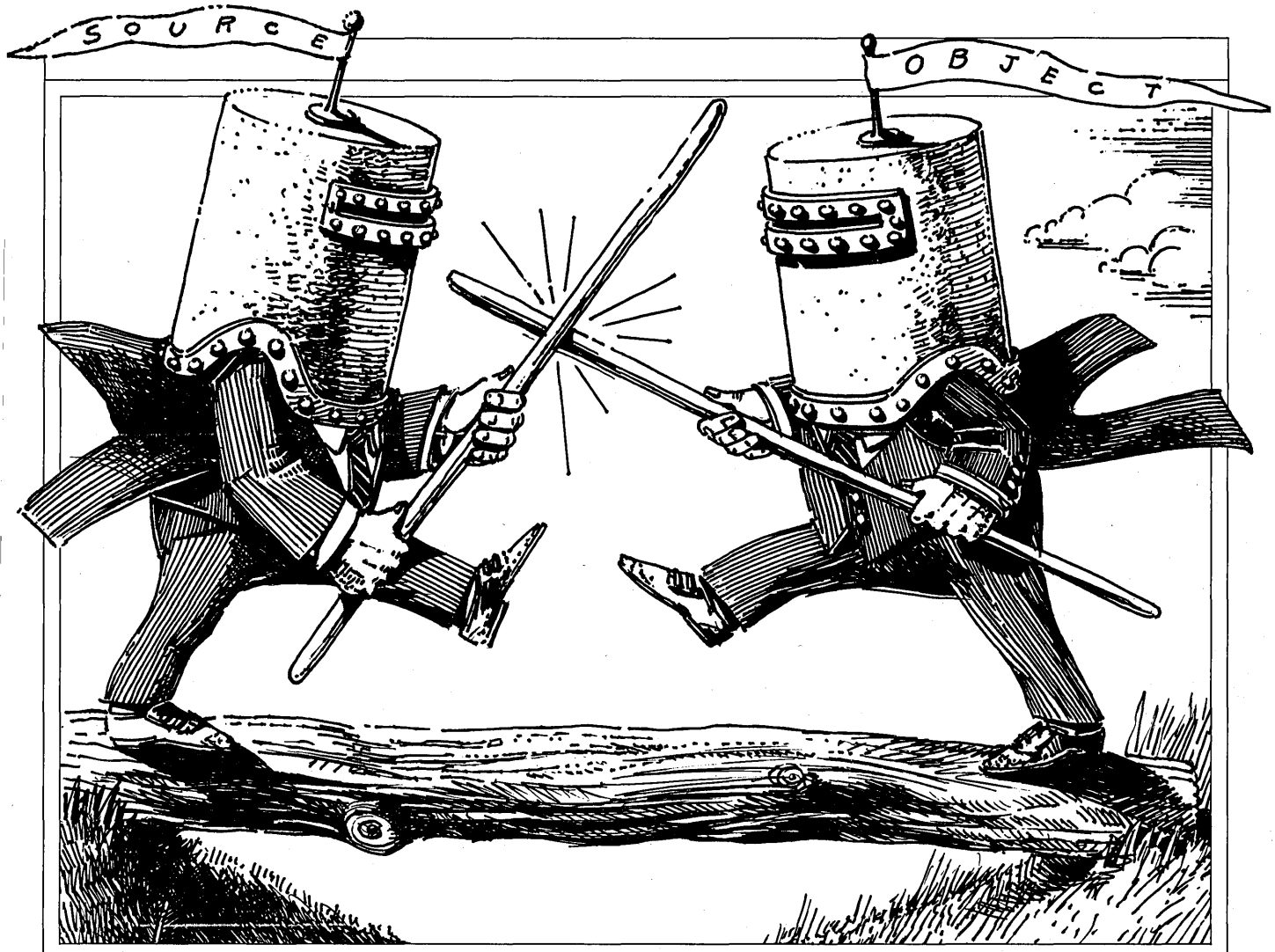

ILLUSTRATION BY JAMES R. JONES

and their input will be reflected in IBM's forthcoming OCO releases."

IBM won't say how many products are currently in an OCO form—a company representative says that the information is proprietary but that the OCO program is proceeding on schedule. One outside estimate is that 50% of all new software releases from IBM last year were OCO. Should this be true, it still constitutes only a small percentage of the total available software, since the real meat—the MVS and VM operating systems—haven't been touched yet.

"One thing that puzzles me," says John Nack, president of the GUIDE user group and director of the data center for Caterpillar Tractor in Peoria, Ill., "is why everybody is in such a flap over OCO. We've all had years to prepare for it, so it should come as no surprise to anyone."

Nack says that IBM first broached the subject of OCO at Caterpillar in the late 1970s, "and we've been moving from mods [user-developed source code modifications] to plain vanilla code ever since." At 200MIPS, Caterpillar's data center is one of the largest in the country. "I'd say our response to OCO is typical of other large shops," he adds.

Nack describes OCO as a logical business step for IBM. "The company is positioning itself for shorter product cycles and remote maintenance. It needs to install new software quickly, and this is difficult to do where major modifications have been made to its systems software."

Indeed, he muses, "I sometimes wonder whether some of the mods made at other shops were really necessary."

SHARE's Jenkins takes the same theme. "I was a programmer myself, and like many others on the VM side we constantly modified IBM's software [in the 1970s] to get the performance we needed. The penalty was zero then," he adds, "because IBM wasn't shipping much code for VM. Today the company is shipping thousands of lines of code for VM as well as microcoding its systems, and we have to coexist with that." Of his own installation at Bell Northern in Ottawa, Canada, Jenkins says, "We're a far cry from where we were. We used to have 30,000 lines of mods to VM/CMS and now we're down to 200 lines—but we *do* have 200 lines."

"We're all trying to reduce mods, but it's difficult when the functional need of your installation is a moving target."

The notion held in some quarters that VM systems programmers modify IBM's code unnecessarily has incensed many VMers. "I've heard such stuff. It must stem from people who don't know programming," counters Gabriel Goldsberg, a systems programmer at the MITRE Corp., McLean, Va. "No one is his right mind would code mods if adequate exit points were available or if there were configuration files to set options."

Sandra Hassenplug, manager of systems programming for a large management consulting firm in Philadelphia, puts the question in a broader perspective. "This is not a techies' or emotional programmers' issue," she says. "Such thinking only obscures the fact that users have a valid business case for obtaining source code. We're all trying to reduce mods, but it's difficult when the functional need of your installation is a moving target.

"There is much talk of user exits, but they have to be foreseen," she continues. "You have to know where to put them. We couldn't anticipate two years ago what today's needs would be, nor can we anticipate tomorrow's. Everything changes."

The VM community is understand-

GARY SCHULZ: "Like many customers we still must have mods to support our third-party packages."

ably more skeptical than MVS users about IBM's OCO plans: IBM has fallen behind in the provision of crucial VM software (see "The Waiting Game," April 15, p. 42), notably in the areas of 31-bit XA, four-processor (dual-dyadic) systems, and device support. The feeling among VMers is that IBM should first get its software right and then pull source, not the other way around.

"Our reflex is to fix our software when it breaks, and then call IBM," Goldsberg says. "IBM is always a phone call away, while our end users are sitting on top of us screaming for action."

These user concerns echo, though in milder language, fears already expressed by the independent software vendors through ADAPSO. While neither SHARE, GUIDE, nor the trade group challenges IBM's right to protect its intellectual property in any legal way it sees fit, they fear that the wall IBM is building against competitors and its own customers may also shut out the innovators and entrepreneurs they say are vital to the industry's growth.

For ADAPSO, moreover, the source code issue is only the tip of the iceberg. "It's only the most recent and most visible symbol of a deeper problem. The real issue is not OCO, it's bundling," says spokesman David Sturtevant. ADAPSO argues that IBM initially unbundled software when the government filed its antitrust suit over 15 years ago, and is rebundling in earnest now that it is over. IBM is now offering everything from bundled program products and services to bundled field support, according to users.

"OCO is simply bundling at the source level." Sturtevant says.

ADAPSO denies rumors that it is preparing legal action against IBM on the source issue. Yet in a 1983 resolution the organization stated that the source restrictions "have the potential to be anticompetitive and to constitute unfair uses of market power."

Sturtevant explains, "Our vendor relations committee has discussed these matters with IBM for two years, but at too low a level. We're now pressing to take the dialog to the upper echelon of IBM."

The destinies of IBM's users and the independent software companies are intimately intertwined, of course. "We've reduced our mods by around 75% over the past few years," says Gary Schulz, data center director at Northwest Industries, Chicago, "but like many customers we still must have mods to support our third-party packages."

One way to get around the problem is for IBM to strike deals privately with individual software companies and customers having strong business cases for source. Though there is no evidence of such arrangements, such a compromise seems the likeliest outcome, according to some sources. "IBM won't publicly back away from its hard line on OCO, one ADAPSO insider says, "but it may do so privately on the condition that nobody talks about it." ◉

MAINFRAMES

IS THE DOOR OPEN?

Analysts contend the pcms have a golden opportunity to regain market share, but customers are betting IBM will ship Sierra early.

by David Stamps

The response to IBM's 3090 series of mainframes from its two large-systems competitors, National Advanced Systems (NAS) and Amdahl, brings into sharp relief both the problems and the opportunities the two confront.

When the 3090 was announced, both firms jumped for joy at IBM's stated shipment schedule, which slated customer deliveries of the high-end model 400 for the second quarter 1987, then 27 months away. Analysts, too, were optimistic: surely, they thought, the pcms could ship competitive models well ahead of that schedule, giving them an entrée into the largest and most demanding IBM shops.

There is a darker side to the issue, however, and it is not one the pcms are eager to face. Simply put, being first—and perhaps cheapest—may no longer be sufficient to guarantee the pcms a comfortable living, some customers say, since they expect IBM to ship the 3090 before the pcms can make any significant inroads.

For the most part, the cards are already all face up on the table. IBM's November 1985 target for the model 200 and spring 1987 target for the model 400 are the benchmarks against which others must compete. NAS, with its Japanese technology cohort Hitachi, wasted little time in staging a joint fanfare for its new AS/XL models 60 and 80, a 28MIPS uniprocessor and a 50MIPS dyadic box. NAS proudly proclaimed that both models will be available in the U.S. by mid-1986, a year ahead of Big Blue.

Amdahl so far has taken a more conservative approach, having learned some caution after two delays in as many years in bringing its current top-end 5880 dual processor to market.

"If a customer needs a machine today, or anytime before mid-1986, our answer is the 580 series," says Dave Anderson, product manager for the Sunnyvale, Calif., firm. "The 580 is essentially comparable to the 3090 model 200," he says.

Sensitive about preannouncing a product, Amdahl will officially say little beyond that. At the same time, it is dropping broad hints to customers that there is a follow-on product in the works.

Gerry Heikel, manager of capacity planning at Aetna Life & Casualty Co., Hartford, Conn., reports that he has been told by Amdahl that it will announce the code-named Apache series—its answer to IBM's 3090—before the end of this year, for delivery in mid-1986.

Jim Flock, director of computing services for Time Inc.'s Home Box Office subsidiary in New York, says he expects the machines to be very similar to the NAS models, with emitter-coupled logic and denser packing but no radically new technology. A four-processor version of the new machine is also expected, but whether that will come in 1986 or later is unknown.

With expected deliveries of 50MIPS machines a year ahead of IBM, analysts say the pcms have a significant window of opportunity to crack all-Blue shops.

NAS, which claims about 6% of the mainframe market, appears to be in the best position to gain some ground on IBM. Initial response to the new Hitachi technology has been favorable. Says one analyst, "NAS and Hitachi are the only ones

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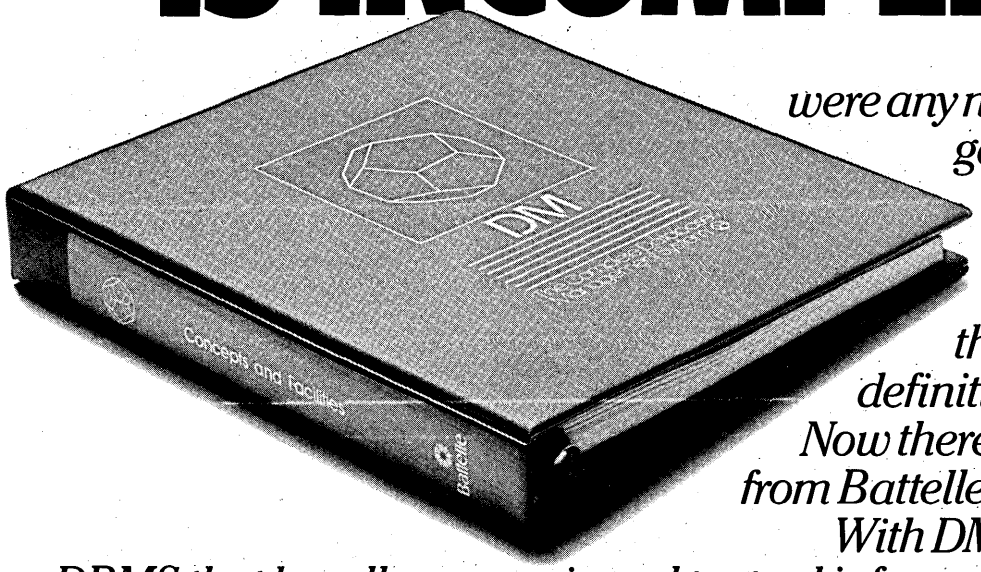

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That Hitachi and NAS announced the new series virtually simultaneously—compared to previous generations in which Hitachi would preannounce NAS by about six months—underscores Hitachi's commitment to keeping NAS competitive in the U.S. NAS itself is emphasizing this point by calling its new XL line the Alliance Generation.

Amdahl, despite its coyness, is likewise judged to be in a favorable position to increase its own 10% share of the large-systems market. "IBM's slippage [on the model 400] has created an opportunity for both pcms to move in and gain some ground," says Bob Djurdjevic, president of Annex Computer Research, Phoenix. "NAS may beat everyone with its new machine, but Amdahl should be able to meet IBM's delivery date."

Out in the mainframe marketplace, IBM may still have a hidden card of its own regarding deliveries. Customers are beginning to suspect that IBM's announced two-year lead time on the model 400 is a calculated piece of marketing fiction.

"NAS and Hitachi are the only ones on the technology and performance learning curve, and they're three years ahead of the competition."

"IBM could produce a model 400 tomorrow if it wanted to," says Aetna's Heikel. Other estimates as to the model 400's potential availability range from "a couple of months" to next year. Apparently few, if any, users take seriously IBM's announced delivery date.

With that perception, it may hardly matter when IBM delivers the machines; not only would the pcms be competing against IBM, but they would also be competing against their customers' expectations of what IBM will do.

"No one is concerned about the pcms relative to the Sierra announcement," says Russ West, vice president of Comdisco, Rosemont, Ill., an independent computer lessor. IBM and its customers care only about IBM, he says, and "the message from IBM is to buy 308Xs."

West has a rationale for his "IBM market ploy" theory: since IBM has converted most of its computer base from lease/rental to purchase, it can no longer meet quarterly earning goals simply by raising rates. Instead, it must sell product, and for now that means selling existing 308X systems.

Orders for the 308X series are indeed up since the 3090 announcement. West expects orders on 308Xs to remain high for another two months at least. After that, he says, IBM will have only two alternatives to keep the revenue stream flowing: it must either lower prices on 308X models or ship the 3090 model 200. Yet simultaneous with the Sierra announcement IBM cut 308X prices, making another price cut unlikely, West says.

"Back-to-back price cuts on an IBM product are unheard of. Just as soon as 308X orders fall off, the 3090 will be shipped," he predicts. "Some 3090s will have been shipped as early as May under the early support program. No one believes 1987. If IBM were to fear losing a sale to one of the pcms because of delivery, you'd see the jack-in-the-box 3090."

There is, of course, another school of thought on the 3090 delivery schedule, and it is one to which the pcms are holding fast. These analysts say IBM may be facing some technical troubles with the model 400.

"There are too many good reasons why IBM would ship the 400 today if they could," says analyst Djurdejevic. "It's not a market ploy. They simply aren't ready. Contrary to popular belief, mainframe product cycles are lengthening, not shortening."

"On the other hand," Djurdejevic continues, "if IBM wants to sell 308Xs in the meantime, they do have to make it look as though the 3090 is some wait away."

At NAS, large-systems marketing director Bob Ludwig discounts user theories of early deliveries. "The market thinks it's all a ploy to sell 308Xs, but analysts tell us it's a technical problem. For the first time, IBM has entered picosecond land, and with the model 400 it is switching in under a nanosecond. You get into some serious timing problems there, especially when connecting dual processors that are several feet apart," Ludwig says. He notes that Hitachi has already addressed that problem by adding "an extra frame to keep the processors close and to switch at 200 picoseconds."

Amdahl's Anderson concurs that there may be more than marketing ploy to the long lead time. "I'm sure IBM has marketing contingency plans, but there may be some technical hurdles facing them as well," he says. "Their previous four-way machine was a hookup of four 8MIPS machines. Now, with 14MIPS uniprocessors around a memory that is still the same speed, they are presented with a trickier technical problem."

Technical difficulties work both ways, however. Neither Amdahl nor NAS was able to close ground on IBM between the 3081 and 3084, a gap nearly as long as the wait for the 3090 model 400.

"That's why you don't see us aggressively announcing our follow-on

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product yet," Anderson says. "There are always technical risks. But our technical problems are no greater and no less than IBM's. They may differ. We have more experience with ECL and high-performance uniprocessors, while IBM has more experience with multiprocessors. But we are confident we can beat or match their delivery schedule."

Some customers are ready to buy the first machine out of the gate, regardless of its nameplate.

"Like most large shops, we consistently are in need of the computer that puts the most MIPS [in] one box. It never comes soon enough," says Bill Cook, director of information services for Morgan Stanley in New York. Though it now has four NAS 9080s and an IBM 3084QX, the firm is trying to upgrade as soon as possible.

"Right now it looks as though NAS may have the edge in terms of price/performance and delivery," Cook says, "but we'll wait and see what's available a year from now before making a decision. For me to try to speculate as to what IBM will do or not do is folly. We just respond to what's in the market at any time, recognizing the fact that IBM can change things at any time."

Dialog Information Services Inc., Palo Alto, another large NAS shop with two 9080s, is also facing a mainframe upgrade. According to operations manager Dan Pritchard, the company will probably stick with NAS, but for reasons other than the announced delivery dates. Still running under the somewhat antiquated MVT (multiple variable task) operating system, Dialog prefers to go with the fastest single processor available rather than pay the software costs associated with multiple processors, he explains.

Another factor, Pritchard says, is that IBM tends to give the best delivery schedules to customers with a Defense Department rating. Since Dialog doesn't have one, it winds up at the end of a long queue for IBM equipment, while the pcms tend to deliver more quickly.

Amdahl customers, too, express a degree of vendor loyalty. "We left IBM for Amdahl three years ago, primarily for cost reasons," says Joe LaRocco, vice president of data processing for Eastern Bankcard Association, Rochester, N.Y. "We get the same bang for less buck and we like the service. We'll stick with Amdahl unless IBM comes back with an unbelievable cost incentive." ◉

WITH A LITTLE HELP

ICL hopes its new mainframe line, built with Fujitsu's assistance, can help it regain customers.

by John Lamb

ICL, the U.K. mainframer, launched two systems last week in a bid to claw back ground lost on its own turf to high-end IBM machines and to U.S.-made superminis. The company's strategy and its new products, four years in development and nearly a year late in execution, lean heavily on chips and peripherals supplied by Fujitsu of Japan.

Called the Series 39, ICL's new boxes are all compatible with each other and with earlier ICL machines using the proprietary VME operating system or, next year, Unix. Ranging in power from 2.2MIPS to about 35MIPS—from a VAX-11/785 through IBM's 3090 model 400—

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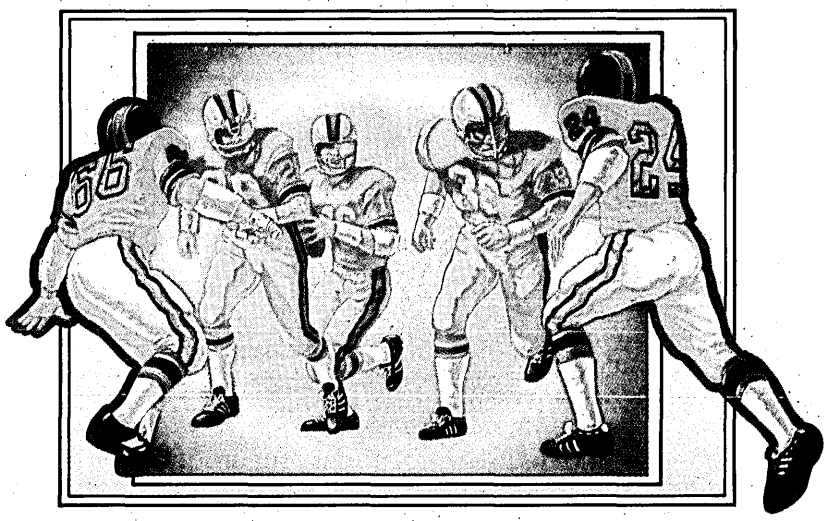

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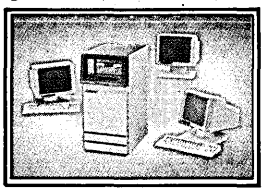

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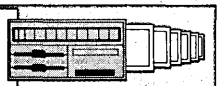

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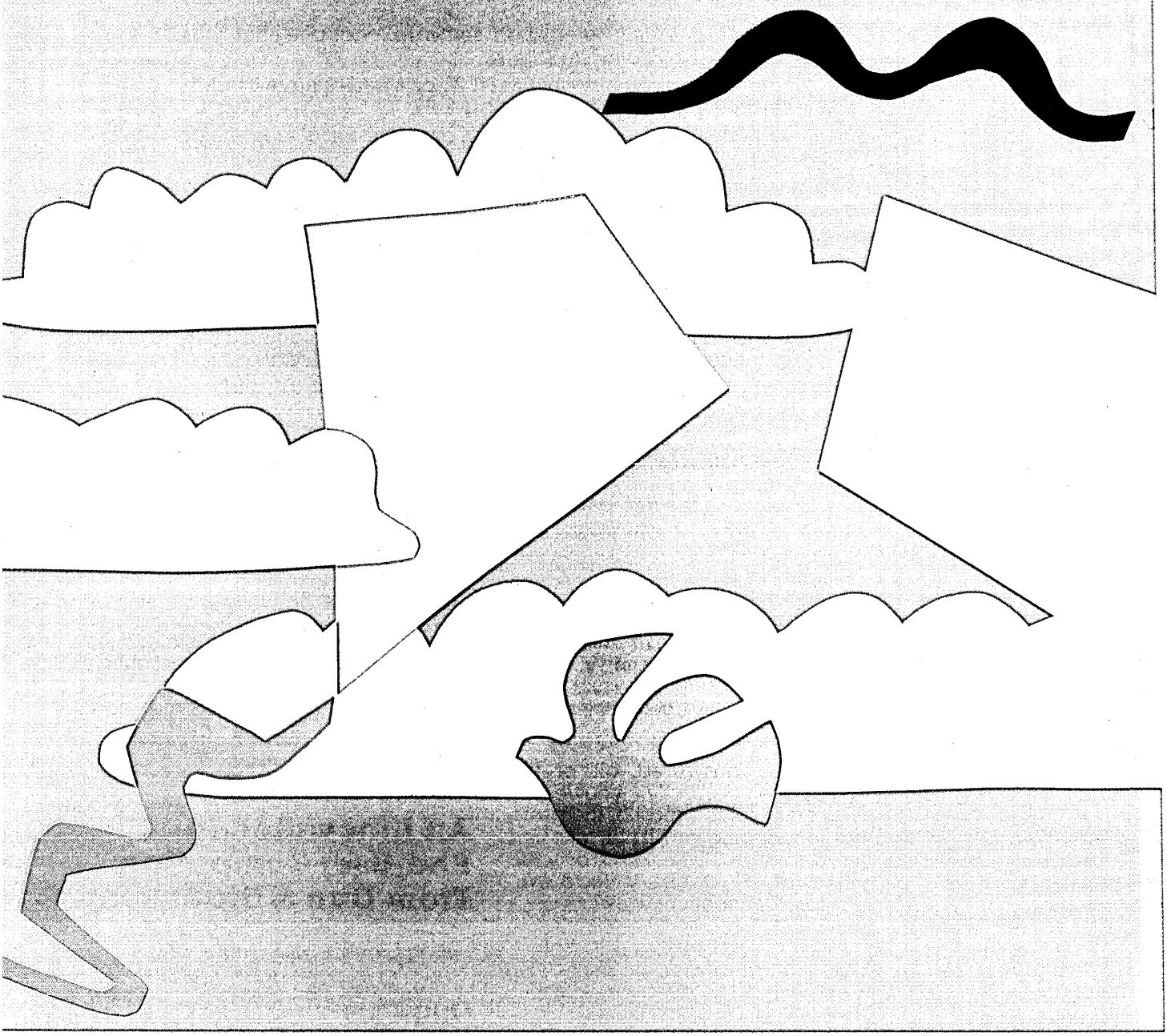

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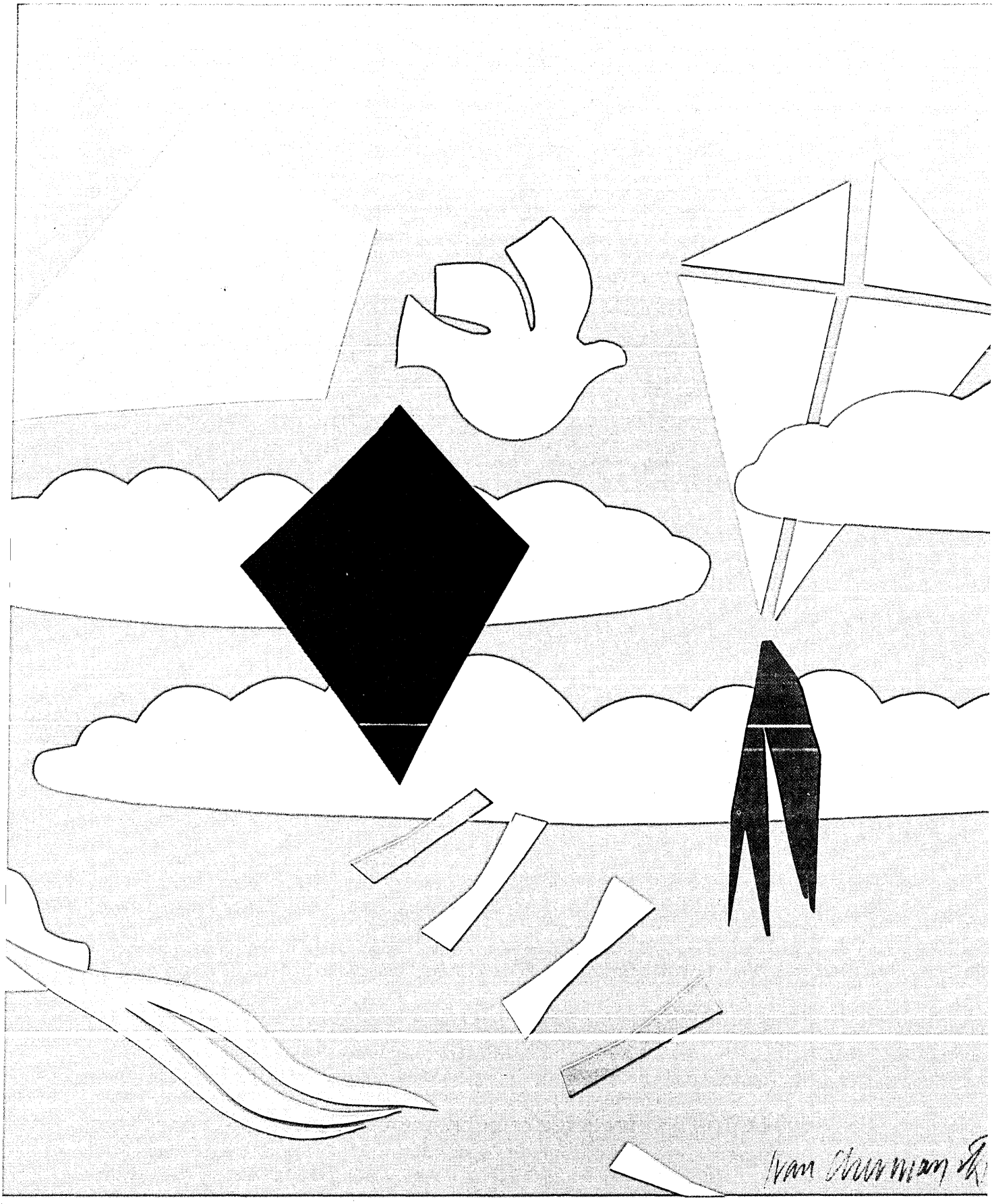

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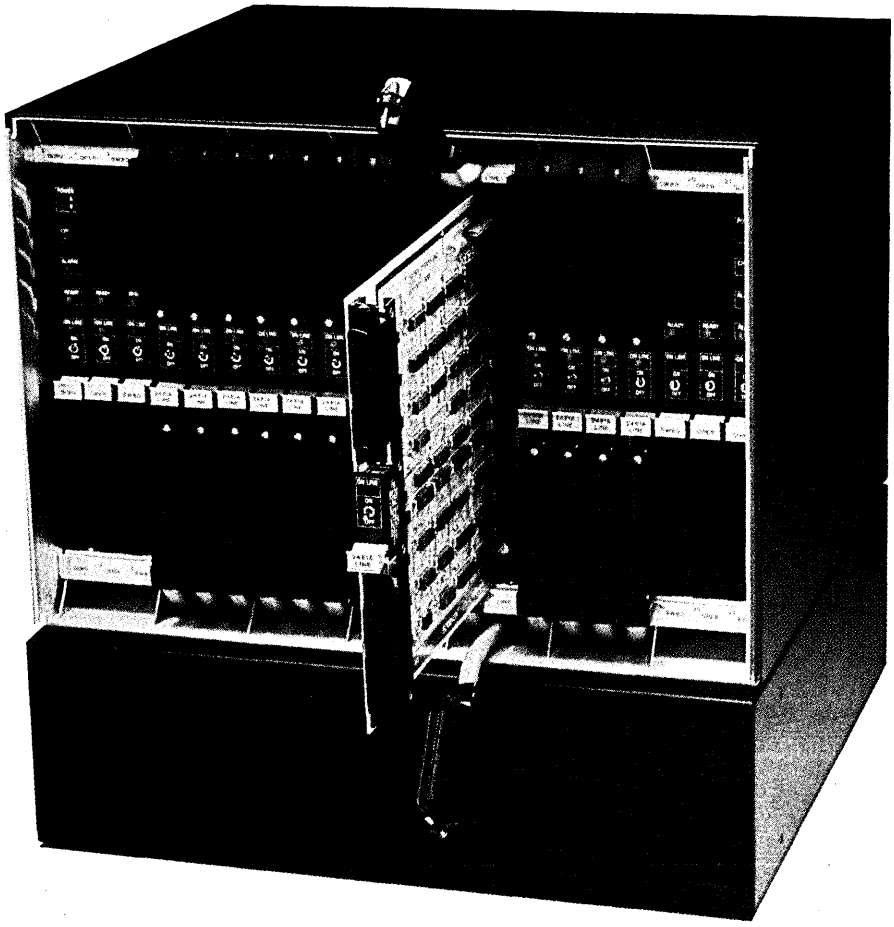

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they wholly overlap the older 2900 series and give ICL a technological boost it most likely could not have achieved on its own. Indeed, if all goes according to plan, ICL says it will be able to out-MIPS IBM for the first time in its history.

The series contains CMOS gate arrays and ECL chips manufactured by Fujitsu, and makes use of a new fiber-optic network to connect processors. The Japanese company has also supplied ICL with its Cube, the proprietary printed circuit board assembly used in Fujitsu's Facom M-380 and Amdahl's 580 machines.

The partnership, which involved an up-front payment by ICL of some $25 million, has resulted in two initial systems. At the lower end is the Level 30 (called DM1 in development), a 2.2MIPS machine containing Fujitsu CMOS chips. Weighing in at 11MIPS, the Level 80 uniprocessor (code-named Estriel) is on a par with IBM's 3081GX, according to ICL. The Level 80 contains air-cooled ECL chips mounted on boards in Fujitsu's Cube.

Series 39 processors and peripherals are linked by a 50Mbps fiber-optic local area network, called Macrolan. Gateways to an Ethernet-like network called Oslan provide communications with end-user terminals.

ICL claims that Macrolan, which operates over a 5mm cable, gives faster throughput than conventional star connections, enables peripherals to be located up to 1km from main processors, and does away with the need for raised floors in computer rooms. The network is controlled by a port switch unit at its center, which organizes the token passing and holds address information.

If all goes according to plan, ICL says it will be able to out-MIPS IBM for the first time in its history.

The most important aspect of Macrolan, however, is its role in building larger systems. ICL plans to use it to create dyadic and quadratric systems. This year, ICL will offer a dual Level 30 system rated at 4MIPS and a dual Level 80 system that at 20MIPS matches IBM's 3090 model 200. By 1987, ICL says it will be offering quadruple Level 80s. "We hope to beat the 3090 model 400 to the marketplace with our quadruple Level 80," says John Gardner, ICL's director of business strategy. "It will be the first time ICL will have a more powerful machine than IBM."

That is important to ICL because the company's ego has taken a bruising from such companies as IBM and DEC. Even in Britain ICL's failure to secure new customers has driven its mainframe market share down to around 25%. In the market for scientific, education, and distributed business systems, ICL has had to stand by and watch American minimakers snap up big orders. ICL hopes the new systems will enable it to gain a percentage point of share each year into the 1990s.

The collaboration between ICL and Fujitsu was the brainchild of ICL chairman Robb Wilmot, who was brought in to rescue ICL from near bankruptcy in 1981. Wilmot's aim at the time was to catapult ICL mainframe technology from relatively old integrated circuits straight to VLSI in a single bound.

ICL became the first firm to design an 8,000-gate CMOS chip with Fujitsu, and is the only Cube customer to demand a reworking of the technology to its own specifications. Working together, ICL and Fujitsu have produced 47 CMOS chips for the Series 39.

Although ICL has toyed with the idea of adopting IBM compatibility to help sell systems, the new machines are compatible with ICL's current 2900 range of systems. The company's mainframe oper-

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ating system, VME, has been updated to handle what ICL calls the nodal style of operation in Series 39 systems.

The new VME features may have contributed to the year-long delay in bringing out the Series 39, although ICL maintains that it held off deliberately in order to continue selling its 2900 range.

In addition to VME, ICL also plans to offer Unix as an option on Series 39. The company recently joined with five other European manufacturers in a campaign to persuade software houses to produce Unix applications using standard tools produced by the six mainframers. While Unix may not be crucial to ICL's existing customer base, Gardner explains that Unix will help to broaden the appeal of ICL's mainframes, particularly in markets where ICL is weak. "A lot revolves around Unix," he says. "We need international mainframe accounts and Unix will give them to us. At present we have a shortage of mainframe applications software, and at £5 million to develop a new package, third-party software suppliers are not going to fill that gap unless there is a wider market for them."

U.S. users are unlikely to be troubled by ICL salesmen looking for those international accounts. ICL has tried the U.S. before and gotten a bloody nose for its pains. This time the company plans to look for niche markets, such as the financial sector.

ICL will bank on the appeal of its CAFS-ISP disk search hardware to U.S. financial institutions that need to search large file stores very rapidly. But action on this front is unlikely before 1986. "I'm a bit cautious and I don't want to get wrapped around a second venture in the U.S. at the moment," Gardner admits.

In the meantime, ICL plans to concentrate on its existing U.K. users. The company is well aware that it has lost out recently on sales of distributed systems to existing mainframe customers due to its lack of a product like the Level 30. The company already has orders for some 120 Level 30s and for 40 Level 80s, which will keep it busy through the end of the year.

"We have a shortage of applications software, and at £5 million to develop a new package, a lot revolves around Unix."

ICL's present 2900 range is built around the 2966 uniprocessor. The Level 80 is four times as fast as the 2966, while the Level 30 offers half the 2966 performance. Improved throughput on the new systems has been achieved by reducing the number of clock cycles required to execute an instruction. The Level 80 executes an instruction every seven cycles, compared with 12 for the 2966.

A basic Level 30 configuration with four megabytes of main memeory, two 300MB disk units, and ICL's CAPS-ISP fast disk search hardware, will cost $190,000. A basic Level 80 with the same peripherals but with 16MB of main memory, will set ICL customers back some $1.5 million.

ICL is also selling Fujitsu's Eagle and Swallow disk drives with the Series 39. The Japanese units offer considerably more capacity than ICL's current products. Sold under the FDS 2500 name by ICL, the Eagle has a 2.5-gigabyte capacity, while the Swallow, rechristened the FDS 300, is a 300MB drive. Fujitsu has also supplied ICL with a new tape drive for the range.

ICL is preparing its existing customers for Series 39 by offering upgrades to four systems in the 2900 range. The upgrades include attachment to the Oslan network and access to the larger Fujitsu drives.

With the arrival of the new systems also comes a new attitude. For the first time ICL seems prepared to compare itself with IBM and DEC. Gardner points

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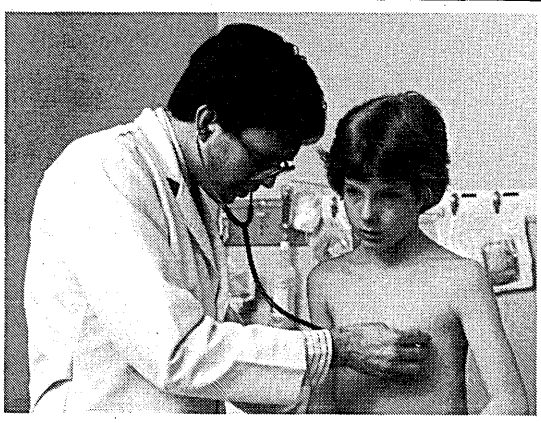

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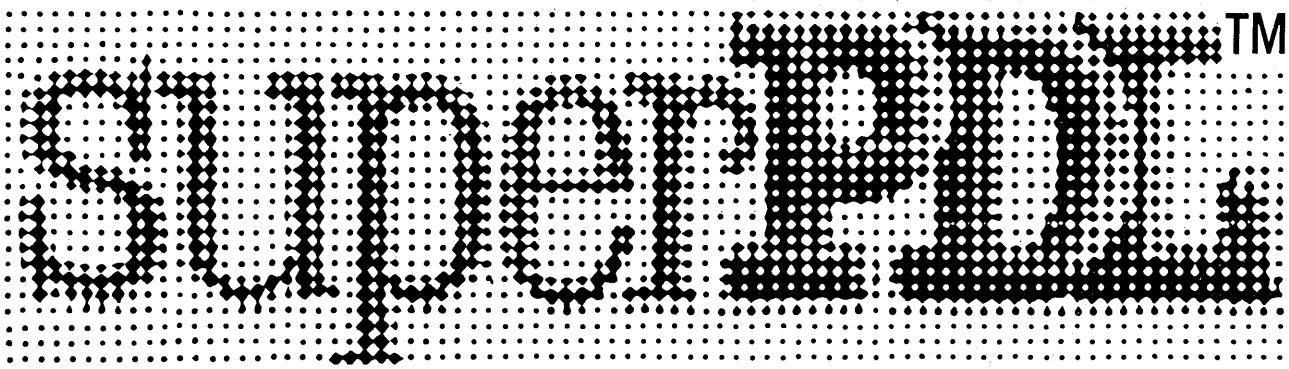

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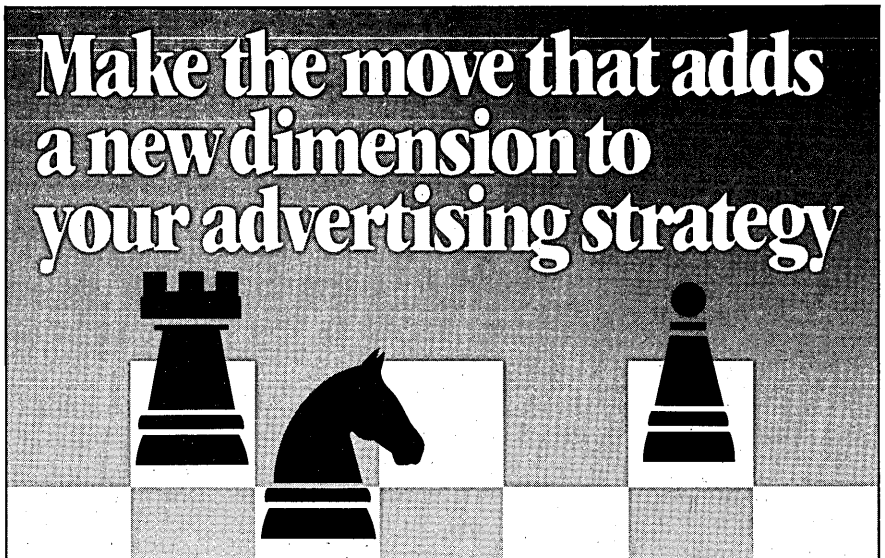

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out that the smaller Level 30 has been designed to behave more like a supermini than a mainframe in a deliberate bid to take on Prime, Data General, and DEC. "These systems are vital to our future as a mainframe company in the 1990s: they have to be a success." ◉

MANUFACTURING

R2D2 MEETS G'WRENCH

General Motors just purchased chunks of five robotic vision companies, and is betting that half the robots in its factories will have eyes.

by Irene Fuerst

For R2D2, a job on an assembly line would be like a stint in a sensory deprivation tank. Real-life robots are primitive creatures, especially when stacked against the human beings they are being designed to replace. People, after all, use their eyes to tack or weld seams, spray paint, or even carry objects from place to place. So far, nearly all of the 15,000-odd robots working in the U.S. are blind. Efforts are being make to change this state of sightlessness.

Although standalone machine vision systems are finding homes in factories, generally as identification or inspection systems, only about 10% of the robots being sold have vision, according to Gerald Michael, an analyst with Arthur D. Little in Cambridge, Mass.

Michael estimates that less than 15%, or $60 million, of the total domestic robotics market of $400 million last year were vision systems, but that segment is growing faster, about 40% to 50% yearly. No matter that the numbers still seem insignificant in the overall factory automation market, there's a definite pickup in interest in vision systems.

Robotic vision has progressed to the point where potential users, such as automakers, are making multimillion-dollar investments in robotic vision R&D. Just a few weeks ago General Motors, for example, bought into its fourth and fifth vision companies. These are not just passive investments—each has received equipment orders from the giant automaker, which has announced plans to spend $40 billion on factory automation over the rest of the decade.

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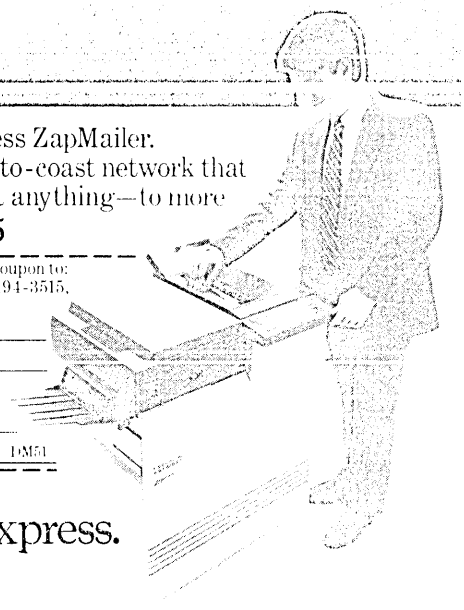

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ments are with View Engineering, of Simi Valley, Calif.; Robotic Vision Systems Inc., of Hauppauge, N.Y.; Diffracto, of Windsor, Ontario; Applied Intelligent Systems, of Ann Arbor, Mich.; and Automatix, of Billerica, Mass., an industry leader.

Although the details of each agreement vary, the general outlines are the same. Since the summer of 1984, GM has purchased about 15% of the four, with an option to buy up to 30%. Along with bankrolling specified projects, GM will allow its partners access to its proprietary machine vision systems and its not inconsiderable expertise in the area—the automaker has been tinkering with vision systems for more than five years. GM will retain the exclusive rights to any products for about 18 months, and after that will receive a royalty on each sale.

For GM, adding machine vision and machine intelligence is another logical step in its factory automation process. "Each company has a particular strength that interests us," explains a GM spokesman. The automaker is already using sighted robots in the manufacturing process of its intermediate "N" cars like the Pontiac Grand Am, Buick Somerset Regal, and Oldsmobile Calais—inserting window glass, attaching parts of the suspension, and assembling doors.

Sighted robots are employed in arc welding, spray painting, printed circuit board stuffing, or muscle tasks such as hanging car bodies on a rack.

The GM Technical Center in Warren, Mich., is also working with machine vision and robotics. Jerry Elson, executive director of machine intelligence technical implementation, says that eventually about 50% of all robots will have vision.

More than in-house technology is at stake when GM is involved. It also sells robots, as a partner in GMFanuc Robotics Corp. (GMF) of Troy, Mich., a joint venture with Fanuc Ltd. of Japan. Gary Rutledge, manager of machine perception, says that by 1990 the market will demand sighted robots. "To be tomorrow's robot company you have to be today's vision company," he says. With GMF already holding a significant share of the robotics market—estimates range from a quarter to a third—the company is clearly leading the way in this technology.

The real payoff on robotic vision for GM and others will not arrive for several years, though, say experts. Many users, while keeping abreast of the technology, haven't found sighted robots robust enough for the grueling pressures of assembly-line work. "It will be several years before we see a significant number of robots shipped with vision," says John Evans, president of Transitions Research Corp., of Hartford, Conn. "They are hard to justify economically." Transitions Research is one of dozens of recently founded companies in the business, but with an important pedigree—it was created by Joseph Engelberger, called the father of robotics for cofounding Unimation, the pioneering robotics company now owned by Westinghouse.

Sighted robots that have made it to the factory floor are generally employed in arc welding, spray painting, printed circuit board stuffing, or muscle tasks such as hanging car bodies on a rack.

Workable vision systems will remove one of the biggest barriers to widespread use of robotics. The items a sightless robot manipulates must be presented in exactly the same orientation. Thus, if a robot is picking cups off an assembly line, each cup must be in exactly the same position as its predecessor. The great advantage of a sighted robot is that it ought to be able to adjust its actions to what it sees.

A vision system relies on one or more microprocessors, often Motorola 68000s or proprietary chips, to analyze what it sees through its camera. Different types of image analysis include edge detection, where the system recognizes a clearly defined two-dimensional border, and a more advanced "gray scale" system. This more complex method digitizes the captured image into several shades of gray. Since the robot and the vision system are separate, getting the two to communicate sometimes means adding another computer as a go-between.

The various software techniques and the massive amounts of data that must be manipulated have been significant impediments for even the most advanced dp vendors. IBM, for example, does not see a significant market for robotic vision systems, although it uses a few internally for parts acquisition, according to Bruce Haupt, director of sales operations for IBM's Manufacturing Systems Products organization of the Robotics group in Boca Raton, Fla. Says Haupt, "Where vision is practical is in parts acquisition—allowing a very intelligent robot the capability of accessing a part that is loosely oriented. Up to this time the process was slow and expensive for most small parts assembly. It is more cost-effective to regulate parts so that a robot can use tactile sensing." IBM also sells its own robots as well as some from Japanese suppliers. Although few have seen it, IBM's Boca Raton PC factory uses the mechanical arm-type robots.

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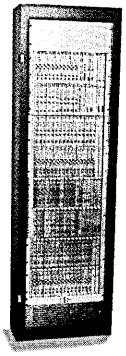

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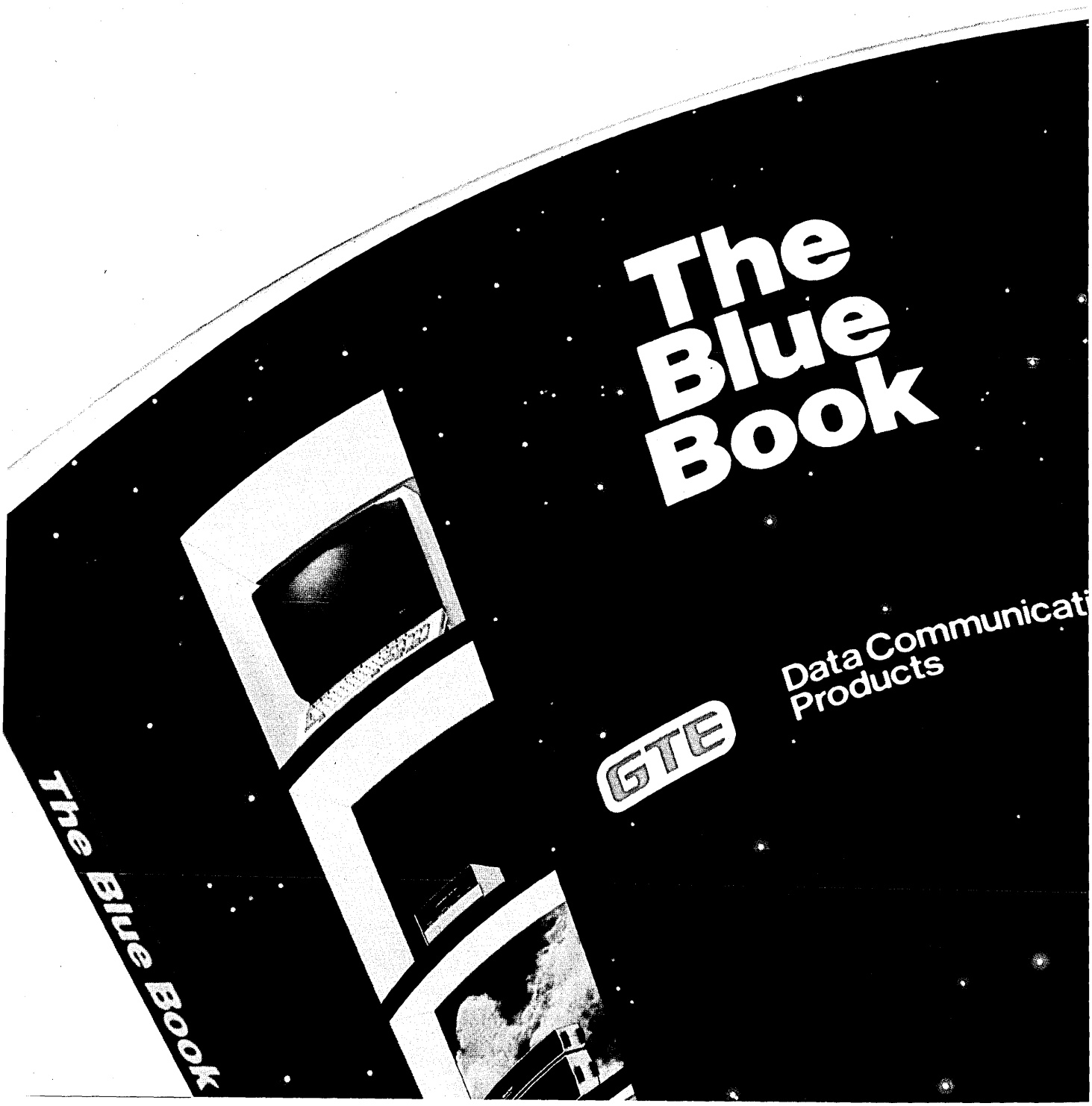

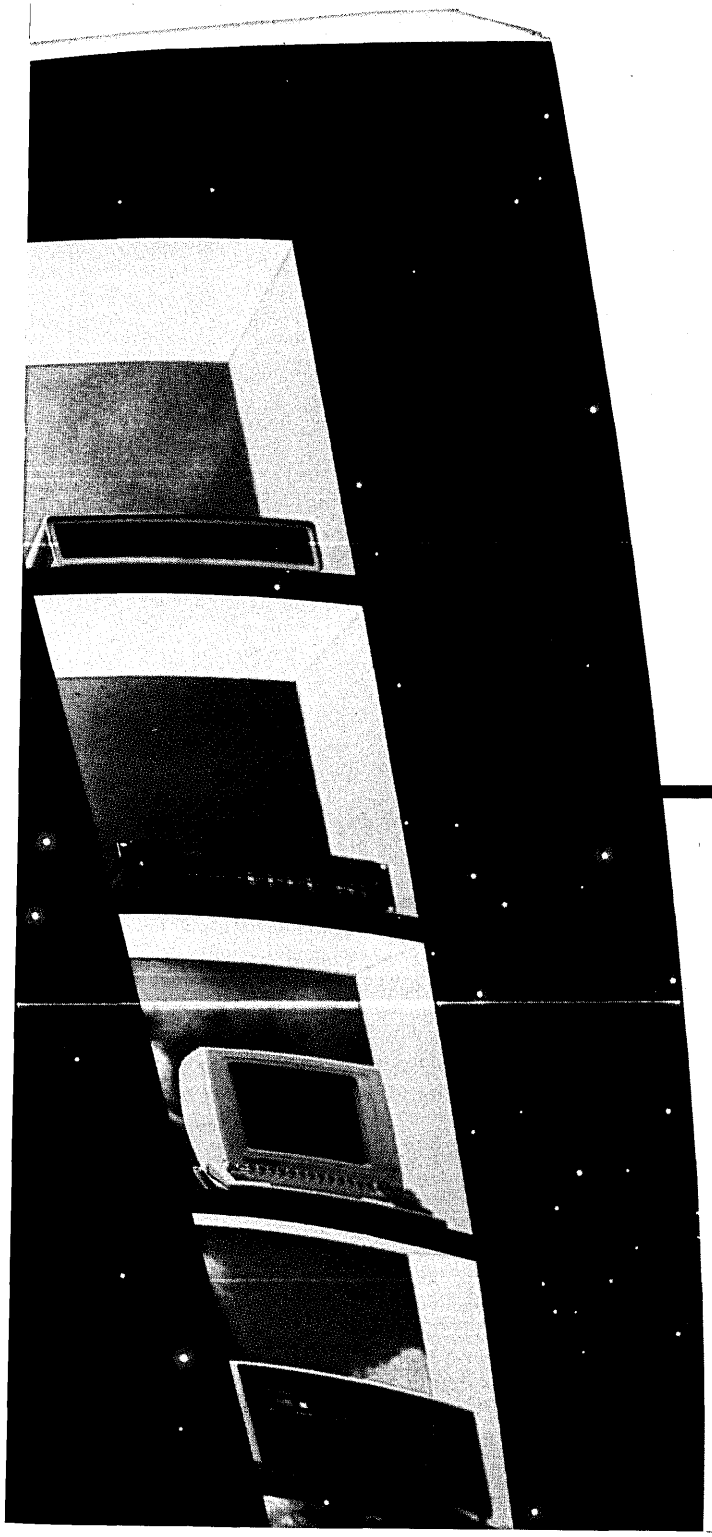

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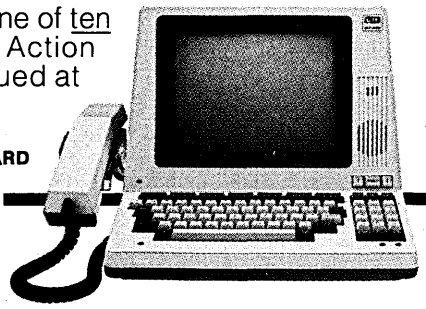

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threshold of the dawn of the robotic vision market is also seen at the Ford Motor Co. Vision consultant Robert S. Richards says he is evaluating 25 or 30 robot applications and one or two vision systems. Within Ford he estimates there are 50 to 75 vision systems, but few are on robots. "We look at robotic vision for some applications where that's the only way to do it, but from a user's viewpoint we're looking for the lowest technology solution to a problem," he says. "We're not interested in using vision-guided robots if we can do the job without vision. Vision systems are not factory proven for the most part." The complexity in linking the robot to its "eyes" and the heavy dp resources to make it all work fast are the obstacles, he explains.

Manufacturers are on the threshold of the dawn of the robotic vision market.

IBM's Haupt elaborates by saying that "the parameters are so broad—there's tremendous variance in any vision application." Variables that affect a system's ability to recognize an object include variations in the part itself, its reflectivity, contrast, and the ambient lighting. Another problem with vision systems is speed. "The processing time is very slow. It might take a second to take a picture and figure out where the object is, while the robot is waiting," says Haupt.

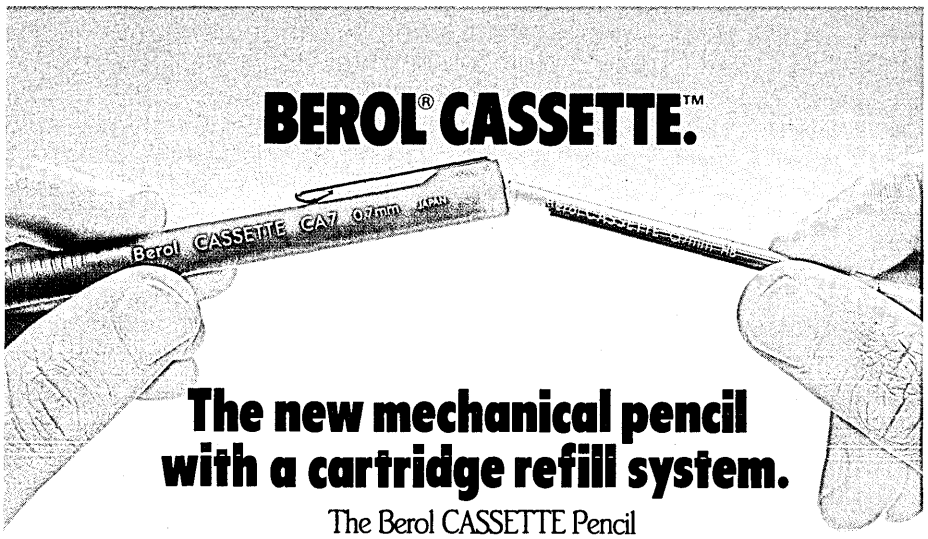
The high cost of adding vision to a robot is a handicap yet to be overcome. A vision system can cost as much as the robot it is supplementing. This is due to the fact that the vision technology improvements and cost reductions have not kept pace with robotics innovation: prices for small assembly robots have declined rapidly with increased competition and improved electric motor technology. Ford's Richards terms a $30,000 accessory for a $20,000 to $100,000 robot "marginally justifiable."

Another more mundane barrier to robots with vision is the amount of work entailed in installing a system. "We don't want to spend time putting together a system," exclaims Richards. "We want our suppliers to do that. We don't want to develop the technology. GM does not want to develop the technology. That's why they bought five vision companies. The best way would be to get the vision companies and the robot companies to put systems together and work with us to develop applications."

"We look at robotic vision for some applications where that's the only way to do it, but from a user's viewpoint we're looking for the lowest technology solution to a problem."

Other manufacturers in less technologically advanced fields are taking a close look at vision systems, but the view is still cloudy. "We're not using any vision robots as such for production work," says Bob Maller, manager of manufacturing planning and technical applications at farm implement maker Deere and Co., Moline, Ill. Although Deere is a beta site for a robotic vision system, Maller's assessment is that robotic vision "doesn't seem refined enough at this time." He declines to name the vendor of Deere's system.

The state of contemporary robot vision is best summed up by Ted Lane, president of Applied Robotic Technology of Concord, Calif.: "I hear a lot about vision in robotics, but in reality very few are out there." To paraphrase a celebrated statement made by a former GM official many years ago, what looks like it has potential for GM may very well offer something to the rest of the country. ◉



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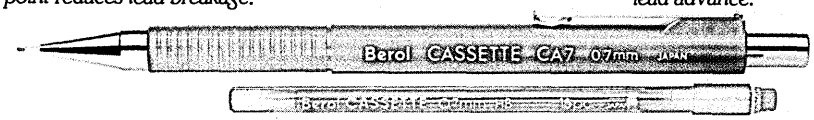

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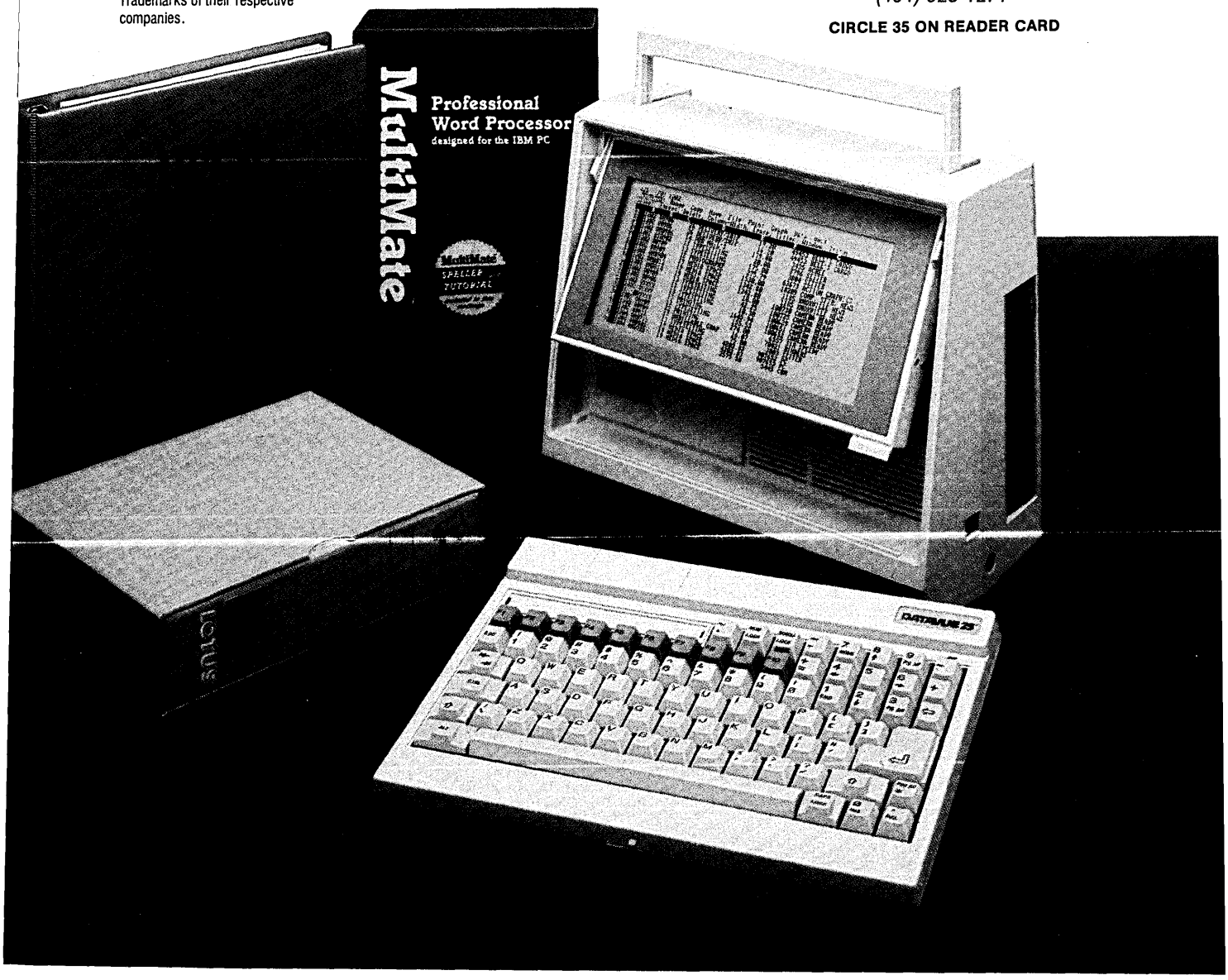

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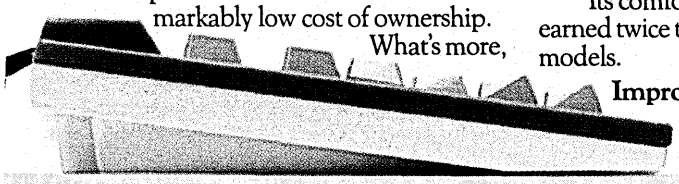

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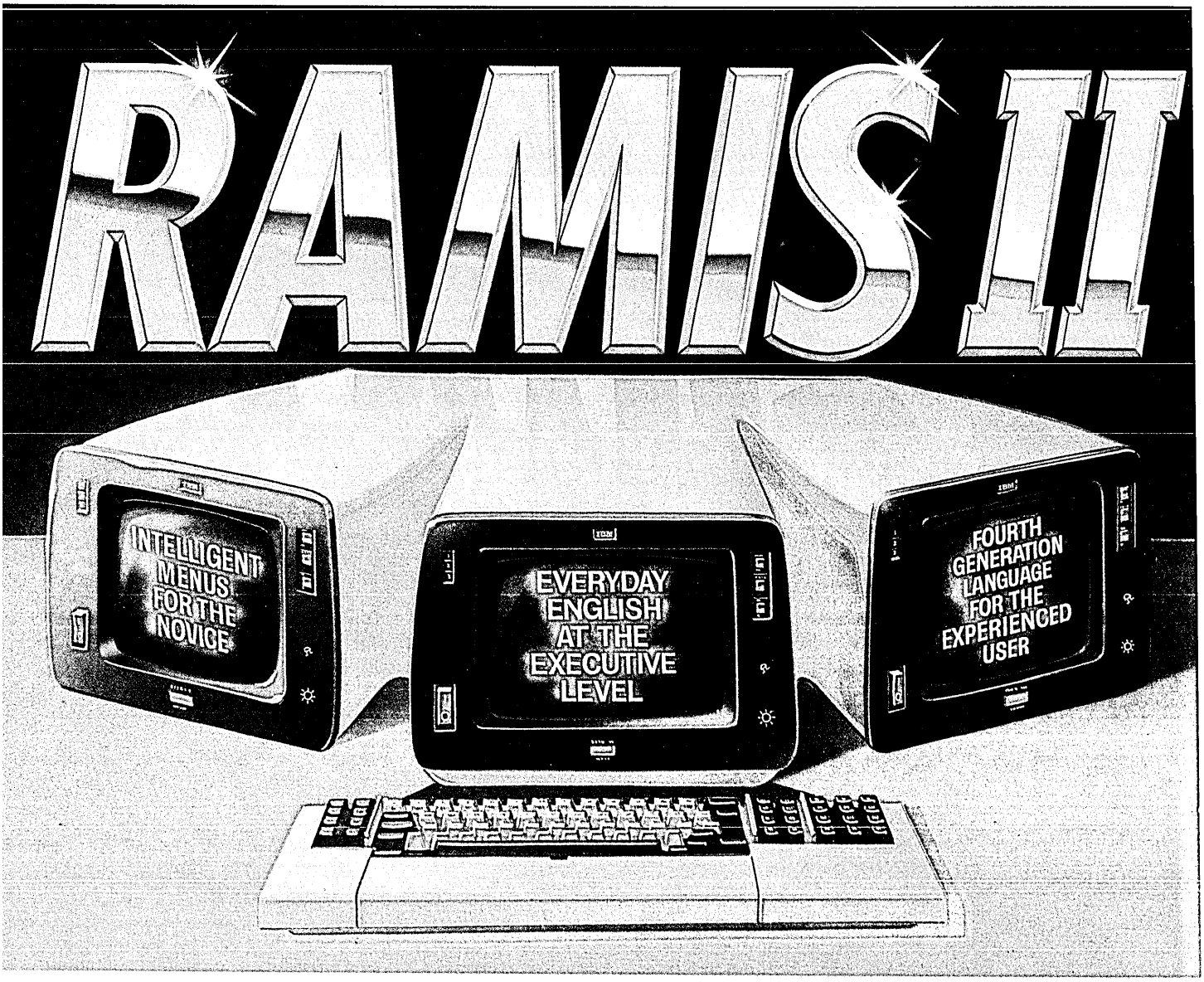

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NEWS IN PERSPECTIVE

MICROCOMPUTERS

DAVID WHIPS GOLIATH

A tiny upstart has snatched an $85 million Navy contract from giant defense contractors like Sperry and Zenith.

by Willie Schatz

Maybe there is some poetic justice out there after all. Why else would the government's biggest transportable computer contract be awarded to the littlest guy in the game?

We're talking at least $85 million here, folks. A speck in the Navy's budget, to be sure, but a significant piece of business for Federal Data Corp., Rockville, Md., which will put the systems together, and perhaps a new lease on life for Seequa Computer Corp., Annapolis, Md., which will supply the basic machine. The Navy may want up to 36,000 over the next three years.

Federal Data, which before being declared the official winner had to pass a rigorous functional test and survive any protests by the losers, beat five other bidders. Zenith, M/A-COM, and Sperry, all experienced in the ways of military procurement procedures, were among those who went home unhappy. Sperry may have been the glummest: it thought enough of this business to submit four bids.

The competition wasn't even close, either. Fed Data was $3 million better than Sperry. "We felt we could beat them," says Fed Data vice president Larry Smith. "But I'm surprised it was by this much. I thought it would be closer. I'm also surprised Sperry beat Zenith. It's the first time I've seen them even that close."

The elation carried over to Fed Data's principal supplier for the contract. "It feels darn good beating Sperry and Zenith," admits Jim Hoffman, Seequa's vice president. "There's no question we ruffled a lot of feathers. Very few people thought we'd win."

To do that, Federal put its money up front. It started with the highest basic system price of any bidder. It finished with the lowest.

"Federal made a gutsy bid," says Terry Miller, president of Government Sales Consultants Inc. (GSCI), a leading Washington consulting firm. "If the Navy orders 500 in the first year and 20,000 in the second, they could get hosed.

"But the real question is whether the Seequa machine is viable. A lot of folks think Seequa is about to collapse."

Seequa doesn't happen to be in with that crowd. The two-year-old privately held company, like the rest of the industry, has experienced explosive growth since its inception. Future Computing, the Dallas research firm, puts Seequa's 1984 shipments at 55,000 and revenues at $80 million. Dataquest, San Jose, projects the company will ship 28,400 units worldwide this year and take in $64.3 million in revenue.

"Eighty million dollars is a respectable number for a company that started in '83," says Future Computing's Bill Ablondi. "But it wouldn't take much for them to go under. If they make any mistakes, they could fail."

Seequa thinks it will pass this test quite nicely, thank you.

"We've heard that talk and it's just rumor," says Seequa's contract manager, Don Blewitt. "True, this is the largest contract we or anybody else have been awarded. But we've got enough going so that we can handle any production requirements."

Even 1,000 a month, which may be the Navy's high hand. And what, you may ask, is the Navy going to do with all those machines?

"They're going to be used by Navy and Air Force personnel for nontechnical situations," says Ed Nash, the Navy's contracting officer. In nonmilitary language, that translates into office automation. "They're going to be for normal business use. It's a generic-type computer."

"If the Navy orders 500 in the first year and 20,000 in the second, Seequa could get hosed."

It surely wasn't a "generic-type" procurement.

The Navy did an unusual two-step on this one. Rather than the usual request for proposal (RFP) procedure it normally takes, in this case it chose the invitation for bid (IFB) process.

In that mode, the first step is soliciting bids from interested parties. Then, after a rigorous review by the Navy techies, the survivors put in their bids. Then, just like the Oscars, the Navy opens the envelopes. "This was a gutsy move by the Navy," says Ray Lunceford of GSCI. "One shot and the low bidder wins. It's a hardball game. They're putting the heat of competition on the vendors. A dollar more, you lose the contract. A dollar less, you don't want the business. It will be a

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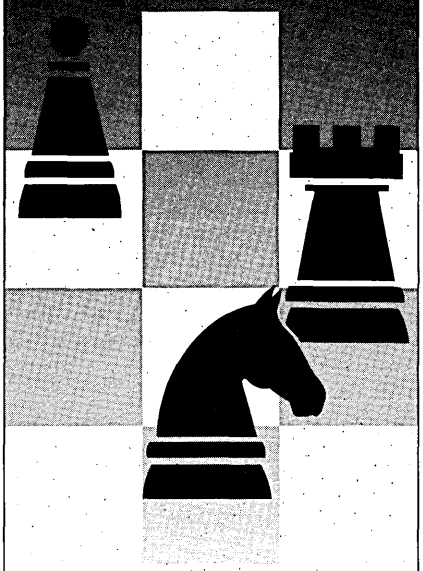

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NEWS IN PERSPECTIVE

good deal for the taxpayers.

"This type of procurement leaves very little room for chicanery."

Well, maybe. Two of the competitors thought there was some, although they changed their minds at the last minute.

Quadram, the Atlanta board maker, thought its Datavue 25 portable processor was the best machine for the job. A late 1984 addition to the Datavue 80-300 line, the machine uses MS/DOS and BASIC. International Research & Information Systems (IRIS), Fairfax, Va., also told the Navy that the Datavue 25 processor, in an IRIS configuration, was the way to sail.

It may have been. But neither firm could prove it to the Navy's satisfaction on paper.

Both proposals were declared technically unacceptable for two reasons. The solicitation requires the delivery of a diagnostic software program to test the electronic circuitry and the mechanical components of the cpu, main memory, internal disk drives, keyboard, peripherals ports, and communications interface. The Navy ruled that Quadram and IRIS failed to furnish a manual demonstrating the existence of such a program.

This is the military, remember. So they really do it by the book.

Unfortunately for the two companies, the military's book doesn't have pictures. Thus, Quadram's photos of successive monitor screens purporting to demonstrate the diagnostic software program in operation were irrelevant, immaterial, and inadmissible.

The solicitation also requires that the machine be furnished with a port outputting either IBM's standard red, green, and blue (not necessarily big) video signal or a composite video signal. The Navy said Quadram and IRIS flunked this test, too. In this game, two strikes were enough. The companies would not pass Go, would not collect $85 million, and would not advance to Step Two.

"The purpose of your proposal was to convince the government that your organization could and would satisfy the requirements of this particular procurement," the Navy wrote. "Your proposal failed to convince the government."

Don't take it personally, fellas. "This decision does not have a negative bearing on the capabilities of your organization, merely that your proposal did not accomplish its purpose," the Navy went on.

Sez you, Quadram and IRIS shot back. As Yogi Berra said, it ain't over till it's over.

Both firms then protested to the General Services Administration Board of Contract Appeals, saying they were wrongfully excluded and that Sperry and J-4 had been dismissed in Round One, then allowed to return, no questions asked. J-4, a Rockville, Md., dealer, denied that allegation. Sperry refused to comment.

Zenith clammed up as well. The company may have figured it had the inside track due to its winning recent Air Force contracts worth $29.3 million and $100 million. But it reportedly didn't have a machine that met the Navy's weight requirements. So what was it doing here?

Neither company would talk about it, but sources indicate that Zenith had scotched a deal with Matsui, a Japanese manufacturer, and married Morrow, San Leandro, Calif. Matsui was reportedly dumped because Microsoft was having trouble with the ROM-based software it

"A dollar more, you lose the contract; a dollar less, you don't want the business. It will be a good deal for the taxpayers."

was developing for the machine. Morrow, on the other hand, was ready to go with its 10-pound Pivot product, featuring two drives, a five-hour battery-operated processor, and an electroluminescent screen.

One source indicated that not winning the contract would delay Zenith's introduction of the machine it planned to use for the Navy. A Zenith representative would only say, "I can't talk about it, but that is not the Zenith way."

Back at the protest table, Quadram and IRIS decided they'd gone about as far as they could go. An hour before their hearing was to start, they bagged it.

"We were led to believe that other Step Two bidders had been found to be technically unacceptable, as we were, but were then let back in," says Jeff Christie, Quadram's attorney. "We were also led to believe that other parties submitted information after the deadline. When we found out information about both questions, we were satisfied that there was nothing improper."

Christie adds, "This isn't the end of the world. It was our first procurement, but it won't be our last. There will be plenty of others."

Maybe. They may be somewhat more crowded, though, especially when word gets out that David whipped two Goliaths at their own game.

"This is a high-value, prestigious contract. Every company with the possible exception of Apple and IBM could get a lot of mileage out of this for the future," Seequa's Hoffmann says. "We have to keep some level of innovation in this industry or it will be stifled by the major players.

"I think this is going to encourage

What every Apple II+ and IIe user should ask before buying the "Sider" 10 MB hard disk:

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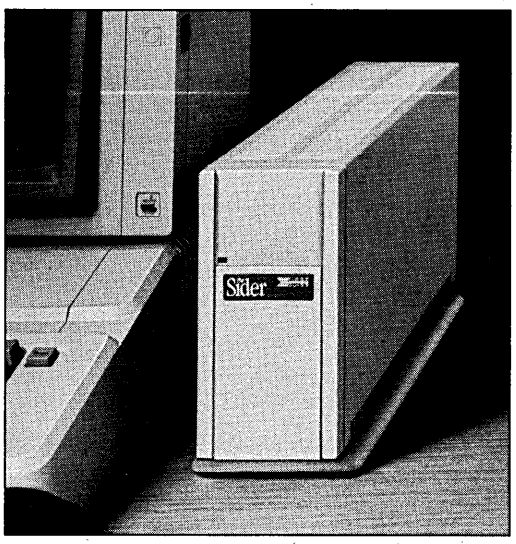

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What's more, a small "footprint" lets you incorporate the compact Sider into your existing computer set-up with ease.

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What makes it so reliable?

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Special design features further enhance reliability. The Sider's controller is the field-proven, industry standard Xebec S1410A. And Xebec's 3200 drive tester, the toughest in the industry, ensures that the Sider will operate reliably. One more assurance of the $695 Sider's quality: it's UL Approved and FCC Class B rated.

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The Sider also comes with a full one-year limited warranty. Plus, there's a convenient, toll-free hotline you can call anytime you have a technical or service question, or need help.

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people to be more innovative. A lot of people thought Sperry and Zenith had the inside edge for government business because Sperry is so experienced and Zenith had those Air Force contracts. Now people know there's a new player in town."

The kid obviously knows the rules, too. ◉

SHAKEOUT

BUSINESS AS UNUSUAL

Datapoint may not be carved up, but customers still wonder how much blood they'll lose.

by Karen Gullo

"Business as usual." That's the company line at Datapoint Corp., the San Antonio-based maker of office automation systems, but business has been anything but usual in recent weeks. A takeover by a corporate raider with a reputation for buying up companies and selling them off piecemeal has produced a drop in sales and a high degree of concern—indeed, panic—among customers. Some are apparently ready to jump ship.

"If Edelman breaks up the company we'll be looking at other vendors," says Paul Kedo, manager of information systems at I C Industries, a Chicago-based holding company that owns, among other things, Illinois Central railroad and Pet Milk, with 1984 revenues of $4.2 billion. Datapoint officials acknowledge they're concerned over the potential loss of customers, but claim business will "return to normal" soon. Users, analysts, and Wall Street are skeptical.

"There isn't much business as usual at Datapoint," says senior consultant Norm Weizer of Arthur D. Little Inc., Cambridge, Mass. "Sales have gone through the floor, and they've lost some of their key people. With talk of splitting up the company, the question is what will be left, and will it meet customer needs."

For three months Datapoint fought the takeover by the Wall Street wheeler-dealer Asher B. Edelman. As its stockholders clamored for a higher value for their shares, company directors tried to sell Datapoint in one piece to a large corporation like AT&T. But in the end, company chairman Harold O'Kelley resigned, and Edelman was named the new chief, although he is retaining president and chief operating officer Edward P. Gistaro. Upon manning the tiller, Edelman initially said he hoped to sell each of Datapoint's three divisions: manufacturing, international marketing, and service. Edelman and the other shareholders had hoped that the sums attracted for the parts would have been greater than the whole of its stock market value.

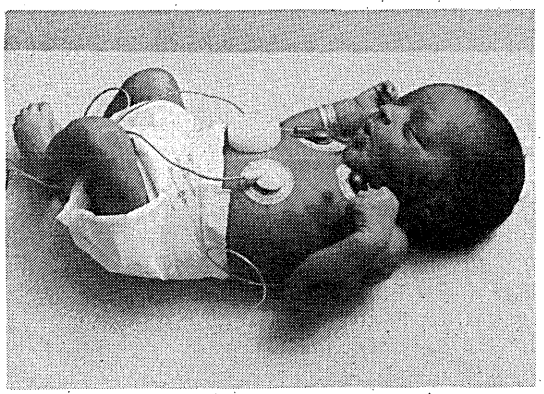
When no potential buyers came forward for two Datapoint divisions,

"I'd be an idiot not to be concerned about an acquisition by someone like Edelman."

however, Edelman drastically changed his tune. Rather than attempting to liquidate the company, he said he would "very quickly" sell the service unit—Datapoint's most profitable arm—perhaps to a service-oriented firm such as TRW, Cleveland, or Mohawk Data Sciences, Parsippany, N.J. Edelman recently won control of MDS and has been threatening to liquidate that company as well.

Edelman's reversal on the manufacturing division stems, he says, from new products to be announced this

We want to take heart defects out of the nursery.



It almost breaks your heart to see it. She's two days old and there's a question about a hole in her heart. She's fortunate. Something can be done about it. Each year, 25,000 infants are born with heart defects which can disable them for life.

The American Heart Association is fighting to reduce this form of early death and disability with research, professional and public education, and community service programs.

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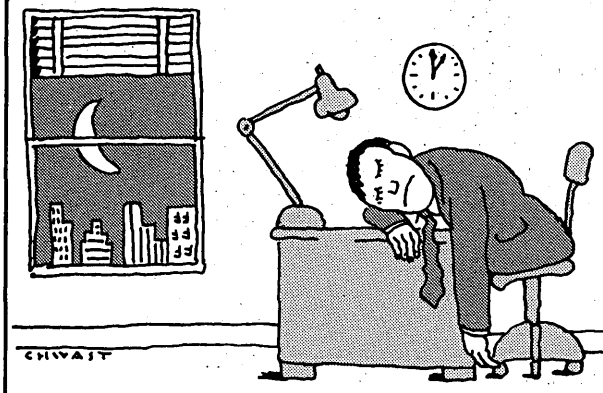

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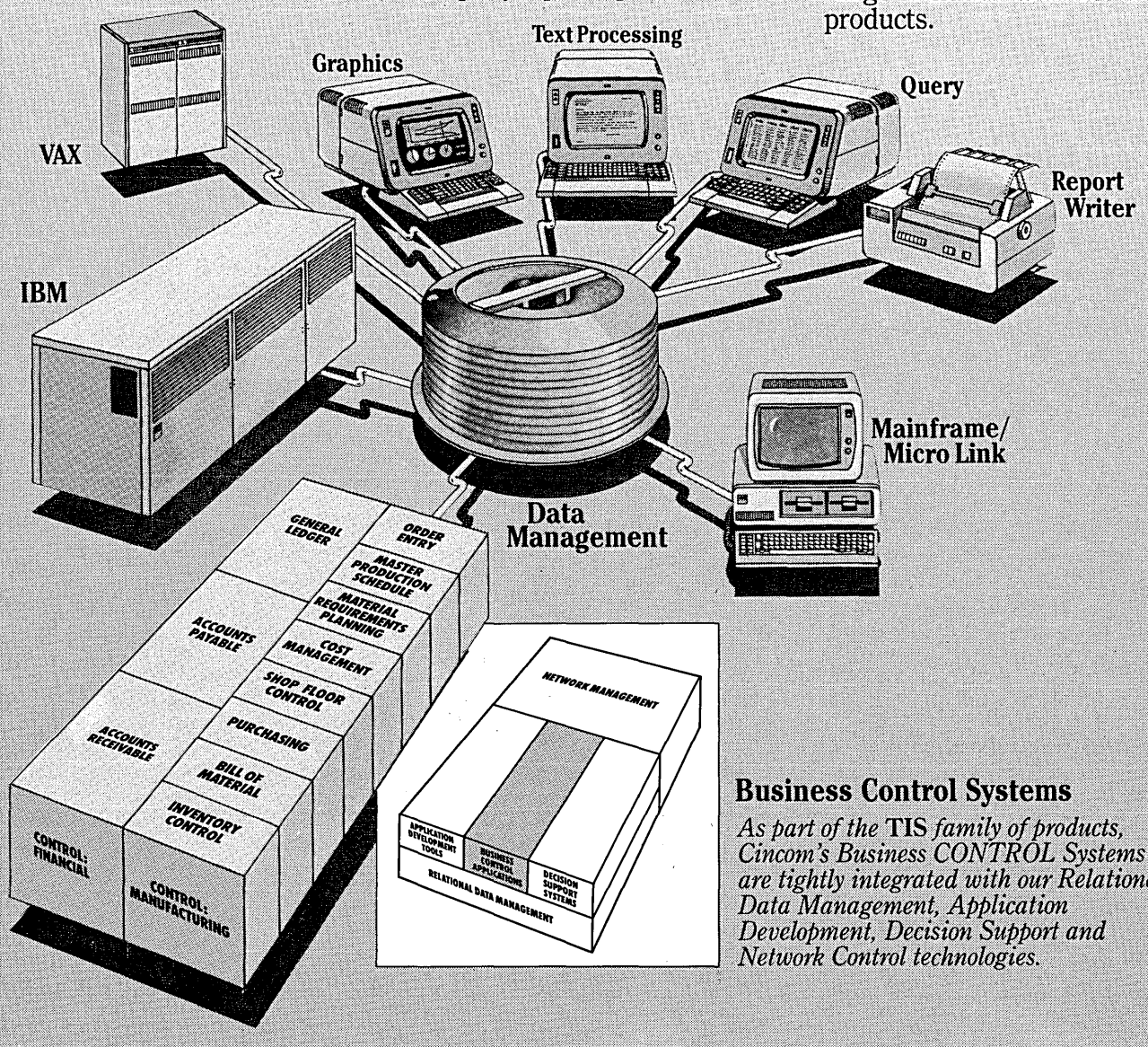

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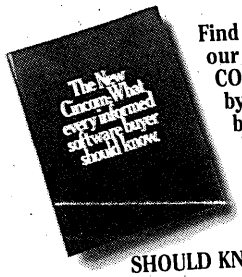

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spring. "I saw a technology I didn't expect to see," he explains. "I'm doing the thing that I think makes the most sense for shareholders. After all, I am the largest one." (Edelman owns 11.9% of the firm's 20.2 million outstanding shares.)

While the manufacturing division will be retained for the foreseeable future, the international marketing division will still be sold off, although not as quickly as the service division.

While Edelman and Gistaro are now committed to running the manufacturing division much as it had been run before the takeover, the battle between Edelman and the former management still has taken its toll on sales, not to mention customer morale. The company reported a $15.9 million loss on revenue of $129.5 million in the fiscal quarter ended January. It was the company's first quarterly loss since 1982.

Microcomputer companies are falling like flies, but the safety nets don't seem to be as strong, except for service divisions.

For many Datapoint customers and dealers, the Edelman takeover is a decidedly negative turn of events. Those interviewed by DATAMATION say they are concerned about the future of the company, and while some users profess brand loyalty, they confess to feeling trapped. "This leaves us uneasy," says Frank McQuade, MIS director at Swift Independent Packing Co., Chicago. "We hope they will continue to support the equipment we have, especially the software. I don't know what the alternatives are for the short term. We don't especially feel at risk now. Our plan for purchasing Datapoint equipment in the next year probably won't be affected, but after that we may have to look at other vendors."

Says another Datapoint customer who has a large number of the company's products, "I'd be an idiot not to be concerned about an acquisition by someone like Edelman. Datapoint is a good company. They do a great job with their local area network, better than anyone else in the business. If I needed to upgrade my system, I would have to look at Datapoint. What am I going to do? What are my choices? There's always Wang or an IBM PC cluster, but frankly, we can't afford a total retooling."

There's no telling how long it will take to sell off Datapoint's nonmanufacturing divisions, and in the meantime customers have few options. "There are huge software investments among Datapoint users, so they will have to wait it out and see what happens," he says. Weizer points out that in other sell-out situations in the past, such as RCA's mainframe division back in the early 1970s, there was a vendor, Honeywell, who picked up the pieces and provided a safety net of support and, most important, upgrade products for customers who felt abandoned.

Today, however, microcomputer vendors are falling like flies, but the safety nets don't seem to be as strong, except when it comes to service divisions, where there is still money to be made. "If RCA's users had been left without a vendor, there would have been lawsuits. Datapoint's customer base is large enough so that lawsuits are a distinct possibility unless someone steps in and supports the product line," Weizer explains.

What customers can expect from Datapoint in the future will depend heavily on the company's ability to keep critical personnel from leaving the manufacturing operation, Weizer says. "Without the key developers and engineers, Datapoint can lose the ability to enhance its products, which will affect the customer base."

Datapoint is not the first computer company to be taken over by Edelman. In 1983, Edelman started buying stock in Management Assistance Inc., a New York-based maker of small computers about half the size of Datapoint. He later won control of the board of directors and in January sold off MAI's service arm, Sorbus Service, and its systems manufacturing division, Basic Four Information Systems, to separate buyers. Sorbus went to Bell Atlantic for $180 million, as part of the former Bell operating company's plan to become a nationwide factor in the computer business via the acquisition route, while Basic Four went to private investor Bennett S. LeBow. Altogether, Adelman reportedly made $11 million on the deals. Last year he took control of Mohawk Data Systems and has been peddling its parts, but without much success at press time.

"A lot of Basic Four users probably said they were going to switch. The fact is, if you've bought a lot of one vendor's equipment, you're hooked, and it takes a lot to get out of it."

Basic Four continues to manufacture products under a version of its old name, MAI-Basic Four Inc., New York. "The sale unsettled a lot of people's lives, mainly users," says Bob Posey, a Basic Four dealer in Bellevue, Wash. "It was a good time for the stockholders, but the customers wanted to know what was going on. But after the initial shock, when the new owner took over, they probably didn't feel any big changes."

Posey says although Datapoint may indeed lose customers, "a lot of Basic Four users probably said they were going to switch to another vendor. But the fact of the matter is that if you've bought a lot of one vendor's equipment, you're hooked, and it takes a lot to get out of it."

Basic Four is better off today than it was before the takeover, contends Posey, because the company makes more cash selling parts to its former sister company, Sorbus Service, at higher prices, than it did when the two were owned by the same company. New investors can tighten fiscal controls while allowing the company to continue operations with minimal affect on customers, he says.

Late last year, Edelman launched a successful takeover battle against MDS, which resulted in his being named chairman of the board. In March, Edelman resigned the position due to a potential conflict of interest with his role at Datapoint. (He is still vice chairman of MDS.)

The big question at Datapoint is who will become the new owner of each piece. There's still a chance that Edelman will sell part of the company to AT&T or some other company anxious to get a firm foothold in the computer market by buying an installed base. Whatever happens, the corporation is likely to change in some big ways. "There will still be a Datapoint product, but the company will not be the same in six months," says Bruce Underwood, head of marketing at Chilson's Management Control, a major Datapoint systems house in Rancho Cucamonga, Calif. "There will be a whole new set of people and new policies. On the positive side, equipment orders can be submitted until July, and servicing provisions are good for five years. There's too much Datapoint equipment out there for the company to just go away, but it will be restructured."

"There's too much Datapoint equipment out there for the company to just go away, but it will be restructured."

This isn't the first time Datapoint customers have felt uneasy about the goings on at the company. A onetime Wall Street favorite, Datapoint made headlines three years ago when it was discovered that the company overstated sales in FY '81, resulting in a severe drop in earnings, from $49 million in 1981 to $2.4 million the following year. The company seems to have recovered. Revenues for 1984 were $600 million, but customers are once again wondering whether they want to invest in equipment made by a troubled company. Back then, nobody was questioning whether the company, its directors, and its developers would still be around in six months. Today, no one knows for sure. ◉

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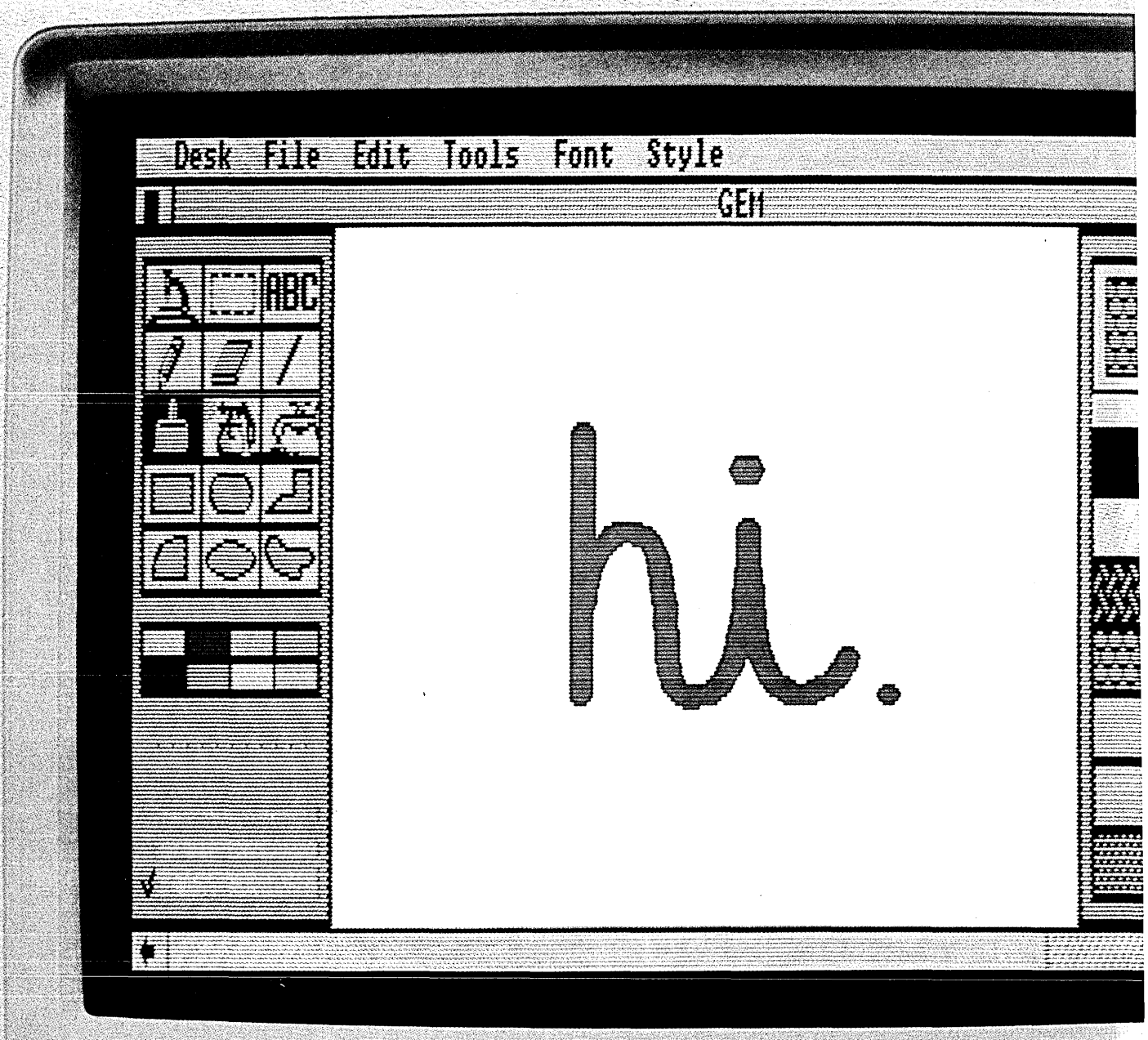

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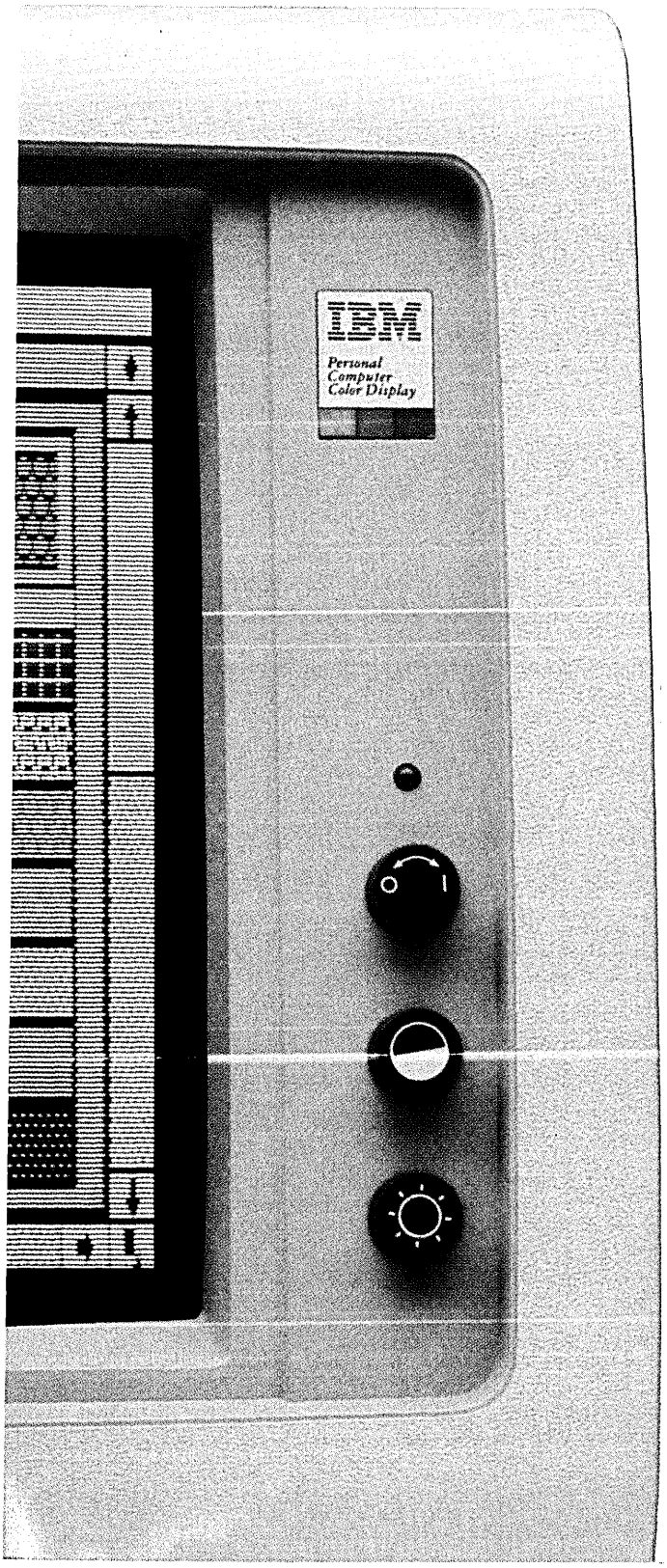

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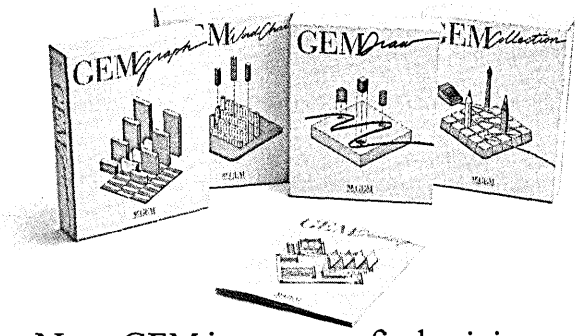

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NEWS IN PERSPECTIVE

BENCHMARKS

CLOSES PLANTS: Faced with deteriorating earnings, a seriously slackening order rate, and rising inventories, Wang Laboratories announced that it would close all five of its Massachusetts factories and one plant in Puerto Rico for two weeks in July. The company told all affected employees to take their vacations at that time, reinstituting the unified vacation schedule it abandoned in the U.S. in 1976. The firm's plants in Ireland, Scotland, and Taiwan still operate on a unified vacation schedule, the company said. Wang hasn't estimated the potential savings that will come from the shutdown, according to company general counsel and vice president Edward Grayson. Wang's order volume has slowed significantly in the past six months due to currency exchanges and the general slump in the minicomputer industry, Grayson added. The company has also suffered from a lack of customer confidence in its ability to provide viable office automation systems in an IBM environment, many users have charged (see "Dark Days at Wang," April 1, p. 32). Wang president John Cunningham said he expects the slowdown to last through the year and possibly through the first quarter of 1986. Wang recently reported that its earnings for the quarter ended March 31 fell by about a third over the same quarter in 1984.

NEW MAINFRAMES: Hot on the heels of IBM's Sierra announcement came introductions of two competing mainframes, from Hitachi and Honeywell. The Hitachi models, an M-680H uniprocessor and an M-682H dyadic configuration, were also announced in the U.S. as National Advanced Systems' AS/XL models 60 and 80. (See "Is the Door Open?" p. 36.) Honeywell's new DPS 90 series are Americanized versions of NEC's high-end mainframes, which are also being sold in Europe by CII Honeywell Bull. The five models support only the GCOS-8 operating system, despite Bull's strong endorsement of Unix. The mainframes are "competitive" with the 3090 series in commercial batch applications, and "significantly superior" in transaction processing or scientific environments, Honeywell said. Single, dyadic, triplex, quadratic, and fully redundant fault tolerant dyadic configurations were all introduced, for delivery this summer. Prices begin at $4 million.

CHARGES BURROUGHS: It amounts to no more than a light slap on the wrist, but the Securities and Exchange Commission's recent charge that Burroughs had overstated its earnings may foreshadow similar charges against other computer makers. The SEC filed an administrative proceeding, its lightest form of accusation, arguing that Burroughs had failed to write down obsolete inventory properly during the five consecutive quarters beginning July 1981. As a result, the SEC said, Burroughs overstated its profits in that period by $61.4 million, misleading investors about the company's financial health. Burroughs wrote down $154 million in obsolete equipment at the end of 1982, but "generally accepted accounting principles require you to make those judgments on a periodic basis, not just once every two years," according to the assistant director of the SEC's enforcement division, Bruce Hiller. "That equipment did not become obsolete all at once." Burroughs signed a consent order with the SEC, neither admitting nor denying the charges. The mainframer will restate its earnings, decreasing its quarterly profits by a total of $61.4 million for the five quarters in question and then reducing its 1982 year-end write-down by the same amount.

JAZZ DELAYS: For the first time in its short history, Lotus Development Corp. failed to ship a product on time, but the impact may have been more severe on Apple Computer than on Lotus itself. Combating continuing technical glitches on its Jazz integrated package for Apple's Macintosh micro, the Cambridge, Mass., software house announced that it would not be able to ship the product until May 27, two months later than it had initially said. While Lotus has been able to maintain sales of its older 1-2-3 and Symphony products, Apple has been waiting with bated breath for Jazz. "The lack of [Jazz] on the Macintosh just cuts this real wedge" between the Mac and Apple's targeted market, former Apple marketing manager Barry Smith said. Otis T. Bradley, an analyst with Alex. Brown & Sons in Baltimore, calculated that the delay will cost Apple about 15,000 sales of the machine. At over $2,000 apiece even in volume, that's over $30 million in lost revenue to Apple. To Lotus, meanwhile, the impact may be minor. Richard Sherlund, an analyst with Goldman Sachs, projected that Lotus would sell 95,000 Jazz products in 1985, for $28 million. That's a small piece of its projected $225 million in total revenue. The firm's 1984 revenues were $157 million.

KILLS JUNIOR: Even IBM makes mistakes, as its PCjr has shown on several occasions. Rather than continue struggling to sell the product, the industry leader halted all new production of its smallest computer last week. The move effectively killed the product, although IBM said it would continue to support the machine and to provide new software for it. "That our initial expectations were overly optimistic shouldn't detract from the product," an IBM spokesman said. Since the product was introduced in November 1983, about 250,000 units were sold; more than three quarters were shipped during the 1984 Christmas season, when IBM dropped the model's price to under $800 including a color monitor. IBM said it will suffer no financial impact from the decision. Analysts speculated that the firm may actually gain by being able to retool its Boca Raton, Fla., assembly lines to make more profitable members of the PC family or even the rumored PC2 upgrade to the basic PC.

BUYING . . . : Continuing to make good on its promise to increase its presence in the floppy disk market, Eastman Kodak announced that it had agreed to purchase Verbatim Corp., Sunnyvale, Calif. The Rochester, N.Y., firm would pay about $175 million for the floppy maker's outstanding shares. Under the agreement, which had not been finalized by shareholders and regulatory bodies at press time, Verbatim would operate as a subsidiary in Kodak's mass memory products division, which was formed last November following Kodak's announcement that it intended to expand its role in the floppy market. Since forming the division, Kodak has signed several contracts to remarket floppies made by others, contracts that it said it would continue to honor. "It had been Kodak's intent eventually to build floppies themselves through its own facilities," said Dean Witter analyst Eugene Glazer. When Verbatim approached Kodak, Glazer added, Kodak had the opportunity to buy the technology at a "somewhat distressed price." Verbatim's earnings have taken a beating in the past year, and the firm suffered a $9.2 million loss in the six months ended Dec. 28.

. . . AND SELLING: The final remaining hitch in IBM's takeover of Rolm was removed when the computer giant conditionally agreed to sell Rolm's Mil-Spec Computer division to a group of employees in a leveraged buyout for $97 million. The agreement may be canceled if another party is willing to top the offer made by the Rolm employees. IBM said that it is still accepting offers, although no other "firm" offers have been made. Several other companies, including Data General, "are actively participating in the bidding process," IBM corporate treasurer Jon Rotenstreich said. The division had sales of $43.6 million in the last six months of 1984, and sales of $81.2 million for the year ending June 30, 1984. ◉

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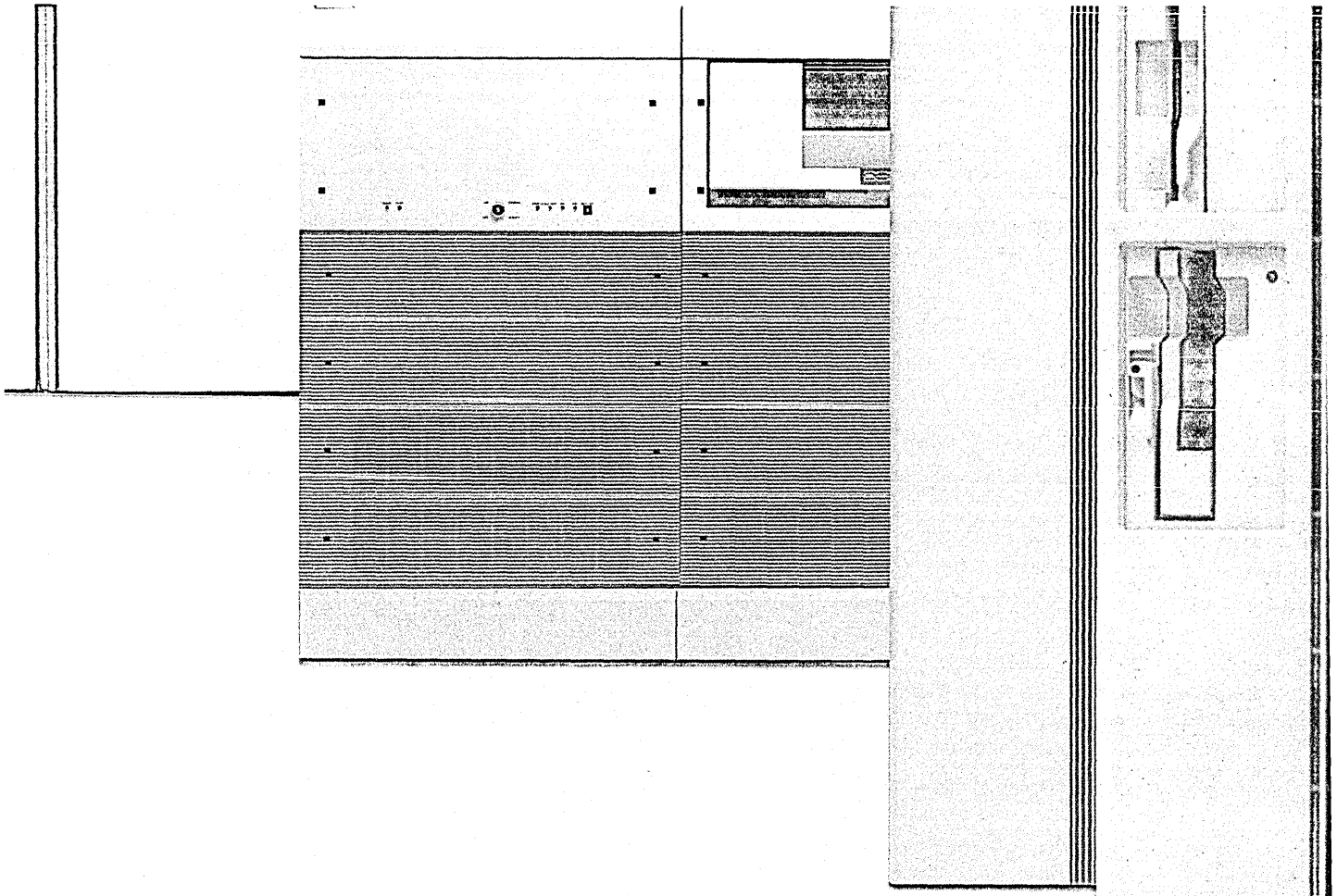

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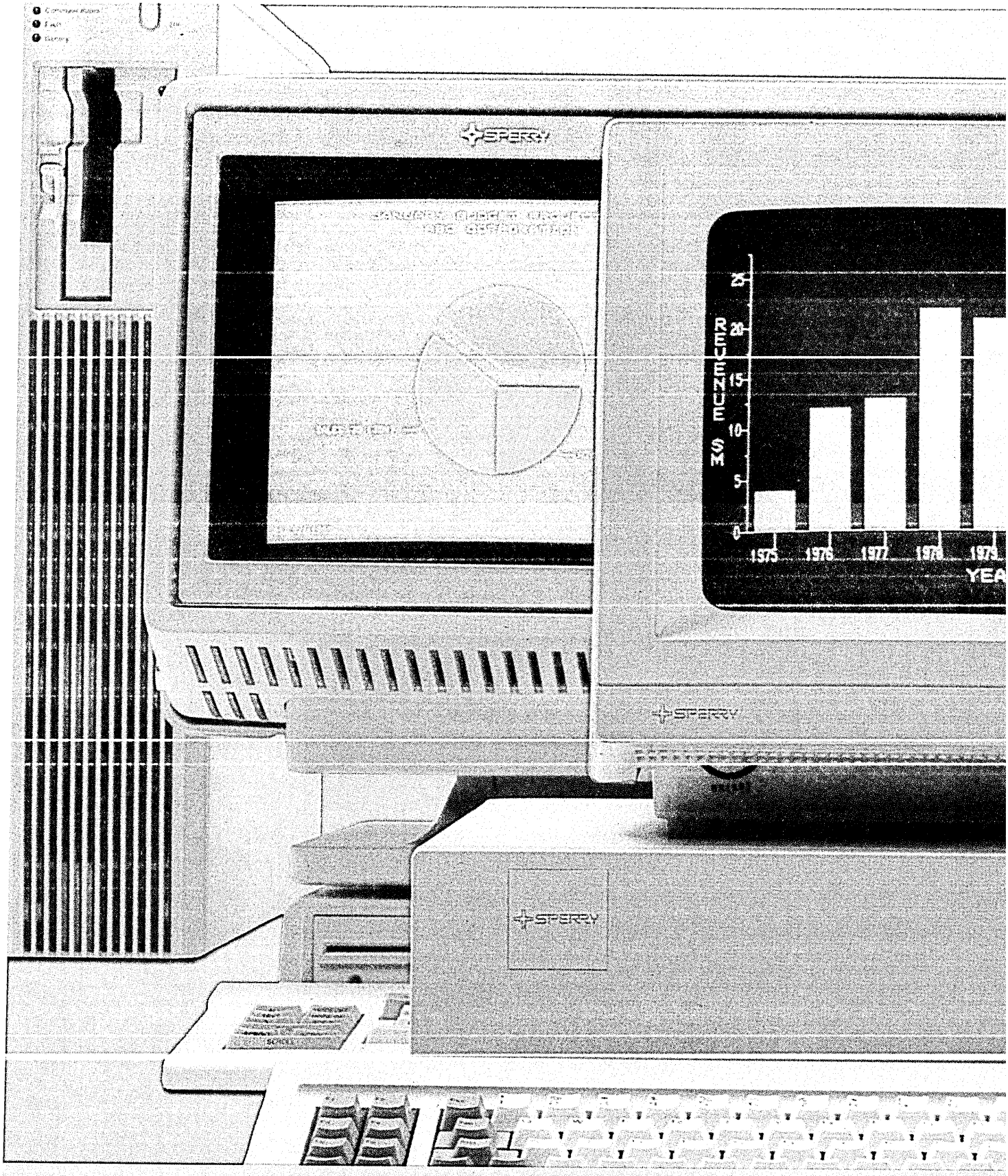

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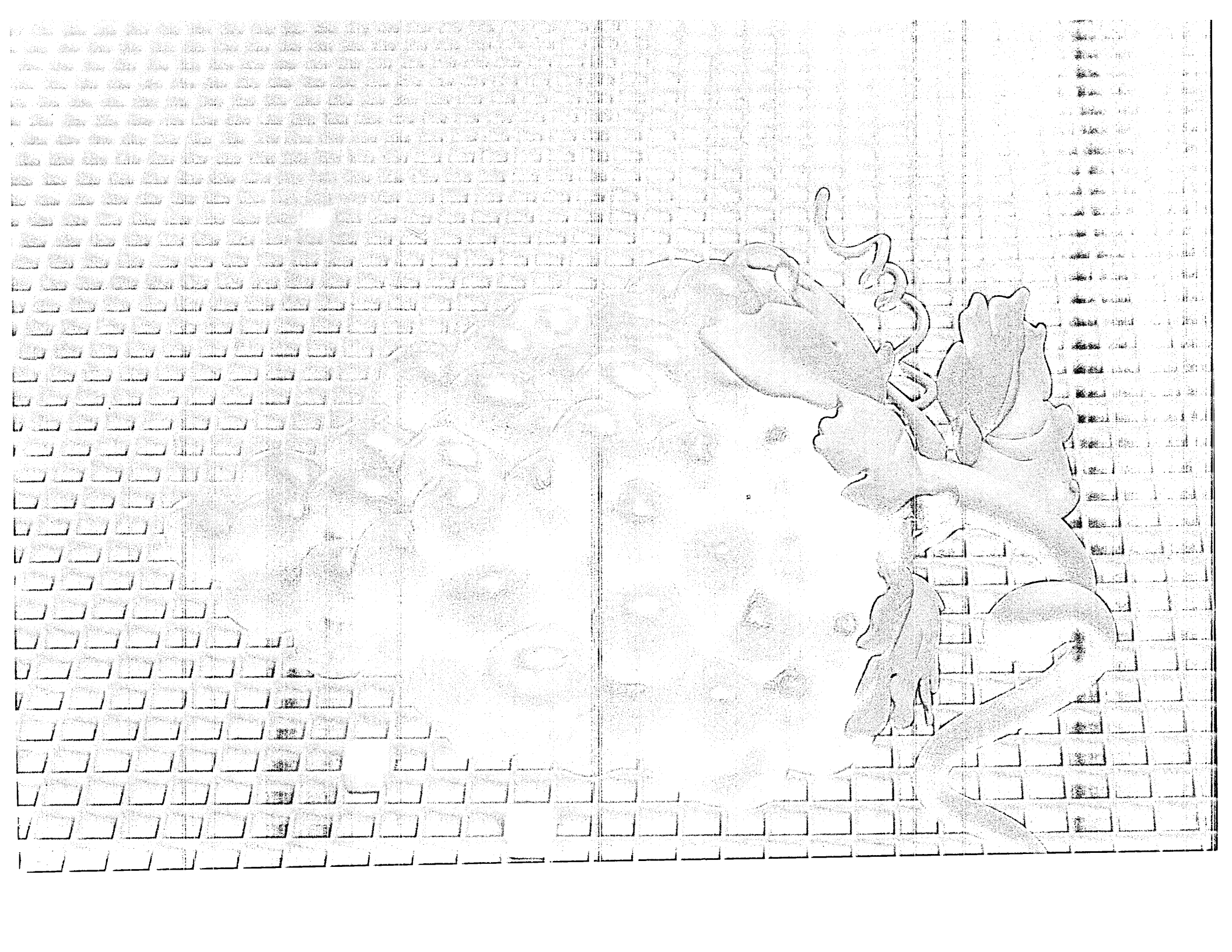

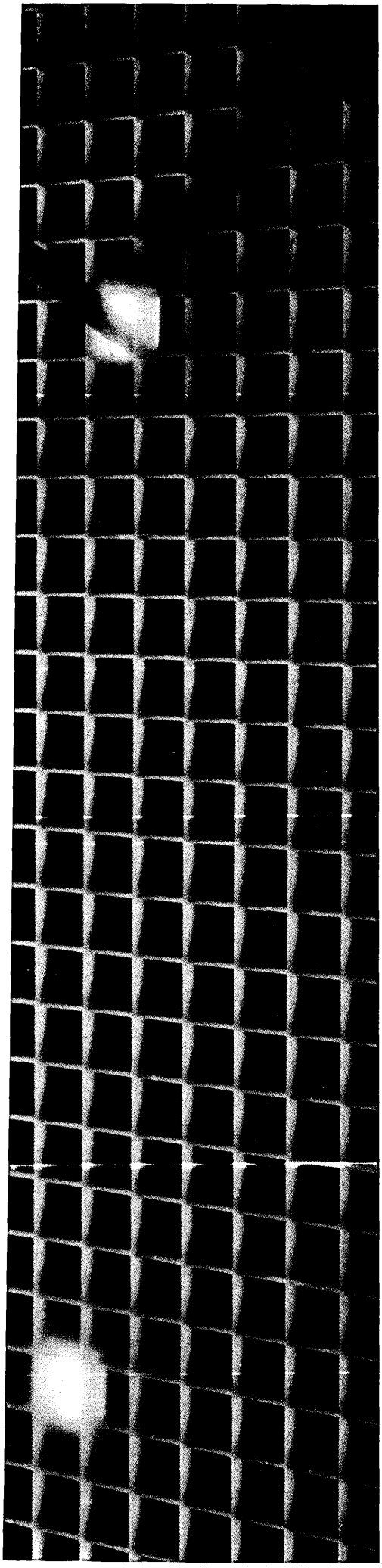

Truly integrated applications packages are making their mark in financial and manufacturing areas.

ADVENT OF THE CLUSTERED SYSTEM

by Larry Welke

The good news is clustered software systems are coming and better productivity is the reason. The bad news is, despite a few hundred million dollars of advertising to the contrary, truly integrated software clusters are not all that easy to find.

Cynics will tell you that true clustered systems—the kind that are integrated and not merely collections of formerly separate modules that now share an interface—really are just one more technology "hook" brewed up by an obscure ad man to reel in users enchanted with the avant-garde sound of it all. And those cynics will depict, with some justification, a commercial lethargy (at best) and conceptual misunderstanding (at worst) on the part of the vendors who claim to have such systems. The cynics will also say that the vendors' "system design" methodologies are akin to a sculptor who, in creating a statue, throws clay at it from across the studio and hopes it sticks in a way that is anatomically correct.

Things are not that bad. The best perspective to maintain about the advent of clustered systems is guarded optimism. The reason is that users need them to do business productively and efficiently. That, as Harvard Business School instructs its aspiring executives, means there is a market need. And where there is a market need in the software industry, there are slightly over 5,000 companies of varying wherewithal ready to try (that's a key word) to meet it.

The problem, alas, is the lack of a standard definition for the word try. Some vendors try to provide integrated systems by creating interfaces between otherwise discrete applications. This is a quick way to stake a claim among the ranks of the integrated or clustered systems. Unfortunately, it has little to do with either. The combined applications will route transactions among themselves, but since the data they share are not integrated (because they are likely tied to a hierarchical rather than a relational database), there still is data redundancy eating up system resources. Also, less than complete integration doesn't answer the information problems posed by concepts inherent in total office information systems (OIS) and decision support systems (DSS), which are the chief beneficiaries of integration.

Perception of the conceptual advantages of clustered systems simply has advanced faster than the technology to correctly implement them and faster than users' willingness to absorb the costs and headaches of conversion—at least until they are certain the technology is viable.

Still, the user community is speaking and the vendor community is listening. This situation has left both communities in a kind of technolimbo. Last year, International Computer Programs Inc. (ICP), which publishes software magazines and directories, received more than 550 announcements of new interfaces—that is, program-to-program links written by software vendors for their own products, for the products of another software vendor, or for the software products of a hardware manufacturer. Now, even hardware manufacturers, faced with the massive and loyal client bases of the independent software vendors, are deigning to write interfaces so their software will work in conjunction with these widely installed products.

PERFECT HARMONY A MYTH

Add to this avalanche of program connectivity the number of software merchants who profess to have a "completely integrated" product line—sometimes consisting of as many as two dozen products—and it's easy to see why some neophytes think anything they buy today will complement anything they buy tomorrow, ad infinitum, until they have the perfectly harmonious business information system.

If we accept the premise that much of what we have seen and heard to date about clustered systems is marketing noise, we can better discuss the truly valid rea-

3-D ILLUSTRATION BY KATHY JEFFERS/PHOTOGRAPH BY WALTER WICK

Integrated systems are built by removing the artificial boundaries among related but discrete applications.

sons for optimism. First and foremost, as earlier noted, users who are familiar with the clustered concept like it, want it, and need it. And if they don't get disenchanted with it because of pseudointegration announcements in the form of links, interfaces, and patches, they ultimately will buy it en masse.

One has only to examine the impact of, for example, integrated micro software on the discrete micro application business. 1-2-3 from Lotus Development Corporation, Cambridge, Mass., dealt VisiCalc and its clones a deathblow. Shortly thereafter, VisiCorp—since purchased by Paladin Software, San Jose—saw the writing on the wall and introduced the first of the environment products, called VisiOn. That product's windows let users see several applications at once. Interesting concept, but no one, including VisiCorp, had the several applications necessary to run it, so it didn't go over. The company then came out with VisiFile and a number of other Visi applications, but true integration never happened (even though VisiFile could transfer data to other Visi software).

What, then, is meant by true integration? What, indeed, will vendors have to do to achieve it? And how will users have to change their thinking to put it to use?

Intergrated systems are built by removing the artificial boundaries among related but discrete applications. They require a database management system (DBMS) with relational capabilities that is built around the way a company works, not by application. And they require a task force of users and systems architects working in tandem to literally change the way information processing is done at their respective companies. This task cannot be accomplished just by users, or just by the dp managers, or just by software vendors who say they have the answer. It requires a coalition of all three. They must all be willing to suffer the ordeal of teaching everyone involved about the concept, convincing top management that it has to change the way it has been doing business (because business procedures have probably been dictated by applications constraints rather than logical and coherent business practices), and then, having obtained the commitments, seeing the technological conversion through to its conclusion. Nothing short of this will accomplish anything.

First, a company has to accept the concept of on-line transaction processing. For whatever reasons, people still often confuse on-line transactions with on-line batches. On-line transaction processing in the true sense means having a database that stores current information about the business. A transaction, such as a parts order, affects the business in a host of areas. Ideally, the system will instantaneously note a change in inventory, record and print an invoice, update accounts receivable (and payable, if necessary), notify shipping, and send instructions to the warehouse. Obviously this requires a degree of integration. The important criterion for most businesses is that all of this activity takes place at the moment of order entry. It must be remembered that all on-line applications do not update the databases instantly. In these cases, transactions entered on-line are queued and then the database is updated at a later time. This isn't problematic in every business, but it undercuts the potential benefits of clustered systems that are truly integrated.

The system described above can be taken a step farther. The seemingly trivial keystroking by the data entry clerk would then be expressed variously, via a relational database in which the data are integrated, in the decision-support systems of an executive who wants a completely accurate and current portrait of his company at a given moment.

REACHING SUPERIOR LEVEL

In order to reach this superior level of information processing, the database has to go from being application oriented (probably hierarchical) to being business or subject oriented (relational). A business-oriented database is set up very much like a business itself. There are projects, vendors, customers, employees, etc., all represented only once on the database.

Clustered applications then can access this single body of information, which is always current to the moment and whose data elements have established (depending on the application using the data) relationships with one another. Within this structure, new applications can be added to the cluster. So long as they meet the relational criteria, they will in theory be as endlessly complementary as in the idyllic vision of the neophyte. Ultimately, using artificial intelligence within the relational framework, an executive will be able to pose any question about any aspect of current business and get an answer using data that are no more than one second old. He will be able to play what-if games, changing data in one field to see their effect on any or all other variables, most importantly on the business itself. By simulating foresight, an executive can then construct an arsenal of business plans. Which one he uses, of course, depends on which of the what-if scenarios happens. If he sees he's headed for disaster, he might even be able to avert it. That's what executives need from systems: not accounts payable reports, but analyses of how an alteration in the A/B-A/P ratio will affect cash flow in the next 90 days. Do your systems provide that?

They probably don't, although there are sytems available that do just that and more. The best examples today of integrated software are financial and manufacturing systems. A lot of vendor research and development has been done for the financial cluster because everyone, without exception, has to worry about financials. Even IBM, which grosssed $46 billion and netted almost $5 billion in 1984, worries about financials. They are worth three worry lines on any executive forehead.

Cluster work in financial and accounting systems has also been catalyzed by the fact that discrete financial and accounting applications have so many interdependencies. Order entry affects accounts receivable, purchase orders affect accounts payable, they all affect general ledger. And, of course, between the lines of those endless numbers can be read, with appropriate tools, the secrets of the company. That is where data become information.

While there are about 210 integrated systems for minicomputer and mainframe hardware, it must be remembered that there are varying degrees of integration. Too often the term is meant to imply that a cluster of subsidiary accounting systems—e.g., accounts payable and accounts receivable feeding into the general ledger—constitutes an integrated accounting system. While those modules might be technically integrated (and they are important), it really is a functional integration rather than the more significant strategic integration.

The popular A/P-A/R-G/L triumvirate, when integrated in the loose sense, still only provides current G/L information. An executive, for example, could retrieve labor billings for a given project from the general ledger, but wouldn't have access to detailed labor charges (say, by individual employee with specific pay rates) because that information is in the payroll system. This, of course, denies the analyst a convenient measurement of an important element of the project.

Financial clusters, however, demand even more than a thorough and logical integration of primary accounting systems. Assuming that these are in place, and that they are connected to the relational type of database described earlier, they still require some additional reporting modules for the cluster if it's going to be able to give the executive analyst, or even

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All companies are concerned with financials; they're worth three worry lines on any executive forehead.

the accountant, meaningful information.

In many cases, these modules will be (or at least can be) microcomputer-based, employing smaller databases, spreadsheet capabilities, graphics, word processing, and, frequently, communications. If it is a micro, it should be connected to the central database via a micro-to-host link, which will assure the integrity of the data being manipulated at the micro level (assuming true on-line transaction processing is part of the system).

RESPONDS IN THEIR LANGUAGE

Even without such exotics as artificial intelligence, this setup still puts management in a position to get ad hoc information or to respond to unforeseen information requirements. And when management gets the information, it is easier to understand because the database has been built to look like the business they know, not a computer software application for a line accountant. It can respond to them in their language.

Naturally, because a great deal of the data redundancy has been eliminated by the relational database, a significant amount of computer resource has been freed up. And since data do not have to be entered time and again, input time and costs are lowered. This has the happy consequence of cutting down on entry errors.

Financial clusters such as this also lessen the dependency on the systems staff, who are usually playing catch-up anyway. In theory, the executive could go to the dp department and request a program be written for a specific analysis, which he might never need to see again. If, via the financial cluster and a relational database updated with every transaction, the executive can get the answer to that ad hoc question, he has solved two business problems. First, he got information that will help him make his decision and second, his dp staff wasn't disrupted with what they might regard as a whimsical emergency and thus were able to proceed with more important (at least in their eyes) work.

Perhaps the crowning benefit is that the system design is stable. If the database is built to reflect the business (with customers, vendors, projects, etc.), the cluster of software modules can be enhanced while the central hub of information off of which they operate changes only to the degree that it is updated. This is a joyous anomaly in a business where technological turnover seems incessant.

Of the 16 software packages whose sales in 1984 surpassed $100 million (up from 10 the year before), three were truly integrated financial and accounting systems: the MSA Payroll System from Management Science America, Atlanta; the General Ledger and Financial Reporting System from Software International Corp., Andover, Md.; and G/L: Millennium from McCormack & Dodge Corp., Natick, Mass. A fourth system, Focus (a versatile DBMS with nonprocedural query language) from Information Builders Inc., New York, is designed to produce standard and ad hoc financial reports, analysis, and models.

Among the other 10 sellers of $100 million in 1984 were MSA's General Ledger System; Ramis II (another DBMS with financial analysis capabilities) from Princeton, N.J.-based Mathematica (now owned by Martin Marietta); and personnel management systems from MSA and Information Science Inc., Montvale, N.J.

In other words, eight of 16 software products that have sold in excess of $100 million—from a field of roughly 20,000 business-related packages—are tied to finance and accounting. Considering the diversity of applications available today, that would seem astounding, but it reinforces the point that everyone worries about financials. An examination of these products also shows that they are massively integrated in financial clusters (most of MSA's financial and accounting software integrates with its extensive manufacturing resource planning [MRP II] software), or are tied to a specialized database (essentially all of them). Clearly, the companies that have assembled truly integrated clusters, and founded them on flexible DBMSs with a variety of reporting and analytical capabilities, are succeeding phenomenally.

The other application area where clusters are especially advanced is in manufacturing. Like finance and accounting, the components of the manufacturing process have seemingly endless interdependencies. The best example of a truly workable cluster is MRP II. The concept evolved in the mid-1970s from materials requirements planning (MRP), the admirable goal of which was to apply a little science to the art of guestimating fluctuating inventory needs.

ORIGINAL VISION FOR MRP

The late Oliver Wight, who is regarded as the father of MRP and MRP II, saw some additional benefits that could be realized from a more comprehensive systems approach. With his concept, he envisioned an integration of all the major components of the manufacturing process, from the shop floor to inventory to production control, with the conventional financial requirements of any organization. The result, he foresaw, would be an efficient and cost-effective production process requiring minimum inventory levels. (He actually thought of the just-in-time

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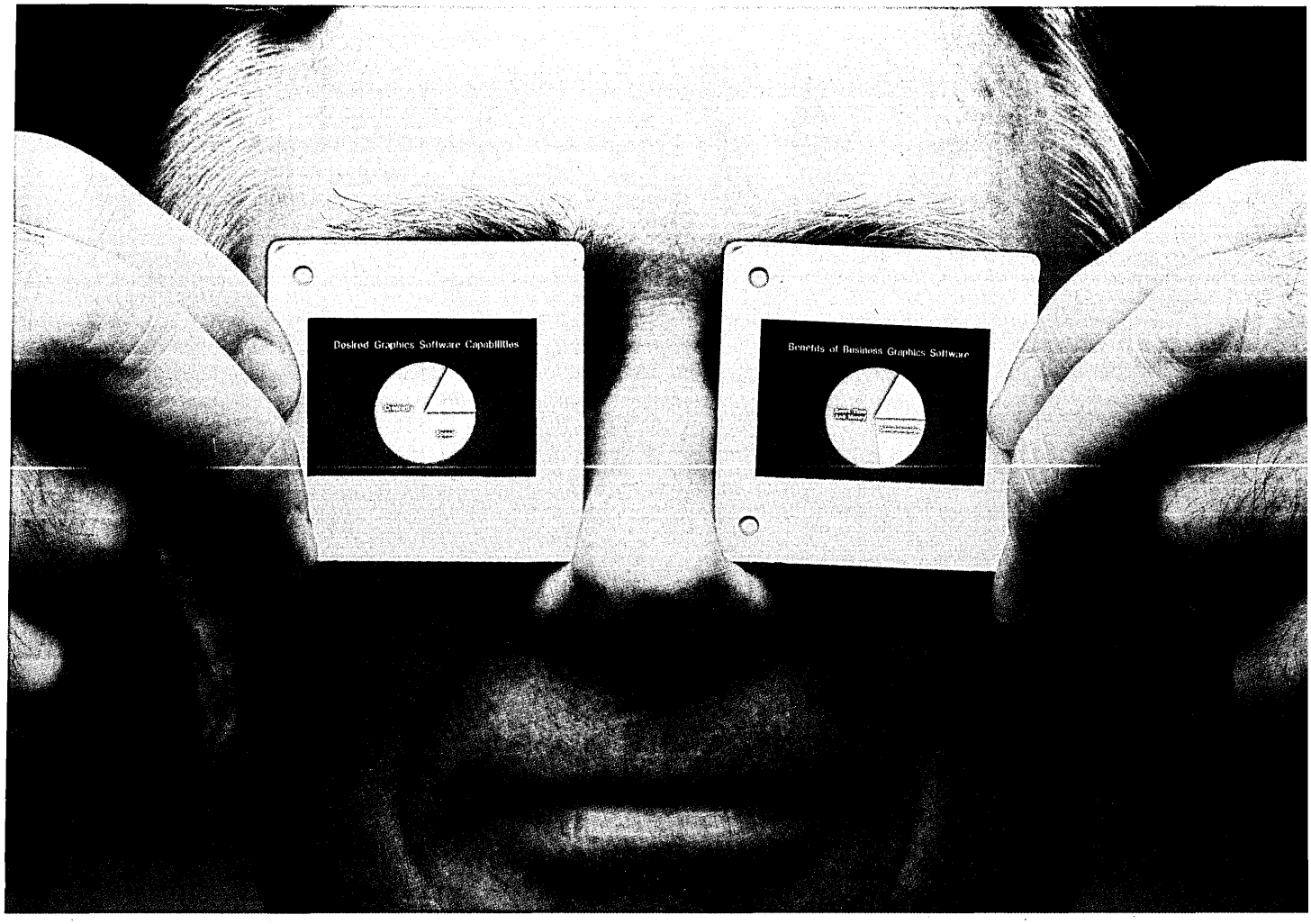

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Integrated manufacturing systems can make production more efficient and reduce inventory levels to a minimum.

inventory concept—where there is virtually no inventory, and therefore no stocking costs, because parts arrive precisely when they're needed—before the Japanese did.) Wight's model also included a variety of management reporting mechanisms tied to the manufacturing/financial cluster that would give manufacturing managers both standard and ad hoc reports about the sometimes wildly chaotic stage of their businesses.

Wight and his colleagues at the Oliver Wight Companies, Newbury, N.H., created a rigorous model of MRP II and dubbed the tough implementation Class A. The company, using the model, assists manufacturers in understanding and implementing the concept and the technology.

Last year, the Wight Companies mailed a survey to 40,000 people representing some 7,000 companies. Twenty-eight hundred management people in 1,123 companies, all using MRP and/or MRP II, responded. The survey also recognized the Class A users. The results illustrate the effects of coherent clustering:

- 85% of the companies responding judged their performance better after the installation of MRP II.
- 32% classified their performances as "enormously better"
- "Improved control of the business" was judged the most dominant contribution of MRP II.

The survey answered high-level questions that had less to do with a line manager's interests (where are those fenders?) than with executive management's concerns (where is that market share?). In every area examined—including cost control, planning and simulation, expense reduction, control of the business, and vendor performance—the MRP II users came out ahead of the nonusers, and the Class A users beat the standard MRP II users.

While the implementation of a Class A system wasn't cheap (the average company spent $1,181,000), the weighted average annual return on investment was 200%.

That, in a nutshell, is what integrated systems should do for you, and what you should begin to expect of them. While there is much talk year after year about the decline in the cost of computing, budgets implacably continue to grow. DP/MIS management, operations management, and top management all have to face the reality of the illusion. It's not getting cheaper, it's just getting better. While there is a lot of fog and noise in the marketplace right now about integration and clustered systems and artificial intelligence (the most abused term in the industry), good systems are beginning to emerge, almost always from good vendors. Users might have to look a little closer, listen a little more discerningly, to avoid being swallowed in the hype. The one certainty you can take to bed tonight is that clustered systems have begun to arrive—and if you don't wire them into your systems planning, rest assured your competitors will. ◉

Larry Welke is founder and president of International Computer Programs Inc., Indianapolis, which each year publishes over 12,000 pages of software information and awards prizes to vendors for software that sells particularly well.

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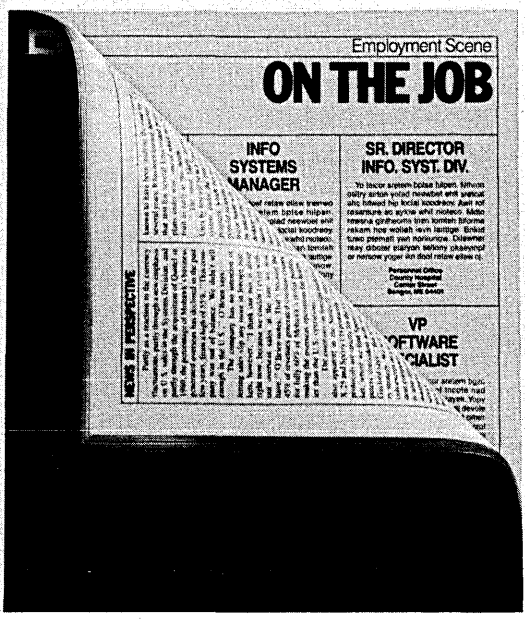

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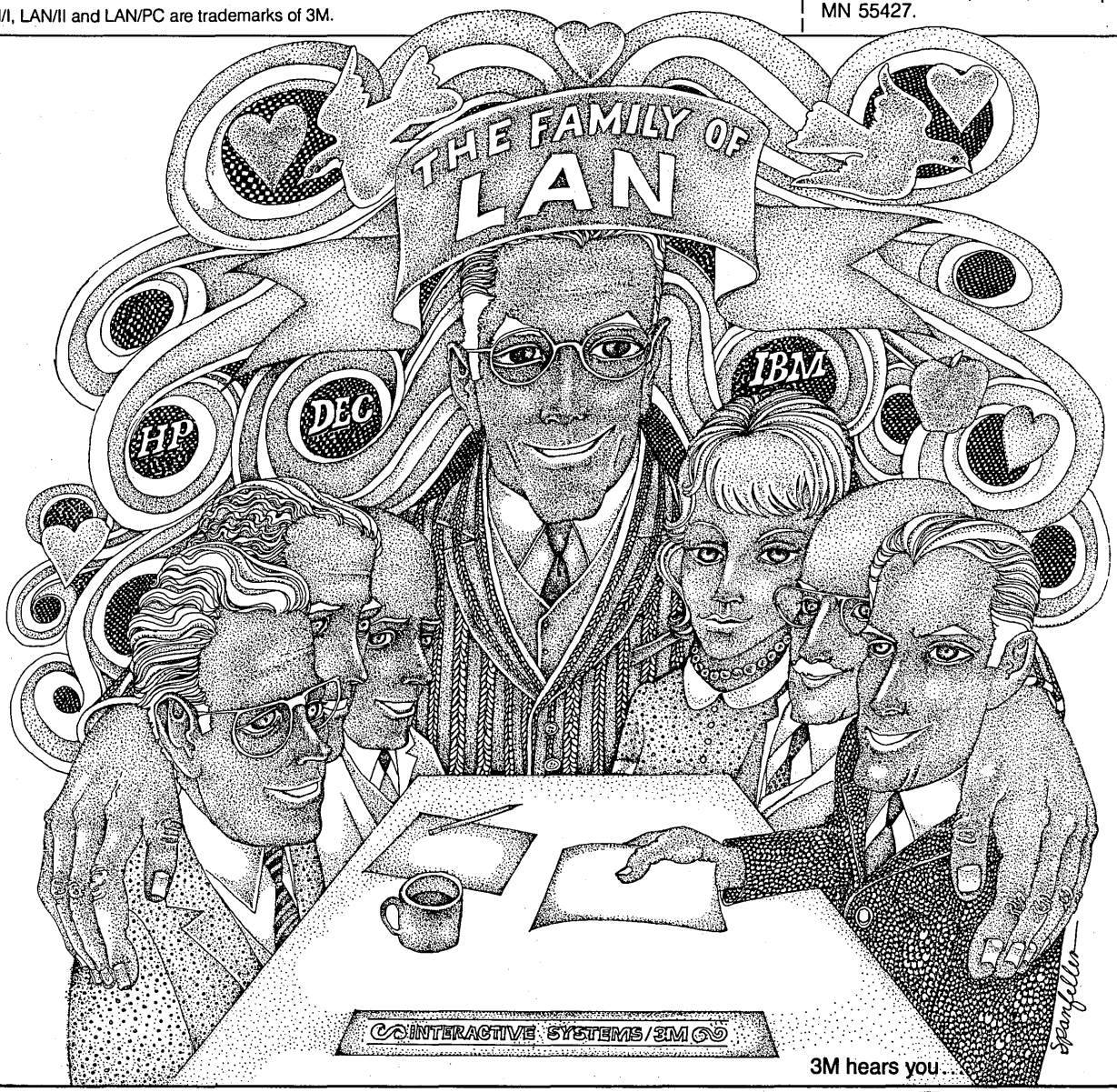

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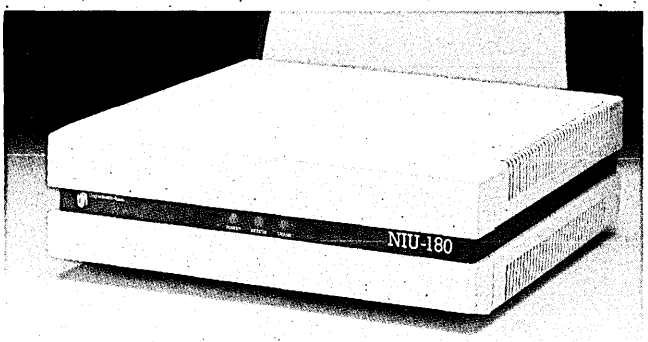

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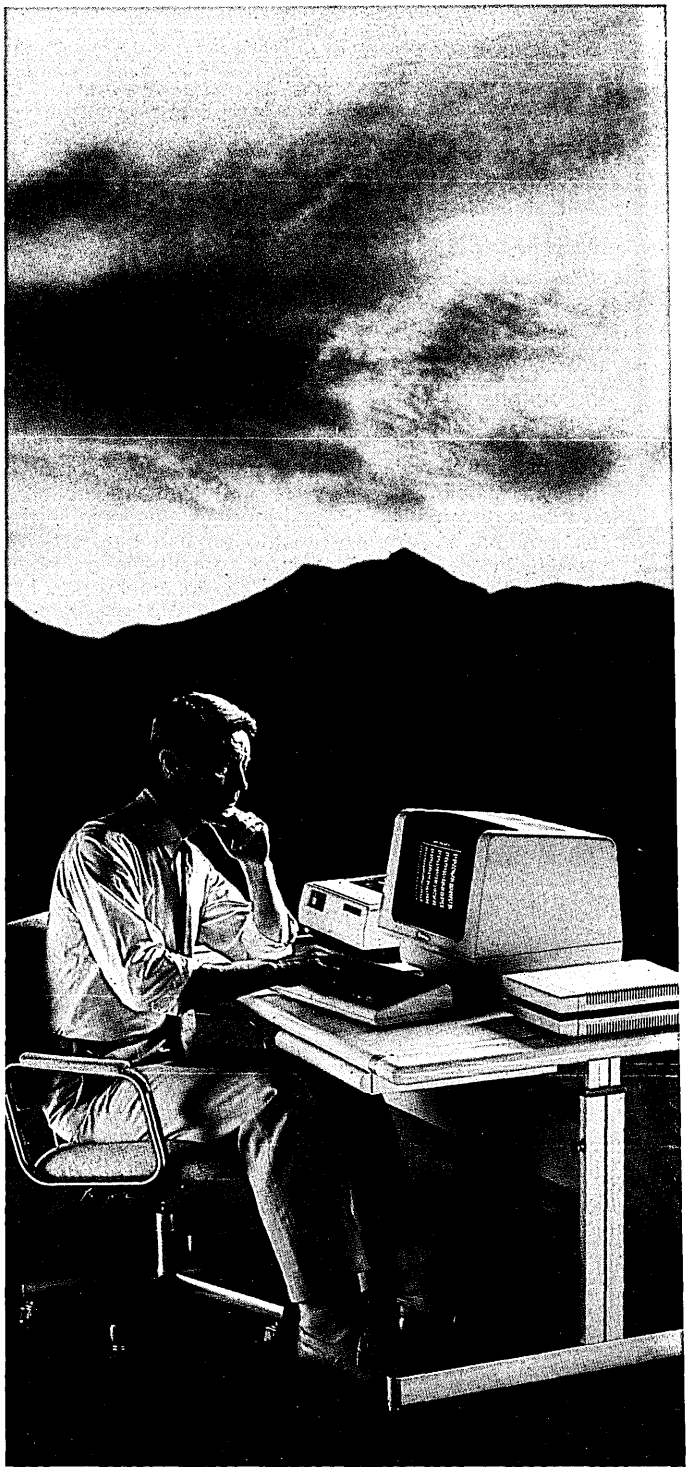

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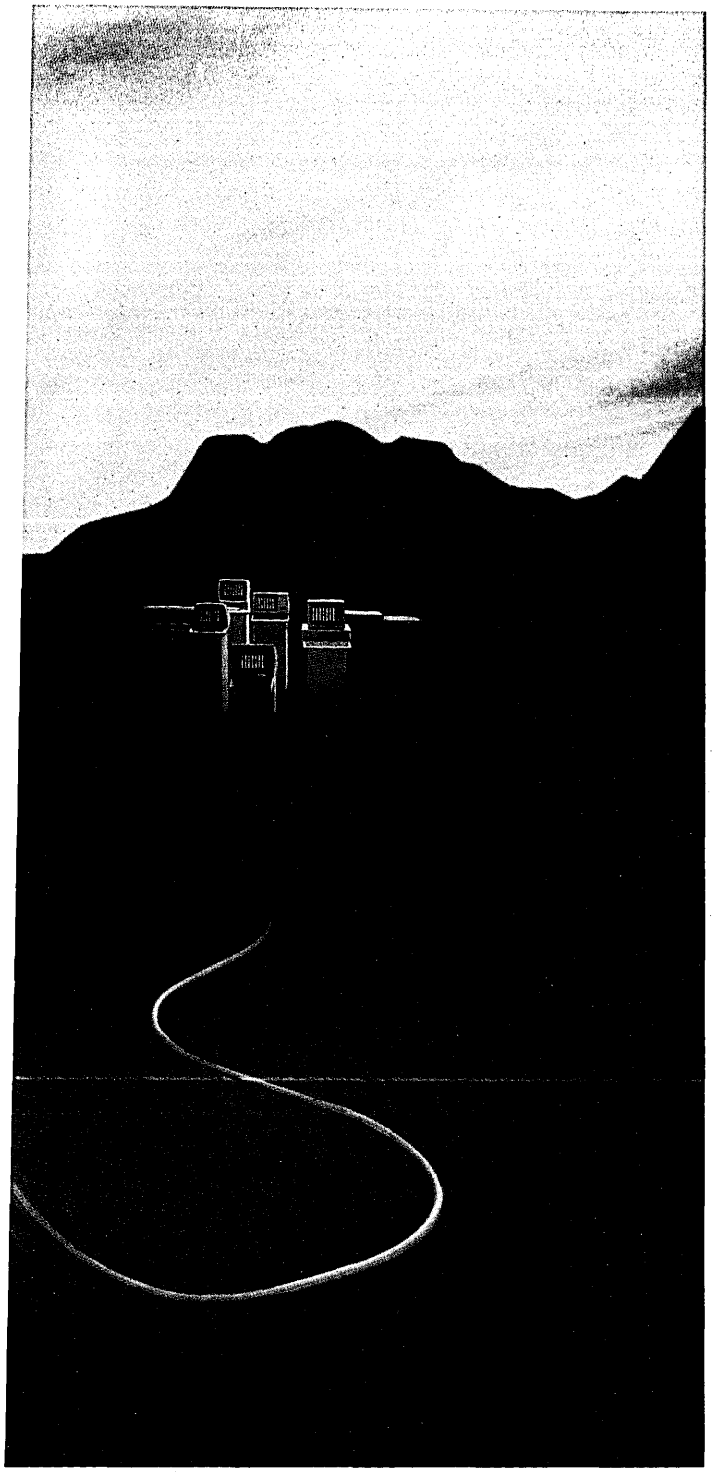

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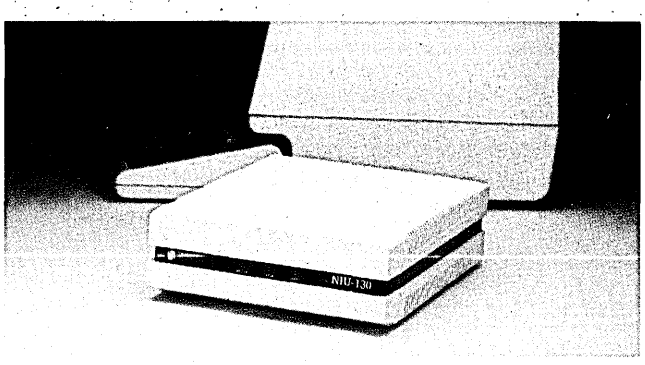

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It's either the multi-user system or a network of personal computers, says this noted industry observer.

DEPARTMENTAL COMPUTING: A CHOICE OF STRATEGIES

by Omri Serlin

A battle royal is developing over the automation of work groups—those groups of five to 50 office workers who are closely related by function and exhibit strong, daily interaction. Two strong factions are fighting over this emerging market.

In one camp are those who firmly believe in the "one person, one computer" solution. Led by Apple Computer and such local area network (LAN) suppliers as 3Com, they preach local networking for interconnecting pcs. Makers of more conventional, multi-user systems, on the other hand, envision work group members using dumb terminals connected point to point to a central computer, running such software as DEC's All-in-One, Data General's CEO, or Wang's VS.

Users are beginning to appreciate that the selection of one or the other approach is not merely a technical issue. It is principally a strategic decision that should be guided mainly by the type of applications and the nature of the computing environment that the buying organization expects to maintain in the foreseeable future.

Both solutions are likely to continue to find favor. Multi-user systems have a clear edge in transaction processing application, and in situations involving many users, where cost per user is a key consideration. Locally networked pcs are appropriate for smaller work groups, where personal productivity software carries most of the load, with electronic mail and occasional file transfer as secondary requirements.

The sharpest confrontation is likely to occur in the server area, where it is becoming increasingly difficult to distinguish between a work group computer and a network file/print server. Straddling the fence are a host of suppliers that offer both solutions, including IBM, Convergent Technologies, and Altos Computer.

There are several key issues at stake in this new market, one of the most important being cost. Which of the two basic solutions is more cost-effective? The issue is complicated for two reasons. First, a number of different cost components are involved, including initial outlay, cost of adding one additional user, average cost per user, and postpurchase costs. Second, it is often difficult to separate costs from such other considerations as performance, functionality, and availability. Nevertheless, it is worthwhile to try to treat each such issue separately.

A number of facets of the cost question can be appreciated by studying Fig. 1. Here are shown purchase costs for a hypothetical multi-user system compared with those for a system of locally networked pcs. The chart does not attempt to accurately represent actual systems, but the assumptions on which it is based do approximate the actual costs of currently available systems.

One must also consider up-front costs. One disadvantage of the multi-user system clearly seen in Fig. 1 is a larger initial outlay. Because the multi-user system contains an overhead that is meant to be amortized over many users, this system is initially more costly than a comparable group of networked pcs, even though pcs cost much more than dumb terminals. Note, however, that smaller multi-user systems are available (e.g., the Altos 486 four-user system, or the three-user IBM PC AT), which eliminate or minimize this disadvantage, provided the work group remains small.

DISKLESS PCS LESS COSTLY

Expansion costs. Adding terminals to the multi-user system is less costly than the addition of pcs to the network. The disparity between terminal costs and pcs is abating, however, especially in situations where diskless pcs, which obtain all their disk requirements across the network, can be employed.

Bill Krause, president of 3Com of Mountain View, Calif., a leading supplier of the locally networked pc solution, points out that dumb terminals contain most of the same components that are found in pcs, namely crt, keyboard, microprocessor, some memory, power supply, and packaging. Prices of terminals and of diskless pcs are, he claims, rapidly converging. And diskless pcs are becoming a reality, due to such products as 3Com's EtherStart—a ROM chip that plugs into the IBM PC's network interface and, upon power up, downloads the operating system image from a server on the network. Any additional software required at the PC during operation can also be downloaded in a similar fashion.

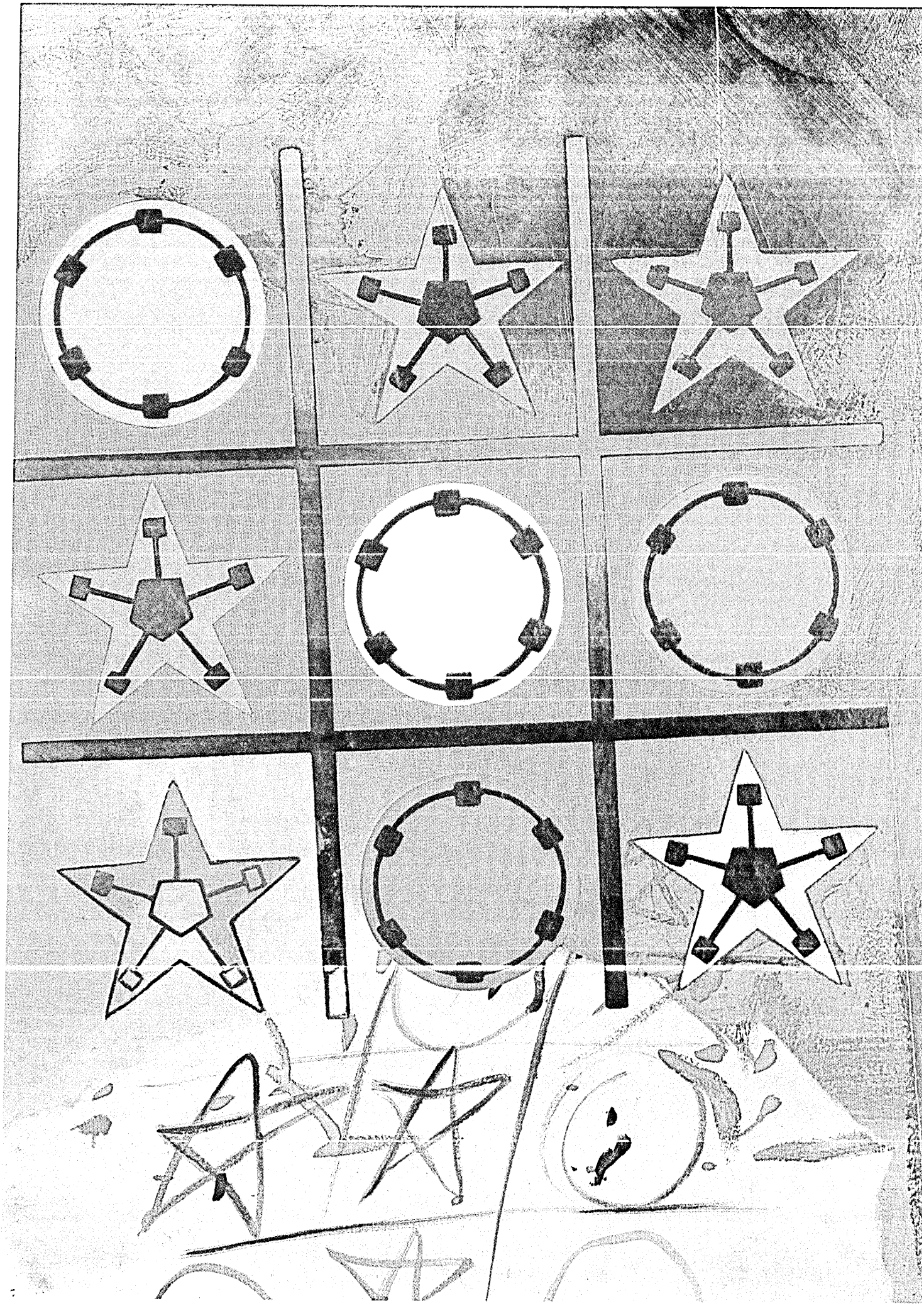
Another problem with the multi-user solution is that expansion costs jump sharply when the system reaches its full capacity. Lee Reiswig, manager of communications systems for IBM's Entry Systems Division, puts it this way: "If you are at the performance limit of a multi-user system, it costs you a great deal to add the next user."

Total system cost. In the model depicted in Fig. 1, total system costs become higher with the locally networked pc solution at around six users. The actual crossover point may vary with different system configurations. In general, though, unless the multi-user system is grossly oversized for the task at hand, it can be expected to be more economical in absolute cost as the number of users increases. As long as the incremental costs for adding a terminal are less than those for a pc with its network interface, there will always be a crossover point where the multi-user system becomes less expensive than networked pcs. This is one of the key arguments in favor of the multi-user solution.

Cost per user. Fig. 2 compares the per-user costs of the two approaches. At around six users, the multi-user solution becomes more attractive in terms of costs per user.

3Com's president Krause sees a more subtle issue here. "A multi-user system is almost never at the optimum price/performance point," he claims. If the system is capable of supporting, say, 10 users, then any time it has fewer than 10, the cost

ILLUSTRATION BY STEVE RIEDELL



"If you are at the performance limit of a multi-user system, it costs you a great deal to add the next user."

per user is higher than it would be at the maximum number of users, he explains.

This is seen clearly in Fig. 2: the cost per user for the multi-user solution starts high and gradually improves as more users are added, until the system reaches its full capacity. Then, following each upgrade, the pattern is repeated. With locally networked pcs, cost per user remains relatively stable, as seen in Fig. 2, and hence the growth in system costs is directly proportional to the number of users. With pcs, "you can gracefully scale up the system," says Krause.

Software licensing. An issue related to cost is software licensing. Some vendors (e.g., IBM) demand that in a network situation each pc that might ever run a particular software package be individually licensed for that software. In multi-user central systems, each software item is typically licensed only once. Even here the choice is not clear-cut. The license fee for Unix, for example, is roughly proportional to the number of users supported. IBM mainframe software licensing also imposes larger fees for the same software running on larger cpus.

Interconnect costs. Our model assumes that the LAN used in the pc solution is Ethernet, interfaces for which are currently available at $650. The IBM PC Network uses $695 interfaces. The costs of such interfaces, along with network software, in a 10-member work group using PCs will almost pay for an entry-level, multi-user Altos system, points out Altos senior vice president Phil White.

If the number of workstations involved is small, however, and the distances are short, less expensive solutions are available: for example, the RS422-based, $50 AppleTalk (available currently only for Apple Computer's Macintosh) and the $395 pc interface to WorkNet from Altos.

DO YOU NEED A PC?

But do you really need a pc? Next to cost, the most significant issue is the type of workstation that each user should have. Can it be a relatively dumb terminal, or must it be a full-capability pc? Many of the arguments in favor of LANs make little sense if the worker can be satisfied with a dumb terminal, 3Com's Krause concedes.

Pcs have become the principal vehicles for delivering personal productivity software to the individual user. Popular spreadsheets like VisiCalc and Lotus 1-2-3 and such word processing packages as WordStar did much to establish pcs in business office environments. Availability of such packages, which are still largely limited to pcs, along with a great deal of other pc software, serve as a key justification for buying pcs.

Even when similar packages are available on multi-user systems (as, for example, IBM's Displaywrite word processor, which now runs on the PC, System/36, and System/370 architectures), the pc is preferable in many situations because it affords a higher level of interactivity and isolation. "With my own PC, I am not contending for its resources," says IBM's Reiswig.

"There's a much wider bandwidth for interactivity between the user and the pc," explains 3Com's Krause. "I can enter the spreadsheet data on either a pc or a dumb terminal. But when I hit the 'calculate' key, the pc does it right away, whereas with a multi-user system I may have to wait a while until the cpu becomes available."

Pcs are even taking over the software development functions that were the original principal goal of multi-user, time-shared systems of the 1960s and early 1970s. "We do compilation on a VAX system connected to our LAN," notes 3Com's Krause, "but each software engineer has a pc for program development and program execution." The IBM PC AT/370 and PC/370 are even able to recreate the VM mainframe environment specifically for software development activities.

One type of multi-user application that is unlikely to be preempted by pcs in the foreseeable future is on-line transaction processing (OLTP). Here, terminals attached to a central computer will continue to be the rule.

The key characteristic of OLTP is a common database, which the users access for inquiries, updates, or both. The airline reservation systems of the mid-1960s were early examples of commercial, large-scale OLTP applications.

Over the past several years, similar types of on-line access have been applied even to such routine business applications as accounts receivable/payable, billing, and inventory control. IBM's CICS and IMS/DC are typically used in such environments. IBM's ACP, now renamed TPF2, is also being applied to such new OLTP applications.

Key considerations in OLTP systems are database integrity and consistency. Integrity means the physical protection or recovery of the common data, say after a disk crash. Consistency means that the data remain correct, even when multiple users want to implement updates simultaneously, or that they can be brought back to a correct state after a processor or system crashes. Suppliers of fault tolerant systems, such as Tandem and Stratus, are mainly targeting this type of application.

Transaction processing and similar applications where a common database is the core element are likely to remain the key mission of multi-user systems in the future. There are no known practical ways to distribute the database among networked pcs, for example, and still guarantee database consistency, integrity, and availability.

Of the advantages of multi-user systems, perhaps the most telling is dynamic resource allocation. If a central facility is powerful enough to serve multiple users running small tasks, it can often handle an occasional large task by temporarily suspending service to some or most users. A collection of individual pc workstations interconnected over a LAN cannot be similarly combined.

POWER IN SMALL FRAGMENTS

In technical terms, the central facility can practice dynamic resource allocation, while LAN-based workstations represent a "hard preallocation" or fragmentation of such resources as cpu power and memory capacity. Jay Spitzen, vice president of planning for Convergent Technologies, puts it this way: "If you have a dozen workstations, you have a lot of computer power, but it's divided up into pieces. You may have 20MB of memory, but if it's in 1MB chunks, you can't attack the problem that needs 20MB."

A key advantage of multi-user systems is that they are available as a complete package from a *single vendor* and include central computer, terminals, interconnect system, communications protocols, and software. This minimizes considerably the complexities of initial installation and eases requirements for internal support, including system personnel and end-user training, since the number of different systems that need to be integrated and supported is limited. Equally important is the fact that external service is simplified: there is just one phone number to call, and the potential for finger pointing (vendors blaming each other's equipment) is eliminated.

LANs are typically considered after the installation already has a significant number of different pcs, probably purchased under departmental budgets without central coordination. Thus the effort involved in integrating them into a coherent network, and in selecting a server that will be compatible with most stations, may be significant and may be beyond the technical capabilities of in-house organizations. User training and support may be more complex.

Many multi-user systems are actually available and demonstrable in complete form, and can be installed and put to

FIG. 1

SYSTEM COST COMPARISON

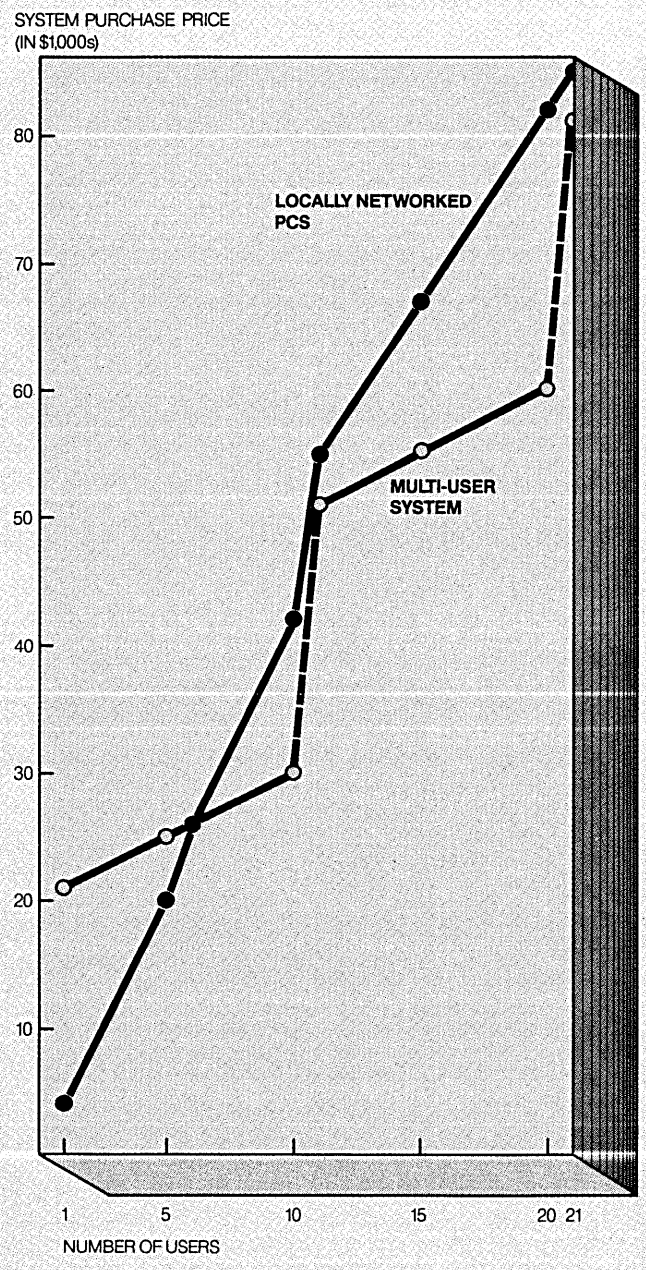


FIG. 2

COST PER USER COMPARISON

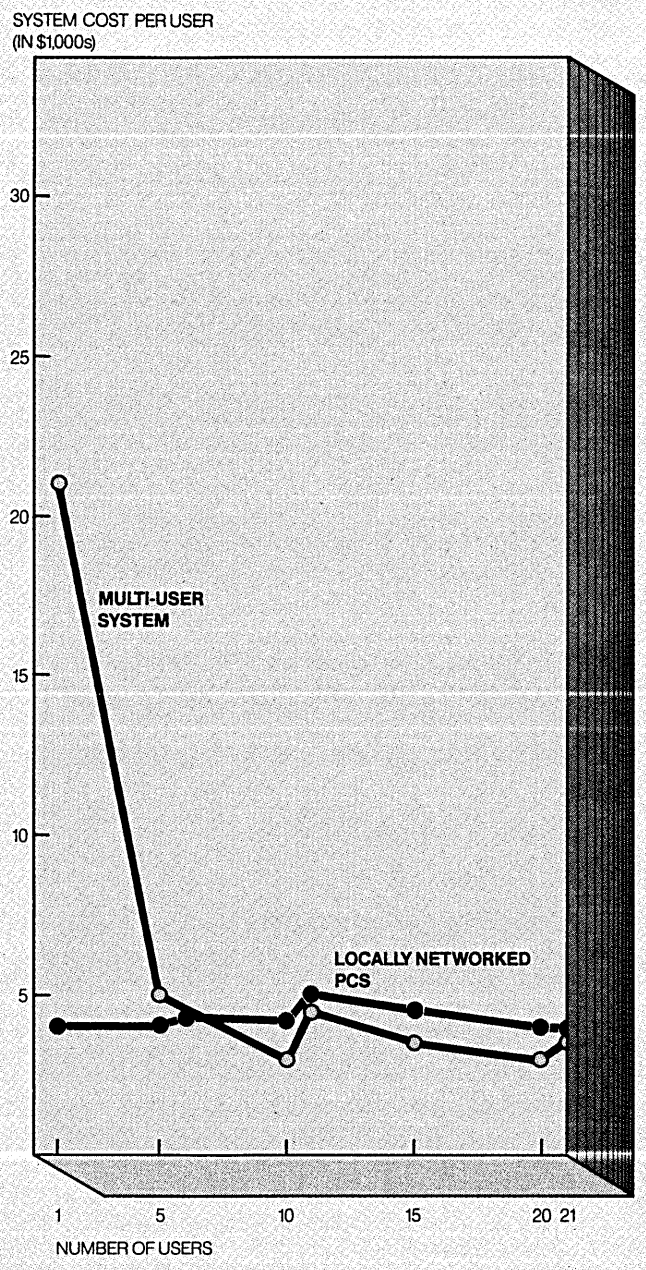


Fig. 1 assumes that the multi-user system initially costs $20,000 and can support up to 10 users merely by adding terminals costing $1,000 each. To go over 10 users, the system must either be replaced or upgraded at an additional cost of $20,000. A similar upgrade is required to enable the system to support more than 20 users.

The pcs are assumed to cost $4,000 each, including the cost of an Ethernet interface ($650) and network software (typically $800 to $1,000 per network). To support more than five users, one of the pcs will have to be a more powerful one, including, say, a 20-megabyte disk; the cost of such a pc is assumed to be $6,000. To support more than 10 users, a specialized server will be required; its cost, including a good-sized hard disk and possibly a $4,000 laser printer, is assumed to be $10,000. Additional pcs, however, can then have lower-capacity disks, and require no local printer; their cost is figured at $3,000 each.

Fig. 2 is based on the same assumptions; it shows the average cost per user—i.e., total system cost allocated over the number of supported users.

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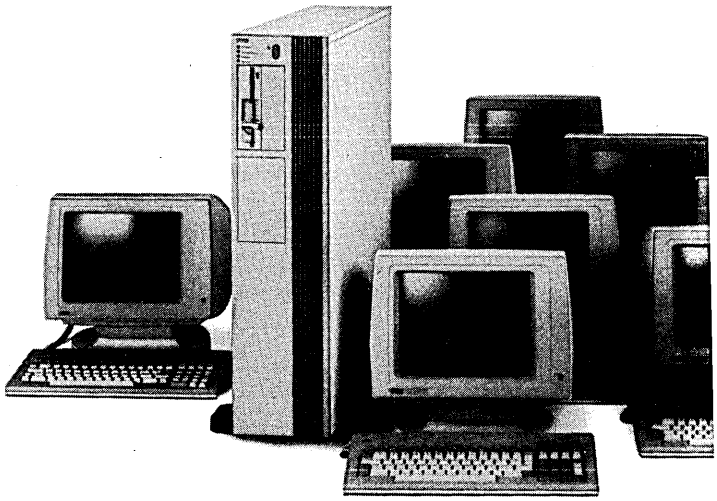

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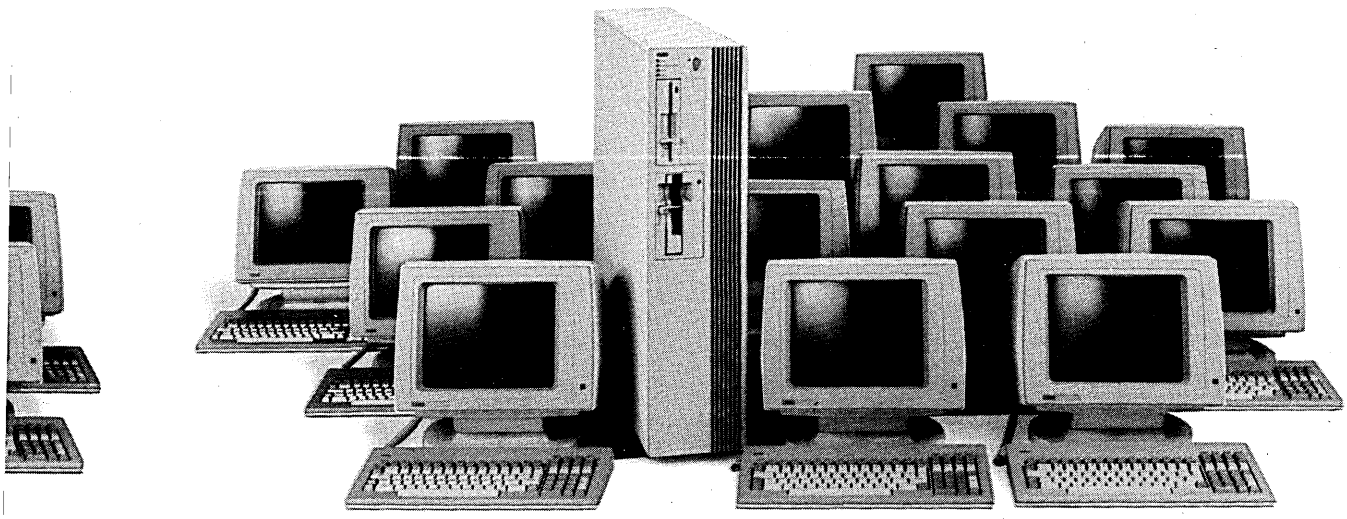

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CIRCLE 46 ON READER CARD

Few LAN suppliers handle the presentation level compatibility problem.

use immediately. This is less true of LANs, where in many cases only the lowest-level hardware and software is available off-the-shelf, and much else remains to be accomplished by either the end-user personnel or by hired system integrators. This situation is changing rapidly: such offerings as the IBM PC Network or the EtherSeries from 3Com do provide a high degree of network software integration.

Homogeneity. Since all users on a multiterminal system access the same processors using the same procedures, users can move from terminal to terminal with ease. This is not true when each user is accustomed to a different personal computer (e.g., Apple vs. IBM) with different software packages (e.g., VisiCalc vs. 1-2-3).

MESSAGES HANDLED WELL

Electronic mail. This is another key advantage of multi-user systems. Temporary storage of messages to terminals that are currently off-line for some reason, as well as maintenance of address directories and mail lists, are best done in a central facility. A local network can handle this mission in a distributed fashion (e.g., by keeping directories in each node), but this is a much less efficient mode of operation. A properly programmed network server can solve this problem, notes 3Com's Krause.

Security. Many MIS managers prefer to limit the physical replication of corporate data by keeping them physically in central databases, and allowing users to access them only with dumb terminals that have no local removable storage. The argument is that once data are physically removable (i.e., on a floppy), all sorts of abuse are possible.

No collisions. Because each terminal is individually attached to the computer, there are no transmission bottlenecks similar to collisions of data on a LAN. Of course the central computer and/or its communications controller(s) can become saturated, but unlike LAN collisions, such situations merely hold back traffic and do not result in loss of efficiency due to retransmissions. (A token-passing LAN discipline also solves this problem.)

Access to/from long-haul nets. The central computer can be interfaced to the telephone network with the same equipment (RS232 interface) it uses to attach most terminals. Given proper software (commonly available), the computer can allow local terminals to access remote facilities as well as permit remote terminals to log-on locally. A LAN, on the other hand, requires a special, fairly costly gateway between the local network and the telephone system or other long-haul facilities.

Network control & monitoring. Few LANs come with effective and convincing means of diagnosing network failures or monitoring network performance. Yet these are critical to quick isolation of network problems, avoiding finger pointing, and planning network expansion. "LAN companies are going to have to improve on this," concedes 3Com's Krause, citing as an example an incident at his company when he and a number of engineers spent the better part of a Saturday morning looking for a network malfunction that turned out to be a loose connector on one of the personal computers.

Diversity of software. Since each pc on a LAN may be running different software, substantial format-conversion problems may arise, even with text files. For example, one word processor may not understand the formatting codes inserted by another. That could result in garbled handling or printing when the user is trying to manipulate a file created elsewhere in the network. Few LAN suppliers handle this presentation level compatibility problem. In fairness, it should be noted that this problem exists whenever diverse computers are networked by any type of interconnection. IBM's DISOSS over SNA facilities is an example of one vendor's attempt to address these issues.

The LAN approach, of course, also has advantages:

Resiliency. The central computer constitutes a single point of failure; when it's down, all workers (and customers) relying on its services are forcibly idled. Interest in fault tolerant (FT) systems, such as those offered by Tandem and Stratus, is driven largely by the need to minimize disruptions of service in on-line systems.

In contrast, the failure, removal, or addition of any individual pc node as well as a network failure (e.g., a break or short in the cable) need have no effect on other individual nodes, which may continue to function normally and provide local service.

Of course, if the LAN employs a server, much of the resiliency argument is invalidated. The failure of the server can take down many of the network services (private files, electronic mail directories, spooled print functions, off-net access, etc.).

Upgrade problem. When a central computer runs out of power due to increasing workload, it typically must be shut down and either upgraded in place or replaced entirely. New software installation and database checkpointing also usually result in system unavailability. In a local network situation, additional pcs may be added to serve new users, sometimes even without disrupting the network, but in any case, without disrupting the private work carried out on the existing pcs.

User independence. Each pc user on the network is free to carry out private computing activities (e.g., word processing, spreadsheet analysis) without affecting, or being affected by, other users. Users can install new or upgraded software at will, without affecting others.

Cost allocation. When autonomous departments are required to share the costs of purchase and/or continuing maintenance of a central facility, equitable allocation of such costs, and the corresponding equitable access to the service, are often a source of friction. Avoiding such friction was one of the key motivations for the spread of distributed processing in the 1970s. Allocation of costs is easier with networked pcs, since the principal cost items can be clearly associated with specific individuals.

PREVENTS FLEX HOURS

Common hours. A central computer typically runs only during specific hours of the day. This forces all users into a common work discipline and prevents flex hours, an increasingly popular work ethic now in use in many firms. With private pcs, users can utilize computer power at odd hours.

Software ergonomics. Multi-user systems, including Unix-running supermicros, have evolved from previous generation minis and mainframes. With the possible exception of Wang's menu-driven systems, they typically present the user with a relatively unfriendly interface that requires substantial effort to master. In contrast, the most advanced software ergonomic interfaces, featuring multiple windows, mouse or touch screen control, and on-line HELP facilities are available principally on pcs.

High transmission speed. LANs are capable of transferring data much more rapidly than the typical 300bps to 9,600bps connection between a terminal and a central computer (directly or through a voice/data PBX). This makes LANs more efficient in handling large data transfers (e.g., large program, data, or text files). Of course, the counter argument is that with centrally located files a multi-user system has no need for file transfer between workstations.

Variety. The individual pcs on a LAN need not, in principle, be identical; they can be chosen to suit individual requirements, as long as all have the appropriate network interfaces, support the same

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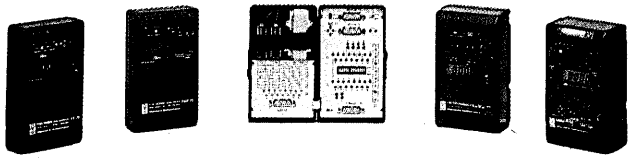

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In some cases, it's difficult to distinguish between a "work group computer" and a "network server."

protocols, and have the necessary applications-level software. The last item is often missing and must be supplied by the user.

Combined services. With broadband LANs, once a plant or a building has been wired up with the necessary coaxial cable, the possibility exists of utilizing the same cable for voice and video transmission, in addition to data. CATV installations for plant security in industrial plants, patient monitoring in hospitals, or educational tv in schools and universities can be used to provide data transmission. Another interesting possibility is to provide video outlets in every office so that teleconferencing equipment could be placed wherever the need arises. (The interface for satellite or wide-bandwidth land lines, necessary for remote teleconferencing, is of course a separate requirement).

Who should use LANs?

Where workers are primarily concerned with individual computing tasks, such as word processing or spreadsheet analysis, with frequent need to exchange data or program files but with only occasional need to access corporate or departmental databases, a LAN solution is indicated.

If workers expect to exchange large files frequently, a high-transfer-rate LAN, such as Ethernet, should be considered. Key suppliers are 3Com in Mountain View, Calif., and Ungermann-Bass, Santa Clara. Note, however, that the need to transfer files may be obviated by selecting the central-computer solution. For example, a group engaged in performing various CAD/CAE activities on a given design (printed circuit board, machine part, or what have you) may do so more efficiently by working with a centrally kept database, rather than by passing a given file back and forth between personal workstations.

If the number of users (now and in the future) is relatively small and they are located in close proximity, a "lightweight" LAN such as the IBM PC Network; OmniNet from Corvus of San Jose; the Plan networks from Nestar, Palo Alto; MultiLink from Davong, Sunnyvale, Calif.; Gateway from Gateway Communications, Irvine, Calif.; or X-Net from XComp, San Diego, may be appropriate.

SOFTWARE FOR LOCAL NET PCS

Software to support locally networked pcs may be had from Microsoft, Bellevue, Wash.; Intel, Santa Clara; Lantech, Dallas; Network Research Corp., Los Angeles; Novell, Orem, Utah; and Software Connections, Santa Clara, among others. ASCII file transfer software is available from Microcom, Norwood, Maine; and Communications Research Group, Baton Rouge. A PC-to-SNA link is available from Communications Solutions in San Jose.

If a large number of users, spread over a campus of buildings, must be interconnected, one should consider the heavy duty networks like Ethernet, or LocalNet from Sytek in Mountain View.

For computer vendors, or users that are very capable technically, the Excelan offering should be considered. This company provides 802.3-compatible boards that interface directly to the computer system's bus and take care of all network protocol details. The computer merely points to the I/O buffer in main memory and initiates I/O as if the network were a local peripheral.

If the computers to be locally interconnected are principally DEC and/or Data General minis rather than desktop pcs, then the offerings of Interlan (now a Micom subsidiary), 3Com, and Ungermann-Bass should be considered. (The latter two also supply pc-based LAN solutions.) DEC itself offers a variety of Ethernet interfaces for its computers. Intel offers some board-level Ethernet products. Xerox offers Ethernet interfaces for practically all of its office equipment products, including the Star workstation, 820 personal computer, and memory typewriters.

If group members are likely to be frequently involved in teleconferencing, or if the organization already possesses a CATV installation in the right location, then a broadband network should be considered. Sytek, Interactive Systems/3M in St. Paul, and Concord Data Systems in Waltham, Mass., have such offerings, as does Wang.

Bridge Communications, Cupertino, Calif., offers interface boxes that enable RS232-equipped devices to be hooked to an Ethernet network. This lets the user attach computers with standard communications software and terminals with standard RS232 interfaces.

Who should use a multi-user system?

If the group members are (and will be) primarily concerned with access to a common database, which they wish to frequently interrogate or update, then a multi-user central computer would be the right choice. Examples of such situations might be a small travel agency, where the principal terminal activity is to call up the customer file from the local group computer, and to display flight information, obtained from one of the major carriers' reservation systems. Here group members have no need for word processing or spreadsheet analysis, nor do they need to exchange files with each other. On-line accounting (A/P, A/R, inventory) is another example of where a multi-user system is best.

If the cost per user is of prime significance and the organization or the group has no in-house technical capabilities, a group computer approach may be preferable due to its cost and single vendor benefits. If the initial outlay must be minimized, a lightweight LAN (see above) may be more appropriate.

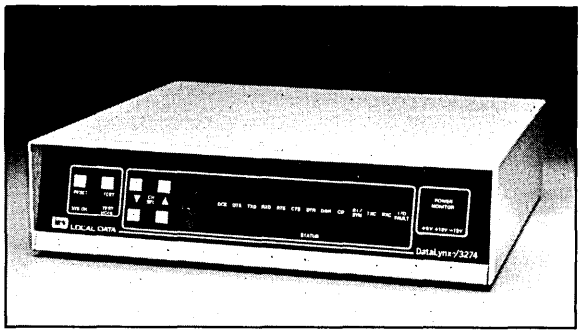
SPECIALLY SUITABLE COMPUTERS

Suppliers of computers that are especially suitable for group service include the leading minicomputer vendors (IBM, DEC, Data General, Hewlett-Packard, and Prime) as well as such supermicro suppliers as Convergent Technologies, Santa Clara, which sells primarily through Burroughs, NCR, and Motorola/Four-Phase; Altos Computer; Intel Corp., Santa Clara; and Zilog Corp., Cupertino, Calif. Suppliers of fault tolerant computers that could be considered for group service include Tandem Computers and Stratus Computer. Britton-Lee, Los Gatos, Calif., makes a relational database management machine that may be appropriate as a back end to a group of pcs or DEC minicomputers. While not fault tolerant, Britton-Lee's machine does incorporate database recovery procedures to protect against loss of data or loss of consistency after a system failure.

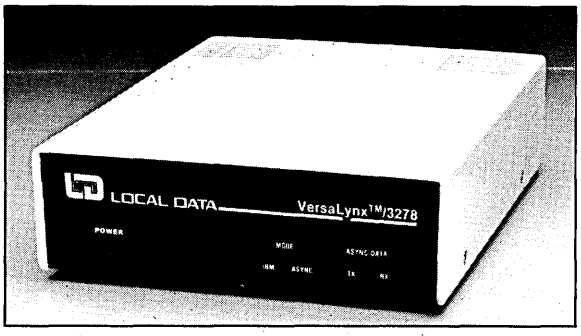
What's the difference between a network server and workgroup computer? In some cases, it is becoming increasingly difficult to distinguish between the two. The objectives of both are the same: to provide for electronic mail and file exchange among the multiple users, and allow resource sharing among users, especially of file storage (disk space), and utilization of such peripherals as laser printers or other equipment that is either too costly or too infrequently used to replicate at each user's workstation.

IBM, for instance, is promoting its System/36 as both a conventional data processing system, supporting multiple general purpose terminals, and as a server for networked PCs. "With the System/36, we are making it easier for the user to make a system choice without dictating the type of workstation," says Bill Harrington, director of office systems for IBM's Information Systems and Communications Group (IS&CG). Recent software releases for the System/36, including Displaywrite and Personal Services, were designed to allow the System/36 to act as a server for a group of PCs. Thus, Harrington says, "if you have a substantive mix of dp applications along with productivity applications," you can service both with one server system.

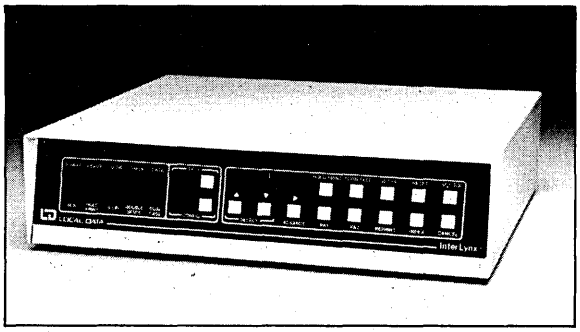
Local Data Protocol Converters



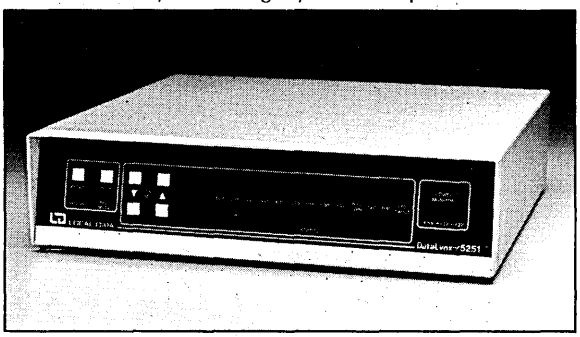
DataLynx/3274 connects 1 to 9 async CRTs and printers to a 3270 multipoint network, SNA or BSC.



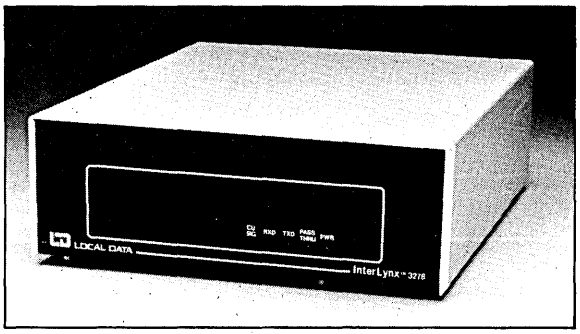
VersaLynx/3278 allows an IBM 3178/3278 terminal to access ASCII systems using asynchronous protocols.



InterLynx/3287 attaches low cost serial ASCII printers to IBM Type "A" coax ports on 3274/3276 controllers and 4331 CPUs.



DataLynx/5251 connects 1 to 9 async CRTs and printers to a system/3X host.



InterLynx/3278 attaches low cost ASCII CRT terminals or PCs to Type "A" ports.

DataLynx/3780 connects asynchronous devices or minicomputers to 2780/3780 BSC networks, and has CRT and printer port and file transfer utility.

InterLynx/3287 NP is the InterLynx/3287 packaged in a smaller unit with the security of tamper-proof, no panel construction. Options are set by the portable plug-in panel.

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IBM is interested in providing both solutions because, Harrington says, "we believe that for us to be successful in the office, we have to be broadly based. There isn't a single solution; we have to offer multiple solutions. That's why we have a spectrum of products." Displaywrite (for word processing) and Personal Services (for electronic mail) are available in versions for the IBM PC, System/36, and System/370 architectures.

Lee Reiswig, at IBM's Entry Systems Division, agrees. "We don't want to make this a binary choice. There may be areas in which a System/36 may be a better choice relative to locally networked PCs, but we look at them as complementary. We would like to provide, through gateways, ways in which PCs connected to our LANs could access services and facilities in System/36s, System/370s, and other processors."

Convergent Technologies is another company that is promoting both solutions. The company is now a $362 million supplier of workstations and multi-user computers to such oems as Burroughs and NCR. Originally, notes planning vice president Jay Spitzen, the company heavily promoted a distributed logic approach, with personal workstations connected over an RS422 link to a master workstation. Then, in 1983, the company unveiled two multi-user computers, the MegaFrame and MiniFrame. Why the change of heart? "We recognized that you couldn't satisfy all requirements with one approach," concedes Spitzen. He cites as specifics the need for more power in the master as the number of workstations increases, environments where the workstations could be dumb terminals, and the fragmentation of resources argument.

"The MegaFrame is being used in all three types of situations," Spitzen notes.

Altos is a leading supplier of multi-user supermicros, supporting four to nine users with Xenix-running machines based on Intel's 8086 and 186 microprocessors, and up to 16 users on a Motorola 68000-based system running Unix System III. Altos claims to have installed some 40,000 such systems (plus 20,000 more of the older, 8-bit systems), and is expected to record revenues of some $130 million in the fiscal year ending June 1985.

Phil White, an ex-IBMer who is now senior vice president at Altos Computer, claims that "with Altos, the user gets the best of both worlds." The user can tie his pcs into an Altos that is acting as a server, White says. "That is a function he will need anyway, even if he connected his pcs over a LAN," he points out, noting that Altos recently introduced PC/Path, a $395 interface card that allows IBM PCs to connect to the Altos WorkNet, an RS422-based local network. The demand for PC/Path is exceptionally strong, White reports. In addition, the user may attach low-cost terminals over RS232 ports. Thus, White concludes, "We don't see this as an either/or situation." ◉

Omri Serlin heads ITOM International Co., a research and consulting firm in Los Altos, Calif. He writes the *Supermicro* newsletter, which comments on the increasing competition between multi-user supermicros and locally networked pcs. His other interests include fault tolerant systems.

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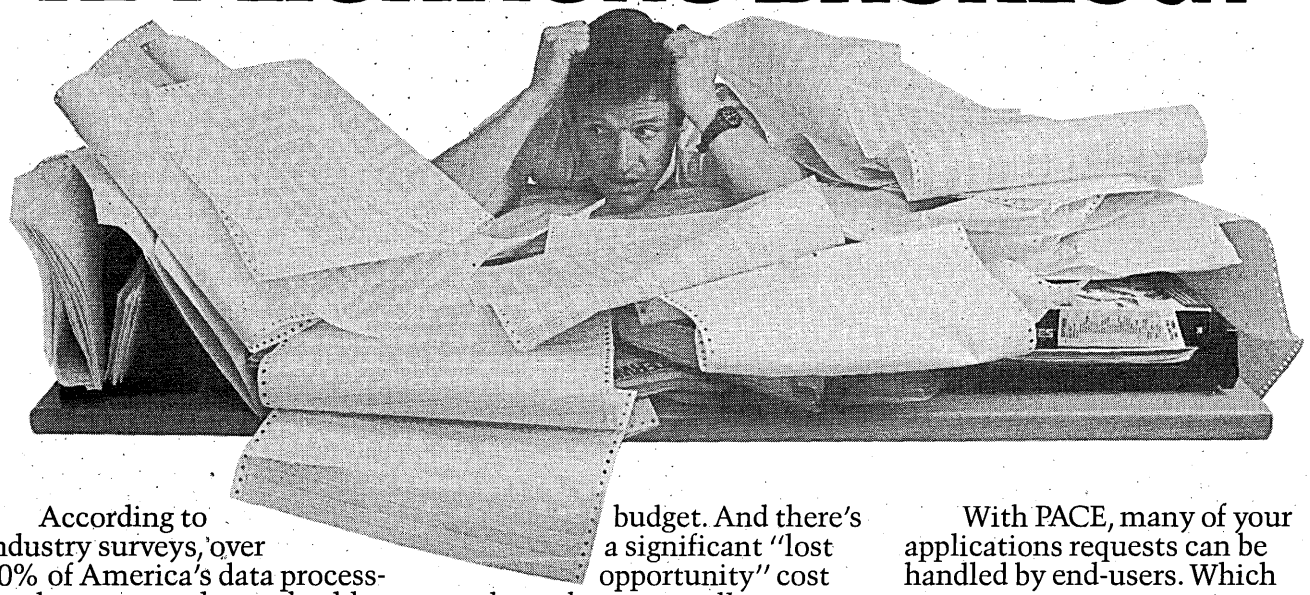

According to industry surveys, over 90% of America's data processing departments have a backlog of applications requests that ranges from three months to three years.

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Migration without conversion up to 192 users	Yes	No
32-bit Architecture	Yes	No
Cache	Yes	No
Object Code Compatibility	VS 15, 25, 45, 65, 85, 100, 300	36 only
Virtual Memory Operating System	Yes	No
Removable Storage Options	Yes	No
Local Area Networks	Yes	No
Architectured for OA/DP	Yes	No
Relational Data Base	Yes	No
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The problem is, with most computer systems, including IBM's System 36, most applications must be developed by programmers. It's a time-consuming process that can account for up to half of your data processing department's budget. And there's a significant "lost opportunity" cost to the end-user as well.

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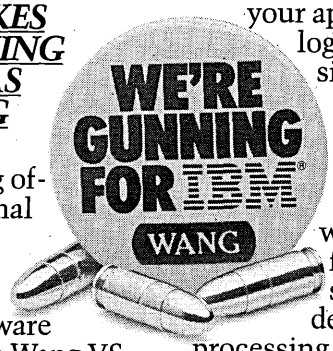

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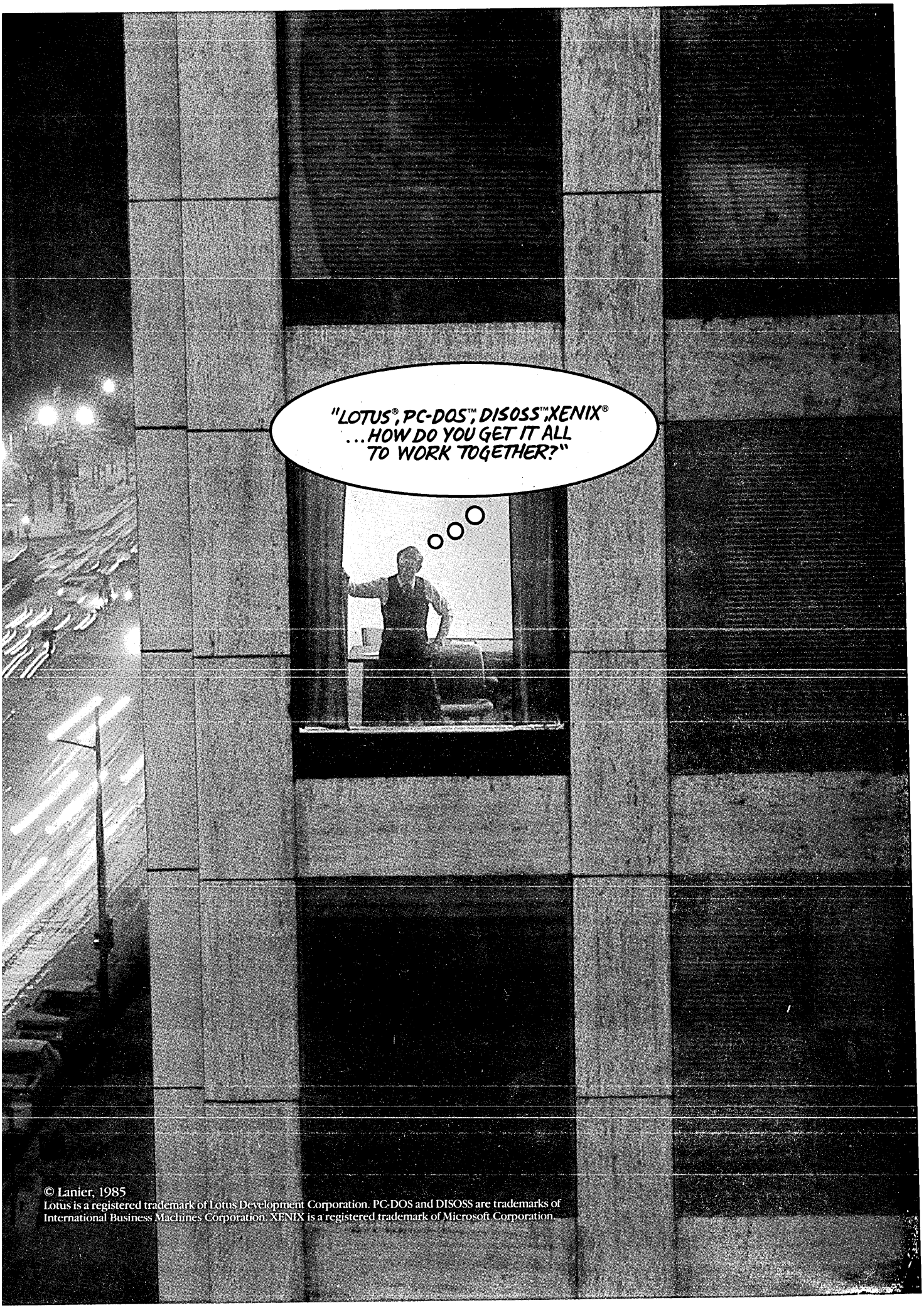

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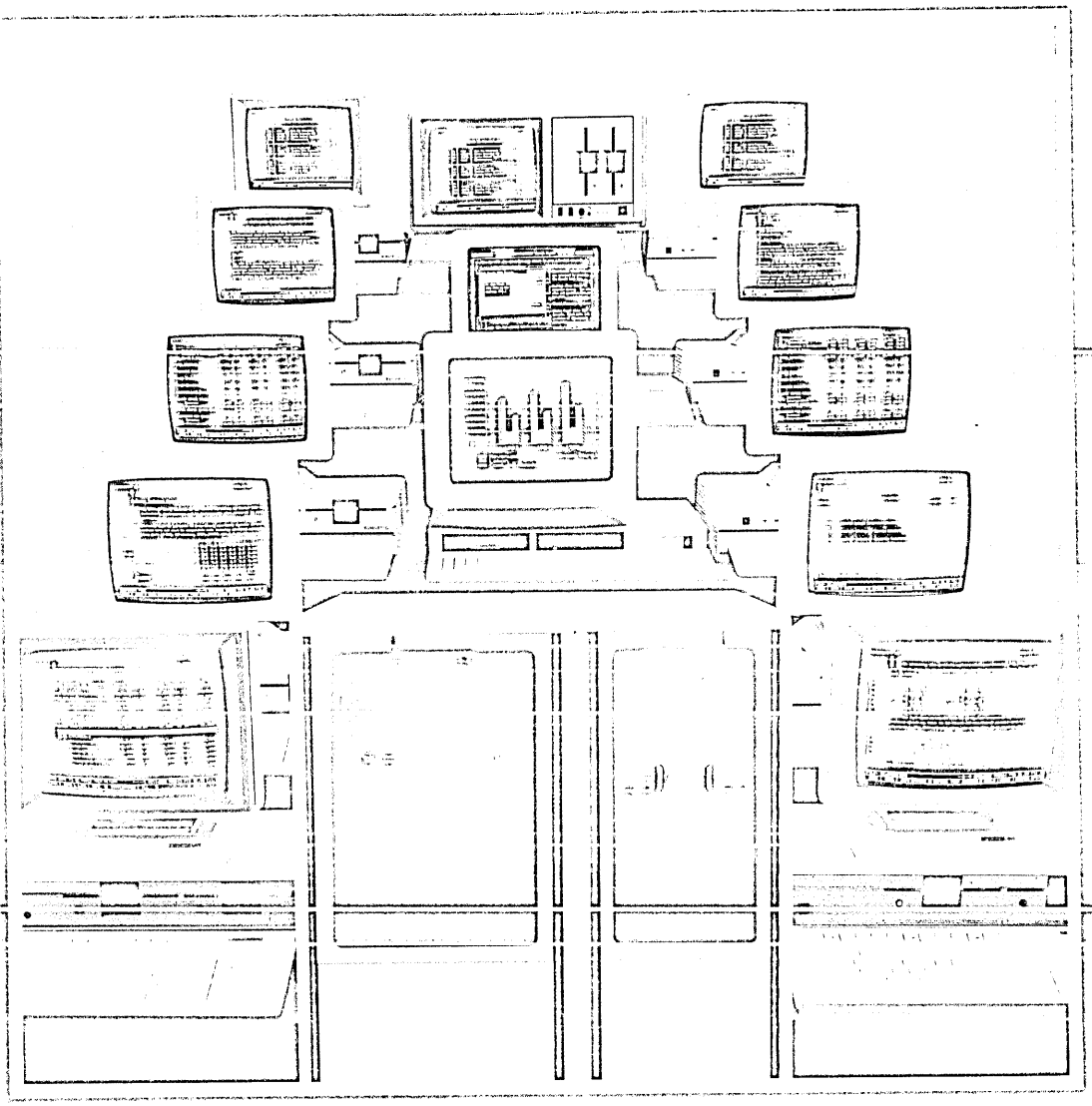

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IBM's joint venture with Merrill Lynch could change the rules in the financial information game.

IMNET TAKES THE FIELD

by Tom Lawton

In September 1982, Merrill Lynch Pierce Fenner & Smith, the giant stock brokerage, hired a company called Monchik-Weber to design an office automation system that would place an IBM PC on the desk of each of 10,000 Merrill Lynch employees. It was the opening move in what now looks like a stratagem by IBM to assume a major role in the distribution of financial market information. Today, IBM and Merrill Lynch share equal ownership in a joint venture,

International Marketnet (IMNET), that plans to deliver financial data, news, and stock quotes from the various exchanges to clients using IBM-PCs as terminals. The system was scheduled to start operating on a pilot basis in the second quarter of this year.

Back in 1982, Monchik-Weber seemed an unlikely instrument of change for giants like IBM and Merrill Lynch. Founded in 1970 by John Weber and Stewart Monchik, the New York City-based firm specialized from the start in services to financial institutions. By fiscal 1981 Monchik's revenues totaled $16 million. Those sales consisted of 50% professional services, 25% remote computing services, and 25% software products. Remote computing included transmission of price and quotation data for options and futures, and of data tables for publications and service bureaus. The software products operated on Data General, Hewlett-Packard, and IBM System/34 hardware, and provided management and multicurrency accounting for investor portfolios. Net earnings on 1981's sales were $892,000, for an after-tax margin of over 5%.

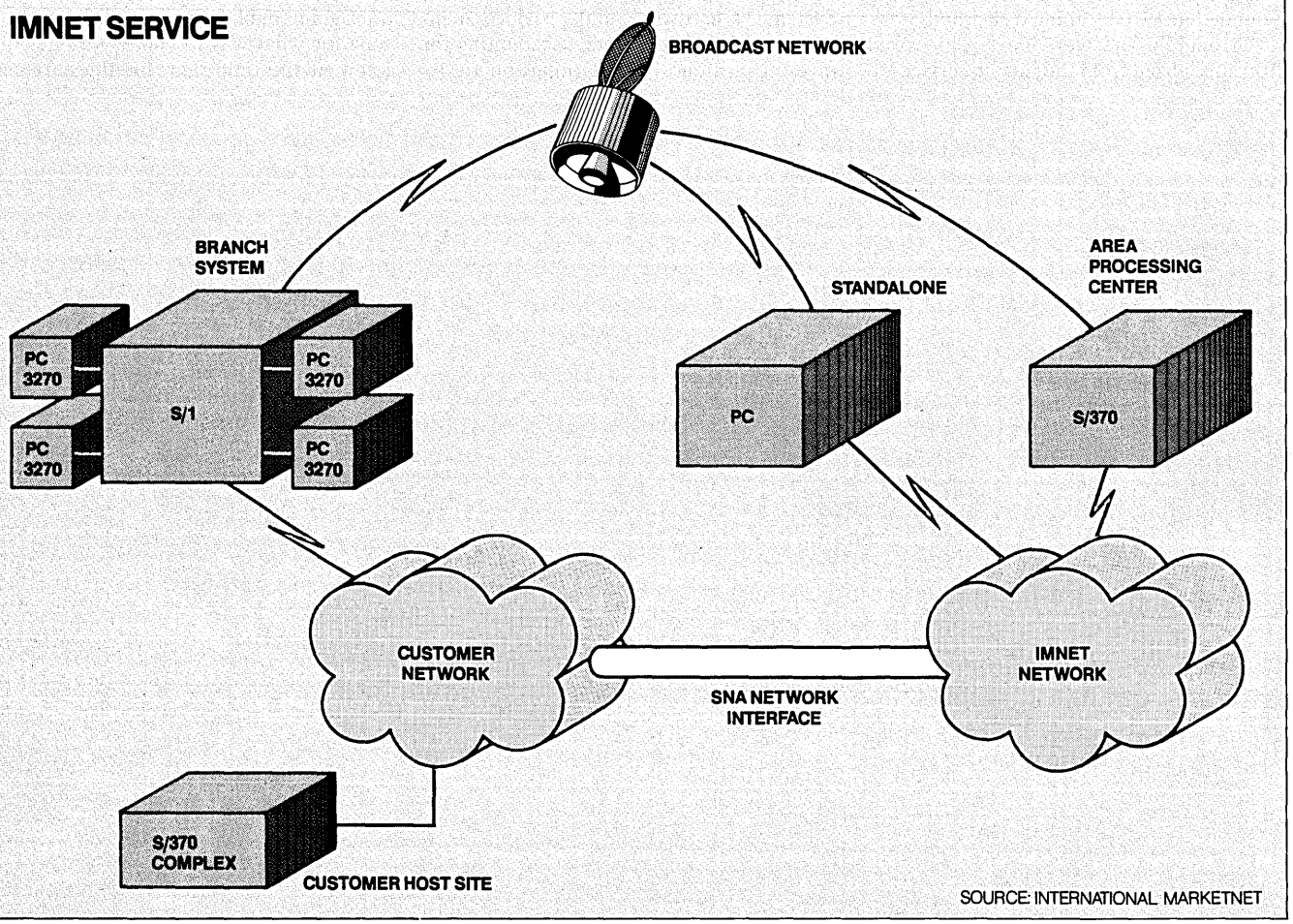
In November 1981, Monchik-Weber took the big plunge. It made an initial public offering of its shares, selling 900,000 at $11 each. In the fiscal year ended May 31, 1982, Monchik-Weber posted excellent results. Sales shot up 39%, to $23 million, while net earnings leaped 91%, to $1.7 million. That was, of course, the first year-end after going public. It may well have set the tone for what was to come. No one could know at the time that, for the next eight

ILLUSTRATION BY JOE DAWES

Some early users report problems putting Topview to work.

Fig. 1

IMNET SERVICE



SOURCE: INTERNATIONAL MARKETNET

quarters, Monchik-Weber would show declining net earnings on a year-to-year basis.

Sometime in 1982, Monchik-Weber approached Merrill Lynch with the idea of designing a new information system based on IBM PCs. That's clear because the contract between the two was announced in September of that year. What has not been revealed before is that Monchik-Weber was accompanied by representatives of IBM. It's doubtful Merrill Lynch would have staked so much on a firm of Monchik's size if IBM had not been in the background. Moreover, Joseph P. Castellano, president and ceo of IMNET, attests that IBM did call on Merrill Lynch together with Monchik. At the time, Castellano was director of Merrill's Corporate Systems Department.

Why did IBM choose to remain in the background? Maybe it was negotiating with Merrill Lynch for higher-stakes commitments. Or it could be that IBM, burned before, wished to avoid an unpleasant repeat. In 1974, Merrill Lynch announced that all its account executives would be supplied with specially designed desktop systems from IBM. The deal fell through, though, and Merrill's account execs wound up with Quotron terminals; the IBM product was quietly dropped. Armonk didn't want that to happen again. So, to some extent, Monchik-Weber was a stalking-horse for IBM.

On New Year's Day 1983, Stewart Monchik died. He had been ill with cancer for some time but his death at 45 years of age cast a pall over the firm. He had been the key marketing man and the driving force in the business. His death coincided with the beginning of a decline for Monchik-Weber. In the quarter ended Feb. 28, 1983, Monchik-Weber lost $254,000 on decreasing sales. The November quarter produced more losses, amounting to $112,000 on sales of $5.7 million.

In March 1984, Merrill Lynch and IBM announced the formation of the IMNET joint venture. Reportedly, the two firms set aside $120 million for development. Monchik-Weber was not a partner but continued to function as a software and data supplier. The firms said the pilot product would be released in the second quarter of 1985 and would first be aimed at Merrill's 10,000 account executives. The system would also be offered to Merrill's competitors. Indeed, the success of the joint venture might depend on acceptance by other firms.

QUOTRON STOCK DROPS

The initial shock to IMNET's competition was substantial. Quotron, which claims it has 65% of the financial quotations market, saw its stock fall 30% in one day, to $10. The other significant suppliers are Bunker Ramo, a division of Allied Corp., and ADP Corp.

Monchik-Weber continued to muddle along until last summer. Then, an investment group that included management bought most of John Weber's holdings—200,000 shares at $15 each. The price seemed high since the stock had been trading at $7 at the time. But it quickly became

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IBM may be interested in acquiring Merrill Lynch.

clear what was afoot. Monchik-Weber was acquired by publishing giant McGraw-Hill for more than $55 million last August. The price per share was, of course, $15.

McGraw-Hill says it bought Monchik-Weber because it wanted the firm's information distribution technology. It is combining Monchik-Weber with two other subsidiaries, Standard & Poor's and Data Resources, to form the Financial and Economic Information Company. McGraw-Hill has been making significant moves into computer services for some time. In 1979, it purchased Data Resources Inc. for $103 million. DRI provides econometric modeling on a timeshared system. McGraw-Hill subsequently bought micro software firms Cyma and Educational Management Services, and also the microcomputer market researcher Future Computing.

So Monchik, as part of gigantic McGraw-Hill, now has a staying power that was quite beyond it as an independent. In 1983, McGraw-Hill's sales were $1.3 billion and net earnings were over $125 million. Now all the companies involved in IMNET are behemoths.

FULL SPEED AHEAD

Meanwhile, it's full speed ahead at IMNET. President Castellano says employment totals over 130. About one third are from IBM or Merrill Lynch; the rest are new hires. There are more than 100 Monchik-Weber staffers (mostly software people) assigned to the development. Pilot tests will still commence by the end of June, Castellano says. Live operations will begin in the third quarter at Merrill.

The IMNET system (see Fig. 1) will use IBM's 3270 PCs and Topview windowing system. Each Merrill Lynch branch will have an IBM Series 1 minicomputer as a data concentrator and terminal driver. IBM's Systems Network Architecture will be the basis for communications design. The network will consist of three elements: a land-based, conventional two-way net; a satellite net supplied by Equatorial Communications Inc.; and the vertical blanking intervals from the Public Broadcasting System. The Equatorial system will transmit to (but not receive from) small dish antennas. The PBS capability relies on the fact that there is unused capacity between television frames—the black lines you can see on your screen when the picture rolls over vertically. This PBS capability allows transmission of more than 40 million characters per second and reaches an estimated 96% of the population.

Still, there may be problems looming. For example, some early users report problems putting Topview to work. Also, a 3270 PC is a very expensive terminal, especially when little use is made of its computing power. The network's three-part design is complex, to say the least, and IBM is not known for its communications expertise. Monchik's management may be distracted as it struggles to integrate with Data Resources and Standard & Poor's. McGraw-Hill's priorities may not center on IMNET.

Then there's the competition. First, consider the leader, Los Angeles-based Quotron. The firm was founded in 1957, and claims it was the first to offer brokers an electronic stock quotation system. As of last Dec. 31 it had over 72,000 terminals installed at 6,400 customer sites. Those terminals are served by a New York-based network that includes one international and nine national computer centers. In 1984, sales advanced 23%, to $190 million, and earnings lagged a bit, climbing 12%, to $27 million. But that's still an after-tax margin of 14%—not shabby.

Quotron's president, Milton Mohr, says that first of all, he can't predict what the future holds. But Quotron's contract with Merrill Lynch now runs to 1988 with an option to extend to 1990. Mohr says Merrill Lynch has expressed a desire to extend for the two years. Merrill Lynch is Quotron's biggest customer and contributes about 25%, or $50 million, of the company's sales. No matter what IMNET does, says Mohr, it will require lots of time. Merrill Lynch has more than 400 branch offices, and it will take years to swing them over to a different system. In the meantime, he says, Quotron is not standing still.

Quotron's answer is the Unix-based Q1000 system. It is designed to combine market data with office automation and personal computing, just as IMNET's offering will do. Each Q1000 can service more than 50 terminals. One Quotron goal is to support a variety of personal computers rather than just IBM look-alikes. At the end of February Quotron had 76 Q1000s installed at client sites and 223 operating internally.

Bunker Ramo Information Systems has been a division of the Morristown, N.J.-based conglomerate Allied Corp. since 1981. Bunker Ramo's business is divided between banks and brokerage firms. In the brokerage area it has over 30,000 terminals installed at more than 3,000 client locations. Bunker Ramo does not release information on financial performance, but if the terminal count is accurate it seems safe to assume Bunker Ramo is number two in the business. Mike Cooper, vice president for sales and marketing, says the firm designs and builds its own dumb terminals, designated the MDS 790 family. It also sells an intelligent terminal called Aladdin, which is oemed from microcomputer producer Fortune Systems.

When asked about Bunker Ramo's reaction to developments at IMNET, Cooper says, "We have exciting products coming along and under development." IMNET, he continues, has taken on a major effort that will require a long time to reach fruition. "They've picked a very sophisticated box. It's a very expensive approach. I guess Merrill can justify it, but a lot of others can't."

ADP is another supplier of securities quotations. The firm's roots on Wall Street go way back; it established a data center there in 1962. Until recently the company concentrated on back office services such as processing trading reports, stock loans, portfolio reports, and customers' orders. In 1972, ADP developed a major data communications network for the brokerage industry to accommodate message switching, order matching, and control of securities.

ADP's big entrance into stock quotation services, and the front office, came in June 1983, when it acquired GTE Telenet Information Services. At the time, the business had sales of about $35 million per year, and provided information via 15,000 terminals to more than 400 customers. The terminal count has since increased to more than 20,000. ADP initially paid GTE $10 million; additional payments were to be based on performance of the business, with a minimum of $13 million. ADP's Financial Services group is doing $180 million to $200 million annually in both back office and front office services. The company doesn't break down sales figures further.

LARGEST SERVICES VENDOR

ADP is the largest independent computer services vendor. Sales for the year that ended last June 30 were almost $900 million and net earnings exceeded $75 million. ADP has gotten into a variety of business applications and has been unsuccessful at only a few. With over 25 years on Wall Street, it's probable ADP knows what's going on there. Remember, Monchik-Weber made its deal with Merrill Lynch in September 1982, about nine months before ADP bought GTE's operation. Just nine months later, Merrill Lynch and IBM disclosed plans for IMNET. ADP certainly had a good idea of what was coming but still elected to spend at least $23 million to get into the quotation business.

If ADP believes IMNET will succeed, then it also believes there will be more than enough business left to make the GTE buy-

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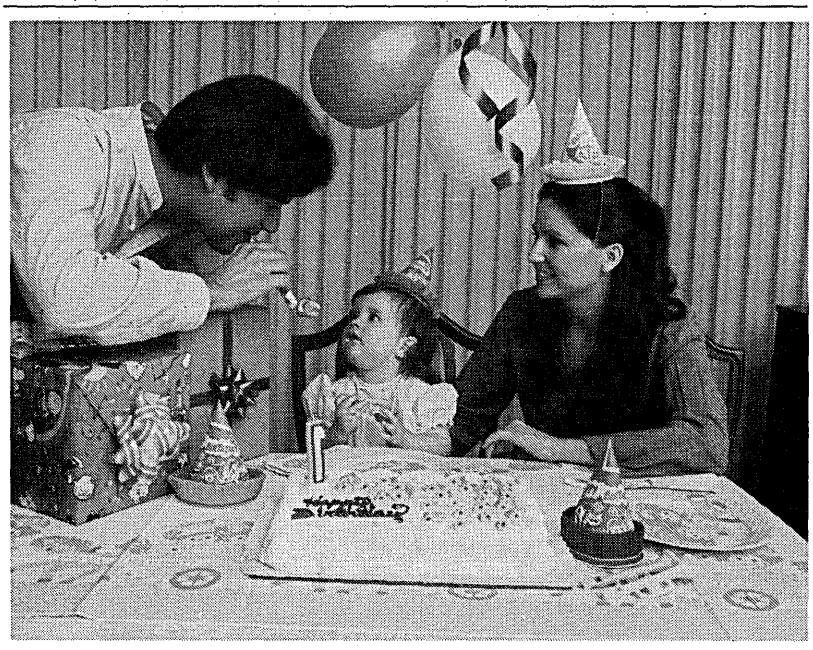

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out reasonable. Since ADP entered the field, it has signed major contracts with Prudential Bache Securities and Alex. Brown & Sons, the Baltimore-based brokerage. Prudential had been a customer of GTE, but this was a major new contract involving the use of Convergent Technologies terminals valued at $20 million.

Ric Duques, group president of ADP Financial Services, says that in the fall of 1983 ADP signed a "joint development agreement" with IBM. The agreement called for ADP to convert the products acquired from GTE to make them usable in an IBM PC and Series 1 environment. IBM is supplying development hardware and systems programming support. According to Duques, the system was to be in beta test by May 1985. That seems to indicate ADP will beat IMNET at its own game. Duques says the IBM PC is a very expensive solution to the quotation problem when compared with dumb terminals or even the Convergent Technologies terminals. He wonders if there is as much price elasticity as IMNET seems to assume.

So IBM and Merrill Lynch have hurled down the gauntlet before Quotron, ADP, and Bunker Ramo, and the securities data business has gotten a lot livelier as a result. Consider the possibilities, unlikely though some of them may be:

- IBM may be interested in acquiring Merrill Lynch. After all, Sears Roebuck and American Express both bought out major brokers.
- McGraw-Hill could become a partner in IMNET. In many ways that's a natural move.
- IMNET could flop. The 1974 deal between Merrill Lynch and IBM didn't work. Then Quotron, ADP, and Bunker Ramo would have a new lease on the securities information business.
- All the participants may find that office automation for brokerage account executives is an expensive luxury that adds nothing to productivity. The competitors would be forced to scale back their products to provide minimum on-site intelligence. The development losses would be staggering, running to hundreds of millions of dollars.
- IMNET could be so successful that all its competitors are effectively driven from the business.

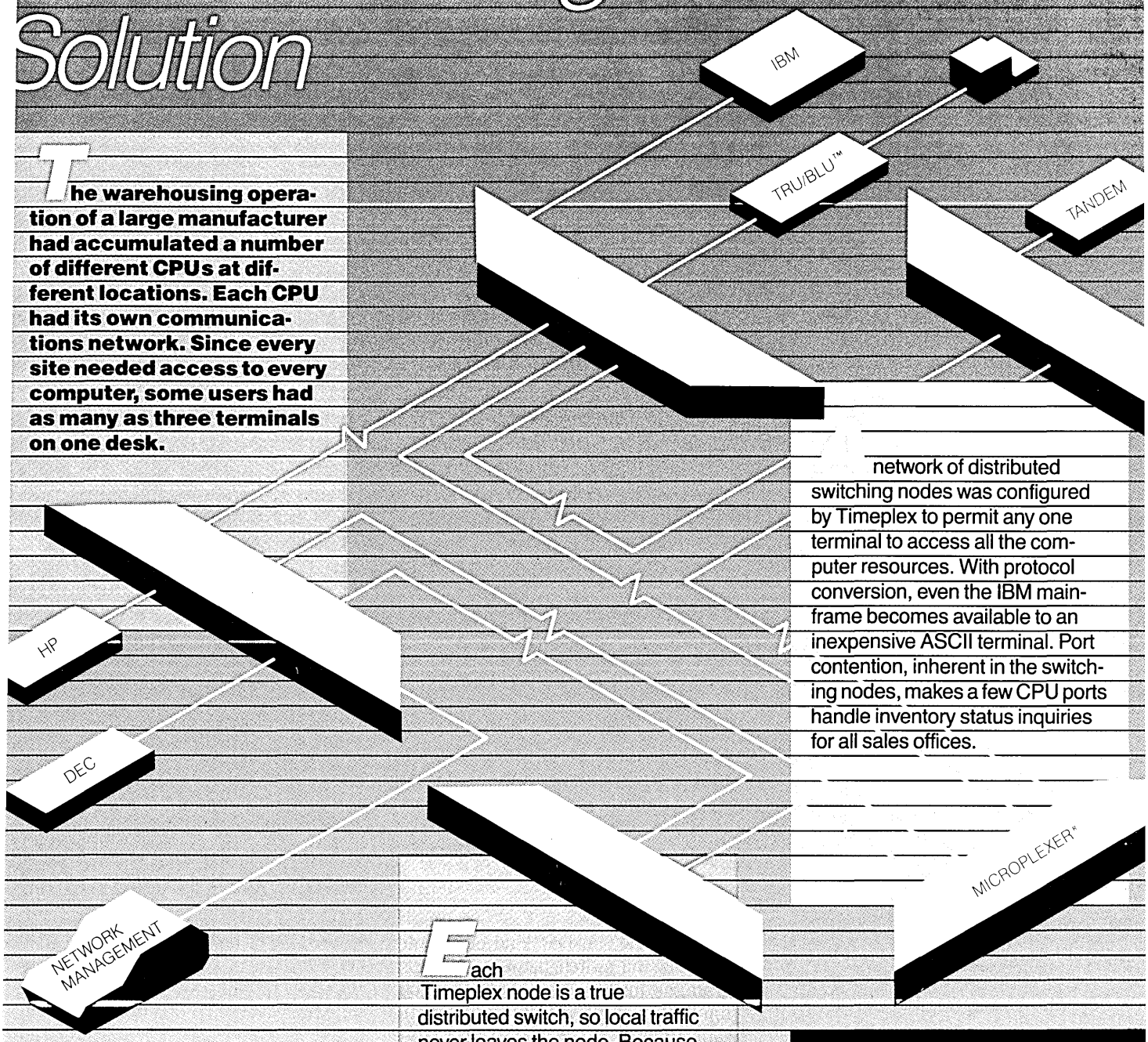
We won't see any of these come true for a couple of years, of course, but whatever happens should be interesting to watch. It's no secret that IBM wants to move into information services. IMNET should give us an indication of how nimble the moves will be. ◉

Tom Lawton is editor and publisher of *Computer Services Report*, a four-year-old business and financial monthly for the computer services business, based in Belmont, Mass. He has 25 years' experience in the computer services business in management and technical postions.

Distributed Switching Systems: A Case Study

The Networking Solution

The warehousing operation of a large manufacturer had accumulated a number of different CPUs at different locations. Each CPU had its own communications network. Since every site needed access to every computer, some users had as many as three terminals on one desk.



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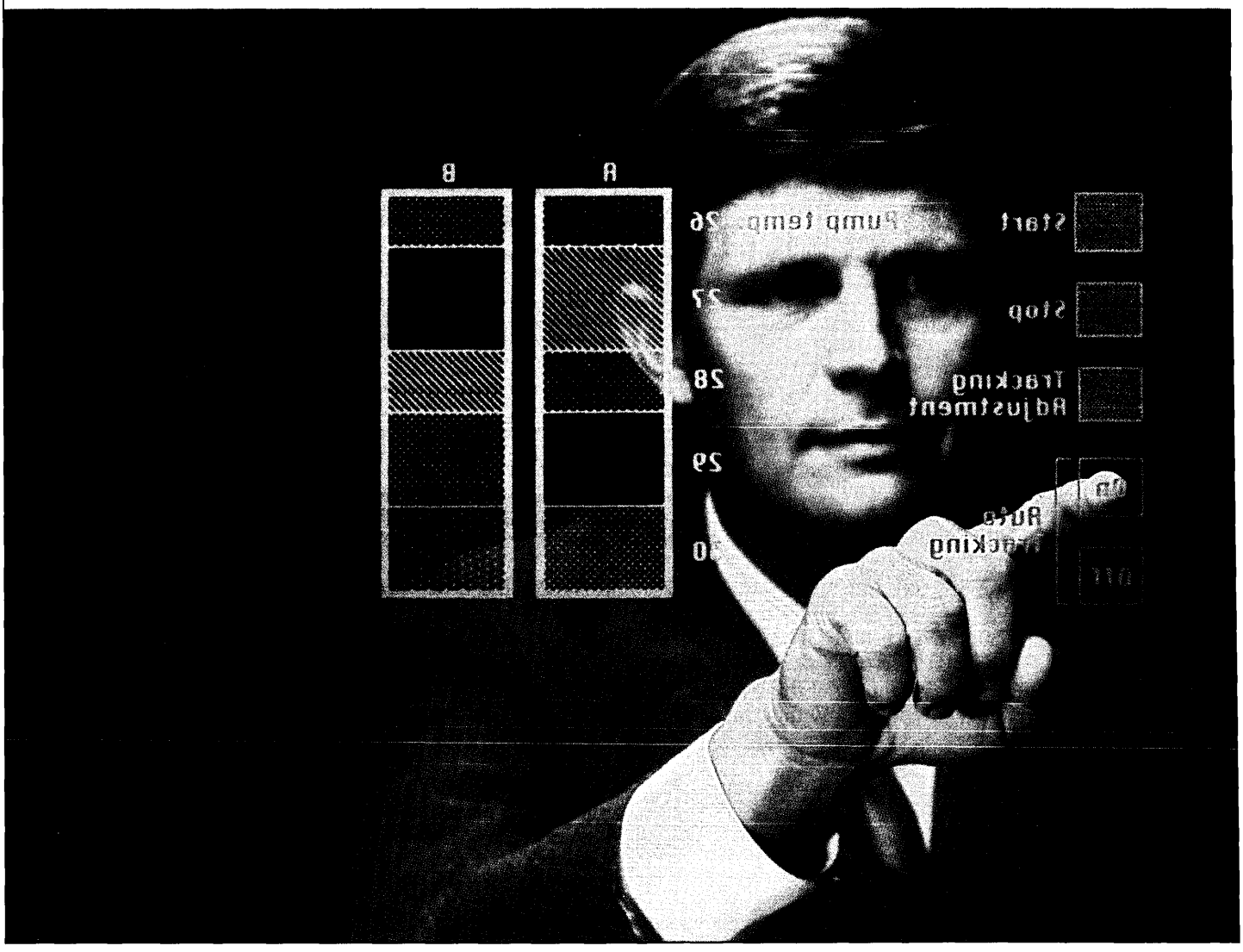


Unlike traditional system development techniques, the structured approach offers more reliable results and gives users a sense of progress.

BREAK WITH TRADITION

by Robin E. Spock

Structured system development is an extension of structured programming and a somewhat different approach to developing computer systems. The concepts are comparatively simple and may have been introduced in many organizations, though from my experience, few of those organizations seem to have published their findings. The methods described are quite powerful and lend themselves to situations where the specifications are subject to change as the system develops. In addition, these methods provide the user with concrete evidence of the development process. The process is admirably suited to situations where a data dictionary is used and tight control is maintained over the elements and segments that go into the database.

The computer trade press is full of articles that discuss the problems MIS encounters while developing systems for its users. The most common questions have to do with the user's inability to clearly state the problem, the system development staff's difficulty in recognizing the real problem, the user's unrealistic expectations with respect to development schedules, the problems associated with changing specifications, and the incurable optimism of programmers. Great efforts have been made to measure the productivity of the system development process and significant sums of money have been spent on development methodologies. All these expenditures are made in hopes of preparing precise specifications, calculating resource requirements, and estimating time to completion fairly accurately. This article is about another approach to the development process that provides reliable results, enables the specification process to be flexible, and gives the user some sense of progress.

All systems go through a development cycle that usually starts with a request for service. Some kind of a feasibility study follows and an estimate of impact (although this process is sometimes more subjective than objective) is completed. Subsequent steps involve specification development, programming, and finally, implementation and maintenance. Concurrently, user manuals are prepared, internal documentation of the system is written, and users are trained. The whole cycle usually takes several months to complete. Towards the end of the development cycle, the user is introduced in detail to the system through training manuals that are often developed as an afterthought. Furthermore, the training takes place on a system that has not been shaken down in the real world. It may still have logical errors even though system testing has taken place.

REVISING WASTES TIME

While the above picture is painted in bleak colors, the conventional procedure does indeed work against itself by requiring that some specifications be released to the programmers who then code and test the programs independently. When most of the programs have been developed, system testing is done to expose the major inconsistencies between the programs, a revised set of specifications is prepared, and the programs are reworked. This reworking wastes a significant amount of time.

The major problem with this conventional development cycle is that it takes an unusually sophisticated user to realize how much work has been done while the code is being written and tested, even if there is little to show for it. The user has an opportunity to assess the effectiveness of the system only when the results are delivered. When the programs are being developed, the typical contact consists of a conference between the user and the programmer on matters of detail. A sequence of such conferences may have little apparent relationship, although such meetings reassure the user and instill a sense of progress. The meetings themselves are discussive in nature because there is little to show for the work that has already been done.

The development process is essentially an open-loop affair with minimal feedback to the user. The user can only hope that the programmer understands the problem and is sufficiently skilled to interpret the user's specifications precisely. In fact, during these conferences the programmer may sense that the specifications are changing or have changed. The changes usually generate ramifications throughout the computer system. At the end of the coding and testing stage, the user is usually asked to sign some kind of an acceptance document. The signature is requested even though the user may still be uncertain whether the system is working to the current set of specifications. Once this "turnover" point is reached, the system goes into a maintainence and enhancement mode.

The alternative method of system development described here assumes that the system is in the maintenance and enhancement mode right from the beginning and that the growth of the system reflects the user's current needs and MIS's ability to deliver. The development process can be considered a superset of structured programming—structured system development, if you will. In this process, the system goes into production immediately after the go-ahead from management. The sequence of steps is as follows:

- Step 1. Work with the user to draw up an outline of the user manual. The initial outline consists of a table of contents and a short general introduction followed by a description of the system in layman's terms. The system description defines the inputs and outputs in general and outlines the benefits the user can expect to derive from the system. In the case of a menu-driven interactive system, the initial specifications must cover the sign-on procedure.
- Step 2. Develop the system infrastructure in the form of Job Control Language (JCL). Each program consists only of the division identifiers and the statement necessary to return control to the operating system. The JCL for the files is prepared at this time al-

The development process can be considered a superset of structured programming.

though the files themselves have no data in them. The run instructions are prepared and provided to the operators. The system is invoked on a regular timetable and is, in fact, in a production mode right from the beginning. All the JCL errors are exposed at this point and any operating problems of a fundamental nature are brought to light.

Many systems today connect the user to the mainframe through a terminal. The visible output provides the user with an indication that the terminal is connected to the system. Where there is a choice of systems, the user knows the new system exists, even though there is nothing in it yet. If he selects the new system, the only entry on the main menu is the Exit choice, which returns the user to the sign-on or log-on menu. If the user enters any other selection through the keyboard (which is the default entry), an error message appears. The display of the sign-on message is a convenient checkpoint for the user to know that the system is officially in existence.

- Step 3. In the case of batch input—and most systems do have batch capability—the designers next address the flow of data through the system. The initial flow concerns itself with the problem of the unidentified input record whose format is not cataloged in the system in any way. This is the default-record type, which contains data that are meaningless (to the system) because the system cannot determine the names of the fields or data elements and, therefore, the information the record contains.

There are several ways to track the default record through the system, e.g., should the default record be discarded at the input, listed and turned over for review, or displayed on the user's screen for review? With the default record as the only input record, the system is exercised to make sure that it works as expected. The user is brought into this decision-making process by learning the exact problem and the options for solving it and then agreeing on the right way to solve it. Any program that is expected to process the default record is modified and the system is tested with data (note that all data are default data at this point). Once the system is handling the default data according to agreement, it becomes operational at the default-data level.

MESSAGE FILE ONE OF FIRST

One of the files that is initially operational is the message file, which uses the message number as a key-field. It is used to display the short-form text of a message; an optional longer form text, which provides the message in significant detail; and a "help" capability that gives an indication of corrective actions. The message file is incorporated into all programs that are going to be read by humans. The message file is printed, becomes an integral part of the user manual, and may be modified if the messages appear ambiguous or misleading to the user. Note that a printed user manual provides support to the user when the help file capability cannot be accessed and the screen is displaying an unfamiliar message.

- Step 4. The next record or segment handled by the system is the one that contains the highest level key-field. It introduces the key to the system and catalogs the key. There are no other data on the record except padding that brings the record out to at least the expected final length, if not somewhat longer (increasing the length of a record or segment throughout a system is time consuming). The key is validated (checked for format, duplicates, etc.), established, and the record is added to the database. The key information is recorded at the point of input, processed through the system, and appears at the output.

For screen-based systems, the menu must reflect the systems' ability to accept a new key-field and to display the results of all processing, including error messages. The user is responsible for entries in the user manual that reflect this processing.

When the user is satisfied that the key-field is properly set up and can be controlled from the terminal or other input system, then the key is considered to be in production and the logic cannot be touched again. In fact, the user should be encouraged to try to exercise the system. By leaving the system up at all times, the user can help detect errors before serious problems occur. When a change is made to the system, the user is notified that the change is about to be incorporated, the system is brought down, the change is made, and the system is then reinitiated so the user can make sure the change (which is usually additional capability) was done according to the user's idea and the user manual.

- Step 5. With the key data in a position to be added to or deleted from the system, one of the concerns that arises is how to manage key-field changes. Such changes occur when the key is not under the control of the user but is assigned by some external agency. For example, use of the social security number may lead to key-change difficulty because the original social security number may have been incorrect. All the records that have been accumulated under one key are moved to another key. The processing for this type of change can be complex and should be done with great care. Tracking of key-field changes within the system may be needed since "turnaround" documents may be keyed to the previous number and automatically referenced to the current number.

If the changes occur infrequently, the user may decide to reenter all the data from scratch. If the changes occur frequently, however, then machine processing is necessary. A related issue concerns the copying of data from one part of the database to another at the level immediately below the key level. Such processing occurs when a new part in a bill-of-material situation is similiar to an old part and most of the information is identical.

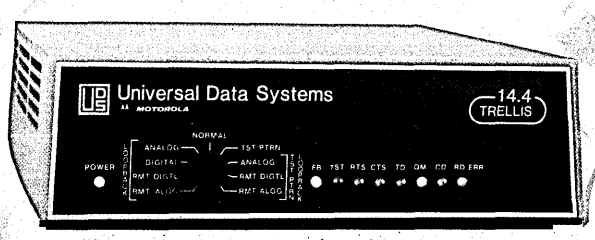
- Step 6. From this point on, system development takes place more quickly. The sequence consists of establishing a new record or segment type, if required, and subsequently creating one field or data element at a time within the record. The decision as to which record should be added and which data elements should be included in the record depends upon the demands of the moment.

SPEC PROCESS DYNAMIC

Thus the specification process is dynamic and meets the user's immediate needs. The currency ensures that the user is responsible for the priorities of the development process and becomes an excellent judge of a realistic timetable for implementation. When the record is defined, the coding is included in all the programs that process the record, and the system is tested with the new record in place. The coding includes the insertion of messages in the message file. In a similiar manner, as the coding for each field is prepared, appropriate error messages are developed and placed in the message file, and the field is tested for activity throughout the system. Once included, the ongoing system testing establishes that new data have been properly defined and processed.

In terms of managing this type of system development, the monolithic part—which consists of the overall system-structure development and the incorporation of terminals into the network—takes the longest.

The development of the key-field is the second most time-consuming task. Once these two system parts are in place, the records and data elements are added in a systematic manner. Use of externally compiled and tested modules using standard interface specifications and test programs is recommended. This enables many records and data elements to be developed concurrently with the monolithic and key-



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field core of the system.

One small group of programmers is responsible for the monolithic and key-field sections of the system and coordinates development of them with the user. Other programmers incorporate their records or segments and fields or data elements on a schedule that allows the user to determine whether the new data are what is required. Externally compiled and linked segments can be developed by an entry-level programmer.

One of the advantages of the structured system development technique is that MIS is forced to develop a tightly controlled method of handling change. In particular, there is a carefully managed procedure by which changes are made to production systems. The programmer and system analyst are responsible for a particular item of data or a group of related items and not for a particular program. Cooperation guarantees that the impact of one individual's work does not create problems for another. Cooperation will also make documentation more effective because programmers are quick to bring ambiguities to each other's attention. The technique means that the organization is no longer dependent upon one individual for maintenance of a particular program or on one person's programming techniques.

The technique described in this article was tested but didn't make it into production because of dissolution of the development team. The process was developed at one of the colleges of the City University of New York, using some of the better COBOL programming students. Error rates were very low, and any errors that did exist could be found in the relatively small amount of code that had been written since the last system test, because the system was run every night. Externally compiled and linked segments were employed and an elaborate message management system was incorporated in which numbered messages (and return codes) were transmitted from lower-level modules to higher-level modules. Each message included a priority code and only the five highest-priority messages were displayed—lower-priority messages were discarded. Most of the data elements or fields were edited through tables wherever possible. The final result was several thousand lines of error-free code that were quite familiar to the operational staff and well documented with respect to the changes that took place. ◉

Robin E. Spock is professor of electrical technology at the College of Staten Island (CSI), a unit of the City University of New York. He has been associated with dp since 1962 when CSI installed its first set of equipment for administrative work. Subsequently, he worked as director of dp and in other capacities at CSI's central office and at Baruch College, where the work discussed in this article was performed.

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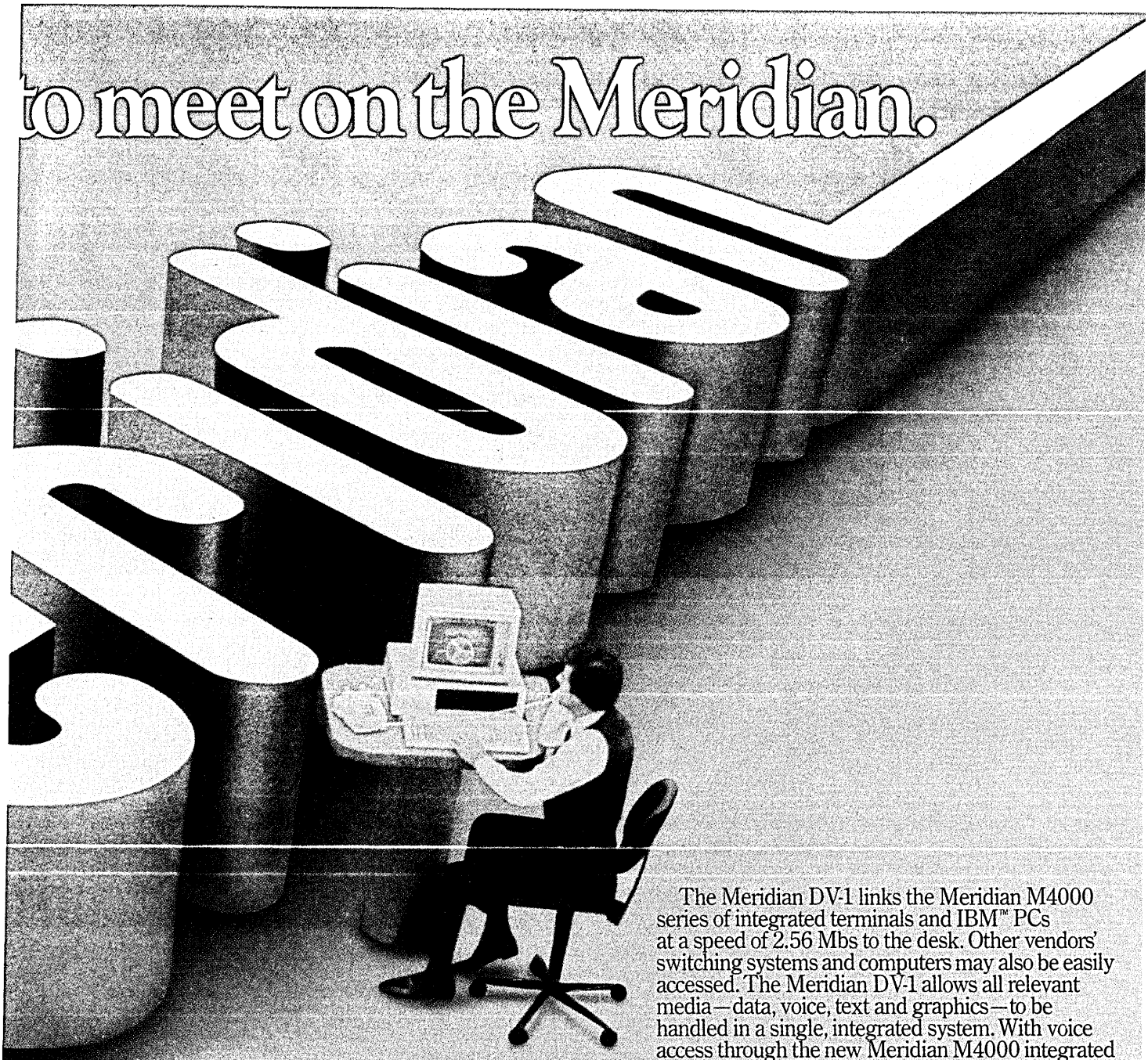

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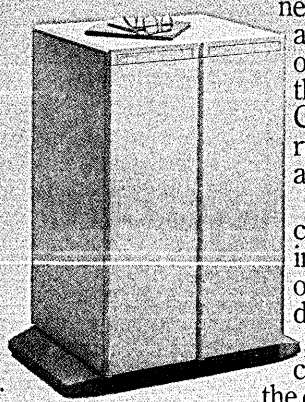

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No matter how you slice it, users give good grades to their vendors and packages.

THE APPLICATIONS SOFTWARE SURVEY

by Data Decisions

Application software packages are good and getting better, but all of them need a bit of tailoring from user to user. It's almost become a rule of thumb that 85% of the content of a good package can be used right away and the rest has to be modified to fit a particular situation, according to 50 dp managers contacted by DATAMATION as part of the Annual Applications Software Survey done in conjunction with the computer consulting and analysis firm, Data Decisions, Cherry Hill, N.J.

Whether the modification is done by the customer or by the vendor, and how extensively the modifications have been specified and how easily they can be implemented, become the key factors in whether a customer thinks he or she has a good or a poor product, and therefore color the responses in the poll. Other factors—such as whether the vendor promised more than could be delivered or whether the customer thinks the software is of good value—are becoming less significant, according to the 4,020 users who were asked to rate business mainframe and minicomputer applications packages. Only 6% of the respondents said they received "poor" value and only 3% said their packages didn't meet the vendors' promises. When it came to rating vendor-supplied services like responsiveness, training, and documentation, the level of satisfaction declined.

Asked to rate vendor services on an ascending scale of one to 10, the score averaged 5.9. That compared with a rating of 6.5 in terms of overall satisfaction with the average package. Keep in mind that the "average" blends the results of a wide variety of packages together. Even the averages within one product category are not absolute, because of differences in the products (see "What the Charts Say and Don't Say," p. 126).

Just as there are no perfect 10s in real life, so is it in software. The highest-scoring product, an account reconciliation package developed by Disc Inc., Baltimore, received a 7.8. A total of 97 packages developed by 50 vendors were rated. Because of space limitations and the limited number of responses to some of the less widely used vertical market applications, only the ratings charts for 53 general accounting, payroll/personnel, and business management and forecasting packages are included here (see "Methodology," p. 120 for more information).

The relatively low score for vendor services may be attributable to that 15% content in general purpose packages that users say must be tailored to fit their unique environments and the heavy demands that such tailoring places on vendors' support capabilities. As more end-user departments begin to acquire software packages without going through the data processing department, inexperienced users may be expecting more from the vendor than the maintenance fees—usually 8% to 15% of the license price—justify, although many data processing managers try to curtail such action by giving users more access to the products while keeping the maintenance of the packages within their domain. More than a third, 38%, taking part in the study were end users who access their applications directly, while only 14% said their access was controlled by data processing.

This is a rapidly accelerating trend. "While only a few years ago we had 100 people in the dp department doing data entry, it's now down to 25 and our goal is zero," says Hal Danowitz, information systems manager with the City of Los Angeles. He adds, though, that while end users have access to the applications, data processing will retain responsibility for maintenance and data security.

Companies are structuring their planning to encourage such delineation of responsibility. Pennwalt Pharmaceuticals, Rochester, N.Y., brought together a committee representing 10 levels of user interests when it decided to go outside to acquire an MRP package. The evaluation procedure lasted 18 months. "By that time, we knew clearly what should be specified to the vendor and where responsibilities started and ended," says William R. Brown, the company's dp director. "And dp only had a one-tenth say in the matter."

Too many users tend to select packages simply because they look good, contends Arnold Adams, corporate director of dp at Charles T. Main Inc., Boston. "In doing it this way, they aren't specifying what they're looking for in a product. A well-thought-out specification definition is essential in selecting such software," says Adams.

This is especially the case in selecting business management and forecasting packages, those most often accessed directly. In this study, 54% of the users were found to have direct access to them, reflecting a growing demand by management personnel for end user-oriented decision support software to help with planning, profit estimating, and expense control.

CONCERNS OF THE BUYERS

What determines a customer's overall satisfaction? In this study the respondents were asked to rate their software according to four concerns—performance, operations, I/O functionality, and vendor support. Their performance rating is a composite based on factors like efficiency of hardware utilization, ease of use, level of program errors, and the amount of time necessary to install the system.

Business management and forecasting packages received the highest rating for both performance (6.5) and vendor support (6.3). The average rating in all the groups was 6.1 for performance and 5.9 for vendor support. Older packages, such as personnel software with a 5.8 rating, scored lowest for vendor support, but scored highest for performance with a rating of 6.6. Performance ratings were based on features such as recovery/backup facilities, security provi-

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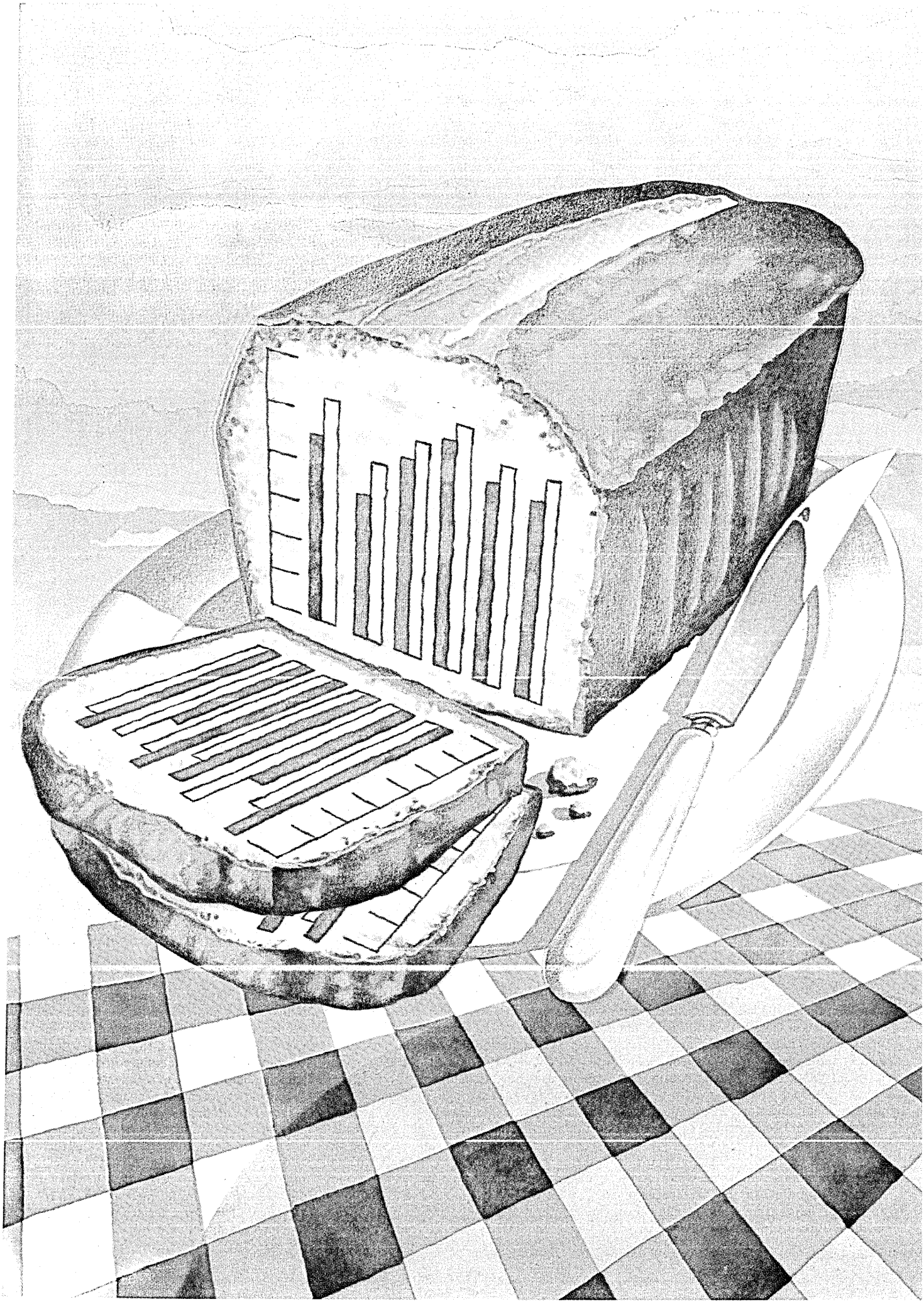


"Vendors don't lie anymore because the packages are too widely used."

sions, ability to handle expanded processing volumes, and compatibility with other software.

The average rating for I/O operations was 6.0. Users were asked to judge data entry provisions, prescribed output formats and procedures, and how quickly and easily format changes could be made.

Many data processing professionals who were asked to comment on the results of this study said applications software is getting better because so many of the people writing it used to work in the user community and are keenly aware of the productivity requirements. That might explain why an impressive 53% of the respondents said they'd received "good" value, and 36% said they'd actually received "excellent" value. Only 6% felt they had received "poor" value.

A package was judged to be excellent if it provided good or excellent capabilities at or below competitive prices. Good value meant that it provided good or excellent features at slightly higher than competitive prices or that if it indeed had minor shortcomings, its price still was lower than its competitors'. A package would be considered a poor value by the respondents if its price was either significantly higher than competitive packages or if it lacked important capabilities but was priced comparable to or higher than competitors.

NO MORE FALSE PROMISES

With very few exceptions, customers are getting what they order; salesmen with false promises have been weeded out of the industry. "Vendors don't lie anymore because the packages are too widely used," explains Arnold Zweig, manager of technical services at the forest products firm, Crown Zellerbach, San Francisco.

"We may be increasing in numbers, but we're still a closely knit community, and we ask each other about salesmen's unfilled promises," adds Adams of Charles T. Main.

Asked in this study whether vendors kept their promises, 85% said they did and 65% even said their acquisitions met or exceeded vendor promises in all categories, including performance, speed, efficiency, and installation time. Again, the greatest satisfaction was shown for business management and forecasting packages, where 72% said vendor promises were met or exceeded.

Commenting on the 3% who said their acquisitions didn't meet any of the vendor's promises, Joseph M. Yaeger, director of data processing at the Cook County Bureau of Administration in Chicago, wonders if many of these disappointments weren't self-inflicted by vague specifications. "It's not that easy to change your system to do what the package does."

While nearly all of the 4,020 respondents use more than one kind of vendor support, the most popular was the telephone hot line, followed by mail, on-site support, and on-line hookup. On an ascending satisfaction scale of one to 10, on-site support was rated the highest with an average of 6.6, followed by telephone hot line, 6.2; on-line support, 5.8; and mail support, 5.6.

Data Decisions detected a growing need, especially among owners of business management and forecasting products, to keep abreast of new packages. One in six users, or 17%, reported they have evaluated competitive products since first buying a package but few (one in seven) were actively seeking replacement packages.

The proliferation of software packages and enhancements to them, and the growing participation by end users in their selection, have spurred many data processing organizaions—certainly the larger ones—to set up formal mechanisms to review new software offerings. "You don't fall into good software by accident," ob-

METHODOLOGY

The 1985 Data Decisions Applications Software Survey is made up of application software packages sold by independent software developers cited by International Computer Programs, Indianapolis, as having generated $5 million in sales as of the publication date of its directory last year. To obtain a reasonable-sized sample, the 115 vendors whose products qualified for inclusion in the directory were asked to submit a list of 125 of their most recent customers, or their entire customer file when fewer than 125 customers used the package. They were asked not to contact these customers with regard to the survey and respondents also were asked whether they were contacted by the vendor.

Each vendor received a registered letter and two follow-up phone calls. Altogether, those who cooperated provided lists for 92 different packages, although the number was later reduced to 83 when nine packages contained fewer than 29 customer names. In addition, the names of users of 16 of the most widely used packages from vendors who didn't cooperate were obtained from the directory of Computer Intelligence, La Jolla, Calif. That increased the total number of packages surveyed to 99.

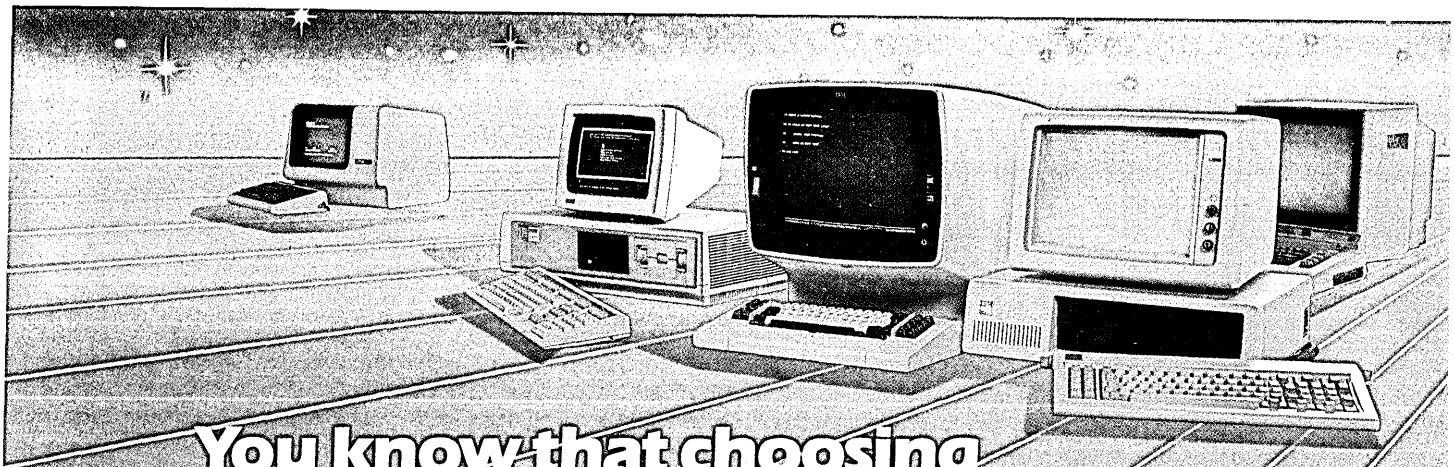
In late August, 7,782 questionnaires were mailed and 3,931 were returned for a net response of 51%. To provide a minimum response rate of 40% and a minimum user base of 15 for each package, 89 telephone interviews were conducted, bringing the total number of responses to 4,020. This figure included 536 respondents who indicated that the package was not currently being used at their installation. For the purposes of this printed excerpt from the survey, only packages with 25 or more respondents were included.

The survey was designed by Data Decisions and conducted by Beta Research Corp., Syosset, N.Y.

AVERAGE TOLERANCES FOR 68% CONFIDENCE LEVEL

	OVERALL SATISFACTION			SPECIFIC ATTRIBUTE RATINGS			
Sample Size	6.0 or Under	7.0	8.0 or Higher	5.0 or Under	6.0	7.0	8.0 or Higher
60 or more	.25	.20	.15	.35	.30	.25	.20
50–59	.25	.25	.20	.35	.30	.30	.25
40–49	.30	.25	.20	.35	.30	.30	.25
30–39	.30	.30	.25	.35	.35	.35	.35
15–29	.40	.40	.35	.50	.50	.45	.40

As in all sample surveys, the numbers reported are estimates within a range of what would have been obtained if the entire universe had been queried. The margins of sampling variation, or tolerances, for both the overall ratings and for ratings of specific attributes are given above. These tolerances range from .25 to .5. This means that the chances are approximately 2 in 3 that a reported rating differs by no more than the indicated tolerance from the rating that would have been obtained if all eligible sites had been surveyed. For example, if a sample of 30 sites gives a package an overall satisfaction rating of 7.0, the table indicates a tolerance of 0.30 on this estimate. Thus, the chances are 2 in 3 that the interval 6.70–7.30 includes the rating that would have been obtained if all eligible sites had been surveyed.



You know that choosing the right software is serious business. So does WATCOM.

So before you make any decisions about your software needs, talk to WATCOM—the people major software users around the world have trusted for years.

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CIRCLE 58 ON READER CARD

Frequently there's a pattern to the ratings—all of a company's products perform at about the same level.

serves Tom Murray, director of information system development at the Del Monte Corp., San Francisco. At that company, a group consisting of data processing staff and end users constantly probes all sources of new product information, such as publications, catalogs, and vendor seminars, and then issues competitive evaluations on the products, he says.

Among the respondents seeking alternative packages, 40% were doing so because the installed system didn't meet their current needs. Another 33% listed other reasons like changing computer vendors, 20%; upgrading to an incompatible product by the same vendor, 13%; general dissatisfaction, 20%; or dissatisfaction with execution speed, 13%. A small group, 13%, thought that the cost of upgrading their existing system was too high and thus were opting for a replacement.

Four major factors on which customers base their buying decisions include features and capabilities, cited by 81%; productivity and ease of use, 52%; vendor's reputation, 47%; and compatibility, 36%. Among the least important factors were experience with other packages from the same vendor, 19%, and advice from consultants or third parties, 14%.

In making those decisions, 71% had evaluated other packages, either from their computer hardware vendor, 19%, or from independent software suppliers, 66%. In evaluating independents' products, an average of 3.7 packages were studied.

OLDER PRODUCTS PREFERRED

The study also turned up a preference among many users for older products that worked, rather than for packages that incorporated the latest features. Even though the average package surveyed had been in use for 40 months, about one out of three respondents said they weren't using the latest version of a product. But 59% said they were; 5% weren't sure.

Those who weren't using the latest versions might agree with the comment by Michael Bilotti, vice president of management information systems with the retail chain Zayre Corp., Framingham, Mass. "If a package is filling a need, why look for something else?" he asks.

Frequently a vendor tailors a version of an application package to a specific user environment. As long as it performs to specifications, why should the user spend the time and money to customize a more current version, especially one that solves problems not encountered or provides enhancements not needed at the installation?

An exception to this trend were the users of business management and forecasting packages. Seventy-six percent of these users were running with the latest version.

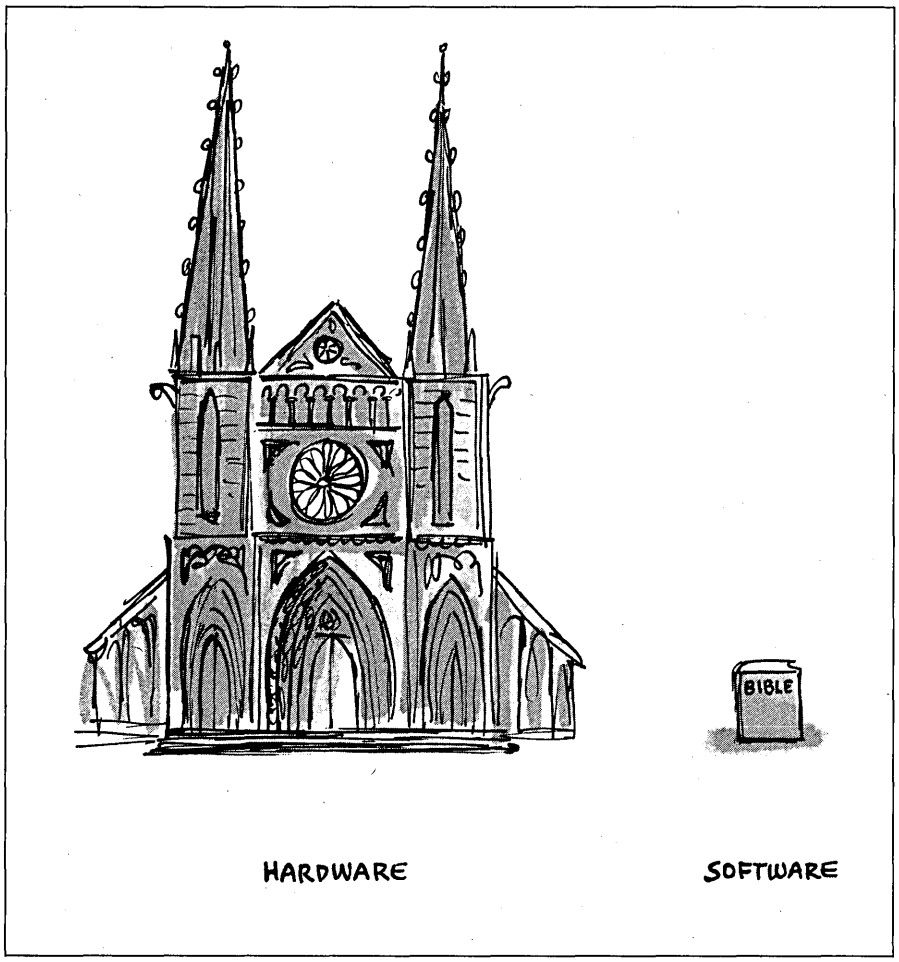
Seventy percent of the respondents said they run their programs under IBM operating systems, 67% on IBM machines and the rest on systems from Amdahl or National Advanced Systems. Digital Equipment Corp. machines were a distant second with 6% of the user base, followed by Hewlett-Packard with 4%, Wang with 3%, and a group of other vendors (Burroughs, Honeywell, Sperry, Texas Instruments, and Prime) each averaging 1% or slightly more.

Many of the packages that were rated in this study are products of long-established software developers, such as Management Science America Inc., Applied Data Research Inc., UCCEL (formerly Wyly Corp.), McCormack & Dodge, and Software International, companies whose annual revenues last year ranged from $30 million all the way up to more than $100 million.

In some cases, however, customers are giving good marks to newer offerings. Among these are four general accounting packages from Walker Interactive Products, San Francisco, whose general ledger package, II/GL (for Integrated Interactive), scored comfortably higher than the average rating for these products, though the fact that the packages received ratings from fewer than 25 respondents should be noted. The other three are packages for materials management, accounts payable, and purchase orders.

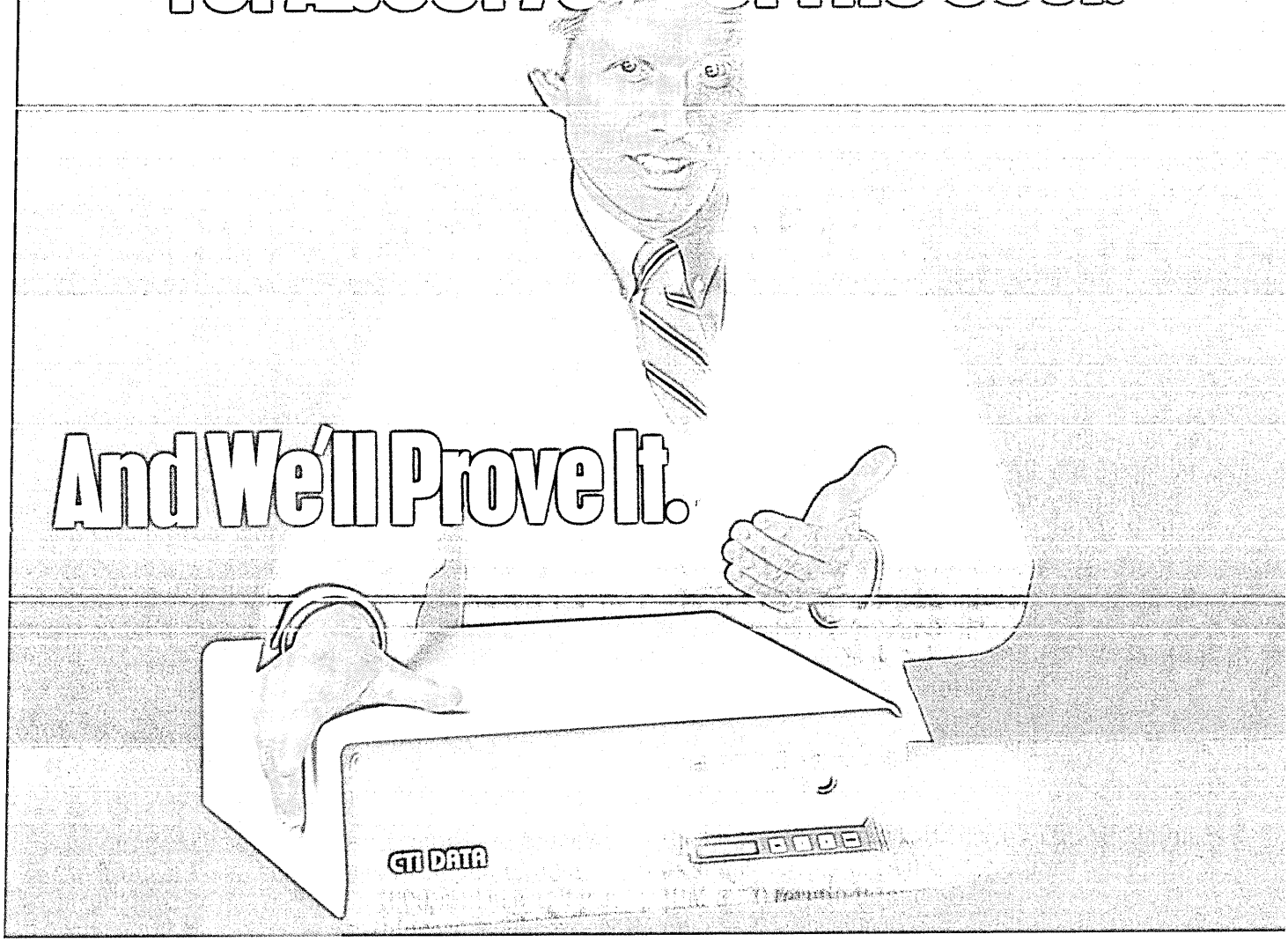
Customers show an increasing interest in using integrated products like those offered by Walker because they handle accounting functions more rapidly than products that merely interface to each other. In an integrated package, a change mode on one module of an accounting package causes necessary changes to be made simultaneously in other modules. This integrated approach, however, means that some products are not directly comparable to others in a particular category.

Some patterns can be detected in the general quality of vendor offerings. Eight of 10 packages from MSA scored above average, including its Human Resource System



CARTOON BY HENRY MARTIN

CTi Gives You 100% Of The IBM Remote Controller Performance For About 70% Of The Cost.



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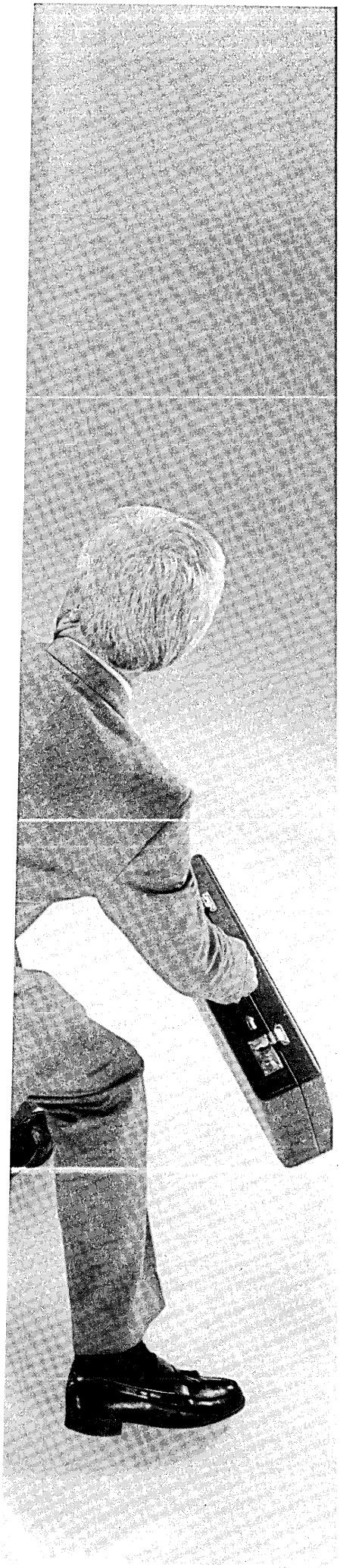
CIRCLE 59 ON READER CARD



Fewer PCMs to choose from says even more about us.

Imagine an industry that's growing by 20% a year. And yet has fewer companies competing in it this year than last.

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The strong became fewer last year. Because the few became stronger.

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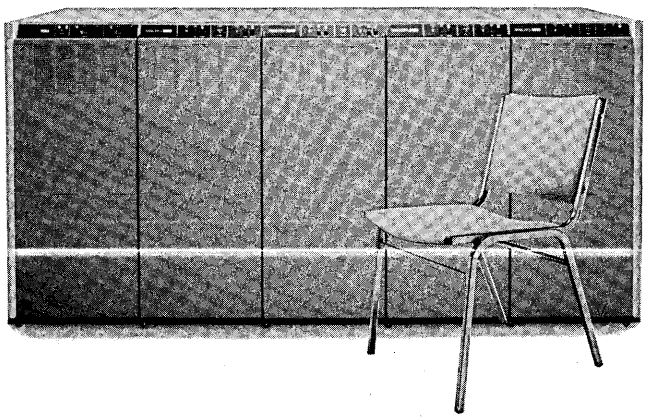

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Companies are structuring their planning to encourage delineation of responsibility.

and Payroll Accounting packages, which were rated number one in the category of payroll/personnel with the high score of 7.4 each.

While Software International's general ledger and financial reporting package was tied for second place with MSA in the general accounting packages category, three others of its packages—accounts receivable, fixed asset accounting, and payroll/personnel—were ranked below 5 on the 1-to-10 scale. Its accounts payable did a little better, getting a 6.4 rating, just under the 6.5 average in the general accounting group of packages.

A summary of ratings received by 53 applications packages and bar charts showing how some of them performed against the average rating for a given group follows. An asterisk after a product indicates it was rated by fewer than 25 users and thus isn't represented by a corresponding bar chart in this excerpt, though its ratings are available from Data Decisions.

Ratings Summary

GENERAL ACCOUNTING—
32 packages studied.

7.8—Disc Inc. DISC ARP
7.7—MSA General Ledger; Software International G/L & Financial Reporting; Timberline Systems MAC
7.6—McCormack & Dodge G/L Plus
7.4—Data Design Fixed Asset Accounting
7.3—MSA ALLTAX
7.2—McCormack & Dodge Fixed Assets Plus
7.1—MSA A/P & Purchasing; MSA A/R; MSA Fixed Assets
7.0—McCormack & Dodge A/P Plus
6.9—Walker II/GL*
6.7—Data Design A/P Purchase Control; Information Associates Financial Accounting
6.6—Consco Consolidation System; UCCEL FCS/FCO*
6.5—**Group Average**; Global Software G/L & Financial Reporting; Information Systems of America ISA/Accounting, Budget & Cost
6.4—Compro G/L System*; Software International A/P
6.3—Transcom TOLAS
6.1—Compro A/P System*; Global Software Accounts Payable*
6.0—Compro Fixed Assets*; MSA (formerly Computeristics) CUSTOMAR*; Walker II/MM*
5.9—UCCEL CARMS*
5.3—Walker II/AP*
4.7—Software International A/R; Walker II/PO*
4.2—Software International Fixed Asset Accounting

PAYROLL/PERSONNEL—
11 packages studied.

7.4—MSA Human Resource System, MSA Payroll Accounting
7.1—Cyborg Systems Payroll/Personnel
7.0—Genesys Software Payroll Accounting
6.9—Integral Systems Payroll/Personnel
6.8—MSA Personnel Management Reporting
6.6—**Group Average**; Gensys Personnel Management
6.5—Information Science Human Resource System
6.4—McCormack & Dodge Human Resource Plus
5.8—Information Associates Payroll Accounting
4.7—Software International Payroll/Personnel

BUSINESS MANAGEMENT & FORECASTING—
10 packages studied.

7.7—Cognos POWERHOUSE; SPSS Inc. SPSS Batch System
7.0—Execucom Corp. IFPS
6.9—Computer Associates AUTOTAB II*
6.7—**Group Average**
6.6—EPS Consultants FCS-EPS; MSA Forecasting & Modeling*
6.3—AGS Management PAC System
6.2—Applied Data Research ADR/EMPIRE; Compro FORESIGHT
6.1—Xerox Corp. Business Management System ◉

WHAT THE CHARTS SAY AND DON'T SAY

There is no such thing as a summa cum laude in software ratings. These results should not be taken as gospel. Because only the best-selling products were rated, the packages in this survey by no means represent a broad cross section of products and users, and it's even possible that the best product on the market may be absent. In particular, products introduced last year were omitted because they were new and didn't have high enough sales figures to be included in the directory used as the foundation of the survey. Or, the hot package everyone talks about at Data Processing Managers Association meetings is only now being shipped in large quantities, and there weren't enough users to poll for a statistically valid rating.

Furthermore, to avoid many of the sins of omission as well as the sins of commission, this year's survey excerpt does not include vertical market packages such as banking, manufacturing, and other sectors. In some cases there were too few respondents or too few packages represented in a given category to get what DATAMATION considers a meaningful picture of real world experience; in other cases Data Decisions was not able to obtain a suitable number of users to question.

What the bar charts do indicate is a summary of the user ratings for 53 packages covering applications for general accounting, payroll/personnel, and business management and forecasting. Included are those packages that received ratings from 25 or more users.

Each chart shows the number of users reporting on the package, the percentage that judged the package and its vendor support to be outstanding; the percentage seeking to replace the package; and the percentage citing unsatisfactory performance as the reason for replacement. Next to each bar that shows the product's rating, in color, is a bar that shows the average rating for that group, in black. Bar charts that break out the ratings by their individual components are available for all 97 products in the full Data Decisions report on which the findings in this summary are based.

One factor to consider when reviewing these results is that there are no absolute evaluation standards that are relevant to all users and installations. Many of these packages are multipurpose tools but are categorized by their primary function. Since one man's DBMS may be another's program generator, the unavoidably subjective nature of the categorization precludes any definitive declaration of "best in its class." In some cases a product's function only partially resembles others in its "category."

Given these caveats, then, the reader should consider the results of this study as, at best, a useful first step in the product evaluation process. While the findings may reflect certain trends, they don't tell the whole story.

—Tom McCusker

This survey is based on a forthcoming report in Data Decisions' *Software*, a monthly updated information service covering systems and applications software for mainframes and minicomputers. To order the full report, or for additional information on Data Decisions' subscription services and custom consulting capabilities, contact Data Decisions, 20 Brace Rd., Cherry Hill, NJ 08034. The telephone number is (609) 429-7100.

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CIRCLE 61 ON READER CARD

Ratings Values

10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

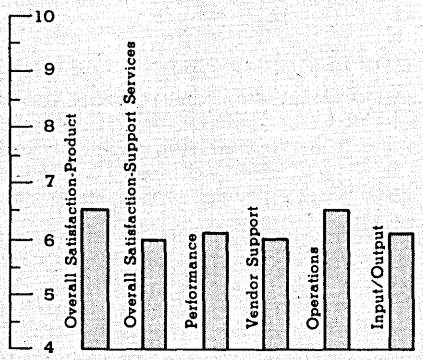
Legend

Specific Product Rating
Group Average Rating

☐ GENERAL ACCOUNTING

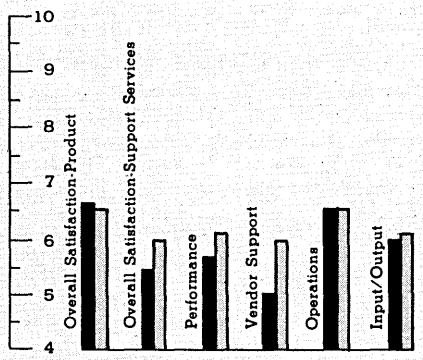
Group Average • 32 packages

1199 responses • 15% judged package and 12% judged vendor outstanding • 144 actively seeking to replace package, with 36 citing unsatisfactory performance as reason.



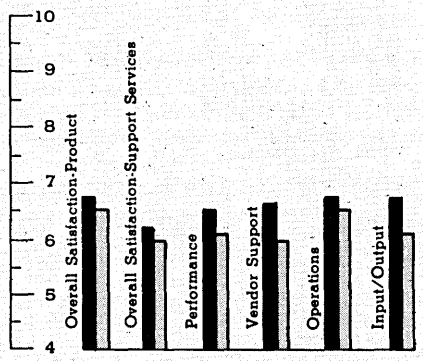
CONSOLIDATION SYSTEM • Consco Enterprises, Inc., 400 Corporate Court, South Plainfield, NJ 07080 • 201-561-2111

30 responses • 13% judged package and 7% judged vendor outstanding • 5 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



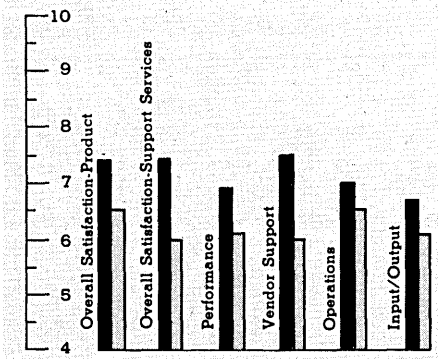
ACCOUNTS PAYABLE • Data Design Associates, Inc., 1250 Oakmead Parkway, Suite 310, Sunnyvale, CA 94086 • 408-730-0100

49 responses • 12% judged package and 6% judged vendor outstanding • 8 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



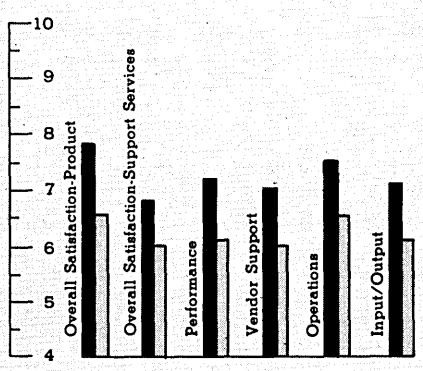
FIXED ASSET ACCOUNTING • Data Design Associates, Inc., 1250 Oakmead Parkway, Suite 310, Sunnyvale, CA 94086 • 408-730-0100

53 responses • 25% judged package and 34% judged vendor outstanding • 2 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



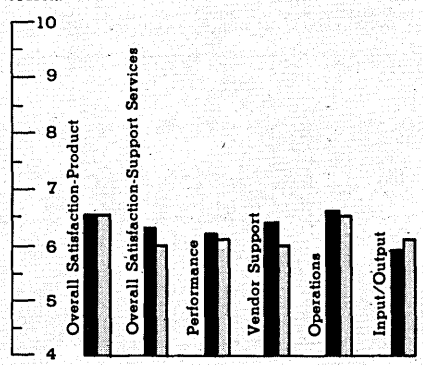
DISC ACCOUNT RECONCILIATION • Disc, Inc., 3837 Naylors Lane, Baltimore, MD 21208 • 301-486-0410

43 responses • 30% judged package and 16% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



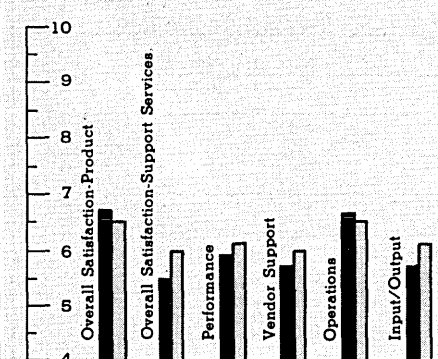
GENERAL LEDGER & FINANCIAL REPORTING • Global Software, Inc., 1009 Spring Forest Road, Raleigh, NC 27609 • 919-878-0710

44 responses • 5% judged package and 7% judged vendor outstanding • 8 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



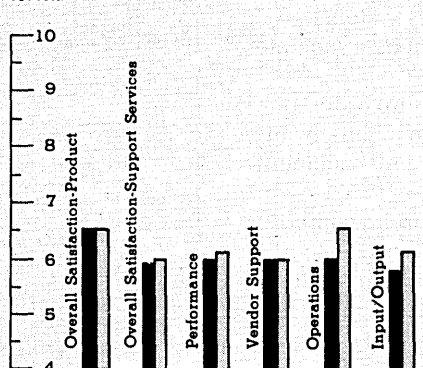
FINANCIAL ACCOUNTING • Information Associates, Inc., 3000 Ridge Road, East, Rochester, NY 14622 • 716-467-7740

28 responses • 11% judged package and 7% judged vendor outstanding • 5 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



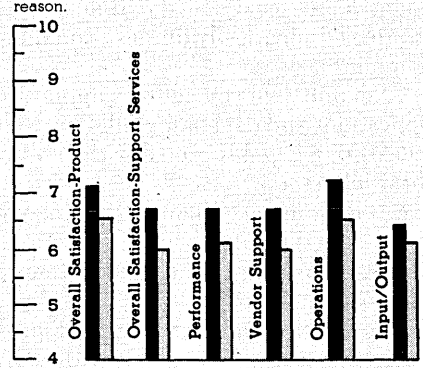
ISA/ACCOUNTING, BUDGET & COST • Information Systems of America, 500 Northridge Road, Atlanta, GA 30338 • 404-587-6800

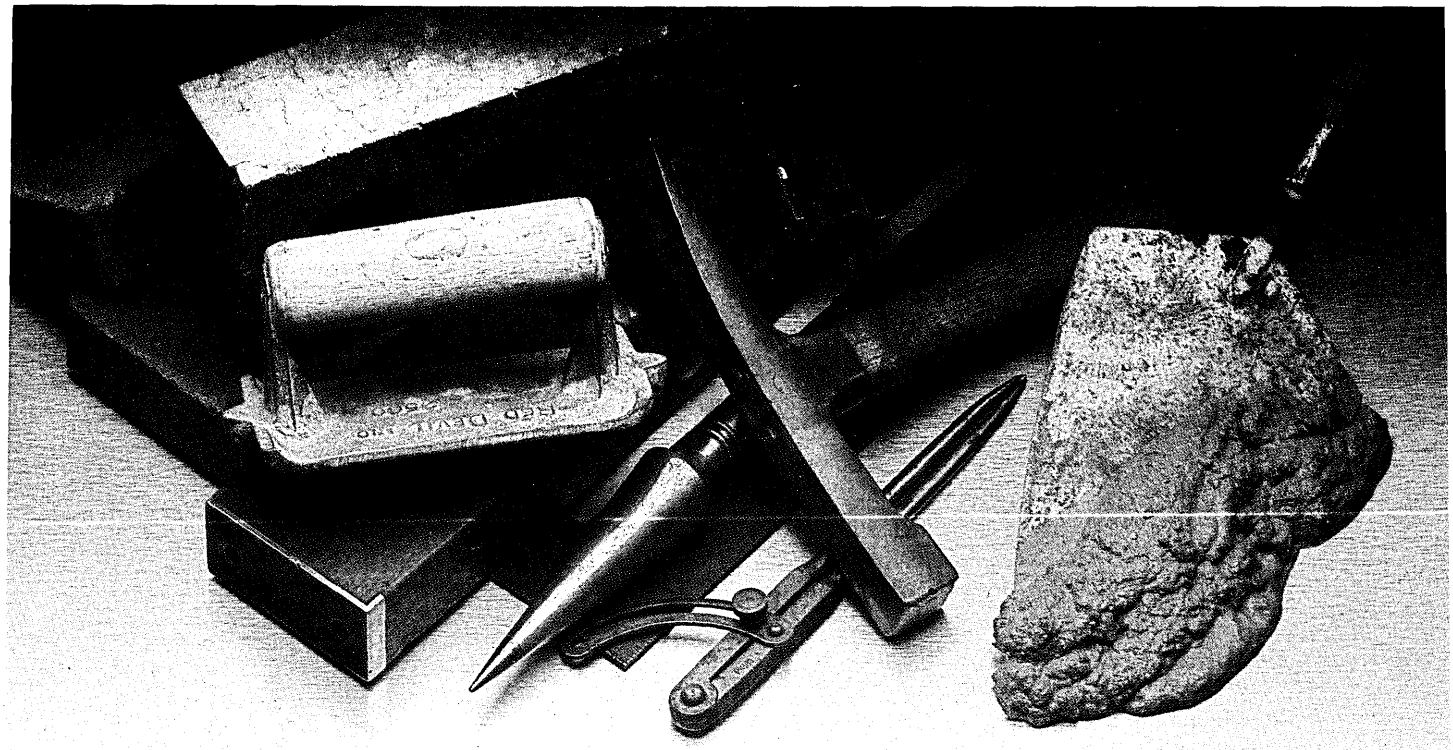
46 responses • 7% judged package and 0% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



ACCOUNTS PAYABLE & PURCHASE ORDER • Management Science America, Inc. (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

54 responses • 19% judged package and 17% judged vendor outstanding • 6 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.





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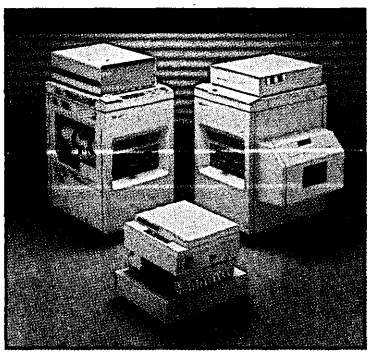

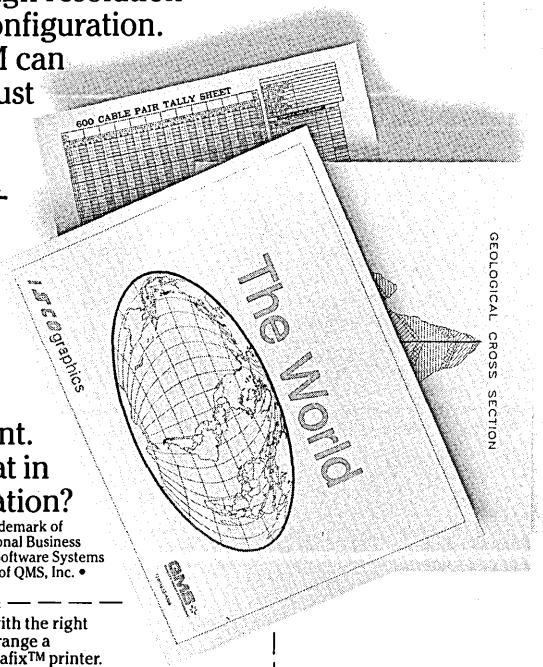

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CIRCLE 62 ON READER CARD

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Ratings Values

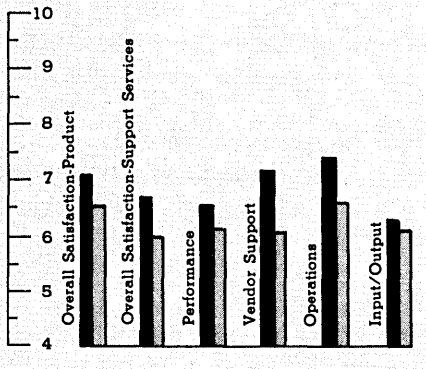
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

Specific Product Rating
Group Average Rating

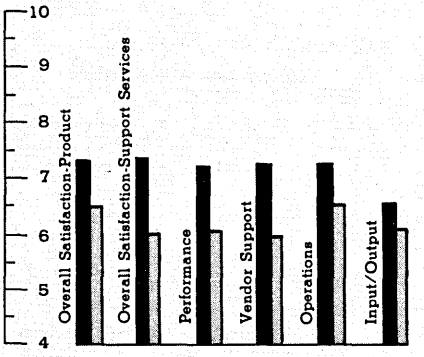
ACCOUNTS RECEIVABLE • Management Science America, Inc. (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

50 responses • 18% judged package and 20% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



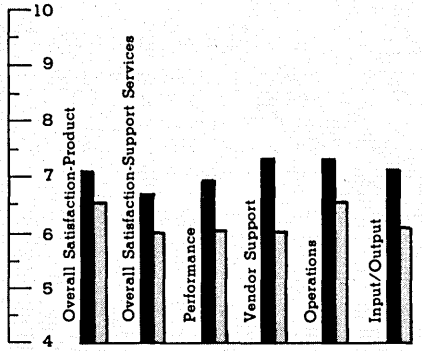
ALLTAX • Management Science America, Inc. (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

47 responses • 17% judged package and 21% judged vendor outstanding • 10 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



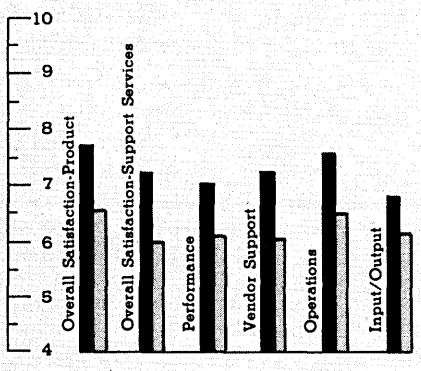
FIXED ASSETS • Management Science America, Inc. (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

61 responses • 16% judged package and 13% judged vendor outstanding • 3 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



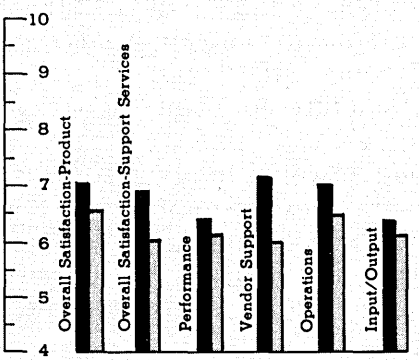
GENERAL LEDGER • Management Science America, Inc. (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

62 responses • 26% judged package and 23% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



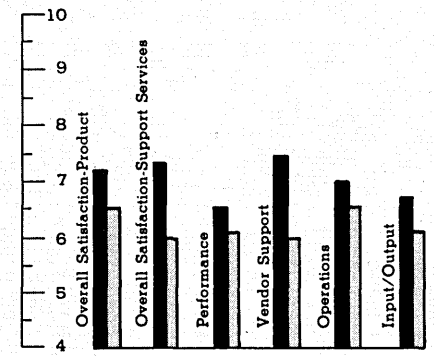
ACCOUNTS PAYABLE PLUS • McCormack & Dodge, 1225 Worcester Road, Natick, MA 01760 • 617-651-1010

56 responses • 21% judged package and 21% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



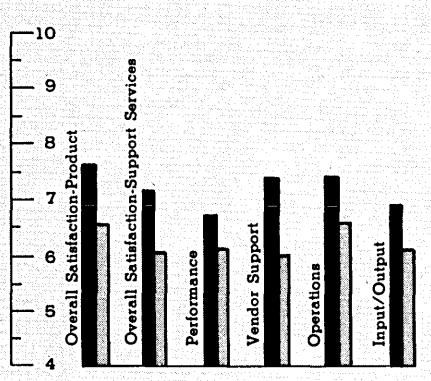
FIXED ASSETS PLUS • McCormack & Dodge, 1225 Worcester Road, Natick, MA 01760 • 617-651-1010

58 responses • 17% judged package and 24% judged vendor outstanding • 4 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



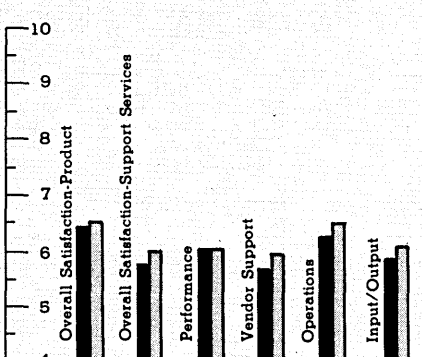
GENERAL LEDGER PLUS • McCormack & Dodge, 1225 Worcester Road, Natick, MA 01760 • 617-651-1010

62 responses • 29% judged package and 26% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



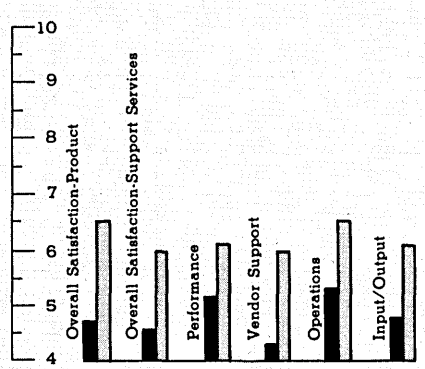
ACCOUNTS PAYABLE • Software International Corp., One Tech Drive, W. Andover, MA 01810 • 617-685-1400

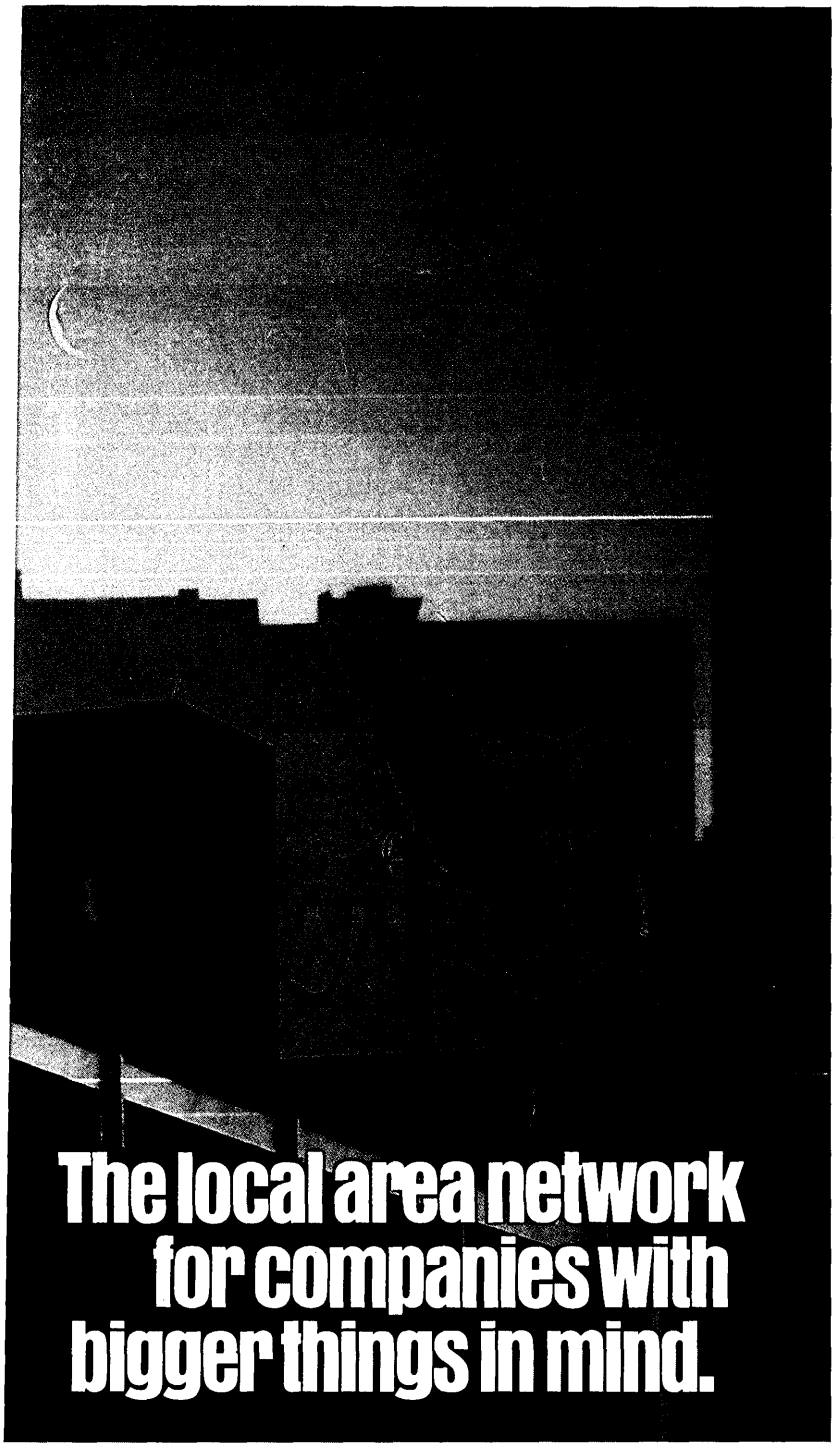
61 responses • 8% judged package and 3% judged vendor outstanding • 2 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



ACCOUNTS RECEIVABLE • Software International Corp., One Tech Drive, W. Andover, MA 01810 • 617-685-1400

35 responses • 6% judged package and 6% judged vendor outstanding • 9 actively seeking to replace package, with 7 citing unsatisfactory performance as reason.





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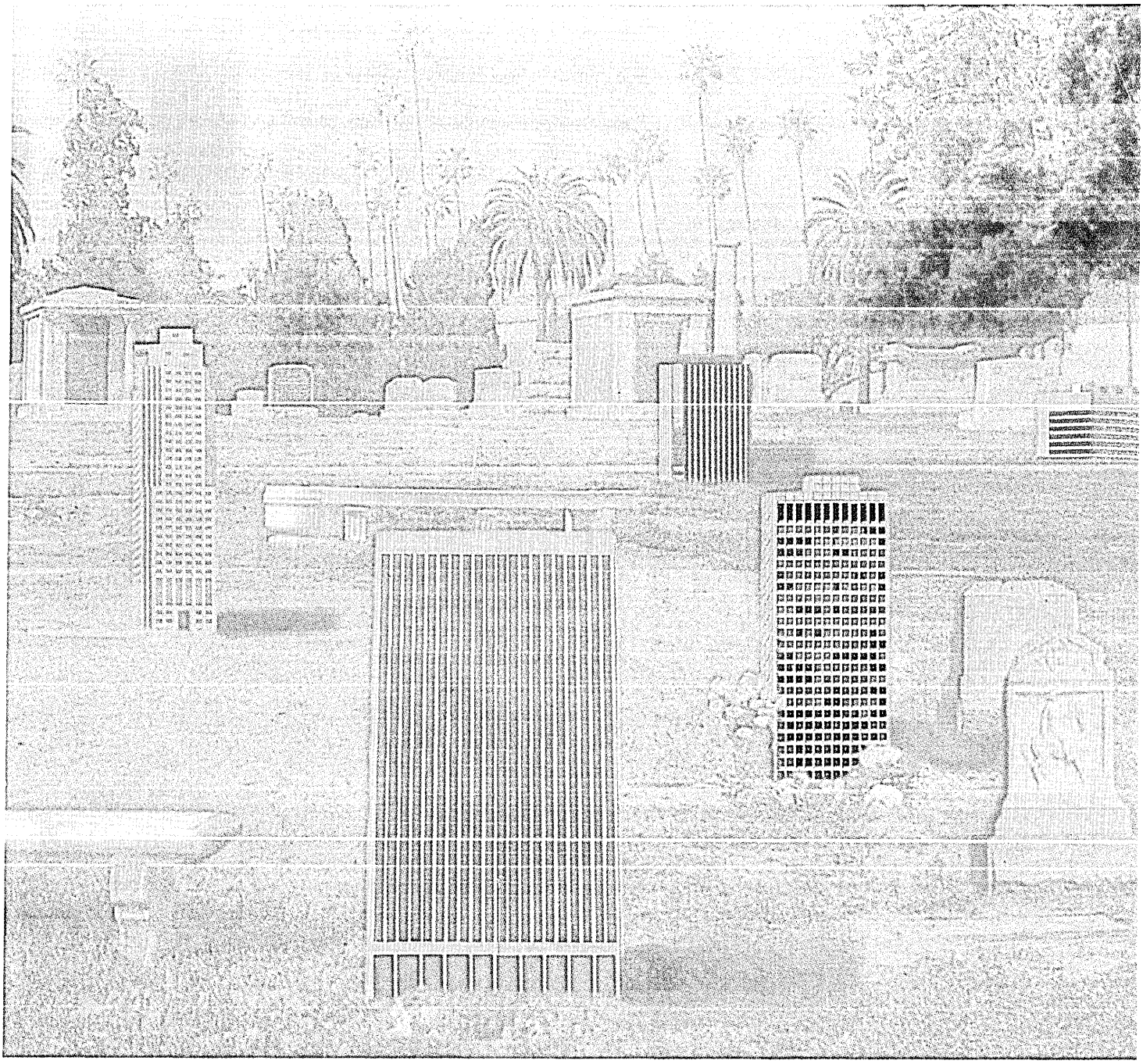

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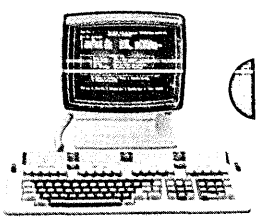

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CIRCLE 64 ON READER CARD

Ratings Values

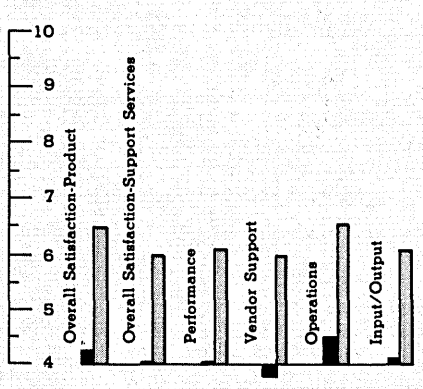
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

Specific Product Rating
Group Average Rating

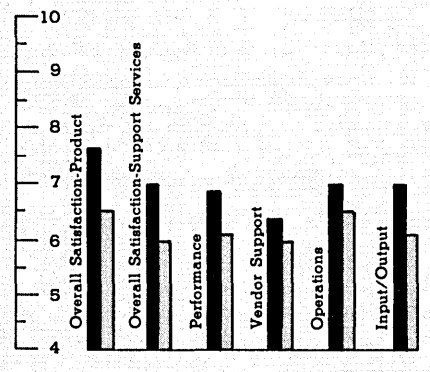
FIXED ASSET ACCOUNTING • Software International Corp., One Tech Drive, W. Andover, MA 01810 • 617-685-1400

45 responses • 2% judged package and 2% judged vendor outstanding • 10 actively seeking to replace package, with 9 citing unsatisfactory performance as reason.



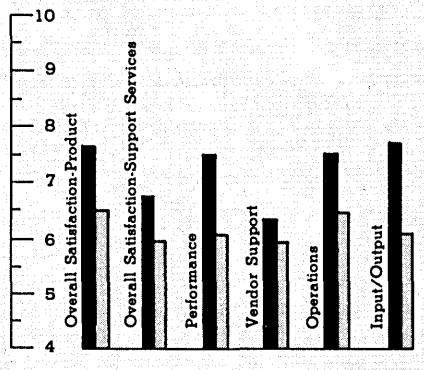
GENERAL LEDGER & FINANCIAL REPORTING • Software International Corp., One Tech Drive, W. Andover, MA 01810 • 617-685-1400

57 responses • 30% judged package and 16% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



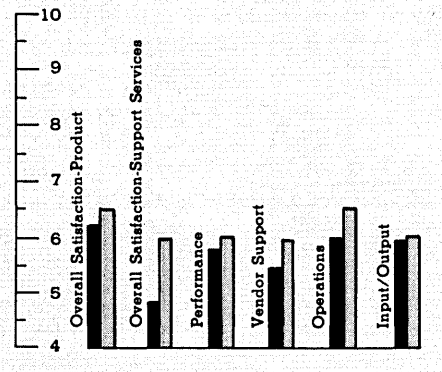
MANAGEMENT ACCOUNTING FOR CONSTRUCTION • Timberline Systems, Inc., 7180 Fir Loop, Portland, OR 97223 • 503-684-3660

43 responses • 40% judged package and 23% judged vendor outstanding • 3 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



TOLAS • Transcomm Data Systems, Inc., 1380 Old Freeport Road, Pittsburgh, PA 15238 • 412-963-6770

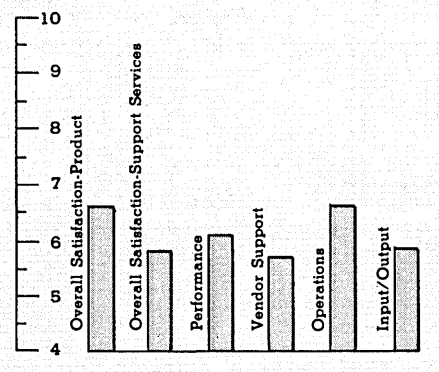
27 responses • 19% judged package and 7% judged vendor outstanding • 8 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



☐ PAYROLL/PERSONNEL

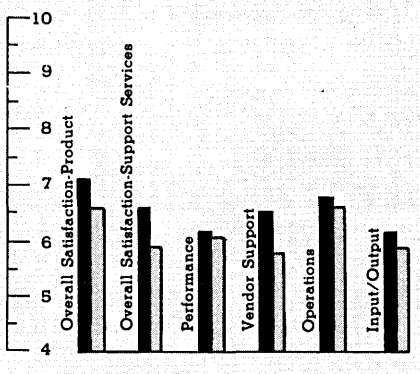
Group Average • 11 packages

489 responses • 13% judged package and 8% judged vendor outstanding • 68 actively seeking to replace package, with 20 citing unsatisfactory performance as reason.



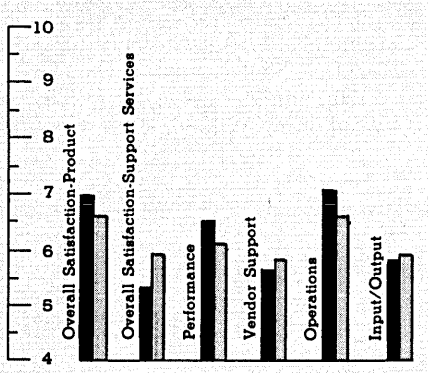
PAYROLL/PERSONNEL • Cyborg Systems, Inc., 2 N. Riverside Plaza, Suite 2160, Chicago, IL 60606 • 312-454-1865

69 responses • 22% judged package and 17% judged vendor outstanding • 5 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



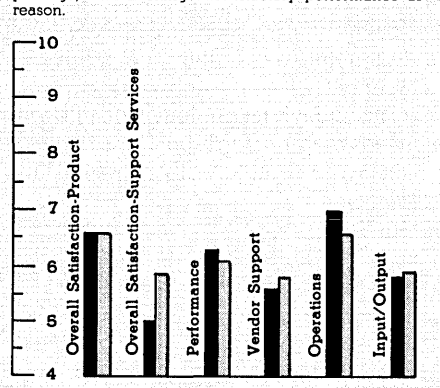
PAYROLL/ACCOUNTING • Genesys Software Systems, Inc., 20 Ballard Way, Lawrence, MA 01843 • 617-685-5400

47 responses • 19% judged package and 6% judged vendor outstanding • 12 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



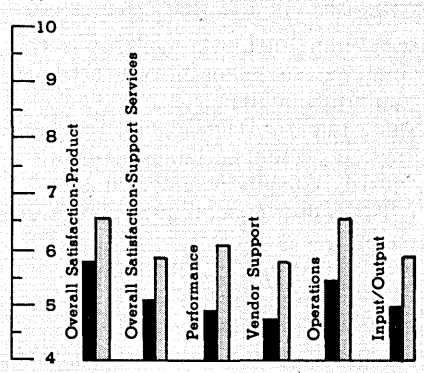
PERSONNEL MANAGEMENT • Genesys Software Systems, Inc., 20 Ballard Way, Lawrence, MA 01843 • 617-685-5400

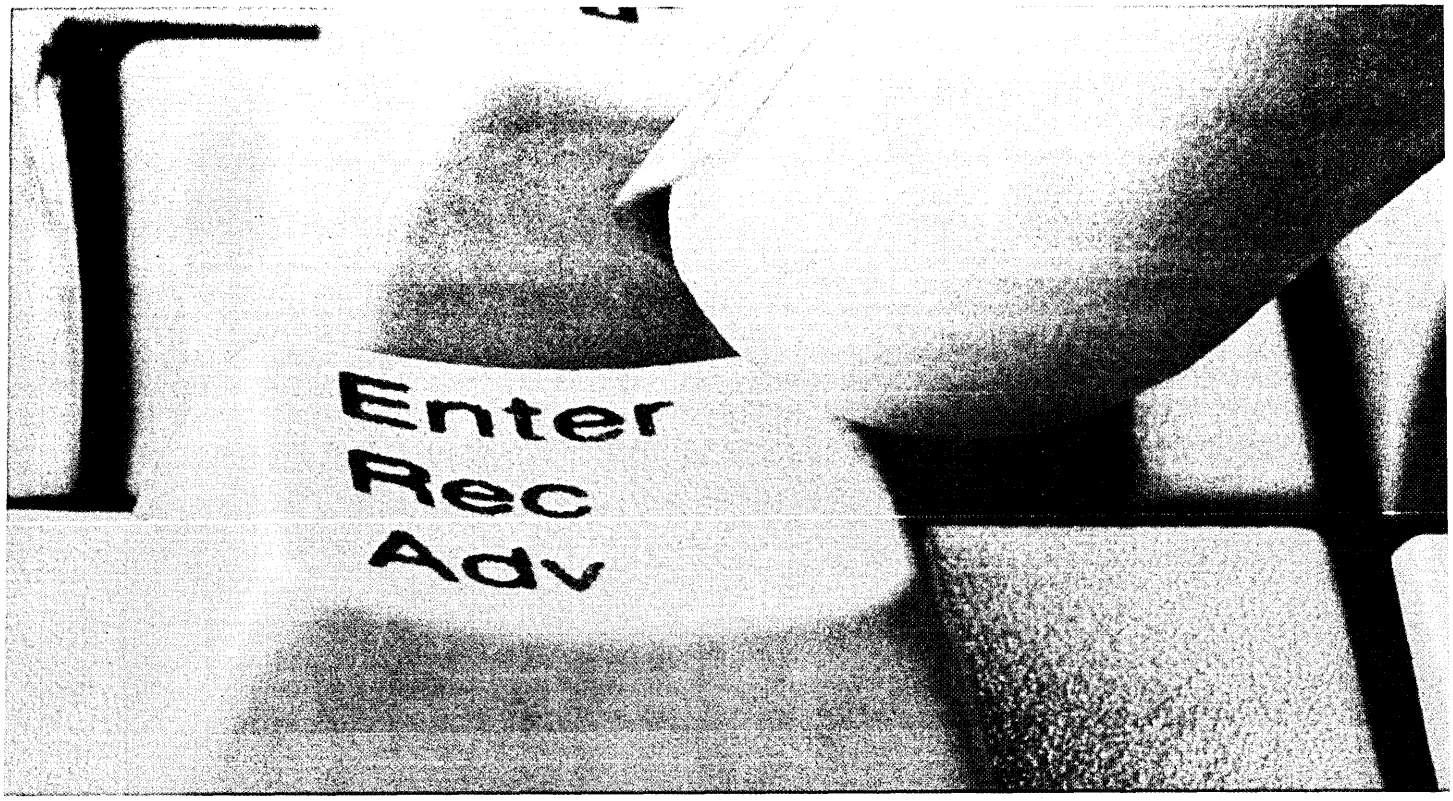
32 responses • 16% judged package and 3% judged vendor outstanding • 6 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



PAYROLL ACCOUNTING • Information Associates, Inc., 3000 Ridge Road, East, Rochester, NY 14622 • 716-467-7740

26 responses • 8% judged package and 0% judged vendor outstanding • 6 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.





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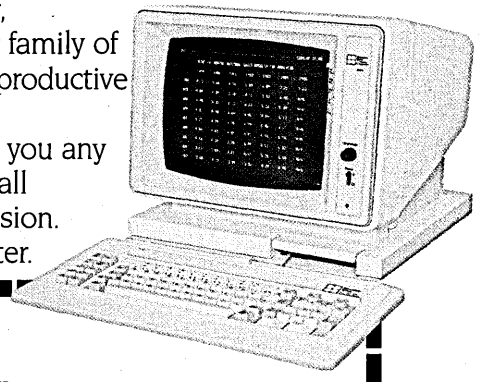

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CIRCLE 65 ON READER CARD

Ratings Values

10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

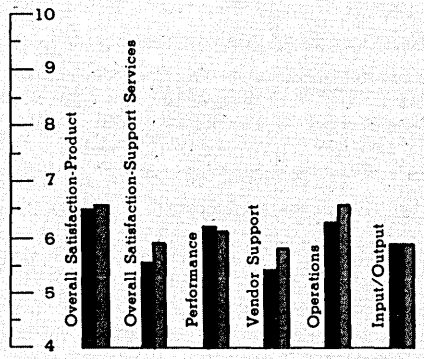
Legend

Specific Product Rating
Group Average Rating

HUMAN RESOURCE SYSTEM (HRS)

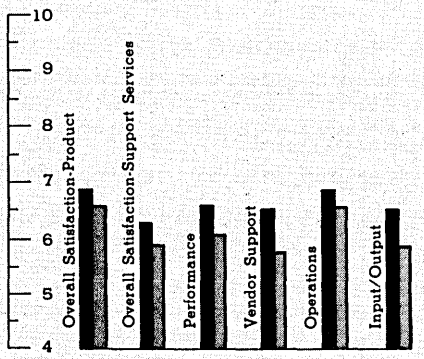
• Information Science, Incorporated, 95 Chestnut Ridge Road, Montvale, NJ 07645 • 201-391-1600

39 responses • 3% judged package and 0% judged vendor outstanding • 5 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



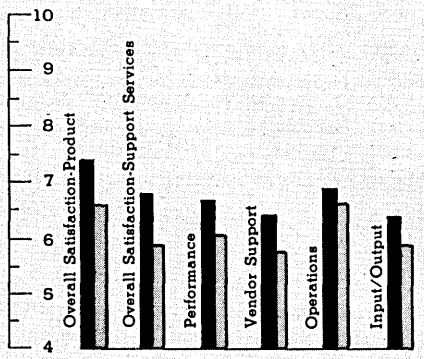
PAYROLL/PERSONNEL • Integral Systems, Inc., 165 Lennon Lane, Walnut Creek, CA 94598 • 415-939-3900

56 responses • 16% judged package and 11% judged vendor outstanding • 3 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



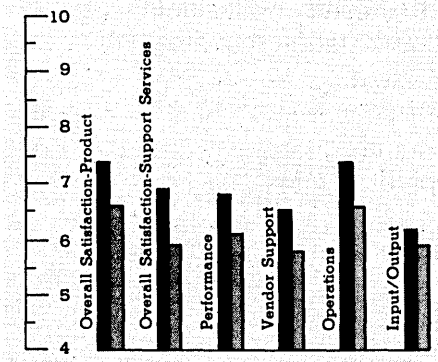
HUMAN RESOURCES SYSTEM • Management Science America (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

41 responses • 20% judged package and 10% judged vendor outstanding • 0 actively seeking to replace package.



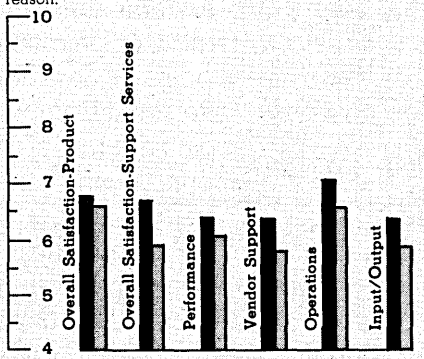
PAYROLL ACCOUNTING SYSTEM • Management Science America (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

58 responses • 21% judged package and 14% judged vendor outstanding • 4 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



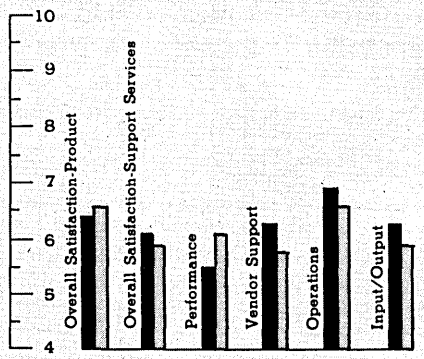
PERSONNEL MANAGEMENT & REPORTING SYSTEM • Management Science America (MSA), 3445 Peachtree Road, N.E., Atlanta, GA 30326 • 404-262-2376

53 responses • 11% judged package and 11% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



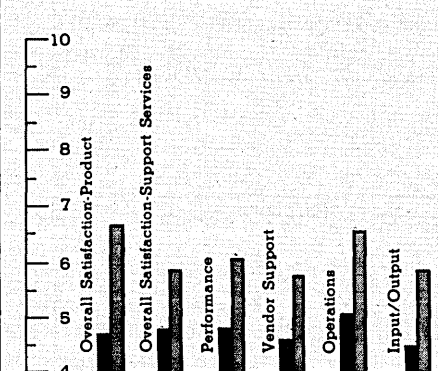
HUMAN RESOURCES PLUS • McCormack & Dodge, 1225 Worcester Road, Natick, MA 01760 • 617-651-1010

25 responses • 8% judged package and 12% judged vendor outstanding • 4 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



PAYROLL/PERSONNEL • Software International Corp., One Tech Drive, W. Andover, MA 01810 • 617-685-1400

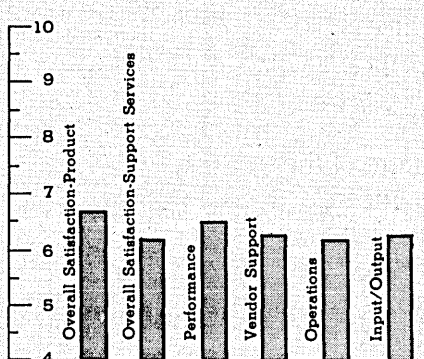
43 responses • 5% judged package and 2% judged vendor outstanding • 14 actively seeking to replace package, with 8 citing unsatisfactory performance as reason.



☐ BUSINESS MANAGEMENT & FORECASTING

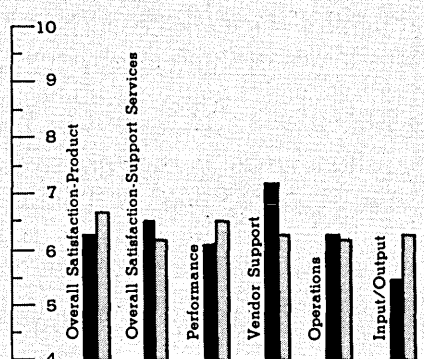
Group Average • 10 packages

413 responses • 16% judged package and 15% judged vendor outstanding • 78 actively seeking to replace package, with 17 citing unsatisfactory performance as reason.



PAC SYSTEM • AGS Management, 880 First Avenue, King of Prussia, PA 19406 • 215-265-1550

61 responses • 15% judged package and 23% judged vendor outstanding • 8 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



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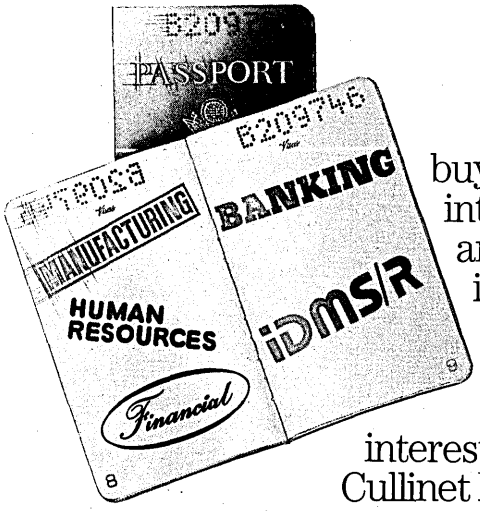

It's an all too common problem. Manufacturing buys an application, and data processing is expected to integrate it with the corporate database. Finance buys an application, and data processing is expected to integrate it, too. And so it goes. Three years later, the job still isn't finished. And the ideal of a *true* database management system is still just that—an ideal.

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Ratings Values

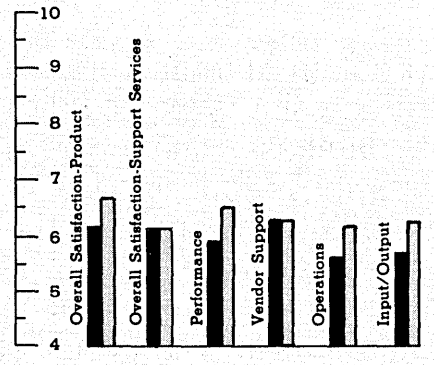
10-9: Superior
8-6: Very Good
5-3: Acceptable
2-1: Inadequate

Legend

Specific Product Rating
Group Average Rating

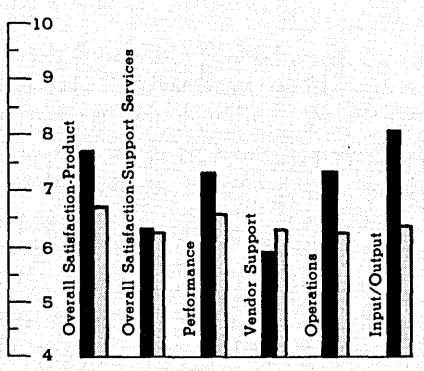
ADR/EMPIRE • Applied Data Research, Inc., Route 206 & Orchard Road, Suite CN-8, Princeton, NJ 08540 • 201-874-9000

39 responses • 13% judged package and 15% judged vendor outstanding • 10 actively seeking to replace package, with 5 citing unsatisfactory performance as reason.



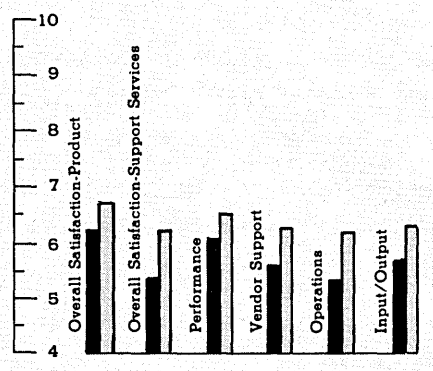
POWERHOUSE • Cognos Corp., 1801 Oakland Boulevard, Suite 100, Walnut Creek, CA 94596 • 415-943-7277

49 responses • 25% judged package and 10% judged vendor outstanding • 2 actively seeking to replace package, with 0 citing unsatisfactory performance as reason.



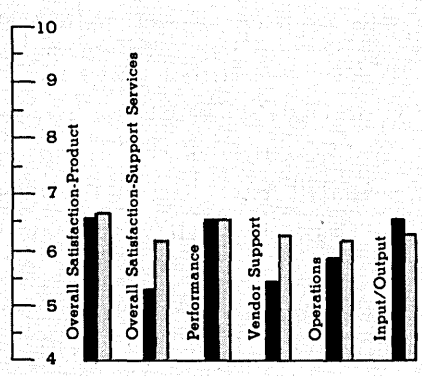
FORESIGHT • Compro Financial Systems, Inc., 2080 Peachtree Industrial Court, Suite 114, Atlanta, GA 30341 • 404-455-1943

48 responses • 10% judged package and 2% judged vendor outstanding • 18 actively seeking to replace package, with 4 citing unsatisfactory performance as reason.



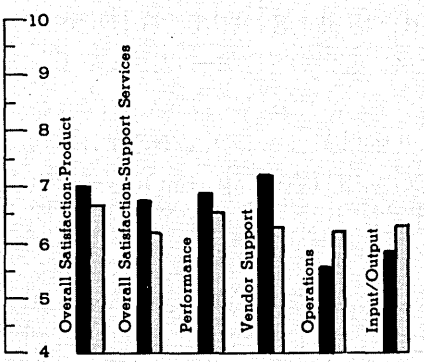
FCS-EPS • EPS Consultants, One Industrial Drive, Windham, NH 03087 • 603-898-1800

59 responses • 17% judged package and 5% judged vendor outstanding • 9 actively seeking to replace package, with 3 citing unsatisfactory performance as reason.



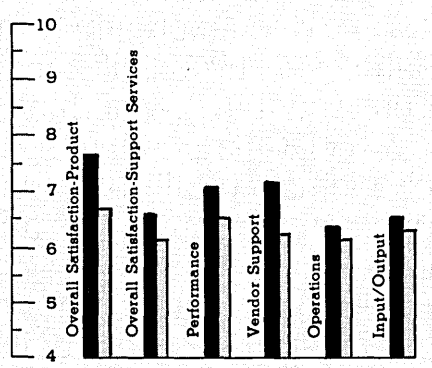
IFPS • Execucom Corp., P.O. Box 9758, Austin, TX 78766 • 512-346-4980

29 responses • 21% judged package and 17% judged vendor outstanding • 7 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



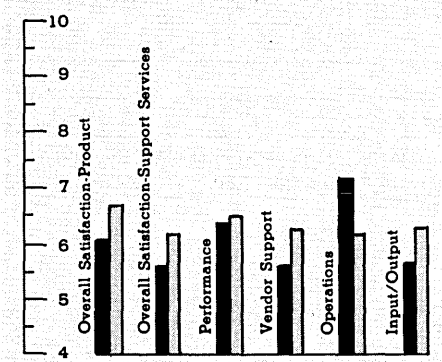
SPSS BATCH SYSTEM • SPSS, Inc., 444 N. Michigan Ave., Suite 3000, Chicago, IL 60611 • 312-329-2400

59 responses • 29% judged package and 20% judged vendor outstanding • 12 actively seeking to replace package, with 1 citing unsatisfactory performance as reason.



BUSINESS MANAGEMENT SYSTEM • Xerox Corp., 5310 Beethoven Street, Los Angeles, CA 90066 • 213-306-4000

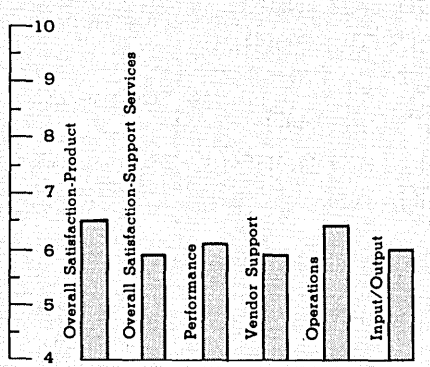
36 responses • 11% judged package and 14% judged vendor outstanding • 16 actively seeking to replace package, with 2 citing unsatisfactory performance as reason.



OVERALL SUMMARY

Average—All Packages • 97 packages

3,472 responses • 13% judged package and 11% judged vendor outstanding • 521 actively seeking to replace package, with 104 citing unsatisfactory performance as reason.



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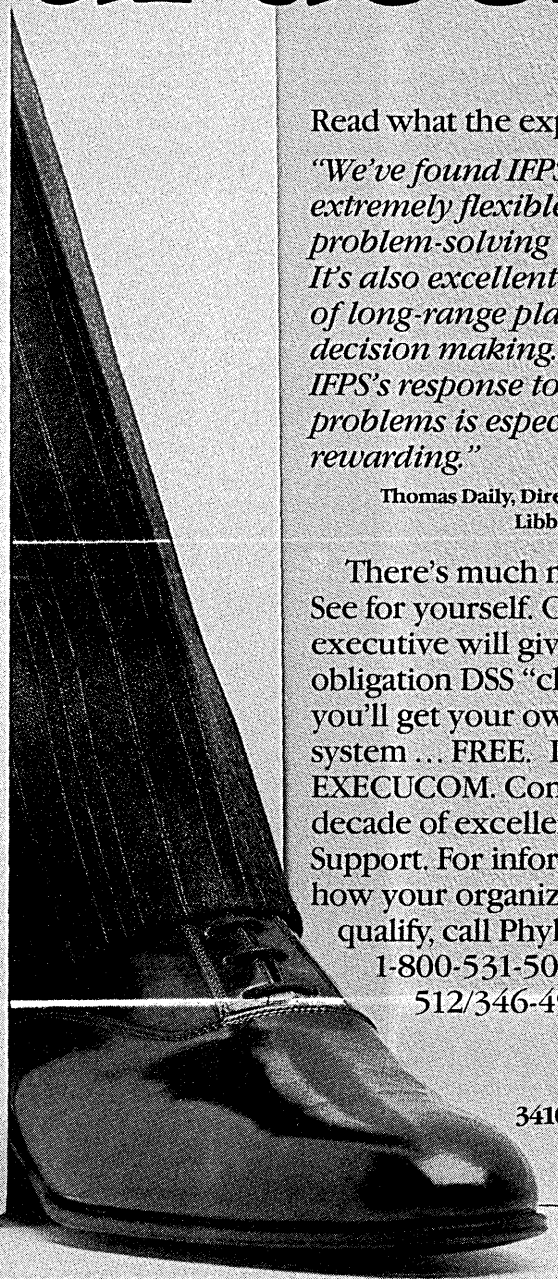

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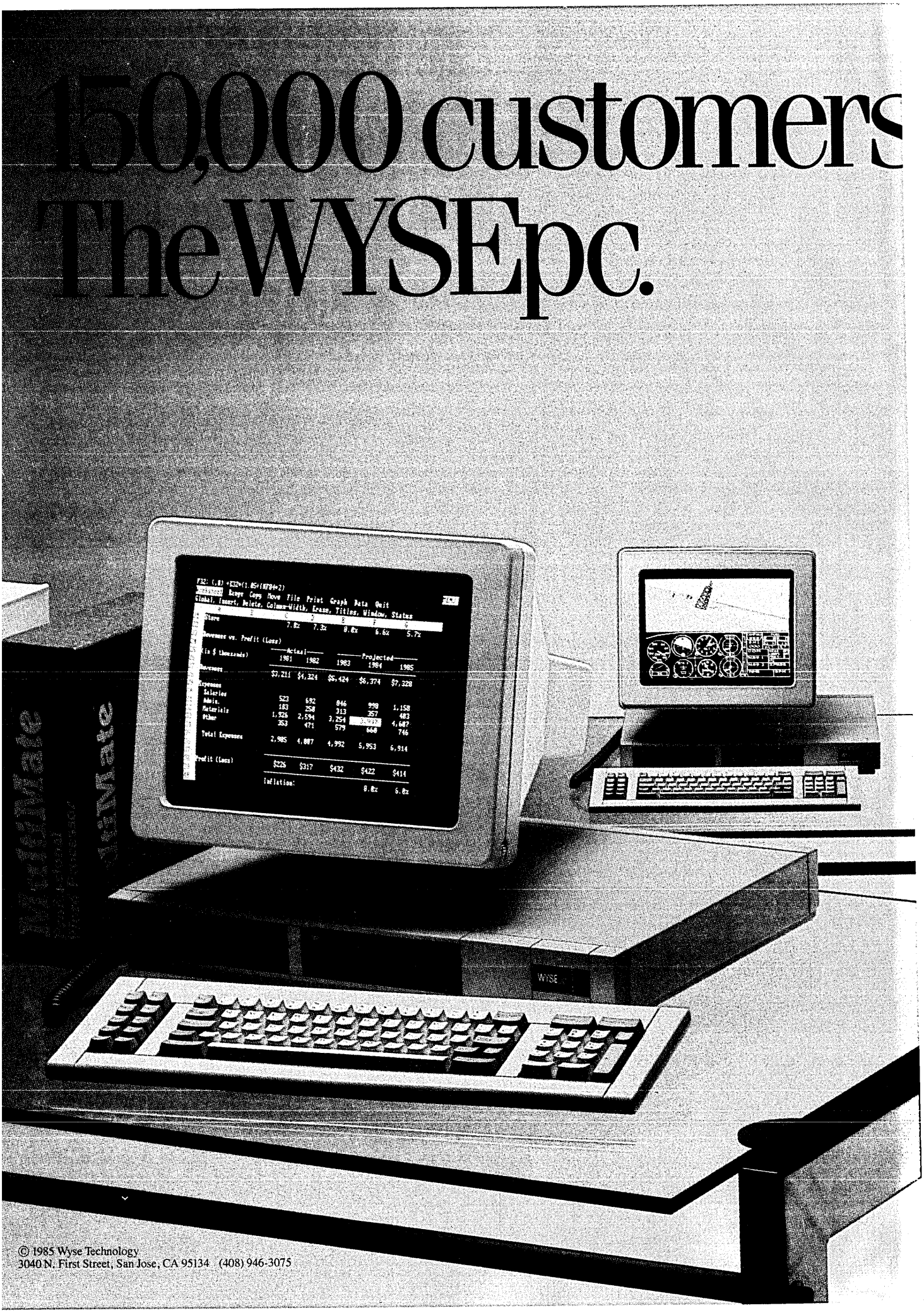

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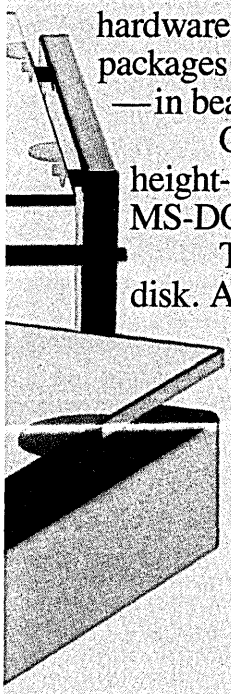

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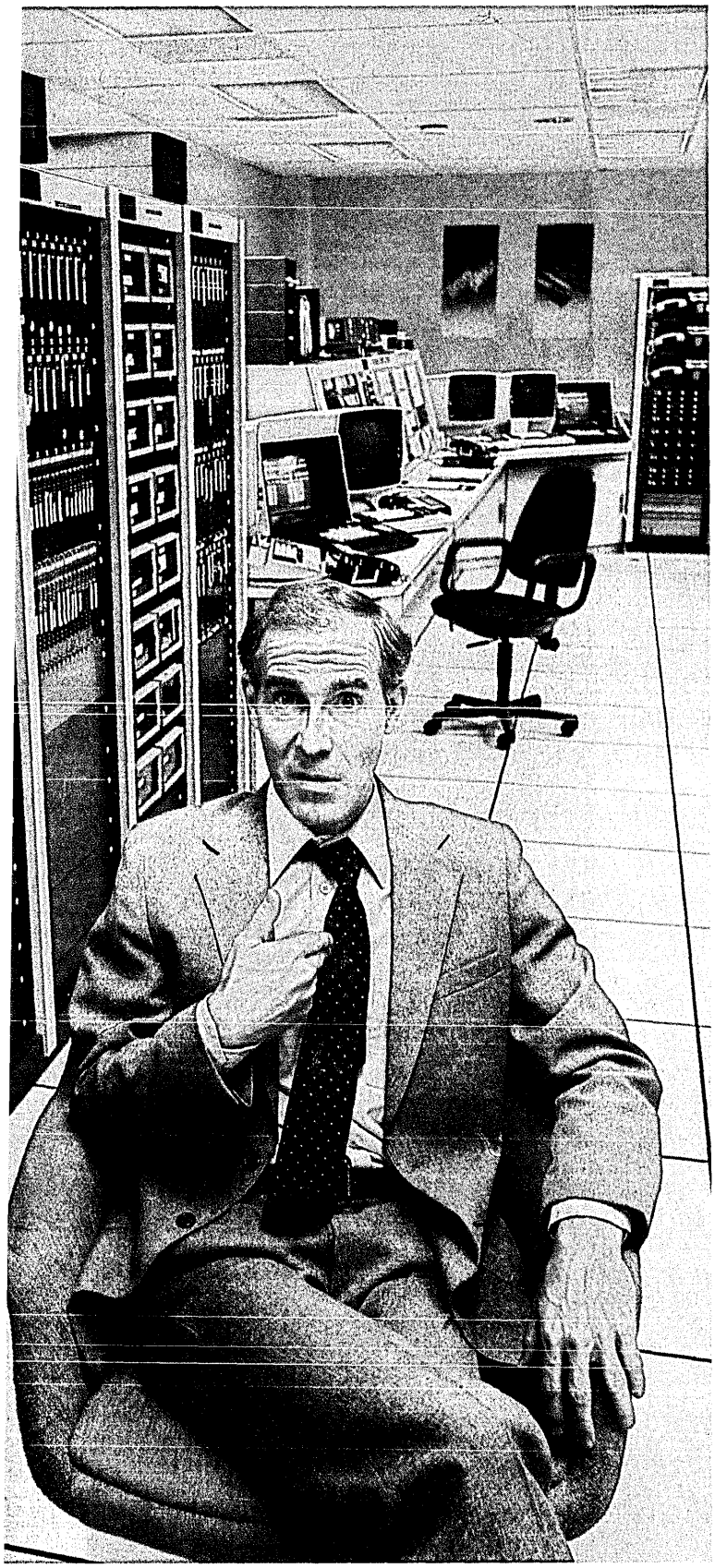

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PEOPLE

FORGING CROCKER'S MIS TEAM

It's the nature of data processing to present special problems to managers. The technology is so vast, is changing so dramatically, and is so obtuse to outsiders that it threatens at times to overshadow the manager's primary responsibility: building a productive and cohesive team.

Jeanne Cribbs, senior vice president for telecommunications and information management at Crocker National Bank in San Francisco, concedes that although technology is critical to the overall success of the organization, for managers it's only a means to an end. "You have to have a blend of skills. Knowing the technology is the least of them."

Cribbs' view of her own record reflects this emphasis on managerial skills. Despite coming up through the dp ranks, starting as a programmer, Cribbs says her most important attribute is the accommodation of her employees' needs for personal growth and their corresponding needs for making their own contributions to Crocker's business goals and strategies.

With 155 employees in her charge and an $11 million budget, Cribbs plays a key role in both her employees' development and Crocker's ability to provide information services, such as automated teller machines (ATMs), to customers.

Cribbs is currently completing a strategic planning project that directly addresses the advantages gained through the integration of telecommunications and information systems. Her group was

JEANNE CRIBBS: In telecom, "There's no history and no vision of the future."

formed for the integration of telecommunications, decision support systems, personal computing, and professional computing. She is also in charge of selecting, designing, implementing, and operating all voice and data communications services for the bank.

Her group has two basic functions. "One concentrates on developing delivery systems. The other concentrates on the effective use of those delivery systems," Cribbs says.

The group was charged with creating systems to "deliver bank information requirements on a cost-effective, high-quality basis, while increasing the productivity of skilled professionals," she says.

Cribbs spends much of her time working with people outside her group, using their input in defining overall solutions to her projects. She says she gains the most satisfaction from giving people the opportunity to contribute, which she calls "linkage. I enjoy making people feel they're players, part of a larger team."

Before coming to Crocker in 1978, Cribbs spent 10 years rising through the MIS establishment at Firemen's Fund, the San Francisco insurance company now owned by American Express. Firemen's made a practice of hiring college graduates with dp aptitudes and degrees in a few carefully selected fields: math, because it taught a logical problem-solving process toward finding correct answers; music, for candidates with proficiency at detail and creativity; and history, for those with the ability to stay with a problem. The selection method "made a hell of a lot of sense," Cribbs says.

It also made her an attractive candidate. She double-majored in math and history, and "almost in English and psychology. I did not get interested in the career of data processing. I fell into it by accident," she says. "I wanted to deal with people and make a contribution, but I'm sure they hired me because I was smart."

She climbed the ladder at Firemen's, from programmer to analyst to project manager. "I was responsible for accounting and customer service systems. I liked customer service systems very much because I was supporting products of which I was a customer. It became a compelling career. I could see the results of my work in other people's lives."

Women in Cribbs's position are still a rarity. Crocker Bank has only six female senior vice presidents among over 30 male counterparts, and Cribbs was among the first women to reach that level when she was promoted last October. "There were few women with the authority and visibility to become senior vice presidents," she says. "All of us who were promoted within the year assumed additional responsibilities and authority."

Three or four of the 15 program-

PEOPLE

mers with whom she worked on her first job, at Firemen's, were women. "The [hiring] issue at that time was whether it was cost-effective to invest the necessary training time in a woman who was going to get married and have babies." (Cribbs herself was married for 10 years and has no children.)

Cribbs believes women make good managers because they concentrate on helping employees work together. "Women bring a set of skills and capabilities to management and to business that are valued: a sensitivity toward good listening and toward interpreting what people mean rather than what they say, and the ability to build a team."

Working one's way up the ladder is difficult for anyone, and although Cribbs says her gender has been more of a plus than a minus, she also acknowledges the discomfort present in areas in which she's been the only woman. "I know I was making breakthroughs into [previously] male domains. To some people I was breaking in. The people I couldn't win over, I tried to be nice to and ignore." Everyone has prejudices, she says. "If you can leave them out of business decisions, you're a hero. If you pretend you don't have them, you're a liar."

Cribbs initially jumped to Crocker because "its philosophy was very much to blend long-term, knowledgeable, and experienced people with a sprinkling of new hires possessing varied backgrounds, a blend that was very attractive to me." This led to an environment where people could share skills and expertise for better results, she says.

"I stayed because I always have challenging work to do and because I was able to build an organization that I think reflects high quality, professionalism, and concern for people."

Cribbs also values being "the main, most visible, tangible indicator of the level of customer service provided by our bank. If the ATM isn't working—that's us. If you call a branch and the phone isn't answered—that's us."

Expanding from data processing to include telecommunications under her wing meant some changes. "Telecom requires that you bring in stronger business planning, project management, and vendor relationships," she says. "Telecommunications people don't know about project management. They just used to call up Pacific Bell and say, 'do this thing.' I need to help our telecom people hone their [project management] skills. At this point, external factors like deregulation and application of new technology affect you much more in telecommunications than in systems development."

Cribbs's current on-the-job headaches stem more from telecom technology than anything else. "I do not get the information I need because it's not available or because no one will state his assumptions in order to project and control costs." Unknowns include what tariffs will be in effect, what services will be available, how much installation and maintenance will be required, and how much those services will cost. "It's too new. There's no history and no vision of the future."

One of her main concerns is "the development of standards within the entire telecommunications industry, from the end terminal through circuits, PBXs, central offices, access carriers, and satellite carriers—at least nationwide and preferably worldwide.

"Why does everybody care about who's the vendor of the workstation? The key point is the integration of voice, data, text, and images. How does it hook up? Does it fall into standards that allow you to get into public and private databases? Who's going to win the workstation is not the issue; the issue is who's going to win the standard."

—Irene Fuerst

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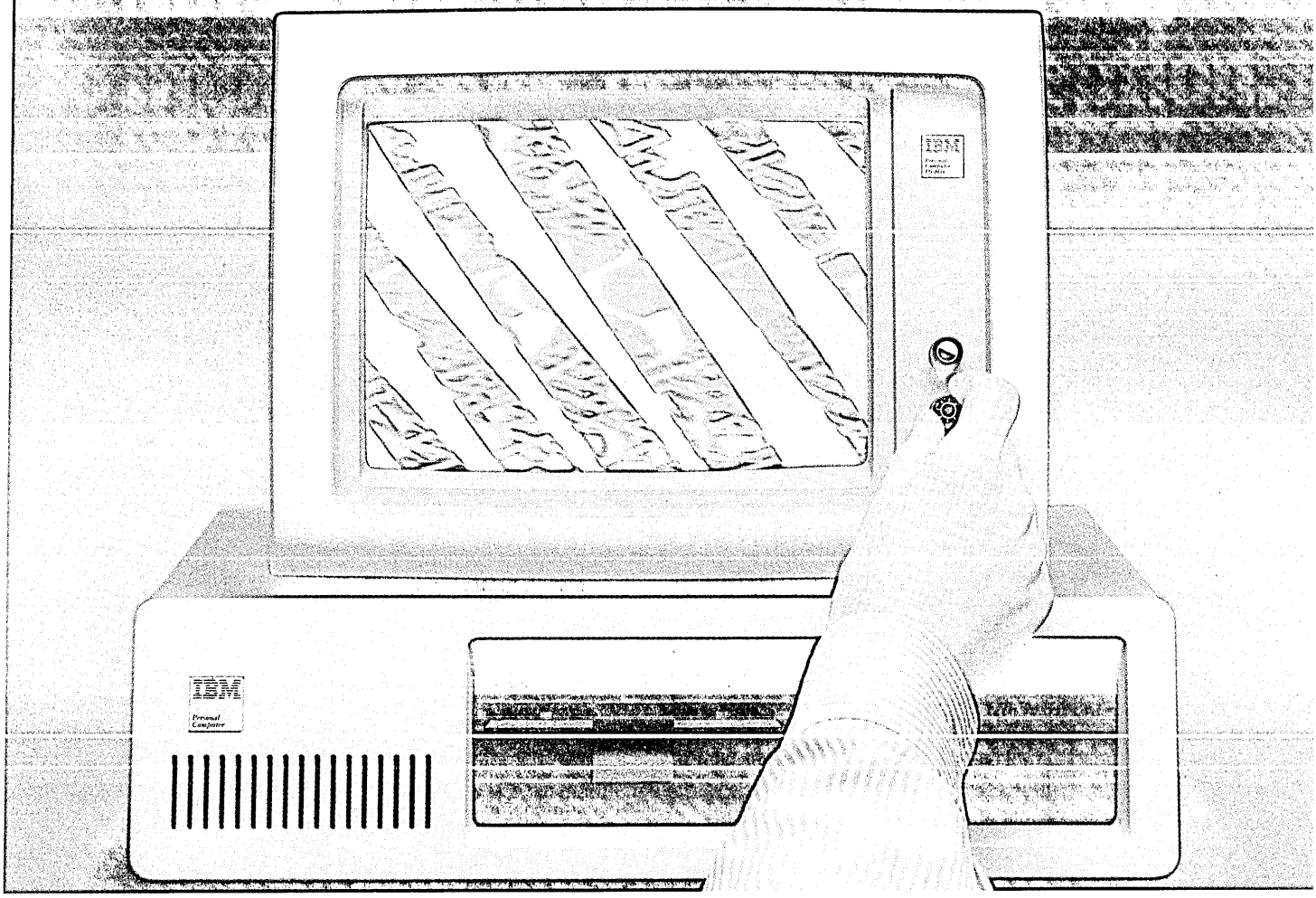
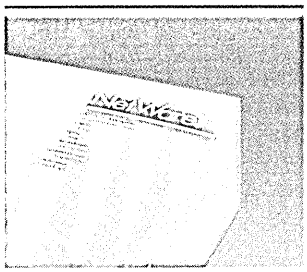


In a relatively short time, the local area network (LAN) market has attracted a host of suppliers. Each has a LAN system to sell. And each is fighting for a proverbial piece of the LAN pie.

Amid all those LAN contenders, only one company is out to make all LAN systems perform better. Only one company offers high-powered LAN operating system software that improves the performance of every major LAN system on the market. Only one company is finishing the job the other LAN makers begin.



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NetWare performs.

How good is NetWare? In recent benchmark tests conducted by Novell as well as Belmont Laboratories, NetWare significantly improved the performance of every LAN system tested.* In fact, NetWare currently runs on 24 different LAN hardware systems, outperforming the original software for every one.

Serving all LANkind.

Whichever LAN hardware you choose, NetWare is the LAN software designed to get the most out of your network. When it's time to improve the reception your network gets from those who use it every day, plug into NetWare. It's from Novell, the people dedicated to serving all LANkind.

For more information, call or write Novell, Inc. 1170 N. Industrial Park Drive Orem, Utah 84057 (801) 226-8202

*LAN Benchmark Report, May, 1985, Novell, Inc. and "Software, Not Hardware Key to LAN Performance," *PC Week* 1/15/85.

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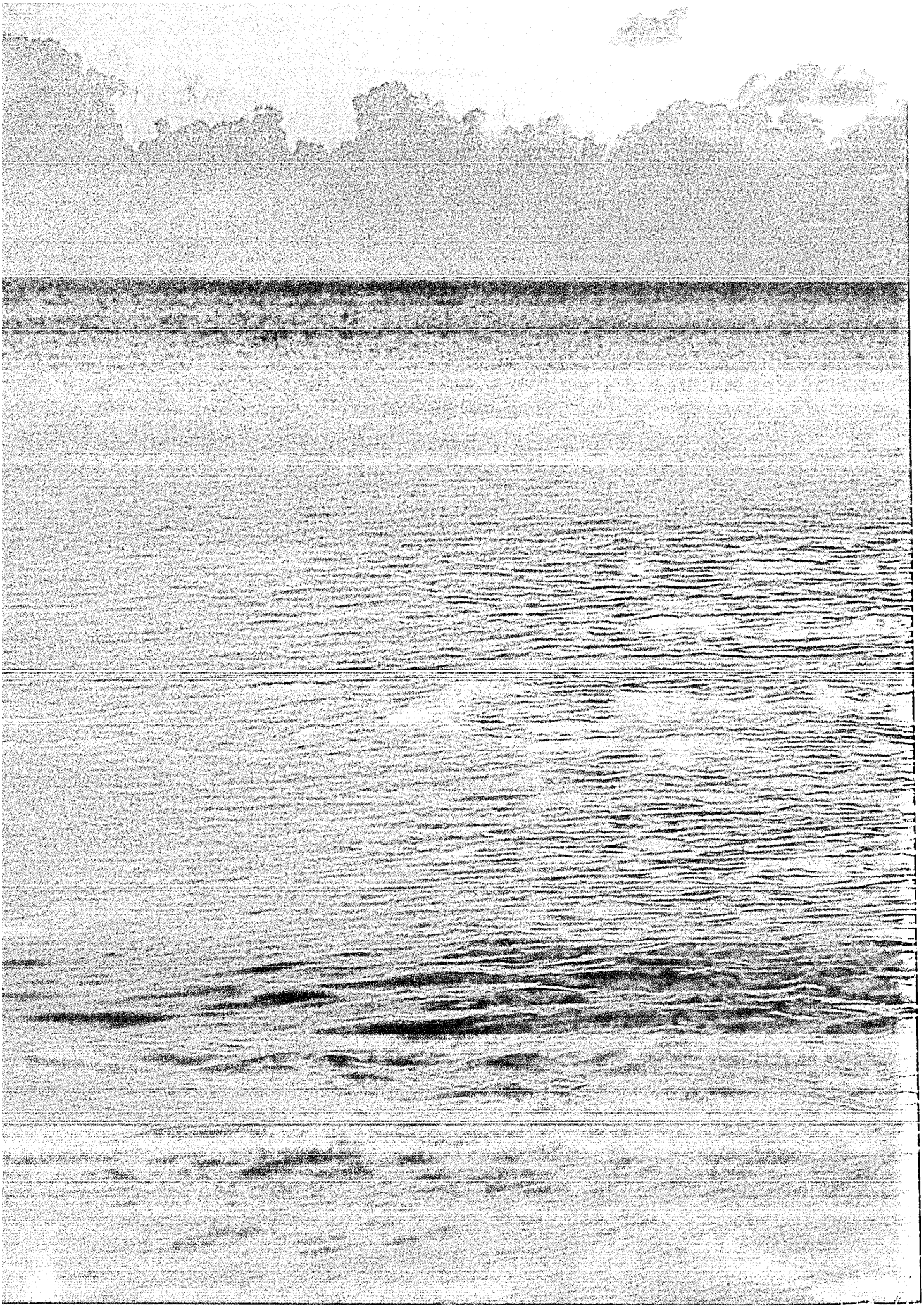

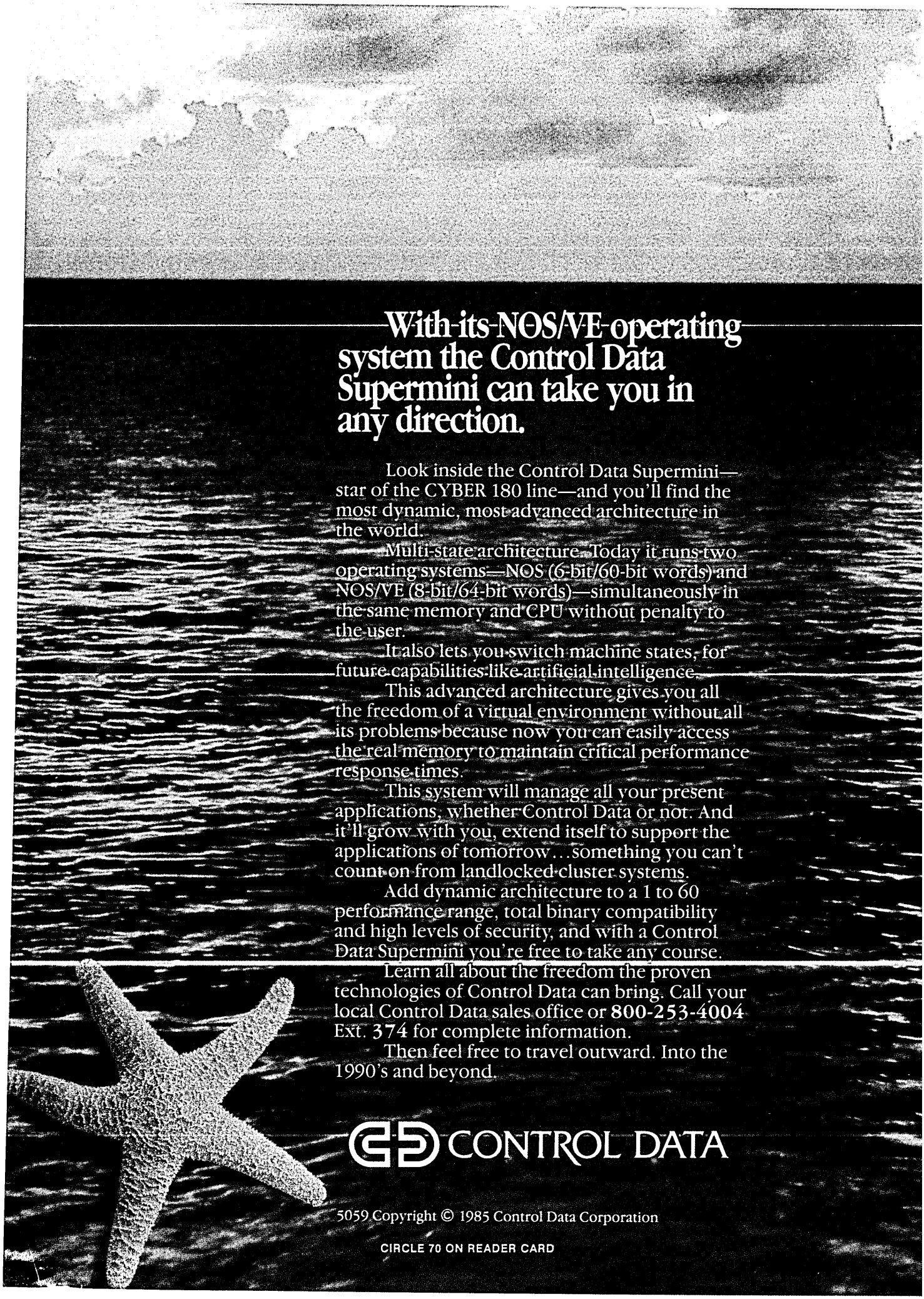

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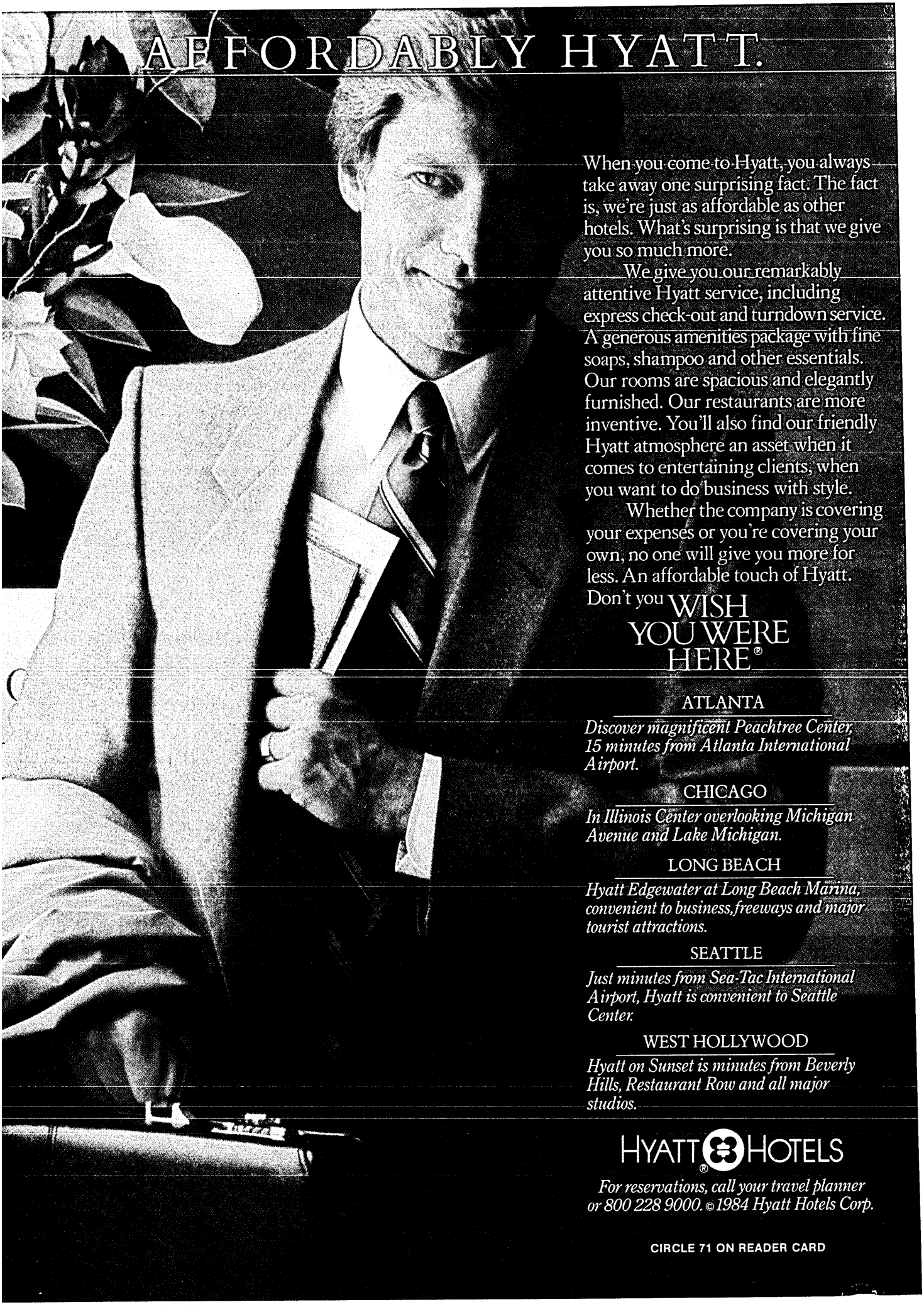

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CIRCLE 71 ON READER CARD

HARDWARE

OFF-LINE

When folks discuss Network Systems Corp., the operative word is usually "fast." The Minneapolis company's Hyperchannel network is fast becoming corporate America's favorite way to link multiple mainframe hosts; the company's revenues, profits, and stock price are growing very fast (NSC stock split last month); and at 50Mbps, the Hyperchannel itself is a very, very fast product. As with many growing companies, however, sooner or later Network Systems may be discussed in the same breath as words like "slow" and even "disappointing."

NSC clearly seems to be slowing down, despite revenues that grew 51% to $71.2 million and profits that jumped 56% to $15.6 million in 1984. Its biggest obstacle at the moment is Datapipe, its long-awaited 275Mbps fiber-optic network. The product was designed to operate as a backbone attaching multiple Hyperchannel networks, but at the moment it isn't attaching anything at all. The product was delayed in the engineering and development stages and is now well behind its initial schedule. Datapipe will enter beta testing this month or next, the company says.

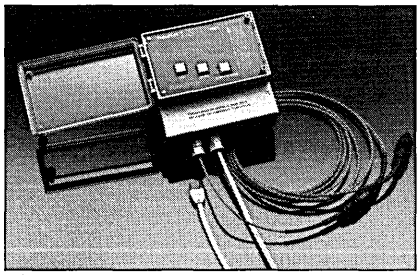
In the interim, NSC announced several new products. A fiber-optic extender can connect Hyperchannels up to two miles apart, and the RDS-500 remote channel extender can link remote printers at 1.5Mbps. The company also announced intelligent boards for Apollo and Computervision CAD/CAM systems that enable those cpus to offload the proprietary Netex file transfer software from mainframe hosts. By letting the software reside permanently on the mainframe, the mini-based systems can perform their intended functions without becoming bogged down in Netex's 100,000 lines of code.

Datapipe isn't NSC's only problem. The firm's low-end Hyperbus product, which connects hosts at the relatively snail-paced 10Mbps, has recorded disappointing sales in the past few months. The company says that the slowdown is largely due to customers that deferred large orders into later fiscal quarters, and to the incompatibility of Netex with Hyperbus. The validity of the first excuse can be seen in NSC's March and June quarterly reports; on the second count, NSC says it will soon provide Netex for the Hyperbus as well as for the Hyperchannel for which it was originally designed. NSC also says that Hyperbus is now available on the IBM Cabling System.

3M's Data Recording Division in St. Paul is developing a high-capacity data cartridge drive system for personal computers equipped with Winchester disks. The drive will provide higher transfer rates and a sophisticated system for eliminating data error. The data cartridge drive system is based on a 3½-inch form factor. The product will permit storage of up to 20MB of formatted user data on a single DC 1000 high-capacity minicartridge, and up to 40MB on the high-end DC 2000. The product is aimed at the oem market, and a formal announcement is expected in the second half of the year.

WATER DETECTION

The TraceTek 100 continuously monitors raised floors to detect water leaks that could cause business interruption, hardware damage, and data loss. The sensing and locating system will enable dp facility personnel to respond quickly to leaks before any damage occurs, the vendor says.



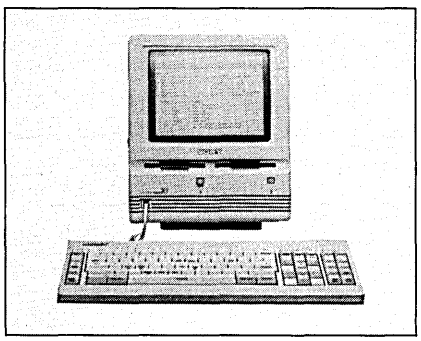
The product consists of a water-sensing polymer cable connected to an electronic module. When water is detected, the module simultaneously sounds an alarm and displays a digital readout of the distance to the trouble source. The cable is resistant to corrosion and abrasion and can be installed in both new and existing facilities. Output is available from 4 to 20 ma. RAYCHEM CORP., TraceTek Products Group, Menlo Park, Calif.

FOR DATA CIRCLE 301 ON READER CARD

CP/M WORD PROCESSOR

The Model 10 is a low-end word processing system with a small footprint. It is engineered to deliver comparable performance to the vendor's larger word processing systems. It is designed for businesses seeking to automate the preparation of letters, contracts, and other documents. According to the vendor, the unit's economical use of space, low cost, and ease of operation will make it an alternative for users considering an electronic typewriter or pc for these types of applications.

With the exception of the printer and detachable full-size keyboard, all functions are contained within the main console, which measures 13½ inches by 9⅞ inches by 12½ inches and weighs 23



pounds. It is available with a 20cps, 35cps, or 55cps printer. The 9-inch screen displays 80 characters by 25 lines. It accommodates up to two 3½-inch disk drives and has 288KB of RAM. Other features include a tilt-and-swivel console base and brightness adjustment.

The CP/M-based system is compatible with the vendor's full-size Series 35 word processing systems. Software includes a windowing feature that permits two documents to be viewed simultaneously. Additionally, both systems will be enhanced with a shared file capability. The Model 10 also offers multitasking capabilities that permit the system to perform up to four different functions at once. The Model 10 with basic word processing software carries a base price of $2,400. SONY COMMUNICATIONS PRODUCTS CO., a division of Sony Corp. of America, Park Ridge, N.J.

FOR DATA CIRCLE 302 ON READER CARD

PRINTING SYSTEM

The HP 2689A laser printer subsystem is designed to work with IBM mainframe computers. The system combines an HP 2680A laser printer with an IBM channel control unit to provide output at 45 pages per minute (approximately 3,000 lines per minute) using 8½- by 11-inch continuous form paper.

Other paper sizes ranging from 3 by 6½ inches to 11 by 17 inches can also be used. The printer permits the use of electronic forms and signatures as well as multiple character fonts. Electronic forms are designed off-line and transferred to the controller via a 3½-inch floppy disk. According to the vendor, this system enables mainframe users to take advantage of a low-cost laser printer for dp-type applications. This is made possible with the vendor's channel interface that connects the printer to non-HP computers.

The HP 2689A is also designed to operate on-line as an IBM 3211 printer replacement and can be connected to the IBM System 370, 43XX, 303X, or 308X byte or block multiplex channels. It can also be connected to the IBM 360 via the mux or selector channel. The laser printing system offers a medium-speed alternative for applications requiring 100,000 to 800,000 pages per month. For higher output, multiple HP 2689As can be added to the mainframe.

Standard environment files, which specify character fonts, forms, and vertical forms commands to be used during a print job are provided with the printer. Each environment file contains ASCII and national language character fonts. The environments also include landscape (horizontal) print orientation and portrait (vertical) orientation, as well as two-to-one and four-to-one reduction capabilities. The HP 2689 laser printing subsystem sells for $100,000. HEWLETT-PACKARD CO., Palo Alto.

FOR DATA CIRCLE 303 ON READER CARD

HARDWARE SPOTLIGHT

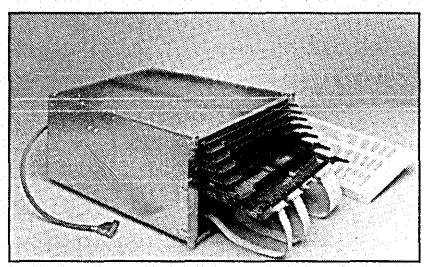
DATABASE SORTER

The DBA 1000 Database Accelerator is a hardware sorter designed to offload a host computer's data sequencing overhead and sort through the database at speeds in excess of 1MBps.

The product is a peripheral processor serving a single host or a network of hosts such as an Ethernet local area network. It combines semiconductor circuitry with a patented data rearrangement technology. The machine manipulates data much in the way a floating point processor would manipulate numbers, the vendor says, adding that a data sort taking 12 to 16 minutes on a minicomputer could be done in approximately 20 seconds with the aid of this device.

The unit consists of three components: a front-end processor, memory control unit, and from one to five self-sorting memory modules totaling up to 5MB of memory. The front-end processor incorporates the 80186 microprocessor. The memory controller's bipolar, bit-slice architecture performs specialized operations. The product can sort files larger than 5MB by creating sorted strings of data and storing them on two closely coupled 5¼-inch Winchester disks. These disks, located in the chassis, accept files up to 640MB. There are an additional five slots on the chasis for oem applications.

The front-end processor receives data from the Ethernet LAN and passes it onto the sorting system. It then brings the



data back through memory in a sorted fashion and sends it back where it was stored. The product works with Digital Equipment Corp. VAX computers and Data General Corp. superminis. The device does not house the database, but receives a copy of the data file, which is sorted and returned back to the host for processing. The file remains stored in the host system.

Data error checking procedures are also employed. If a memory module fails, the operations will continue with performance only slightly degraded, according to the vendor. The integration of the product with the host computer's sort/merge software ensures that should the peripheral be unavailable or down, the sort can still be accomplished in software on the host. The DBA 1000 Database Accelerator's price ranges from $23,000 to $51,000, depending on the number of self-sorting memory modules, pipeline elements, and the disk capacity within the box. ACCEL TECHNOLOGIES INC., San Diego.

FOR DATA CIRCLE 300 ON READER CARD

COMPLEMENTS DATABASE

The Microdata 6500 and 6300 computer system series is designed to make McDonnell Douglas's Reality database management system more readily available to smaller businesses or large business branch departments. The two systems offer varying features for specific data storage capabilities and space requirements.

The 6500 has a modular design that can be integrated into an office environment. It measures 34 inches high by 22 inches wide by 40 inches deep. It can be configured with 512KB of memory to a maximum of 1MB. The system offers disk storage from 40MB to 640MB.

The 6300 offers users the same bit-slice architecture and pipelining techniques found in the vendor's superminicomputers. The system features modular growth from 256KB to 1MB of main memory and from 40MB to 120MB disk storage capacity. The unit measures 23 inches high by 9 inches wide by 29 inches deep and is constructed in a vertical design to fit in tight office spaces.

Both systems have an asynchronous communications capability that permits up to eight terminals to be connected via a single cable. Prices for the 6300 range from $23,500 to $60,000. The 6500 is priced from $39,000 to $110,000. MCDONNELL DOUGLAS COMPUTER SYSTEMS CO. (formerly Microdata), Newport Beach, Calif.

FOR DATA CIRCLE 304 ON READER CARD

—Robert J. Crutchfield

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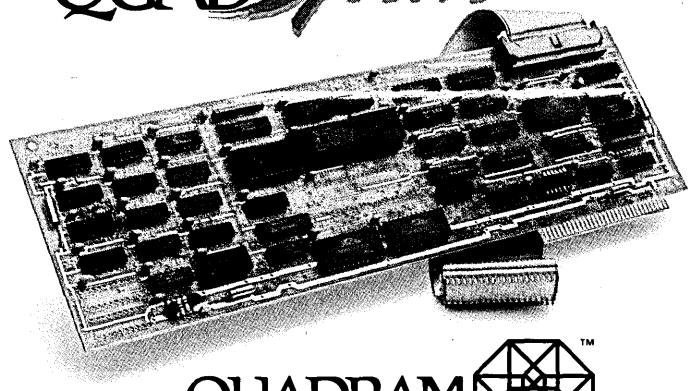

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CIRCLE 73 ON READER CARD

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☐	☐	Overnight tape backup is quick, easy, and totally error-free.
☐	☐	Running a VM data center isn't half as tough as it's cracked up to be.

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AGENDA

8:30 am	Registration/Coffee
9:00 am	Taking Charge of your Data Center
10:15 am	Break
10:30 am	Specific Needs, Specific Solutions
12:00	Complimentary Lunch
1:00-3:00 pm	User Workshop (non-users welcome as well!)

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CIRCLE 74 ON READER CARD

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SOFTWARE AND SERVICES

UPDATES

High-tech partnerships are formed and deals are made at all levels of the computer business. Most of the time a marketer or salesperson teams up with an engineer who has an idea (that may have been rejected by his own employer), and before you can say "venture capital" the deal is done and the newly formed startup company is gagging on real estate prices in Silicon Valley or along Route 128.

Not all partnerships are that cut and dried, of course, nor do all of them accelerate so quickly. Look, for example, at MacHart & Associates, Costa Mesa, Calif. Robert Reinhart and Chris MacDonald formed this modest startup to sell a security system for disks and tapes. Both these men are in the computer business: Reinhart is a salesman in Zenith's computer division and MacDonald works at TRW. Yet that is not what brought the two together; they met while racing and flying biplanes in Southern California. Now, the two are flying by the seats of their pants selling Disk Seal and Tape Seal.

In concept, the devices work the way old wax seals used to ensure confidentiality when letters were sent. It's no secret that unauthorized persons can easily access, duplicate, or change information recorded on tapes or disks without leaving any evidence that would arouse the suspicions of the information's owner. Reinhart's and MacDonald's self-defined mission is to create a security seal that, when broken, will leave positive, unalterable evidence that the break has occurred.

The patented seal consists of two thin, rigid, dish-shaped plastic parts that snap together over the hole of either the floppy disk or computer tape reel. Once the seal is in place, the disk or tape can't be inserted into a machine without unlocking the seal. The seal is constructed to be locked easily and only one time; once unlocked, it may not be used again. Because each seal is unique, a new seal must be used every time the information is secured. (Don't worry: at 2 cents apiece, the disposable seals won't ruin anyone's budget.)

Copying the seal is made doubly difficult, Reinhart says, because each seal can be fastened together with a unique identifier placed on the interior surface. Someone tampering with the disk could replace the original seal with one that looks similar, but could not duplicate the identifier on the inside.

Reinhart and MacDonald certainly believe in their product, but as entrepreneurial as these two men may be, neither has quit his day job. Consequently, MacHart is doing what many startups don't -- growing slowly, with the founders doing most of the work on the seal themselves. Reinhart acts as the director of finance, communications, and marketing; MacDonald handles product development.

Still, MacHart has a huge potential market. According to Knowledge Industry Publications Inc., U.S. revenues for floppy-based micro software surpassed $1.25 billion in 1984 and will jump 87% to $3.2 billion next year. That's a lot of disks.

DATA MANAGEMENT

R:BASE is a line of integrated data management software tools that offers end users processing capabilities in both the micro and mainframe environments, connected by a link. It provides users with an application development tool that operates consistently at the micro and mainframe levels.

The line contains R:BASE Micro, R:BASE Host for the mainframe, and R:Gate, a gateway that provides menu access to the product line. Features include prompt and help facilities, screen painting, report painting, on-line tutorials, and relational data structuring. The products are available on the IBM PC and compatibles as well as on IBM and Control Data Corp. mainframes. DEC and Prime versions are planned. The total cost for the R:BASE line is $20,000, which includes two copies of R:BASE Micro and R:GATE, one copy of R:BASE mainframe plus documentation, training, and support. UCCEL CORP., Dallas.

FOR DATA CIRCLE 326 ON READER CARD

INTEGRATION STANDARD

Digital Equipment Corp. has announced an Integration Standard and Applications Integration Kit for its All-In-1 system. The integration standard is the design of the file and human-interface architecture that were built into the second version of All-In-1 system.

The integration kit documents the integration standard and consists of guides that explain how to integrate business applications with All-In-1. The kit makes it possible to integrate departmental applications—from DEC, its customers, and third parties—with the office capabilities of the system.

The kit allows applications to be integrated with consistent menus, interfaces, and shared data and text files. When applications are completely integrated, users can work both with business and office applications through a single, seamless interface. For example, users can query an application database and

add data to a report, file it, and send it through their organization, in the same system, using the same commands.

The All-In-1 Applications Integration Kit documents the Integration Standard and explains its use. It includes a management guide to aid in choosing the proper level of integration for each application, a system overview with three manuals for integrating applications, and two VAX information architecture manuals. The All-In-1 Integration Kit sells for $150. DIGITAL EQUIPMENT CORP., Maynard, Mass.

FOR DATA CIRCLE 327 ON READER CARD

UNIX ICON INTERFACE

Unicon (Universal Icon) is an icon-driven end-user interface to the Unix operating system. It uses graphics to display pictorial representations (icons) of the files and data in the users' file store, and to show functions that the system can perform.

It is an object-oriented interface that attempts to model the user-task environment by giving the user a set of tools (functions) and objects (files and data) where the shapes reflect the way the user would expect to see them. The user-defined icons facility allows users to modify the standard icons, add new icons, create new tools based on underlying Unix functions, and ask to see the Unix command equivalent of its icon operations.

The software uses the GKS interface and provides a number of system administration functions including management of tool kits and establishing relationships between objects and tools. It can be used as a general purpose system for building icon interfaces to Unix and other operating systems. It supports Berkeley Unix 4.1, Unix System V, PC/DOS, and MS/DOS. The usage license fee for a single-user system is $500. INFOLOGIC INC., Eatontown, N.J.

FOR DATA CIRCLE 328 ON READER CARD

FACILITIES MAINTENANCE

The Maintenance Management System is written for the IBM System/38 and takes advantage of that computer's database architecture. The software enables users to control maintenance, labor, and material costs while the company's assets are being maintained.

Features include a work order management module to reduce maintenance costs by planning, scheduling, and monitoring activities. The manpower allocation module monitors repair activities while the equipment management module gives users access to equipment specifications and repair history. Other modules include preventive maintenance, inventory control, accounts payable, and a purchase order management facility. Prices of the Maintenance Management System range from $10,000 for an individual module to $80,000 for the complete system. SHAWWARE INC., Portland, Ore.

FOR DATA CIRCLE 329 ON READER CARD

PROJECT MANAGEMENT

MicroMan is a microcomputer-based project management system for information services departments and software development groups. The vendor says the menu-driven system has features usually found on mainframe products.

The product gives users total workload control for everything from major projects through problem reports. Users can monitor staff time on projects as well as administrative and nonbillable activity. Weekly reports give the status of all projects. It simplifies planning and scheduling through an automated project planning function that identifies the project's critical path and determines the completion date with available resources, or the resources required to meet a specified completion date. If the plans need expansion or revision, the system can offload a project to another personal computer so the user can develop plans and perform what-if analyses.

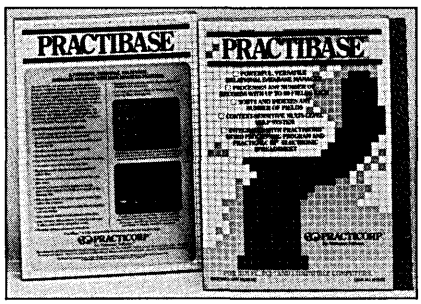
The management reporting capabilities provide statistical summaries of minor projects, detailed reporting of major projects by phase, and rolling forecasts of staff time availability. For cost accounting and chargeback purposes, the system generates a monthly financial report for each user listing the time and dollar charges for each billable staff member.

MicroMan runs on an IBM Personal Computer or compatibles with 256KB of memory, a 10MB hard disk, and a printer. It operates under PC/DOS, MS/DOS, CP/M, and most Unix and Xenix operating systems. Prices for MicroMan range from $3,000 to $5,000. POC-IT MANAGEMENT SERVICES INC., Santa Monica, Calif.

FOR DATA CIRCLE 330 ON READER CARD

MICRO DBMS

PractiBase is a relational database system for the IBM PC, PCjr, and compatible computers. Designed for business, professional, and home office use, the product gives users the ability to organize and retrieve all types of alphabetic and numeric data.



The program requires 128KB of memory and can handle up to 60 fields per record with an unlimited number of records. It can access up to three files at one time and can sort or index any number of fields at once. The software can handle up to 2,000 characters per record and 254 characters per field. In addition, it can generate customized reports, handle customized input and calculations, and provide data entry check.

This product integrates with the vendor's word processing and spreadsheet software so users have to learn only one set of commands to use all three programs. Other features include single key commands, the ability to generate page and columnar reports from data contained within files, a memo-writing feature, and on-screen context-sensitive help. Additionally, it converts dBase II files and can run existing dBase II programs as well as provide optional password protection. PractiBase sells for $100. PRACTICORP INTERNATIONAL INC., Newton Upper Falls, Mass.

FOR DATA CIRCLE 331 ON READER CARD

—Robert J. Crutchfield

SOFTWARE SPOTLIGHT

MACINTOSH/UNIX LAN

Ultra-Talk software enables Apple Macintosh personal computers to be linked to a Unix-based supermicro or supermini serving as a cluster processor. The software works with the AppleTalk Personal Network and allows communication between Macintoshes.

The software is transparent to the user. It uses Apple-like icons instead of Unix commands. Features include a personal file management system, a library available to all system users, electronic mail, and password-protected access. Other features include the ability to use the Unix system as a Macintosh disk, print spooling, the ability to use the Macintosh as a Unix terminal, back-end networking of Unix cluster processors with a high-speed LAN, IBM PC integration, gateways to remote file search capabilities, and a bridge between AppleTalk networks.

According to the vendor, the Ultra-Office product line, including Ultra-Talk, is entirely compatible with Apple's office information system design. The vendor analyzes management operations and requirements and tailors the network to the user's needs. The initial release runs on a Zilog Z8000 supermicrocomputer. Ultra-Office costs $2,000 for the cpu software and $300 per connection. LUTZKY BAIRD ASSOCIATES, Culver City, Calif.

FOR DATA CIRCLE 325 ON READER CARD

How to tell when an on-line application development system is exactly right for you.

If you're like most DP managers, you have a tremendous on-line application development backlog. And too few Command Level COBOL programmers. Which means you need an on-line application development system. The question is, which one?

Now there's a quick, simple, graphic way for you to find out.

Define your parameters with The Resource Management Grid.

Based on experience with over 2,000 CICS users, Oxford Software has developed The Resource Management Grid. By plotting all the projects on your work list on this grid, you can define which on-line system best meets your own unique parameters.

Upper-left-hand cluster: Optimum UFO performance.

When your on-line projects cluster in the upper-left-hand corner of the grid, delivery time is your main concern. So the system for you is UFO,® a fourth-generation solution to on-line application development in the CICS/VS and IMS/DC environments.

UFO dramatically reduces the time required to develop and maintain new programs. What might take months to put up and get running with Command Level COBOL can now be accomplished in as short a time as one day. Because UFO is so easy to use, your entire programming staff can develop applications with it. And even end users can participate in the development of programs and access data for one-time inquiries.

Lower-right-hand cluster: Optimum UFO/COBOL performance.

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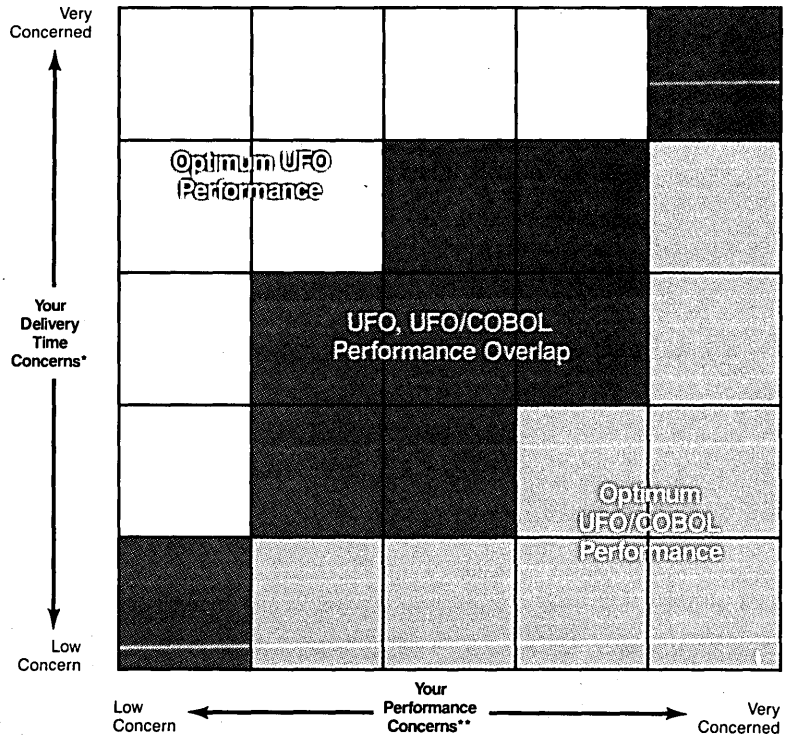
The Application Development Resource Management Grid:



* A Function of—Number of programmers, Number of applications, Skills available, Due dates.
** A Function of—Machine resource availability, Application complexity, Transaction volume.

No cluster pattern: UFO plus UFO/COBOL.

You may well find, however, that many of your projects cluster right in the middle of the grid. Or that there is no pattern. In that case, installing both UFO and UFO/COBOL is the most cost-efficient solution.

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Call or write for your Grid Kit.

Only you can decide, of course, which on-line application development system meets your needs best. Or which vendor can provide you with the most complete solution. But The Resource Management Grid Kit can be of immeasurable assistance in helping you make these assessments.

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☐ Please send me your Grid Kit.
☐ I'd like to schedule a ☐ UFO and/or ☐ UFO/COBOL demo. Please call to set a date.

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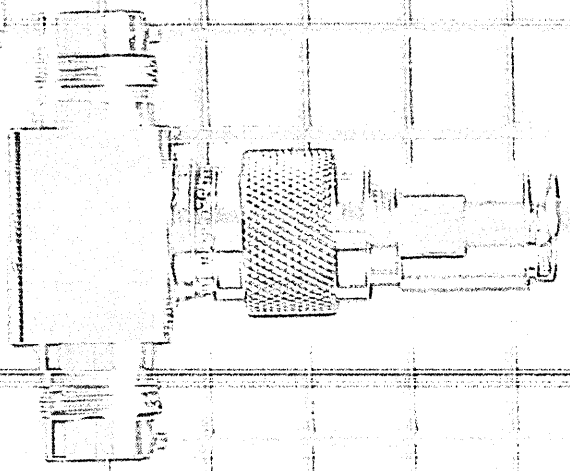
CIRCLE 75 ON READER CARD

Direct PC to System 34/36/38 Connections Using Standard Twinax Cable



It's Easy With AST-5251/11™: Fast Hookup, File Transfer and Extra Capabilities

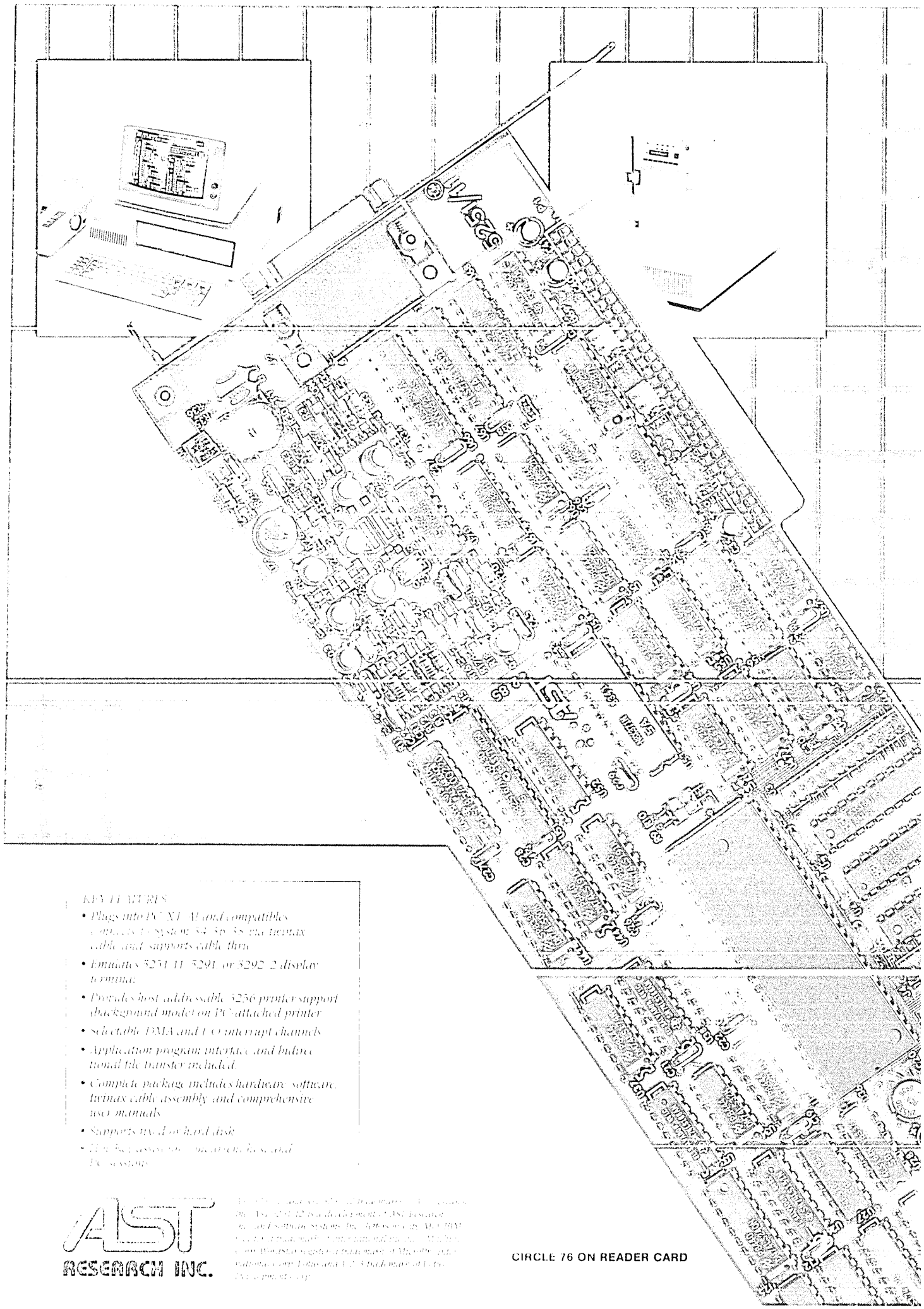
Standard Twinax Cable Support Makes Installation A Snap. AST-5251/11 and twinax connection means easy, cost effective direct cable attachment of your PC to your IBM® System 34/36/38—no expensive communications adapter necessary. Just plug our AST-5251/11 emulation board into your PC/AT/XT, portable or compatible and connect the twinax cable. With this complete hardware/software solution that's all it takes to use your PC just like a standard IBM 5251/11 display terminal.

File Transfer Is Only The Beginning. Use your PC as always, and emulate a Model 11 terminal—with extra capabilities—to access your powerful host minicomputer. Then transfer files bi-directionally between your host and PC, in a ready-to-use format.

Use Your Favorite PC Software. AST's file transfer support not only eliminates the burden and the errors of re-keying, it adds the ability to manipulate transferred data using your favorite PC software packages, like Lotus 1-2-3™ and WordStar.® And our Hot-Key support lets you conduct concurrent DOS and host sessions, while our applications program interface (API) makes integrating PC and host applications simple.

Even Greater Efficiency. For configuration flexibility, AST-5251/11 provides host-addressable 5256 printer support in a background mode, and can effectively utilize low-cost PC-compatible printers.

This complete package—from the leader in PC enhancement products—is available from your neighborhood computer store. So is our AST-5151/12™ for remote connections. See your dealer today, or call our Customer Information Center (714) 863-1333 Ext. 5249 for more information. AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 (714) 863-1333 TWX: 753699ASTR UR.



KEY FEATURES

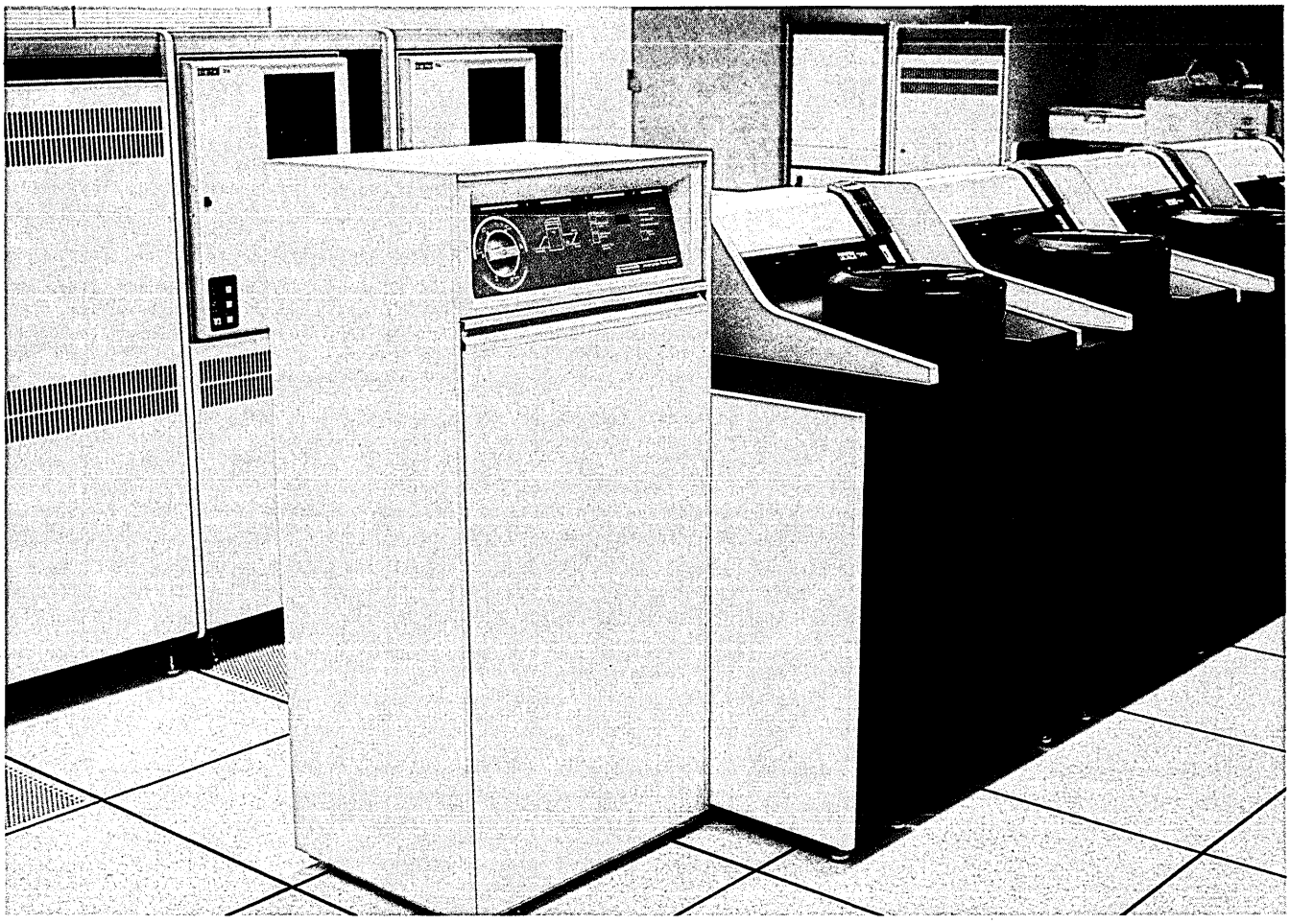
- *Plugs into PC XT/AT and compatibles connects to System 34/36/38 via twinax cable and supports cable thru*
- *Emulates 3251/11, 3291, or 3292/2 display terminal*
- *Provides host addressable 3256 printer support (background mode) on PC-attached printer*
- *Selectable DMA and I/O interrupt channels*
- *Application program interface and bidirectional file transfer included.*
- *Complete package includes hardware, software, twinax cable assembly and comprehensive user manuals*
- *Supports fixed or hard disk*
- *[illegible] and PC sessions*

AST RESEARCH INC.

[illegible]

CIRCLE 76 ON READER CARD

No. It's not a computer.



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Until now, if you wanted a true, uninterruptible power system for your minicomputer, you'd have to hide it in the basement or equipment room.

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CIRCLE 78 ON READER CARD

SOURCE DATA

BOOKS

THE HUMAN FACTOR
by Richard Rubinstein and Harry Hersh

When all is said and done concerning human factors, much more is said than done. Consider for a moment the comment made by the president of one software company when describing the conclusion that many software suppliers have come to when trying to make their packages more user friendly: "The best approach, so far, has been to take all the old brochures and just rubber stamp them with 'user friendly' on the front cover."

Authors Rubinstein and Hersh recognize this problem (they cite this comment in their introduction) and they seek to overcome it in two ways: by carefully articulating a very practical philosophy of human factors design and by providing a set of nearly 100 guidelines for designers to follow. Now books and papers proposing various guidelines abound, but it is the consistent philosophy of human factors, not as an arcane discipline but as an integral part of systems engineering, that distinguishes this book from the others.

In the very beginning the authors note that "in a sense, good human factors engineering is just good engineering. It is based on a thorough analysis of the problem, broadly conceived." Bravo! Just as we humans are part of the problem, so, too, should we be part of its solution. It is pure folly (and a continuing manifestation of engineering arrogance) to define the users out of a system. How many times have we all heard, "It's not a system failure, it's a user error"? Now we're beginning to realize they're the same thing.

Rubinstein and Hersh know the limitations of guidelines: they "cannot be easily generalized," "taken out of context they may be misleading," and "knowing when and where to apply [them] is a skill [learned] by experience rather than by formal instruction." Nevertheless the authors do suggest some specific rules that they recommend be tempered by the designer's intuition (deriving from his "skill, taste, experience, and knowledge") and by the use of "causal models or theories of user behavior" that may be unique to the particular system being developed.

The book covers task analysis and use models, interface language style, information presentation and representation, and system testing. Within each area, the guidelines range from detailed ("avoid error codes") to broad ("don't distract"). Ironically, in this book devoted to user friendliness, I found it somewhat unfriendly that although the guidelines are numbered and set apart from the rest of the text with horizontal lines and italicized type, they are never summarized anywhere as a straightforward list of do's and don'ts. Perhaps the authors felt that if the guidelines were read completely out of context they would be misapplied, but it will undoubtedly disappoint those methodical designers and developers who, whether for inspiration or decoration, like to post lists of good ideas around their desks. In their "Parting Thoughts," the authors do summarize their guidelines in 10 fundamental ideas, and these are quite valuable, for they express the authors' philosophy in ways that clearly lead to action.

An important point that recurs throughout the book is "designers make myths; users make conceptual models." Expressed so compactly this may appear abstruse, but the idea is fundamental to good interface design.

Users rarely know exactly what goes on in the bowels of the system. From the users' point of view, the system responds to something they do. Whenever such a cause and effect relationship appears to exist, most people naturally begin to develop explanations for the computer's behavior. They may be logical ("The system is programmed to create a new record for this product if one does not already exist") or they may be illogical ("If the system thinks it knows you it won't ask you for your password"). Regardless of how well the users' ideas about how a system functions approximate its actual functioning, the point is that users develop "conceptual models" to feel satisfied that they know what's going on.

In view of this, Rubinstein and Hersh contend that designers must not only design systems that make it easy for users to come up with useful conceptual models, but must actually anticipate and shape what those models will be. This is important since "conceptual models . . . provide the basis for expectations." The authors go on to note that "if users can easily build consistent models of the computer, they will perceive the system as easy to learn. If they must build complex models, they will perceive the systems as difficult and confusing."

The key to properly influencing the users' conceptual models is to present and maintain a "consistent myth" of how the system functions. It's not especially important that the users' models be accurate; it is much more important that they be clear, consistent, and effective in helping the users know how the system will behave in all circumstances.

Another central theme in this book is that good designs are "user centered." In the introduction, the reader is admonished to "know thy user, for he is not thyself," and the authors dedicate themselves to describing what you should know about users, how to acquire this knowledge, and what to do with it. To those ends the authors describe the principles of task analysis (what is being done, what needs to be done, and how) and use models (given a specific system implementation, how and by whom will it be used). And they illustrate these methodologies by applying them (and their other points throughout the book) to a single case study—designing an automated tell-

er machine (ATM) for a fictitious bank in New York City.

Exactly 200 years ago the Scottish poet Robert Burns commented that the best laid plans of mice and men often go astray, and today's computer systems are no exception. Since errors are a fact of life, we must design systems to run in "error mode." Rubinstein and Hersh are well aware of this and spend some time discussing how, when, and where to report on error situations. Some of their recommendations seem painfully obvious ("distinguish between success and failure"), but when I reflect on the sad state of the many system interfaces with which I'm familiar, I realize one man's obvious is another's obscure. Most important, the authors advise designers to "design the error behavior of the system" and "state errors in terms of the external myth" they are presenting. These thoughts and the attitudes they foster are invaluable if you plan to do more than stamp your brochures, "New! User Friendly!"

While the authors have done an admirable job of identifying and illustrating some of the central issues in good human factors design, I was disappointed not to see any discussion of two points that frequently come up in practice.

First, to what extent should new systems emulate and simply accelerate the work methods now in use, as opposed to offering radically new ways of addressing the same problems? The use models the authors propose approach this issue but do not tackle it head on. In most cases it may be more effective to design new systems to "go with the flow" of established user procedures. However, where these procedures are not amenable to an automated implementation (as is often the case in time-triggered sequences of events) or where the basic task objectives can be far more easily accomplished through new work methods, these should be seriously investigated. Users, like the rest of us, are creatures of habit and tend to accept the familiar more readily than the new, but designers should be cautioned against approaches that simply automate the status quo.

A second point that the authors skirt concerns the industrywide problem of multiple "good" interfaces. When designers are involved in delivering more than one system to the same users or to overlapping communities of users, how should several good, but different, interface methods be integrated or reconciled so that the users are not confused? I have often found it more difficult to keep straight the external myths of several well-designed systems that I use regularly than to deal with one less friendly but more comprehensive system that offers all the applications I need.

Unfortunately, individual designers and even design teams often find it difficult to solve this problem since users frequently combine packages from several different suppliers to support their various requirements. In this respect the industry as a whole must look seriously for some interface standards not based simply on physiological factors such as the width of the average male fingertip, but on the much more important (and more difficult to measure) psychological and emotional criteria that govern how we perceive and process information.

For the individual designer, this multiplicity of systems in the user's environment remains a critical problem that cannot be ignored. Designers who are responsible for several related systems must seriously consider the collective interface presented by the entire constellation of programs and they must be prepared to compromise some desirable local features in order to achieve a global harmony.

Rubinstein and Hersh conclude their book with a short but valuable appendix in which they outline an approach to teaching human factors design. Given the wide range of good solutions that might be proposed for many interface design problems, the authors advocate an unorthodox class structure in which the instructor is not the grader. This, they feel, will promote a more collegial atmosphere of mutual learning between the instructor and the students, increasing creativity and minimizing the intellectual regurgitation of formula solutions that is so often a consequence of the scramble for grades. They suggest a series of student exercises that are imaginative and challenging and that should effectively reinforce the book's main themes.

All in all, *The Human Factor* provides us with a valuable review of enlightened guidelines for designing better, not just friendlier, systems. Rubinstein and Hersh have confined their remarks to that which today is practical and, in most cases, cost effective and I have no doubt that their recommendations, if heeded, will make life a little easier for all of us, designers and users alike. Digital Press, Bedford, Mass. (1984, 249 pp., $21).

—D. Verne Morland

THE RACE FOR THE NEW FRONTIER: INTERNATIONAL COMPETITION IN ADVANCED TECHNOLOGY

The first half of this book was written by committee. Actually, it was written by a panel established by an office that resides within a council (The National Research Council). Whoever edited the panel's report managed to avoid many of the pitfalls of composition by committee: the prose is consistent, clear, competent, and speaks with one voice. This is a blessing since the content is the inevitable, politically careful product of a government group.

What, you may ask, were they being careful about? Well, it was technical innovation—innovation, that explosively exhilarating, doggedly demanding, risky, rewarding, wonderfully awful process by which we exchange our old world for a new one. This book examines advanced technology and the innovations that grow from it. The special perspective of this book is the U.S. looking at international competition in advanced technology.

The report concludes that advanced technology is important to us, as well as to other nations, too, and that some of those nations behave in ways we think are unfair. It recommends that we continue to consider advanced technology important, encourage our competition to play fair, and reexamine these conclusions and recommendations every two years. If this summary appears to trivialize the report, I plead only that I am doing less damage to the report than the report does to its subject.

The second half of the book was written by individuals. It consists of 10 research papers, nine commissioned by the panel and one written by a panel member. These papers were intended, according to the preface, to illuminate the panel's report. Instead, they embarrass it. The papers (except for two) share a common trait—they have a sense of reality about them. The reader feels the authors know about their topics and aren't afraid to say so. It is especially interesting to hear from people active in the process of advanced technology innovation.

There are good contributions by Ralph Gomory, IBM's research chief; William Perry, a senior executive of the venture capital firm Hambrecht & Quist; and Robert Swanson, a founder of Genentech Inc. The other papers (except for two) were written by university professors, and these also have a much more solid texture than the report proper. The two papers that don't seem so real and weren't written by a professor were authored by a consultant to a subcommittee of a U.S. House committee. The two are impenetrable discussions of the laws, regulations, and governmental processes that surround U.S. international trade.

The preface to the book is careful to point out that the papers in the back do not necessarily reflect the opinions of the members of the panel. It doesn't explain why the best ideas presented in the papers never made it into the body of the report. Specifically, the theme comes through loud and clear from the private sector writers that the best thing the government

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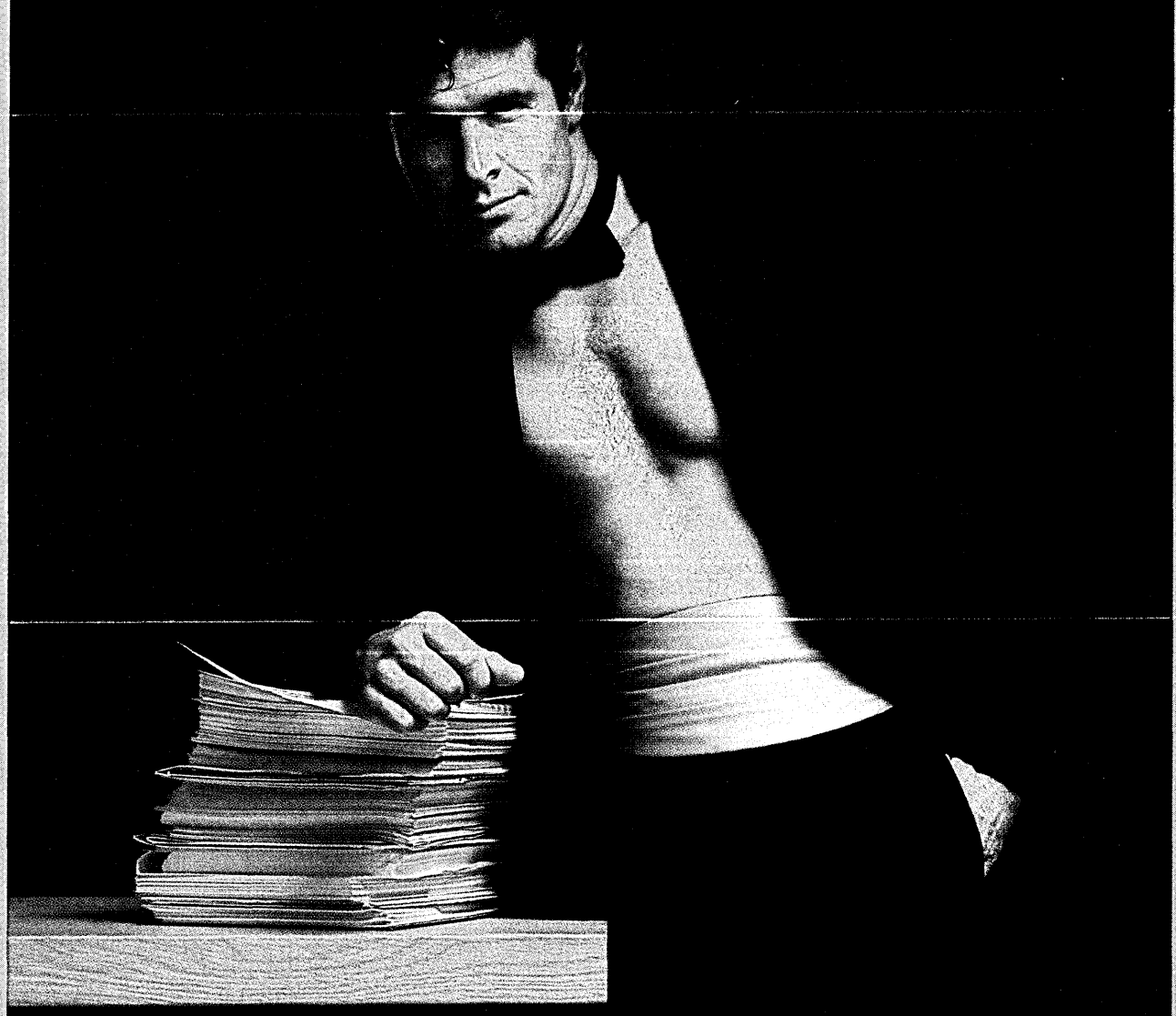

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HOW TO AVOID IT, FROM THE LEADER IN ON-LINE TRANSACTION PROCESSING.

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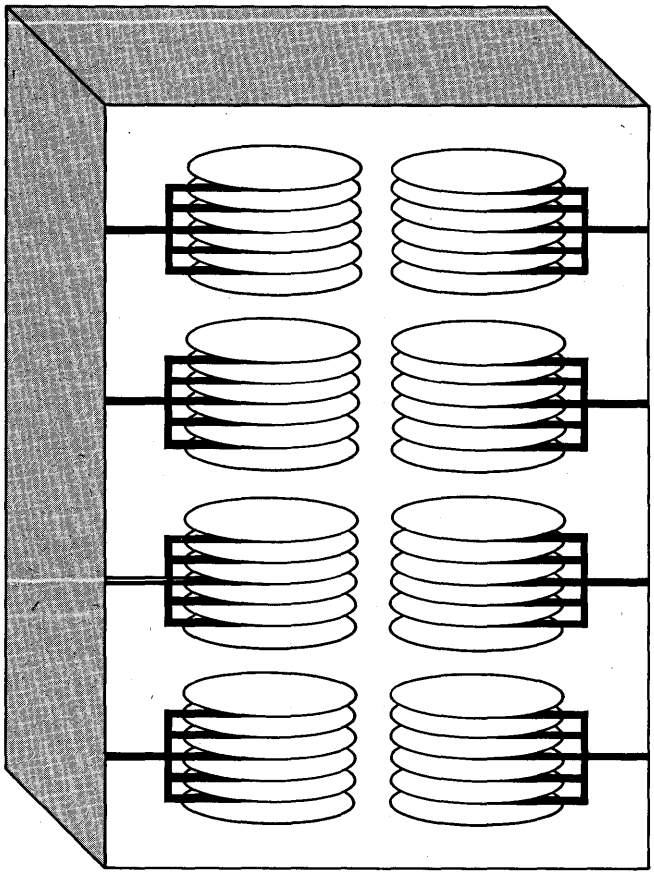

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8 disc drives, 8 actuators in one cabinet.

Instead of one actuator handling I/O requests sequentially, eight actuators can now work simultaneously. No disc space goes unused.

The Tandem V8 gives you high throughput, stores 1.3 gigabytes of data, yet remarkably takes up only six square feet of floor space.

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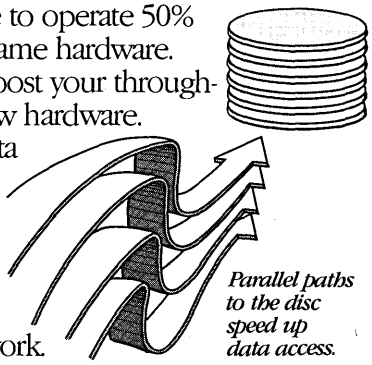

Parallel paths to the disc speed up data access.

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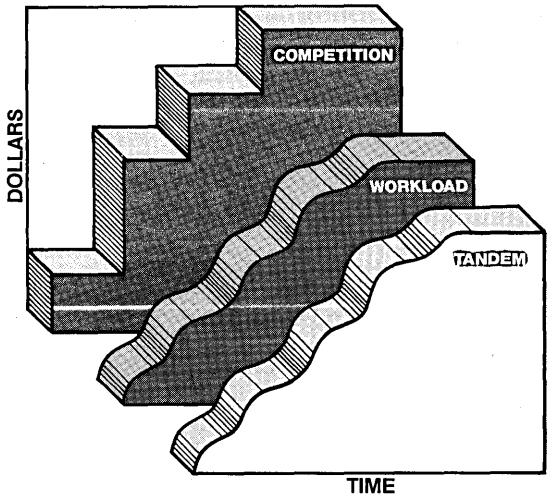
When you outgrow a Tandem system, you don't replace it. You just add to it. You can start with two processors in a local system and expand at any increment you choose, all the way to 4,080 processors worldwide. You never buy more than you need.



Tandem matches need. The competition overspends it.

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Tandem systems are already at work for FORTUNE 500 companies in banking, telecommunications, manufacturing, transportation, retailing and energy, as well as several branches of the U.S. Government.

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TANDEMCOMPUTERS

CIRCLE 105 ON READER CARD

could do to encourage innovation in advanced technology is cut capital gains taxes, continue favorable tax treatment for R&D, and knock off regulatory hassles, especially for small business.

Think about this book as a bull: the brains are in the back, the results are in the front. A Touchstone Book. National Academy Press/Simon & Schuster, New York (1984, 225 pp., $9.95).

—Bruce W. Hasenyager

REPORTS & REFERENCES

THE DP MERRY-GO-ROUND

The Department of Commerce warns that "assessing the competitiveness of the U.S. data processing industry is like trying to take a snapshot of a single horse on a moving merry-go-round."

This caveat, however, did not stop the Department of Commerce and the International Trade Administration from taking a shot at compiling *A Competitive Assessment of the U.S. Data Processing Services Industry.* The bulk of this 61-page publication is a discussion of the current position of the domestic dp services industry and its foreign counterparts.

The international market for data processing services is highlighted with reports on Japan, Western Europe, Canada, and other emerging competitors that stress their competitive advantages and disadvantages in relation to the U.S. data processing services market. Chapters dealing with trends in international competitiveness and the national and federal implications associated with such foreign rivalries set the stage for the final section of the publication on federal policy options.

A Competitive Assessment of the U.S. Data Processing Services Industry is available for $3 from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

CRACKING DOWN ON CRIME

In an effort to thwart hackers, more computer crime laws were enacted in 1984 than in any one year since the first state computer crime law was passed in Arizona in 1978, according to the *Privacy Journal's* annual survey of privacy laws. The 1985 supplement to *Compilation of State and Federal Privacy Laws, 1984-85 Edition* describes all the new laws, and updates the existing computer crime laws that were amended last year. In 1984, four states revised their computer crime laws to reflect new technology trends or new patterns of abuse.

One state amended its computer crime law to include regulations for organic data processing media such as biochips, another punished misuse of a password, and two states made it a crime to deny computer use to an authorized person or to use a system without authorization. In total, there are 36 states punishing computer-related offenses, plus a 1984 federal law protecting certain computer systems from misuse, according to the five-page supplement.

For a copy of the 94-page *Compilation of State and Federal Privacy Laws, 1984-85 Edition* and the supplement, send $22 to Privacy Journal, P.O. Box 15300, Washington, DC 20003. The supplement alone is available for $10.

SEMINARS

SNA IS HERE TO STAY

Recent industry surveys indicate that SNA and the ISO standard will dominate the communications networking industry for many years, according to the Center for Advanced Professional Education. That's why the center is sponsoring a three-day seminar entitled, "SNA—Concepts, Design and Implementation," to be held in five states over a three-month period. The course includes such subjects as formats and protocols, design criteria, terminal hardware, interfaces, and network topology, and examines SNA advanced facilities and future trends. The sponsor suggests that this seminar would be especially beneficial to network designers, systems and applications analysts, systems programmers, systems programming managers, communications supervisors, automation planners, and vendor technical support personnel. The seminars will be held at the following locations: Chicago, May 15-17; Newport Beach, Calif., May 29-31; Dallas, June 12-14; Cincinnati, June 24-26; and Arlington, Va., July 10-12. For further information contact the Center for Advanced Professional Education, 1820 East Garry St., Suite 110, Santa Ana, CA 92705, or call (714) 261-0240.

NIP IT IN THE BUD

Be prepared—two words that are important to Boy Scouts and to dp professionals. Life can be much easier for a dp manager if he's aware of the problems his users will most likely encounter before these calamities strike. "Data Communications—A Complete Overview and Update" is a three-day workshop designed to expose dp professionals to those common, annoying problems. According to Data-Tech Institute, the workshops will discuss the managerial, operational, and technical aspects of datacom, as well as give participants an overview of datacom facilities. Cost-performance perspectives on major data transmission services and hardware will also be covered at the workshops held at Newport Beach, Calif., June 19-21; and Philadelphia, June 26-28. To register for the course contact Douglas Grube, Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, NJ 07015, or call (201) 478-5400.

VENDOR LITERATURE

WIRING AND CABLING

"A Building Planning Guide for Communications Wiring" and "IBM Cabling Systems Planning and Installation Guide" are the titles of two new brochures from IBM. The building planning guide is intended for use by building owners, architects, engineers, communication system planners, and building consultants to help plan for data and voice communication wiring systems. The planning and installation brochure contains information on planning, ordering, installing, customizing, and testing the cabling system. IBM, White Plains, N.Y.

FOR DATA CIRCLE 350 ON READER CARD

FIBER OPTIC INFO

A four-page bulletin outlines the features and applications of Welch Allyn's Series SLP fiber-optic light pipes. The literature includes a technical description of the fiber, its operating temperature range, jacketing, terminated lengths, and custom product options. Charts and graphs explain the product line, ferrules, transmission vs. length, spectral attenuation, and spectral transmission. Design specifications are included. WELCH ALLYN, Skaneateles Falls, N.Y.

FOR DATA CIRCLE 351 ON READER CARD

BACK TO BASICS

Pirelli Cable Corporation is offering an 18-page glossary that defines commonly used fiber-optic and data communications terms. Designed so that manufacturing, marketing, and support personnel can easily understand it, "The Pirelli Fiber Optic and Communications Glossary" features more than 150 words and phrases. PIRELLI CABLE CORP., Wallingford, Conn.

FOR DATA CIRCLE 352 ON READER CARD

BUYER'S CATALOG

A 16-page "Guide to Buying DEC Compatibles" has been published by the California Computer Group Inc. This updated edition gives detailed information and prices on the firm's line of DEC-compatible products, including a DEC-based minicomputer system built around LSI 11/23, 11/73, VAX 730, and VAX 750 cpus. The Buyer's Catalog also lists current pricing information on more than 100 DEC-compatible products, including disk drive subsystems. CALIFORNIA COMPUTER GROUP INC., Costa Mesa, Calif.

FOR DATA CIRCLE 353 ON READER CARD

Why key DP/MIS managers are keeping RCA Cylix a secret.

They're keeping RCA Cylix a secret because they don't want their competition to hear about our value-added data communications network. They know that control of fast, accurate data communications is vital to keeping ahead of the pack. And they're delegating the details to us because we assure them better control.

We achieve this control by keeping ahead of the latest technology changes, and maintaining a close relationship with all major carriers. At our central switching facility, back-up equipment assures maximum uptime. And, our Customer Resource Teams stand ready around the clock to address customer needs quickly, before valuable time and data are lost.

The RCA Cylix on-line network offers satellite-based, end-to-end management of your synchronous data communications. Plus, a continuing array of new services, including dial-in asynchronous, to make sure your network is no less than top notch. The result is single-vendor simplicity with no capital investment, available throughout the U.S. and Canada.

To find out more about why RCA Cylix is the best kept secret in data communications, send the coupon or call, 901-761-1177 fast. Before your competition hears about us.

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"The Best Kept Secrets In Data Communications."

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Title _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone _____

Protocols currently used (including lookalikes)

☐ IBM 3270 Bisynch

☐ Burroughs Poll/Select ☐ Asynch

☐ SDLC ☐ X.25 Other _____

How many of your sites are 300+ miles from your host computer? _____

Type of Network: ☐ Start-up ☐ Existing

RCA Cylix Communications Network

Dept. MC
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Memphis, TN 38119

DA4

CIRCLE 84 ON READER CARD

Burroughs announces our second hundred year plan.

A hundred years ago, with the introduction of the first adding machine, a company was founded with one single objective: to make business more cost-efficient.

A century later, celebrating our centennial year, Burroughs Corporation has become a worldwide leader in information processing systems geared to helping businesses improve the bottom line.

Today, in an age when productivity is threatened by information overload, the need for cost-efficient information management is greater than ever.

Which is why Burroughs is rededicating our efforts to making our products, services and support systems more cost-efficient and productive than ever before. This commitment to the future is symbolized by our new corporate logo.

We've focused our resources on specific lines of business—emphasizing finance, manufacturing and distribution, health care, government and education among others. And we've developed complete systems to meet their special information processing problems.

In the area of new products, we've designed a family of mainframes that costs less to run, needs fewer support people, and allows users to increase processing power up to 70 times without reprogramming.

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And we offer a lot more.

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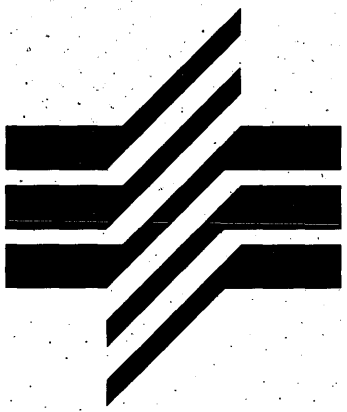
In an industry where many companies don't last a decade, Burroughs is proud to be launching our second century.

The experience and insights we've gained are helping us develop new solutions that will benefit our customers and their profitability for the next hundred years.



Burroughs

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CIRCLE 81 ON READER CARD

An exchange of readers' ideas and experiences. Your contributions are invited.

READERS' FORUM

ELECTRONIC MISCHIEF

The computer hacking phenomenon, widely publicized in the past year, has led to growing concern about the effect of computer technology on our privacy. The infiltration of TRW computer systems containing the credit histories of over 120 million people helped demonstrate to the general populace that highly confidential personal computerized records are too easily accessible. Despite all the attention given to this crime, however, the public continues to view computer hacking as mostly just mischievous teenage pranks. To control the hacking phenomenon, the effect that electronic mischief has on personal privacy must be understood and taken seriously by all.

Compromising the security of a computer system is a crime that can be explained in a variety of ways. It is useful to compare breaking into a computer file with breaking into someone's home. There is harm simply from the violation of the owner's privacy. A homeowner can be harmed merely by an intruder being in his house, as he can be harmed by an intruder merely seeing information about him in a computer file (e.g., a file with credit card or personal financial information). The public respects the idea that each individual has a territory, but people must also realize that the computer user who violates someone's territory is like the thief who is guilty of breaking and entering.

Burglars rarely enter a home just to enter it; they generally want to do other things that will result in further damage to the homeowner. Again, this can be true of computer criminals. Just as a thief can steal a watch or money belonging to the homeowner, so too can the computer thief steal ideas. Burglars can also recklessly destroy items in a house, and computer thieves can do the same. Last year, a local Los Angeles high school student gained illegal entry into UCLA's computer system and willfully destroyed graduate student research data, "just for the fun of it." In this case, not only did he engage in a violation of privacy, but also in the willful destruction of property.

Why is the privacy of the individual valued so highly? One reason is that the invasion of privacy can also bring thievery, destruction, or exploitation—any of which can cause considerable damage to personal lives. It is possible, however, for these three crimes to exist in the computer industry without any violation of privacy. For example, an outside consultant hired by a company might use information that he could rightfully access to exploit that company; in this case there would be exploitation without privacy invasion, and the company could be damaged considerably by the exploitation of this legally gained information.

The extent to which the public is not properly horrified by such a destructive crime is startling. When Los Angeles police finally managed to catch the hacker in the UCLA case, many people in Los Angeles were amused. "Boys will be boys," they said. The TRW credit history infiltration inspired a rash of comic articles and cartoons displaying the hackers as mere pranksters rather than lawbreakers.

The technological sophistication of hackers is impressive; many people tend to admire hackers in the way one might admire clever bank robbers. And when the damaged parties are large corporations, government agencies, or universities, people believe that the crime is not serious because such institutions are too big to be significantly hurt. But this reaction to computer violators is quickly replaced by horror and outrage when one's own computer files are in jeopardy; people don't think it is quite so amusing when a hacker alters their credit card files "just for the fun of it." Thus, as people come to see themselves victimized by the proliferation of this kind of crime, they are more likely to perceive computer hacking as reprehensible.

The intial step in handling the computer hacking phenomenon is to make the public aware that hacking is a crime that affects everyone. Publicizing the devasting potential for invasion of privacy would raise concern about the hacker issue and provide the needed impetus for securing privacy of personal information.

The next step is to implement security measures to secure computer systems from unauthorized access and modification. The fact that we design computer systems without incorporating basic security controls is unacceptable. While fully secure systems are not yet technically feasible, implementing reasonable measures to protect computerized personal and financial information would prevent the majority of current computer abuse. Both government and industry must encourage commercial dp manufacturers and software design engineers to devote more attention to incorporating security into systems.

Finally, the legal and ethical environment in our society doesn't do enough to discourage hackers from penetrating computer systems. Federal and state legislators must work with the computer industry to develop a better legal framework to use in prosecuting individuals who electronically invade our privacy. Moreover, while professional computer associations have developed standards of conduct for their membership, the nonprofessional computer user has not received any instruction in ethical use of his computing resources. Schools and universities offer courses on ethics, but few require ethical course work of their technical students. Equally disappointing is the fact that most high school students receive little guidance on the ethical use of this new technology in any of their classes. Ethical standards and guidelines, based on mutual respect for the right of an individual's privacy and rights against theft, damage, and exploitation, must be integrated into all technical curriculums.

—William R. Hampton
Woodbridge, Virginia
Jean E. Hampton, PhD
Los Angeles, California

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READERS' FORUM

MICROS AND ME

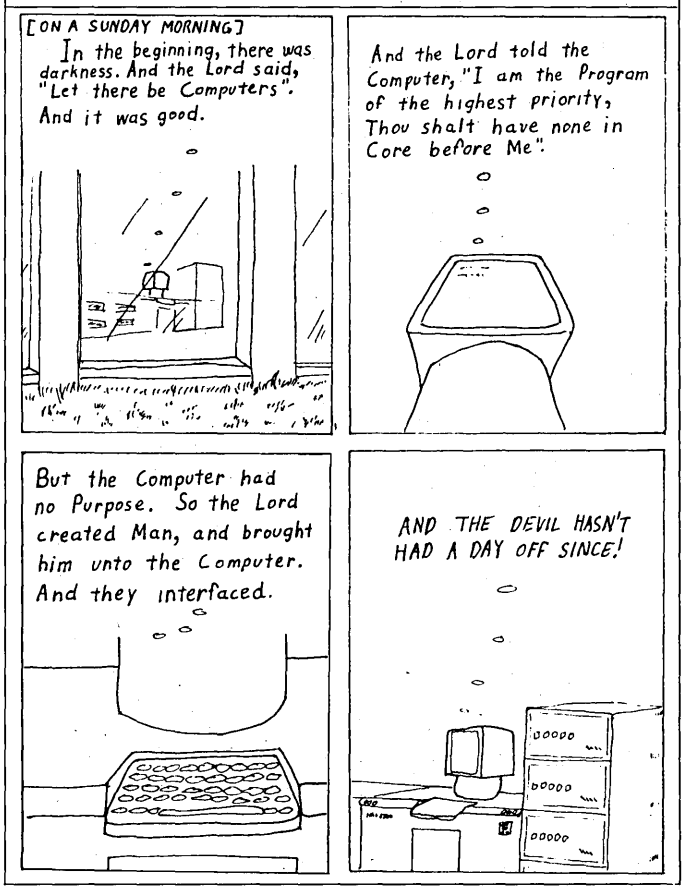
Lots of magazine articles discuss people's fears about micros. I love the little machines, though. I think they've got the potential to make most people very happy. Let me tell you why.

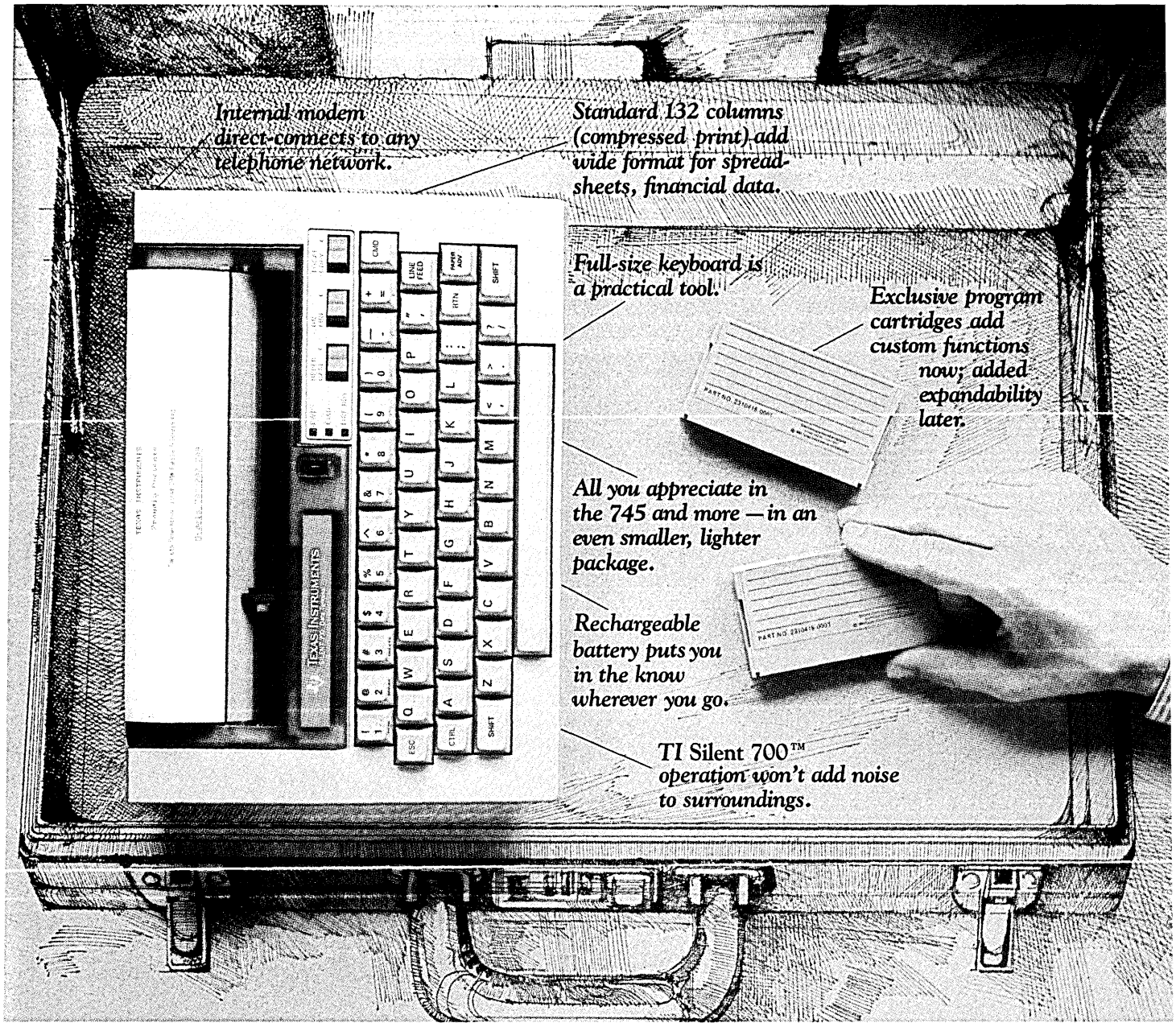
A few years ago the wife decided we needed a new car. She picked one out and it became my duty to shop around for the best price (obviously this was an American car). After I called around, I settled on a dealer, "Ralph's." We went down to order the car and were required to give a $50 deposit.

Two months later the phone rang. They told us to come down to sign the papers and take delivery of the car. It was time to shop around for financing. The salesman at Ralph's naturally recommended I talk to their finance manager, Alberto. After I checked out rates at the banks (high), and the Credit Union (higher), I called the finance manager at Ralph's. They offered a rate similar to the others and a longer term. "And how much will you finance?" I asked. "All of it" replied Alberto. "No, what I mean is, how much more down payment do you need?" I countered. His tone sounded exasperated: "Just your current deposit!" "OK," I finished, "we'll be down tomorrow."

So, my wife and I visited them and sealed the deal. They were true to their word, and most efficient. Their little computer churned out the documents, and happily rechurned them when we noted an option had been left out. "Wow," said the finance manager, "the paperwork is much faster and more accurate since we got our micro." "Did it cost a lot?" I queried. "Oh no, it was very reasonable," responded Alberto, "we got an especially good deal on some software customizing by a local high school student." After we left, I said to the wife, "I don't believe it. They financed the state taxes, the transfer fees, everything.

DIGITS BY ROY MENGOT





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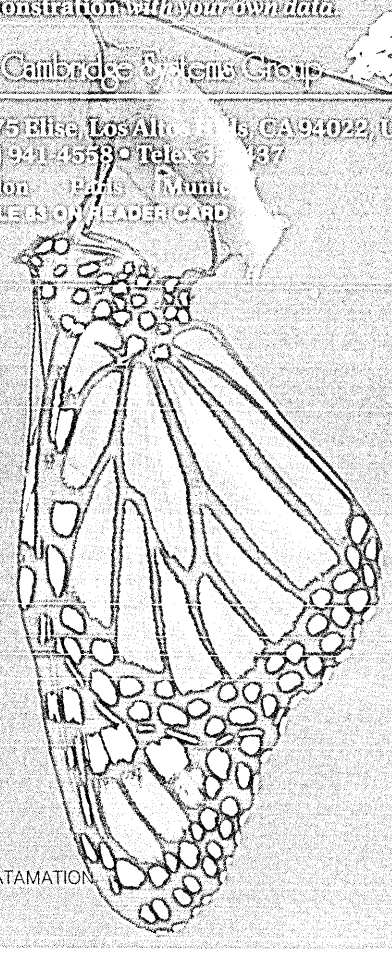
CIRCLE 63 ON READER CARD



READERS' FORUM

That can't be legal!" "Well, don't worry about it." she counseled, "They'll get back to us soon enough if there's a problem."

I had forgotten about it until I got a small check in the mail from Ralph's. When I asked Alberto about it, he consulted his computer, then assured me that the check was correct; they had overcharged me for the gizmo. "But I haven't gotten my payment book," I noted. "No problem," he replied, "the computer says it's been taken care of."

Well, Alberto soon discovered the problem and politely asked me to return Ralph's check. But the episode made me start wondering how things might have turned out. . . .

On the first of each of the next three months, I received a check for $300, marked Monthly Payment. I dialed the dealer. "Why are you calling us?" he asked. "It's all in the computer; it says you're a good payer!"

Over the next three years the payment book never arrived but the checks continued coming every month. I got worried again when a check arrived marked Final Payment. But before I could call the dealer, Alberto called me. "Sir, we thank you for your timely and regular payments to us. Perhaps you're ready for a new car?""Well, yes, I might be. By the way, do you finance homes? Small apartment buildings?"

—Ward Arrington, CDP
Miami, Florida

YOU DON'T SAY...

The following is a partial list of the phrases that most often strike terror in the hearts of software engineers:

"I have one small change . . ."
"It's a simple change."
"All you have to do is . . ."

"It's just two or three lines of code."
"Why don't you just simply . . ."
"Everybody knows that . . ."
"Have it pick the best one."

"When I get to a decision point simply select . . ."
"Well, it's supposed to . . ."
"Fix it so it can be restarted anytime."

"Select the fastest way to . . ."
"One small point . . ."
"Well it should work."
"I like it, but . . ."
"Can you add this?"
"No, you can't change the hardware!"
"We are going to standardize . . ."

"We are just changing the format."
"We are only changing the interface."
"There's been a problem with your files."

"Your disk space is full."
"Error code 63 which should never occur . . ."

Note: This last item occurred when the author was testing at 2:30 a.m. on a Honeywell H6080 during the mid-'70s.

—Thomas K. Schminke
Northboro, Massachusetts

If you'd like to share your opinions, gripes, or experiences with other readers, send them to the Forum Editor, DATAMATION, 875 Third Ave., New York, NY 10022. We welcome essays, poems, humorous pieces, or short stories.

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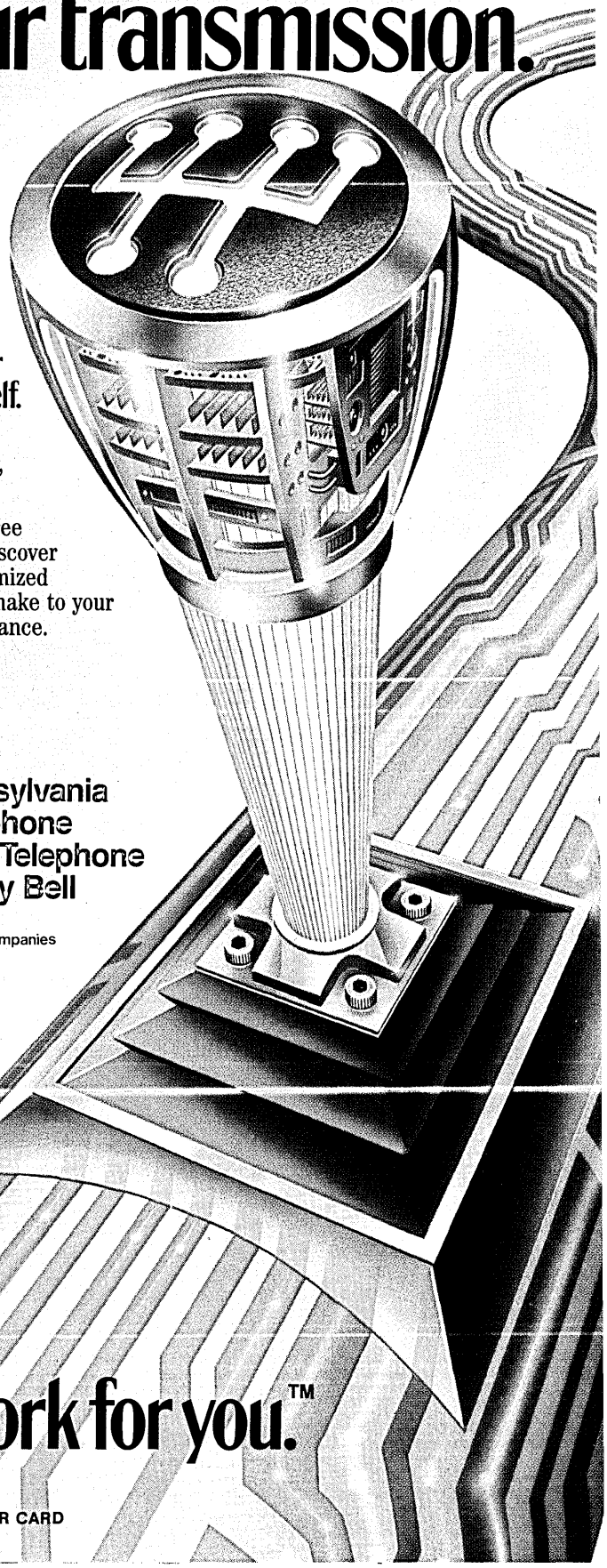

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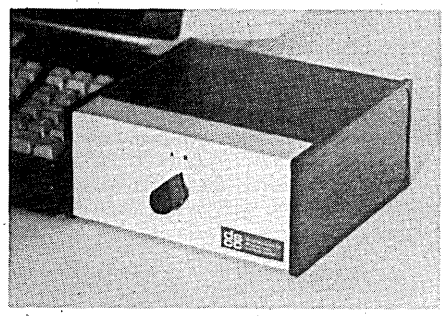

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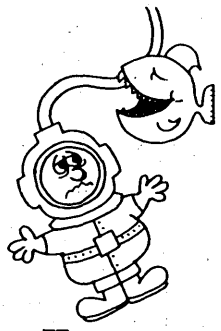

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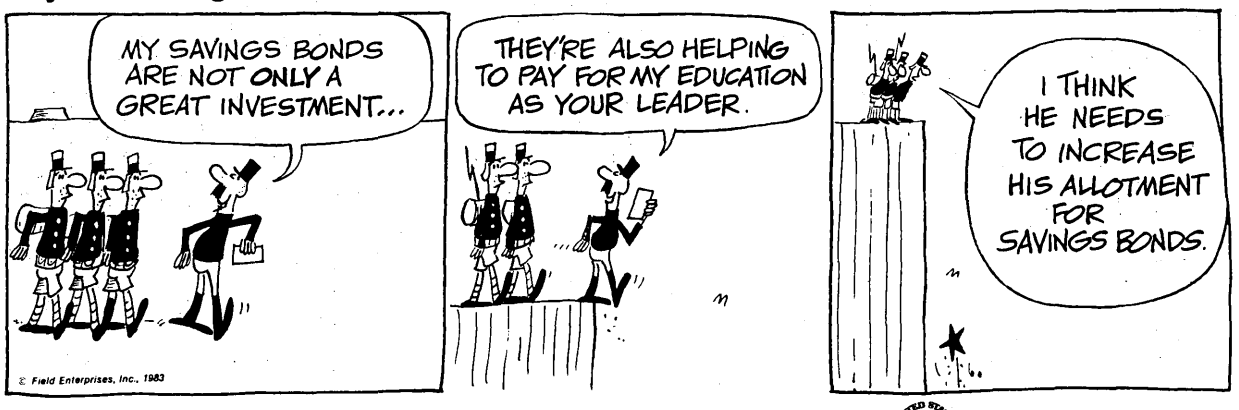

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*International Edition
**Marketplace
***Regional Insert

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The MIT Museum

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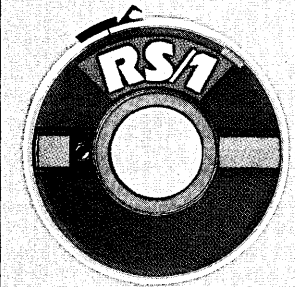

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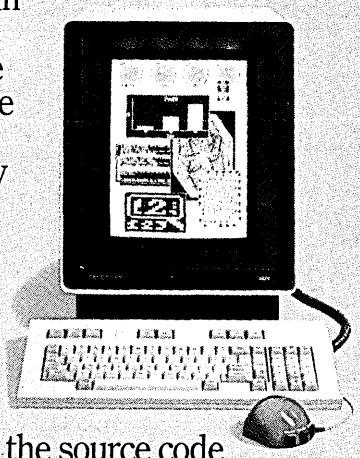
CIRCLE 2 ON READER CARD

OUR 5620 TERMINAL WILL CHANGE THE WAY YOU VIEW YOUR UNIX* SYSTEM.

If you want to get the most out of your UNIX System, get the single terminal that performs like six—the 5620 Dot-Mapped Display from Teletype Corporation. This terminal is an exceptional value because it offers graphics and capabilities you'd expect to find only in higher-priced workstations.

With its unique capability to divide the display into six windows, the 5620 makes excellent use of UNIX System V resources to greatly improve productivity. You create and control the size and position of each window simply, using the electronic "Mouse." Unmodified host programs then view the windows as separate terminals, making it possible for you to work on several things at once.



Just think how much easier that'd make it for you to prepare documents and graphics, do computer aided engineering or write and debug programs. Imagine, for example, while a program is compiling in one window, you edit the source code in a second window, check output in a third window, and send and receive mail concurrently in a fourth window.

The 15-inch diagonal display boasts 100 dots per inch, which gives you high resolution graphics and font capabilities. Complete with a full 32-bit processor and up to one megabyte of memory, you can also offload the host by running programs in the 5620.

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