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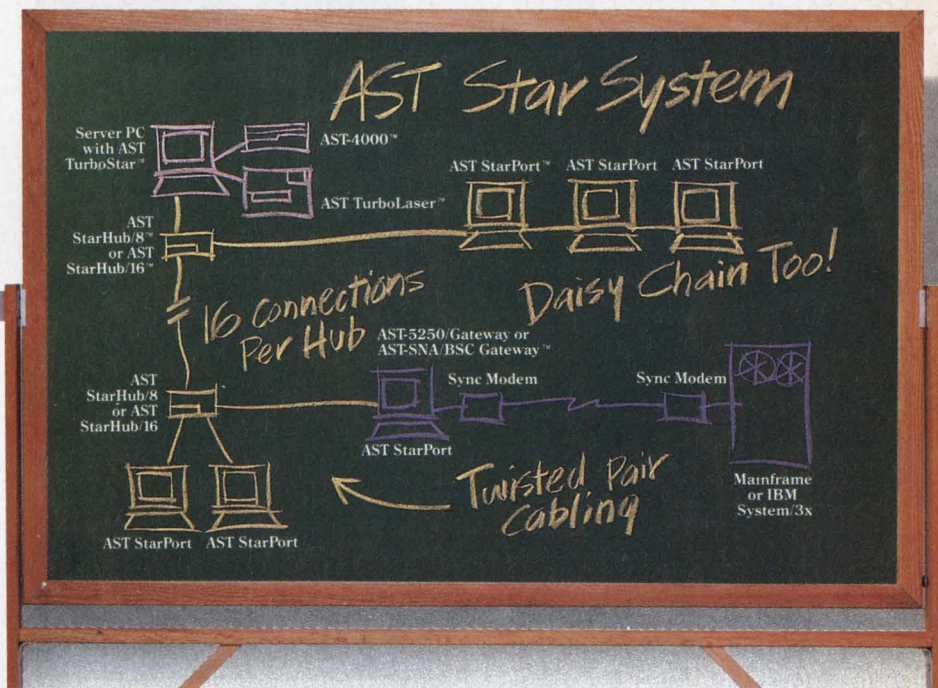
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# DATAMAT

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BY FREDERIC G.

WITHINGTON

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BY R. RYAN NELSON

AND PAUL H. CHENEY

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# ION

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Does not appear in all copies.

### - 3 **32-Bit Systems: Is the Future Spelled 3-8-6?**

BY LAMONT WOOD

There have been other 32-bit chips around for years, but they have been overwhelmed by the stampede to adopt the Intel 80386 with its compatibility with the 20,000 to 30,000 MS/DOS application programs currently available.

Cover illustration by Kerry Gavin

## OEM EDITION

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THIS ISSUE, 191,927



1987 JESSE H. NEAL AWARD

## Editorial

### Not Unlike Non-Negatives

Rumblings of an industry rebound are not unexpected. Where did these rumors of cautious optimism originate? Why, from reports of lessened pessimism, of course.

Take IBM's first-quarter earnings, for instance. The facts are these: IBM posted a 23% decline in first-quarter profit to \$785 million from the \$1.02 billion of the comparable quarter a year ago; the decline would have been worse had IBM not had the benefit of favorable currency translations and a lower tax rate. The earnings drop would have been greater still were it not for strong mainframe and PC sales in March; these results prompted IBM chairman John F. Akers to comment that "there are some encouraging signs in our business"—the most positive (or least negative?) note from him in over a year.

Now for the interpretations. The town criers shouted out not a 23% decline in earnings, but rather a less-than-expected decline. Add Akers' "encouraging" remark, and the not-as-bad-as-predicted decline became an improvement-over-expectations, which was simplified to a tale of improvement.

"We are not unencouraged . . ." began some accounts of IBM's earnings decline. "The negative attitude toward an industry turnaround is abating," read others. Surely by now you are not unaware of the pattern.

In the wake of IBM's splashy announcement of almost 100 PC-related products, we have not gone wanting for analysis. "We are not unimpressed . . ." with the depth and breadth of this product line, say industry analysts. The new products are "certain to stem further losses in market share for Big Blue," say others. The Personal System/2 "will not foster significant short-term discontinuity" for the pc industry and its players, others speculate.

Be not uncareful as you read John W. Verity's report on results of the annual DATAMATION/Cowen & Co. mainframe survey (p. 69), which tells of "continued deceleration in dp budgets." Our lead News In Perspective stories reported by Susan Kerr, Gary McWilliams, and Edith D. Myers (beginning p. 21), which show computer users "not unconcerned" about some aspects of IBM's Personal System/2 announcements, should not go unnoticed. Most important, be not unaware of the possibility of double negatives resulting in a nonpositive.

(None of which is to say an industry rebound is not unlikely.)



REBECCA S. BARNA  
EDITOR





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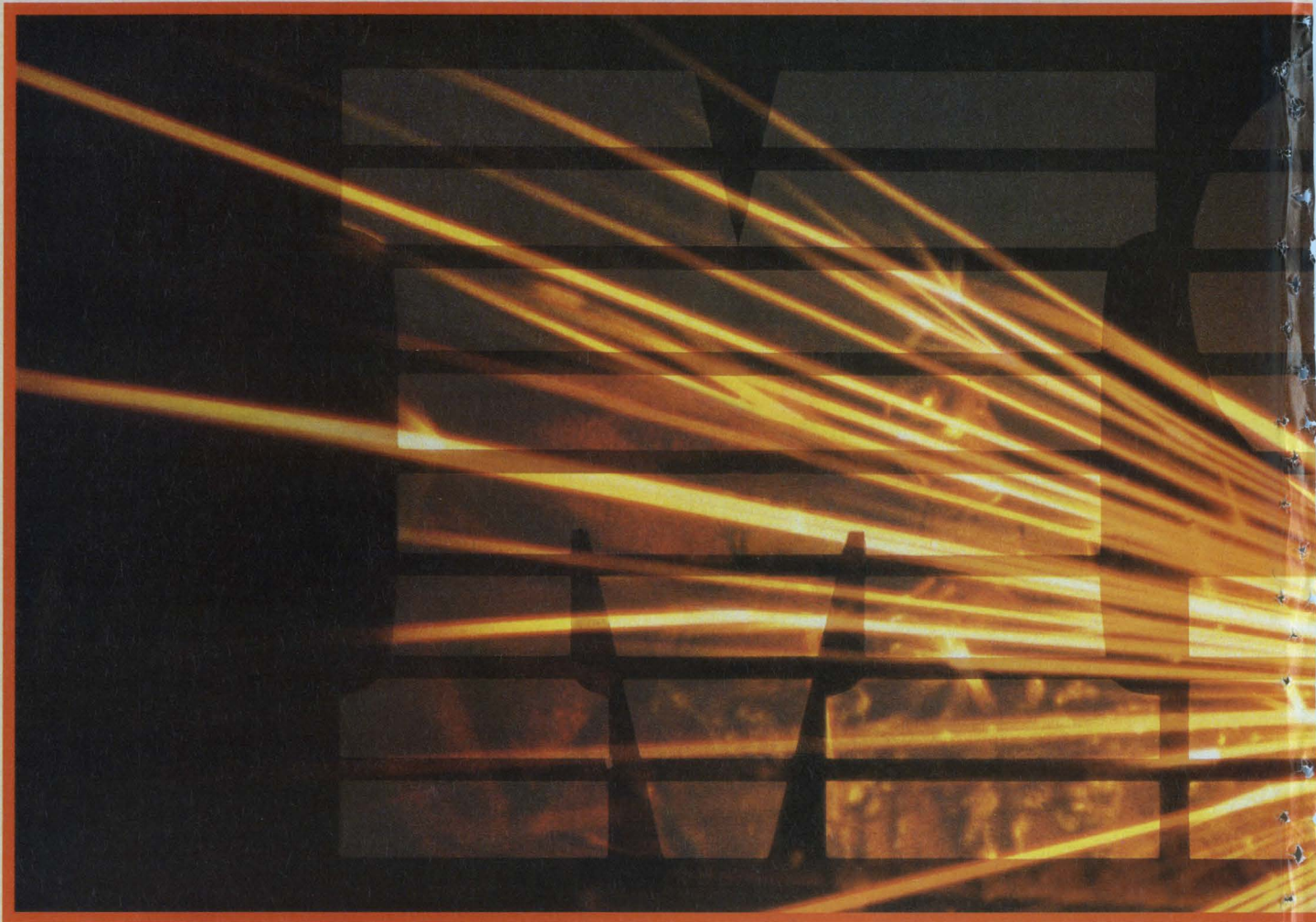
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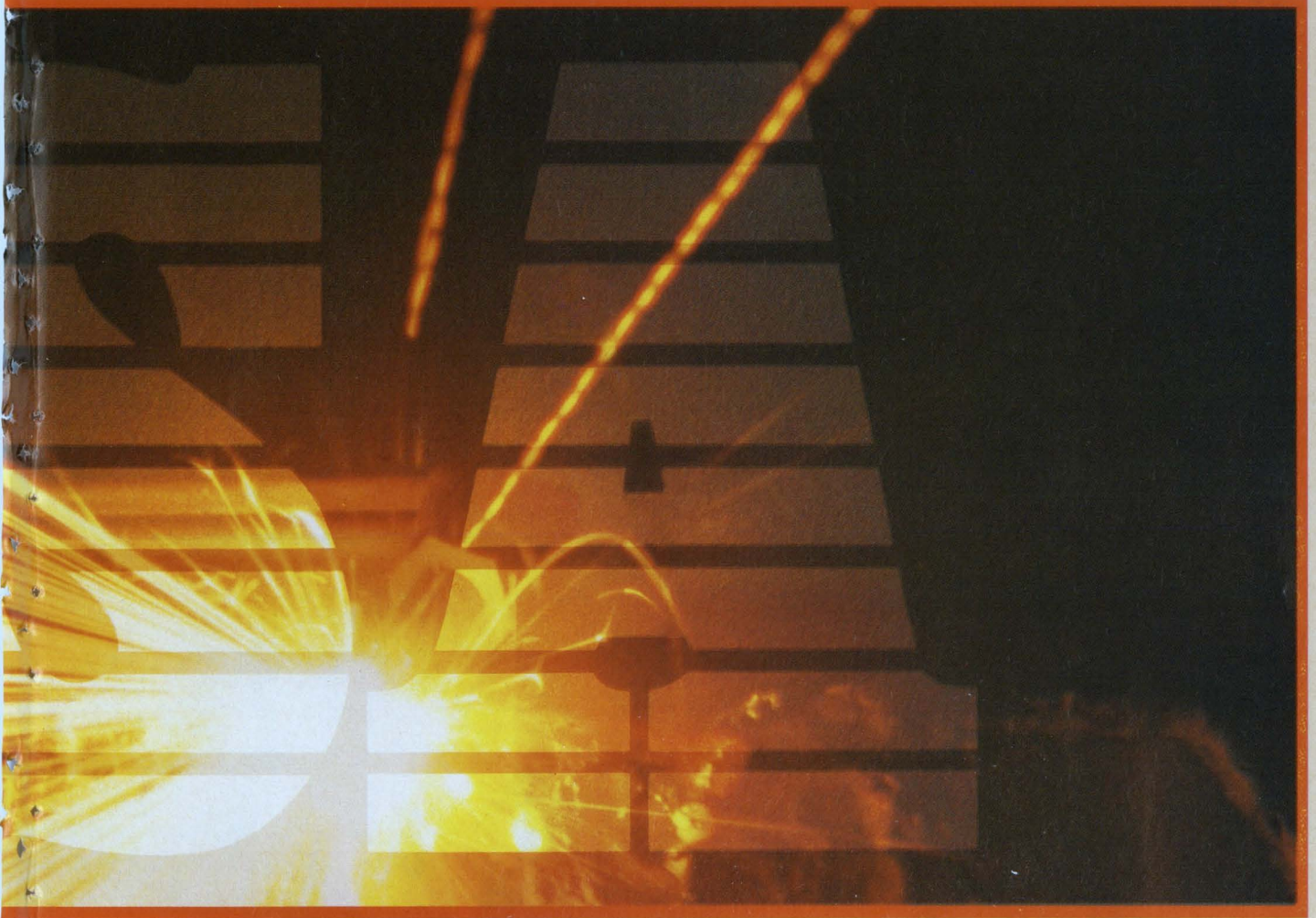
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CIRCLE 6 ON READER CARD



# Look Ahead

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## LEGAL WORRIES IN AI WORLD

PALO ALTO -- First, Lotus tried to lay exclusive legal claim to the "look and feel" of its 1-2-3 program, and now a similar move may be under way in the AI vendor community. Teknowledge Inc., Palo Alto, has sent a letter to Paperback Software Inc., Berkeley, Calif., warning that Paperback's VP Expert AI shell product may violate Teknowledge patents obtained last year. Teknowledge's letter, sent to Paperback chairman Adam Osborne, apparently has some other AI vendors worried. While Teknowledge so far hasn't filed a suit against Paperback, Osborne has contacted most major AI vendors to seek their backing; none have rushed to Osborne's aid as yet. Carnegie Group Inc., Pittsburgh, has asked Paperback to "keep us informed." Intellipcorp, Palo Alto, has taken a similar stance, but is also considering patent filings.

---

## JAPAN'S OWN SANCTION LIST?

TOKYO -- Although the Japanese response to the U.S. semiconductor trade sanctions has been measured in public, the talk is tougher when only Japanese nationals are around to hear. Besides reports that Japan had rejected abandoning the trade agreement that led to the sanctions in the first place, rumors have surfaced that the government had drawn up its own list of imported U.S. articles that could be slapped with retaliatory tariffs. One of the big losers in such a case could be Digital Equipment Corp., which imports virtually all of what it sells in Japan.

---

## LESSORS PLAN TO PURSUE IBM COMPLAINT

AMSTERDAM, THE NETHERLANDS -- IBM faces a further attack on its leasing practices in Europe, despite fending off an injunction sought by Holland's three largest leasing companies last month. IBL Holland, Econocom Nederland, and Atlantic Computers' ICA subsidiary had complained that IBM was setting predatory leasing rates and refusing them the volume purchase agreements it makes with other large customers. The three are now preparing to take their case to a full hearing here and they hope for a ruling by the end of this year. They have also lodged a complaint with the EEC, but a decision may take years.

---

## IS MICROSOFT PLANNING AN OS/2 EXTENSION?

REDMOND, WASH. -- Is MS/DOS developer Microsoft likely to sit by and watch IBM produce a so-called extended version of the operating system for the new Personal System/2 family of computers? Not likely. Microsoft, like IBM, is said to be working on an extended version of its OS that will include a built-in relational DBMS. Microsoft reportedly has considered basing the RDBMS for its extended OS/2 on the on-line-oriented



# Look Ahead

system from Sybase Inc., Berkeley, Calif. A Sybase spokesman declines to confirm or deny reports that the company is working with Microsoft. A Microsoft spokesman says the company is not building an RDBMS into the standard edition of OS/2, but he declines to say if there would be a "nonstandard" version, or if Microsoft is working with Sybase.

---

## **AMDAHL JOINS HANDS WITH NIXDORF**

SUNNYVALE, CALIF. -- Amdahl Corp. has reportedly brought a partner into its current development efforts to improve the SNA connectivity of its UTS mainframe Unix software. The partner is Nixdorf, which had a license to resell the UTS product on its own mainframes. That earlier license went nowhere, but sources say Amdahl and Nixdorf have joined forces in developing new SNA capabilities for UTS. Also, Amdahl is planning to consolidate its software development efforts in a single, secure Silicon Valley facility, the better to avoid charges later that its SNA work or any other work uses IBM proprietary code. Amdahl has hired Eric Miles, former Bank of America MIS honcho and ex-IBMer, to handle software development.

---

## **TERADATA IN TALKS WITH METAPHOR**

LOS ANGELES -- Teradata Corp. is talking strategic partnering with Metaphor Computer Systems Inc., Mountain View, Calif. Under consideration are joint marketing and development deals combining Teradata's high-end database machines with Metaphor's icon-based networked workstations. Both company's offerings are SQL based. For Teradata, the agreement would mean a new interface capability; for Metaphor, it would mean more storage capability to offer customers.

---

## **NCR, UNISYS USERS HUNGRY FOR MSA...**

ATLANTA -- MSA is developing a portable version of its Information Expert product family for non-IBM hardware. NCR and Unisys equipment users who also use MSA software have been clamoring for the IE series, which is now IBM assembler based. The first member of the IE series will be available in the fourth quarter of this year, in a portable version of the Expert Retrieval and Reporting program, with the rest of the series available throughout next year. MSA also plans to release a micro version of the IE Query/Link program, but this product, says MSA, is several releases down the road.

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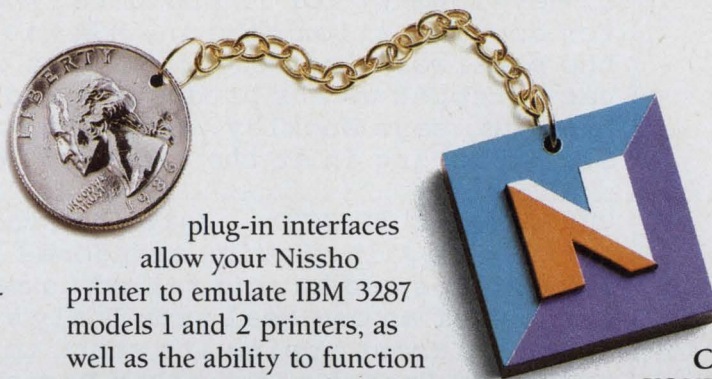
## **... BUT MSA CAN'T FEED 'EM**

ATLANTA -- Meanwhile, MSA wasn't ready for the onslaught of user response to the new release of the IE, version 8701. The company had anticipated 200 re-

(continued on p. 12)



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# Look Ahead

quests for information, says Dick Buckley, director of development for IE products. When over 800 requests for documentation came in, MSA was unable to process the paperwork fast enough to meet the demand. The company stepped up its production and has corrected the problem, says Buckley. Requests for documentation are still pouring in at the rate of 50 to 60 a day.

## **PONDERING PARTNERSHIPS**

VERSAILLES, FRANCE -- Xerox is searching for a micro partner--again. Having abandoned its own attempts to make micros and having failed to make a commercial success of an oem deal with Italy's Olivetti, Xerox is thinking about upping its stake to a controlling interest in French micro maker Normerel Systèmes. The Rank Xerox subsidiary in France owns about 35% of Normerel. Rank Xerox companies in France, Eastern Europe, and West and Central Africa sell about 80% of Normerel's output--around 20,000 units this year--under oem agreements. A U.S. marketing deal, with Xerox selling the French-built equipment, is in the air.

## **A SHELL OF AN IDEA**

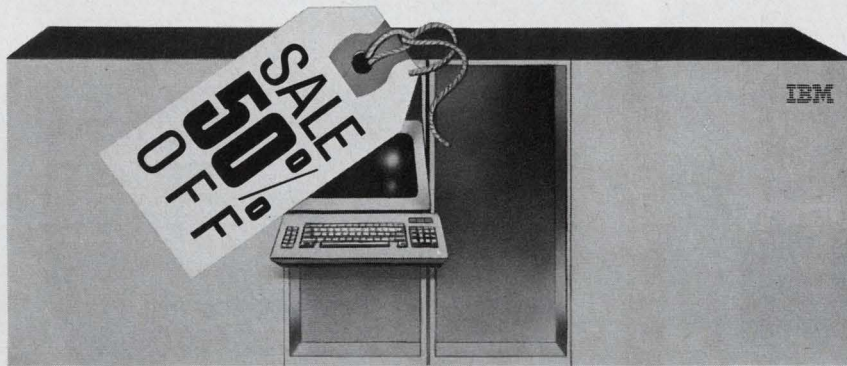
BUDAPEST, HUNGARY -- Hungary's government-funded computer research and innovation center, SZKI, is developing an expert systems shell based on its version of Prolog. It claims over 1,000 users of its machine-independent MProlog worldwide. The expert systems shell is planned to be finished in about a year and will incorporate features such as forward and backward chaining, uncertainty handling, an interface to Ashton-Tate's dBase III, and an SQL-type user interface. It is negotiating marketing rights with its North American distributor, Logicware Inc., Toronto, and its Japanese outlet, Rikei Corp., Tokyo.

## **RUMORS AND RAW RANDOM DATA**

Digital has broken with tradition by releasing a file transfer package that requires software on a non-Digital system. The Data Transfer Facility goes beyond existing DECnet/SNA software by providing transparent access to physical sequential files on MVS mainframes. . . . NCR Corp. is unveiling a series of hardware and software packages providing bus-level links between its 9800 multiprocessor and 8000 Series or Tower family of computers. Versions for tying 8600 and 8800 mainframes to the 9800 are expected late this year or early next. . . . Kubota Ltd. of Osaka, Japan, a major maker of agricultural machinery and cast-iron pipes, has set up a subsidiary to manufacture and market superminis from Dana Computers, Sunnyvale, Calif. By next year, Kubota plans to be making 200 machines a month, 70% to 80% targeted at the U.S. and Europe.



# GET HALF-A-COMPUTER FREE WITH ORACLE VERSION 5



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

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

### □ REASON #1: AI OPTIMIZES QUERY PROCESSING.

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

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

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

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

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

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

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

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

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

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

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

## THE ULTIMATE REASON

Oracle introduced the first relational DBMS and the first implementation of SQL back in 1979. Today ORACLE is installed on thousands of minis and mainframes, and over ten-thousand PCs. ORACLE is the only SQL-compatible relational DBMS that's portable across IBM mainframes, DEC, DG, HP and most other vendors' minis and micros, including the IBM PC. And ORACLE applications and databases are connectable across different hardware and operating system, providing you with a true distributed solution to your information needs.

Spend half a day at an Oracle seminar in your city, and find out how you can have the benefits of a portable, DB2-compatible relational DBMS... and save half a computer. Call our national seminar coordinator at 1-800-345-DBMS. Or write Oracle Corporation, Dept. V5, 20 Davis Drive, Belmont, CA 94002.

### U.S. SEMINARS

AK Anchorage..... Apr 14	DE Wilmington..... May 5	MI Detroit..... Apr 7, May 12, Jun 9	Cleveland..... Apr 1, May 5, Jun 2	San Antonio..... Apr 2, Jun 10
AL Birmingham..... May 12	FL Tampa..... Apr 8	Grand Rapids..... Apr 9	UT Salt Lake City... Apr 29, Jun 18	
AR Little Rock..... May 12	GA Atlanta..... May 6	MN Minneapolis..... Apr 23, May 13, Jun 30	VT Burlington..... May 6	
AZ Phoenix..... Apr 15, Jun 3	IA Des Moines..... Apr 15, Jun 17	MO Kansas City..... Apr 9, Jun 9	WA Seattle... Apr 7, May 12, Jun 24	
Tucson..... Jun 30	ID Boise..... Jun 4	St. Louis..... Apr 14, May 12, Jun 16	WI Madison..... Jun 23	
CA Concord..... Jun 10	IL Chicago..... Apr 9, May 14, Jun 11	NE Omaha..... Jun 2	WV Charleston..... Apr 15	
Los Angeles..... Apr 7, May 12, Jun 16	IN Indianapolis..... Apr 22, May 20, Jun 25	NJ Iselin... Apr 1, Apr 15, Apr 29, May 13, May 19, Jun 11, Jun 25	OR Portland..... May 7	
Newport Beach..... May 5	KS Wichita..... Apr 2	NM Albuquerque..... Apr 30	PA Allentown..... Apr 21	
Pleasanton..... Apr 8	KY Louisville..... Apr 8	NV Las Vegas..... Apr 1	Harrisburg..... May 6, Jun 17	
Sacramento..... May 5	LA New Orleans... Apr 15, Jun 26	NY Albany..... Apr 23, Jun 17	King of Prussia..... Apr 23	
San Diego..... May 14	MA Boston..... Apr 15, May 14, Jun 10	Buffalo..... Apr 8	Philadelphia..... Apr 9, May 7, Jun 11	
San Francisco..... Apr 9, May 7, Jun 16	MD Baltimore..... Apr 2, Jun 24	New York City... Apr 8, Apr 16, Apr 22, May 6, May 14, May 21, Jun 16, Jun 24	Treviso..... Jun 30	
San Jose..... Apr 30, Jun 18	Bethesda..... Apr 7, Apr 15, Apr 21, May 5, May 13, May 19, Jun 4, Jun 10, Jun 18	Rochester..... Apr 16, May 14, Jun 11	TX Columbia..... Apr 7	
CO Colorado Springs..... Apr 21	ME Portland..... Apr 22	OH Cincinnati..... Apr 22, Jun 17	Nashville..... Apr 9	
Denver..... Apr 16, May 5, Jun 25			Amarillo..... Apr 7	
CT Hartford (Farm.)..... May 5			Austin..... Apr 1, Jun 11	
			Dallas/Ft. Worth..... Apr 14, May 5, Jun 9	
			Houston..... Apr 9, May 7	

### CANADIAN SEMINARS

Calgary..... May 19
Edmonton..... Apr 14
Hamilton..... Apr 21, May 19, Jun 16
London..... Apr 28, May 26
Ottawa..... Apr 2, May 7, Jun 4
Regina..... Jun 16
Saskatoon..... Jun 9
Toronto..... Apr 7, May 12, Jun 9
Vancouver..... May 14
Victoria..... Apr 21
Winnipeg..... May 5

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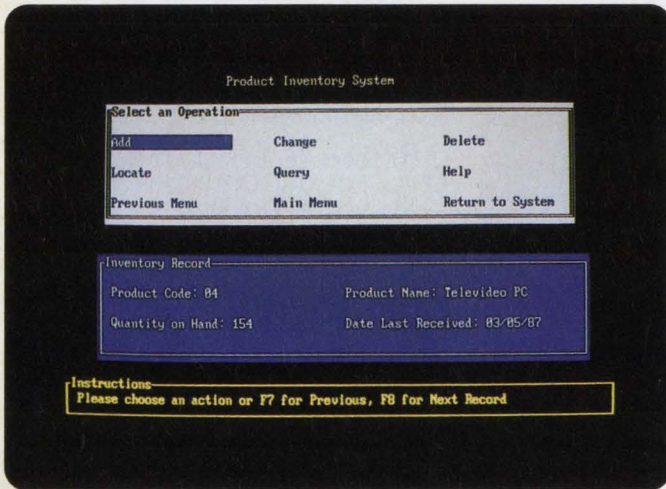
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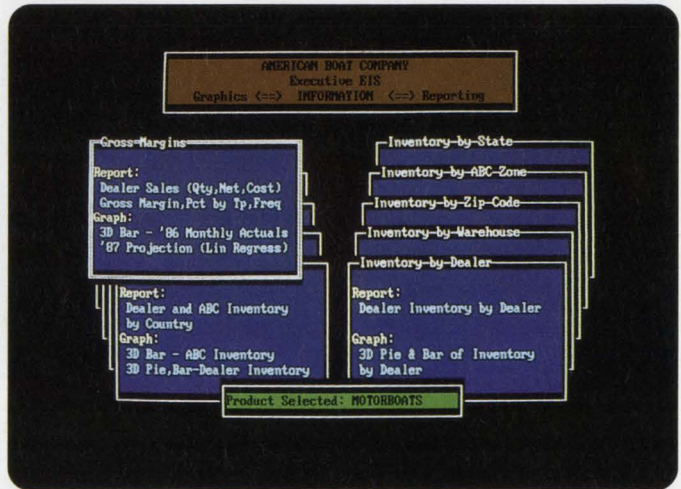
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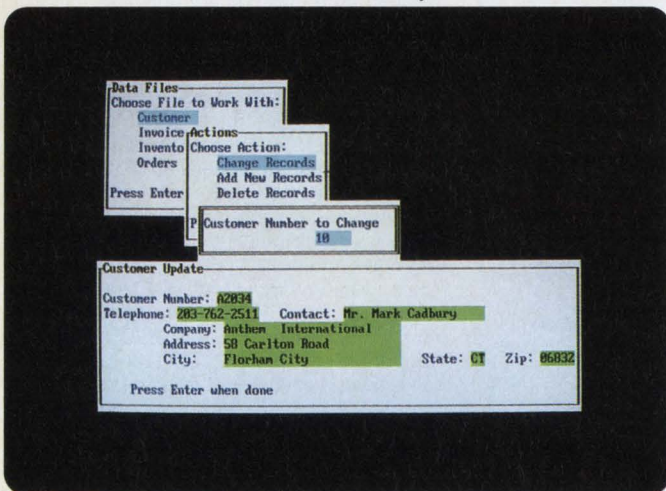
# NOMAD WOULD LI OF THE REASONS YOU BO



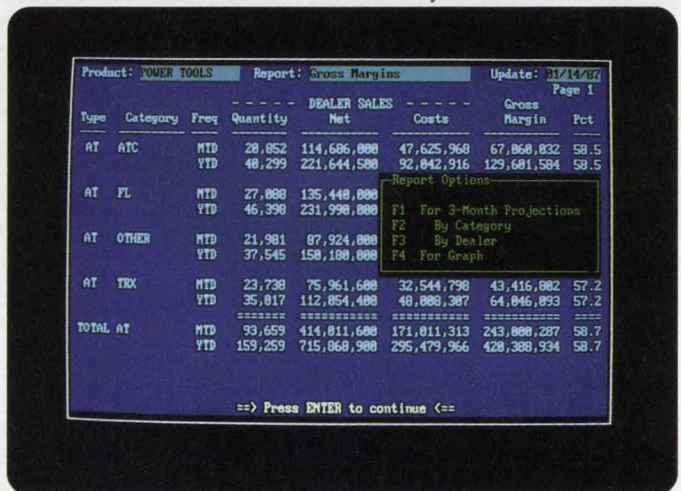
Product Inventory



Executive Information System



Customer Information System



Sales Analysis



# MAKE TO REMIND YOU UGHT SQL TO BEGIN WITH.

Executive Assignment Form

Name: Anne Wayne  
Start Date: 030479  
Starting Salary: \$22,000

Org. Unit: 002  
Position: Financial Analyst

Description:

Ending Salary: \$44,500  
Assign End Date: 030487  
Performance: A : Excellent

Table-Maintenance  
Update/View  
Add  
Delete  
Locate  
Quit

Help  
Enter Number? 3

- 1 States
- 2 Skills
- 3 Organizations
- 4 Positions
- 5 Executives
- 6 Qu

Valid Organizations

- 1 Andrews Services Inc.
- 2 Block and Tackle
- 3 Am. Boat Comp.

User-Message  
Please choose the record that you need help with...

Human Resources

Department Profitability Analysis

Type:	ACT	Dept:	M/V	Region:	EASTERN	
Var Pct:	8.458	Tax Pct:	8.378	NPV Profit:	16,502	
	Jan 85	Feb 85	Mar 85	Apr 85	May 85	Jun 85
Sales	4,800	6,000	8,400	4,800	4,800	4,102
Variable Costs	1,800	2,700	3,700	1,800	1,810	1,882
Fixed Costs	300	400	500	300	303	307
Total Costs	2,100	3,100	4,200	2,100	2,121	2,189
Gross Profit	1,900	2,900	4,120	1,900	1,919	1,993
Taxes	783	1,073	1,524	783	718	737
Net Profit	1,197	1,027	2,596	1,197	1,209	1,256

F1: Help F2: Cancel F3: Quit F6: Menu F7: Previous  
F8: Next F9: Last F10: Save F11: ChgKey F12: Delete

Profitability Analysis

Tab to Activity desired, press Enter (F4: Quit)

System to Activate  
File Name: projects

Project Tracking System

Maintenance

Update  
Add  
Delete

Reports

By Project Manager  
By Department  
By Completion Date

Function Keys

F1: OPEN MENU  
F2: CLOSE MENU  
F3: CHANGE SYSTEM  
F4: QUIT

Project Tracking

[Invoice Update]

Customer Number: C2695 Marketing Rep: ALM  
Invoice Number: 18875 Terms:   
Purchase Order: Order Status: 0  
Place Date: 08/15/86 Ship Date: 09/01/86

F3 [Order Update]

Invoice Number: 18875 Part Price: 7.75  
Part Number: A10398 Order Price: \$465.00  
Quantity: 60

F3 Exit F5 Prev F6 Next F7 Ins F8 Loc F9 Del

[Special Information]

Part Number: A10398 out of stock.  
Changing Ship Date to: 09/01/86

Order Processing

If you bought SQL in order to create applications like these, you'll be glad to know about NOMAD.

NOMAD makes it easier to develop SQL applications. Not in COBOL or PL/1, but in NOMAD's intuitive fourth generation language. NOMAD treats the SQL/DS or DB2 database like its own, effectively combining the data management capabilities of the SQL engine with the applications development and report-writing capabilities of NOMAD.

It's a combination that will help your applications developers and end users in two ways. First, by increasing their productivity through NOMAD's powerful commands. Second, by letting them access data and create applications through interactive windows similar to those on a PC.

All without forcing you to make unacceptable compromises in performance.

In addition to the SQL applications you see above, there are hundreds more. And every one of them is a reason to buy NOMAD.

For more information, write to Deborah Cox, at D & B Computing Services, 187 Danbury Road, Wilton, CT 06897. Or call (203) 762-2511. In Europe, call Pierre Jouanny in Paris: 33 (1) 42852552.

D & B Computing Services has offices throughout the U.S. and in London, Paris, Munich, Rome, Turin, Cologne, Brussels and Amsterdam.

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CIRCLE 8 ON READER CARD



# Develop Better Systems Using Excelerator— Over 8,000 Systems Professionals already do.

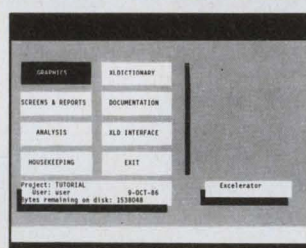
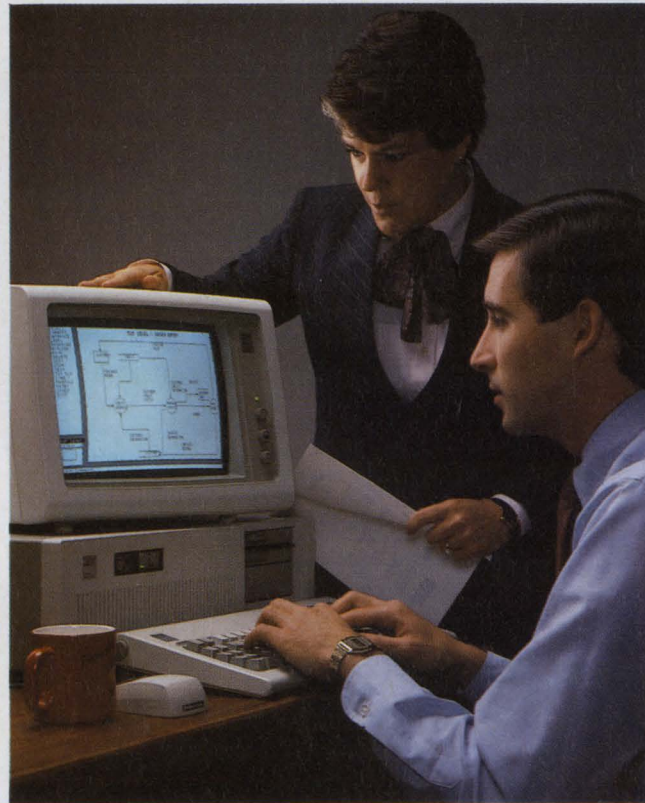
Many of the country's largest organizations have eliminated the tedious, manual process of systems specification. Instead they automate their systems analysis and design with Excelerator—the best-selling computer-aided software engineering (CASE) tool.

Their systems development teams use Excelerator in the early stages of DP projects to quickly create, analyze, and modify a design. With Excelerator's help they tackle large, critical projects such as customer billing and manufacturing requirements planning systems.

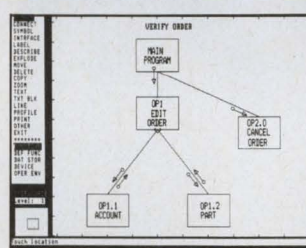
Excelerator's highly integrated, automated design environment helps them build accurate, consistent, complete, and successful specifications. Excelerator offers:

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- Easy-to-use screen and report prototyping.
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- Documentation facilities that produce complete specifications documents.

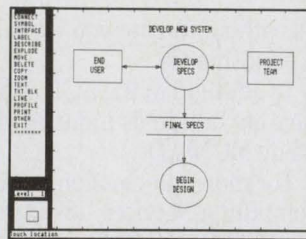
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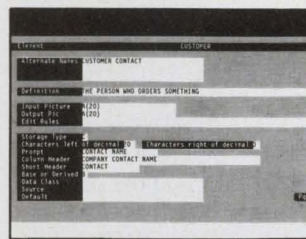
Main Menu



Structure Chart



Data Flow Diagram



Data Dictionary

## Index Technology Corporation

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Here's what users say:

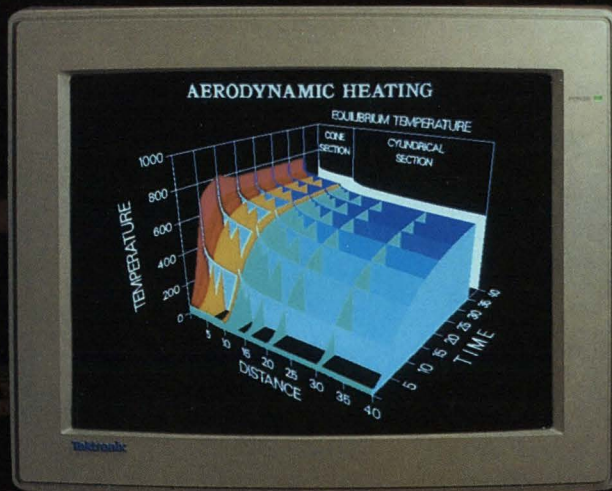
“We cut nine months off a scheduled year-long project.”

“DP employees now tend to do the kind of documentation they had not done before because it was too complex. Now documentation is done the same way every time increasing standardization.”

“Communications during the analysis and design process is improved because systems analysts and end users can sit in front of the screen and review the design.”



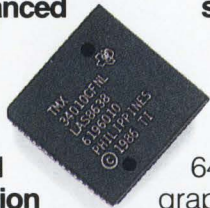
# TEKTRONIX NEW ADVANCED PC GRAPHICS STANDS ALONE.





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Introducing Tek Advanced PC Graphics: a fully integrated system of high-performance graphics, easy system connectivity, and unparalleled application



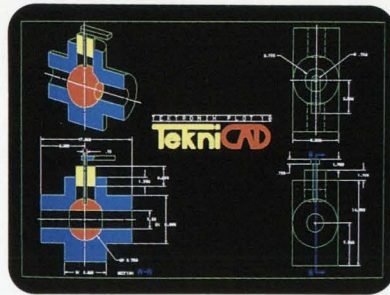
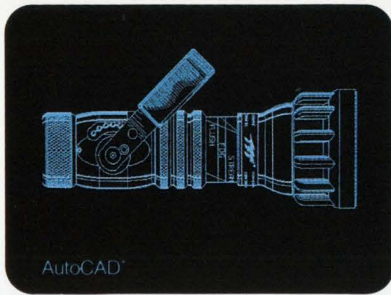
software for your PC. Tek Advanced PC Graphics starts with a flexible multiple-rate color graphics monitor that provides 640x480 Tektronix-style graphics as well as EGA and

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Driving your monitor to a whole new level of graphics speed is Tek's PC4100 graphics coprocessor board. It features Texas Instruments' powerful TMS 34010 32-bit







Graphics System Processor for ultra-fast throughput of your design applications. Add to that Tek's PC-05 or PC-07 terminal emulation software, and you're ready for stand-alone computing or access to a world of mainframe graphics.

To bring those applications to life, you can connect a Tek color ink-jet printer. And start producing high-resolution, vibrant hardcopy output on either paper or transparencies.

Couple all that with Tektronix worldwide support and service, and your PC can gain the

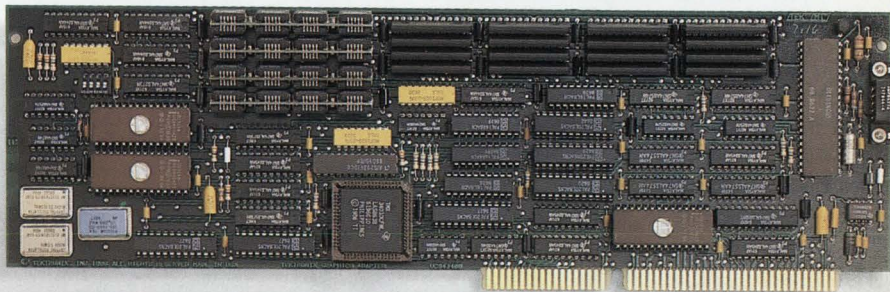
same productive advantages that host-based systems in scientific and engineering environments have had for close to two decades.

**Tek's PC4100 graphics coprocessor board delivers serious graphics on a stand-alone basis.** Built around the Texas Instruments Graphics System

Processor(GSP),™ the graphics coprocessor board achieves a combination of sophisticated graphics and fast throughput your PC just couldn't deliver before. The GSP assumes the complete graphics processing workload, freeing your PC processor for other requirements.

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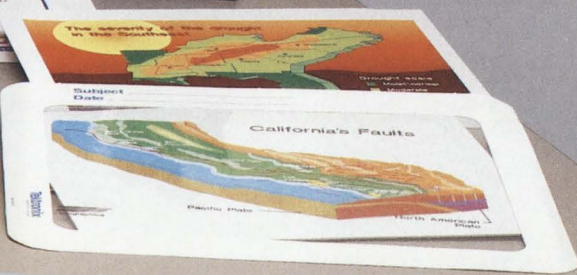


**New companion monitor brings together fine detail and maximum flexibility.** You'll view your applications on Tek's new multiple-rate monitor. In true Tek tradition, it provides ideally balanced, 640x480 addressability and a 60 Hz non-interlaced

ready to run the popular PC packages you probably already use in CGA/EGA mode—standards like Lotus® 1-2-3®, Microsoft® WORD® and Microsoft® Windows®, to name just a few.

Last, but not least, Tek's PC4100 links you to a world of mainframe graphics. All you do is load Tek PC-05/PC-07.

**Tek PC-05/PC-07 terminal emulation software gives you mainframe accessibility with the local processing power of your PC.** Because Tek PC-05 and PC-07 terminal emulation software runs under MS-DOS® 2.0 and higher, you can run your mainframe-based



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# AND SETS YOU APART.

applications software on your PC as if it were a Tek 4105 or 4107 terminal.

Which means you can quickly access the power of Tek graphics—including 4107 segments, true zoom and pan, rubberbanding, definition of up to 64 viewports and more. You can use these highly productive features with a wide range of well-known designer software packages such as ISSCO's DISSPLA<sup>®</sup> and TELL-A-GRAF<sup>®</sup>, MCS's ANVIL-5000<sup>™</sup>, SAS Institute Inc.'s SAS/GRAPH, Precision Visuals' DI-3000<sup>®</sup>, Swanson Analysis Systems' ANSYS<sup>®</sup> and McNeal-Schwendler's NASTRAN.

In addition, you can utilize software development tool sets like Tektronix PLOT 10<sup>®</sup> GKS, IGL, TCS and STI software as well as numerous driver support packages created for the 4105 and 4107.

**Completing the picture: perfect color output with Tek's reliable ink-jet printers.**

At the push of a button, the Tek 4696 lets you produce exacting color reproductions of



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Because of its 120 dots per inch addressability in both horizontal and vertical directions, you can achieve resolution of up to 1280 points x 960 points per "A" size image.

**All the key tools for software development, right from the outset.** The new Tektronix Graphics Interface<sup>™</sup> (TGI) for the PC provides the basics of Tek graphics functionality to application programs

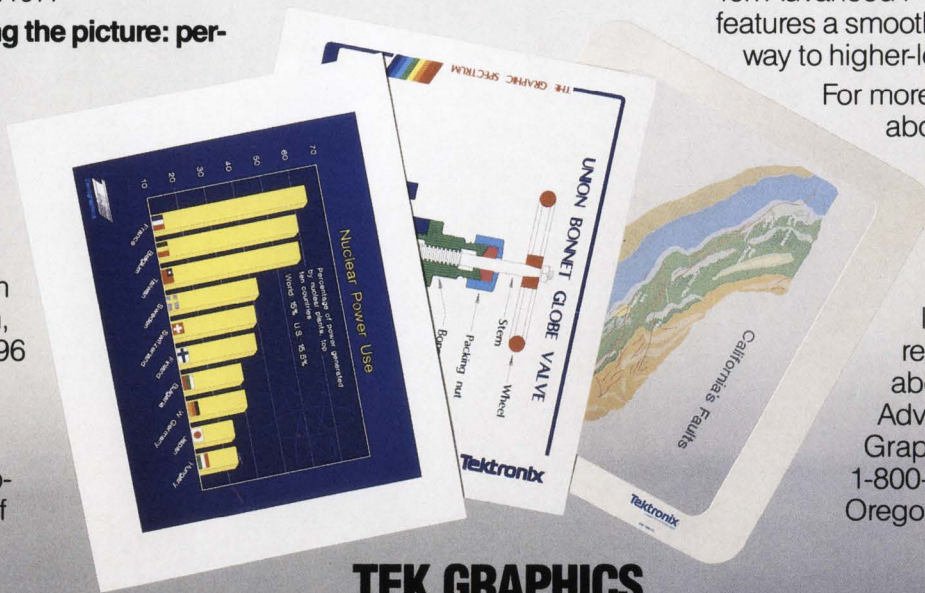
running under MS-DOS. What's more, in-circuit emulator, C-compiler, assembler and linker are all available from Texas Instruments to help software developers write applications packages for the PC4100 graphics coprocessor board.

To enable sufficient workspace for custom interfaces or specific application programs, the PC4100 graphics coprocessor board comes standard with a full megabyte of program memory.

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Whether you choose Tek PC stand-alone graphics, Tek's high-resolution monitor, Tek terminal emulation or all three, you can be assured Tek will keep you current with the best and most productive graphics. Because like all our products, Tek Advanced PC Graphics features a smooth built-in pathway to higher-level graphics.

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## TEK GRAPHICS PROCESSING SYSTEMS

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# News in Perspective

## IBM'S PS/2: DATABASE SYSTEMS

### OS/2 DBMS Sending Mixed Signals to Users and Vendors

Some users see the SQL-based product as providing consistency across machine types, but third-party vendors are expressing discomfort.

BY SUSAN KERR

IBM's vague preannouncement of a revolutionary microcomputer operating system that incorporates built-in database and communications capabilities sent third-party software vendors scrambling to downplay its importance and left users scratching their heads in confusion.

Nonetheless, if IBM actually manages to pull off its new Operating System/2 Extended Edition for its next-generation Personal System/2 family, today's crop of database management software companies will need more than words to back up their sanguine stances.

"The empire strikes back," is how database industry expert Paul Leghart of Computer Technology Research Corp., Patchogue, N.Y., laughingly sums up IBM's move. And that's an assessment IBM isn't doing too much to combat.

Lee Reiswig, IBM systems manager of communications and data management systems, said in an interview with DATAMATION, "I think for a standalone user using OS/2 [Extended Edition] it's really not necessary to buy any additional application code to get value." Driving the stake in closer to the hearts of database companies, he added, "so you don't need any more programs to create your own [standalone] relational DBMSs."

That's not exactly music to the ears of many third-party software suppliers. Even if

IBM's product isn't half as comprehensive as Reiswig boasts, nobody will know for at least half a year. IBM won't announce OS/2 Extended Edition availability until the fourth quarter and will not comment on how soon afterward key enhancements, including remote local area network data services, will find their ways into user sites.

"The whole industry will be totally confused for weeks if not months," comments Jeffrey Alperin, assistant vice president of corporate technology planning at Aetna, Hartford, Conn. "We've only seen the first shoe drop."

But the details he's heard, particularly those relating to the industry standard Structured Query Language (SQL), make Alperin feel positive.

#### SQL-Based RDBMS at Core

At the core of OS/2 Extended Edition, in IBM technobabble, is a relational database management subsystem based on SQL and "consistent" with at least two IBM large systems database products: DB2 and SQL/DS. It is part of IBM's new System Application Architecture and will run on the new family of 80286- and 80386-based Personal System/2 machines as well as the older AT. Although based on Microsoft Corp.'s OS/2 Standard Edition, all extensions are being developed by, and are proprietary to, IBM.

While the fact remains that the new OS/2 Extended Edition will contain no DB2 code per se, its "functions and verbs are in typical DB2" for-

mat, according to Reiswig.

That may be a good path to the hearts and minds of corporate America. DB2 has staged a staggering turnaround for IBM's mainframe DBMS business and is attracting more fans every minute (see "DB2: Dressed for Success," March 1, p. 59, and "For IBM, the Times May Not Be A-Changin'," this issue, p. 69). By pinning DB2 compatibility on OS/2 Extended

line of database software. Sun director of information systems services John Link implies that when possible, less, not more, will be better.

"While nothing leads me to believe we'd buy less Lotus," he says, "in regard to Ashton-Tate, their primary product is database. This could be very difficult for them. Obviously, since we use DB2 on our mainframe, if it were available on a PC, that's advantageous. It would be one less technology to learn."

IBM's announcement, industry participants say, also marks the first time SQL has been bundled into an operating system. By viewing database functions as part of systems software, IBM feels it is moving software developers



YABLONSKY: The Cincom president sees the possibility of negative fallout from the IBM announcement.

Edition, "it'll appeal to mainframe users and people concerned with cross-system consistency," says Goldman Sachs & Co. vice president Rick Sherlund.

Sun Co. Inc., Radnor, Pa., is a DB2 user. On the micro side, the company uses Lotus Development Corp.'s spreadsheet programs as well as Torrance, Calif.-based Ashton-Tate Corp.'s dBase

on to what it views as more crucial tasks: end-user applications.

IBM isn't doing away with third-party vendors, it's merely changing the way they do business. An enthusiastic Reiswig says, "We'll encourage ISVs [independent software vendors] to develop applications that take advantage of ease-of-use" features of the Extended Edition. "I



## News in Perspective

would venture to guess that the majority of applications written [for PC/DOS] were written to produce basic system services and not end-user applications. It will be less expensive and more productive for applications [by having] a common repository for data."

Thus, this will be a boon to such applications as payroll and accounts receivable, he says. However, Reiswig remains mum on IBM's plans to offer application packages that take advantage of the new operating system.

Given the high level of sophistication to be built into OS/2 Extended Edition, offering products that run on top of it seems to be many market players' direction. As a result, those independent companies, including Ashton-Tate, that are not yet supporting the de facto SQL standard appear to be stepping up work to do so.

"Lots is not yet known, but the announcement [of OS/2] will be the foundation upon which Ashton-Tate will build its products," promises company president Ed Esber. Executive vice president Roy Folk adds, "Our customers just need to hear Ashton-Tate say what its direction on SQL is. Granted the specter of IBM is a significant one, but until an announcement of OS/2 comes, we're not worried about it."

Maybe they should be. In the wake of IBM's announcement, Ashton-Tate stock fell and the company canceled a new stock offering.

### Independent Readjustment

Even those vendors already supporting SQL-based products on microcomputers admit that there's a little readjustment in the works. Roger Sippl, president of Informix, Menlo Park, Calif., acknowledges that when the souped-up version of OS/2 is out, some customers may choose not to buy the Informix SQL



**ESBER: The IBM products are guidelines for the future.**

RDBMS. "To the extent people will buy OS/2 Extended version, it's possible they may not buy Informix SQL from us," Sippl says. But he claims that only a small percentage of buyers of that product currently run it on IBM PCs. Instead, Informix sees the real opportunity in the company's 4GL offerings.

"If people need to develop very specialized applications, then they'll have to buy a fourth generation language," proclaims Sippl. "IBM will put on top of the SQL engine their QMF [query and report writing facility] human interface and QMF... allows users to design a few forms but does not allow a dp professional to take specifications... for any application with any complexity. And 95% of dp [applications] do have complexity."

As IBM won't be too open to promoting databases or hardware other than its own, offering services and products to tie alternatives into the IBM world will still be big business, says Sippl.

On the other side of the fence, some vendors say there will be room to make the SQL subset friendlier and more acceptable to PC users.

"It's one thing to be a database engine appropriate for a programming tool and

it's another for it to be robust to handle end-user computing," remarks Richard Schwartz, software development vice president for Belmont, Calif.-based Ansa Software.

Applied Data Research Inc., Princeton, N.J., which recently announced its intention to support SQL (see "Business as Usual?" March 15, p. 19), doesn't view SQL as very user friendly, says vp Martin Goetz. "You can't look at an SQL statement and on the surface know what it's accomplishing... The language is cumbersome."

IBM is one step ahead, counters Reiswig. "We're going to do something new with our user interface for SQL," he says. "It's a 'Prompted Query Interface' so you don't need all that syntax—that'll help a lot. This interface is not available on our hosts today."

He adds, "I guess what's new is that we're trying to be economical about systems resources and trying to bring a highly interactive environment—rather than a 3090 system in the basement with a batch kind of DBMS. In that regard we're emphasizing... simplicity of end-user" interaction.

To do just that, IBM needs to beef up communication between those microcomputers running under OS/2 Extended Edition and mainframes running DB2 or SQL/DS. While currently there are plenty of schemes to upload and download files between PCs and hosts, IBM is looking at OS/2 Extended Edition to be an aid. But it won't be an automatic function—a file transfer program will be required, and it is probably a full year, at the very least, before more complex communications options such as remote LAN data services and SNA LAN gateway support will be ready, IBM says.

"Transparent connectivity is a gleam in someone's

eye [inside IBM] at this point," says Schwartz of Ansa Software. "So over the next few years you'll have to rely on other solutions."

While he says he doesn't see anything technically earthshaking in IBM's plans, Stuart Miller of Software AG concedes that it's "a very complex thing." The president and ceo of the Reston, Va.-based company notes that "once you hook up a micro to a mainframe, while it doesn't have to look exactly like the mainframe, the micro must start thinking about a lot of things the mainframe is doing... for starters, integrity and system reliability."

Beyond technical issues, Miller argues that the announcement doesn't affect Software AG. "I really don't believe large mainframe customers will select any piece of software on the basis of PC capability. They leave it to overall application needs."

## CINCOM'S YABLONSKY SEES SOME NEGATIVE POTENTIAL.

That, in general, seems to be the public opinion of most mainframe DBMS vendors competing headlong with IBM. In fact, they take it one step further and question how many users want to "lock" themselves into DB2 and IBM in general. Some elements of concern, however, escape nonetheless.

"It can affect us negatively," concedes Dennis Yablonsky, president and chief operating officer of Cincom Systems Inc., Cincinnati, in reference to the time lapse



## IBM'S PS/2: DISK MEDIA

# Users, Vendors Ponder 3½ Format

IBM's Personal System/2 disk format has raised questions about migration and support.

BY GARY McWILLIAMS

Information center directors and software vendors alike came away from IBM's Personal System/2 debut with the same dilemma: how to manage the move from existing 5¼-inch software disks to the 3½-inch media used by the new computers.

Given the large number of personal computer users and programs, the problem stands to cause headaches for corporate support centers. Differing plans among software vendors for releasing the 3½-inch disks suggest the scope of the problem.

To begin with, users can choose between exchange methods ranging from the addition of external disk drives to the purchase of new versions of existing software on 3½-inch disks. While such provisions satisfy most needs for data exchange or usage, they are not universally applauded.

"The [migration] bridge is still kind of a kludge," says Peter Potthoff, assistant vice president and information center director at Liberty Mutual Insurance, Boston. "The fact you can install 3½-inch drives in an AT went over here like a lead balloon. I don't think IBM understands what a problem exchanging that media will be."

The jumble of disk sizes and formats is complicated by the release of a 1.4-megabit format, creating a fourth disk format for the two personal computer lines. In addition to the 360Kb and 1.2Mb formats available on 5¼-inch disks, the newer systems incorporate 720Kb and 1.4Mb sizes on 3½-inch disks. "It's exacerbated the problem to [have added] another drive and format again," notes Potthoff.

Ken Gardner, a senior consultant in the info center at Indiana Blue Cross and Blue Shield, Indianapolis, says he hopes software developers

will emulate IBM and package two disk media sizes in a single box. "It would make my job easier to be able to order [Cambridge, Mass.-based Lotus Development Corp.'s] Symphony and be able to use it with any machine here. It wouldn't cost [vendors] that much more" to include the extra disk in their product offerings.

Software vendors are finding that the media choices force some soul-searching over the question of which software packages to offer on the new 3½-inch disks and how quickly to make them available. As important as the migration tools appear to the initial success of the new computers, neither Lotus nor Ashton-Tate Corp. of Torrance, Calif., will recommend them. "To us, it's not 'Will it [an application] run?' but will it run the way you want it to run?" notes a Lotus spokesman.

To preclude the need for migration tools, the company plans to incorporate the new 3½-inch media on seven of its 12 products. The spokesman promises the entire line will be migrated onto the smaller disk "within the next 12 to 15 months."

Packaging decisions on the remaining five applications, which include newer releases and lower-volume software products, have not otherwise been disclosed. Similarly, while it has no plans to retail its software languages on the 3½-inch disks, Microsoft Corp., Redmond, Wash., is offering to mail the smaller-sized versions to customers who purchase 5¼-inch disks.

### Older PC Phaseout Seen

Like developers, many users plan on employing several of the options available in order to get the software they need. Although concerned about the compatibility issues, most expect an eventual

between IBM's announcement and actual delivery. "This is one of the tactics they [IBM] use—since time is on their side—if they're deficient. They make an early announcement not saying too much, freeze people for six months, leak out some information then. This could take a year."

Still, IBM has to get a tricky product out the door, and from a marketing standpoint, there are some holes. Brian Jeffery of International Technology Group, Los Altos, Calif., maintains that IBM's highly interdependent strategy is "risky."

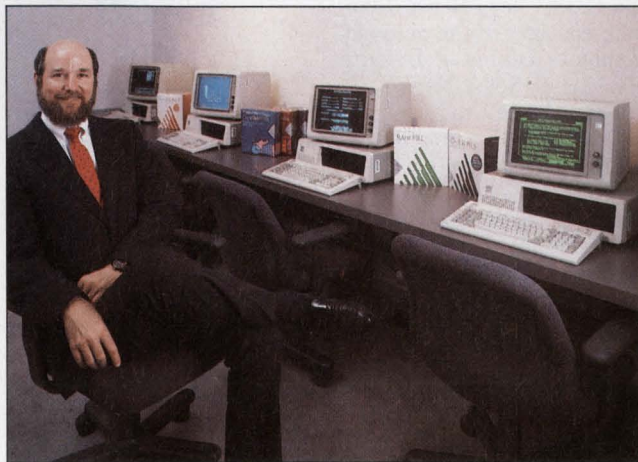
### IBM's Mainframe Plan

Behind OS/2 Extended Edition is IBM's attempt to ensure that workstations used by its big-time customers are emblazoned with the IBM logo, he says. That implies that IBM is "depending on mainframes to sell 9370s and PCs, and 9370s to sell PCs, and PCs to sell high-end systems." Users are no longer blindly loyal to IBM and may not play ball, Jeffery adds.

IBM may have one big tricky marketing maneuver up its sleeve. The OS/2 Extended Edition currently is priced at \$795, a little more than double the standard version of OS/2. Many current popular microcomputer database products retail in the \$200 to \$400 range. Considering that OS/2 Extended Edition includes the operating system and additional features, it'll give standalone packages a run for their money.

"The only thing at all surprising is the difference in price," says Microsoft chairman Bill Gates. "If it [OS/2 Extended Edition] is a fairly good product, then that's a good deal." ■

*New products editor Theresa Barry assisted in the reporting of this article.*



**DENNIS:** Separate media packaging was resisted by Ashton-Tate to avoid inventory problems for retailers.



phaseout of older PC models and gradual introduction of Personal System/2 into their organizations. Even Liberty Mutual's Potthoff concedes he is planning to retrofit some older PCs with 3½-inch disks to gain immediate compatibility for the new machines. Others are already planning for data exchange using mainframe connections, IBM token ring networks, or the migration tools available with the Personal System/2 line.

## SOME SAY IBM DOESN'T UNDERSTAND THE PROBLEMS IN CHANGING MEDIA.

"I don't find the diskette to be a major problem," notes Herb Targum, director of office systems development at Peat, Marwick, Main & Co., Montvale, N.J. "I could see putting 3½-inch disks into our ATs, or into enough to give me [media] compatibility." The international accounting and consulting firm is a token ring network user and expects any new additions to be attached to the network, Targum says.

Though willing to disregard media size concerns, Targum isn't without some disappointment over the new systems' incompatibility with older PCs. "We're going into a major implementation and the recommended system is the AT. Our specific problem is that the new machine makes our add-ons invalid. We can't connect them to a Bernoulli Box—all our add-on boards are invalid."

Such concerns are causing some large users to fear that the sum of the small changes add up to a future in which there are separate camps of PC and Personal System/2 users. No longer will computer managers be able to distribute systems on an as-needed or availability basis without first checking to see what others in the department or group are using. Such groupings present a host of support problems.

"The 'camps' idea is not popular from the viewpoint of support and control: it's more difficult," says Jeff Knepper, director of advanced technology at Touche Ross, Washington, D.C. "When a support person has to make a service call, it means carrying both operating systems and different media sizes."

One benefit users see is the delayed release of the multitasking OS/2 operating system. It is at least eight months away, requiring initial installations to standardize on the PC-compatible DOS 3.3 operating system. The later release of OS/2 will afford some users the opportunity to begin experimenting with its features. But it doesn't mean some users aren't already speculating on OS/2's support requirements.

"If we decide to go with the OS/2," says Bruce Johnson, manager of the personal computer center at Deloitte Haskins & Sells, New York, "it won't be able to run on our existing 640Kb machines. What's likely to happen is—at a minimum—we will have some DOS and some OS/2 machines. It doesn't seem in our best interest to do that."

### Mixed Environments Expected

Beyond getting the information center acquainted with OS/2, there is the issue of diffusing practical expertise to users. The front-line support provided by technically astute users accustomed

to DOS is going to be unavailable when OS/2 hits. Such "local experts," notes Rick Bartosek, senior programmer at LTV Corp.'s Aircraft Products Group, Dallas, free up the information center staff by helping colleagues with routine matters.

"All in all," says Liberty Mutual's Potthoff, "we were pretty happy with the functionality and price. The only drawback we see is the media transition problem. It means we'll have to start seeing some mix of machines with both [sizes of] drives."

The expected mixed environments also are reflected in vendors' plans to distribute their software on 3½-inch packages. Curiously, each of the three major independent vendors—Ashton-Tate, Lotus, and Microsoft—have selected varying methods of addressing the issue. While all will continue to offer 5¼-inch versions, they are split on how to incorporate 3½-inch media into their offerings.

## TWO FORMATS MAY MAKE SUPPORT MORE DIFFICULT.

Ashton-Tate is packaging 3½-inch and 5¼-inch versions in a single box, while Lotus has them in separate boxes, and Microsoft is varying its packaging decisions by product line.

Ron Dennis, Ashton-Tate's assistant to the president, devised his company's strategy; he says the firm decided against packaging 3½-inch and 5¼-inch versions

separately, in order to avoid the inventories it would force on retailers. "If we had separate versions, that would be putting our dealers up to keeping track of 18 products. We thought that was a burden," says Dennis. The dual-size packages are priced at a \$35 premium over the 5¼-inch package but include license rights to use the second size at other times on a portable or home computer.

Thomas F. Cox, Lotus's director of corporate manufacturer relations and the program manager for 3½-inch products, says Lotus chose to market 3½-inch and 5¼-inch program disks separately because it sees the two computer lines diverging. "We've every reason to believe IBM will continue to enhance Personal System/2 and incorporate more advanced devices. It will have little interest on supporting the older PCs."

He also says that while the company has no plans to offer a two-sizes-in-one-box package, the decision will be left to individual product managers. "As far as the man in the street is concerned, he's going to see the full Lotus product line within the next 12 to 15 months on the 3½-inch size," he says.

Past experience in marketing 3½-inch media for the PC Convertible bore on Lotus's decision not to bundle two disk sizes in a single box, notes Cox. The company offered portable users the opportunity to purchase 3½-inch disk versions of its software at a reduced cost. "We had very few takers," he adds.

Taking note of the change the media size forces on users, Ashton-Tate's Dennis notes, "Everyone's asking if IBM can pull this off. Are they going to convince people to go with these new machines? The corporate world may say, 'We don't want 3½-inch machines.'"



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## IBM'S PS/2: DESKTOP PUBLISHING

# Publishing Standard Gets Nod from IBM

### IBM adopts Adobe's technology for the new Personal System/2.

BY EDITH D. MYERS

Early in 1984, a small startup company in Palo Alto began talking about page description language, a language it had developed that allows text and graphics to be used in various output devices, freeing vendors from the need to build drivers and interfaces for different devices.

The company was Adobe Systems; the language, PostScript. In under a year, it became the de facto standard for page description languages in the burgeoning electronic publishing business. Now it has IBM's blessing with SolutionPac, a personal publishing system for its new Personal System/2. Among its components is "The IBM Personal Page-printer Adapter Program, a version of Adobe PostScript."

"It was a broad-based statement of support," says John Warnock, founder and president of Adobe, "and we were very pleased about that." Warnock says Adobe had been working with IBM "for some time on and off," and that the licensing contract was signed a few months before the announcement. The company already had a number of OEMs, including Digital Equipment Corp., Texas Instruments, and Apple Computer Inc.

What's generally available now in page description languages, or PDLs, almost boils down to just PostScript. It has virtually had the field to itself since its introduction. Warnock is quick to give some credit for PostScript's

early acceptance to the firm's early work with Apple, during the time when Apple was developing its LaserWriter. But, Warnock adds, "the reason LaserWriter is good is PostScript."

For Warnock and Adobe's cofounder, Charles Geschke, Postscript's success has been parlayed into a company that did \$16 million in business during its last fiscal year, ending Nov. 30. Adobe's revenues for the first quarter (ending Feb. 28) of the current fiscal year were \$6.9 million, with earnings of \$1.6 million. Warnock says analysts are predicting a year-end total of between \$30 million and \$35 million, probably including anticipated royalties from IBM.

#### Technology Had Forebear

Before founding Adobe, Warnock and Geschke had been with Xerox's Palo Alto Research Center (PARC) where they worked on a page description language called Interpress. Warnock says a lot of the technology that went into Interpress (and later into PostScript) was based on work he had done earlier with Evans & Sutherland Co., Salt Lake City.

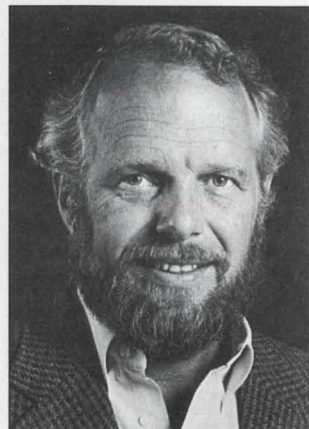
Arlene E. Karsh, director of computer systems market requirements services for CAP Inc. (formerly C.A. Pesko Associates Inc.), Marshfield, Mass., believes the IBM announcement "right now makes PostScript the strongest [PDL]," but adds, "In the long term, I believe it will be one of several standards." What will the others be? "It's too early to tell, but IBM said

its support of PostScript would not be exclusive of other mechanisms, other printer drivers. One of the hooks to IBM is its own AFP [Advanced Function Printing, a printer architecture]. It will make sure AFP and PostScript can talk to each other, but not necessarily only PostScript."

Karsh mentions Xerox's Interpress and DDL (Document Description Language) from Imagen, Santa Clara, as possible long-term contenders. She notes that to date Interpress has been implemented only on Xerox printers and that DDL has yet to be delivered on a product, although it has been endorsed by Hewlett-Packard's printer division in Boise, Idaho.

A spokeswoman for the division says no date has been set for the introduction of a Hewlett-Packard product supporting DDL. "We started page description languages last summer," she says. "One problem with PostScript was that you can't implement it and PCL [HP's Printer Command Language] on the same machine." She says the company will be taking another hard look at PostScript as a result of IBM's backing. "We like to support industry standards."

Xerox certainly isn't counting Interpress out. The



**WARNOCK: The IBM imprimatur is a "broad-based statement of support" for PostScript.**

ultimate version of Interpress has yet to be implemented except in test environments, but, says Abhay Bhushan, manager of systems integration standards at Xerox in Sunnyvale, Calif., real world implementation isn't far off. Bhushan believes it will be implemented across Xerox's printer product line by the first quarter of next year.

He says support for Interpress at this level has been announced by Compugraphic, Wilmington, Mass., and Siemens, in West Germany. Both also support PostScript, as does Xerox itself.

He says Interpress will be the leader in handling multilingual character sets because it is based on an eight-bit binary code that expands to a 16-bit compressed code, whereas PostScript is tied to seven-bit ASCII.

Another area where Bhushan claims Interpress has it over PostScript is in document independence, which means each page is defined independently so printing can be handled in any order the user wishes.

Imagen also claims DDL has this feature. "This makes for layout flexibility," says Candice Eagle, DDL product specialist. Eagle says that in addition to Hewlett-Packard, Cordata Corp. of Thousand Oaks, Calif., supports DDL.

#### A Standard Was Needed

Bhushan of Xerox believes the IBM announcement "will help PostScript a lot," but, more important from his standpoint, "it will get people to agree that page description languages are important."

Adobe's Warnock thinks this is critical too. "End users are not really aware of what a page description language is doing when they are using it but they should be aware at the purchase level. If a printer doesn't support PostScript, it means a lot of applications won't work." ■





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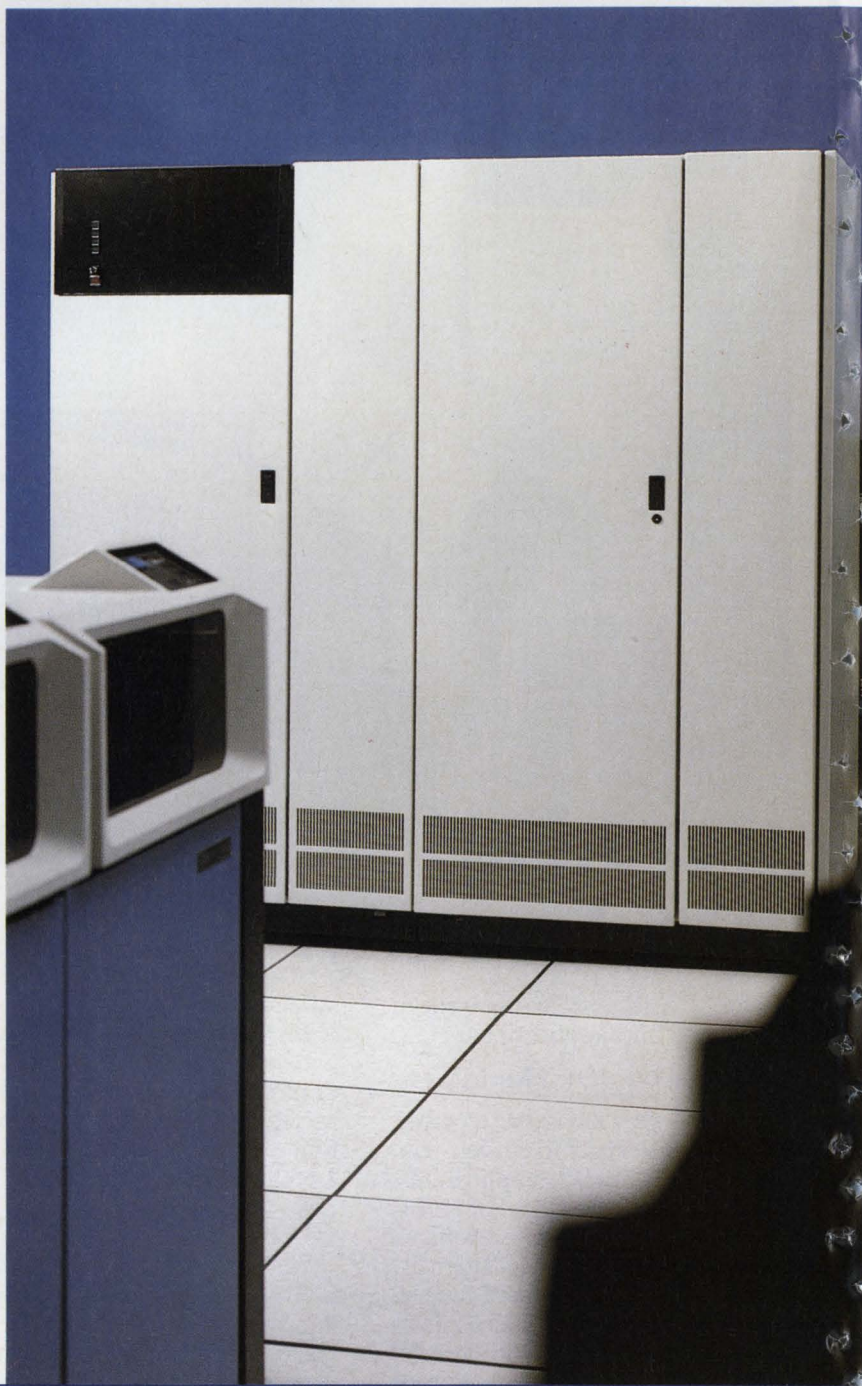
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### SUPERMINICOMPUTERS

# Sequent, Embracing Intel, Eyes the Commercial Market

But the battle may be uphill as others, notably Encore and Pyramid, also target an on-line market already dominated by the likes of Tandem and DEC.

BY JEFF MOAD

Many people were surprised when four years ago superminicomputer startup Sequent Computer Systems Inc. decided to base its line of tightly coupled parallel computer systems on National Semiconductor Corp.'s new 32000 32-bit microprocessor. After all, Sequent's ceo Karl C. "Casey" Powell Jr. and several members of the company's founding team had just left Intel Corp., where they had enjoyed a front-row view of the IBM-backed microprocessor leader's plans to transform the dominant 16-bit 8088 engine into a full 32-bit design capable of becoming the de facto desktop standard.

But Beaverton, Ore.-based Sequent went its own way, and its decision seemed to pay off. While users of the 80286, the next generation Intel chip, were struggling to deal with the chip's memory limitations, Sequent shipped Balance, its first 32000-based parallel processor in late 1984. By the end of 1986, Sequent had shipped about 100 systems into the highly competitive and sometimes fickle technical and engineering supermini market where hot new computer architectures hit the streets with the frequency of Rambo sequels. Sequent recently had its fourth consecutive profitable quarter on \$7.5 million in sales and it has announced plans to go public.

Just another heartwarming little success story in which a computer architecture and a microprocessor

meet, marry, and live happily ever after, right? Well, not exactly. Sequent next week will return to the Intel fold, introducing a pair of parallel systems based on the new 80386. The move is meant to give Sequent a much needed performance boost in the technical market. More significantly, it signals the company's intention to bring its Unix-based parallel architecture to the fast-growing on-line commercial market.

#### A Question of Timing

Sequent isn't the only young company planning to migrate new high-performance computer architectures from the technical market to the commercial market. Others, including Encore of Marlboro, Mass., and Pyramid Technology, Mountain View, Calif., are hoping the timing and the technology are right to bring Unix-based parallel multiprocessor and RISC architectures to commercial on-line applications. Like Sequent, they are rushing to adapt new relational database management systems such as Oracle, from Oracle Corp., Belmont, Calif., to their hardware and to overcome some of the I/O, data integrity, and programming problems identified with Unix and new architectures such as parallel processing. If they are right, these small, young vendors could escape the increasingly crowded and competitive technical superminicomputer market and enjoy higher margins and multiunit sales.

It won't be easy, though. Larger, better known ven-

dors such as Digital Equipment Corp. and Tandem Computers, Cupertino, Calif., already have discovered and staked out strong positions in the on-line, transaction-oriented commercial market.

But Sequent, like its RISC-based rival Pyramid, already has had some success selling to commercial users. Since the end of last year, about half of the 64 systems Sequent has shipped have gone to commercial users such as Radisson Hotels, Liberty Life Assurance Company of the U.K., the Oxford Financial Group, and others. Such commercial customers have new, standalone database-oriented applications that need to support multiple on-line users. They have been attracted by the significantly better price/performance—about \$20,000 per MIPS—that the purveyors of new Unix-based architectures can offer. And the users of Sequent's machines have discovered that because of the system's parallel architecture and its powerful dual-channel parallel disk controller, well over 100 simultaneous on-line users can be supported.

An example is Prime Net Marketing Inc., a subsidiary of \$10 billion retailing giant Dayton-Hudson Corp., Minneapolis, which recently installed a 20-processor, 15MIPS Sequent system to support telemarketing order processing. Although Dayton-Hudson is a solid IBM user, the company's dp department originally recommended the subsidiary try an AT&T 3B12 running the Unify

relational database and Excel 4GL, both from Unify Corp., Portland, Ore., because "it had much better price/performance than a DEC VAX cluster," says Prime Net systems manager Jim Brooks.

When the 3B12 proved unable to support 40 on-line users, Prime Net wheeled in a Sequent system running the same DBMS and the same applications.

#### The DBMS Is Key

A key to convincing commercial users to try something as exotic as a system with parallel architecture, according to Sequent, is the database management system. Sequent, like Pyramid and Encore, has adapted to its hardware several of the better known relational DBMSs, including Unify, Informix, from Informix Software Inc. (Menlo Park, Calif.), and INGRES from Relational Technology Inc. (Alameda, Calif.).

According to Sequent marketing vice president Michael D. Simon, "If you can offer major price/performance advantages over IBM and DEC and, at the same time run the same DBMS that users have already written their software to, your selling job is much easier."

The relational database management systems also solve another problem that has plagued Unix-based systems—the lack of adequate transaction protection and recovery schemes. Most of the new RDBMSs being ported to the advanced architecture systems like Sequent include their own transaction protection and recovery.

Sequent recently signed a one-of-a-kind, two-year joint marketing agreement with Oracle, which some observers saw as an Oracle endorsement of Sequent's commercial market efforts. The agreement calls for Oracle's sales force to receive commissions when they partici-



## News in Perspective



**TEAMWORK:** Sequent ceo Casey Powell and executive vp Scott Gibson.

pate in selling Sequent hardware equipped with Oracle software. Sources say Oracle also is engaged in proprietary new product development with Sequent.

"We're very impressed with the technology and the price/performance they can bring to the market. We think Sequent will generate substantial revenue for Oracle," says Oracle sales vice president Gary Gibson. "The IBM and DEC markets are still important to us, but we want to make sure Oracle is running on the leading edge price/performance platforms, and that's what Sequent represents to us."

The switch to the Intel 80386 should help Sequent improve its price/performance position and open the door for Sequent to support important PC/DOS and OS/2 applications and protocols directly rather than as a task under Unix or via emulation. The 80386 will give the new Sequent Symmetry systems a performance boost up to four times greater than its current 32032-based Balance product line.

At the high end, with a 30-processor Symmetry, Sequent claims to offer an 80MIPS system at about \$10,000 per MIPS. "There's never been a machine in that class or at that price that could support on-line applications,"

says Sequent's Powell. "Users needing to put hundreds of terminals on-line have had to use a mainframe and spend several million dollars. Now they don't have to."

According to Sequent's Simon, the company switched microprocessors because "we feel the 80386 has moved a generation ahead of the 32000 until National can ship its 32532 upgrade. We couldn't afford to wait."

Simon says Sequent was concerned that if it did not move to the 80386, university-based software research programs currently working with Sequent's parallel design might switch their focus to other architectures such as the parallel multiflow designs currently being touted by startups such as Multiflow Inc. of Branford, Conn., and Cydrome Inc. of Milpitas, Calif.

### Performance Complaints

According to some Sequent users, while the system's price/performance is attractive, there is still work to be done in getting the parallel architecture to handle all types of applications efficiently. Some users complain of performance reductions when an application calls for an unusually long, sequential instruction. The problem, which multiflow designs are intended to correct, is that

when such long instructions are given to a processor in a parallel machine, sometimes the other processors must wait for processing of that long instruction to be completed.

"I'd like to see a way to get better parallel programming so that the other processors can take the partial results and start putting them together while one processor is working on a long instruction," says Harold Trammell, director of the Illinois Animal Poison Information Center in Champaign, which uses a six-processor Balance system with the Informix RDBMS to collect and distribute reports.

Nor has Sequent developed the levels of connectivity to the IBM environment that most observers believe will be required if it is to be successful in commercial markets. Sequent says moving to the 80386 microprocessor will make it easier to support the important peer-to-peer cooperative processing elements of SNA and will allow for native support of micro applications.

But Sequent isn't there yet. While it is working with Locus Computing Corp. of Santa Monica, Calif., on micro applications support and with oem partner Siemens AG, West Germany, on developing full SNA support, the company isn't saying when either will be available.

Ike Nassi, technology vice president at Encore, another maker of Unix-based parallel systems, agrees that "getting into on-line commercial applications is a good strategy, and it's something we also plan to do, but we feel there is a lot more to that market than just being able to offer four relational database management systems or switching to the 80386."

Meanwhile, Sequent says it will continue to support its 32032-based Balance product line and will ship new

Balance systems, primarily as low-end, low-cost entries in its product line. The new 80386-based Symmetry product is source code compatible with the Balance product line, and users need only recompile Balance applications to run them on Symmetry, Sequent says.

That still means there won't be a ready catalog of applications when the new system starts shipping this September. So far, however, without new micro applications and SNA support on the Symmetry line, few Balance users are actively planning to upgrade to the new systems.

### Oem Picture May Change

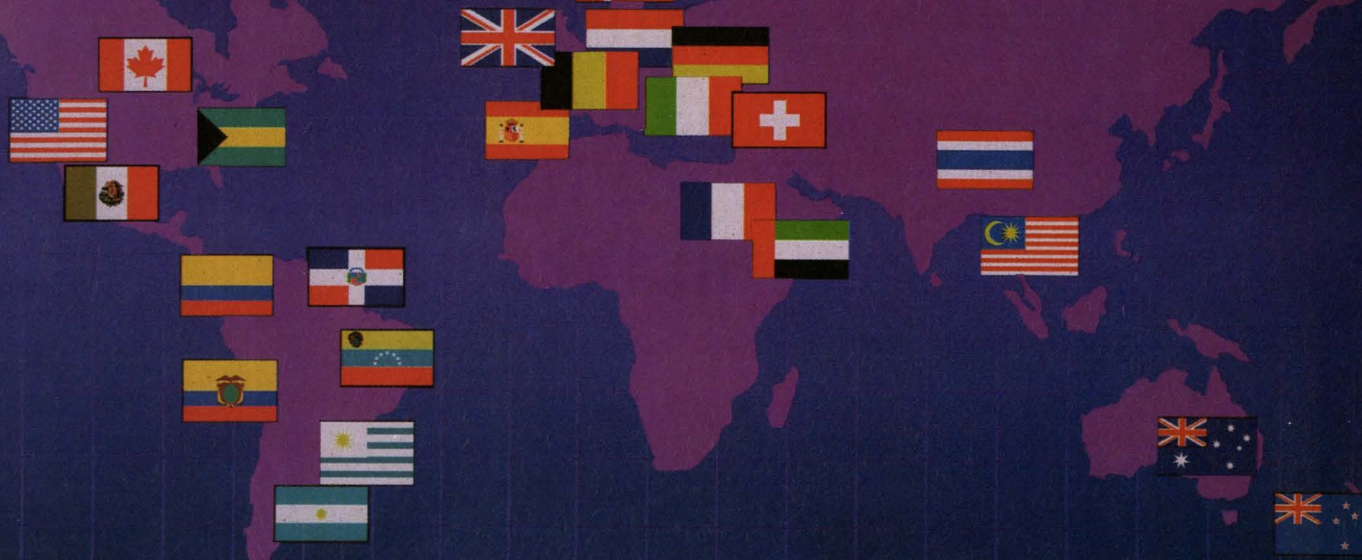
Sequent also is hoping the technology switch won't cost it its largest oem customer, Siemens, which has not yet committed to reselling Symmetry in Europe. Siemens accounted for 19% of Sequent's sales last year but, according to Sequent's Gibson, is "committed to the National [32000] architecture."

Recently, however, Sequent signed another, potentially large oem deal with MAI Basic Four Inc., Tustin, Calif., which could help propel its commercial market efforts in the U.S. Basic Four will resell a version of the Symmetry system. Significant revenues from that deal won't start until 1989.

Meanwhile, tiny Sequent will continue its plunge into the on-line commercial market where it will run headlong into some big-time competition. "They've done well in the technical market, but now they'll be competing with DEC, Tandem, and eventually, IBM," says Richard Shaeffer, a newsletter publisher and advisor with Financial Technology Partners of New York. "Sequent will need lots of resources and will need to stay several steps ahead of DEC in price/performance if it is going to work." ■



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```
PROCEDURE DIVISION
000-SWITCH-SECTION
  MOVE DFHCOMMAREA TO NEXT-TASK
  IF NEXT-TASK='S' PERFORM 100-SEND-SCREEN
  IF NEXT-TASK='R' PERFORM 200-RECEIVE-SCREEN
  .
100-SEND-SCREEN
  EXEC CICS HANDLE CONDITION MAPFAIL(MENU)
  ERRORS(ERRORS) END-EXEC
  MOVE 'R' TO NEXT-TASK
```

```
EXEC CICS WRITE TSO FROM(CAR-REC)
RIDFIELD(CAR-ID) END-EXEC
EXEC CICS SEND MAP(CAR-PNL)
MAPSET('PRODSET') END-EXEC
EXEC CICS RETURN TRANSID(CAR1)
COMMAREA(NEXT-TASK) LENGTH(1) END-EXEC
200-RECEIVE-SCREEN
EXEC CICS HANDLE AID ANYKEY(300-MAIN-LOGIC)
END-EXEC
EXEC CICS RECEIVE MAP(CAR-PNL) MAPSET('PRODSET')
INTO(KEY-MAP) END-EXEC
```

*With COBOL/XE. A pseudo-conversational task coded in COBOL/XE. COBOL/XE automatically performs the functions necessary for pseudo-conversational CICS execution simply by using the verbs DISPLAY and ACCEPT. Complex CICS code is unnecessary, and efficient execution is ensured.*

```
DISPLAY CAR-PNL
ACCEPT CAR-PNL
```

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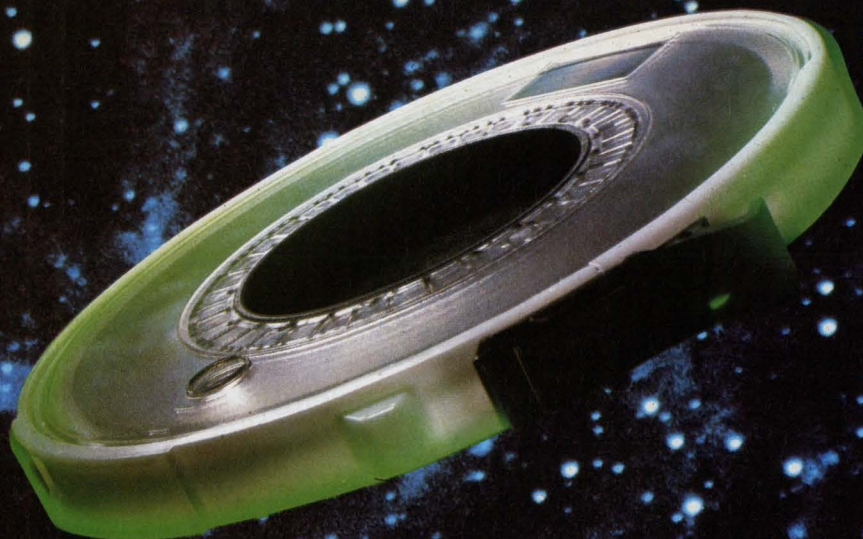
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Two development options let you balance programmer time while handling any application—from the simplest to the most complex. When speed is crucial, the menu-based facility lets you "code and go." For more complex applications, the 4GL gives you complete control over transaction logic.

Whichever approach you choose, you get the timesaving benefits of pre-programmed logic, built-in functions, and portability between environments.

**New maintenance speed with our active data dictionary.** Our active data dictionary, with automatic run-time linking of data definitions and programs, allows you to achieve data independence. To alter a screen layout or a data definition, you need only make the change once. And the change

will *automatically and immediately* be carried throughout every program that's affected.

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## SOFTWARE

# The Gauntlet is Thrown: RAMIS Challenges Focus

An emboldened On-Line Software says it's ready to take on rival Information Builders, but can the former middleweight hold its own in the heavyweight division?

BY WILLIE SCHATZ

The line is drawn, the die is cast. Will the first one now later be last?

"RAMIS is going to be number one," says Rick Granger, senior executive vice president of marketing for Fort Lee, N.J.-based On-Line Software International (OSI). Last October, On-Line acquired most of Martin Marietta Data Systems' (MMDS) packaged software business, including RAMIS, the number two product in the 4GL market behind Focus, now the market leader by several orders of magnitude (see "Clash of Cultures," Nov. 1, 1986, p. 22).

"We are going to become *the* end-user tool for information retrieval and database within two years," Granger says.

Others, namely the competition, would beg to differ. "What do they expect, magic?" asks Gerald Cohen, president of Information Builders Inc. (IBI), New York. Cohen helped create RAMIS while at Mathematica, Princeton, N.J. Mathematica was bought by MMDS in 1983. Cohen departed Mathematica, then founded IBI and created Focus.

"What kind of B.S. can these guys put out?" Cohen asks. "They don't have a sales force, they don't have real support offices and they don't have the features customers want. We're way ahead technically. They're really not a viable factor in the market."

Just wait a minute, counters On-Line. With pro forma revenues of \$76 million

and net income of \$4.3 million for the fiscal year ended May 31, 1986, it's not about to fold its tent and go home. On-Line has earned new respect on Wall Street as well.

"The street was very nervous about the acquisition because no one wanted the product," says Goldman Sachs & Co. vice president Rick Sherlund. "But the acquisition's put these guys on the map. People have gotten the sense that it's working for On-Line." Things are going so well that Sherlund has revised On-Line's earnings forecast sharply upward. He's now forecasting a return of \$1.15 a share for the upcoming fiscal year, a 74% increase over 1986's 66 cents a share. The stock has been performing heroically too, going to the current high of \$24 from a starting point of \$11 in 1985.

So, this could be quite a dandy little war; On-Line, which has been a telemarketer all its life, ventures into uncharted waters—direct sales—to take on Focus.

The situation was noticeably different a few years ago. RAMIS was king and all the others—notably Focus and Dun & Bradstreet Computing Services' Nomad—were merely pretenders to the throne.

### MMDS Gets Its Deserts

Then a funny thing happened on the way to the coronation. RAMIS tripped, stumbled, and fell—badly. MMDS stopped caring about its users, according to executives there. Users then returned the favor and ceased to give a

damn about the company.

"We probably held up some growth because we had a customer base that we somewhat mistreated in promising things we were late in delivering," said Pat Zilvitis, former president of MMDS, last October when the On-Line deal went down.

No lie. It took a large number of very angry users at the 1985 user group meeting in Washington, D.C., to convince MMDS management that there was revolution in the

air. That feature finally showed up around Christmas in 1985, six months later than promised.

This erased one specific problem. But it didn't come close to alleviating RAMIS's overall grief. MMDS management responded to some user concerns, but that proved only a temporary palliative. Nothing else has worked since.

The record so reflects. According to Focus Research, West Hartford, Conn., RAMIS has been down for the last three years while the end-user reporting tool market has been up, at least until this year's first quarter.

IBM mainframe sites using Focus, RAMIS, or Nomad will have risen to 22% by the end of 1987, from 7% in January 1983. Of those sites, 3% will use a combination and 19%



**BERDY:** On-Line's chief executive officer says the company has completely turned around the negative situation for RAMIS.

air. The users made it emphatically clear that there was no communication, no caring, and, perhaps most importantly, no concurrency.

Zilvitis left in January "to pursue other interests," according to MMDS. He was replaced by Frederick Hudoff, who had been vice president of Martin Marietta's air traffic control division.

Concurrency allows multiple users access to the same database simultaneous-

ly. The users made it emphatically clear that there was no communication, no caring, and, perhaps most importantly, no concurrency.

will use a single product by the end of the year. And, of all sites using such a product by the end of the year, 13.6% will use multiple products.

In the numbers that really count—distribution of installed units and users' buying intentions—RAMIS is getting creamed.

In the period from January 1983 to January 1988, Focus Research predicts that Focus's share of IBM mainframe units will have gone up



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## The new systems.

There are four models of the new IBM Personal System/2: Models 30, 50, 60 and 80, with a choice of configurations, with new design and components, and built not merely for speed but for well-balanced performance.

processor, is an even bigger step forward. It has new architecture (as do the even more powerful models) that breaks old barriers. One megabyte of memory is now standard, and there's plenty of room for more. Its graphics (again, in common with the larger models) are



*IBM Personal System/2 Model 30*

*Model 30* is about 25% smaller than the IBM PC, does many jobs more than two times faster than the IBM PC XT,<sup>™</sup> and comes with 640KB of memory and a 20-megabyte (MB) fixed disk if you want one. Much of what used to be optional is now standard, and improved. Graphics are spectacular. So is the value. *Model 30* offers exceptional performance for the money.

*Model 50*, with its 80286 micropro-



*IBM Personal System/2 Model 50*

cessor, is an even bigger step forward. And it finishes many jobs significantly faster than the IBM Personal Computer AT.<sup>®</sup>

*Model 60* takes up less space on your desk because the computer itself doesn't sit on your desk, but rather, beneath or beside it. Equipped with a 44 or 70MB fixed disk, up to 15MB of memory and expanded expandability, it's a system for serving a very busy person, and can be a file server for



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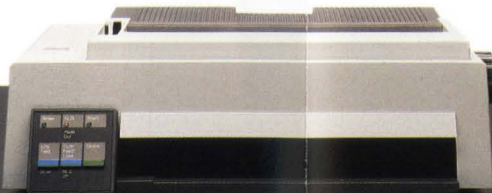
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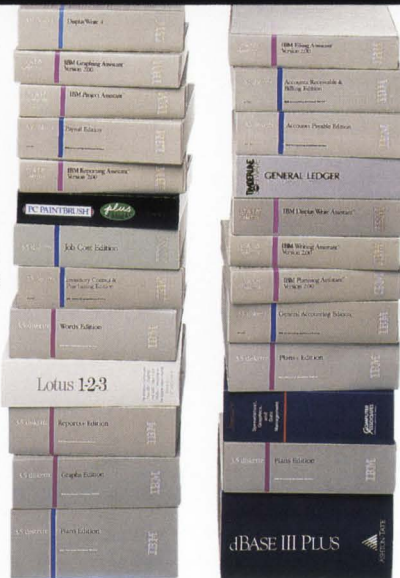
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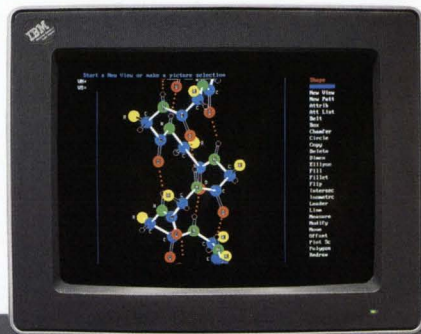
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*IBM Personal System/2 Model 80*

integrated design and new operating systems that together lift raw power to higher levels of true performance, while cost goes the other way.

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It's tempting to size up computers by the numbers, but in the IBM Personal System/2, real performance exceeds the sum of its parts.

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Models 50, 60 and 80 share a design that's new to personal computing. Technically it's described as parallel bus architecture (we call it IBM Micro Channel™), but think of it as a highway.

Our first PCs were built around a two-lane street. Usually that's enough, but sometimes there are traffic jams. Your sales figures might have to stand on the corner while your mailing list goes by.

The new system is like an expressway. There are more lanes open



*The IBM Personal System/2 takes up less space on your desk. The on/off switch is on the front, and monitors tilt and swivel.*





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“colorful” and “sharp.” And new displays that give your programs a heightened sense of reality.

### **The new connectivity.**

There will be new avenues for sharing information; new match-ups of hardware and software that shorten the distances and widen the roads between PCs, minis, mainframes and people.

### **The new media.**

You'll see rugged diskettes that are

*The IBM Personal System/2 is designed for connecting with larger computers like the IBM System/36 and the IBM 9370.*



### **The new printers.**

You'll see an expanded family of



*IBM Proprinter XL24*

half as big, but hold up to twice as much as floppies did. Plus low-cost devices for transporting your data from one generation into the next. And a new IBM 200MB optical disk drive.

### **The new solutions.**

You'll discover new ways to solve problems; ideas about choosing not just software or hardware, but software, hardware and support in balance.



*IBM Quietwriter III Printer*

personal printers that fills just about any need, from economy, to speed, to the fussiest levels of document quality.

### **The new support.**

And because it's not just what you buy but where you buy it, you'll learn how we've been working closely with the people who sell the Personal System/2 to create new levels of dealer support.



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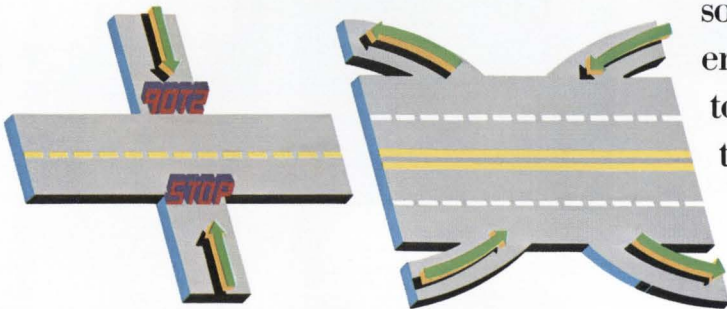
in both directions. The ramps are more smoothly paved, and signals are better synchronized. So data can flow more freely.

This is what the 286 and 386 chips have been waiting for. A highway to match their horsepower.

### The new operating systems.

The Personal System/2 is being introduced with a new IBM PC DOS Version 3.3 that lets you tap into the new systems immediately, and works with all previous IBM PCs as well.

There's also an IBM 3270 Workstation Program that, with PC DOS Version 3.3, helps the Personal System/2 connect with



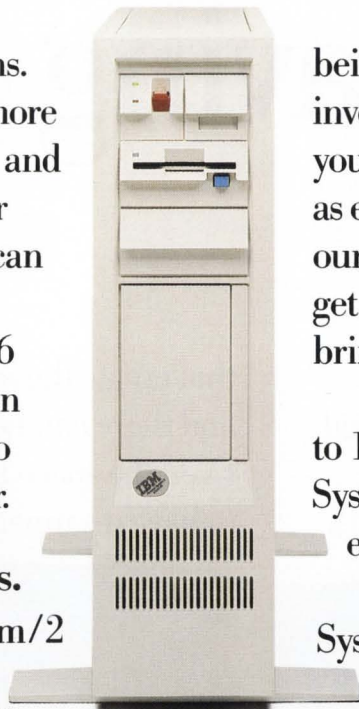
*In earlier PCs, data sometimes had to stop and wait. New IBM Micro Channel architecture is more like an expressway. Data flows more freely.*

mainframes, supports more memory, and lets you run multiple applications.

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A new IBM Operating System/2™ will run on Models 50, 60 and 80.

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*The IBM Personal System/2 Model 80 was created to unleash the power of the 80386 microprocessor.*

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**Memory.** Our new systems offer up to 16 megabytes' worth, and Operating System/2 will make these vast resources easier to access.

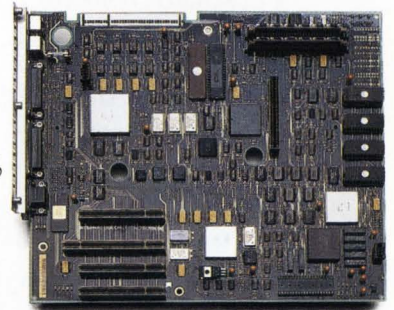
**Multi-tasking.** With IBM Operating System/2, you won't have to be a "power user" to understand how to run several programs at once. Multi-tasking will become a routine experience.

**Software.** Together with the new architecture and more memory, Operating System/2 will give software developers new freedom to create programs

that are more powerful, better looking, and easier to use than ever before.

**A bigger idea.** Operating System/2 is also part of another new idea, called IBM Systems Application Architecture.

Its goal is to bring the world of IBM computing closer together; to provide a greater consistency in look, function and feel—for systems, for software and for people who use them. IBM Operating System/2 is the first step for personal computing in this promising new direction.



*IBM Personal System/2 "planar boards" have many standard features that used to be options.*



# It's like having 256,000 in one box.

## The new graphics.

Back in the dark ages of personal computing, the world was ruled by numbers and words. Graphics were a nicety, but rarely a necessity.

Welcome to the Renaissance.

The IBM Personal System/2 has a talent for graphics that's dazzling.

Each new system can paint up to 256 colors on the screen at once, drawing from an incredible palette of over 256,000.

And not one of those colors costs a penny extra.

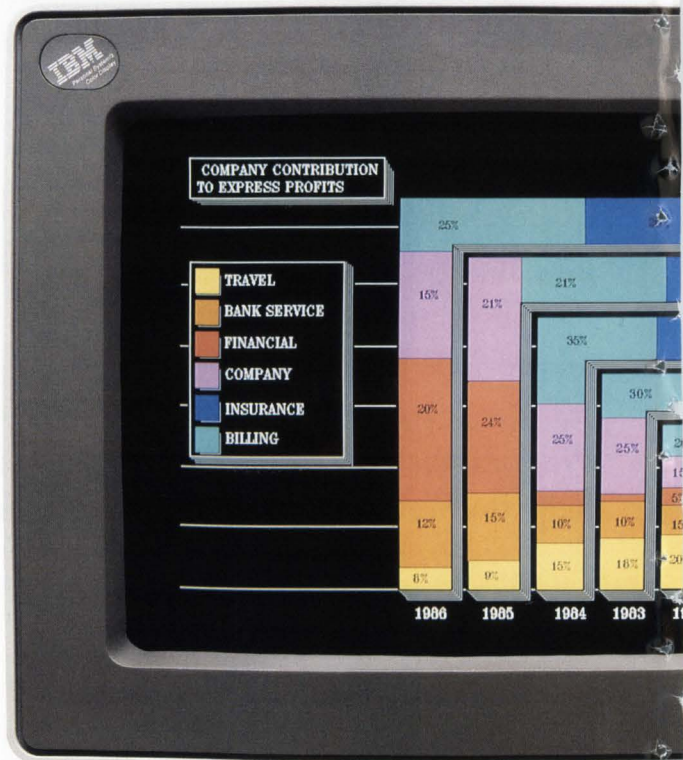
Even in monochrome, things aren't monotonous. There can be up to 64 shades of gray for new dimension and contrast.

And the images themselves are greatly improved. The tiny "pixels"

that create the image can now be tinier, and there can be lots more of them. Even the space between them seems to have disappeared. So pictures are



*The IBM Personal System/2 Monochrome Displays 8503.*



*All screens in this brochure are actual and unretouched.*



# 0 crayons

sharp and clearly defined.

**Better letters.**

Equally important, letters and numbers are clean-edged and precise,

mountings that tilt and swivel so your neck doesn't have to.

There are four new IBM displays, and each works with every Personal System/2 computer, all showing graphic improvements in price.

The 12" monochrome and 14" color displays are great for most general-purpose work. The 12" color display is even sharper, ideal for detailed business graphics. And for design work, there's

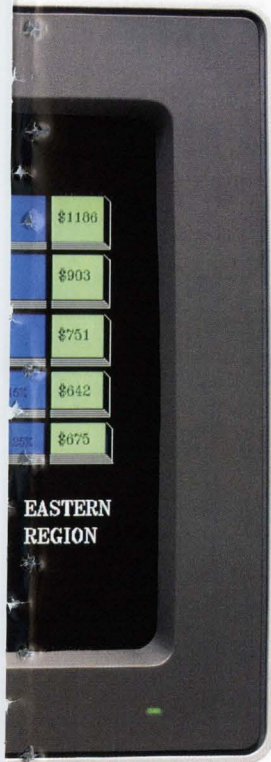
the big 16" color display with even higher resolving power.

**Your favorite programs.**

Just about any program you can run on the IBM Personal System/2 will look better, and will likely be more pleasant to spend time with. Many other programs are being

reworked just to take advantage of the new graphics.

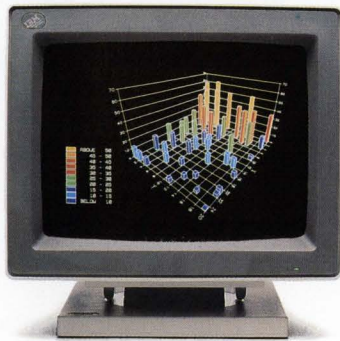
But the future holds real surprises. The screens of the Personal System/2 are like a brand new kind of canvas. How the artists will use them should be something to see.



*The IBM Personal System/2 Color Displays 8512.*



*The IBM Personal System/2 Color Displays 8513.*



looking more like they're printed than projected. After a few hours with your trusty spreadsheet, you'll appreciate that.

You'll also like the non-glare viewing surface, and



*The IBM Personal System/2 Model 50 and the IBM Personal System/2 Color Display 8514.*



# The future belongs to well-connected.

## The new connectivity.

The earliest computers were big and costly, so people shared them.

Then people wanted smaller computers just for themselves. Soon PCs were in offices everywhere. And how did people want to use them?

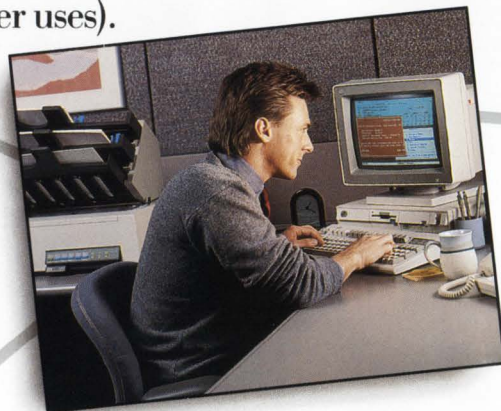


*The managing director uses IBM 3270 Emulation and Professional Office System™ software (PROFS) for checking calendars and sending electronic mail.*

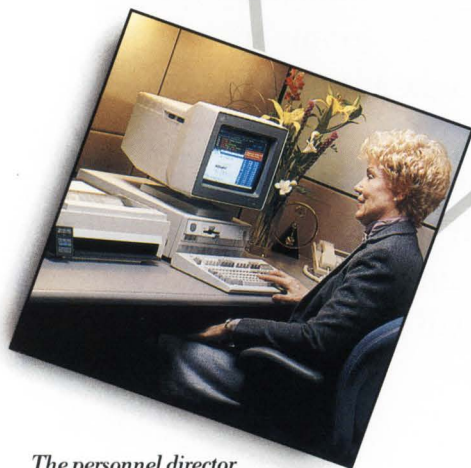
For sharing things. So the idea of PC connectivity was born.

From the start, the IBM Personal System/2 was designed to connect; with other IBM personal systems, with bigger IBM systems.

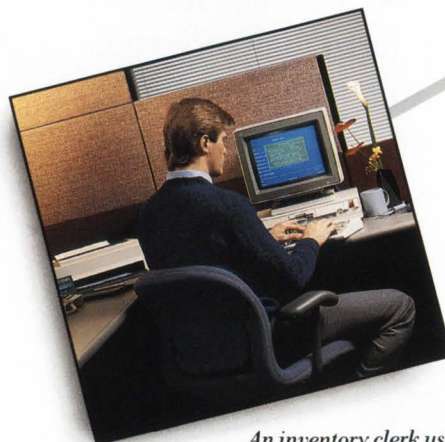
Each new system comes with built-in asynchronous communications (which can save you an option slot for other uses).



*An executive assistant uses IBM DisplayWrite 4 to polish up memos and reports for distribution through IBM DISOSS.*



*The personnel director sends bulletins using the IBM 3270 Workstation Program and PROFS.*



*An inventory clerk uses an inquiry to a data base to compare what's out in the warehouse with sales orders.*



# the

So information has no trouble traveling back and forth. But the real news is what happens inside.

## Going with the flow.

The new architecture in Models 50, 60 and 80 will improve the flow of traffic within the system, so when an important message comes in from

corporate headquarters, it's less likely to see stop signs. And if the sender has a properly equipped IBM PC, PC XT, Personal Computer AT or IBM Personal System/2 Model 30,

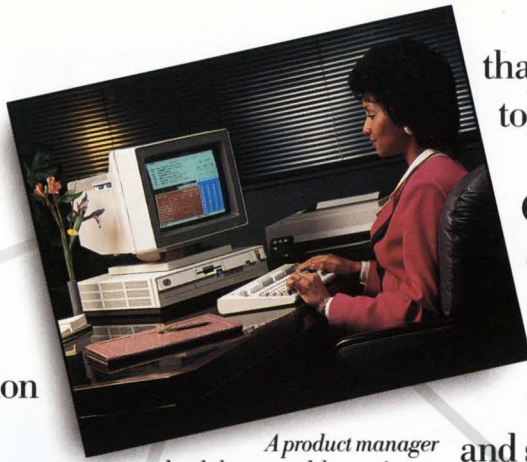
that's okay too—they work together.

And as the new IBM Operating System/2 unfolds, communication will become even easier. Its multi-tasking capability will make it easier for your system to receive and store electronic mail, main-frame data, or whatever, while you're busy doing something else.

The scope of communication has been increased, too.

A wide array of local area network and connectivity products is part of the IBM Personal System/2 family, so your resources can be as broad as your needs; from the first IBM PC your company ever bought, to mid-range systems, to the biggest IBM 3090 mainframe, the lines are open.

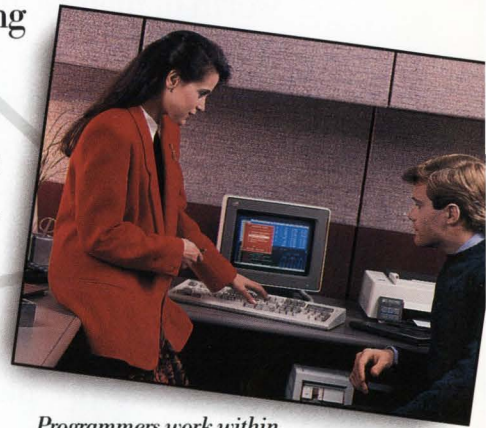
And this is just the beginning.



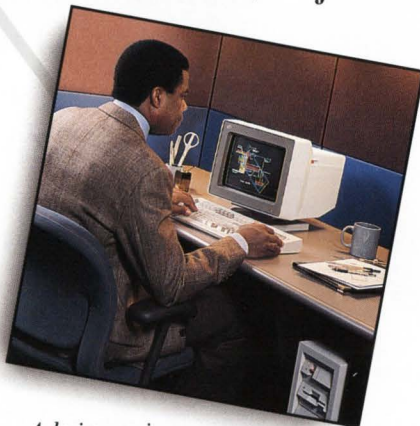
*A product manager loads her spreadsheet using the IBM Token-Ring Network to access information.*



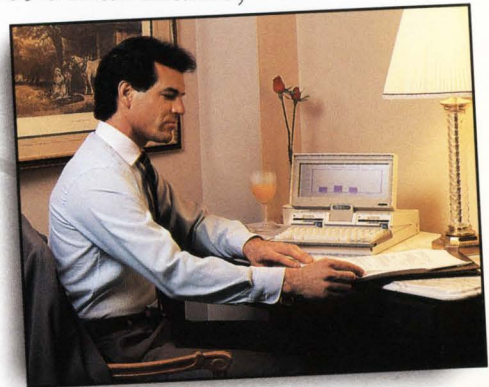
*The IBM 9370 computer stores information and provides data base management support for the business.*



*Programmers work within the framework of IBM Systems Application Architecture to develop applications.*



*A design engineer uses an IBM Personal System/2 Model 80 to create a product accessing designs from the host computer.*



*Meanwhile, from a hotel room, a salesman uses the modem in his IBM PC Convertible to send back details of a new order.*



# IBM just got smaller. three quarter inches.

## The new media.

The amazing 5¼" floppy diskette can hold literally hundreds of pages' worth of memos, reports and vital statistics.

So why are we switching to 3½" diskettes?

Because they hold up to twice the information, and they don't flop. A hard

plastic case protects them from mishaps that floppies are heir to.

So not only can you slip a diskette into your shirt pocket, you'll have fewer of them, with more of

*A simple accessory kit transports data from 5¼" to 3½" diskettes.*

your work all in one place. You won't have to fool around with write-protect tabs anymore, either. They're built right in.

## Bridging the gap.

Very nice, you say, but what about all that work on 5¼" diskettes?

We thought about that from the very beginning, and we're offering a num-

ber of low-cost solutions to make the transition as smooth as possible.

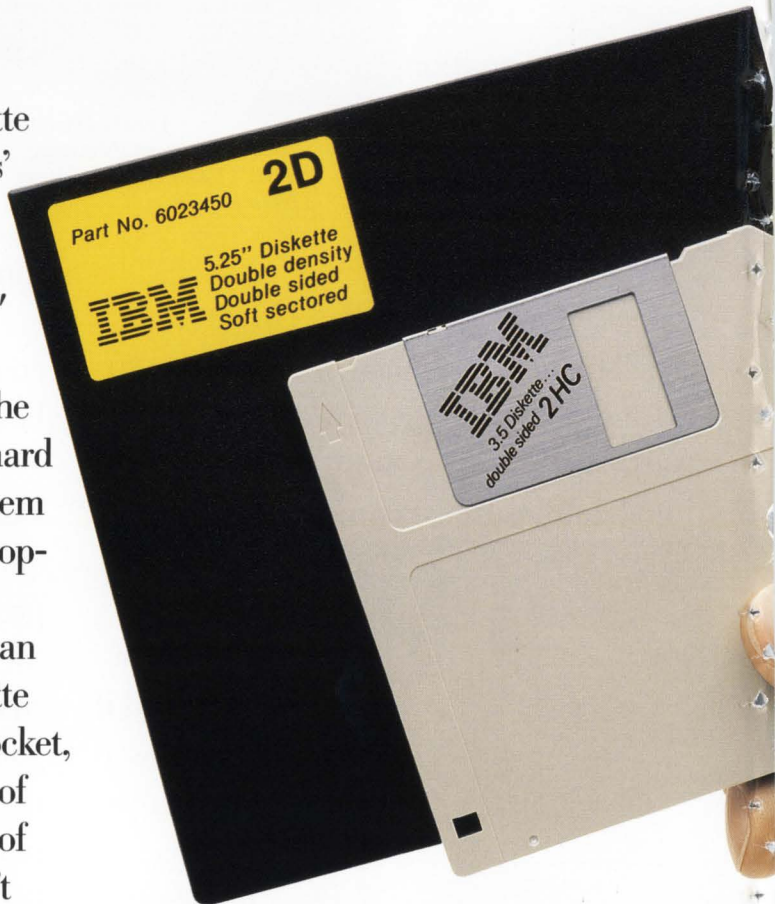


*It takes two 360KB 5¼" diskettes to hold as much as one 720KB 3½" diskette.*

One is a simple cable adapter and software package that lets you send your data from an IBM PC, PC XT or Personal Computer AT to your IBM Personal System/2, then onto the smaller diskettes. Depending on how much data

you have, the whole job could be over in one sitting.

Also available are special IBM 3½" and 5¼" external diskette drives, to be there





# By one and

anytime you need them, for conversions in either direction.

## Software is here.

And what about software? Well, 3½" diskettes may be new to full-sized IBM personal computers, but they're not new to personal computing.

They're used, for example, by the IBM PC Convertible.

So, many popular spread-

sheet, word processing, data base and other programs (from IBM and other companies) are already available on 3½" diskettes. And software makers are working to get new releases out quickly.

## Optical allusion.

If a 3½" diskette can store large amounts of information, here's a way to store gargantuan amounts.

We're introducing a 200-million-byte optical disk drive.

It works with all Personal System/2 computers and, with advanced laser technology, will let you build a massive library of infor-



*The IBM 3363 Optical Disk Drive with "write-once, read-many" disks (left) and the IBM 3.5 Inch External Diskette Drive (right).*



*The IBM 5.25 Inch External Diskette Drive.*

mation for business, science and education on removable disks you can hold in your hand.



# The solution is part of the system.

## The new solutions.

We sell computer systems, but that's not what you're really after.

You want the things a system can do for you.

So while we were busy developing new machinery, we were also active on the software front.

One of the first things we looked at was how you choose software.

Over the last five years, thousands of programs have been written—by us and by others—for IBM PCs. That's a

independent software companies.

## Getting with the program.

We're telling them about our move to 3½" diskettes so they can convert popular programs to that size. We're showing them our new graphics so they can revise software to take advantage of them. And we're keeping them up-to-date about the new IBM Operating System/2

so they can create brand new programs with even higher levels of function.



*IBM CADwrite Design and Drafting System SolutionPac for designers and engineers.*

good thing, and we want to keep it going, so we've continued to work with



So, popular programs like Lotus 1-2-3™, WordPerfect® and dBase III PLUS™ will be available for the Personal System/2.



f the Needless to say, we've also updated our popular IBM software. IBM DisplayWrite™ 4, the IBM Assistant Series™, IBM Business Adviser\* and IBM educational programs are ready to go for the Personal System/2.

### The IBM SolutionPac™

Then we looked at software from another point of view.

With so many decisions to make, so many combinations of hardware and



IBM Business Adviser Financial Accounting SolutionPac.

software, choosing the right one can be confusing. Maybe you'd prefer "one-stop shopping?"

So we created an idea called IBM SolutionPacs.

You'll be able to buy them from selected IBM Authorized Advanced Products Dealers.

What you'll get is a software package

designed for your kind of business, with a hardware ensemble that's been matched to it, and tested. Plus a program of service, training and support.

A wide range of IBM SolutionPacs is in the works.

Among the first ones available are the Business Adviser Financial Accounting SolutionPac, a

CADwrite Design and Drafting System for designers and engineers, a desktop publishing SolutionPac and a Doctor's Office Management package, as well as SolutionPacs for contractors and lawyers.



Popular programs will be available for the IBM Personal System/2.



They will make buying easier, and should shorten the time between "I've got my computer system" and "I've mastered my computer system."

Of course, a big role is played by the new Advanced Products Dealers. Their new "whole-solution" training will make it easier for the two of you to assemble the best system for you.

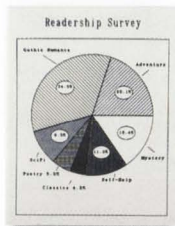
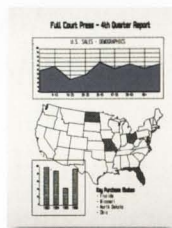
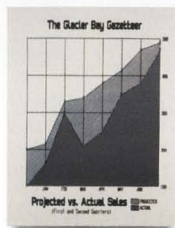
\*ADVISER is a registered trademark of Computer Designed Systems, Inc., Minneapolis, Minn.



# New power to the prin

## The new printers.

Most of what shows up on your computer screen is seen by just one person. You.



But what comes out of your printer goes out to the world. So it has to look professional, and getting it done has to be easy; virtues that have made IBM personal printers best-sellers.

The IBM Proprinter™ and the IBM Quietwriter® Printer have earned high marks from both customers and critics.

Now our printers are even better, and we've added



The IBM Proprinter X24 with optional sheet feed.

new members to the existing family.

## The IBM Proprinter II.

What made the original Proprinter so popular was speed, versatility and convenience.



So what *The IBM Proprinter II.*

do you get more of in the Proprinter II? Speed, versatility and convenience.

There's now Fastfont™, an extra-fast draft mode. Switching to "near letter quality" is faster too, because now there's a button for changing modes.

There's also a choice of timesteps, and of course you can still load envelopes from the front and put in single sheets any time you want.

The IBM Proprinter II is for anyone who wants to print text and graphics, with a printer that's fast and economical.

## The IBM Proprinter X24 and Proprinter XL24.

The IBM Proprinter X24 and Proprinter XL24 are new. The "24"



The IBM Proprinter XL24 has a wide carriage, ideal for spreadsheets.



# ted page.

stands for 24-wire technology. What *that* stands for is new levels of Proprinter quality for everything you put on paper.

Both models print letter quality text with greater detail and graphics with better density and definition. The improvement is easy to see.

So is the performance. When compared to current, best-selling, comparably priced 24-wire printers, the Proprinter X24 and Proprinter XL24 print 1½ to 2 times the draft output in the same amount of time.\*

The Proprinter XL24 has a wide carriage for spreadsheet printing, and both have an optional sheet feed for added paper-handling convenience, plus FontSet™, an option that lets you choose from 11 other typestyles.

## The IBM Quietwriter III Printer.

Earlier IBM Quietwriter printers have always been

easy on the ears, but the new IBM Quietwriter III Printer is even quieter and goes nearly twice as fast, printing executive letter quality text and graphics in an executive hurry.

There's new flexibility in style, as well. The Quietwriter III Printer comes with four different type fonts built in and you can combine typestyles within the same document.

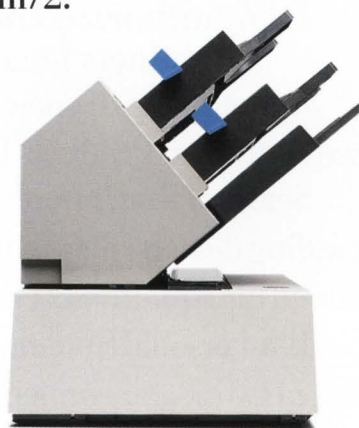
If that's not enough, there are optional font cartridges that give you the freedom to use up to eight typestyles on one page.

There's also a new dual-drawer sheet feed (with optional envelope feed) that lets you use letterhead stationery for the first page of a letter, then plain paper for the rest.

No matter what level of price or performance you need, there's an IBM personal printer to fit the bill. And they fit very nicely with the IBM Personal System/2.



*The IBM Quietwriter III Printer with single-drawer sheet feed.*



*There's also an innovative multiple-drawer sheet feed.*



# It's not just what you buy but where you buy it.

## **The new support.**

As we designed the IBM Personal System/2, we weren't just thinking about products. We also paid serious attention to how, and where, you buy them.

The IBM Personal System/2 offers so many possibilities, so many new ways to do things better, astute guidance must be there if you need it.

So we're raising the bar for customer support. Naturally, our IBM Marketing Representatives are fully knowledgeable about the Personal System/2. But also, we're bringing even greater levels of support from our dealers to you.

## **IBM Authorized Advanced Products Dealers.**

Announcing the new IBM Authorized Advanced Products Dealers.

Selected from our already outstanding dealers, they're being specially trained and qualified. They will have the IBM Personal System/2 computers, IBM network and connectivity products, peripherals, new IBM Operating System/2 when it's available, and all the support you should need.

Perhaps even more important, they'll have a new focus; on systems instead of single pieces of hardware, on solutions instead of circuitry.

They'll be thinking not only about the system you buy, but also about how you'll be using it.

They'll offer help with learning about systems and software, connectivity, and Operating System/2.

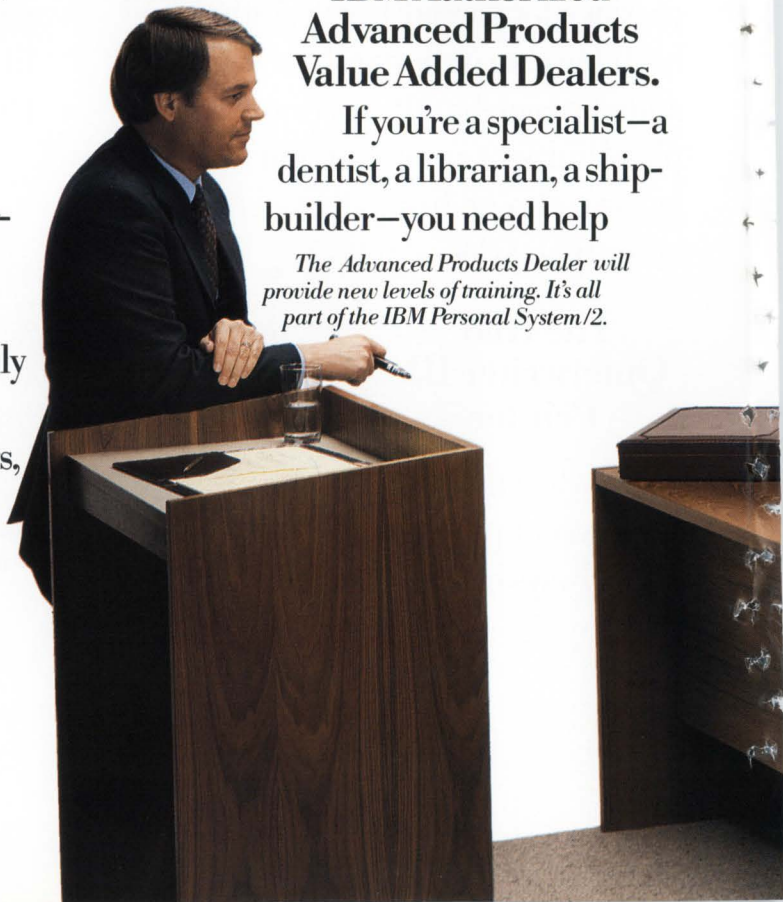
And they're committed to new standards of training for their sales, technical support, and service people.

No matter how big your business, whether you need one computer or a whole network's worth, the Advanced Products Dealer has what you need.

## **IBM Authorized Advanced Products Value Added Dealers.**

If you're a specialist—a dentist, a librarian, a ship-builder—you need help

*The Advanced Products Dealer will provide new levels of training. It's all part of the IBM Personal System/2.*





uy,

from a special kind of dealer.  
Introducing the new IBM  
Authorized Advanced Products  
Value Added Dealers.

They're specialists, too. They build enhanced systems for specific industries and now, with the entire Personal System/2 family, their building blocks are better than ever. There's an Advanced Value Added Dealer who understands your business almost as well as you do.

### **IBM Authorized Dealers and Value Added Dealers.**

Our IBM Authorized Dealers and Value Added Dealers will have the IBM Personal System/2 Model 30 and peripherals to go with it, plus special know-how for helping people get started in computing.

### **IBM Marketing Representatives.**

These people have special skills for

helping large companies and educational institutions make the most of their investment in the IBM Personal System/2.

And now, through the IBM Customer Fulfillment Option, our customers may also work with our dealers and value added dealers to get the best of both worlds; additional support for the Personal System/2 plus the benefits of dealing with IBM directly.

### **Congratulations are in order.**

It's not easy to qualify (and stay qualified) as an Advanced Products Dealer. Our expectations are high, as high as yours are.

So when you visit one of our Advanced Products Dealers, give them a nice pat on the back. They've just signed up for a tough course.



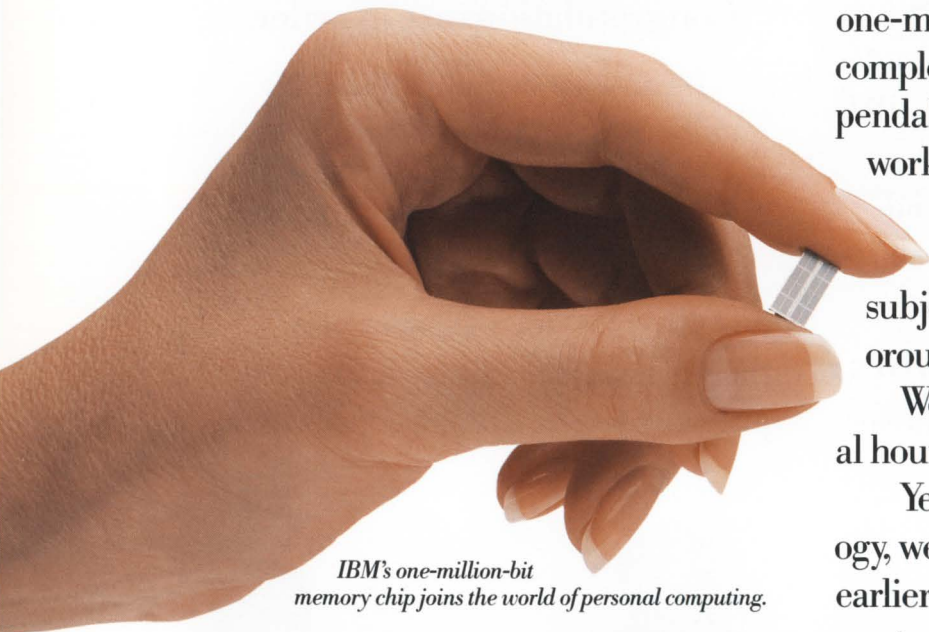


# A system that's bigger sum of its parts.

## A new direction.

The IBM Personal System/2 arrives in the wake of some fairly eager public speculation. So we expect there'll be a focus on "the new IBM PCs."

But our focus is different.



*IBM's one-million-bit  
memory chip joins the world of personal computing.*

While the machines are certainly key to the system, they are not The System.

It's bigger.

And it begins, not with chips or circuit boards, but with you. After all, if our products don't answer your needs, you don't need them.

So everything about the Personal System/2—how we build it, how you learn and use it, where you go to buy it, and how well it works with your other systems—is balanced to give you the highest overall performance.

## A new quality.

We're making the Personal System/2 even more reliable than our earlier PCs.

With new Very Large Scale Integration technology, many pieces in a system are now replaced by one piece. Our one-million-bit memory chip reduces complexity, too. So costs go down, dependability goes up, and you get more work done in less time.

We're also using more IBM-made components, and we're subjecting our systems to more rigorous testing.

We even operate each one for several hours before it goes out the door.

Yet in creating all this new technology, we didn't forget that three million earlier IBM PCs are out in the world. So our two generations are close relatives, and your investment in equipment and training is protected.

Nor did we forget that many of you have larger IBM systems. The Personal System/2 will help you build better connections with IBM mid-range and main-frame computers.

## New help.

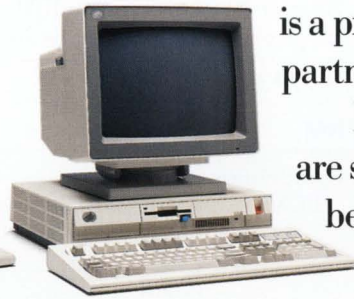
We've also made the Personal System/2 easier to learn. New IBM manuals, tutorial



# than the

diskettes, and start-up procedures will help you get your system going quickly.

So will the people you bought it from. Our new Advanced Products Dealers and IBM Marketing Representatives won't just sell you the right system, they'll be there to help you get the most out of it. And as your needs grow, they'll be able to help you expand your system to meet new challenges.



*Earlier IBM PCs and the new IBM Personal System/2 work together so your investment is protected.*

## A continuing tradition.

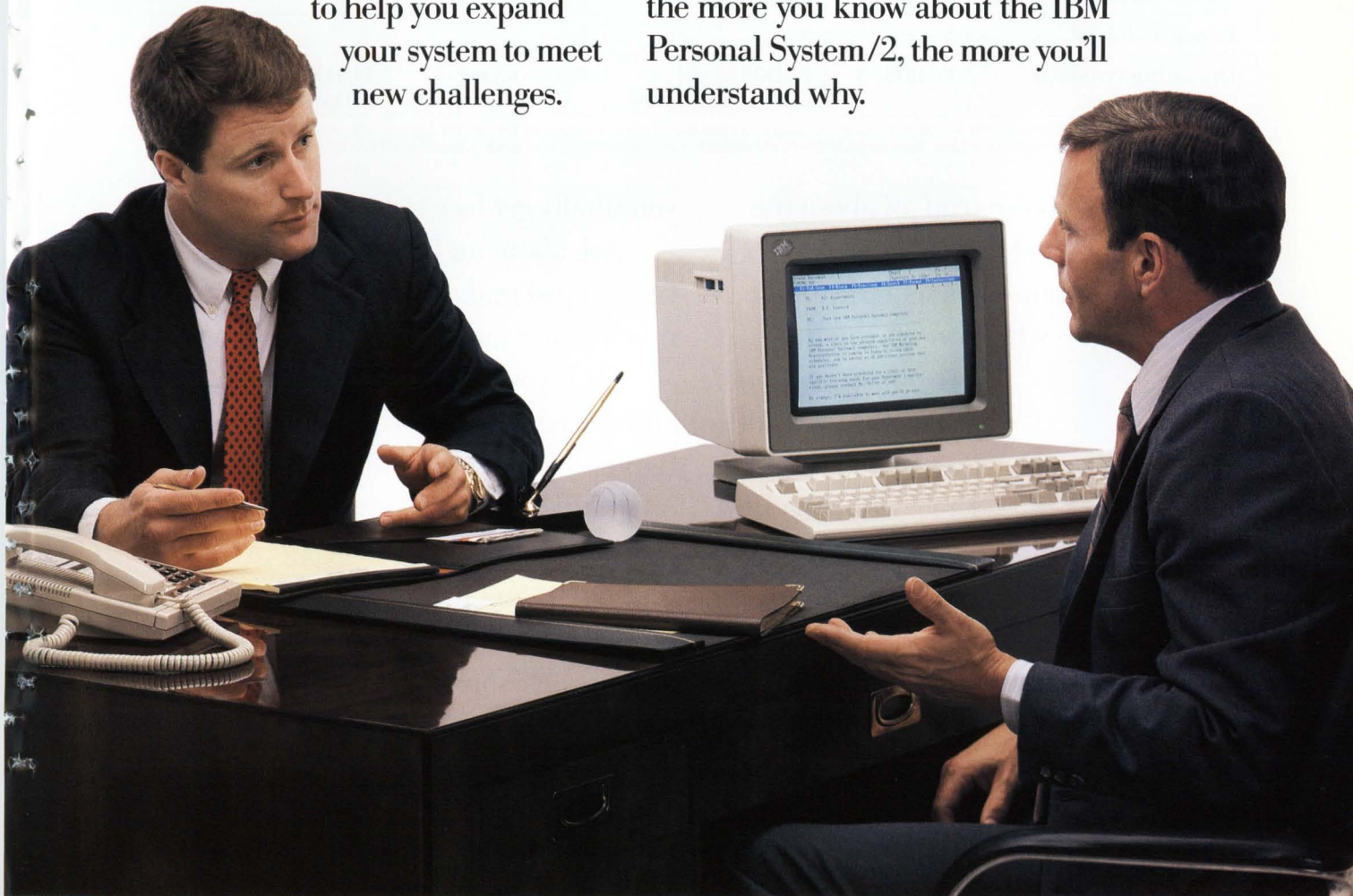
It's said in the world of computing that the only constant is change, but that's not entirely true.

In IBM's world of computing one thing holds firm, and it's the notion of partnership between our people and our customers. The Personal System/2 is a product of that partnership.

IBM people are some of the best listeners in the business, and when they hear what you

want, they do something about it.

We're very proud of them all, and the more you know about the IBM Personal System/2, the more you'll understand why.





# And now for the fine print.

All models include integrated display support, 256-color graphics capability, clock/calendar, and ports for serial, parallel and pointing devices. All systems use a common IBM enhanced keyboard and accept any IBM Personal System/2 monochrome or color display. All models accept the 200MB IBM 3363 Optical Disk Drive option.

	Model 30	Model 50	Model 60	Model 80
<b>Microprocessor</b>	8086	80286	80286	80386
<b>Potential system throughput<sup>1</sup></b>	Up to 2½ times PC XT	Up to 2 times Personal Computer AT	Up to 2 times Personal Computer AT	Up to 3½ times Personal Computer AT
<b>Standard Memory</b> <b>Expandable to</b>	640KB	1MB 7MB	1MB 15MB	Up to 2MB 16MB
<b>Diskette size and capacity</b>	3.5 inch 720KB	3.5 inch 1.44MB	3.5 inch 1.44MB	3.5 inch 1.44MB
<b>Fixed disk<sup>2</sup></b> <b>Additional Options</b>	20MB	20MB	44, 70MB 44, 70, 115MB	44, 70, 115MB 44, 70, 115MB
<b>Maximum configuration<sup>3</sup></b>	20MB	20MB	185MB	230MB
<b>Expansion slots<sup>4</sup></b>	3	3	7	7
<b>Operating system(s)</b>	PC DOS 3.3	PC DOS 3.3 and Operating System/2	PC DOS 3.3 and Operating System/2	PC DOS 3.3 and Operating System/2

1. Based on the testing described in the IBM Personal System/2 Performance Guide. Your results may vary. 2. Model 30 also comes in a diskette-based configuration. 3. Models with 44MB fixed disk expandable to 88MB. 4. Model 30 accepts most IBM PC and IBM PC XT option cards. Models 50, 60 and 80 accept new IBM Micro Channel option cards.

Now that you've read all about the new IBM Personal System/2 and examined its specifications, what should you do?

Go to your telephone. Call 1-800-447-4700 (ext. 9) and you'll learn who's the IBM dealer nearest you.

(In Alaska call 1-800-447-0890, in Canada 1-800-465-6600.)

And here are two things to ask when

you finally get face to face.

Ask about an IBM Credit Card. It just makes buying that much easier for a person or a business.

Or, if you prefer leasing, ask an IBM authorized dealer or IBM Marketing Representative about the IBM leasing programs.

With those formalities out of the way, you'll want to join the next generation in personal computing.

The IBM Personal System/2. **IBM®**



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to 66.9%, from 63%. Not a spectacular leap, but reasonably steady progress. RAMIS, on the other hand, started out at 37% and will have shrunk to 23.9%. Talk about precipitous drops. When Nomad first appeared on the scene in 1984, it had 2.5%. That figure will rise to 9.2% by next year. Not bad for a relative newcomer.

"I can't comment on the specific numbers but that sounds reasonable to me," On-Line chief executive officer Jack Berdy says. "RAMIS didn't just go downhill. It fell from people's minds." But not all that far. On-Line's estimate of current installations puts Focus at 2,000, RAMIS at 1,200, and Nomad at 300 to 400. On-Line expects RAMIS's number to soar following its three-pronged campaign of improving the end-user interface, increasing the databases that RAMIS can access, and adding more pc functions.

"I think our numbers reflect the disarray in RAMIS over the last 12 to 18 months," says John Worthen, president of Focus Research.

## "THE WORST IS BEHIND US," SAYS ON-LINE'S BERDY.

"There was tremendous fall-out from the transfer [of RAMIS ownership]. But all the numbers show RAMIS is losing market share."

There's nothing coming along to reverse that trend, either. In its first-quarter survey this year of 1,600 IBM mainframe users, Focus discovered that about one fifth

fewer of them are thinking of buying any end-user tool product than were considering such a move in the first quarter of 1986. At that time, 64% wanted Focus, 26% preferred RAMIS, and 10% Nomad. In this year's first quarter, the figures were 72%, 12.5%, and 15.6%, respectively. Thus, it would seem the buying intentions for RAMIS have been cut in half in a market that's shrinking by 15% to 20%.

No way, On-Line's Berdy says. "The only guy who says the market is shrinking is Gerry Cohen. I'd like to see those numbers at the end of 1988."

"The traditional 4GL market of \$75,000 and above has matured and is coming close to being saturated," Worthen says. "It's definitely on the downside. IBI sold more units in 1985 than 1986 and still increased its market share."

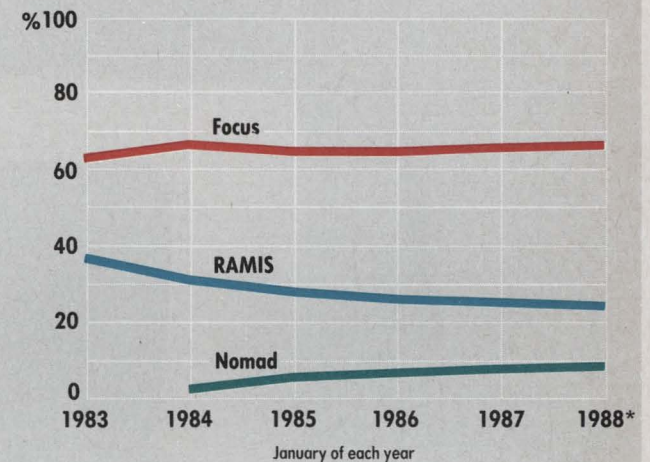
"The challenge now is product positioning. If On-Line is going to make a move, it will have to find the right niche. I wonder if they can do that at the high end. Those users are pretty sophisticated, and a stripped down RAMIS won't cut it. I think you can milk more out of your technology by repackaging at the low end. If they put their mind to it, they can do that and they can move a lot of software. I think their major thrust will be to compete by price."

Actually, it's been both. RAMIS II, as the language was officially known, is now RAMIS Information System. Once sold in individual components, it is now offered as one integrated system except for the English and French modules, which are still options. The price has been lowered, too. It costs about one third less to buy it than it would have before integration.

On-Line cites other improvements to indicate it's on the right road again. It claims

## Three-Way Heat

DISTRIBUTION OF INSTALLED UNITS IN IBM & PCM SITES



Source: Focus Research

\*Projected

since the acquisition to have signed 60 to 70 new RAMIS licensees, evenly split between domestic and international firms. Unanswered phone calls, occurring under MMDS, have been reduced from 950 last July to under 400 in February, with 100 the goal by this July. Both the RAMIS Technical Assistance staff and the support staff for UFO, the other major product bought from MMDS, have increased. OSI expects great things from RAMIS/PC Workstation, introduced in March and for which the company claims to have 1,000 orders. Not to be outdone, D&B Computing Services recently added PC/Nomad to the roster.

### Making Users' Use Easier

"Our buying points are price, customer desire to see the product, and a single department decision maker," says On-Line's Berdy. "We will continue to reduce the number of decisions a user has to make when he's using the product."

That thrust has worked at Arkwright, a Boston-based corporate insurer, where the information systems depart-

ment studied the market for a year before going with RAMIS.

"We were impressed with the new menu and the direct command systems," says Fred Krach, Arkwright's information center director. "We wanted to keep it simple so nonprogrammers could use it. We wanted to bring it down to a low level quickly. We didn't want people to do a lot of coding."

"We liked RAMIS even at the original price. But as a prior user, the price for us dropped radically."

That won't be the last time. As Worthen's numbers at Focus Research indicate, the high end is essentially history. That leaves the third-tier, below-Fortune 1,000 companies, as potential customers. There are legions of them out there, and that sector is just beginning to realize the benefits of having an end-user reporting tool around.

Making one of those companies a customer, though, takes much more time, money, and effort than it does to do the same with bigger companies. They don't order in the same volume, either. So the return on invest-



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CIRCLE 18 ON READER CARD



# News in Perspective



COHEN: IBI's president says Focus is "way ahead" of RAMIS technically.

ment is hardly the same.

But On-Line may not have a choice. "If they do what they say they will, it sounds great," says Jack DeWald, a Long Beach, Calif.-based consultant who advises a major aerospace manufacturer and a major research organization. A former president of the RAMIS Western Regional Users Group, DeWald says he wasn't reelected because he argued against On-Line's decision to cancel the yearly national meeting and have regional meetings in its place.

"When MMDS sold RAMIS, we all said it's about time. On-Line has always had good service and support. But they'd better do something fast, because their only advantage over IBI is concurrency. They've got to be aggressive, creative marketers who will do anything, just like Gerry Cohen will. That's what it's going to take.

"From a user standpoint, it would be nice to be 'the firstest with the mostest' rather than 'the lastest with the leastest.'"

In the end, On-Line has to answer the same question people have been asking for the past two years: can RAMIS deliver? "We have run this business professionally since the acquisition," Berdy says. "We've turned it around from

day one. The worst is behind us."

"They let 350 people go when they bought RAMIS," Cohen says. Berdy says On-Line absorbed 250 MMDS employees. The remaining 361 returned to MMDS. Cohen says, "That's the way to run a service business? We never lose unless it's price. That's their only advantage. People gave up on them, and it's going to take a tremendous investment to show their care. People are using our product up the kazoo. We're way ahead technically. What they're doing is so primitive as to be silly."

"We don't lose to Focus on technology, period," On-Line's Granger says. "The product is now very stable," adds On-Line president Howard Sorgen.

All that sounds great. But will anybody really care?

"On-Line may move software, but that's a lot different than overtaking Focus," says an industry source who requested anonymity. "They'd better find the right niche, because if they go head to head they'll just be wasting their money. They've got zilch for experience in this business. I don't think there's a snowball's chance in hell they can overtake Focus."

That's all On-Line thinks it needs. ■

## BENCHMARKS

### Dreyer Resurfaces

Jerome L. Dreyer, who resigned unexpectedly last fall as president of ADAPSO, has resurfaced at Federal Sources Inc., Vienna, Va., as vice president of the Consulting Division, a new post. Federal Sources, founded in 1984, is a privately held company that provides data processing and telecommunications products and services to the federal government and industry. The company is also a value-added remarketer of Irvine, Calif.-based AST Research Inc.'s desktop publishing products. Dreyer, whose tenure at ADAPSO stretched 20 years, says Federal Sources plans to join ADAPSO in the next few months, and that he expects to be the company's representative to the trade organization.

### Lotus Sued

The developers of the VisiCalc spreadsheet have filed a \$100 million lawsuit against Lotus Development Corp., Cambridge, Mass., and its founder Mitchell Kapor for alleged copyright violations. The plaintiff, SAPC Inc. (also in Cambridge), is a company formed by former employees of Software Arts Inc., Wellesley, Mass., which developed VisiCalc and sold the rights to the program to Lotus in 1985. The suit charges that Kapor copied features of VisiCalc when he was employed in 1980 at Personal Software Inc., later known as VisiCorp, which marketed VisiCalc, and when he served as a beta tester for VisiCalc after leaving VisiCorp. Kapor allegedly signed a nondisclosure agreement when he was a beta tester, which prohibited him from using any information he received during the beta test process, according to the suit.

### DG Bids On Lisp

Shortly after artificial intelligence firm Lisp Machines Inc. (LMI), Lowell, Mass., filed for

bankruptcy protection, Data General Corp. put in a bid to acquire the company. DG announced that it will hire LMI chairman and ceo Ward MacKenzie for an undisclosed post. LMI has been actively seeking a buyer since it filed for Chapter 11 protection in April. LMI makes AI hardware and software. In an unrelated matter, DG announced that it formed a joint development agreement with Relational Technology Inc., Alameda, Calif., to adapt that company's INGRES relational database system to DG's MV family of 32-bit processors and DS/7500 engineering workstations.

### Sun Drops Prices

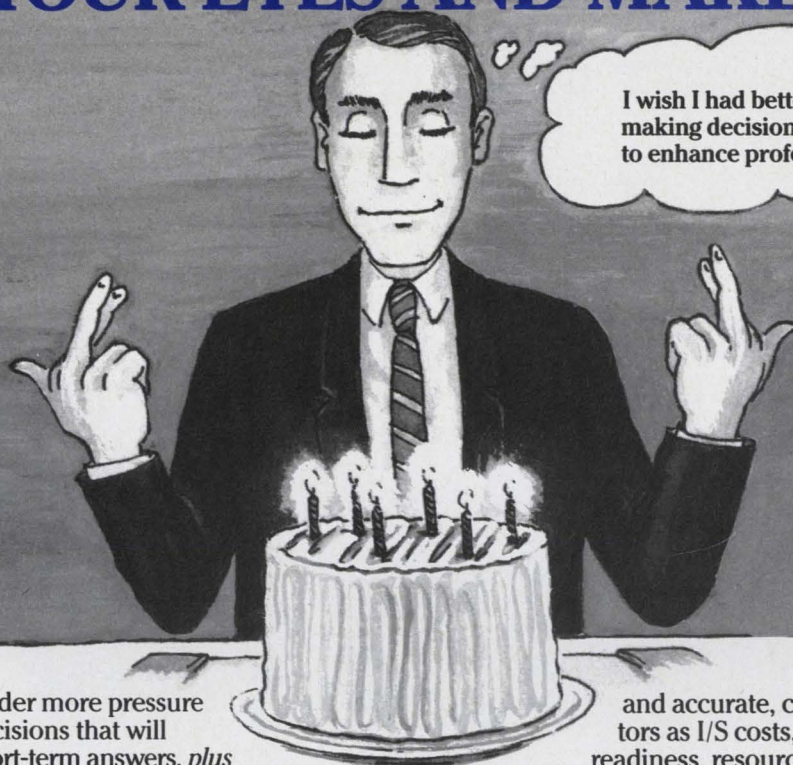
In response to IBM's announcement of a new generation of personal computers, Sun Microsystems Inc., Mountain View, Calif., cut prices of its entry-level engineering workstations by 37%. Sun officials say the new breed of pcs, one utilizing the Intel 80386 microprocessor, is aimed at the technical market, and that reducing the price of its low-end model 3/50M to \$4,995 from \$7,900 will allow the company to capture market share. IBM's high-end Personal System/2 carries a price tag of \$10,995. Sun plans to introduce additional low-priced workstations this year.

### IBM Names Rolm Chief

IBM appointed Ray S. Abu-Zayyad, formerly president of IBM General Products Division, San Jose, as president of Rolm Corp., replacing Dennis Paboojian. The appointment came after IBM created within its Information Systems Group a telecommunications marketing and service organization for the Rolm PBX line, incorporating 6,000 employees from Rolm's sales and service force. Paboojian will serve as a consultant to the group. ■



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# Behind the News

## BIG SYSTEMS

### Mainframe Users Survey: Tough Times for IBM

Decelerating dp budgets signal gray skies for the industry leader, but pcms may clean up, the 10th DATAMATION/Cowen mainframe survey shows.

BY JOHN W. VERITY

Despite upgrades for its 3090 mainframes and the beginning of shipments of its new midrange 9370s, IBM will find it hard this year to show substantial growth in its domestic mainframe revenue stream. Data processing hardware budgets are declining due to general economic sluggishness; installed mainframes possess an increasing excess capacity; and makers of plug-compatible gear seem to be retaking market share from the besieged giant.

A large sample of IBM computer sites in the U.S. and North America indicated in March that in the months to come, through December 1988, they planned to install equipment worth 31% of the value of their installed mainframe gear. That is not a shabby number, but a similar sampling taken a year earlier showed plans to acquire equipment worth 34% of the installed base. Thus, with the added negative factor of demand that is less than overwhelming for its new line of Personal System/2 microcomputers (measured before it was formally introduced), IBM this year may be hard-pressed to regain its traditional pace of double-digit growth. Improvements will come primarily from internal cost-cutting and repricing of products.

These are among the major findings of the 1987 Computer and Telecommunications Survey conducted by DATAMATION and Cowen & Co., Boston. The survey, which polled mainframe users as to their installed equipment and near-term spending plans (see "Survey Method"), also revealed the following trends:

- Peaking product cycles bode well for fairly strong shipment growth at the non-IBM mainframers, namely Honeywell, Unisys (Burroughs/Sperry), and NCR. However, those firms face increasing competition from IBM and Digital Equipment Corp. in the important areas of distributed processing and office systems.
- Pcm companies Amdahl Corp., Sunnyvale, Calif., and National Advanced Sys-

tems, Santa Clara, seem particularly well positioned to gain market share from IBM in the mainframe cpu and disk markets, where their products are beginning to ship in high volumes with competitive prices and features. Amdahl enjoys great customer loyalty on the strength of its multiple domain feature, which permits several disparate operating systems to run concurrently on a single cpu without all the overhead incurred by IBM's VM software hypervisor. Meanwhile, Storage Technology Corp. appears to be regaining lost ground in the disk drive market.

- IBM's 9370 midrange 370 processor, although accepted fairly well by users, may not produce as much incremental business for Big Blue as some may hope. Al-

though some 60% of the 9370 systems planned for installation will replace no previously installed systems, where replacement is involved the machine appears to be capturing many applications once destined for other IBM systems. More than half of the applications intended for the "VAX killer" were originally intended for other IBM machines.

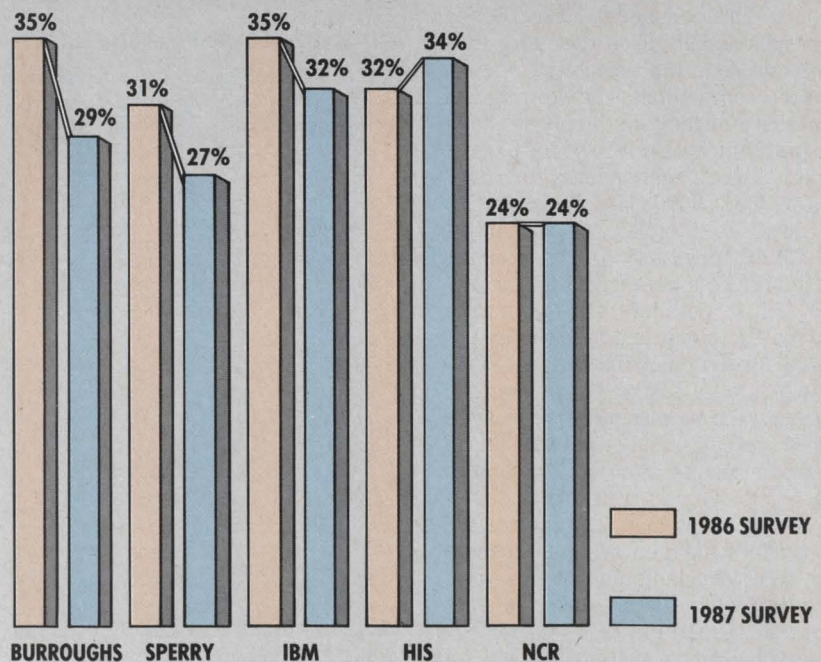
- IBM Credit Corp. (ICC) is an increasingly important factor in users' acquisition plans. It is involved in 19% of users' planned 3090 acquisitions, up from 12% a year earlier. ICC is also shown as capturing about 11% of projected 9370 installations for 1987-88 while third-party lessors gain 44% of that business.

- Growth in each and every area of the dp budget (cpu/peripherals, pcs, teleprocessing equipment, software packages, and salaries) is decelerating. Dp budgets that were expected to grow 9.7% in 1985 and 8.2% in 1986 are projected to grow only 5.7% this year. IBM hardware budgets were projected to increase only 7.8% in the coming three to five years, down from the more robust 8.6% seen in last year's survey.

- On-line transaction processing now accounts for over a quarter of all the pro-

FIGURE 1 Less Need For Mainframe Capacity

PERCENT OF SITES INDICATING "NEED MORE MAINFRAME CAPACITY"





# Behind the News

cessing done on IBM mainframes—27% this year, compared with 20% the year before. Its substantial growth (up from 17% in the 1983 survey) comes at the expense of batch and timesharing.

- The Unix operating system, although gaining considerable acceptance for workstations and departmental systems, has yet to gain much attention from mainframe users. Some 70% of the survey's respondents said they had no desire for the AT&T-developed software.

- Corporations indicated remarkably low interest in IBM's new personal computer line, as yet unannounced at the time of the survey. Asked how likely it was that they would "broadly replace" installed IBM PCs with the new machines, only 3.1% said it was "very likely." Meanwhile, users indicated increasing acceptance of PC clones during the past year.

IBM's mainframe business is now largely concentrated on the 3090 mainframe. That machine has been shipping for less than two years and yet in terms of dollar value it comprises more than a third (36%) of the IBM installed base sampled by the survey this year.

With IBM's shipping of the 3090 in high gear, Amdahl and National Advanced Systems have seen their combined North American installed cpu market share decline for the fourth year in a row. Amdahl's share as of February was just below 7% while NAS came in at just over 2%. This combined share of 9% is down substantially from the more than 15% recorded in 1983's survey.

IBM's competitors will likely regain some share in the months ahead, however, with Amdahl likely to be the biggest winner. Survey respondents indicated that for 308X/3090-class equipment to be acquired in the following 24 months, they would spend 14% of their money with pcms (2% for NAS and 12% for Amdahl). Those numbers are up sharply from the 4% total in last year's poll. Amdahl will further enjoy the fact that as users switch to its 5890 systems from the 580 series, the average price per planned Amdahl system is rising to \$3.6 million in this year's survey from \$1.7 million in 1986.

Asked about their attitude toward pcm vendors and their systems, respondents were decidedly upbeat this year. Some 23% of the large-scale IBM-compatible sites (up from 19% a year earlier) said they had a pcm system installed, on order, or had plans to order, and 15% (up from 14% last year) said they were con-

## FIGURE 2 BUNCH Users Want More Application Software

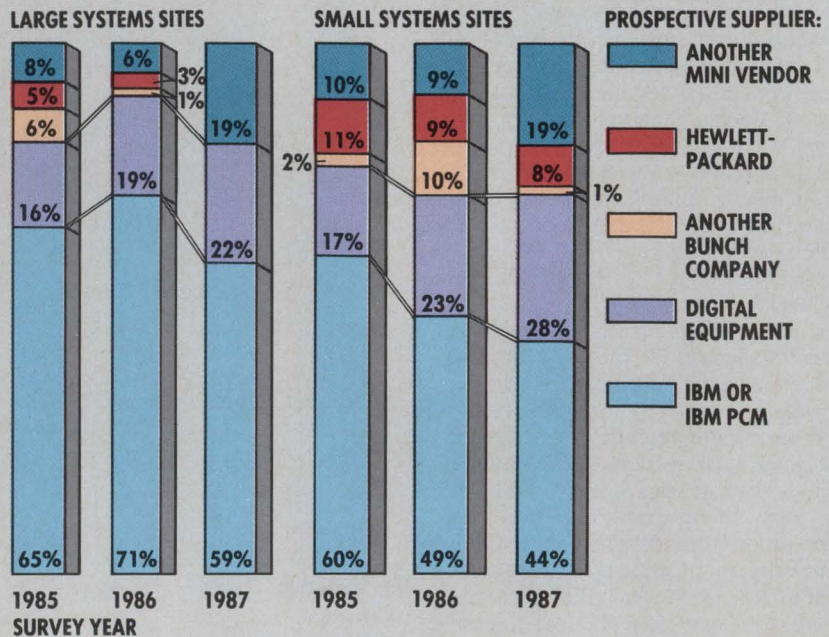
Query: Which category of service needs the most attention by your vendor?

INDUSTRY SERVED	MOST FREQUENTLY CITED CATEGORY(S)			
	HONEYWELL	SPERRY	BURROUGHS	NCR
MANUFACTURING	Applications Software	Applications Software	Applications Software	Applications Software
WHOLESALE/RETAIL	DB/DC Software Field Maintenance Operating System	Applications Software	Applications Software	Sales Personnel Applications Software
FINANCIAL INSTITUTIONS	Applications Software	Applications Software	Applications Software	Applications Software
SERVICE BUREAUS	Applications Software	Applications Software	Applications Software	Systems Price/ Performance
EDUCATION	Applications Software	Sales Personnel	Systems Engineering Support	Applications Software
GOVERNMENT	Applications Software	Applications Software	Applications Software	Applications Software
DEPARTMENT OF DEFENSE	Applications Software	Operating System	Field Maintenance	Systems Engineering Support

## FIGURE 3 BUNCH Users Lean to IBM and DEC

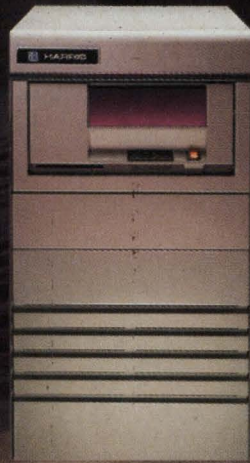
Query: If seriously considering a change in vendors, who is the likely supplier?

DISTRIBUTION OF RESPONSES (AGGREGATE OF BURROUGHS, HONEYWELL, NCR, SPERRY)





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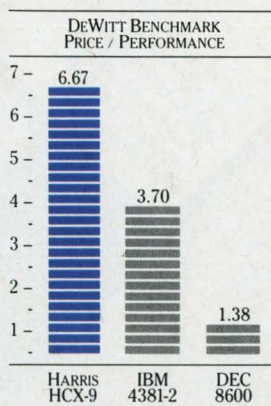
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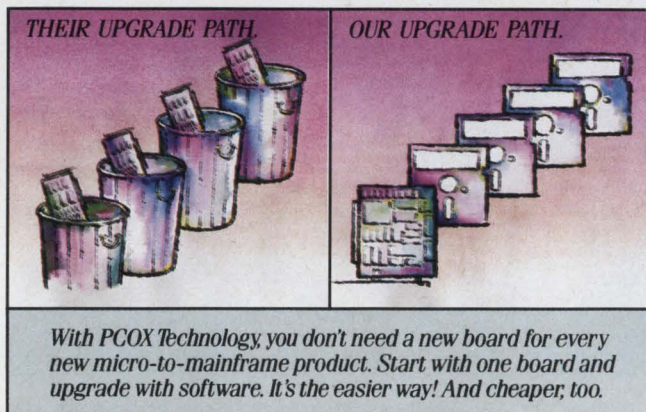
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# Behind the News

sidering installing one. Among current Amdahl and NAS sites, only 12% of the former (down from 22% in 1985) and 5% of the latter (down from 24%) said they would go back to IBM when it came time to replace their present cpu.

In fact, respondents' attitudes toward IBM as a supplier took a sharp negative turn this year: while 23% of the sites in 1985 said they looked on the company more favorably compared with the year before, this year's poll found only 13% in that category. Similarly, 11% said in 1985 that their attitude was less favorable, but this year 21% held that view.

As noted above, Amdahl has pleased users greatly with its multiple domain feature, something IBM does not supply. Of those sites with the feature in use, 90% said they would stick with Amdahl for their next large-scale Amdahl cpu upgrade; among Amdahl sites without the feature in use or planned for 1987-88, 43% said they would switch back to IBM. Luckily for Amdahl, the share of its users with the multioperating system feature installed is projected to rise to 55% by the end of next year, from 24% now.

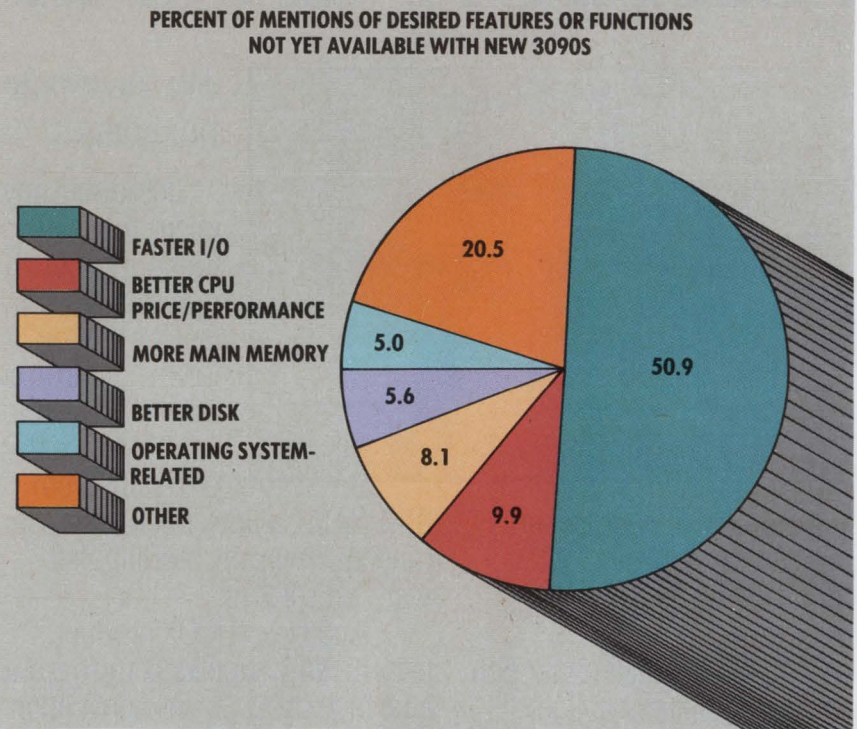
## IBM Slipping in Drives Category

Planned installations of peripherals for IBM users were found to be up only slightly from the year before. About 44% of the respondents planned to add disk drives (up from about 41% the year before), 20% planning additional tape drives (up from 19% last year), and 41% planning additional terminals, up from 40%.

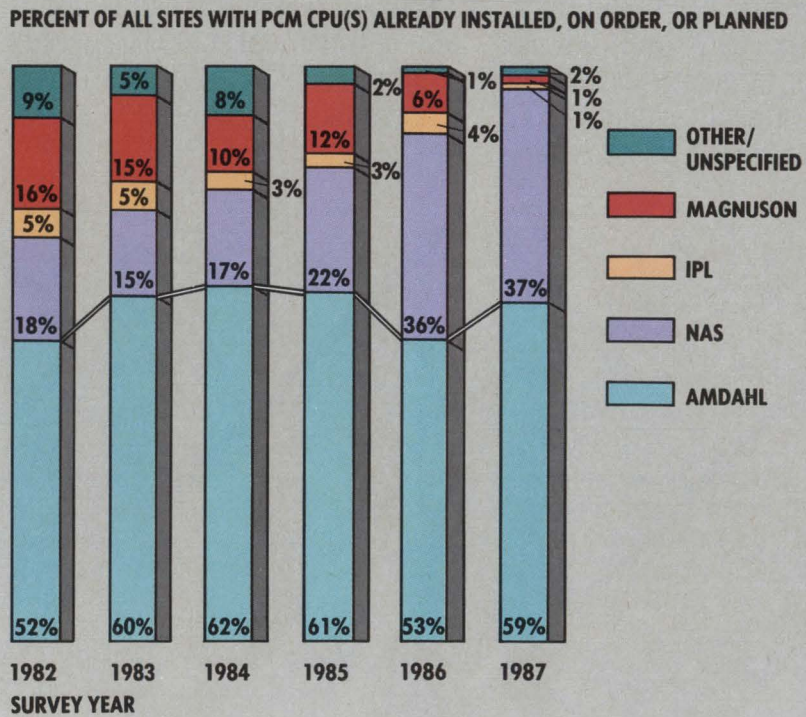
In disk drives, a prime contributor to IBM's bottom line, the industry leader's position seems to be slipping a bit. IBM's share of the installed base looks stronger than in its share of planned acquisitions for the upcoming 24 months, as plug-compatible manufacturers boost shipments of their 3380-type products. IBM controls 79% of the mainframe disk drives that respondents have installed (including 3380s and smaller drives), but it stands to gain only 74% of their future orders.

Big Blue's loss appears to be largely StorageTek's gain: the Louisville, Colo.-based company's share of all installed drives was measured at 7%, but the company will get 10% of the future disk drive orders. NAS, too, will enjoy an increase, to 4% of the upcoming orders, up from 3% of the installed base. Amdahl and Memorex, however, will show a decline,

### FIGURE 4 Users Want Faster 3090 Channels



### FIGURE 5 Amdahl Gains Pcm Market Share





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# Behind the News

to 2% and 1%, respectively, from 4% and 3%.

IBM's share of the 3380 market appears to be dropping significantly, even though respondents said they would acquire more 3380E double-capacity models than single-capacity drives. While last year they said they would get 86% of their 3380 units from IBM during the following 24 months, this year the comparable figure is only 77%. StorageTek's comparable 3380 share rose to 9% this year, from 5% last year. (In the non-3380 disk arena, where IBM's share of planned procurements is holding firm at around 63%, StorageTek will grow to 17% of planned shipments this year, from only 11% a year ago.)

The survey showed a diminished need for disk capacity among IBM and compatible sites. While 72% of the large-scale (308X/3090) sites last year said they needed more capacity, this year's figure was only 65%. Among 4300-class sites, the 1986 and 1987 figures were 55.7% and 54.4%, respectively. System/3X sites, however, showed a slight increase, to 43.9% this year from 42% in 1986.

IBM's share of the tape drive market, buoyed by its 3480 model, continues to rise. Last year, respondents said they'd get 65% of their tape drives from Big Blue; this year, that number is up to 73%. StorageTek, too, will enjoy an increase, to 16% this year from 14% in 1986.

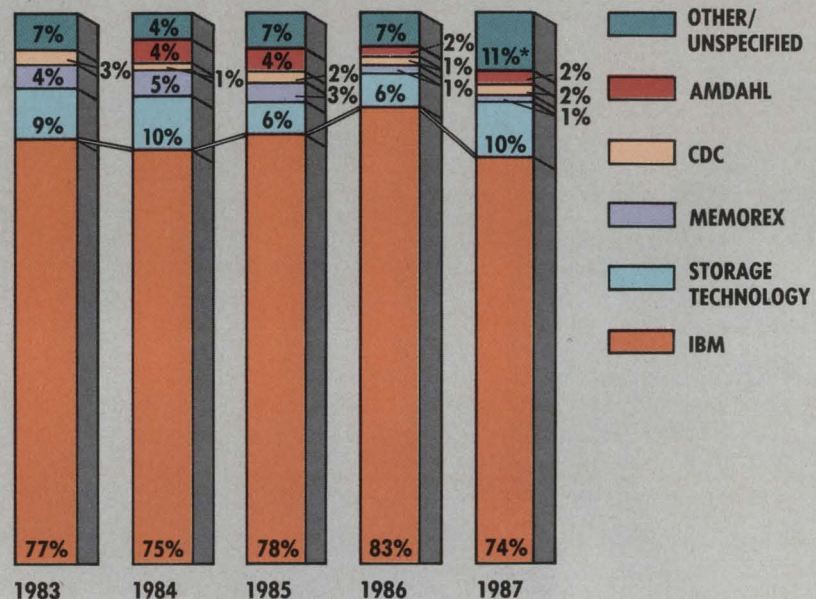
In the crt terminals area, IBM remains dominant, with 67% of planned procurements, up from 59% a year earlier. ITT-Courier and Telex's comparable shares each seem to be dropping to 8% this year, down from 10% in 1986. In contrast, Memorex is enjoying a slight increase to 7% this year, from 5% in 1986.

While IBM had seemed to lose share in the DBMS market in previous surveys, its DB2 package is now coming on like gangbusters. At the time of the survey, IBM sites of all sizes indicated that 5% of their installed DBMS packages were SQL, 6% were DB2, 11% were DL/1, and 17% were IMS. As for planned installations, however, the comparable figures were 15%, 29%, 2%, and 4%, respectively. Among large-scale sites, DB2's share is even more impressive: a whopping 59% of planned installations, up from 10% currently installed.

Needless to say, IBM's rebound in the DBMS market is squeezing independents severely. Cullinet, for instance, garnered 16% of the current installations

## FIGURE 6 IBM Slips in Large Disk Share

RESPONDENT PLANS FOR NEXT 24 MONTHS' DISK UNIT PROCUREMENTS (ALL MODELS)

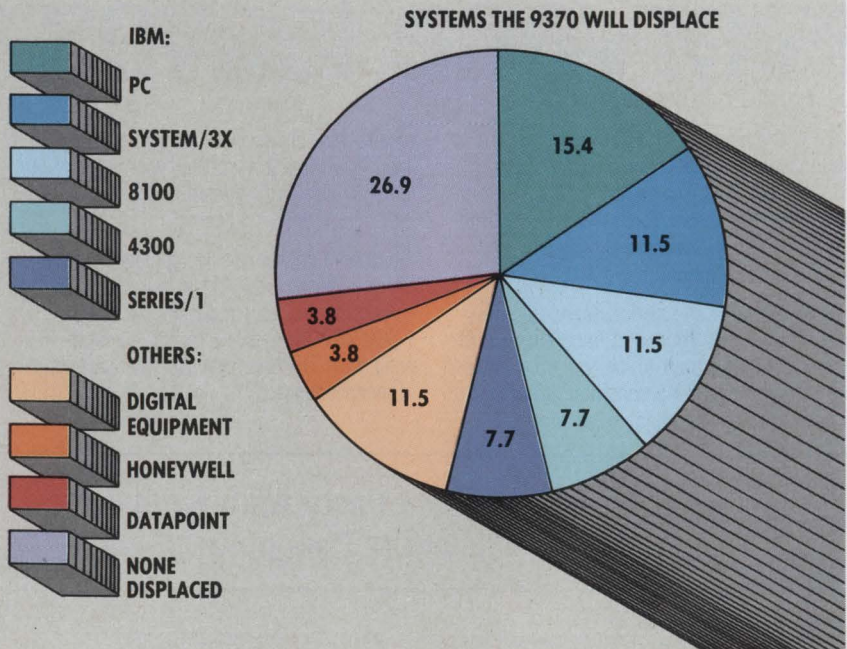


SURVEY YEAR

\*4% National Advanced Systems, 2% in 1986

## FIGURE 7 9370 to Affect IBM Systems More Than Others

Query: In your departmental systems usage, what is the current principal system, and what will be the future principal system?



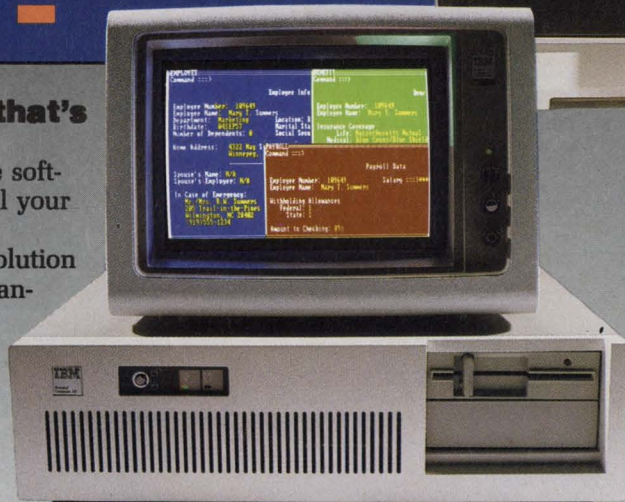
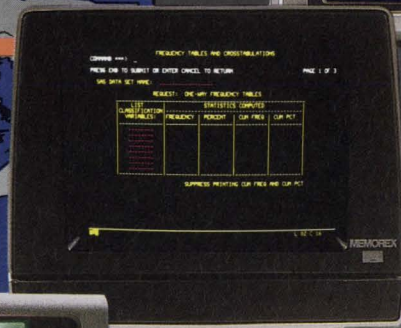
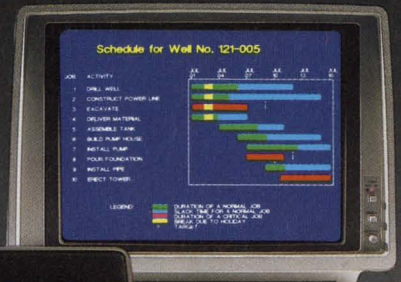


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# Behind the News

but stands to get only 9% of the future buys. Among large sites, Cullinet's share will fall to 6% planned from 18% installed.

But IBM is only holding the line in the 4300-class sites, where even though SQL is moving to 24% planned from 10% installed, the company's total share remains at 41%. Cullinet will drop to 10% planned from 16% installed; Software AG to 8% planned from 9% installed. Applied Data Research, however, will improve slightly, to 12% planned from 10% installed.

### Attitude on Burroughs Improves

Perhaps the biggest event in 1986 for the computer industry was the creation of Unisys Corp., through Burroughs' acquisition of Sperry. Naturally, the big question is how well Unisys can manage its two constituencies' disparate, and possibly conflicting, needs. In general, users of Burroughs gear viewed the merger as affecting their buying decisions quite positively, but high-end Sperry 1100 sites saw it having a negative effect. Given that Sperry initially resisted Burroughs' acquisition move, this latter reaction may simply be an emotional one. There is little sign of potential defections among those disgruntled 1100 sites, even though delivery of compatible follow-on systems may be stretched out.

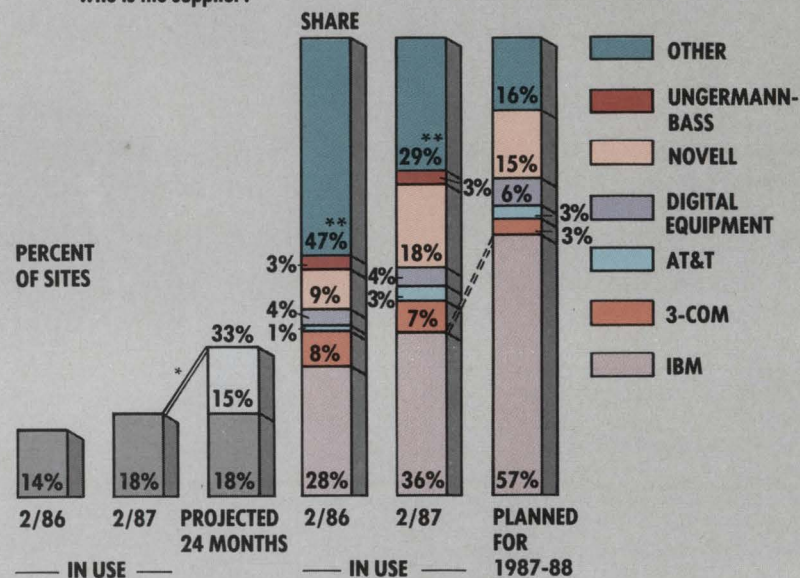
As with the other non-IBM-compatible suppliers, both Burroughs and Sperry users said that the area needing most attention from their respective vendor was applications software. However, overall ratings improved from the year before, more for Burroughs than for Sperry sites.

Unisys respondents said they planned to install equipment in 1987-88 that will be worth 25% of the value of their current installed base. That compares favorably with the 20% figure derived from last year's survey. For Burroughs sites alone, the comparable figure was 31% extra value to be added, up from 23% a year before; for Sperry sites, it was 20% this year, compared with 17% before.

The need for additional mainframe capacity among Burroughs sites was down this year to 29% of the sites, from 35% last year. Among Sperry sites, the comparable figures were 27% this year compared with 31% last year. A need for extra disk capacity was indicated by 39% of the Burroughs sites, down from 44% in the 1986 survey, and by 45% of the

**FIGURE 8 Novell Gains with IBM in LAN Market**

Query: If your organization has installed or plans to install a local area network, who is the supplier?



\*35% compound user base expansion (down from 44% in 1986 survey)

\*\*Includes Sytek (5% 2/86, 2% 2/87), Corvus/Omninet (4%, 2%), Wangnet (3%, 2%), Network Systems Hyperchannel (2%, 2%), Xerox (3%, 1%), etc.

Sperry sites, down from 50%.

The Burroughs sites showing the most demand for extra mainframe capacity were not those among its commercial breadwinners—manufacturing, wholesale/retail, and financial institutions—but rather the education and civilian government sectors. Among Sperry sites, the strongest demand is to be found in national defense and communications utility sites.

Add-on peripherals activity plans among Unisys sites was found to be flat or down compared with those of last year. Only slight increases were found in terminals, while the important disk business was down sharply in both camps. The percentage of respondents buying from Unisys is up, however, at the expense of pcms. Sperry was found to be doing quite well with its personal computers, with 57% of its respondents having standardized on its machines and 20% on IBM's. Among Burroughs sites, the comparable figures are 31% for Burroughs and 35% for IBM.

### Boost for Honeywell

As for Honeywell, after two extremely slow years, planned installation activity among its user base has gotten a

substantial shot in the arm. While last year these users said they would install equipment that was worth 10% of the value of their installed base during the following two years, they indicated a comparable figure of 17% this year. However, only half the percentage of those users (22% this year compared with 44% last year) said that they planned to add disk drives.

The percentage of Honeywell sites needing more mainframe capacity remained just about flat, at 34%, up from 32% in 1986. A similar situation was found in the need for disk capacity (49% needing it this year, compared to 50% last year). Just over a fifth (23%) of the respondents said they planned to add disk drives, while exactly a third said they planned to add crt terminals.

On the distributed processing front, Honeywell users seem to lead the industry: 43% of them are currently involved with that technology, while 58% will be so by the end of next year. However, a relatively tiny fraction of the Honeywell base (7%) said it had standardized on Honeywell personal computers. This compares poorly with, for instance, Sperry's figure of 57%, and represents a vulnerability to other vendors, namely



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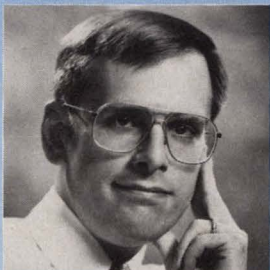
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# Behind the News

IBM. Similarly, only a third or so of the Honeywell sites said they had chosen that firm as the main supplier of office systems.

Nevertheless, there was a general improvement in Honeywell respondents' attitude toward the vendor, with the strongest negative factor continuing to be applications software. The company has gained substantial favor for its field maintenance services, however.

NCR user respondents indicated an overall improvement in their attitude toward the vendor, but showed continuing weak marks for the company's database and applications software offerings. As a whole, planned installation activity was up substantially compared with the year before. NCR customers said that during 1987-88 they would add equipment worth 21% of the value of their current installed base; last year's figure was only 13%. In terms of units, those planned installations would be equivalent to 17% of the installed base, down slightly from the 16% registered last year.

In terms of already installed capacity for 1987-88, a quarter of the NCR sites said they needed more mainframe capacity. NCR's important financial institution customers showed the least need for system capacity. Business services, manufacturing, and wholesale/retail services also have more than enough capacity on hand. A third of the NCR sites said they needed to—and would—add disk drive capacity; the strongest demand came from users of large V8XXX mainframes. A third of all NCR respondents indicated plans to add crt terminals.

But users of the small V8XXX machines showed a strong leaning toward leaving the NCR fold sometime in the future: one out of four such users said they would do so, up from one out of 10 a year ago.

An important product line for NCR has been its Tower systems, based on the 32-bit Motorola 68000 microprocessor. Thirty percent of the large V8XXX respondents already have installed such machines, with another 10% planning to do so. While only 19% of the large NCR sites were currently involved with distributed processing, 43% said they would be by the end of next year.

Each year this survey measures customer loyalties, and this year's poll found sharp increases in the portion of large-scale (i.e., the most important) Honeywell and NCR users who are "seriously considering a change" of primary

## Survey Method

The 1987 DATAMATION/Cowen & Co. Computer and Telecommunications Survey, the 10th to be conducted by the two organizations, began Jan. 12 when some 55,000 questionnaires were mailed to mainframe users across the U.S. and Canada. As in previous years, both general and vendor-specific questions were asked in an attempt to gauge users' attitudes toward their vendors and to project user spending plans.

By late February, a total of 3,919 qualified, unduplicated responses were in hand and ready for tallying. Of those, 2,800 were from IBM sites, 438 from Burroughs sites, 221 from Honeywell sites, 221 from NCR sites, and 239 from Sperry sites. The respondents come from all sectors of the economy: manufacturing, wholesale/retail, banking, insurance, business services, education, government, and others. Annual revenues or budgets for the sites range from under \$25 million to over \$500 million.

After IBM unveiled its 3090 Model E mainframes in late January, a second questionnaire was sent to almost 500 relevant sites to determine what their reaction to the new machines was. Some 320 responses were received and tallied.

In analyzing the survey data—of which only a small fraction is portrayed in this article—one should keep in mind that they reflect the economic environment at a fixed point in time. Thus, the survey cannot anticipate the effects of subsequent products or pricing changes.

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vendor. Last year, only 20% of such Honeywell sites and 4% of NCR sites fit into that category, but this year the comparable figures are 31% and 13%. Burroughs and Sperry users came in this year at 15% and 17%, respectively, up slightly from 14% each last year.

### Digital World Seen as Attractive

As usual, most of those potentially migrating large users (59%) indicated the IBM 370 world as their most likely option, but Digital, at 22%, was mentioned as a strong candidate too. Among small systems sites that might make such a move, Digital scored even higher (28%), compared with IBM's 44%. Hewlett-Packard's score in this respect continued to shrink, down to 8% of small users this year from 11% in 1985.

Price/performance remains the key issue for those non-IBM sites that are seriously considering a switch of vendors, which means that to remain competitive, the BUNCH suppliers must keep up with each other and IBM. Of those likely to switch vendors, 58% said their current vendors' systems offered "inferior" price/performance; 27% ranked their vendor as average.

For the non-IBM sites as a whole, the availability of applications software is again the most cited area needing vendor attention. Third-party vendors may be coming to the rescue, however, for in all categories except Honeywell, fewer us-

ers this year than last ranked outside-supplied applications packages as being "below average."

Turning to communications, the survey found that non-IBM sites are planning further connections into networks based on IBM's de facto standard Systems Network Architecture. Among large Sperry, Burroughs, Honeywell, and NCR sites, respectively, 6%, 1%, 9%, and 1% said they were already using SNA connections. But current plans call for those figures to grow to 9%, 9%, 17%, and 14%, respectively, in the following two years. Proprietary network architectures were in use or planned at 30%, 32%, 41%, and 4% of those same large sites.

However one defines it, distributed processing gains importance each year. This year's poll projects an 18% compound growth rate for that type of computing, with 39% of the sites involved at the time of the survey and a total of 54% planning to be so by the end of next year. There appears to be an interesting shift away from personal computers in departmental computing and toward minicomputers. Of the planned departmental systems cited by IBM sites, 39.6% were to use pcs (down from 45.6% of those already installed), while a less-than-overwhelming 17.4% were to use the new 9370 midrange processor. System/3X machines were to hold steady at about 36%. ■



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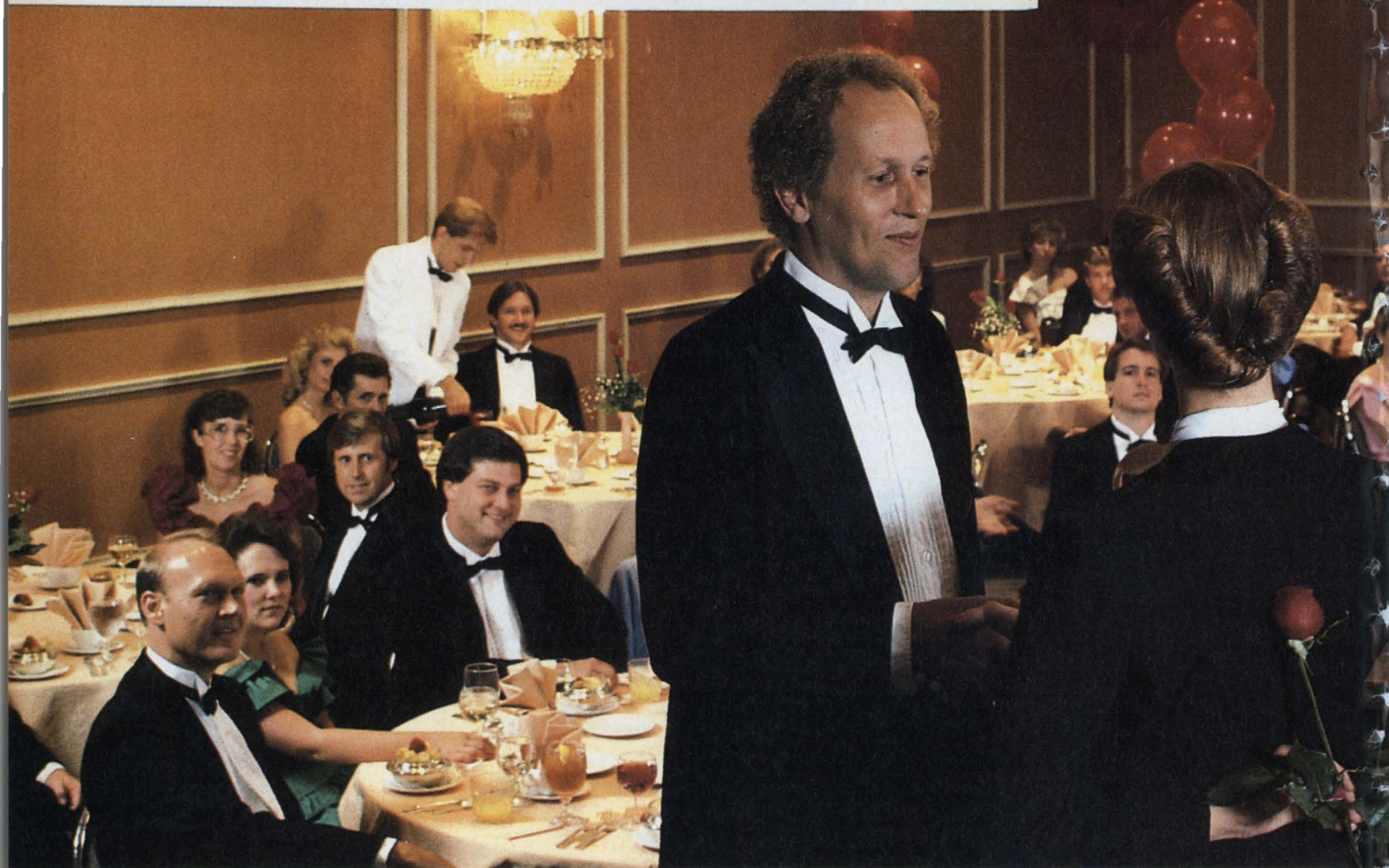
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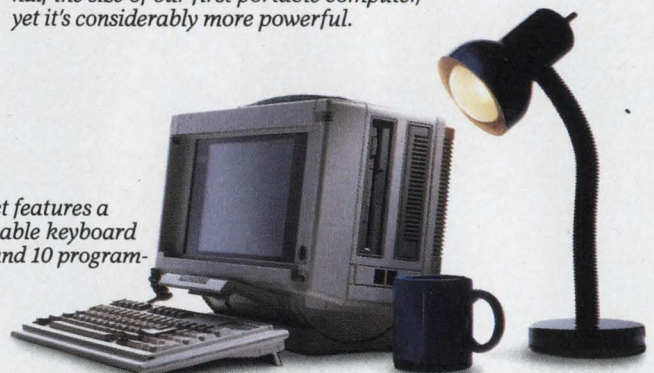


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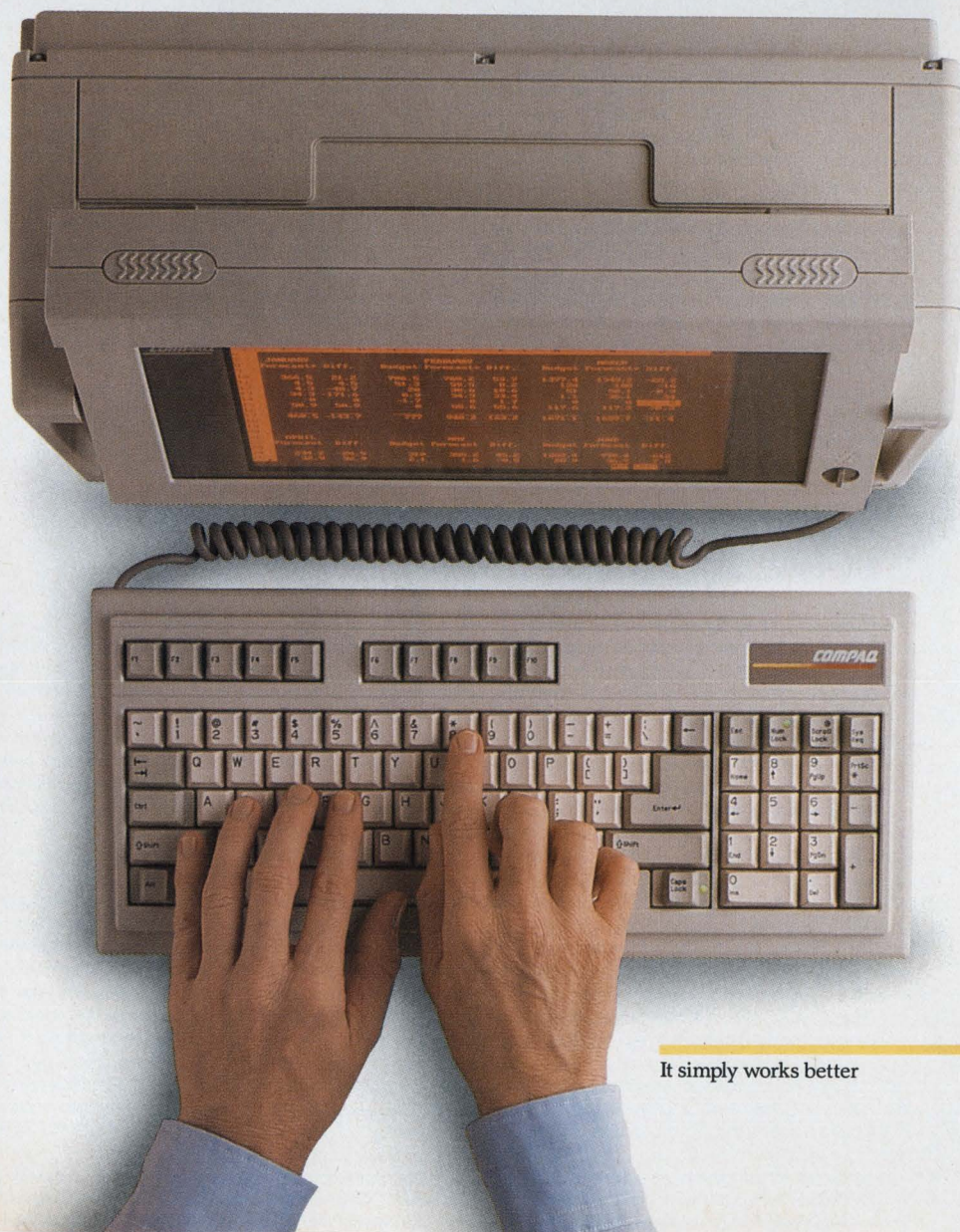
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# Software Bugs: A Matter of Life and Liability

A computerized therapeutic radiation machine has been blamed in incidents that have led to the deaths of two patients and serious injuries to several others. The deadly medical mystery posed by the machine was finally traced to a software bug, "Malfunction 54," named after the message displayed on the operator console. The affair is seen as epitomizing the software reliability crisis at its worst, and raises the thorny legal issue of liability for personal injuries caused by defective programs. The pending lawsuits over the malfunctioning machine may set a legal precedent that could affect all computer users and vendors. Ultimately, such cases call into question our increasing dependence on computers for everything from banking to national defense.





BY ED JOYCE

On the morning of March 21, 1986, Voyne Ray Cox lay face down on a table beneath a linear accelerator radiation machine at the East Texas Cancer Center (ETCC) in Tyler. The 33-year-old oil field worker was undergoing the last phases of radiation treatment as a follow-up to surgery that had successfully removed a tumor on his shoulder. As the two technicians left the room, Cox felt at ease. From his previous eight sessions, he knew the radiation treatment to be a short, painless procedure, no more unsettling than sitting for a photograph.

One of the technicians turned on the accelerator machine at a computer con-

sole outside of the treatment room. Cox heard a frying sound and felt a pain like an electric shock shoot through his shoulder. Another one-second burst from the machine hit him, and he rolled across the table. Following the third burst, Cox jumped from the table and ran to the door, calling for help.

When Cox later asked the radiation oncologist if he had been given an overdose of radiation, the doctor said the machine indicated that Cox had not even gotten the prescribed dose. The accelerator had turned itself off, registering on its computer screen "Malfunction 54," a message that indicates a dose rate discrepancy but not a hazard.

Within days, Cox showed signs of a

severe injury. He began vomiting blood and for the next week had to receive morphine through an intravenous tube. By June, most of his body was paralyzed. In September, he lapsed into a coma and died at a Dallas hospital, less than six months after his radiation treatment. Cox's wife, attributing his death to a radiation overdose, retained an attorney, and has filed suit against the treatment center, the oncologist, and the manufacturer of the radiation machine.

The Cox lawsuit presents a frightening view of what can go wrong when the software controlling a computerized device goes awry. The pending case—along with others similar to it—will definitely "raise the risk consciousness" of

**UNCTION 54**



## Software Bugs



the computer industry, where "malpractice litigation has not yet arrived," declares one lawyer. Since the issue of liability for personal injuries caused by defective computer programs is still unclear, the case may set a legal precedent that could affect users and vendors of all types of software, including applications that, at first glance, hardly seem matters of life and death. For example, who, if anyone, is liable when a software package that is supposed to perform spreadsheet calculations has a logical flaw?

In short, the case epitomizes the software reliability crisis at its worst and brings into question the responsibilities—both moral and legal—of software programmers, designers, and engineers in a society that increasingly entrusts to computers everything from routine bank transactions to matters of national defense.

### Tests Show Nothing Abnormal

After Cox's treatment on that fateful day in Tyler, Fritz Hager, radiological physicist at ETCC, called the manufacturer of the accelerator, Atomic Energy of Canada Ltd. (AECL) in Ottawa, regarding Cox's reaction. An engineer instructed Hager to run basic diagnostics, which revealed nothing abnormal about the accelerator, a Therac 25. The radiation machine was put back into service, and the patient schedule for that day was completed without further incident.

The million-dollar Therac 25, housed in concrete walls seven feet thick, is ETCC's premier radiation treatment device. One oncologist called the Therac "the most sophisticated machine of its kind" for radiation therapy. A user described it as "a wonderful machine—a physicist's delight." Its name stands for therapy accelerator; the "25" refers to the power of the machine, 25 million electron volts.

The Therac administers two types of radiation therapy, X-ray and electron, for different cancers. In X-ray mode, a high-intensity electron beam strikes a tungsten target, which absorbs much of the beam's intensity and produces therapeutic X rays. In electron mode, the Therac's computer, a PDP-11 manufactured by Digital Equipment Corp., retracts the metal target from the beam path and lowers the beam intensity by a factor of 100.

Though the diagnostics indicated nothing wrong with ETCC's Therac 25, oncologist Hager took the machine out of service within a month—after Cox's condition had deteriorated and another pa-

tient had suffered a similar reaction. It seems that "Malfunction 54" had also appeared on the Therac 25's screen during the treatment of a second patient, a 66-year-old bus driver named Verdon Kidd. Kidd died within a month of his last treatment. An FDA official later called Kidd's death the first ever to result from a therapeutic radiation machine accident.

According to the technician who was at the console, a Malfunction 54 occurred only under a peculiar circumstance, when the up-arrow key was used to edit certain parameters on the computer screen. The pressing question among ETCC staff members was, what actually happened in the accelerator room during a Malfunction 54?

After the first incident, AECL engineers speculated that a freak high-voltage arc must have occurred somewhere within the machine. The electrical discharge would explain the noise Cox heard and his sensation of an electrical shock. At the same time, it would disrupt the software controlling the computer, tossing it into random logic that would spuriously generate a Malfunction 54 message. In any case, the amount of radiation applied, according to the computer display, was merely a fraction of the prescribed dose. In no way could that amount burn or injure a person.

Hager, a radiological physicist with 17 years of experience, decided to second-guess the computer. He duplicated the convoluted sequence of keyboard commands required to generate a Malfunction 54 burst. When that burst came, he checked the measured dose with special equipment. The Therac had generated 25,000 rads in less than a second, a dose more than 100 times higher than the average treatment of 200 rads. Doses of 1,000 rads can be fatal if delivered to the whole body.

Hager discovered that during the malfunction the Therac scrambled the two modes, retracting the target as it should for electron mode but leaving the beam intensity set on high for X rays. The unobstructed high-intensity beam traveled through the accelerator guide, destroying any human tissue in its path.

At the end of April 1986, accelerator manufacturer AECL prepared a report for the U.S. Food and Drug Administration (FDA) stating that the Therac's computer software—programmed by the company's own programmers—"failed to access the appropriate calibration data"

under the special editing sequence documented at ETCC. As a short-term solution, the company advised Therac users to pry the up-arrow key cap from the keyboard of the terminal, a DEC model VT100, and cover the key contact switch with electrical tape. This fix disabled the computer's editing function and forced reentry of all treatment data in the event of a mistake.

A few days after the company submitted its report to the FDA, Kidd died in Texas.

Once newspapers and wire services reported the radiation accidents in Tyler, AECL's problems with the Therac 25 software went from bad to worse. Officials at Kennestone Regional Oncology Center in Marietta, Ga., attributed a previously unexplained radiation overdose that occurred nearly a year earlier there to the keyboard editing software flaw. In that incident, which occurred during treatment in June 1985, the patient, Caty Yarbrough, 63, reported a cylinder of pain, "just solid heat," burning through her chest. Her left breast eventually had to be removed.

The most recent incident in which software allegedly contributed to a radiation overdose occurred on Jan. 17, 1987, at the Yakima Valley Memorial Hospital, Yakima, Wash. A patient there received approximately 11,000 rads from a Therac 25, which one AECL official attributes to a previously undiscovered software glitch that he says was "similar, but not identical to," the one found at the Tyler center.

While the Therac accidents repre-



Called "the most sophisticated machine of its kind" for radiation therapy, the Therac 25 is made by Atomic Energy of Canada Ltd.

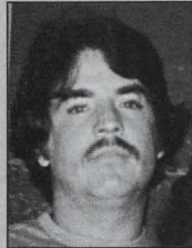
Photograph by Jay Leviton



## “... People Make Mistakes.”



The death of 66-year-old Verdon Kidd in Texas in April 1986 was the first to be attributed to an accident involving the Therac 25.



33-year-old Voyne Ray Cox died in a Dallas hospital in September 1986, six months after treatment involving the Therac 25.



Cathy Yarbrough is believed to have received a radiation overdose during treatment in June 1985 in Marietta, Georgia.



The Kidd and Cox suits filed by Texas attorney Scott Baldwin call the Therac 25 “dangerous and not . . . fit for its intended use.”



Atlanta attorney Bill Bird, representing Yarbrough, seeks data on the “person or entity who initially programmed the Therac 25.”



Vendors must show they’ve “done everything possible to eliminate software errors,” says Palo Alto attorney Susan Nycum.

sent unparalleled tragedies for the medical radiation field, product liability, especially with respect to software, looms as an even larger issue for the computer industry. Observes Susan Nycum, a Palo Alto attorney, “The press is precursor of the plaintiff’s lawyer. Some people who hear of these incidents are bound to get the idea that they too have been harmed by software flaws in computerized devices.”

Scott Baldwin, a Marshall, Texas, attorney, has already filed suits against AECL, ETCC, and the oncologist who supervised the treatment of Cox and Kidd, claiming that each died as a result of radiation overexposures. His complaints charge that manufacturer AECL “put into the stream of commerce a product that was defective, unreasonably dangerous, and not reasonably fit for its intended use.” The suits further allege that “the defendants’ course of conduct departed from the standards of care required of their profession in the diagnosis, treatment, and care” of the patients.

In Georgia, similar legal action has been brought by the Atlanta law firm of Bird & Scherffius against AECL, Kenestone Regional Oncology Center, and Kenneth Haile, the physician who directed the radiation treatment of Cathy Yarbrough. Bill Bird of that firm feels the case hinges on the software defect. Among the legal documents he has submitted is a request for the personnel file of the “person or entity who initially programmed the Therac 25.”

Haile acknowledges that Yarbrough received an “excessive dose of radiation” resulting in “serious injury.” At the same time, he emphasizes, “We followed standard procedures for patient treat-

ment on the Therac. We feel this is a case of product liability, rather than medical malpractice. The physician and oncology center should be dropped from the suit.”

In these situations, attorneys are virtually forced to take the “shotgun approach” and sue everybody involved, remarks Vincent Brannigan, an attorney with the Washington, D.C., law firm of Lamb & Ochs. “When, in the course of a trial, the facts show who is actually liable, you can drop innocent parties from the suit. If the original suit fails to include the responsible parties, however, you may well have lost the opportunity to sue them because of the statute of limitations.” Brannigan, who also teaches at the University of Maryland, is a highly respected authority on the legal aspects of medical software.

### Software: Service or Product?

Whether or not the physicians and cancer centers are dropped from the suits, which are still in their early stages, may ultimately depend on the willingness of the Canadian manufacturer and its insurance company to shoulder blame for the accidents. If AECL tries to deny or minimize its liability, the suits could turn into a protracted legal battle with the physicians and cancer centers pointing fingers at Therac software and AECL attempting to shift the blame to operator errors.

Perhaps the paramount lesson to be learned for the computer industry at large is whether courts will view software as a service or a product. “If programs are viewed as services, those producing the programs will be found liable for defects only if it can be shown that they were negligent,” observes Branni-

gan. Under a negligence standard, the injured party must determine the precise step in the development process of the software, such as design or manufacture, that caused the defect responsible for the injury. Additionally, the plaintiff must prove that the defect was caused by a failure to use sufficient care. In short, a charge of negligence addresses the defendant’s conduct.

On the other hand, if software is seen as a product, “the manufacturer almost surely will be held strictly liable for injuries caused by defects,” states Brannigan. In a strict liability lawsuit, the injury itself may serve as sufficient proof for the plaintiff’s case. Legal experts generally agree that it is much easier for the injured party to recover damages under strict liability than under negligence standards.

“It is striking,” says Brannigan, “how many people automatically assume that negligence, rather than strict liability, is the appropriate test for injuries caused by computer programs. They seem preoccupied with the intangible nature of the program and [think] that the output of the program is a service.”

Vendors who enter a courtroom with the notion that their software is a service, and thus immune to negligence claims, may be in for a surprise. Brannigan says he believes courts will regard software as a product, despite its intangibility, because it has all the other characteristics of a product for legal purposes, namely, it can be owned, passed from person to person, and have errors that can be corrected. In his opinion, the same product liability standards that apply to a lawn mower apply to computer software.



## Software Bugs



"Kludgy, slapped-on-after-the-fact safety mechanisms constitute a major problem for manufacturers today," Brannigan points out. "Generally, these are easily overridden or defeated by the operator. In the event of a problem, the manufacturer may try to shift the blame to an operator who ignored the safety device, but I don't think a court would necessarily see it that way."

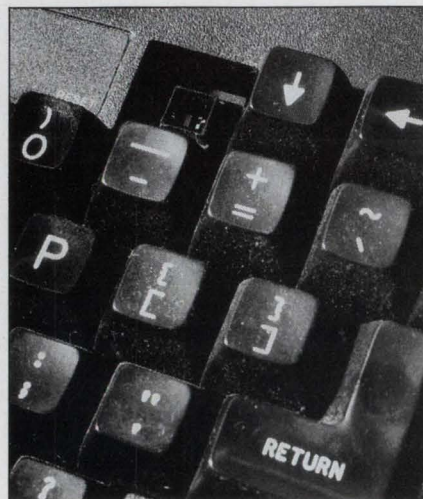
Summarizing a liability strategy, Brannigan asserts, "Assume that the other side is ignorant of any problems or design shortcomings in your device, but that you will have to take the blame for their mistakes." His advice to companies that sell software packages in such high-risk areas as health care should apply to all software developers. "Organizations have to balance the cost of finding every last bug against the liability of a catastrophic loss," he says. "It's a business decision."

If eager customers are clamoring for products that may have defects because comprehensive testing has not been completed, then vendors should protect themselves through indemnity

clauses, recommends attorney Nycum. "Make it clear that the product is still under test and get the customers to assume the risk if they decide to use it in critical areas," she explains.

Nycum has been dealing with the legal issues surrounding software since 1969, when IBM first unbundled software from its mainframes. She feels that the key to lowering exposure to liability claims is being "prepared to show you've done everything possible to eliminate software errors." The first line of defense starts with "policing the programming logic," according to Nycum, who counsels clients to obtain liability insurance coverage when possible from firms that specialize in computers and technology. Two such firms are St. Paul Fire and Marine, and Chubb & Son Inc., Warren, N.J.

Commenting on the Therac incidents, Nycum says, "It's a horrible tragedy, but I don't think very many computer experts are really surprised. After all,



The manufacturer advised Therac users to remove the up-arrow key cap and cover it with tape, as a short-term solution.

software's written by people and people make mistakes."

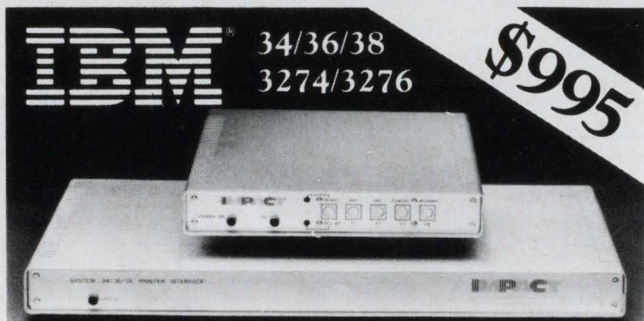
Manufacturer AECL withdrew from the linear accelerator business in the summer of 1985 because of "competitive reasons" unrelated to software problems, says a company spokesman. The company continues to maintain its existing customer base, however, which includes five Therac 25 installations in the U.S. and six others in Canada. To date, four of the U.S. sites have filed reports with the FDA describing some serious problems with the accelerator.

Whatever action the company ultimately takes to debug the software rests partly with the FDA. The agency, which regulates medical devices, must approve any plans to improve the Therac's safety mechanisms. In a formal FDA recall, field changes are made following approval. Pending the recall, AECL has issued temporary instructions for circumventing the software flaws.

Edwin Miller, the FDA official heading the Therac 25 investigation, was recently asked if the agency was considering banning the use of the Therac 25 for patient treatment.

"No such action is planned at this time," he replied. "A complete ban would require an extensive study of risk assessment." Most of the medical centers using the machine, he notes, are multimillion-dollar facilities designed and built around the accelerator. In his opinion, it would not be an easy decision for them to abandon the Therac 25. ■

*Ed Joyce is a consultant and writer based in Charlottesville, Va.*



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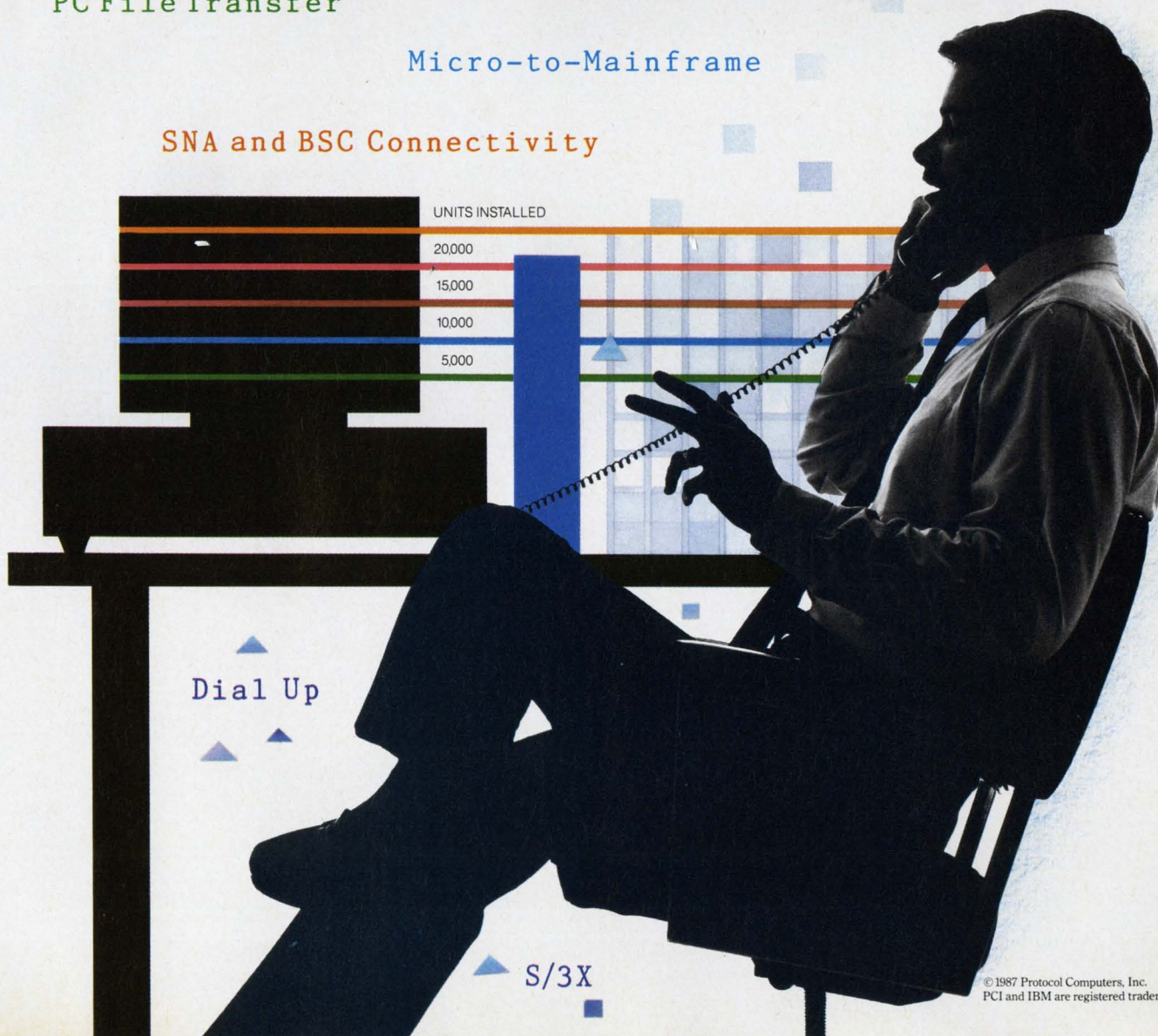
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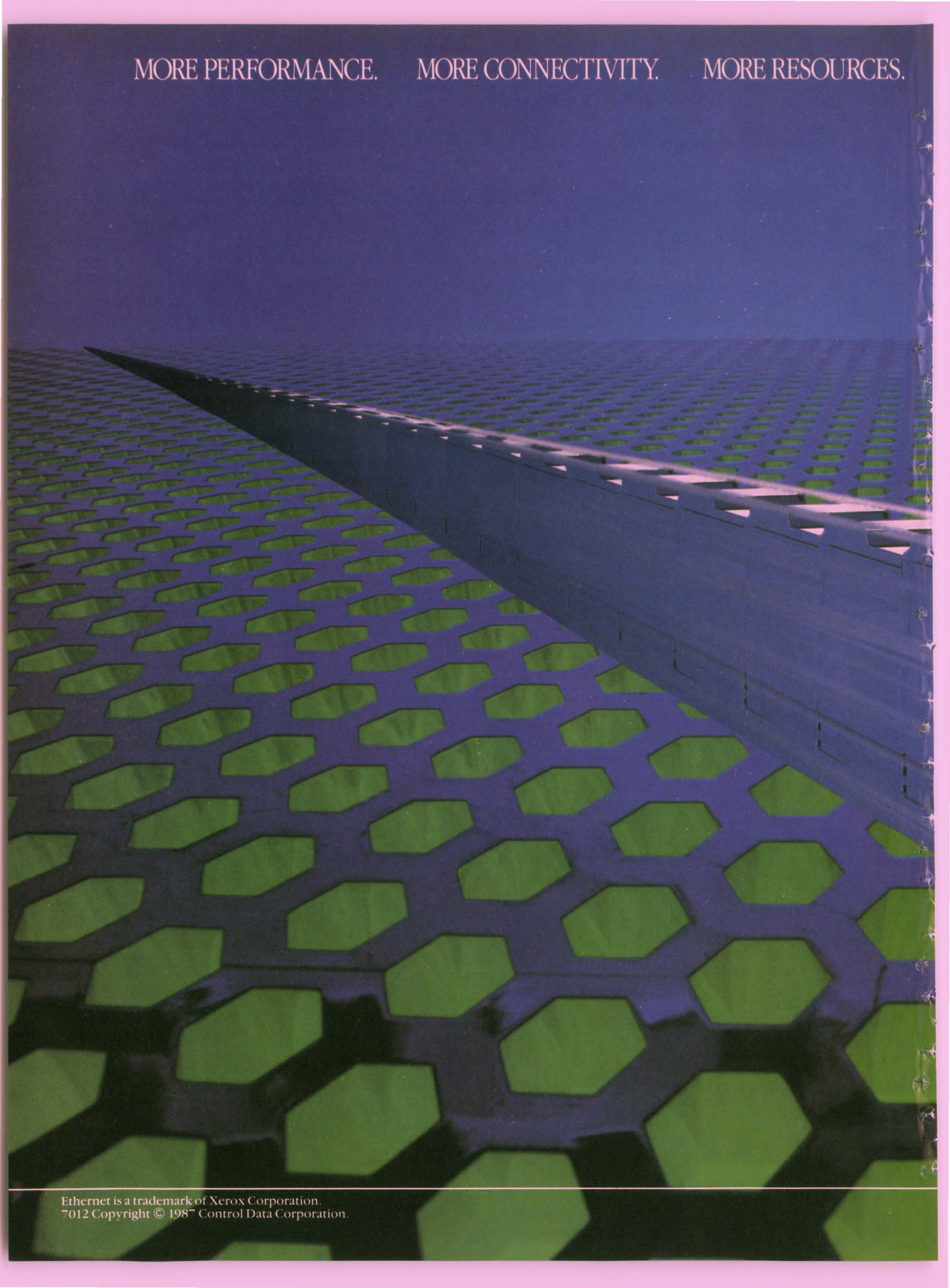
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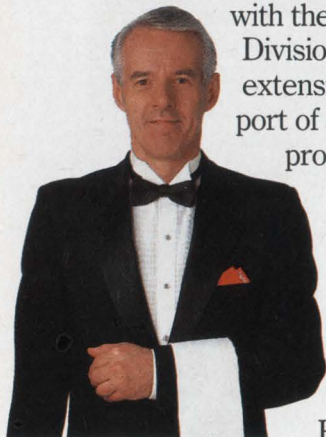


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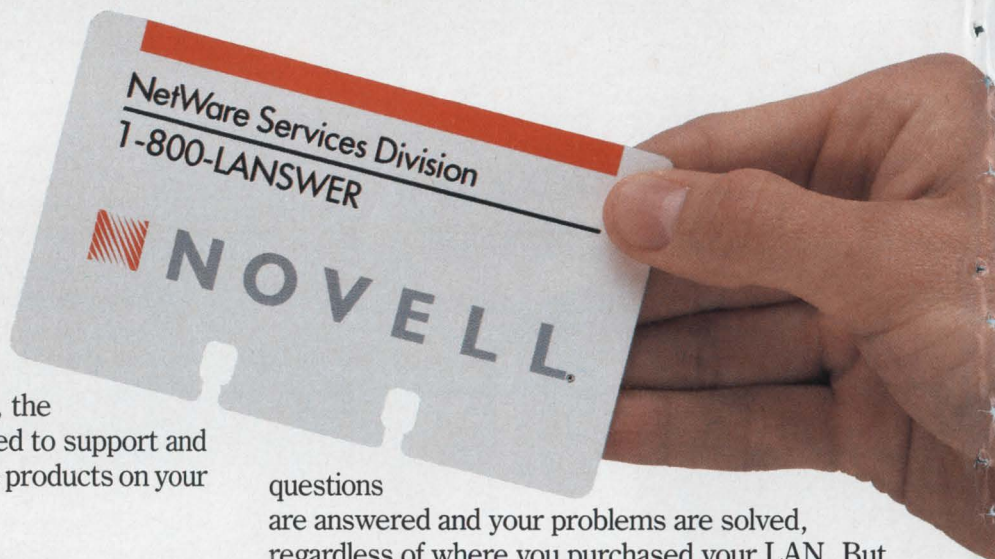
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# NOVELL

Milestones Ahead.





In its crusade to get closer to its customers and competition, Wang has made a former client the new vp of customer information services. Eli Wackstein came from the MIS ranks at Burlington Northern, the industrial giant that showcased some of Wang's more sophisticated wares. Now in the driver's seat at Wang, he wants to show not only that Wang's products work better than IBM's, but that the company is more responsive to user needs. Wang wants to prove it can overcome its OA image and feudal management style.

# From Customer to Catalyst

BY RALPH EMMETT CARLYLE

Information technology vendors are actively seeking customers' help as they attempt to put the current industry slump behind them and regain lost momentum. At a number of gatherings with select accounts, most notably in Dallas last year, IBM urged its customers to become partners in the creation of business solutions. Even Digital Equipment Corp., which has prospered mightily during the slump, is now raiding its customer base for executives—most recently from the food and beverage and financial services sectors—to increase its penetration of their markets. IBM and other leading dp companies are expected to follow suit in the hope that these customers turned managers will help the vendors in their attempts to become systems integrators of widely diverse product sets.

Perhaps the most potent example of this blurring of traditional lines between vendors and users is occurring within Wang Laboratories. Four months ago, Wang took the unusual step of putting control of its internal MIS operation into

the hands of an influential customer, Eli Wackstein, a 19-year veteran of Burlington Northern Inc., Seattle. The \$10 billion industrial giant is among Wang's top five accounts; its subsidiaries are noted for their sophisticated use of Wang wares.

Wackstein, 45, is now one of Wang's top players. Company insiders say the former Burlington MIS exec will play a pivotal role in Wang's revival crusade. A protracted and costly transition from word processing to data processing has hurt both the company's profits and its credibility with its customers. Through fiscal 1987 (which ends next month), the company has been running at a loss and has been plagued by management instability.

Wang's do-or-die crusade is being spearheaded by company president Frederick Wang, who privately refers to it as his "1-3-5-10-20 mission." Sources reveal that by mid-1990, the eldest son of chairman and founder An Wang wants his family firm to achieve five major goals: rate first in customer satisfaction among computer companies, attain the number



## From Customer to Catalyst

three market position behind IBM and Digital, pull in \$5 billion in sales and 10% in after-tax profits, and grow at 20% a year.

Standing in Wang's way is a splintered MIS organization, which was largely neglected during the company's high-growth days. Wang also suffers from the perception—shared by many people both inside and outside Wang—that the \$3 billion concern is merely an office automation company, a niche player. Fred Wang himself recently admitted that his father's company had grown increasingly remote from its customers and that its spectacular growth had masked a number of internal problems (see "Pulling It All Together," March 1, p. 24). In fact, the latest Cowen & Co./DATAMATION survey of Wang's VS customers unearthed trouble spots stemming from problems in software support, the sales/service organization, system reliability, and the new product slate and prices.

Wang has responded by restructuring its MIS operation in a way that helps decentralize the family style of management, enabling it to offer customers more appropriate solutions. Observers feel that Wang's novel idea of using one of its own customers as the catalyst for its initiative is a sign of the times.

Wackstein's appointment as vp of customer information services (CIS), was welcomed by the Wang customers polled by DATAMATION. These users feel that they finally have one of their own on the inside, a person who thinks as they do.


"I'm aware of all their frustrations," declares Wackstein, a Bronx, N.Y., native who majored in accounting and business administration before switching to dp. "I spent seven years defending Wang to my own management—seven years during which it was clear to me that the company didn't have a very good feel for its own products."

Wang's new CIS chief believes the company grew so fast that it had little time for reflection. "Things ended up being done on the fly," he claims. The most glaring indictment of the mini makers' old ways is its internal MIS operation. Prospects who have come to the company's Burlington, Mass., data center hoping to see its dp prowess in action find instead a classic IBM mainframe complex where the 3084 is the computing centerpiece. Even more surprising is the fact that Wang's dp shop is run by Big Blue loyalists who have little conception of what a Wang VS system is, or is capable of doing. "It does send out the wrong mes-

sage," Wackstein admits, "and reinforces the perception that we're an office products company relying on others for dp."

It's perhaps ironic that the IBM-Wang culture clash that is so prevalent within corporate America should also be so apparent within Wang itself. "I don't want to criticize my own people," he notes warily, "but there is a danger in them being concerned more with their résumés than the company's well-being."

Asked if he would keep his IBM mainframes, Wackstein answers yes with no hesitation. "We have to keep our finger on the pulse of IBM technology since we share so many customers in common with IBM and must maintain communications and compatibility be-



### WACKSTEIN WAS "BETTING HIS JOB" ON WANG.

tween the two environments." But it's clear that from now on, the accent at Wang will be on building an integrated and distributed VS network. That setup will enable Wang to pull together and provide the much needed showcase for its customers.

Wang Labs, which shares more customers with IBM at large commercial sites than any other dp vendor, has had a symbiotic relationship with the mainframe giant for years. That relationship has been the bane of its existence ever since it decided to challenge IBM in its bread-and-butter market, integrated systems. In the office, and increasingly in distributed dp, one company's loss has been the other's gain. Lately, IBM's pricing pressure has been one key reason why Wang costs are hurting profits, driving it into a sea of red ink for the fiscal year.

IBM, in contrast, gives MIS execs a cozy feeling. "Senior MIS managers are comfortable with IBM," confirms Wackstein. "They sometimes feel threatened by Wang's dp solutions. The emotional or political response is to stay with what you know."

But some companies are prepared

to challenge this computing credo. One of Burlington Northern's subsidiaries, El Paso Gas in Texas, began to change its Big Blue computing ways in 1980, the year Wackstein took over as its vp of MIS. Asked to evaluate the El Paso data center's performance in light of end-user requirements, Wackstein soon discovered that it was "a classic IBM mainframe operation with MVS and the IMS/DC database software. IBM's software development tools were crude to nonexistent, costs were spiraling, applications were late." Even more troublesome was the fact that end users were being shut out of the whole applications development process because of the complexity of the entire operation.

That operation became more streamlined when pricing pressure in the deregulated energy business forced El Paso to find more creative ways to keep its costs down. "It was unreasonable to expect that the MIS budget could go on increasing out of sync with the rest of the corporation," recalls Wackstein. "We weren't being good corporate citizens."

After evaluating 30 vendors for a distributed dp pilot, the gas firm finally went with a Wang VS "precisely because of its dp capabilities and its applications development tools," explains Wackstein. He says he knew he was on to something when his Wang "novices"—IBM programmers who bitterly opposed the switch to the VS—began writing programs five to eight times faster than their IMS/DC counterparts.

By 1983, Wackstein says that he was "betting his job" when he replaced an IBM mainframe with a cluster of VS minicomputers. He soon found out firsthand that IBM has at its disposal many resources that it can use when it's unhappy. "It was a difficult time," he remembers.

But it was a difficult time that Wackstein feels has saved the company substantial sums since 1982. During the last five years, Wackstein estimates that the El Paso VS operation has spewed out some six million lines of code, some on batch programs that are now being written three times faster than on the IBM mainframe and some on on-line programs that are being churned out 10 times faster. All this, he claims, was accomplished with an MIS department that was cut to 200 from 300 and an operating budget that was reduced to \$18 million this year from \$24 million in 1982.

Wackstein is proud of the El Paso achievements. "One of the reasons I've taken this new job," Wackstein reveals,



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## From Customer to Catalyst

"is to get this and similar stories out. What's really hurting Wang is its word processing image. Many of Wang's employees aren't even aware that sites like El Paso exist—that the VS can be used in this way."

Wang hopes that more VS pilots will begin to take off at mainframe sites. It's counting on corporate cost-cutting trends and IBM's 9370 seal of approval on dispersed processing to speed its computing cause. "We simply ask prospects to try a small experiment, say for \$500,000, have fun, and see where it leads," explains Wackstein amiably.

Meanwhile, there is little fun and games in Wang's future. The company, says Wackstein, must get its own dp house in order to build up credibility with MIS managers. "We have to demonstrate," he declares, "that we've got it all together internally before many of them will come off the fence."

After years of being fragmented into a number of management fiefdoms, Wang is hoping that its new MIS boss will be able to create an integrated data model of its business. That model, which

would give management an overview of all its systems requirements, would also aid in strategic planning. "I probably shouldn't say this, but the company appears to have split into a number of data areas, each doing its own thing. From

**"IT'S TIME  
CUSTOMERS  
HAD THEIR  
SAY."**

now on," he vows, "we want to make sure that information used for one process can be used for other processes across the organization."

Adding to that information flow will be input from select groups of Wang's largest customers that will be fed into the firm on a regular basis. "We must have

fresh blood flowing through our corporate veins," declares Wackstein. The company is also planning to build an electronic data interchange network that will enable its customers to conduct more of their business chores, such as order taking and invoicing, electronically.

To be more responsive and expand its own business base, Wang will arm its sales force with its new laptop computer, Wackstein reveals. This is a move that has Wackstein's name written all over it.

An outsider now turned insider, Wackstein sees himself as an "agent of change" in the family-run firm that once kept customers at a distance. "We have to learn to think like a customer," he insists. "After all, they have more invested in this company than people on the inside realize. It's time they had their say." ■

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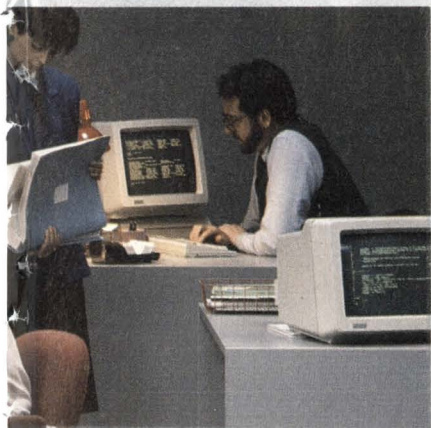
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There's more to distributed data processing than simply scattering minicomputers around. Real distributed processing requires interconnection among multiple sites for file inquiries and updates and sharing of both processing resources and databases. To be successful, a distributed data processing network should follow four rules: there should be a data dictionary for all data elements; transactions should carry status tags; a manager should be responsible for data element integrity; and a manager should be in charge of system status at each site.



# Rules of DDP You Can't Break

BY FREDERIC G. WITHINGTON

While people have talked about distributed processing ever since the advent of the minicomputer, few have actually implemented it. There are thousands of local and departmental machines in use today, but the vast majority of them are not really "distributed" in the sense that they share the support of a common application. In fact, most of these machines, situated at multiple independent sites, serve a local group more or less autonomously. Many of these systems are also found at hierarchical nodes in a network where they handle local work but depend upon a central resource for master file processing, switching, and scheduling.

Real distributed data processing (ddp) requires the geographical division of a dp application among multiple sites. It implies intercommunication among the sites for inquiries and file updates, and sharing of processing resources, files, and complex databases.

Some user organizations that have successfully implemented bona fide distributed processing networks have found there's more to ddp than merely scattering minicomputers around. What they faced were some difficult management issues. Their experience in dealing with those issues and other more technical aspects of network design can serve as a guide for users who also want to follow the ddp path. Fortunately, that path has been pretty well plowed. Users don't have to be pioneers anymore—real distributed processing has grown up.

First, let's address the management concerns. Cost considerations head that list. Distributed processing does not necessarily reduce costs. While cpus are inexpensive, redundant peripherals are not. Twenty local, medium-speed line printers that are idle most of the time cost more than two central high-speed printers that are efficiently used.

Data communications costs may also be increased in a distributed net-



## Four Rules of Ddp

work. In a star network, where all transactions are trunked to a central host, there are relatively few lines. Economies of scale can be realized for those lines that are near the center. With distributed processing, connections have to be established between all sites that might possibly talk to each other, regardless of traffic volume. The resulting proliferation of low-speed lines can easily cost more than a single, optimized star network. (Packet switching offers a more economical alternative, but response times and reliability need to be verified.)

Error recovery must also be guaranteed. Errors can result from undetected software bugs, erroneous data entry, or from equipment or line failures—both hard and transient. These faults will not necessarily be detected when they occur. There must be a way to backtrack to a system status where everything is known to be correct. That backtracking process is much harder to do in a distributed system than in a central one.

Distributed systems also require adherence to certain disciplines. Sometimes organizations prefer not to impose those disciplines that are so necessary to the success of distributed processing. The first discipline comes into play if separate computers are to communicate: they must use the same data definitions. For example, part and customer numbers must be the same; lot sizes, styles, credit terms, and other attributes of the data must be identical.

To attain that commonality, programmers must share a common data dictionary defining all the data elements used in the database, and all users must have access to it and understand it. If communications between the sites are person-to-person by telephone, which is usually the case without distributed processing, discipline does not have to be so precise. People can converse until they have established understanding.

### Discipline in Modifying Records

Second, there must be a disciplined means of modifying records. If people from the various sites can modify one another's records at will, no one can be sure those records are accurate. If the records are associated with items of value or are financial records, there is also the possibility of fraud. In addition, if people at several points of transaction want to modify the same record at the same time, some of them may receive obsolete information. That scenario could result, for example, when travel agents all want to sell the same airplane seat.

## Distributed Processing For Backup

Sometimes, organizations unhappy about relying on the availability of a single computer site establish another to provide backup. The second site is situated far enough away to have independent power and communications and to make any common natural disaster unlikely.

The second site, which is equipped with the same hardware and software as the first facility, must also be outfitted with duplicate files—no easy task, since files change continuously. To date, most users have settled for batch file transfer: periodic transport of files and transaction batches to the backup site after a checkpoint has been reached at the first. This transfer is usually physical since electronic transmission of large volumes is costly and overnight service is acceptable.

The second site is also given work to do, because it is too wasteful to have the equipment sit idle. Those applications, naturally, also need backup. So why not have them backed up at the first site? Of course, that means that file and transaction flows must then occur in the reverse direction. Aside from the operational challenge of keeping track of what's where, this is not hard to implement. This mutual backup relationship between two sites typifies the state of the art today.

Tomorrow, things may be different. Making that difference is data communications. In fact, the speed and cost of datacom are improving so fast that many users may decide that their two sites can be continuously communicating back and forth. If so, then each site can be as current as the latest transaction received by the other. Neither facility, however, will ever be able to tell where the other's processing program was in the processing of a transaction when a disruption occurs. Current transactions, for instance, might be posted twice at the backup site or maybe not at all. For this reason, status-tagging of all transactions will be needed to maintain integrity. Distributed processing for backup turns out to be only a simplified version of the general case, and the same design principles apply.

Third, there must be some assurance that the files at the various sites correspond with each other. If, for instance, a bank wants to collect cash balances from all its branches each night but one of the offices fails to enter all the day's transactions, then the result will be wrong and the central staff will not necessarily know it. Once again, the possibility of fraud arises.

System planners should answer several pertinent questions before a commitment to distributed processing is made. First and foremost, they should determine whether they really want to provide interactive data services to large numbers of people at the local sites. It will be costly and traumatic to do that whether the system is distributed or not, and the benefits will not always be foreseeable in concrete terms. This first decision, which often requires a good deal of faith, usually involves the commitment of senior management.

Second, system planners should decide whether it will be more economical to provide the services centrally or decentrally. The key issues in that debate revolve around the following questions:

- What is the pattern of communications?
- What would the relative costs of equipment be?
- What will the relative costs of data en-

try be?

Precise costs for alternatives are hard to determine, but reliable estimates should be possible using modern modeling tools. If the planned system is big and requires a major investment, prototypes should be implemented anyhow that will provide better cost data.

The remaining two questions in the ddp debate are also crucial. The first is, can recovery from error be guaranteed? This question needs to be addressed early in the conceptual design phase, because experience indicates that the necessary architectural provisions need to be made in the basic file and message designs. They also need to be considered when selecting the system programs to be used. The acceptable degree of risk should be identified, keeping in mind that guarantees can never be absolute. The organization's internal or external auditors may be helpful here.

The last question that needs to be addressed is, can the necessary discipline be attained? That leads to another inevitable question: can the local people be induced to comply with the procedures for using data dictionaries, for updating records, for entering data, and for timely reporting? Goodwill isn't enough; compliance must become habitual.

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## Four Rules of Ddp

rules that seem to be generally applicable have emerged from their experience. Systems that follow these rules will not be certain to succeed—but those that don't, probably won't.

1

First, a complete, up-to-date data dictionary must be maintained for all data elements in the system. This rule, which applies regardless of file structure, must be followed for communications between sites. Many of the vendors' system programs that support distributed processing require these data dictionaries. IBM's Distributed Data Management (DDM) architecture, for example, has a network resource directory.

2

Second, all transactions should carry status tags. These are codes that say what has happened to transactions moving through the system. When a transaction has been successfully moved from one node in the network to another, the status code should be updated to indicate this. When it has been modified, used to update a file record, decomposed into multiple transactions, or combined with others to form a larger transaction, the status record should also be updated accordingly. Delete the status code only when a transaction leaves the network.

This scheme permits unambiguous recovery from any possible failure. Since all transactions are tagged, only those currently being altered can be lost. This rule, which carries a cost in terms of disk operations and processing time, may result in a compromise—batch coding of transaction tags, for example. Transaction tags are nevertheless a good idea.

3

The third guideline concerns accountability. One single manager should be responsible for the integrity of each data element. Any modification of a data element should be performed only under the control of the responsible manager. This does not mean that a person must intervene before an update is performed. It does mean that a single master copy of each data element should be situated at the site of the responsible manager. That copy should be accessible only through a single port that incorporates enough edits and checks to satisfy the manager.

The manager should also be available if the system gets confused. He will be the one blamed if the data element

gets fouled up. To prevent that from happening, the manager should check the data element's status periodically.

4

The last rule requires that someone be given responsibility for the status of the system at each site. (This doesn't have to be the same person who oversees the data elements.) This particular person should be in charge of certifying that all input is on schedule. If it's not, then he should alert central management. He also certifies that only the current copy of a centrally provided file is used, and makes sure that end-of-the-day procedures are correctly followed.

There are not many architectures for distributing data processing that comply with all these guidelines. In fact, only two appear to be in widespread use. This does not preclude, however, using less-popular architectures.

The first architecture is based on central maintenance of a data dictionary and geographical distribution of the database. In this architecture, only one copy of each data element exists. That copy, which is situated in one of the local databases, is identified in the central data dictionary. Modifying the local data element can be done only with the approval of the local manager.

One illustrative example of this geographic distribution approach is the repair parts system of some auto manufacturers. Under this setup, each dealer has his own parts inventory that he manages as he pleases. He also has a local computer system supplied by the auto manufacturer he represents. The computer, which maintains the inventory, can also communicate with other dealers and the manufacturer's warehouses. The manufacturer maintains a central dictionary that contains all the part names and the locations of the dealers and warehouses that stock each part. When a dealer needs a part, he sends a message to the central directory to discover the nearest location of the part. Then, he contacts that location or another, if necessary, to order it. The part is sent after a single session, yet each dealer maintains independent inventory control.

The other popular distributed processing architecture uses "memo files." In this architecture, there is only one official copy of the master file. It is prepared centrally, usually on a daily basis, using batch processing controls. Unofficial copies of it are distributed to the local sites, generally early in the morning. The local users, who modify the files as need-

ed, also send the individual transactions to the central site. At night, the master file is prepared again and distributed and yesterday's local file is discarded.

This architecture, often chosen by banks, also is frequently used to prepare local databases that support distributed information centers. In this architecture, local users can do anything to their files that they like without harming the integrity of corporate files. The disadvantage is that there's a cost for posting every transaction twice—once in real time locally, and again at night centrally.

Both architectures have drawbacks. The geographic distribution method is inconvenient when there is a poor association of data elements with unique locations, or when the discipline of the central data dictionary is onerous. The copy or memo file method, while flexible and convenient for local people, involves duplicate data entry and redundant transmission of databases. It may be impractical for databases larger than a few tens of millions of characters.

### Central Discipline a Must

Any successful distributed processing system must have a degree of central discipline. Both architectures require that a central authority perform three roles: establishing and maintaining a current data dictionary; creating the structures and status codes for the transactions that are to move through the network; and establishing and enforcing the rules for modifying master data elements. In the first architecture, where databases are distributed, the central authority must also establish and enforce site management procedures. In addition, the central organization may also provide the network, the hardware and software, and the training or support for the local sites.

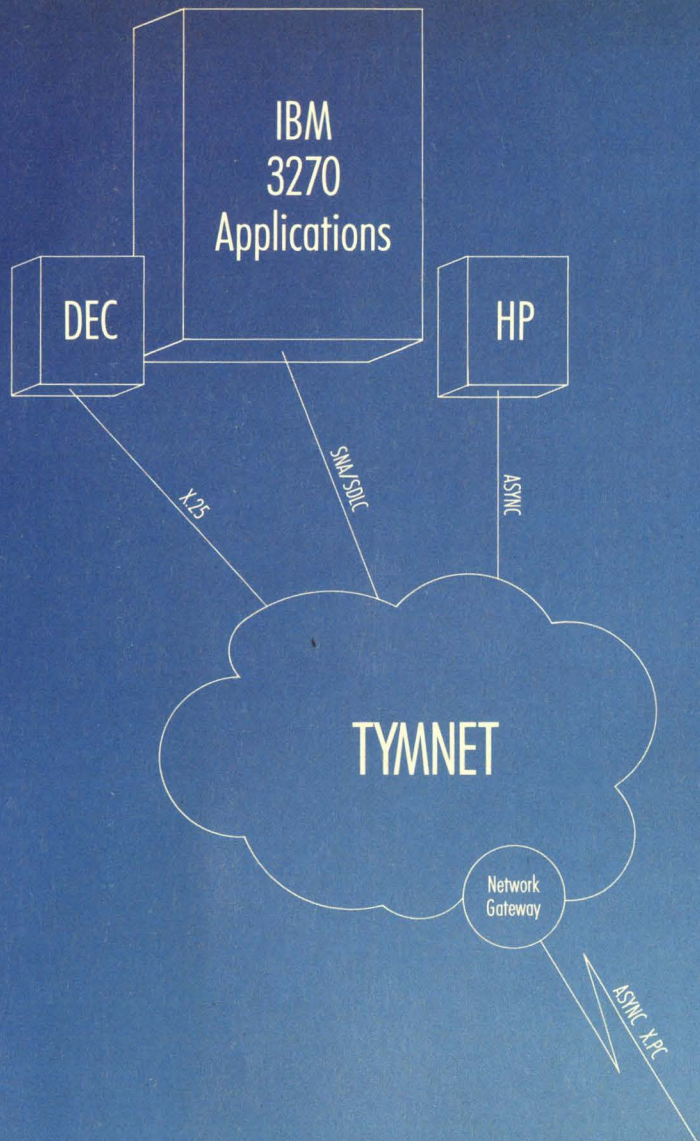
All of us dislike centralized authority, and it may seem disappointing that we must accept these guidelines for distributing processing. But users can take heart and help from the fact that in a well-planned system they should have little trouble following the disciplines required by ddp. In the end, they get better tools for doing their jobs, and that, after all, is the information system planner's job—to give users a net increase in job satisfaction. This has been done with real distributed processing. ■

*DATAMATION* advisor *Frederic Withington*, a 30-year industry veteran, has written four books and over 60 articles and papers on dp topics.



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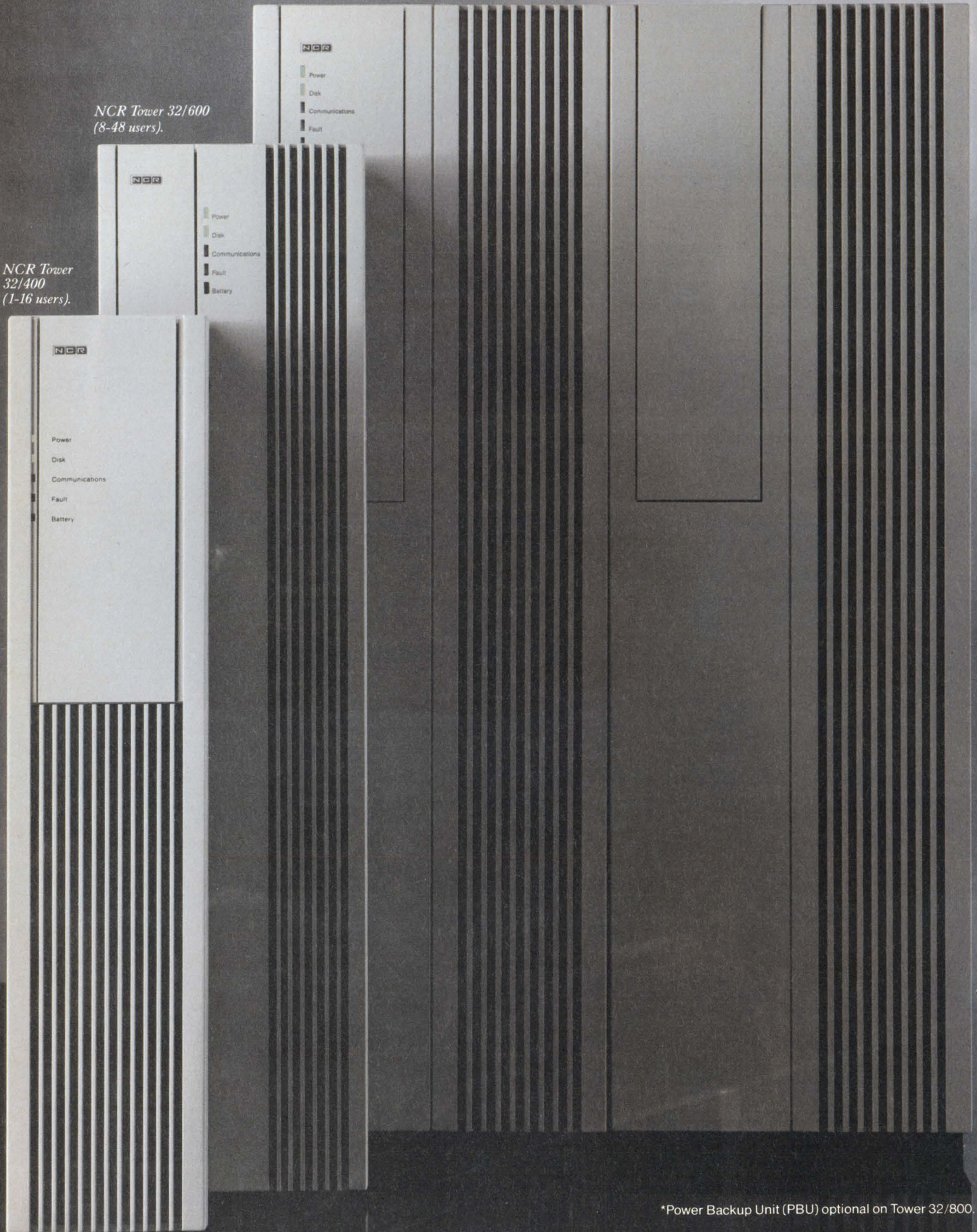
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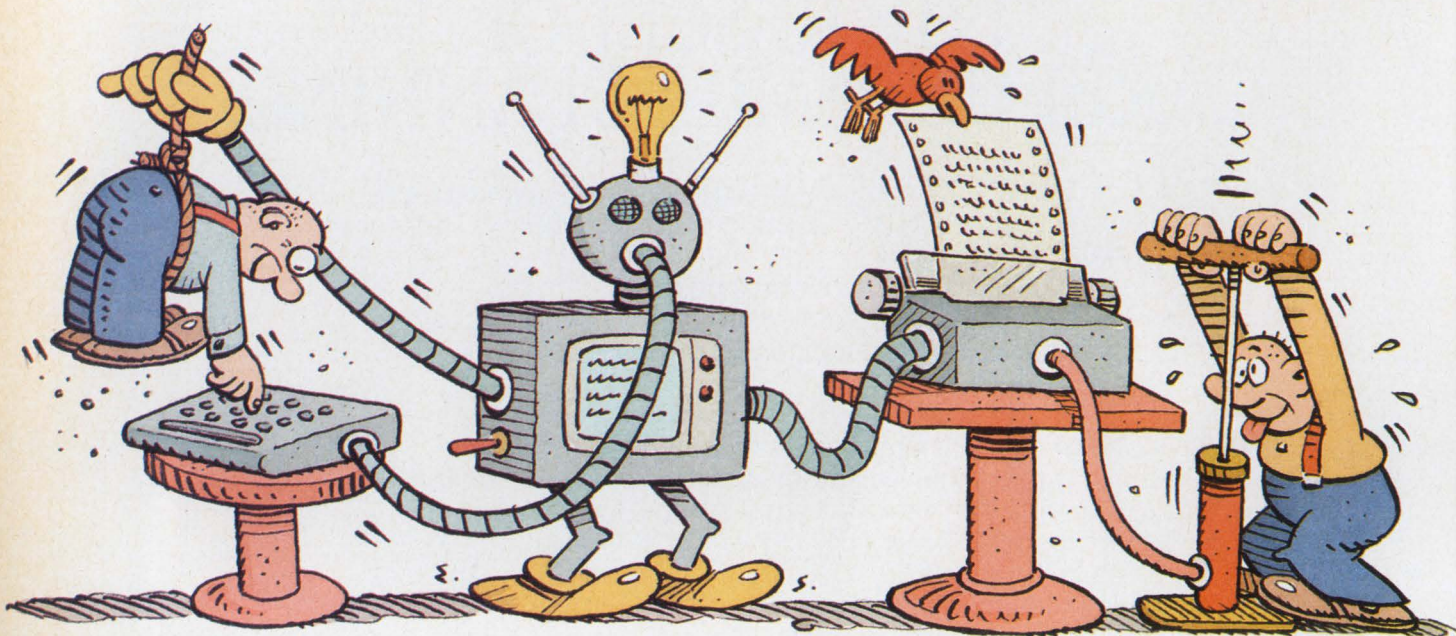
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Long-range systems planning helps to prepare for the deployment of information processing resources over three to five years in a manner that supports organizational growth and development. Two case histories: a large, growing, health maintenance organization makes its information systems support a large expansion in business; and a large, multicampus university system redirects its information systems strategy to improve end-user productivity, enhance management, and improve services to its clients—325,000 students.

# Long-Range Systems Planning

BY DOUG POTTER

Long-range systems planning is like apple pie: everybody claims to believe in it, but few can make a great one. People confuse long-range systems planning with capacity planning or systems development or even simple budgeting.

So what is long-range systems planning?

Long-range systems planning is planning the deployment of information processing resources over the next three to five years in a manner that supports organizational growth and development.

The long-range systems plan must address three key areas in sequence:

1. application systems,
2. technology (the entire environment in which the application systems run), and
3. organization and administration.

The essence of the planning—using a comprehensive methodology developed by Price Waterhouse—is simple: examine the organization's strategic business plan, develop a strategy to address each of the three key areas, and spell out project plans for the effective implementation of the strategy.

Organizations that plan the development of their information processing resources have a distinct advantage over those that do not. Researchers at McKinsey & Co., the Cambridge, Mass., consulting company, ranked 36 major companies in 13 industries on the following criteria:

- return on computer investment,
- the usefulness of computer-based applications, and

• ceos' impressions of their information processing departments.

The results overwhelmingly indicated that companies that plan their information systems activities are more successful than those that do not.

Let's examine some real applications of long-range systems planning. The case study that follows typifies what can happen when an expanding business studies and plans the growth of its information resources.

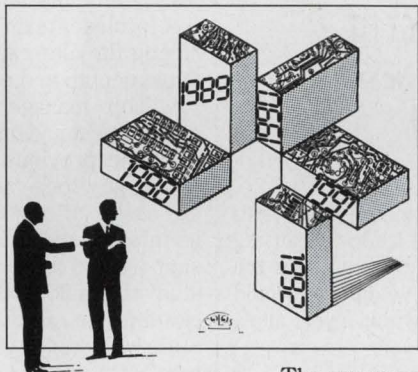
PacifiCare Health Systems is a Cypress, Calif.-based health maintenance organization (HMO) that found itself in a whirlwind of expansion. Faced with an upcoming public offering, management developed a corporate strategic business plan to help guide the organization through this period of growth.

The largest piece of PacifiCare's business was the various HMOs it owned and operated nationwide. New membership for these HMOs was projected to increase at an annual rate of about 50% over the next four years, fueled by new HMOs opening around the country. To operate the new HMOs, the company was considering decentralized management.

## Improvements Needed to Support Plan

While the existing information systems were functioning quite well for PacifiCare's size at the time, it was clear that in order to support the strategic business plan, improvements in application systems features and capabilities, software development technology, and hardware capacity would be necessary.

The existing application systems were originally a packaged system designed for an HMO about half the size of PacifiCare. The original vendor would most likely not recognize much of this software. It had been converted from its native hardware environment to run on PacifiCare's current minicomputer, and all applications had been converted from





## Long-Range Systems Planning

BASIC to COBOL. In addition, the business had changed so much that many features had been added to applications.

A questionnaire survey of key department managers launched the long-range systems planning effort at PacifiCare. The information garnered made it clear that the current applications would have to be rewritten to support growth objectives set forth in the corporate strategic plan. This conclusion came as no surprise.

### Software Search Strikes Out

Also not surprising were the results of a search for packaged software to help replace current systems. If suitable packaged software had been available, it might have determined the kind of hardware that would have been selected. The expected results: the HMO industry was still too new for there to be currently available packages to support an HMO of the size PacifiCare was becoming. This meant there was no compelling reason to select any particular hardware environment. Furthermore, an extensive in-house effort would be necessary to develop applications.

This realization led to the inclusion in the plan of projects to improve software development technology. Specifically, these were the selection of database management software, screen and report generation software, and other tools to support an information center environment.

The next step was to develop a picture of the hardware environment as it would exist. This is ordinarily an easy task—but not in this case. It was clear from management's impressions and comments that actual growth rates could differ from their 50% annual projected growth rates. If the difference was significant, the hardware environment would have to expand or shrink accordingly.


The second problem in predicting hardware needs related to PacifiCare's then current hardware vendor. In developing a long-range systems plan, organizations will often consider alternative hardware scenarios. In most cases, one alternative includes additional or new equipment from the current vendor. In this case, however, it gradually became apparent that this would be a very risky alternative. According to Bob Raymond, PacifiCare's director of information services, "They were proposing to meet our requirements with hardware that didn't exist yet. This, combined with our experience with their service and support, led us to not consider their hardware as a via-

ble future alternative."

Part of the long-range systems plan included a step for projecting the demand for system resources over the time covered by the plan. This step produced a model that correlated the demand for terminals, disk space, processing time, and disk I/Os to the growth rate in HMO membership. The results of this model were used to estimate required resources for the future processing environment.

The model raised some red flags when matched against the capacity of the current system and its newly released upgrade. Even though the current system was only running at 50% to 75% of capacity, it would likely become overloaded within a year. Further, regardless of what the future hardware environment would be, the current vendor's newly released top-end machine would be required to support the current applications, and even this system would be overloaded in one to two years!

These apprehensions and their im-



### A SYSTEMS PLAN MUST FIT THE BUSINESS PLAN.

plications all became incorporated into the plan. The last point led to the setting of a deadline: the largest portion of the ensuing application development would have to be completed within a year and a half.

### Three Alternative Environments

Selecting a hardware vendor for the future environment would have been possible at this point, but the planning team leaders decided that it would suffice to offer three alternative hardware environments in the plan, laying out the advantages and disadvantages of each. The three options were: 1) to continue within the current product line, 2) to select one or more superminicomputers and grow modularly, or 3) to select a large mainframe and develop a central data processing center.

The project team recommended the second alternative, predicting substantial savings and clear advantages over the two other hardware alternatives.

This recommendation by the project team came as a surprise to PacifiCare management. Without planning, their intuitive solution would have been to buy a large central mainframe from a reputable hardware vendor.

The planning process produced further hardware requirements:

- the system must support 500-plus on-line devices in four years;
- these devices must be attachable to either a network of distributed processors or to a large central host;
- it must be possible, in a distributed environment, to manage data stored on geographically separated machines as if the data resided on one large database;
- it must be possible to develop applications centrally and install them throughout the distributed network; and
- the system must support rapid application development by using fourth generation productivity tools.

The final plan, presented to management in a two-hour discussion, showed the intangible and tangible trade-offs inherent in each of the three alternative hardware configurations. It included a management summary and four-year cost estimates for hardware, system software, applications development, and personnel. The final section presented the project team's preferred choice among the alternatives and included an implementation time line.

Top management expressed its commitment and endorsed the plan.

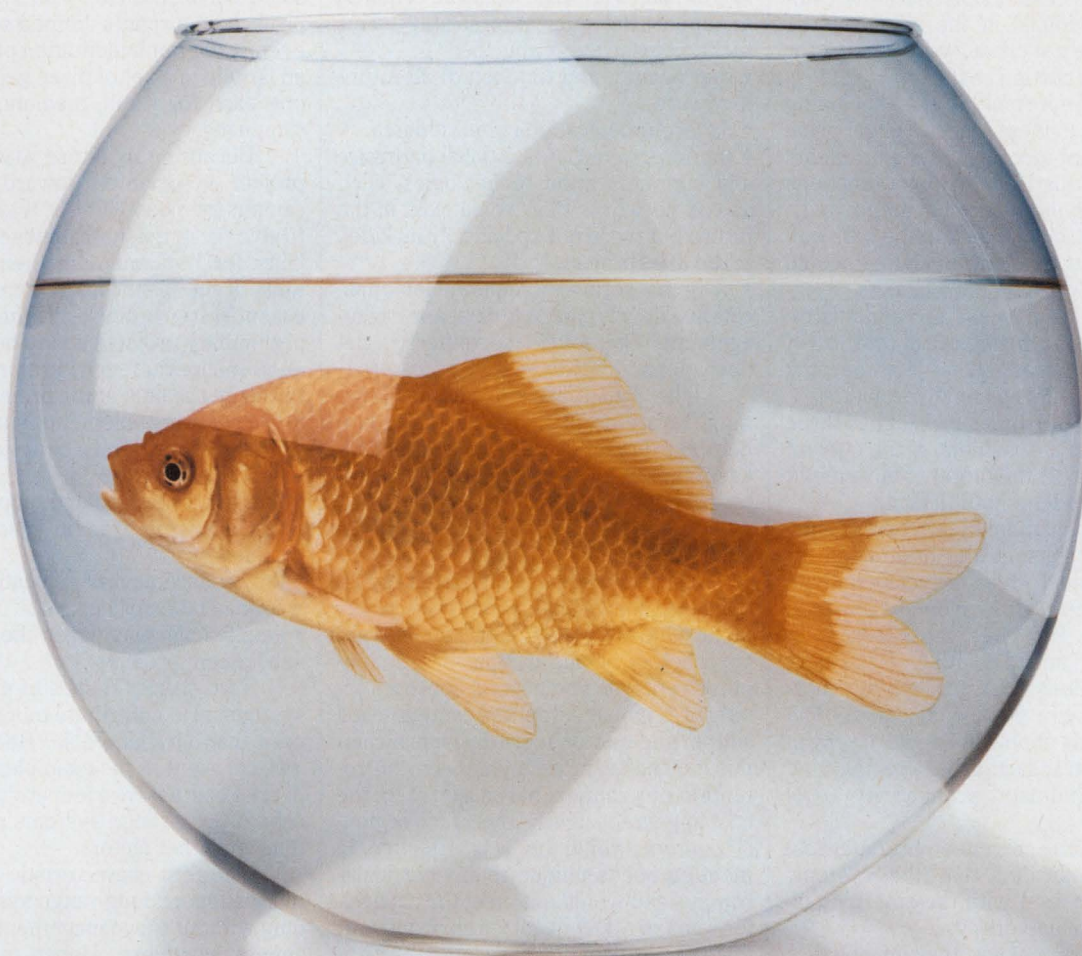
The previous case study demonstrates how long-range systems planning can assist an organization in expanding its information processing resources to support bold corporate growth. The case study that follows describes an altogether different situation. The California State University system is characterized by two features often found in large organizations: geographically separate organizational units, in this case 19 different university campuses, and a stable business environment.

Beginning in the early 1980s, the university had gradually moved toward more decentralized management. Throughout the 1970s the Division of Information Services controlled the central development and implementation of administrative information systems for the university. These systems ran on computers located at each campus. Today these applications form the backbone of the student and financial systems supporting the various campuses.

The change in direction toward a more decentralized environment started



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## Long-Range System Planning

from the top. A new chancellor supported increased responsibility for the campuses. Individuals in the state capitol, including the governor, were looking for new ways of cutting costs.

More important, it was becoming increasingly evident that current applications were not meeting the requirements of the user departments. Major functions at many campuses were not automated.

It became obvious that the only way to implement this kind of change would be to develop a comprehensive long-range systems plan for the administrative information management systems of the 19 campuses. This plan became known as the AIMS planning project.

The AIMS planning project had three phases: 1) an assessment of the current environment, 2) the target environment, and 3) the implementation plan.

The assessment of the current environment established the basic need for the AIMS project. Over the years, individual campuses had developed their own applications. However, most local solutions were unsatisfactory. Hardware, communications, and productivity tools were found to be wholly inadequate. The hardware was unable to handle appropriate on-line transaction processing, and very few end-user productivity tools existed.

Finally, the current environment assessment indicated that the systems were inconsistent with the emerging direction of the university.

The next goal was to paint a picture of the target environment, including each of the three areas mentioned earlier: application systems, technology, and organization and administration.

The first section, the application strategy, defined the applications that should exist in the future, their relationship to the business processes of the university, general priorities for their implementation, and characteristics about their development and operation.

Preparing for this part of the plan included a scan of the packaged software marketplace. This effort was similar to the one mentioned earlier for PacifiCare Health systems. This time, however, the results were completely different: the availability and relative fit of packaged software systems dictated a complete change from the current strategy of in-house development. The application strategy for the target environment would be based on commercially available software packages, modified by the vendor to meet key requirements.

The second area of the target envi-

ronment addressed the hardware and system software that would be required to support the application strategy. This technology strategy specified

- the location and function of all future hardware,
- data communications requirements,
- the integration of additional hardware and communication technologies, such as PBX networks that would exist in the future but were not specifically included in the AIMS project, and
- systems software required for application development, database management, personal computers, and operations.

Like PacifiCare's plan, this long-range systems plan was developed to help the university move toward end-user computing and the information center concept.

### Keep Campus-Based Approach

The project team considered two alternative scenarios for hardware placement. One was to continue the current approach of having campus-based computer centers. The second approach involved regional computer centers, each supporting one or more individual campuses. The team recommended the retention of a campus-based approach: the cost appeared slightly lower, and regional centers would be less effective in meeting needs unique to any particular campus and would not meet the chancellor's aim of a decentralized environment.

The last section presented the management strategy. This defined the organization and administration of AIMS both at the central (systemwide) level and at the individual campuses. Like the rest of the plan, this described an approach quite different from the current environment. At the systemwide level, the Division of Information Systems would no longer develop and support systemwide application software. Instead, it would set standards, determine policies and procedures, develop systemwide plans—such as the one discussed here—and acquire application software and productivity tools for systemwide use.

The management strategy called for each campus to expand its organization to include personnel to implement AIMS-related projects. For example, the responsibilities of application system development and implementation would require additional personnel.

The essence of this phase was to delineate exactly how to reach the target environment by a sequence of carefully thought-out projects. The approach tak-

en here, however, was rather unique. Instead of a fixed master plan addressing all projects in a rigidly defined sequence of events, the implementation plan consisted largely of a set of three generic plans, one each for small, medium, and large campuses.

Because the entire AIMS planning project is oriented toward increased campus responsibility, it was important to give the individual campuses responsibility for implementing their own portions of the plan. This required that one essential step precede all others: specific preliminary projects had to be undertaken to ensure that each location was ready to accept the bulk of the projects defined in the generic implementation plans.

This step, itself a series of projects, would ensure that

- the infrastructure to support subsequent projects was in place in each campus,
- the procurement or relocation of hardware had taken place, and
- detailed planning paved the way for all subsequent projects.

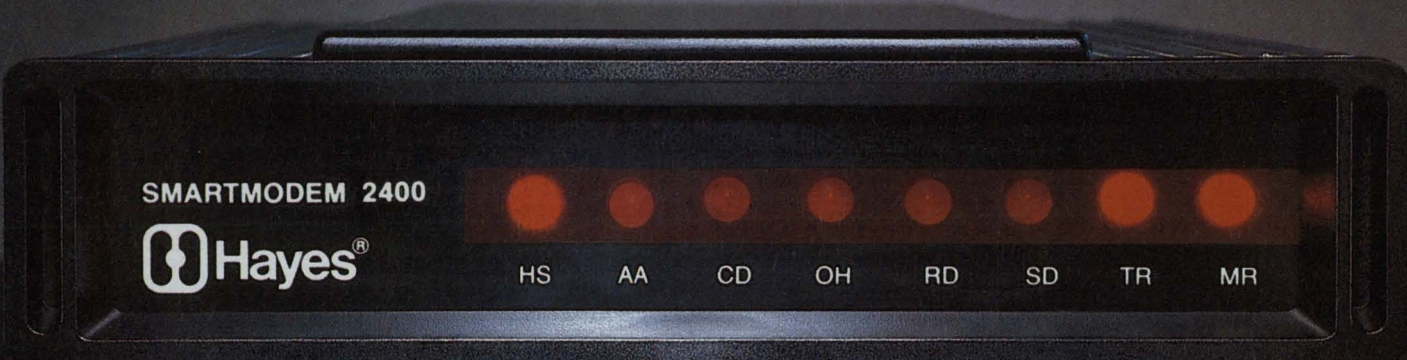
Two characteristics of a long-range systems plan contribute more to its success than anything else. Both of these were present in the examples discussed here. Their absence jeopardizes the success of long-range systems plans more than any other factors.

The first characteristic is management support: long-range systems planning without top management support is almost worthless. Upper management controls the fiscal resources, sets organizational priorities, and hence controls the outcome of every long-range systems plan. While some dissent during the plan's development is expected and perhaps healthy, upper management's ultimate commitment to every stage is crucial to a successful outcome.

The second characteristic of a successful long-range system plan is that it be implemented. A completed plan that is not executed is worth 6.5 cents per pound, the price recyclers pay for paper. Take seriously what has been agreed upon in the long-range systems plan and act on it! ■

*Doug Potter is a manager for Price Waterhouse in its Newport Beach, Calif., office. He has published a methodology for long-range systems planning in the Financial Information Systems Manual (Warren, Gorham & Lamont, Boston, 1986). Potter has an MBA in management and an MS in computer science, both from Pennsylvania State University.*



A black Hayes Smartmodem 2400 device is shown from a top-down perspective. The front panel features the text "SMARTMODEM 2400" and the Hayes logo on the left. To the right, there is a row of eight red indicator lights, each with a label below it: HS, AA, CD, OH, RD, SD, TR, and MR.

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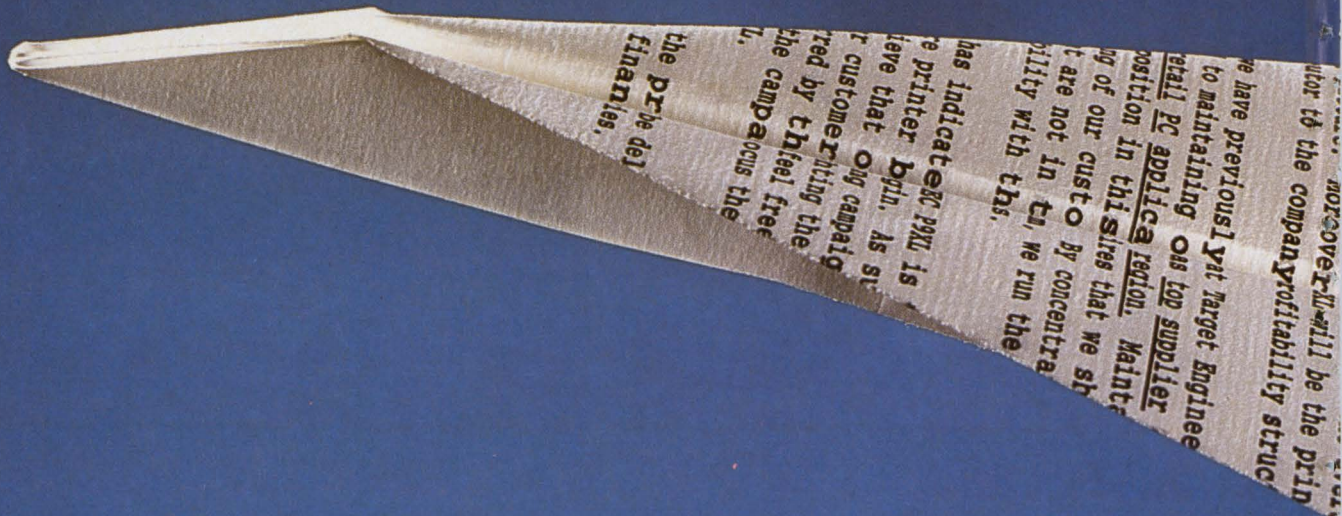
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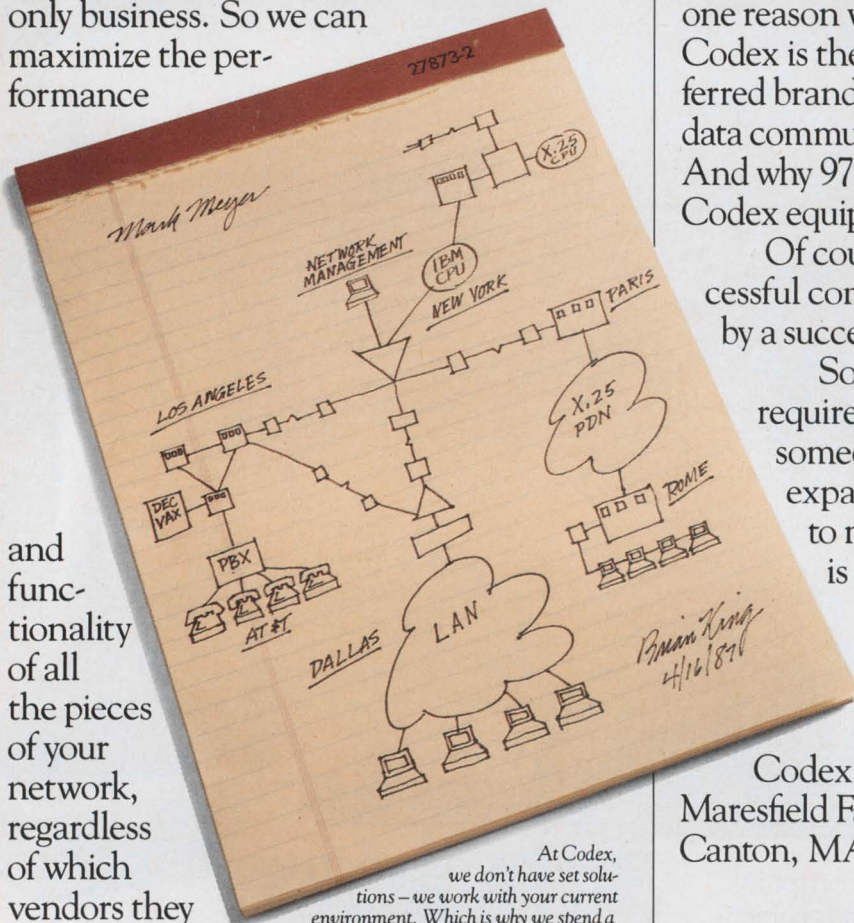
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## The Networking Experts



Companies are simply not meeting the computer training needs of their end-user employees, a recent survey shows. Self-training was found to be the dominant mode of learning among 100 users surveyed at 20 large and medium-sized companies. Top management needs to become more aware of just how important organizational learning is to the successful development of a corporation. Training budgets that represent 1% to 2% of the information systems budget are too small to support yesterday's educational needs, let alone today's.

# Training Today's User

BY R. RYAN NELSON  
AND PAUL H. CHENEY

In today's corporation, training is not a trendy topic. Often, it's not a topic at all. Disavowing any formal role in the educational process, many companies have left dp training of the operational staff up to the individual end user.

A recent survey of 100 users in 20 large and medium-sized corporations shows that companies simply are not meeting the computer training needs of their end-user employees. In many of these firms, technology, not training in technology, gets the highest priority.

Why is this so? The manager of information support at Durham Life Insurance Co., Durham, N.C., candidly

explains, "It is purely a financial reason. . .

When you buy a piece of hardware, you capitalize it and depreciate it over a five-year period. In other words, the philosophy is that hardware is free. Furthermore, hardware is not going to get sick, strike, or quit."

The quitting scenario is one that really

scares some companies that shy away from training. "We've just purchased a \$2 million computer and that decision was made in a one-hour meeting," says Durham Life's dp boss. "On the other hand, I've been through three separate hour-long meetings over whether or not we were going to spend several thousand dollars training somebody in a leading-edge technology only to lose him to some other company."

The first step in meeting a com-

pany's end-user training needs is to determine those needs. This can be accomplished by questioning the employees themselves. They know their own dp skill levels and the type of reports they have to furnish. One way to find out those skill levels is through diagnostic tools such as a questionnaire that rates employees' computer-related abilities.

To see how this works in practice, a questionnaire was administered to the 100 users surveyed. The objectives were to determine individual abilities and to see how important each person felt the different dp skills were to his or her job performance. These users reported they had the most ability in understanding and interpreting output, accessing data, and using hardware; their skills were lacking in programming, model building, and the ability to use graphics techniques. Deficiencies in the model-building area can have a negative impact on the development of decision support applications.

Items from this basic-abilities questionnaire can be modified or deleted as new dp skills or technologies become integrated into the organization. After administering the questionnaire on a periodic basis, organizations should take steps to remedy the shortfall in skills. A seminar on modeling techniques, for example, would be appropriate for most of the 100 survey participants.

## Using Outside Reviewers

There are other approaches that can help an organization assess its dp training needs. One company recommended bringing in outside consultants to review the performance of the information systems area, including computer-related training programs. Another firm reported that at its annual meeting, operating managers are asked to pin-

**TRAINING IS  
OFTEN LEFT UP  
TO THE END  
USER.**



point the troubles they've had with service departments, including dp. During this brainstorming session, managers identify their problems and then state their solutions.

Most companies never seem to get to this needs assessment stage. Generally speaking, top management needs to become more aware of just how important organizational learning is to the successful development of a corporation. Resources need to be devoted to R&D activities aimed not only at the corporate product or service, but also at the corporate employee. Training budgets that represent 1% to 2% of the information systems budget are too small to support yesterday's needs, let alone today's.

The end users surveyed were also asked about the sources of their computer-related training. Self-training was found to be the dominant source of training. Many of the managers described the amount of their computer education as only slight to moderate. More specifically, 80% said they had received none, slight, or moderate training in the five categories listed.

Certain types of training turned out to be useful in building particular computer abilities. College training tended to be most valuable in developing an employee's ability to program, model, and use graphics facilities, and for learning specific applications development packages such as Lotus 1-2-3 and dBase III.

Not surprisingly, vendor training proved especially helpful in educating managers in the use of specific applications software packages and in the other, more proprietary realms of data communications and hardware concepts. Meanwhile, self-training enhanced most of the skill areas, including use of packaged software, data communications, graphics capabilities, and databases.

**Training Increases Abilities**

A total of seven different training techniques were used among the 20 companies surveyed. They included tutorials; courses, lectures, or seminars; program instruction/computer-assisted instruction; interactive training manuals; resident experts; help components embedded in end-user information systems; and education conducted outside the company, such as college courses.

The managerial end users rated each technique in terms of quantity and quality. The average amount of training time received by each user since beginning his or her employment at the firm ranged from 7.82 hours for the inter-

**FIGURE 1 Rating and Ranking Computer Abilities**

ABILITY TO:	PERCEIVED IMPORTANCE		CURRENT ABILITY LEVEL	
	RANK	MEAN RATING*	RANK	MEAN RATING*
<i>Understand/interpret output</i>	1	3.86	1	4.41
<i>Access data</i>	2	3.00	2	3.46
<i>Use hardware</i>	3	2.79	3	3.30
<i>Use packaged application software</i>	4	2.63	4	3.20
<i>Use application development software</i>	6	2.14	5	3.10
<i>Use operating systems</i>	5	2.40	6	2.58
<i>Handle data communications</i>	8	2.03	7	2.48
<i>Use graphics techniques</i>	11	1.95	8	2.45
<i>Use office automation systems</i>	7	2.06	9	2.40
<i>Build models</i>	10	1.96	10	2.34
<i>Program</i>	9	1.97	11	2.12

\*1 = low, 5 = high

**FIGURE 2 Sources of Computer Training**

(FREQUENCY/PERCENT)							
TRAINING SOURCE	NONE	SLIGHT	MODERATE	SUBSTANTIAL	GREAT	VERY GREAT	MEAN*
<i>Self</i>	8	31	17	15	20	9	3.35
<i>College</i>	37	26	27	5	5	0	2.15
<i>Company</i>	25	32	15	14	9	5	2.65
<i>Vendor</i>	43	24	19	7	5	2	2.13
<i>Other</i>	85	5	8	1	1	0	1.28

\*1 = low, 5 = high

active training manual method to 104.82 hours for the resident expert approach. Of the 100 managers, 74 did not have any experience with help components.

The survey indicated that training increased the computer abilities of managers as well as their direct use of dp systems in their organizations. Users were more satisfied using technology tools when they were adequately trained.

The tutorial technique was the most effective in terms of educating end users about packaged applications software. Programmed instruction and computer-assisted instruction were better for teaching office automation skills.

Most of the companies surveyed were not meeting the computer training requirements of their employees, who ended up teaching themselves the dp skills they needed. To put training on the right track, corporations need to invest more in their computer education programs. One to two trainers for a firm with over 100,000 employees is simply not enough.

It may be necessary to bring in training specialists from the vendor or

consulting community to assist in these educational efforts. Self-training is all right as long as it is adequately supported by in-house experts, help components, programmed or computer-assisted instruction modules, tutorials, and in some cases, an interactive training manual.

Companies also should have better communication with colleges and universities, keeping them up-to-date on the computer-related skill requirements they desire for both their technical and nontechnical employees. Industry advisory boards can often serve as useful go-betweens in this process. Even more important is internal communication. Organizations should look for every possible opportunity to bring the information system staff together with operating personnel to exchange information and increase understanding. ■

*R. Ryan Nelson is assistant professor of management information systems at the University of Houston. Paul H. Cheney is associate professor of management information systems at the University of Georgia, Athens, Ga.*



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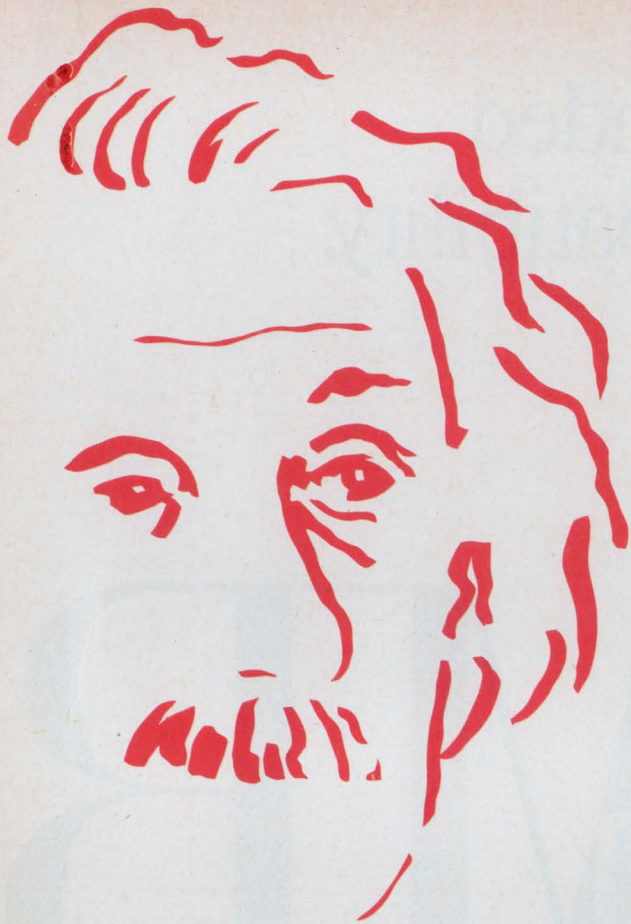
DATA 5/11

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CIRCLE 47 ON READER CARD





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below. To do this, we used HP's new ScanJet desktop scanner, Microsoft Windows and Pagemaker® from Aldus.

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asking

Microsoft

## Soup

Canned Soup Council

Mr. J. C. Ryan, President  
Flossmoor Soup Company  
Flossmoor, Illinois 60422

August 1, 1987  
Dear Mr. Ryan:

In an effort to help you stay competitive, we are publishing 5-year sales projections for two soup categories: canned and dry. Please keep these projections handy as they will aid you in your product planning over the coming years. Of special interest to you are the dry soup projections.

	CANNED	DRY
1987	\$6,700,000	\$1,100,000
1988	\$7,300,000	\$2,100,000
1989	\$8,400,000	\$2,600,000
1990	\$9,300,000	\$4,800,000
1991	\$9,900,000	\$7,300,000

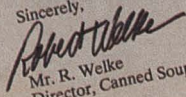
As you can see, industry experts project that the gap between dry and canned soups will begin to close by 1990. They also believe mergers will follow.

### Noodle Price Hike

Bad news this month comes from TNG (The Noodle Group). By year's end, they project the price of noodles to double — up to eighteen cents a barrel. How will this price hike affect you? A two-cent per can increase on all noodle soups you sell.

**Recommended Reading: "Cup or Bowl"**  
This in-depth study discusses the habits of the American soup eater. Call and I'll send you a copy.

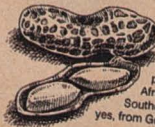
Sincerely,

  
Mr. R. Welke  
Director, Canned Soup Council

# NUTS

Deluxe Assortment

Spring 1987



### Peanut

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### Brazil Nut

Exclusively from South America, these Brazils are fat, hard-shelled and delicious. They'll be much in demand.



### Hazelnut

Cakes, cookies, ice cream, chocolate, salads. They'll never taste better than with this delicious French variety.

### Almond

They're popular and they're versatile. Available whole, sliced or chopped, they're equally at home in Mom's favorite recipes.



### Pecan

Another great favorite in the bakery. And our own superb pecans will satisfy even the most discriminating Southern tastes.



### Walnut

Blond English Walnuts are just one of the many varieties available, in the best nutcracking tradition.



### Pistachio

With an unusually subtle and delicate flavor, these perennial favorites will be perfect for either sweet or savory dishes.

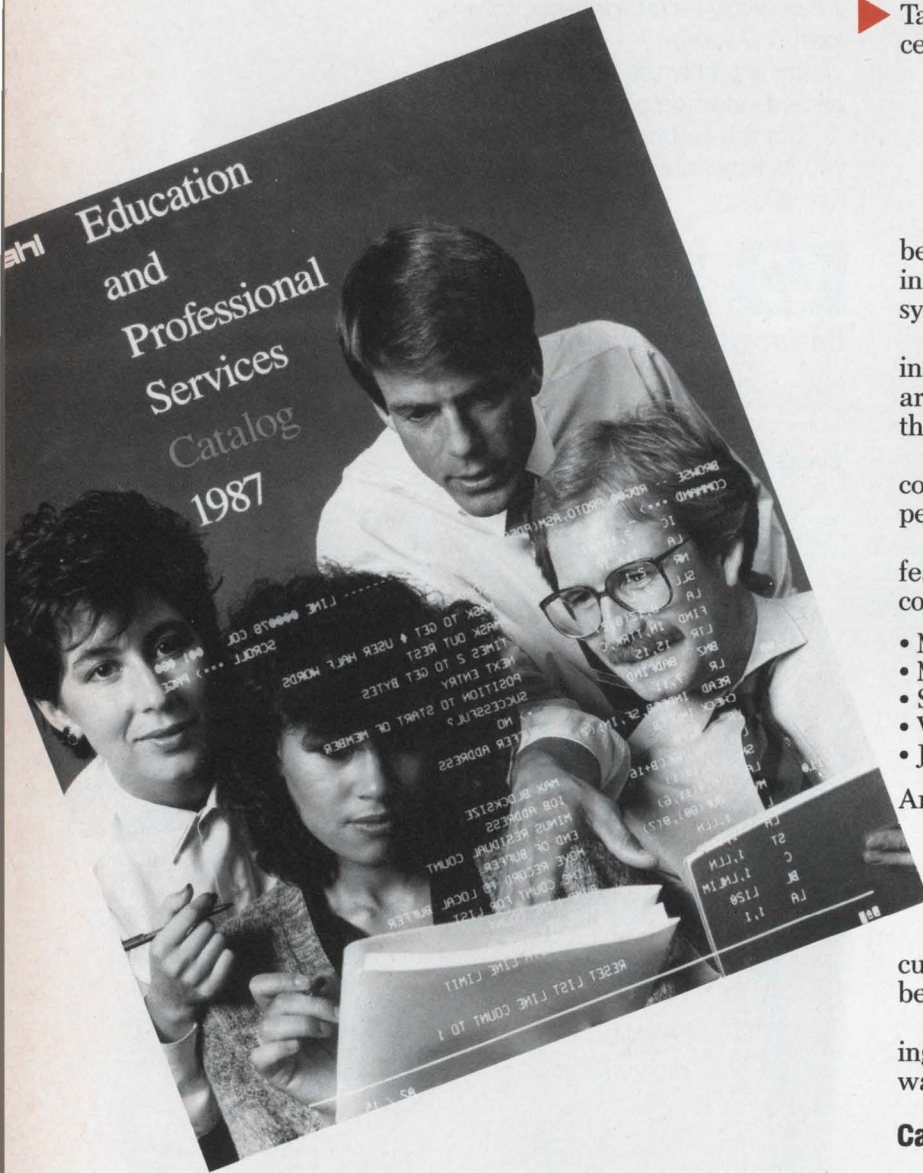


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# Real Time

## OFF-LINE

AMONG THE SLEW of new products announced by IBM in April at the unveiling of its Personal System/2 family of microcomputers were many that will not be available until mid- to late 1987 or early 1988.

Of the eight new Personal System/2 micros, the three Intel 80386-based model 80s are not yet on the market. Two 16MHz versions, one with 1MB of memory and a 44MB disk drive and one with 2MB of memory and a 70MB disk drive, are slated for July delivery. They are priced at \$6,995 and \$8,495, respectively. The third Model 80, which runs at 20MHz and features 2MB of memory and a 115MB fixed disk drive, is slated to hit the streets in the fourth quarter.

Among the options announced but not yet available for the new Personal System/2 models are four fixed disk drives and two optical disk drives. The fixed disk drives range in storage capacity from 1.44MB to 115MB. They'll arrive on the market in the third and fourth quarters and will be priced from \$245 to \$3,495. The two optical drives, which will store up to 1.6GB of data, are both priced at \$2,950.

Five new printers were also unveiled by Big Blue. Among them is the Personal Pageprinter laser printer. The six-page per minute printer, which is set for third-quarter release, is built around a Ricoh engine and is priced at \$2,199. The Personal Pageprinter is IBM's first product to support Adobe's Postscript page description language, the growing standard in the electronic publishing market. IBM says the printer is "dumb" because all its functions, such as the fonts, reside on an adapter card that hooks up to the computer rather than the printer, allowing it to tap into the processing speed of the computer. The Pageprinter is being offered as an integral part of IBM's first desktop publishing offering, a turnkey system based on the newly introduced Personal System/2 Model 30. The software, part of the SolutionPac series, also allows users to upgrade an XT or AT to a Personal Publishing System. SolutionPac software, which IBM says will be available in the third quarter, is priced at \$8,553. A VM Edition, for use with IBM 9370, 4300, and 3090 mainframes running VM/SP or VM/IS, is also slated for release then.

All of the new Personal System/2 models support the newly released DOS 3.3. The new IBM Operating System/2 is currently under joint development with Microsoft (see Updates, p. 139). IBM says it will become available in stages, beginning early next year.

## HARDWARE

# Gould Introduces Its First Line of Minisupers

### The Unix-based series for compute-intensive, real-time applications can work as fast as 96MIPS.

BY THERESA BARRY

The new NPL family of minisupercomputers from Gould Inc., is geared toward compute-intensive, real-time scientific and engineering applications. The first machine in the family, the NP1, comes in five models, the 110, 120, 240, 360, and 480, containing up to eight processors and featuring performance from 10MIPS to 96MIPS. The series is compatible with the company's real-time Concept/32 and SelConnection, and Unix-based PowerNode minicomputer systems.

The NP1 cpu, which uses ECL gate-array technology, consists of a five-board set capable of scalar and vector operations. The system bus is a 32-bit address, 64-bit data path, clocking at 52nsec for a bandwidth of 154MBps. The operating system for the NPL family is Gould's UTX/32, a Unix extension. The NP1 Model 110 is the entry-level, single-processor system. It features one cpu and 64MB of memory, expandable to 512MB. It's priced at \$395,000. The entry-level, dual-processor system, the Model 120, consists of two cpus and 256MB of memory, expandable to 512MB. The 120 starts at \$595,000. An optional Arithmetic Accelerator (AA) increases the speed of all arithmetic operations and boosts the performance of the cpu in ex-

cuting vector operations. With the AA, the 120 has a total MIPS rating of 24.

The vector instructions of the NP1 are supported by an automatically vectorizing FORTRAN 8X compiler. Gould says the Model 120 can handle over 256 time-sharing users.

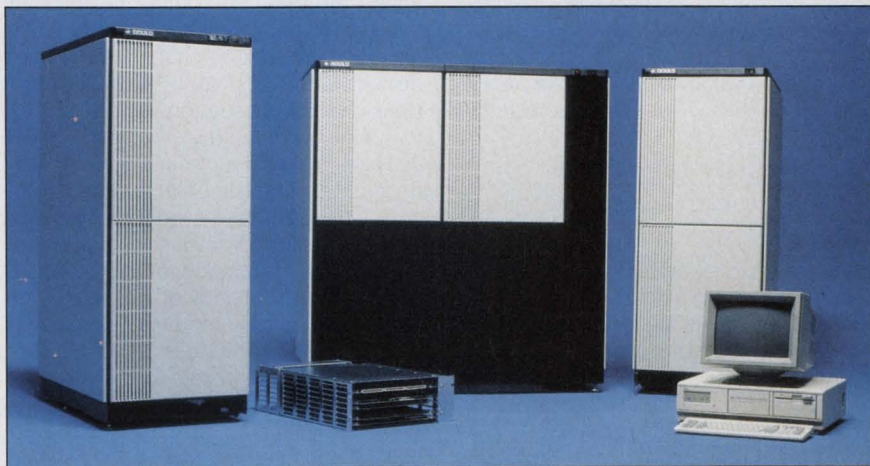
The Model 240, with four cpus, starts at \$1.2 million, the model 360 at \$1.8 million, and the Model 480 at \$2.5 million. Volume shipments will begin in September. GOULD INC., Fort Lauderdale, Fla. CIRCLE 250

## Departmental Computer

CDC's new system for Cyber and multivendor environments.

The Model 930, a new member of the Cyber 180 series billed as a departmental computer, offers cpu power comparable to a Digital Equipment Corp. VAX, says Control Data.

The 930, geared toward engineering and scientific users, can function as a file server, workstation host, or primary system. It features the highest bandwidth, 80MBps, in the Cyber 180 series and is based on CMOS technology. The system comes in two configurations. The entry-level model, the 930-11, has a performance rate of 1.8MIPS. The 930-31 is rated at 3MIPS. Both models come with



Gould's NP1 minisupercomputer utilizes ECL gate array technology.



# Real Time

8MB of central memory, expandable to 64MB. The systems run CDC's NOS/VE operating system and are fully compatible with all Cyber 180 systems. In addition, networking products—namely an enhanced version of CDCNET, which the company also introduced—allow the systems to connect to larger and smaller systems in a mixed vendor environment. The 930 runs many popular industry-specific application software programs, including MSC/Nasran, Ansys, Patran, and the Plot/10 Suite. The system is air-cooled.

The 930-11, which is field-upgradable with the 930-31, is priced at \$59,900, which includes 8MB of memory and a one-year warranty. It is available now. The 930-31, available in August, is \$125,900. CONTROL DATA CORP., Minneapolis. CIRCLE 251

## Laser Printer

Imagen adds new 8ppm printer to ImageServer XP line.

The 3308 ImageServer XP from Imagen Corp. is an eight-page per minute laser printer designed for work groups of two to four users. The print engine is laser electrophotography-based, and the image processor is configured with three 68000 processors and 3MB of memory. An optional 2.5MB raster image buffer can be added to the image processor, and an optional 20MB Winchester disk drive can be added to the system.

The 3308 can support Ethernet, IBM 3270 coaxial attachment, IBM 2780/3780, RS423, Versatec, Dataproducts, or Centronics protocols. Imagen claims it contains resident emulators for most popular print devices, and it also supports Imagen's proprietary imPress page description language.

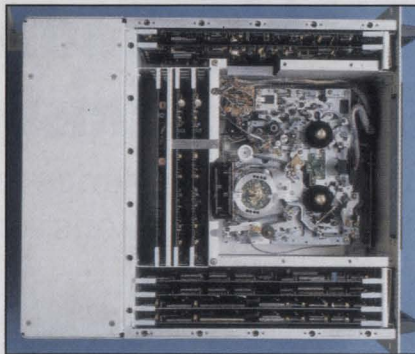
The new printer is available now, priced at \$10,950. IMAGEN CORP., Santa Clara. CIRCLE 252

## High-Density Tape Drive

Honeywell introduces drive with 5.2GB of storage.

The VLDS (Very Large Data Store) high-density tape drive from Honeywell offers 5.2GB of storage using VHS cassette tape. Honeywell says the product is geared toward the mass storage demands of imaging technologies, and will focus initially on the medical imaging market.

The VLDS stores data in "principal blocks," each containing 32KB; a two-



channel unit uses 64KB. Each block has an assigned number, allowing the host controller to generate a directory that can be written onto the tape for identification and database management. End-to-end searches of a T-120 cassette take 90 seconds. Honeywell claims an error rate of  $10^{-12}$ . A Honeywell-designed servosystem resides in the industrial-grade VHS tape transport, which is supplied to Honeywell by Matsushita of Japan. A recording density of 50,000bpi is claimed for the VLDS.

In oem quantities, the VLDS is priced at \$20,000 per drive; evaluation copies are \$30,000. Honeywell says it will expand the capacity of the product to 10GB in the future. HONEYWELL, Test Instruments Division, Denver. CIRCLE 253

## Infotron's New Offerings

Diagnostic modems and enhancements to existing products.

Infotron's new INModem line consists of six modems, which conform to CCITT standards. Four of the six are analog devices, supporting data transfer rates of up to 14.4Kbps over standard telephone lines. The two digital modems transmit from 2.4Kbps to 56Kbps over the standard DDS (AT&T's Digital Data Service) network. Both combine CSU/DSU functions with diagnostic control.

Hot spare modems, remote control dial backup, and centralized trouble monitoring, through the INM Diagnostic Modem Controller, are featured. The INM-DMC Automatic Monitoring mode provides the user with network surveillance reports on the health of the telephone line, the terminal equipment, and the network's modems. Other INModem options include an integral four-channel or six-channel multiplexor for the 14.4Kbps and 9.6Kbps modems, and a 150bps secondary channel on the 2.4Kbps and 4.8Kbps units.

Prices for standalone versions of the analog INModems range from \$1,650 for the INModem 2400 to \$6,100 for the INModem 14.4. Standalone versions of the INModem 50 and INModem 56 are priced at \$1,895 and \$1,995, respectively. Rackmount versions are available for all INModems.

Infotron also enhanced its InfoStream NX4600 and NX3000 Network Exchange products. The three enhancements are compatibility with Infotron's INM Integrated Network Managers (the INM 400, which is for medium-sized networks, and the INM 1000, for large networks), a more advanced networking feature set, and the addition of ADPCM voice support. INFOTRON SYSTEMS CORP., Cherry Hill, N.J. CIRCLE 254

## Desktop Modems

General DataComm unveils four compact versions.

GDC's new DeskTop 201, 202, 208, and 9600 modems are standalone units compatible with other GDC modems.

The DeskTop 202, a 1,800bps private line modem, and the 201, a 2,400bps switched network/private line modem, employ a compromise equalizer to correct for impairments found in unconditioned voice-grade facilities. They also provide an antistreaming timer to protect against potential disruption by faulty streaming terminals. The 208 is a 4,800bps switched network/private line modem, which supports Quik-Poll, a 25msec training sequence. The 9600 is a CCITT V.29-compliant 9,600bps private line modem. All the modems contain a set of diagnostic tests, which include analog loopback, digital loopback, remote digital loopback, and self-test with a 511-bit pattern generator.

The modems range in price from \$400 to \$2,000. GENERAL DATACOMM INC., Middlebury, Conn. CIRCLE 257

## Multiuser System

Qantel's AT-based system runs minicomputer software.

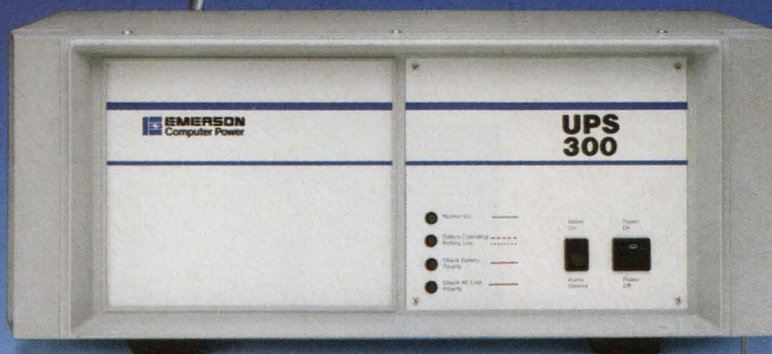
Qantel recently introduced the System 15, a multiuser system based on the IBM AT architecture. It runs Qantel minicomputer vertical market software developed by the company and its dealers. Similar to other Qantel systems, this one is geared toward the manufacturing, retail, and hotel industries.

The system's heart is a Wyse Tech-



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# Real Time

nology AT-compatible desktop computer and a Qantel Q8K add-in coprocessor board. The System 15 can be operated as a single-user system or can be expanded with up to eight additional terminals. The Zilog Z-8000-based Q8K coprocessor board handles the Qantel Best/AOS minicomputer operating system and processes all code associated with the vertical-market applications software. The 80286 processor in the Wyse system handles disk I/O and other I/O functions. An 84MB unformatted fixed disk drive and streaming-tape backup drive are also featured.

Qantel claims the applications software developed for the System 15 can be moved over to a larger Qantel minicomputer-based multiuser system with no software conversion or translation. The System 15 can then be used as a terminal to the larger Qantel system.

Prices for the System 15 begin at about \$12,000, depending on the configuration options installed by the dealer. The board set alone is priced from \$3,100 to \$3,500. (Only the Wyse pc 286 and the IBM AT have been certified by Qantel to run the Q8K board.) MDS QANTTEL INC., Hayward, Calif. CIRCLE 256

## Image Management Systems

Kodak rolls out three optical disk/microfilm systems.

Kodak has announced three systems for image management: the KIMS system 5000, system 3000, and system 4500.

The KIMS system 5000 comes in two versions: an optical disk-only version and a microfilm-only version. (A version that combines both optical disk and microfilm is under development, says Kodak.) The workstations are linked to computers and system peripherals via Ethernet LAN and can accept data from mainframes and other networks through gateways and protocols, including IBM's SNA. The optical disk-based KIMS 5000 provides data storage and retrieval through a 12-inch optical disk library of 2.6GB optical disks (containing up to 121 of them). The microfilm-based KIMS 5000 uses a robotic film library that holds up to 372 rolls of microfilm, enough to store up to 4 million documents. The KIMS system 5000 will be available midyear and is priced at \$700,000 in a multiuser version.

The KIMS system 3000 is a stand-alone optical disk system and is the low-end member of the KIMS family. The system includes a KIMS multiserver running

Kodak software, linked to one or more workstations. Data storage and retrieval is provided through one or two 12-inch optical disk drives that store up to 2.6GB on both sides. The workstation has multiwindowing capability. A desktop scanner, with 200dpi resolution, is said to handle pages at a rate of one every 2.5 seconds. Document retrieval is achieved by a fill-in-the-word search or free-form search. The system is targeted at applications of up to 2,500 documents a day. Connectivity with mainframes is provided by a protocol converter. The KIMS system 3000 will be available midyear for \$150,000.

The KIMS system 4500, a computer-assisted microfilm retrieval system, uses the same KIMS multiserver as the system 5000. It uses Digital's MicroVAX II for indexing and controlling document retrieval, a Kodak IMT-50 microimage terminal for retrieval and printing of hardcopies, and a Kodak Reliant intelligent microfilmer 2000 for document image capture. It will be available midyear for \$150,000. KODAK, Rochester, N.Y. CIRCLE 258

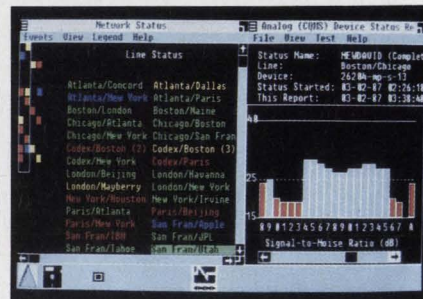
## Network Manager

Codex 9300 Series is for small- to medium-sized networks.

The Codex 9300 Network Manager is based on pc tools and software, specifically the Hewlett-Packard Vectra AT-compatible computer with an enhanced graphics monitor, printer, and mouse. The Codex 9310 Network Management Kit will convert any IBM AT or HP Vectra AT-compatible to a 9300 Series Network Manager. The 9300 series is designed for small- to medium-sized networks.

The 9300 features multiple concurrent windows so that users can, for example, test a circuit while maintaining a split-screen display of the overall network. The series is built on Microsoft Windows and Borland's Reflex management reporting software. Control functions include analog and digital status monitoring and control, network and device testing, network event and test results databasing and report generation, poll tests on lines and modems, bit error rate tests, and loopbacks on lines and devices.

Management functions include inventory management report, network event report and summary, network device report and summary, trouble ticket report and summary, and network alarm listings and summaries. Color graphics



are used, so that colors automatically change to reflect network status.

The 9300 Series will manage up to 400 devices, and supports all Codex 2600 modems. Two models are available: the 9320 complete Network Management System and the 9310 Network Management Kit. Network Manager prices range from \$11,500 to \$17,500. CODEX CORP., Mansfield, Mass. CIRCLE 260

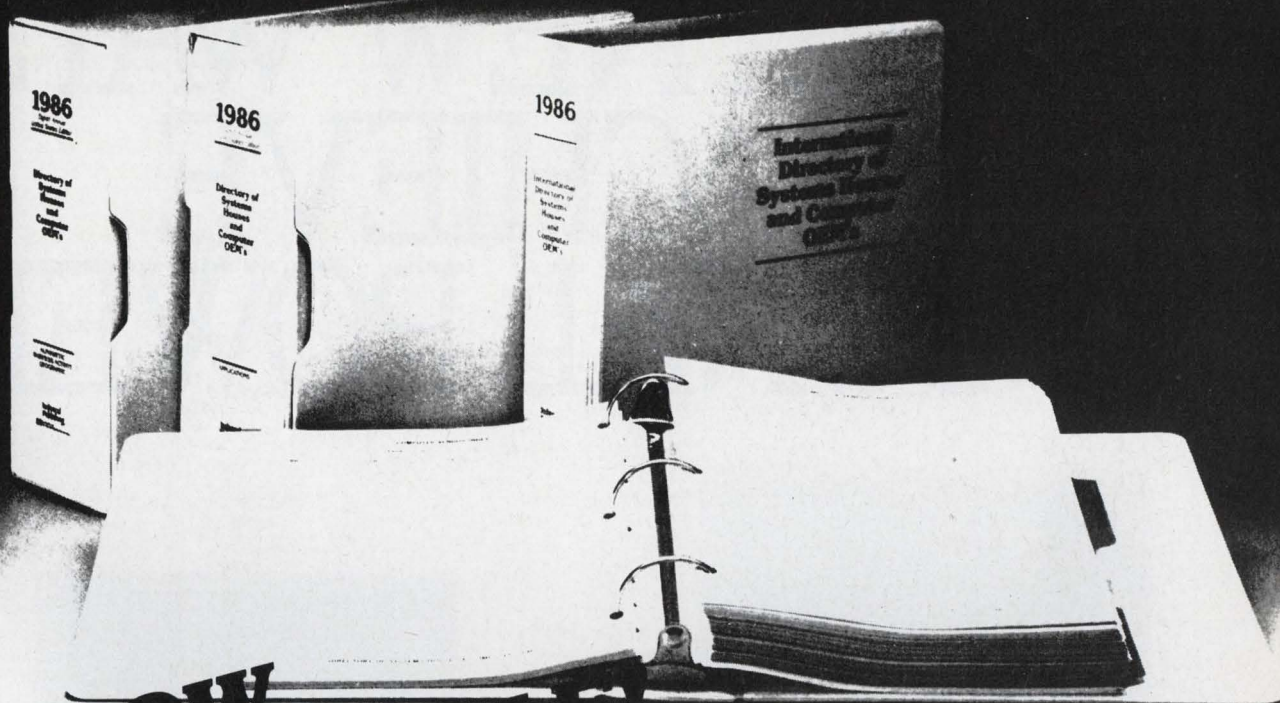
## Data Communications

Case rolls out gateway and multiplexor products.

The 8110-A gateway, from Case Communications, enables Apple II and Macintosh computers and other asynchronous devices to access IBM host computers. It provides protocol conversion and file transfer for up to eight asynchronous devices and emulates an IBM 3274 cluster controller unit linking computers and printers to a bisynchronous IBM host or compatible computer. Case says it has a large file buffer to accommodate the speed differences between IBM mainframes and asynchronous devices. On-screen help compensates for keyboard layout differences. A line-tracing function allows for diagnosing problems in the connections lines. The 8110-A gateway is available now for \$2,850.

Case also introduced the 7126 Time Division Multiplexor, a six-channel multiplexor that transmits at speeds up to 56Kbps over digital services such as AT&T's DDS. Case says the 7126 acts as a transmission line concentrator for both digital and analog modems, and as a backbone for other multiplexors. It also supports voice channels. Each of the multiplexor's channels are buffered to accept different transmission speeds. Used as a backbone it allows integration of both asynchronous and synchronous applications. Local and remote diagnostic and configuration facilities are featured. It is available now for \$1,700. CASE COMMUNICATIONS INC., Columbia, Md. CIRCLE 259





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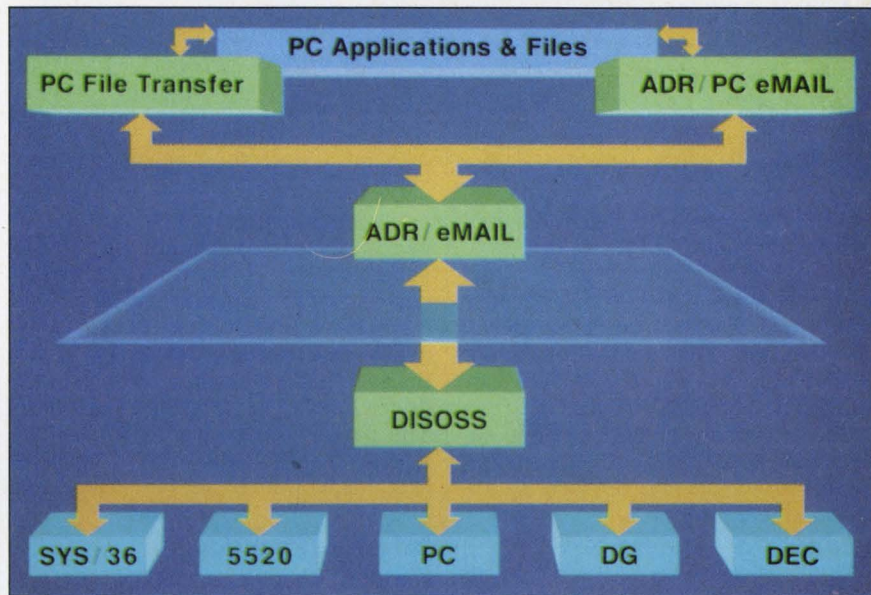
MICROSOFT CORP., in sync with IBM's introduction of its Personal System/2 line of microcomputers, announced the planned delivery dates for its long-awaited new operating system for the more powerful 80286- and 80386-based microcomputers. The development kit for Microsoft Operating System/2 (MS OS/2) is set for delivery to software developers in August and a kernel will go to oems in December. Microsoft, like IBM, is saying end-user shipments will begin in the first quarter of 1988. This is the first product announcement to come out of the joint development agreement announced in August 1985 by the two companies.

MS OS/2, which is a single-user, multi-tasking system, will consist of the operating system kernel and the new Windows presentation manager, which provides a standard user interface and a device-independent graphical application environment. The Windows presentation manager is derived from Microsoft's current Windows product. It has multiple overlapping application display windows, rather than the tiled windows used in the current version of Windows. (Version 2.0 of Windows, slated for third-quarter delivery to end users, also will use the overlapping window display, says Microsoft.)

OS/2 will provide full support for protected mode operation of 80286 and 80386 micros, says Microsoft. The company has filed for a patent on this mode-switching technique, which is said to allow a 286 machine running in protected mode to switch to 386 real mode in a transparent fashion. Microsoft says its technique significantly speeds up this normally very slow process. A user in an OS/2 multitasking environment could, therefore, switch over to DOS in real mode, so that DOS runs in the foreground and OS/2 runs in the background. This will allow applications to use up to 16MB of real memory or 1GB of virtual memory on 80286 machines, compared with the current real-mode limitation of 640KB under MS/DOS. Microsoft says MS OS/2 will run most existing applications designed for MS/DOS.

New features of the operating system are a priority-based preemptive multitasking environment, supported by a set of intertask communication capabilities, and a new application interface that allows users to develop compatible applications across various hardware devices running MS OS/2.

## SOFTWARE



ADR/eMail, release 3.0, provides a path into IBM's DISOSS environment.

## New Release of Applied Data Research's eMail

Release 3.0 features transparent interface to IBM's DISOSS.

BY THERESA BARRY

Applied Data Research has introduced ADR/eMail, release 3.0, which has an interface to IBM's Distributed Office Support System (DISOSS), and also provides mail processing and information distribution capabilities to the IBM S/36, S/38, and 5520 workstation, and to Digital Equipment Corp., Wang, Data General, Hewlett-Packard, Tandem, Unisys, and other DISOSS-compatible minicomputers.

ADR claims the DISOSS interface is "final form" DCA (Document Content Architecture) compatible, which means that all transmitted information is presented correctly. ADR further claims that with this new release, ADR/eMail users communicate electronically with DISOSS users as if the DISOSS users were on the ADR system.

The DISOSS interface is invoked only when necessary, and ADR/eMail users can store and retrieve documents in the DISOSS library, using keyword search and logic conditions to retrieve information. Communication between the two

systems is asynchronous.

With the release of eMail, Spanish, Danish, and Italian language as well as French Minitel terminal support have been added. Previous versions supported French and German.

A new File Transfer facility is featured, which allows users to transfer data between a PC and an ADR/eMail file folder, moving ASCII files or binary data. Frequently used PC/DOS commands can be invoked from within the PC file transfer facility, and users can access eMail directly for mail processing.

ADR/eMail, release 3.0 is available now on IBM 370, 30XX, and 43XX mainframes and plug-compatibles. A permanent license is priced at \$21,500 for VSE and \$35,000 for MVS environments. The DISOSS interface is \$2,500 for VSE and MVS; it requires DISOSS version 3.2 or later. PC File Transfer is priced at \$5,000 for 100 copies, and requires an IBM PC, XT, AT, or 3270 PC and two 360K diskette drives or one diskette drive and a fixed disk. APPLIED DATA RESEARCH INC., Princeton, N.J.

CIRCLE 261



# Real Time

## Relational DBMS

Nixdorf unveils system for its Targon series computers.

The West German company Nixdorf has announced a relational database management system for both structured data and unstructured texts. The software, called Reflex, uses the industry standard SQL query language.

Reflex is currently available on the Nixdorf Targon series running under Unix. Prices range from about \$8,000 for the Targon/31 software to about \$35,000 for the Targon/32 and Targon/35 versions. The software also runs on the distributed processing 8860 series under Nixdorf's own DIPOS, and on the IBM 370-compatible 8890 series under VM/SP and NIDOS/VSE.

Nixdorf will sell the system to users of other manufacturers' computers and is developing versions for the IBM MVS/370 and DEC VMS. NIXDORF COMPUTER AG, Paderborn, West Germany. CIRCLE 262

## PC Applications Software

Valhall squeezes 4GL into integrated package.

Sweden's Valhall Data recently introduced its Royal package, an integrated applications package for IBM PCs and compatibles that includes the usual spreadsheet, graphics, database, word processor, and communications programs, plus a fourth generation program generator, which allows end users with no dp training to design and define their own accounting and file applications.

Royal is available in both single-user and multiuser versions, the latter designed for AT-compatible LAN file servers. The single-user version occupies 256KB RAM and is priced at \$1,000 in Sweden. Distribution is now beginning in other European countries. VALHALL DATA AB, Nacka, Sweden. CIRCLE 263

## Graphics and Music

For developing instructional software on IBM PCs and compatibles.

IDAN of Israel recently announced Courseware, a graphics and music generator for IBM PCs and compatibles. The package is designed to let a user with no programming knowledge develop instructional and educational software by navigating through various menus. The package is capable of creating not just static pictures but animated events. It re-

quires a pc with a large monitor screen for playback to an audience.

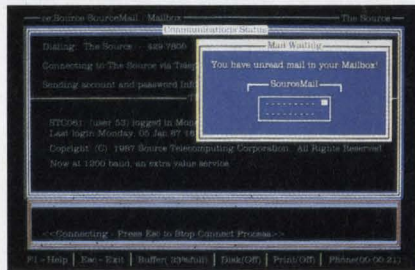
The central component is the event generator. In it, the user defines the time sequence in which different events have to take place on the screen. Other components include a font editor; a graphics generator with a large library of preprogrammed shapes, symbols, and drawings; an animation generator; and a music generator. An administrative data processor keeps statistics on the users.

The software requires an IBM-compatible pc with at least 256KB of RAM, two floppy disk drives, and a color monitor driven by a CGA- or EGA-compatible card. The package costs around \$500. IDAN SOFTWARE & COURSEWARE INDUSTRIES LTD., Ramat-Gan, Israel. CIRCLE 264

## Interface Package

Simplifies access to on-line services.

re:Source, from The Source Telecomputing Corp., is a combination communications and script development program for users of The Source on-line information service. The program is claimed to speed up file transfers and allow users to



automate frequently used command sequences. User entries can be edited and corrected before a connection to the service has been established. The company claims that re:Source can be customized for use with other on-line services.

The program is priced at \$89, which includes a membership in the Source information network. It's available now and is being marketed directly by The Source. THE SOURCE INFORMATION NETWORK, McLean, Va. CIRCLE 266

## New Version of Ada

Has parallel processing power for real-time applications.

Citing the prevalence of FORTRAN in the real-time application development field, Concurrent Computer Corp. has unveiled its version of Ada with interfaces

to FORTRAN and assembler-written procedures. C<sup>3</sup>Ada (pronounced C-Cubed Ada) is a validated implementation of the Ada language as defined in ANSI/Mil Std 1815A. It interfaces to Concurrent's OS/32 real-time production facilities and to its MPS family of multiprocessors.

Concurrent says the C<sup>3</sup>Ada language FORTRAN interface provides access to its proprietary FORTRAN VII runtime library and to user modules compiled by the FORTRAN VII compiler, as if they had been written in Ada.

Concurrent's version of Ada will be available at the end of June, and will be priced between \$17,500 and \$33,000. CONCURRENT COMPUTER CORP., Tinton Falls, N.J. CIRCLE 267

## Performance Management

Boole & Babbage unveils tools for MVS and IMS/VS.

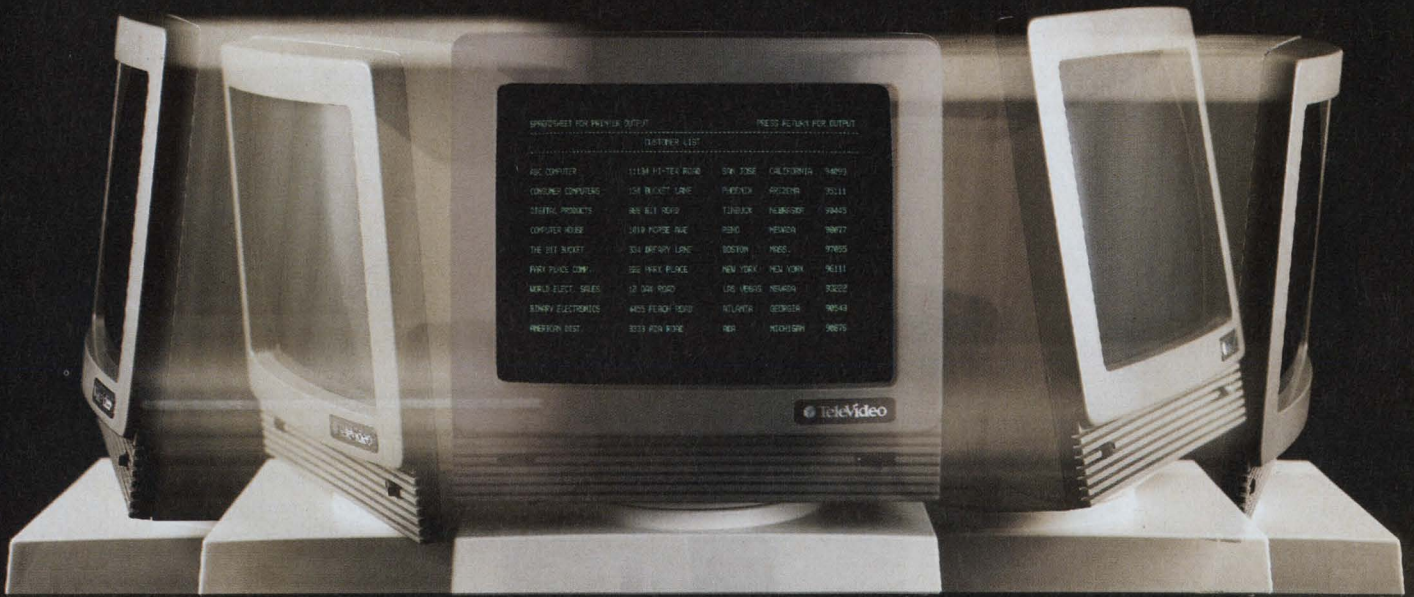
Resolve Plus and IMF 2.3.0 are new software upgrades from Boole & Babbage.

Resolve Plus is an enhanced version of Resolve, B&B's real-time performance tool that provides monitoring, debugging, and analysis features not found in the MVS operating system. ISPF integration for Resolve Plus is provided by a new component, the MVS Performance Manager, which also adds split-screen capabilities, interactive dialogs for defining and executing functions, session output management with a new journal facility, and high-resolution color graphics. Resolve capabilities carried over into the new version include the ability to add SVCs (supervisor calls) and Authorize Program Libraries without an IPL (initial program load); services such as "zap" for modifying main memory and "chap" for changing internal dispatching priority; MVS-like utilities for mounting and dismounting devices, checking table labels, and expediting or suspending jobs; and warning of system problems. Resolve Plus also allows for the combining of MVS, JES, and Resolve commands into one service. Resolve Plus is available now for \$19,000 for MVS/370 and \$24,000 for MVS/XA.

IMF 2.3.0 is the latest release of B&B's integrated family of products for the management of IMS/VS DB/DC systems. It's packaged in SMP (system modification program) format (SMP/4 or SMP/E) and ranges in price from \$12,500 to \$35,000. Licensed IMF users can order the upgrade at no charge. BOOLE & BABBAGE INC., Sunnyvale, Calif. CIRCLE 269



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## Real Time

### Software Distribution System

Delivers software and updates to corporate end users.

SofStore is a new program from DTSS that is an integrated micro/mainframe software distribution system delivering brand-name and proprietary micro software programs and updates to end users. It also provides managers with a controlled software acquisition, distribution, and reporting mechanism.

The system is based on a centralized structure, which DTSS calls a "store." Through it, authorized end users can evaluate, order, and download micro software applications from a central corporate site. Reviews and cost comparisons of available software options are created based on corporate and end-user requirements. The system uses a series of screens that model individual corporate approval processes to allow users to download software. A report-writing feature allows information managers to track software distribution

for internal accounting and reporting to management as well as to software publishers that have volume purchase agreements with the corporation.

Commercially available in August for \$75,000, it incorporates host and PC systems software along with DataPass, DTSS's proprietary micro-to-mainframe link, which permits both asynchronous and synchronous communications. The first release runs under IBM VM/CMS hosts, using the SQL/DS database. The micro portion uses an IBM PC or compatible. DTSS INC., Hanover, N.H. CIRCLE 265

### Natural Upgrade

Software AG offers a complete revision of its 4GL system.

Natural 2 is the recent revision of Software AG's Natural 4GL application development system. New features include an intelligent screen design, new editors for program and data definition, Natural application windows, support for all structured programming constructs, interpro-

gram communication to both Natural and third generation language subroutines, automated array processing, mathematical standard functions, and support for floating point, Boolean, and date/time data types.

Software AG also says it has improved the processing performance of Natural by streamlining the execution phase of an application. Claimed performance enhancements include reduced data transfer to terminals and optimized generation code. The object code of Natural has been restructured into reentrant format, which enables users to share a common buffer pool. It's available in all environments, including batch and all supported TP monitors.

Natural 2 applications can be run under the complete range of IBM mainframes; all TP environments are supported. It's available for ADABAS, VSAM, and DL/1 data structures. The vendor claims a DB2 version will be available by the end of the year. The license fee ranges from \$25,000 to \$150,000, depending on the operating system and cpu. Upward compatibility with existing Natural applications is guaranteed by the vendor, and the new version of Natural is a free upgrade for current Natural customers. SOFTWARE AG, Reston, Va. CIRCLE 268

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### NonStop SQL

Tandem announces relational DBMS for its NonStop systems.

NonStop SQL software for Tandem NonStop on-line transaction processing systems is a distributed relational database management system incorporating the Structured Query Language (SQL). Tandem claims that with the new program, data anywhere in a network of Tandem systems can be read, written, or updated, with full transaction protection, and the database will always reflect the current state of business. NonStop SQL is integrated with Tandem's Guardian operating system and with products in its Encompass DBMS set, such as the Pathway transaction control program, and TMF, the transaction monitoring facility.

NonStop SQL will be available in the third quarter and is priced at a one-time license of \$4,000 plus \$500 per processor per month for a NonStop VLX system; \$4,000 and \$375 for NonStop TXP and II systems; \$8,000 and \$750 for EXT25 systems; and \$6,000 and \$600 for EXT10 systems. TANDEM COMPUTERS, Cupertino, Calif. CIRCLE 270





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## PEOPLE

# From Entrepreneur to Philanthropist

ISSCO's Peter Preuss finds the rewards in helping people are even greater than in founding a successful software company.

BY EDITH D. MYERS

Peter Preuss, age 43, believes luck and good timing played big roles in his ability to bring a company from nothing to \$40.3 million in revenues in 17 years.

The company is ISSCO (Integrated Software Systems), San Diego, which he formed with two fellow University of California, San Diego, students shortly after he had come to the U.S. from his native West Germany at the age of 21 to work toward an advanced degree in mathematics. The company was sold last December to Computer Associates, Garden City, N.Y., in a \$69 million cash transaction.

Preuss also believes that the rewards of luck and good timing bring with them obligations. "I believe that people like me who were lucky enough to be at the right places at the right moments in high technology ought to give back to the community." As his company's success grew, he took an active part in philanthropic activities in art and music. In February 1985, for "some personal family reasons" he became interested in brain tumor research and founded the Preuss Foundation, which he funded with an initial gift of \$3.5 million. Since ISSCO's sale, he has been devoting his efforts almost full time to the foundation, although he continues as a consultant to Computer Associates in strategic planning.

Enthusiasm comes naturally to Preuss and probably had as much to do with his and ISSCO's success as did timeliness and luck. "It was a wonderful time," he says of ISSCO's formative years. Everything in software, particularly graphics software, was absolutely state of the art. IBM had just unbundled and the software business was just emerging."

Preuss, Ian Hirschsohn, and Allan Frankel formed the company when all three were PhD candidates at UCSD and had received a Navy contract for "a series of programs we had written."

ISSCO's first product was DISSPLA (Display Integrated Software System



**PETER PREUSS: "The software industry is in a stage of major consolidation."**

and Plotting Language) and Preuss, early on, got himself a DISSPLA license plate for his car, one he still has and with which he will never part.

The second customer for DISSPLA, after the Navy, was Shell Oil in The Hague, the Netherlands. Preuss went to the Netherlands to supervise installation and ended up spending a year there. "I was in the process of transferring my visa status from student to immigrant and it is not wise to leave the country at such a time. They hadn't heard of my company and felt there were too many unemployed programmers in the San Diego area. It took a year to clean up the matter, but I did manage to do some conversions of our product in that time and even sold a few copies."

From the beginning, says Preuss, "we had a quality product that attracted very, very good customers but very few. We grew slowly, benefiting from tremendous feedback from users. Then, by

1975, a tremendous need for graphics developed. We were five years old and there was nothing out there like DISSPLA."

In 1977, ISSCO introduced its second major product, Tell-a-Graf, which enabled nonprogrammers to generate presentation-quality graphics. This moved the company into the business world. "Till then, we had been hampered by a lack of available hardware technology, but then Tektronix began releasing products at a rapid rate, which was an incredible benefit to us," Preuss explains. "Devices began to appear in large numbers. We began to achieve a high growth rate and started putting more emphasis on the sales environment, on getting a handle on the marketplace." That year, Preuss bought out his two partners.

"We were entirely bootstrapped from the beginning and plowed large amounts back into development. In 1980, even though we didn't need it, I decided to go out for venture capital. We got it and put it in the bank and never used it. Because we didn't need the money, the venture capitalists came to us and we were able to choose the best. They were able to introduce us to banking connections, accounting connections, and legal connections, to the infrastructure needed to become a large multimillion-dollar company. They gave us very good advice."

ISSCO went public in 1983, at which time it was earning \$3 million a year on revenues of \$24.1 million. Why the decision to sell? "I think the software industry is in a stage of major consolidation," says Preuss. "The mainframe software industry has some very large players. We were middle-sized. We strived to be a big player by building up critical mass through acquisitions. We found we didn't have as much muscle as the larger players. We were not able to acquire first-level players, only second-level. Then the opportunity presented itself to sell the company and that was the other good alternative."

But now he is devoting himself to the foundation. He says his "high-tech friends" are "giving large amounts to my foundation. I'm attracting funds to medical research which would not normally flow to medical research." He's funding specific products with grants. He notes the nation "spends \$1,000 per person per year to treat cancer but only \$6 per person per year on cancer research." He's hoping to balance that a bit. ■



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## BOOKS

### Technoscam

TECHNOCRIMES: THE COMPUTERIZATION OF CRIME AND TERRORISM

by August Bequai, Lexington Books, Lexington, Mass. (1987, 193 pp., \$12.95).

BY JJ BUCK BLOOMBECKER

At first, *Technocrimes* was frustrating. By the end it was maddening.

The eighth book by indefatigable attorney and author August Bequai, *Technocrimes* argues that technological advances bring with them the possibility of "increasingly frightening methods of crime and mass destruction," including disruption of world monetary systems, massive invasions of our privacy, and the erosion of our national security through Russian acquisition of our highest high-tech information. Bequai warns that American society must respond to these threats with better computer security, more investigative training, and new codes of ethics (or, to use his term, "technoethics").

I have no question that Bequai is right. Unfortunately, the support for his arguments is so flawed that he runs the risk of discouraging us from agreeing with the many valid observations he makes.

As DATAMATION readers have doubtless noted, there is no shortage of people pretending to commit literature but actually stringing together the most sensational, most frightening, the most unbelievable aspects of the computer revolution. Shrewdly appealing to such mass-market sentiments as technophobia or technophilia, these people engage, I suggest, in "techsploitation." Works of techsploitation play fast and loose with statistics and so-called expert opinions, shunning the demands of serious scholarship (or, for that matter, even good journalism).

True to the genre, Bequai in this book seems unable to distinguish proposals, plans, suggestions, and attempts from reality. Discussing "high-tech terrorism," Bequai reports that "a group of hackers attempted to shut down the California telephone system." He ignores the fact that their "attempt" was hatched in a Shakey's Pizza parlor, and never got beyond the theft of some manuals. In the chapter entitled "Why the Cops Can't Cope," Bequai notes a case in which "a federal court threw out the stolen prop-

erty charge on the grounds that electronic blips transmitted over telephone wires were not property." He neglects to mention that the defendant in this 1976 case was convicted and incarcerated.

August Bequai should know better. He is an attorney who served as project director for a study of computer crime and security funded by the U.S. Department of Justice. Listed in the book are his credentials as a consultant to the U.S. Congress, the White House, and various government agencies.

Yet he has written a book that shows abysmal ignorance (or purposeful neglect) of computer crime laws in the United States. One looks in vain for acknowledgment of the fact that 47 states have passed computer crime laws, or for reference to the Electronic Communications Privacy Act and the amendments broadening the federal Computer Fraud and Abuse Act of 1984.

Instead we are told "[as] a result of inadequate laws, only one in 33 computer crime cases referred to prosecutors results in a conviction." Alert readers may fairly ask what relationship this statistic bears to the one Bequai quotes four pages earlier: "only 12% of all computer heists are ever reported to the police and only 18% of those result in convictions." (Research I conducted for the National Center for Computer Crime Data puts the conviction rate of cases reported to prosecutors closer to 75%.)

What makes me mad, rather than just amused by this apparent attempt to make a fast buck and add another publication to the author's long list, is the fact that it gives support to those who would do the most to undermine our computer security. Bequai scorns the sentiments of the Fortune 500 executive whom he quotes as saying "computer crime is a media creature, exaggerated by politicians [and] security consultants." Yet this book could be exhibit number one to make the executive's case.

Not all of today's information-age scams require technological sophistication. *Technocrimes* suggests—if nothing else—we must beware of those writers who attempt to dazzle us not with artificial intelligence but with intelligent artifice. ■

*JJ Buck BloomBecker is an attorney, consultant, and writer who serves as director of the National Center for Computer Crime Data, a research institute and information clearinghouse in Los Angeles.*

## LETTERS

### Hypocrisy?

It may have been April Fools', but who does ADAPSO think it is fooling? ("Putting Their Heads on the Tax Block," March 15, p. 32). Let's cut through the baloney, fellas. Like most tax issues, Section 1706 boils down to a simple matter of self-interest. ADAPSO and the large job shops it represents are seeking a way to stifle competition from independent consultants, who have less overhead and can charge a lower rate for services. For ADAPSO to claim that they only want to see everyone pay their fair share of taxes is pure hypocrisy. Does anyone out there really believe ADAPSO is spending all that lobbying money in the interest of raising tax revenue for the U.S. government? Not on your Aunt Mildred's mainframe!

The arrangement between clients, brokers, and independent consultants has flourished in the past because it makes good business sense. If all parties comply with the proper tax laws, there's no problem. If taxes are not being paid, enforcement is the issue. What's next? Do we outlaw waiters because they may not be paying full taxes on their tips?

PAUL KONWISER  
Manhattan Beach, California

### Prime Problems

In "The Destiny of DES," (March 1, p. 79) I was amused to read that the one-way function in the RSA public key cryptosystem "... is based on the difficulty of factoring very large prime numbers."

"A Method for Obtaining Digital Signatures and Public-Key Cryptosystems," by L. Rivest, A. Shamir, and L. Adleman in the "MIT Laboratory for Computer Science Technical Memorandum 82" (April 1987) reveals that it is the difficulty of factoring the *product of two very large primes* that provides the essential feature of the system.

GERALD DOWNIE  
Peterborough, Ontario

New advances in our understanding of prime numbers has improved our ability to factor the product of two or more very large primes by a factor of 100 or more. Nevertheless, because the process still might take years to perform, the RSA algorithm is a good one—until some mathematician makes another two-orders-of-magnitude breakthrough!

LOUIS J. BOOKBINDER  
Programmer/Analyst  
Stanford University  
Palo Alto, California



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## CALENDAR

### JUNE

#### NCC '87.

June 15-18, Chicago. Contact NCC '87, American Federation of Information Processing Societies (AFIPS), 1899 Preston White Dr., Reston, VA 22091, (800) NCC-1987, or (703) 620-8955.

#### CEPA 1987 Spring Conference.

June 22-23, Washington, D.C. Contact Society for Computer Applications in Engineering, Planning, and Architecture Inc., 15713 Crabbs Branch Way, Rockville, MD 20855, (301) 926-7070.

#### Plas-Tech '87.

June 23-25, Atlantic City. Contact Delia Associates, Route 22 W., P.O. Box 338, Whitehouse, NJ 08888, (800) 526-5978.

#### A/E/C Systems '87 (Computer Show for the Design and Construction Industry).

June 23-26, Washington, D.C. Contact Conference Director, P.O. Box 11318, Newington, CT 06111, (203) 666-6097.

### JULY

#### Sixth National Conference and Exhibition of the American Association for Artificial Intelligence.

July 13-17, Seattle. Contact American Association for Artificial Intelligence, 445 Burgess Dr., Menlo Park, CA 94025-3496, (415) 328-3123.

#### ACM SIGGRAPH '87 (14th Annual Conference on Computer Graphics and Interactive Techniques).

July 27-31, Anaheim, Calif. Contact Association for Computing Machinery Inc., Special Interest Group on Computer Graphics, Conference Services Office, 111 E. Wacker Dr., Chicago, IL 60601, (312) 644-6610.

### AUGUST

#### 25th Annual Conference of the URISA (Urban and Regional Information Systems Association).

Aug. 2-6, Fort Lauderdale, Fla. Contact URISA, 319 C St. SE, Washington, DC 20003, (202) 543-7141.

#### 1987 International Congress on Planning and Design Theory.

Aug. 17-20, Boston. Contact the American Society of Mechanical Engineers (ASME), 345 E. 47th St., New York, NY 10017, (212) 705-7722.

## READER'S FORUM

### Take IBM's OS Maintenance . . . Please

Maintenance methods have changed over the past few decades, but they are still very time consuming. Take IBM operating system maintenance, for example.

To understand how IBM's fix it shop works, consider how one might add the VM operating system to an installation's menagerie of software. VM begins life by being dropped into one's lap as a stack of computer tapes delivered by Federal Express. One of the tapes contains a copy of a starter system (classic chicken or the egg problem) to provide something to build on. Other tapes contain all the parts needed to put together this giant erector set. When all parts have been properly loaded, an operation known as a SYSGEN is done. This process brings all the pieces together into, it is hoped, a working system. At this point the system may be IPLed (bootstrapped) to see if it works. Unless some major parts have been forgotten, a new version of VM is hatched.

Until this point, the whole thing sounds like a cakewalk. Ah, but now maintenance rears its unsightly mug. What has been put together and called an operating system probably has more holes in it than Bonnie and Clyde's car. So, the games begin. Among the volumes of tape that Federal Express left is one clearly labeled as a PUT (Program Update Tape). This tape contains a collection of all the things that were known to be wrong with the installation's software collection as of a certain date. Before dumping this can of worms on the system, a call is made to the IBM Support Center.

At the Support Center one will find a friendly group of people who exist within a caste system. The front man or woman for this operation will answer the phone and ask for the secret password. If the caller gets through this rite of passage, he or she will be queried as to whether this is an old problem or a new problem, and which particular part of the castle seems to be falling into the basement. At this time, a referral is made to the Level 1 staff. These people hear it all, 24 hours a day, seven days a week. For purposes of illustration, let's say all that's needed is a PUT Bucket (this is a collection of all the nuts and bolts that IBM knows have fallen off the system, but isn't too sure should be put back on yet). The caller leaves an address, says how

fast he or she wants it, and again waits for Federal Express to bring one more piece to the puzzle.

After the system fix arrives, and the system's new form is being tested, more nuts and bolts usually fall off, or parts may be found missing that were never on in the first place. Again a call is placed to the Support Center, the caller goes through the little ritual, and Federal Express brings fixes on fixes on the fixes.

If the newest fix doesn't fix it or there is a problem never before seen, a call must again be put through to the Support Center for Level 2 staff, among whom the experts on the offending widget are to be found. Once in contact with these people, hours and hours are spent on the phone reading them pages of information, one character at a time (F23D would be repeated as "fox two three dog"). Needless to say, people within earshot think the systems staff has gone over the edge talking gibberish for hours on end.

What the IBM people are trying to do is backtrack from when things went blooey to when the problems really began. Depending on the problem, this process may go on for days or months. When the problem is defined well enough, an APAR (Authorized Program Analysis Report) is created and Federal Express gets to take things back the other way. In time, this back-and-forth process results in a PTF (Program Temporary Fix). This will usually be a couple of lines of assembly language code (you guessed it, delivered by Federal Express). Corrections are made, the system rebuilt, and another new version is brought up to see if the problem goes away. Eventually, this whole process may come to an end and the problem can be closed out.

Of course, this isn't the end of the story. PUT tapes arrive throughout the year, new problems come up weekly, if not daily, new products (some of which are installation and maintenance horror stories in their own rights) arrive, and on and on. Although this system of maintenance is a vast improvement over the methods used in the late 1960s, one still wonders if there couldn't be a better way.

RON GREVE

Computing Center Manager and  
Assistant Prof. of Computer Science  
South Dakota State University  
Brookings, South Dakota