

# DATAAMATION®

JULY 15, 1987  
A CAHNERS PUBLICATION

## The Computer Room: Putting The Pieces Together



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CA-User Merger:  
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Pay Price?

How To  
Cut Software  
Maintenance Costs

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```

AF
Command ***
PROC PRINT DATA= AIRDATA
- DOUBLE - N
- ROUND - X LABEL
KEYS (DMKEYS)
Command ***
Key Description
F1 help
F2 keys
F3 log
OUTPUT
Command ***
Lee Aircraft Company Sales Report
For Month of January, 1987
----- DIVISION-AIRFRAME -----
Order Date Price Shipping Cost
BY DIVIS:
PAGEBY DIVIS:
SUM PRICE
TITLES
Command ***
Title Description
1 Lee Aircraft Company Sales Report $50,234 $976
2 For Month of January, 1987 $786,555 $3,400
$109,333 $2,690
$1789,434 $5,000
$1,735,556 $12,266
  
```

**1 Ease of use.** The SAS System has ready-to-use procedures for every kind of analysis and report—from simple to advanced, preformatted to customized. A built-in menu system and on-line help guide you through the procedures. Special windows let you define titles and footnotes for reports, check the characteristics of your data, change function key definitions, and keep notes.

```

HELP
Command ***
PROC DOWNLOAD copies a SAS data set stored on the remote mainframe
system to the local PC system.
PROC DOWNLOAD DATA= OUT ;
LOG
Command ***
NOTE: Remote submit commencing.
5 x alloc (facct) dataacct.monthly shr;
6 proc download data=sct.monthly out=pc.mon;
7 run;
NOTE: DOWNLOAD IN PROGRESS FROM DATA=ACCT.MONTHLY TO OUT=PC.MON
NOTE: The data set PC.MON has 500 observations and 56 variables.
NOTEPAD
Command ***
Data Sets Available for Download
DATA SET DESCRIPTION
MONTHLY Monthly general ledger balances after last close
  
```

**2 Connectivity.** With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus

the SAS System reads data from any kind of file, including dBASEII®, dBASEIII®, and Lotus® 1-2-3®.

```

PSEDIT
Command ***
Obs 151
Lee Aircraft Order Entry System
Part No.: 14-50126 Date Orderd: 03DEC86
Description: Rudder Gear Assembly Time Orderd: 09:45
Price: $ 8,987.35 Taken by: JAD
Quantity: 1
Customer Name: Allen Aviation Inc.
Shipping Address: Billing Address:
Bldg 64 MS 402/ACCT
1 Runway Drive P.O. Box 11036
Hargett IL 60623 Chicago IL 60622
Customer Contact: SHIPPING
John Stevens Command ***
312-344-2222 SHIPPING INSTRUCTIONS
Rudder gears are to be shipped through the
central office in Seattle, WA. Parts will
be shipped by truck or rail. Air freight
can be used if customer prepays shipping.
Date Shipped: 07JAN87
Shipped by: UPS
  
```

**3 Integration.** The SAS System runs on mainframes, minicomputers, and personal computers so you only have to learn one software system no matter what hardware your company has installed. And as your needs grow, the SAS System grows with you. We're committed to supporting all the capabilities of our mainframe software system for your PC. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for 10 years. It's all part of our site licensing plan.

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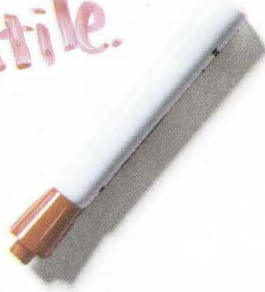


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 Cary, NC 27511-8000  
 Phone (919) 467-8000  
 Fax (919) 469-3737

The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II™, Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

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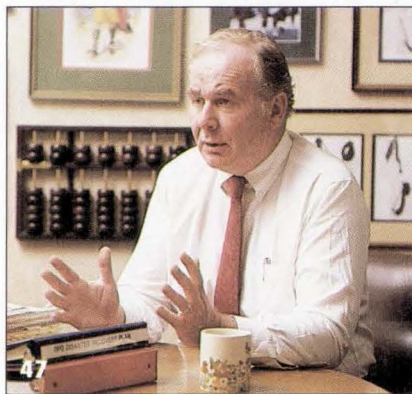
A COMMITMENT TO EXCELLENCE

# DATAMAT

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### 4 Letters

HAL/S developer says the shuttle software wasn't written in FORTRAN: "The space station may be going to Ada but the shuttle will remain with HAL/S." Also, a suggestion that mainframe software is overlooked in information center planning; and kudos for our senatorial face-off on the vexed question of Section 1706.

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Cover Photograph by Walter Wick

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The Future of the Minicomputer  
The European 25  
Plus: News, Products, and more.

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## Editorial

### Keeping the Lead In Information Services

As keynote speeches go, Robert Galvin's remarks at last month's National Computer Conference in Chicago were exceptional. Rather than engage in Japan bashing, as so many information technology executives have done in recent months, the Motorola Inc. chairman presented a realistic—penetrating, in fact—view of where Japan is headed: it wants to become the dominant global force in services. Moreover, he spelled out the consequences of such domination to the smattering of U.S. computer and communications executives in the audience.

"What people own, they manage," said Galvin, who has managed to build Motorola into a \$5.9 billion communications and semiconductor giant. "What they own and manage also directs their sourcing policy . . . one's foreign investment creates a market for one's parent company exports, which of course will include the electronic equipment and software to process and communicate their service sector information needs."

How, you might ask, do such thoughts affect the way you conduct your business? Given that nearly 34% of DATAMATION's readers work in service enterprises, such as banking and retailing, and another 18% of them are employed by computer manufacturers or computer service firms, Galvin's words should be of special importance.

Galvin said, "I foresee an opportunity and a likelihood that the nation which masters the grand management of information for the prime services industries of the service sector—along with the ownership of key parts of the service sector in the major developed world markets—is destined to global economic leadership of historic proportions." He added, "The consequences for the information processing and information communications industry in that leader country will be dramatically favorable. The consequence of being based in an also-ran country will be comparatively debilitating."

All is not lost, however, for American service companies and their U.S. information technology suppliers.

Galvin was quick to point out that the "American Information Age" profession takes second position to no other at this time. Maintaining its position of global preeminence will require strategic planning on the part of U.S. executives—planning that must begin now.



TIM MEAD  
EDITOR-IN-CHIEF

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# Letters

## HAL/S Is It

"FORTRAN at 30: Formula for Success" (April 1, p. 47) states that while NASA has committed to Ada for the space station, most of the shuttle project was written in FORTRAN. This most definitely is not the case. Over 85% of the flight software for the four primary and single backup on-board computers was written in a specially designed language called HAL/S. Approximately 1 million lines of operational HAL/S code have been written, tested, and flown for the shuttle. HAL/S was developed by Intermetrics Inc., Cambridge, Mass., specifically for NASA. The project began in 1970 as a research activity and benefited from the pioneering experience gained in implementing the real-time programs aboard the Apollo spacecraft. In 1975, NASA formally accepted HAL/S for the shuttle and established it as a NASA standard language. The language itself departs considerably from FORTRAN. It is block structured (influenced by ALGOL), strongly typed for enhanced reliability, emphasizes the modular construction of programs, and fully supports structured programming techniques. It incorporates a complete real-time control syntax (revolutionary in the early '70s) within the language to address real-time embedded applications and is unique in that it introduces vector and matrix arithmetic for straightforward spacecraft dynamics and navigation applications.

HAL/S has been judged a great success and has contributed materially to the reliability and on-time schedule of shuttle software. The space station may be going to Ada but the shuttle will remain with HAL/S. In fact, a new HAL/S compiler is being prepared to support an upgrade in shuttle avionics equipment. Considering the size of the shuttle project, it is probable that more lines of man-rated flight software have been written and developed in HAL/S than in any other DOD or NASA language.

FREDERICK H. MARTIN  
Vice President  
Intermetrics Inc.  
Cambridge, Massachusetts

## Overlooked

After reading John Oglesby's "How to Shop for Your Information Center" (June 1, p. 70), I felt that the important area of mainframe software developments had been overlooked.

Mr. Oglesby clearly states that mainframes have an important role in the

information center, but he says very little about recent advances in mainframe information center software.

Just as popular mainframe packages have recently been ported to the pc, many popular pc applications have been successfully implemented on the mainframe. Information centers can now be structured almost solely around mainframe software, offering fully integrated database facilities. There are many excellent packages such as these, provided by a number of vendors. IBM and Lotus are finally realizing the importance of this market, as exemplified by their recently announced 1-2-3/M project.

Mainframe-based software products have been designed with the same ease of use as pcs, meeting and exceeding today's corporate business requirements. These systems avoid the communications and isolation problems associated with pc systems, while maintaining a strong presence within the information center. They should not be overlooked.

EDWARD T. SPIRE  
President  
Dynasoft Corp.  
Rosemont, Illinois

## Again, 1706

As a member of the ADAPSO legislative task force, I was particularly drawn to the comparison of views by Sen. Moynihan and Sen. D'Amato in regard to Tax Reform Section 1706 ("How Should Contractors Be Taxed? A Debate," June 1, p. 89).

I spend an average of two days a month on Capitol Hill presenting the facts and impact of Section 1706 along with many of my colleagues and competitors. All of us would rather be home with our families and businesses but wouldn't you know it, our industry gets through tax reform basically unscathed and now, by the possibility of placing Section 1706 on hold, Sen. D'Amato thinks it will be "business as usual."

Sen. Moynihan provides facts, reasons, and a level playing field as arguments, while Sen. D'Amato chooses wrongs, rights, and the American Way. I couldn't present a clearer picture of how this issue is perceived on Capitol Hill than DATAMATION did. When will Sen. D'Amato and his colleagues start discussing facts?

JOEL BRUST  
President/Founder (Retired)  
Amtec Systems Corp.  
Los Angeles, California

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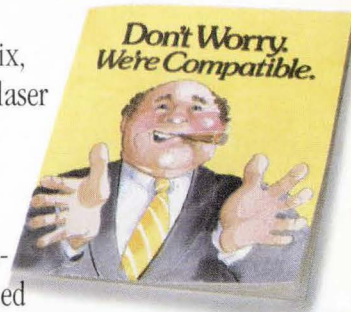
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Paul

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Edwin R. Lassetre conceived efficient software designs that



Paul  
Pippenger  
Totta

simplified data processing on many of IBM's larger computers.

Nicholas J. Pippenger invented the theory used to identify problems that can be solved efficiently by parallel processing.

And Paul A. Totta made possible many advances in semiconductor metallurgy that significantly contribute to the reliability and performance of IBM computers.

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James Lewis  
President  
Continental Container Systems  
A Division of  
Continental Can Company, Inc.

"We're glad we bought into a partnership with Cullinet. After all, we've doubled inventory turn-around in the last 18 months. And we think we can double it again in the next 18 months."

David C. Grigsby  
General Manager, Manufacturing



It's not easy for a company to put a lid on a manufacturing system purchase decision. Continental Container Systems certainly knows that. Before they settled on Cullinet's Manufacturing System (CMS) software, they analyzed over 200 vendors.

Continental Container Systems is a large multinational company that manufactures the closing equipment to put lids on scores of major-brand canned items. Everyone in the division knows how important it is to be a viable, long-term supplier. And a viable, long-term supplier of information management technology was what Continental Container Systems' end-user selection committee saw in Cullinet.

CMS is an advanced MRPII system that's based on Cullinet's single relational database product, IDMS/R. It delivers the discipline and the flexibility to allow companies to readily adapt to changing business needs. And scheduling becomes pro-active rather than reactive.

At Continental Container Systems, CMS has already improved inventory turns by an average of 40%. Overall lead-time is down by almost 43%. On-time delivery has doubled. And the shop-floor has been streamlined. The division uses all eight CMS modules including Bill of Materials, Master Production Scheduling, Inventory and Cost Control. Virtually all of their workforce interfaces with the system every business day. They *know* that CMS is productivity - perfectly packaged.

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## Cullinet

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# Look Ahead

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## **SUN, SAXPY EYE CULLER**

SANTA BARBARA, CALIF. -- The financial backers of Culler Scientific Systems Corp. are seeking a buyer for the 17-year-old company that was a pioneer in scientific computing. Culler's recently installed president, David Folger, confirms that acquisition talks have taken place with a number of potential buyers, although he will not identify any. Companies expressing an interest in Culler's parallel processing technology reportedly include Sunnyvale, Calif.-based supercomputer vendor Saxpy Computer Corp. and Mountain View, Calif.-based Sun Microsystems. Sun, whose technical workstations are being marketed as front ends to the Culler processors, declines to comment. Saxpy confirms its interest.

---

## **3380E TROUBLE PERSISTING**

SUNNYVALE, CALIF. -- Some users of Amdahl Corp.'s double-capacity, 3380E-class storage device apparently are continuing to experience reliability problems, and Amdahl has been replacing some head disk assemblies on the Fujitsu-made drives in an attempt to head off or correct failures. Sources at the company say Amdahl has identified drives coming off the manufacturing line that may be prone to failure and has replaced HDAs on the drives, sometimes before a problem has cropped up. The tactic seems to be working--slowly. The latest UCC-Reliability Plus numbers indicate an increase in 3380E reliability. But the drives still lag far behind reliability leaders NAS and IBM.

---

## **LONGER SHELF LIFE**

PALO ALTO -- Hewlett-Packard's popular HP 1000 real-time computers, used primarily in manufacturing applications, will be around for quite a while, even with the advent of the Spectrum RISC architecture. Users report asking for, and receiving, assurances that the current 1000 architecture will be supported until the year 2000. In the meantime, although HP is pushing a RISC-based HP 9000 solution for top-of-the-line manufacturing needs, it currently appears better suited for engineering applications. Incorporating real-time elements into the 9000's Unix operating system is "hard to do," admits HP vp Lew Platt. He adds that for some manufacturing customers "the 1000 is the product of choice for a very long time . . . . Don't expect a real-time capability equivalent to the 1000 in the [Spectrum] Precision Architecture for a very long time."

---

## **BEHIND THE SCENES**

TOKYO -- Control Data Corp. denies being the force behind the U.S. government's insistent pressure to open up the Japanese supercomputer market, but the timing

## Look Ahead

of the recent introduction of the 10GFLOPS ETA-10 in Tokyo was flawless. Though the latest round of negotiations to increase the transparency of Japanese government procurement procedures were inconclusive, a promise to procure a billion dollars' worth of foreign products--part of the late-May package designed to head off criticism at the economic summit--specifically mentioned supercomputers as buy items. The problem may come after the first few sales. "They could see it as a token purchase to calm the uproar," warns Glen Fukushima of the U.S. Trade Representative's office.

---

### DON'T COUNT LIEMANDT OUT

DALLAS -- Although Uccel Corp. chairman and ceo Gregory Liemandt will be out of the company he helped reshape by the end of next month--if its acquisition by Computer Associates goes ahead on schedule--the software industry hasn't seen the last of him. Liemandt, who stands to pocket a hefty personal fortune as a result of the \$780 million acquisition, has told DATAMATION he plans to take a couple of months off, then get back involved in the industry sometime this fall. While that schedule suggests Liemandt has a specific project in mind, he declines to say what it is.

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### LOW-WAGE HAVENS ATTACKED

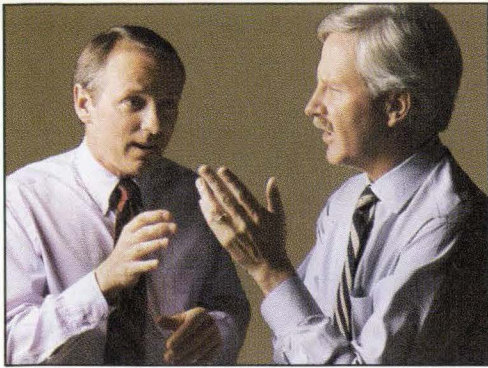
NEW YORK -- Business folk who believe in transferring production overseas to take advantage of low-wage areas should take another hard look before leaping. Robert C. Christopher, author of Second to None: American Companies in Japan and administrator of the Pulitzer Prizes at Columbia University, believes that any company that focuses on labor costs when evaluating the production factor is looking at the wrong thing. He says companies should instead focus on acquiring technology, then skilled labor, and then lucrative markets when deciding where to base facilities. Technology is the key, Christopher says, because of its implications for efficiency and competitiveness. "As a result of technological changes, the importance of labor in production costs is declining and will continue to do so," he says. "The strategy of moving production facilities around to get the cheapest labor is becoming increasingly outmoded and actually damaging."

---

### HIGH TECH IN, WOMEN OUT

TOYKO -- Automation finally seems to be making its way into one of the most tradition-bound and inefficient areas of the Japanese business world--the office. Mitsubishi Electric Corp. claims that increased auto-

(continued on p. 12)

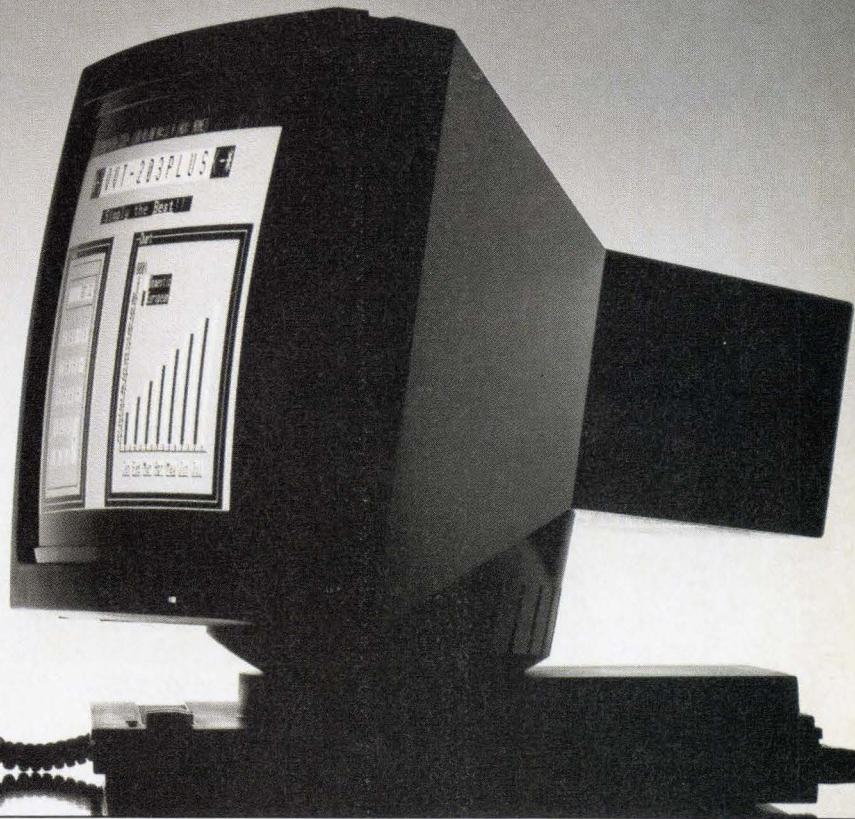


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CIRCLE 9 ON READER CARD

# Look Ahead

mation of its offices has greatly decreased the volume of routine clerical tasks for which large numbers of young women are hired straight out of school every April. Tradition isn't going out the window entirely, however. Instead of giving the young women more responsible tasks to do, Mitsubishi has decided merely to refrain from hiring any of them next year.

---

## **DEC FOCUSES ULTRIX ON SINGLE USERS ...**

MERRIMACK, N.H. -- Digital Equipment Corp. has begun focusing its Unix development activities on the single-user workstation market, says Ultrix marketing manager Gary Oden. A recognition of the market penetration of Unix in areas such as computer aided engineering, the move leaves VAX/VMS as its primary multi-user operating system. Oden says Ultrix continues to be available on multiuser VAX systems, but the intent is to tailor the OS to bit-mapped and single-user workstations such as its VAXstation 11/GPX.

---

## **... HOPES FOR COM SERVICES DEALS**

MAYNARD, MASS. -- Digital is eyeing an expansion of its data network services to voice and T1 network management services via third-party agreements with PTTs, Regional Bell operating companies, and others, says William R. Johnson Jr., vice president of distributed systems engineering and manufacturing. "To be able to say we can be a full-service vendor, whether voice or data, is a high priority," says Johnson.

---

## **FLOATING TO SOFTWARE**

BEAVERTON, ORE. -- Demand for Floating Point Systems' T Series parallel supercomputers may have taken off slower than the company had hoped, but FPS continues to fund new T Series development, primarily in software. FPS is now planning to port Unix as well as FORTRAN and C languages to the scientific system, which is based on the Transputer chip from Inmos. Currently, the T Series supports only the obscure Occam sequential process language. FPS plans to test the T Series supporting the new languages this summer.

---

## **RUMORS AND RAW, RANDOM DATA**

Digital Equipment is revamping its VAX Common Data Dictionary to provide more "active" features. Agreements with third-party tool developers to port database tools to Digital's Rdb database also are on the horizon. . . . A feasibility study conducted by Database Consultants Europe, based in Amsterdam, the Netherlands, recommends that a new building under construction in The Hague be turned into a high-tech showpiece to give politicians access to databases containing reports, statistics, and background details of any issue.

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AK Anchorage..... Sep 9	GA Atlanta..... Jul 8, Sep 16	MA Boston..... Jul 16, Aug 25, Sep 10	MI Detroit..... Jul 14, Aug 11, Sep 15
AL Huntsville..... Jul 9, Sep 17	GA Macon..... Aug 13	MA Burlington..... Aug 5	MI Grand Rapids..... Jul 8
AR Little Rock..... Jul 7, Sep 16	IA Des Moines..... Jul 15, Sep 17	MA Springfield..... Sep 16	MI Traverse City..... Jul 28
AZ Phoenix..... Jul 14, Aug 27, Sep 24	IL Chicago..... Jul 14, Aug 19, Sep 15	MA Worcester..... Aug 5	
AZ Tucson..... Aug 26	IL Springfield..... Aug 11	MD Baltimore..... Jul 28, Sep 3	
CA Lafayette..... Jul 30, Sep 24	IN Indianapolis..... Jul 21, Aug 12, Sep 24	MD Bethesda..... Jul 28, Aug 6, Sep 8	
CA Los Angeles..... Jul 16, Aug 13, Sep 8, Sep 30	KS Wichita..... Aug 4	MD Ft. Lauderdale..... Jul 16	
Newport Beach..... Jul 21, Sep 17	KY Louisville..... Sep 10	FL Jacksonville..... Sep 9	
Sacramento..... Aug 13	LA Baton Rouge..... Jul 23		
San Diego..... Jul 30, Sep 10	LA New Orleans..... Aug 21		
San Francisco..... Jul 21, Aug 18, Sep 15	MA Boston..... Jul 16, Aug 25, Sep 10		
San Jose..... Jul 9, Aug 6, Sep 2	NH Manchester..... Aug 27		
CO Colorado Springs..... Jul 16, Sep 17	NH Nashua..... Aug 13		
Denver..... Jul 14, Aug 13, Sep 15	NJ Cherry Hill..... Jul 30, Sep 9		
CT Hartford (Farmington)..... Jul 23	NJ Isele..... Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29		
New Haven..... Jul 28	NC Raleigh..... Jul 15, Sep 16		
DE Wilmington..... Jul 9, Sep 1	NC Winston-Salem..... Aug 12		
FL Ft. Lauderdale..... Jul 16	NE Omaha..... Jul 9		
Jacksonville..... Sep 9	NH Manchester..... Aug 27		

MN Minneapolis..... Jul 28, Aug 26, Sep 29	OH Cincinnati..... Aug 5	UT Salt Lake City..... Jul 28, Sep 29
MO Kansas City..... Jul 23, Sep 22	OH Cleveland..... Jul 16, Aug 13, Sep 17	VA Norfolk..... Jul 14
St. Louis..... Jul 16, Aug 18, Sep 16	Columbus..... Aug 4, Sep 30	Richmond..... Jul 8, Sep 8
NC Charlotte..... Jul 22, Sep 23	Dayton..... Jul 21, Aug 18, Sep 22	Virginia Beach..... Jul 23
Raleigh..... Jul 15, Sep 16	OK Oklahoma City..... Jul 21, Sep 15	VT Burlington..... Sep 2
Winston-Salem..... Aug 12	Tulsa..... Aug 11	WA Seattle..... Aug 6, Sep 3
NE Omaha..... Jul 9	OR Portland..... Jul 21	WI Green Bay..... Aug 10
NH Manchester..... Aug 27	PA Harrisburg..... Aug 4, Sep 15	Madison..... Aug 20
Nashua..... Aug 13	PA King of Prussia..... Jul 16, Sep 17	Milwaukee..... Jul 22, Sep 3
NJ Cherry Hill..... Jul 30, Sep 9	Philadelphia..... Jul 9, Aug 6, Sep 10	
Isele..... Jul 15, Jul 23, Aug 5, Aug 18, Sep 16, Sep 29	Pittsburgh..... Aug 25	
Princeton..... Jul 9, Aug 12, Sep 22	RI Providence..... Aug 8	
NM Albuquerque..... Jul 7, Sep 22	SC Charleston..... Aug 12	
NV Las Vegas..... Jul 9, Sep 9	TN Memphis..... Aug 12	
NY Albany..... Jul 14	Nashville..... Aug 6	
Buffalo..... Aug 6, Sep 29	TX Austin..... Aug 12	
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New York City..... Jul 8, Jul 16, Jul 22, Jul 29, Aug 6, Aug 13	Houston..... Jul 9, Aug 6, Sep 18	
Aug 19, Sep 9, Sep 17, Sep 23	Lubbock..... Aug 4	
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Edmonton..... Aug 25
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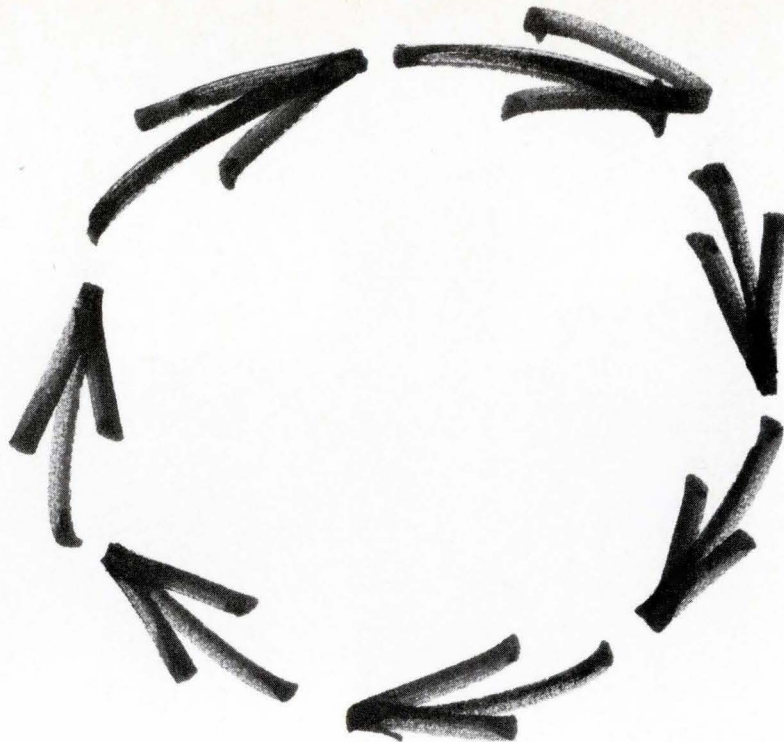
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CIRCLE 11 ON READER CARD

# News in Perspective

## SOFTWARE

### Users May Face Higher Prices, Fewer Choices in CA-Uccel Deal

Computer Associates is attempting to quell user concern over the fate of overlapping CA-Uccel products as well as Uccel's banking/financial programs.

BY JEFF MOAD

When Computer Associates International chairman Charles Wang sat down last month with Uccel chairman Gregory Liemandt to negotiate CA's buy-out of Uccel, the talks were characterized by "fear and ego," according to Bernard Goldstein, a partner with Broadview Associates, the Fort Lee, N.J., investment banking firm.

Goldstein should know. He was the one who brokered the \$780 million stock swap after helping counsel Uccel's majority shareholder, Swiss businessman Walter Haefner, to sell CA his 58% interest in the Dallas-based software vendor.

"Both sides had to overcome competitive urges that two adversaries naturally develop after facing each other in the marketplace," says Goldstein. Add to that the fact that "these were two highly talented ceos and only one was going to survive," and the result was some pretty tough negotiations. Finally, however, what Goldstein calls the "enormous logic" of the deal overcame the fear and ego factor, and the software industry's biggest buy-out to date was off the ground.

Now it's time for Uccel's user base and other users of data center and systems software for IBM mainframes to experience a little fear and uncertainty. In one bold step, Garden City, N.Y.-based CA is poised to get a stranglehold on at least three key data center product markets: job scheduling, data security, and

tape and disk management. As the new, dominant supplier in those segments, CA will continue what has been an aggressive push toward integrating software tools into bundled packages and promotion of a "one-stop shopping" concept.

But a result of CA's emerging market segment power and bundling, say some observers, could be

combining its 26,000-site user base with Uccel's 7,500 sites, CA would control 90% of the installed job scheduling software market for IBM mainframes, according to figures compiled by Computer Intelligence of La Jolla, Calif. In data security, by adding Uccel's ACF-II product to its own Top Secret package, CA would displace IBM as the number one vendor and lay claim to 51%



WANG: CA's chief engineered one of the largest buys in industry history.

higher prices and fewer choices for users.

"Uccel users and other CA customers can expect to be very well served at a very high price," predicts Lee Keet, a partner at Wilton, Conn.-based investment banking firm Vanguard Atlantic Ltd.

Adds Dave Eskra, chairman of Chicago-based software competitor Pansophic Systems Inc., "In some markets, CA now becomes totally the vendor of choice. But if I were a CA customer, I would worry that they don't have to cut prices to get business."

By acquiring Uccel and

of the market. In tape and disk management, the enlarged CA would control 64% of the market, dwarfing the number two competitor, Innovation Data Processing Inc. of Clifton, N.J., which has about 6% of the market, according to Computer Intelligence.

Add to those figures the fact that the data center markets that CA would dominate are among the fastest growing in the IBM mainframe world, and it starts to become clear why CA was willing to pay in excess of five times Uccel's annual revenues to acquire the company. According to Computer Intelligence,

17% of IBM or compatible sites are planning to install data security software in the next 12 months. That is second only to database management software. Job scheduling and disk and tape management also are high on users' wish lists.

CA president Anthony W. Wang just smiles when it's suggested that CA is paying too much for Uccel. "It's been our strategy from the beginning to capture as large a base of users as possible, to keep them as satisfied as possible and supply them with more and more products," he says.

"We acquired Software International for less than one times revenues and, in the same month, we bought ISSCO for two times revenue," Wang continues. "Before that, we paid three times revenue for Top Secret. All those acquisitions worked for us, and we expect Uccel to work because of the products, the customer base, and the strong revenue and profit margin history. Plus we will be looking at what kinds of redundancy savings we can achieve."

#### Cuts Expected Soon

He won't, however, say how much cost-cutting is in store for Uccel and its 1,300 employees once the acquisition becomes final around the middle of August. But some who have lived through a CA acquisition say the cuts will come quickly. "They come in and put their stamp on your company right away," says a former official of San Diego-based ISSCO, acquired by CA last year. "They cut 15% off the bat, and there was a lot of attrition after that."

Anthony Wang acknowledges that CA will continue its practice of bundling programs into higher-priced, integrated packages, matching Uccel products with CA packages. But, he says, users shouldn't worry about higher prices,

because "the user gets more benefits than if he were using standalone products. For example, the user can integrate job accounting with scheduling packages and take advantage of better access to historical information."

Uccel users are aware that the acquisition may spell price hikes, and some aren't happy about it. "There's obviously the potential for higher prices with CA in such a strong position," says Uccel user Jim Dwyer, information services manager for Baltimore Blue Cross/Blue Shield. "But that may force IBM to become more competitive in data center management products,

Inc. of Dallas. But, he says, the CA-Uccel combination means that "maybe for the first time IBM will have something to be concerned about in the software industry."

Previously, it had been IBM and the quivering dwarfs, and IBM had started coming on strong in job scheduling and storage management, not to mention banking. So this deal will give Computer Associates the strength to provide more product enhancements and be a real alternative to IBM."

But Liemandt says he does not know whether or not users will face higher prices as a result of the acquisition.

says Dwyer, a user of CA's Top Secret security product, "is what will CA do about ACF-II and Top Secret? If I were an ACF-II user, I'd be a little nervous that CA might drop it in favor of Top Secret."

CA is attempting to reassure Uccel users that "we will guarantee to continue support on all Uccel products," according to Anthony Wang. He notes, however, "There may be a point where it makes sense to bring together two products. Where we do that we will assure users that all the features that prompted them to buy the original product will be found in the combined product."

nization will be integrated into the company. While we currently aren't in banking at all, we have a complete line of financial and accounting packages that can be integrated with the Uccel products."

## CA To Continue Leap

Wang says CA plans to continue funding Uccel's development of a new integrated banking package code-named Leap, even though Uccel recently announced that the program has fallen about a year behind schedule.

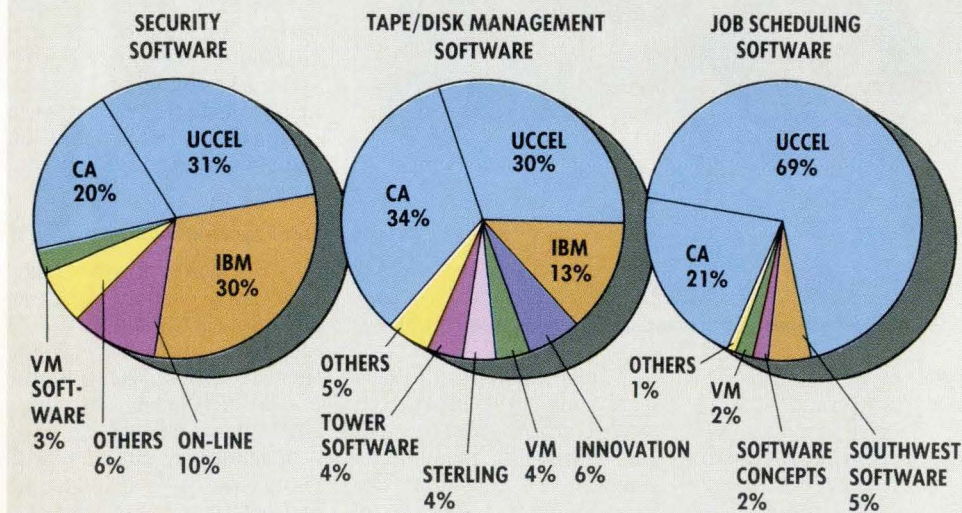
Still, many of Uccel's banking customers seem unsure about what the CA takeover will mean. According to one of Uccel's original banking customers, Ray Dwyer (no relation to Jim Dwyer), senior vice president at the Bank of New England, Boston, "Greg Liemandt did a great job with the company, focusing it on financial and systems software. I think many of us are unhappy about his leaving. The basic question many users of the Uccel banking software have is whether the CA management will continue with Uccel's development programs and how well they serve this market."

Specifically, observers note that the banking applications market requires vendors to provide a higher level of professional support services than CA is used to. In light of CA's plans to cut Uccel operating costs and the probable departure of key Uccel managers, some users wonder if CA will be able to provide the level of support they're used to.

Wang says the answer to that question is yes, and he contradicts the image of CA as a company that is light on management expertise and likely to have trouble digesting an acquisition the size of Uccel. "We have our layers of senior and middle managers," declares Wang. "And we don't plan to make any big or-

FIGURE 1 **The Morning After**

The following graphs depict the percentage of combined market share in installed sites once Computer Associates' acquisition of Uccel takes effect.



and that would be good for users." While IBM has about a third of the data security market, it is not a factor in job scheduling or disk and tape management.

The way Uccel's Liemandt sees it, IBM is already becoming more active in the data center market just as it has moved aggressively into banking through its marketing deal with Hogan Systems

"I have no idea how that will evolve over the next couple of years," he states.

Uccel users also want to know what CA intends to do about CA and Uccel products that are directly competitive and whether CA plans to continue to invest in Uccel's products for the financial and banking industries, markets in which CA has little experience. "The big question,"

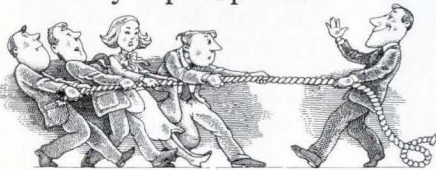
But users say that may not be so easy in the case of ACF-II and Top Secret, which use different data definition and data access methods.

Wang also tries to assure users of Uccel's financial and banking products that Computer Associates is committed to those markets. He denies reports that CA is thinking of selling off the Uccel financial division. "That orga-

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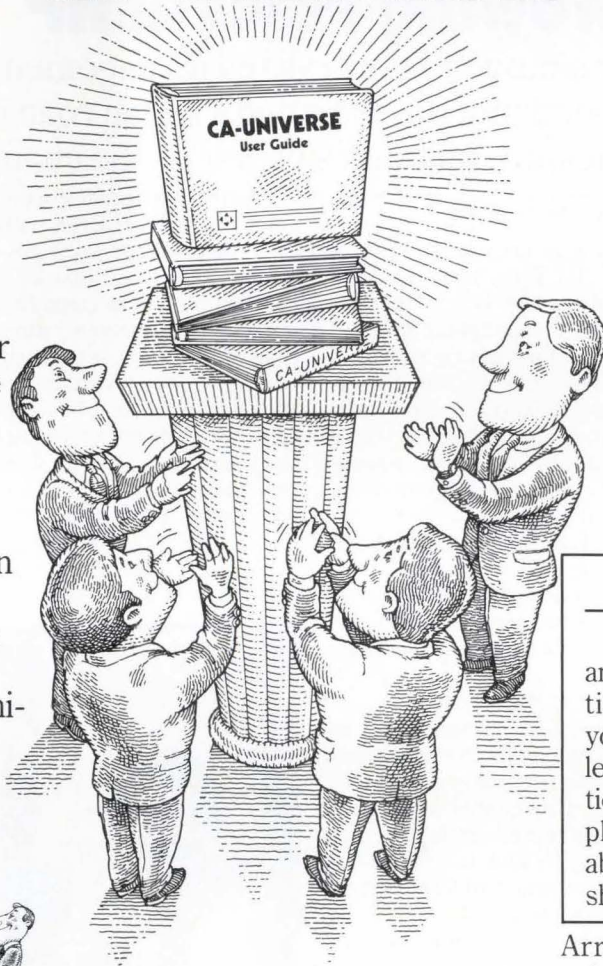


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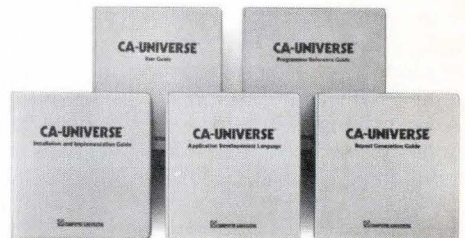
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ganizational changes.”

Nor does CA plan to modify its strategy of growing its customer base, its product line, and its balance sheet through acquisition. Wang doesn't believe the high price CA proposes to pay for Uccel will stifle software industry acquisitions. "Many software companies will continue to get to the point where, for a number of reasons, they are unable or unwilling to grow bigger and they will look to sell," Wang says. And, after taking some time to digest its Uccel acquisition, "we expect to continue to participate in that process," says Wang.

## Rivals Plan Strategies

Meanwhile, many of CA's competitors are trying to figure out how to win against a software company more than twice as big as its closest rival. Companies like Boole & Babbage, Sunnyvale, Calif., the \$40 million maker of performance management and capacity planning software, may now have to answer more user questions about its viability. But, says Boole & Babbage senior vice president Jack van Kinsbergen, "There are always going to be viability questions. But there are also always going to be niche markets. For a company as big as Computer Associates is going to be, it will be hard for their salesmen to understand all the products they're supposed to sell. We can take advantage of that."

In the meantime, even software vendors that currently don't compete much against CA are looking over their shoulders at the new giant. "Overnight, this has changed the face of the software industry," says Pansophic's Eskra. "They overshadow most everyone now in the data center segment. And, although they haven't done much in the applications development area, it doesn't mean they won't." ■

## CORPORATE CULTURE

# New Mind-set Brings Growing Pains at HP

The move to centralized management, sparked by Spectrum, has traveled a rough road inside Hewlett-Packard, but users welcome the change.

BY SUSAN KERR

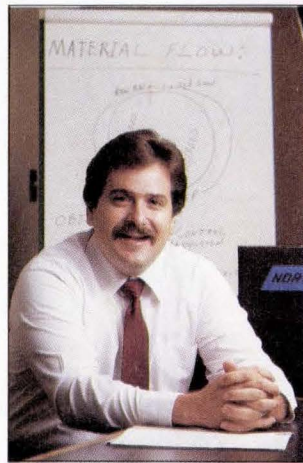
Sitting in his executive cubicle, Bill Terry leans forward to share the latest Hewlett-Packard management joke. "Real men don't coordinate," chuckles the 30-year HP veteran and executive vice president. Then he snaps back to attention. "But that's wrong, of course. Management is coordination."

For many HP insiders, learning that the two activities go together has been tough but necessary. Since embarking on the Spectrum RISC computer project, which is by far the largest and most radical development effort in the company's 48 years of existence, HP's legendary culture of divisional autonomy and entrepreneurship has given way to what is—for HP—a unique brand of centralized management.

It has become obvious that the way HP structures itself has a direct bearing on how well and how soon it brings products to market. Some blame HP's old-time divisional autonomy for its failure to keep the HP 3000 mini-computer series competitive at the high end. The Spectrum Precision Architecture is expected to cure those performance ills. Meanwhile, the organization that has evolved to deal with the project may be to blame for some of the delays in its introduction, but it is certainly directing the course of follow-on products and permitting business directions that once would have seemed inconceivable.

The course that HP is on

seems positive to many of the company's users. Even with its reputation for loyal customers, users say that HP's decision to look at computer operations as a whole, rather than as separate feudal estates, has led to certain improvements. Take Cheverly, Md.-based Allegheny Beverage Corp., a longtime HP 3000 customer, which also has become bullish on HP pcs. Kevin Larkin, operations and technical support assistant director, comments that his company



**FERIANE:** With the Spectrum system, he figures he can get more machine for half the money.

likes the advantages of one-vendor solutions, particularly since "the quality of support [by HP] on pcs has gotten better" over the last six months.

This month marks the third anniversary of HP's most dramatic corporate overhaul. Present and former HP employees tell DATAMATION that only now are its effects fading. "Things are much clearer today than they were a year

ago," comments an HP sales manager. "I hear fewer people saying, 'I don't know who to go to.'"

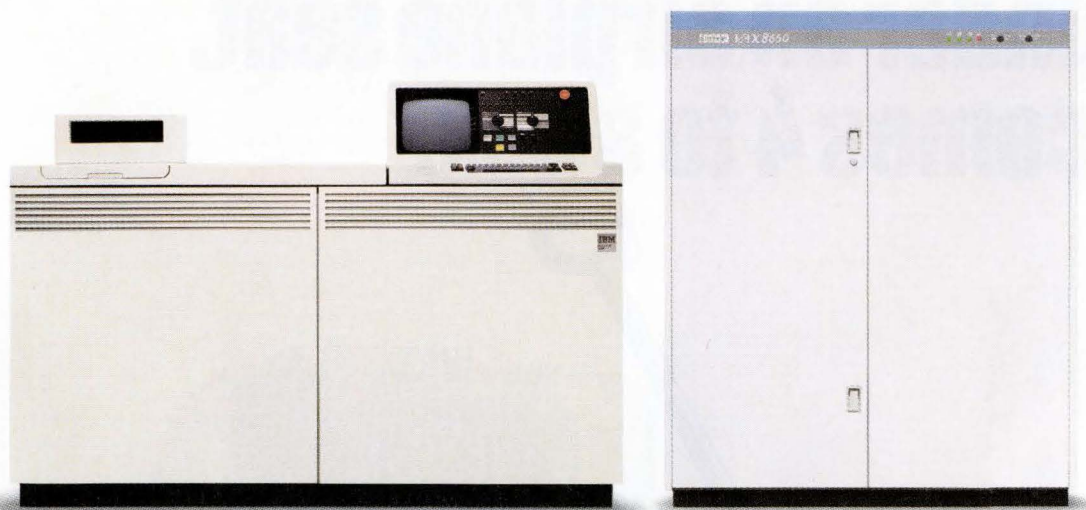
The reorganization became necessary, he says, when HP recognized the need to coalesce many of its 10,000 products into complete systems.

## Product Groups Dissolved

With vendors such as IBM and Digital Equipment Corp. in mind, HP in July 1984 brought together its previously independent product groups into three major business sectors and a fourth sector devoted to marketing and selling, just months after its first public acknowledgment of Spectrum.

"The joke among users for years has been that they [HP] change the organization chart every month," comments Larry Boyd, systems director at Shawmut First Mortgage, Dallas, an HP 3000 site. Joke or no, the evolutionary approach must be working: in regard to marketing and customer support, Boyd says that "in the five years since I started with HP it's always been getting better."

HP chief operating officer Dean Morton says that within HP, however, he thinks "people feel possibly a sense of less individual control over what they're doing. I'm very aware of it. But you can't go back. It's the real world. We have to try to [maintain] HP values with the contributions individuals make, but even these must be considered under the total systems requirements. We've tried . . . coun-



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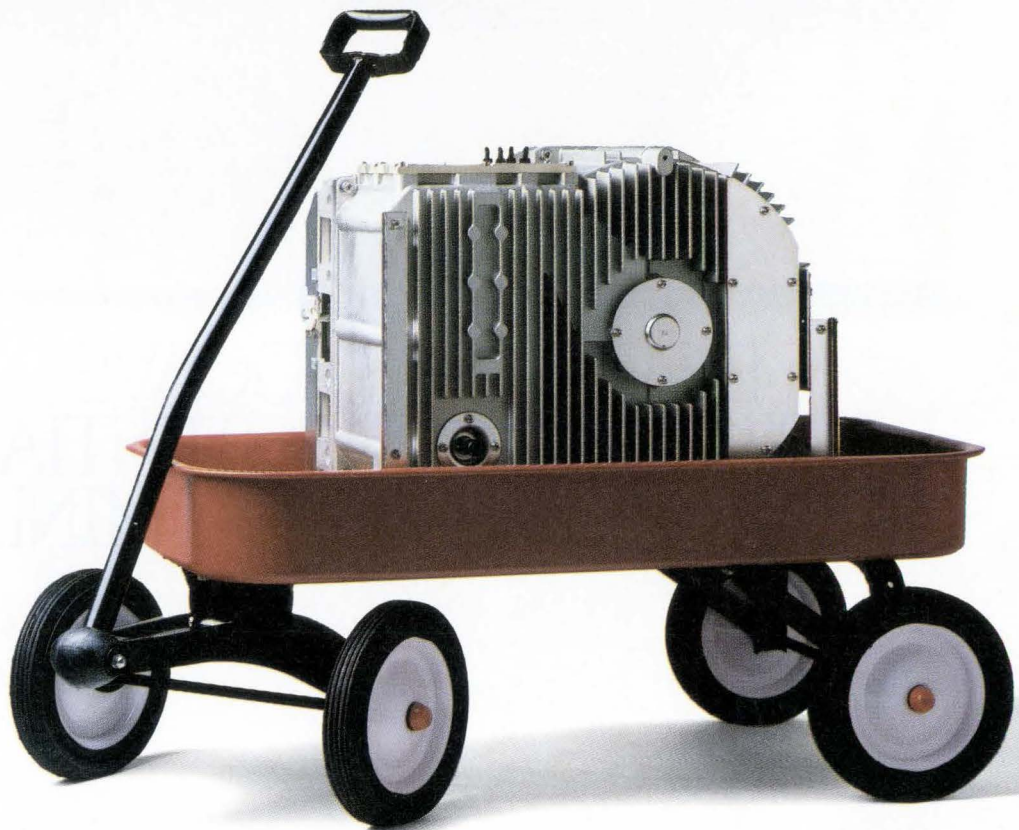
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cils and committees, so that various constituencies may have a voice."

Multiple input into management is the HP way and, with the advent of Spectrum, that's meant committees—lots of them. One of the most important is the 12-member Systems Business Management Council, which allocates resources. But the committees don't stop there. Morton, for example, also sits on one that reviews the salaries of the top 1,200 employees once each quarter. There are other, less formal sessions. "Compared to other companies, we're probably task force happy," agrees executive vp Terry.

## Too Many Voices?

Some employees complain that by allowing multiple voices, less work is completed. An HP manager contends that while HP has set up centralized structures, there's a lack of centralized planning to accompany it. That, he says, has had a negative effect on Spectrum. "It can take a year or two just to get a piece of software done," he charges, "because sometimes more than one committee wants to test and retest it."

While none of the HP executives were willing to put the blame on the organization for any slippages, they admit to the complexity of installing a new management style to deal with the project.

"The hindrance to progress is learning to manage an organization this size and across boundaries," concedes Lewis Platt, executive vice president and head of the Technical Systems Sector. "That's what we have to learn." To do that, HP has sought advice from outside consultants and has instituted procedures common to large aerospace companies and to IBM. One of these procedures, put into place six months ago, is phase review,



**MORTON:** "People feel a sense of less individual control. But you can't go back. It's the real world."

wherein first a project's feasibility and then its advancement is reviewed by committee at set phases. HP had had a similar informal process, but the general corporate formalization is new. When asked to relate the management process to Spectrum, Platt replies, "It's not clear to me that we would have done the project faster if we had done a more formalized process, [but] some of the slips that caught us by surprise—we'd have known about them."

So the theory is to keep the committees but find better ways to run them.

One thing that evidently will not change is HP's well-

regarded concern for its employees. During the depths of the industry slump, the company did not lay off any of its more than 80,000 workers. Maintaining that concern, by minimizing internal bureaucracy for example, is a corporate objective.

## Some Employees Frustrated

But the new concept of where power lies and how it is to be gained has been tough for some people to take. Although HP says its turnover rate has stayed fairly stable at 7%, employees say they've seen signs of frustration. Tellingly, the HP sales manager says, "I can't think of anyone who's left HP to go to another big company. They go to do their own thing." That's perhaps most clearly seen among engineers. By turning into a "market-driven" company (as opposed to the old "product-driven" style), there are more people labeled as sales and support personnel. Traditionally, an engineering degree was a prerequisite to getting ahead inside HP. That's no longer the case. Particularly now that most computer engineering has been placed under one roof, it's conceivably become tougher for engineers to get the broader business exposure that was the norm in the autonomous divisional structure.

The changing role of engineers is coupled with a changing attitude toward homegrown technology. For example, while HP always bought a certain percentage of outside technology, it still also had a full-blown integrated circuit group to supply its systems. In its push to save money, sources say, the company now seeks to cut back on internal integrated circuit design and fabrication. More astoundingly, these sources say that HP has inked a deal to farm this work out to IBM.

Chief operating officer

Morton replies with a "no comment" to questions about a deal with Big Blue. But he does note that "we're much more open to what others could contribute. The business of the company is not to make technology as such but to offer services with the most competitive benefits."

That's crucial, customers agree. Norton Co.'s Chemical Process Products Division, Stow, Ohio, uses both HP commercial and industrial systems. Norton also has a lease on a DEC VAX, and plans to allow the lease to run out this summer. It will then buy a new Spectrum Model 825. "Two years ago, DEC was in its heyday," says Jim Feriance, Norton systems development manager. With the Spectrum system, he figures he can "get more machine for half the money."

That's the kind of decision HP executives want more customers to make, a decision they figure would have been impossible before. Richard Love, general manager of computer manufacturing, talks of eight different locations that made computers. On the sales side, no corporate-wide major accounts program was instituted until 1984.

As customers became more demanding of products and as products became more integrated through the wonders of networking, a new scheme needed to be worked out.

"Today, we'd rather focus on beating DEC than on beating the guys in Fort Collins," home to some of HP's engineering systems operations, says Chance. That's a simple but important perceptual change. And although HP has come a long way, it still has further to go in learning how to deal with it. ■

*San Francisco bureau manager Jeff Moad aided in the reporting of this article.*

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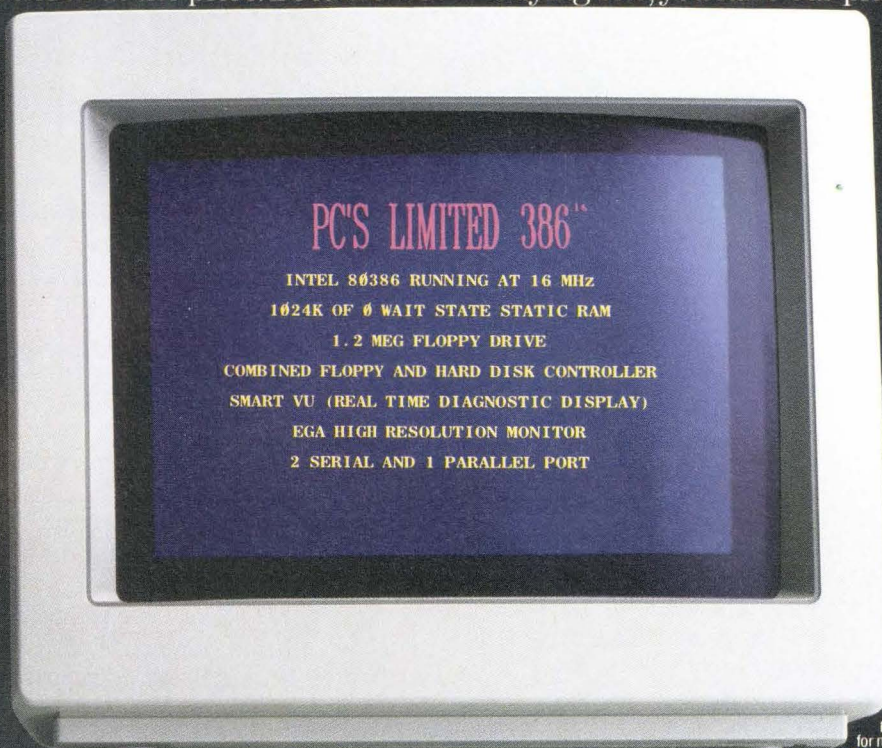
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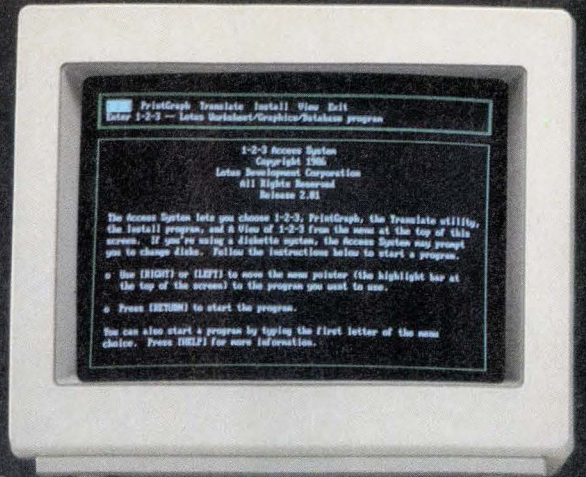
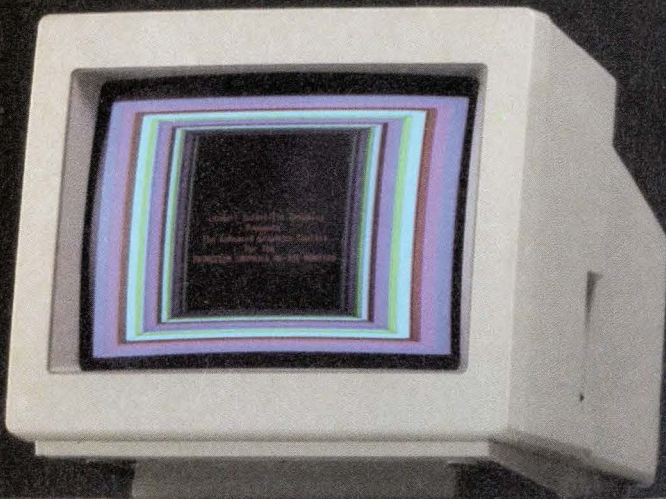
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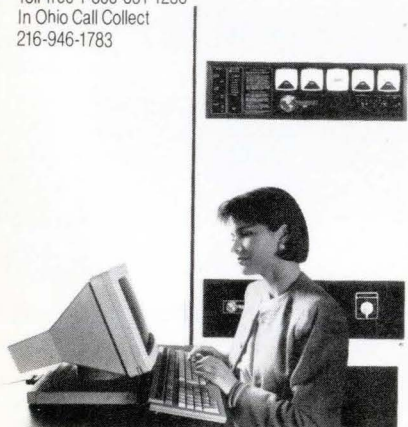
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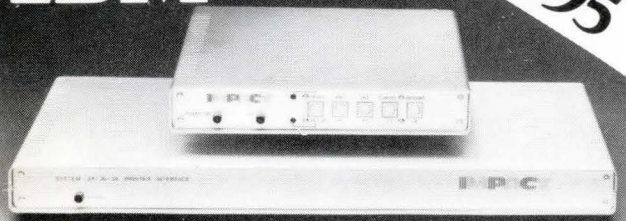


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## News in Perspective

### DATABASE SYSTEMS

# CCA Is Going Back To the Basics

Renewed focus on Model 204, new executives, and a "parental" commitment get a positive response.

BY EDITH D. MYERS

"We're a startup with a 22-year-old product," says Richard Stewart, who has been since last January the president and ceo of Computer Corporation of America (CCA), the Cambridge, Mass.-based database management system company.

Certainly, CCA's management team is largely new, having been put in place by Stewart in the time since he joined the company.

"They needed to change management," says Eric Adler, director of product research for A.C. Nielsen Co., Dunedin, Fla., which uses CCA's Model 204 DBMS in its tv ratings business. "They were a company run by technical people. Now they're more marketing driven. We expect to see more stability and responsiveness to users."

Adler, who is also president of the International Model 204 Users Group, thinks CCA, under its old management, "was spreading itself too thin. They were not concentrating on database and database tools. They were into peripheral areas. Now they're getting back to basics."

Stewart acknowledges the company did "try to broaden itself for a few years, in '84, '85, and '86, getting into things that were in the database area but not directly connected to Model 204 or what we consider high-performance DBMS. We're returning to our heritage. We're historically a database company and that's what we're go-

ing to emphasize."

Karen Buras, project coordinator of Model 204 applications development for Elf Aquitaine Petroleum Corp., Houston, applauds the back-to-basics move. "They [CCA management] are finally going to focus on what clients have wanted for the last several years," says Buras, "on their core system, on making it a better product. Users were concerned when they seemed to be concentrating on end-user tools."

### A Sale Was Considered

The focus on basics follows a gut-level evaluation of CCA and its prospects by Crowntek of Toronto, CCA's parent company. Crowntek does not release CCA's financial results. A former CCA executive vice president, Larry DeBoever, who is now president of his own consulting firm, DeBoever & Associates, Acton, Mass., recalls that, early in 1986, "We had an opportunity to sell CCA to another software company [which he declines to name]. I think it was a good option but the Crowntek board decided against it. Then came the dent in the DBMS marketplace created by DB2."

Crowntek management decided it was in the game for the long haul. "Ed Cannon [Crowntek's president] came down to the U.S. to talk with CCA people to let them know this," DeBoever recalls. "When he asked me if I was in it for the long haul, I said no. It was clear there was no equity in it for me."

Following the Crowntek

decision, a number of senior CCA executives and managers left the company. Ken Draeger stepped down as CCA president last October to become president and chief executive of Autographix Inc., Waltham, Mass. Also leaving the company, in addition to DeBoever, were Bob Roda, sales vp; John Donnelly, marketing vp, who has joined Draeger at Autographix; Adam Rin, vp of product planning and development, who is said to be involved in a startup in Cambridge; and Berl Hartman, former vp, who recently joined Sybase Inc., Berkeley, Calif., as product marketing manager. Draeger, who says he left CCA for much the same reason as DeBoever, adds that a number of CCA software developers went to Lotus Development Corp., Cambridge, Mass.

Does this constitute a brain drain? Stewart doesn't think so. "It seems as if a lot of people left but they all came from different parts of the organization. The average length of service of the Model 204 development team is still seven years."

Despite all the changes, CCA did score some major wins last year. One of the most notable was the government's Worldwide Military Command and Control System Information System contract award for a DBMS. Also, Stewart has brought in three new people to fill key positions. They are Jose Leruth, vp of marketing, who joined CCA from Alsys, the Waltham, Mass.-based Ada compiler company; William Silver, vp of customer assurance and corporate quality, who came from the Atex division of Eastman Kodak Co.; and Rick Medeiros, vp of sales, who came from Citicorp/Quadstar.

The CCA management team turned out in force at an International Model 204 User Group conference in New Or-

leans in May, participating in sessions and talking informally with users, all of which seemed to please attendees. Says A.C. Nielsen's Adler, "I've never seen top management listen so intently to users and interact with them."

#### VM Product Demonstrated

At the New Orleans meeting, users saw a demonstration of a new VM version of Model 204, running on the IBM 9370, a combination that management sees as head-on competition for the Digital Equipment Corp. MiniVAX in departmental computing markets. They also heard promises of DB2 and SQL compatibility and distributed database capability.

"We're hearing loud and clear that SQL is a standard," says Liz Mullen, director of Model 204 Product Planning

and Management, "and we're going full steam ahead in developing an SQL language." Both SQL and distributed database capability were promised for 1988.

Stewart, who joined CCA from Boston-based Geophysical Corp. of America, after 20 years with General Electric, is upbeat about the future. When he calls the firm a startup, he explains, he is referring to what he sees as a new market, the market for strategic information systems. He de-

finer such systems as those that help a company gain a competitive advantage. "This is a new market for DBMS and will be the biggest market for the next decade," he says. Such systems, he contends, need high-performance DBMSs. "They're what Model 204 was designed for from the start."

A former CCA employee who helped develop this strategic direction and who requests anonymity, agrees. "Those systems require a unique solution, a focus on on-line transactions and heavy volumes and that's where Model 204 excels."

As an example of a strategic information system using Model 204, Stewart cites one developed by Nynex, the New York telephone company. "They've built a system that permits interrogation of

market changes, such as the acceptance of specific standards," he says, "and it's bearing out in numbers."

#### Growth Is Stable In 1986

He says CCA, the smallest player among independent DBMS vendors in the mainframe market, had reasonably stable growth in 1986 and experienced an increase in market share. "Of shipments from independents, CCA accounted for one in 13 to 15 in 1984 and '85, to one in eight or nine in 1986."

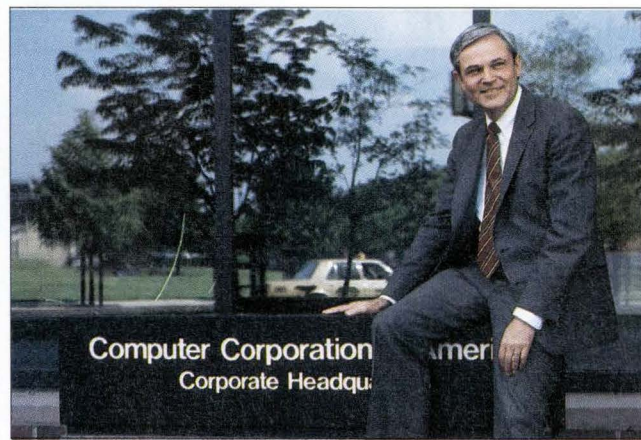
CCA was founded in 1965 as a laboratory for the development of advanced database management software by a team of researchers from the Massachusetts Institute of Technology. The laboratory is still considered a major company asset.

This heritage is a key point, former vp DeBoever feels: "The lab represents a big technology reservoir. I would leverage the lab. There are a lot of great projects going through that lab."

DeBoever is pessimistic about this leverage occurring, but Stewart says he has plans for the lab. "I can't go into detail at this point on all the things we will be doing, but we plan to expand their [the researchers'] contributions to the company."

DeBoever sees the new emphasis on marketing at CCA as going too far. "Crowntek management will sell 204 like they were Kentucky fast foods or Fred's software and won't understand why they fail," he says.

But Stewart is confident that the market is large enough to support the continued presence of CCA. And while he's well aware of the power of IBM, not to mention his larger independent brethren, he feels CCA has a high-performance edge. "We're selling at the top and crumbs from IBM's table will keep us rich for a long time." ■



STEWART: CCA will once again emphasize its DBMS strengths.

all database information in the company," he explains, "information on service, billing, leased lines, etc. Marketing people have access to all information on one account or a collection of accounts."

Peter Burris, an analyst with International Data Corp., Boston, feels that CCA has targeted its niche market of high-performance, transaction-oriented systems well. "They're more flexible than some of their competitors in that they can respond more quickly to

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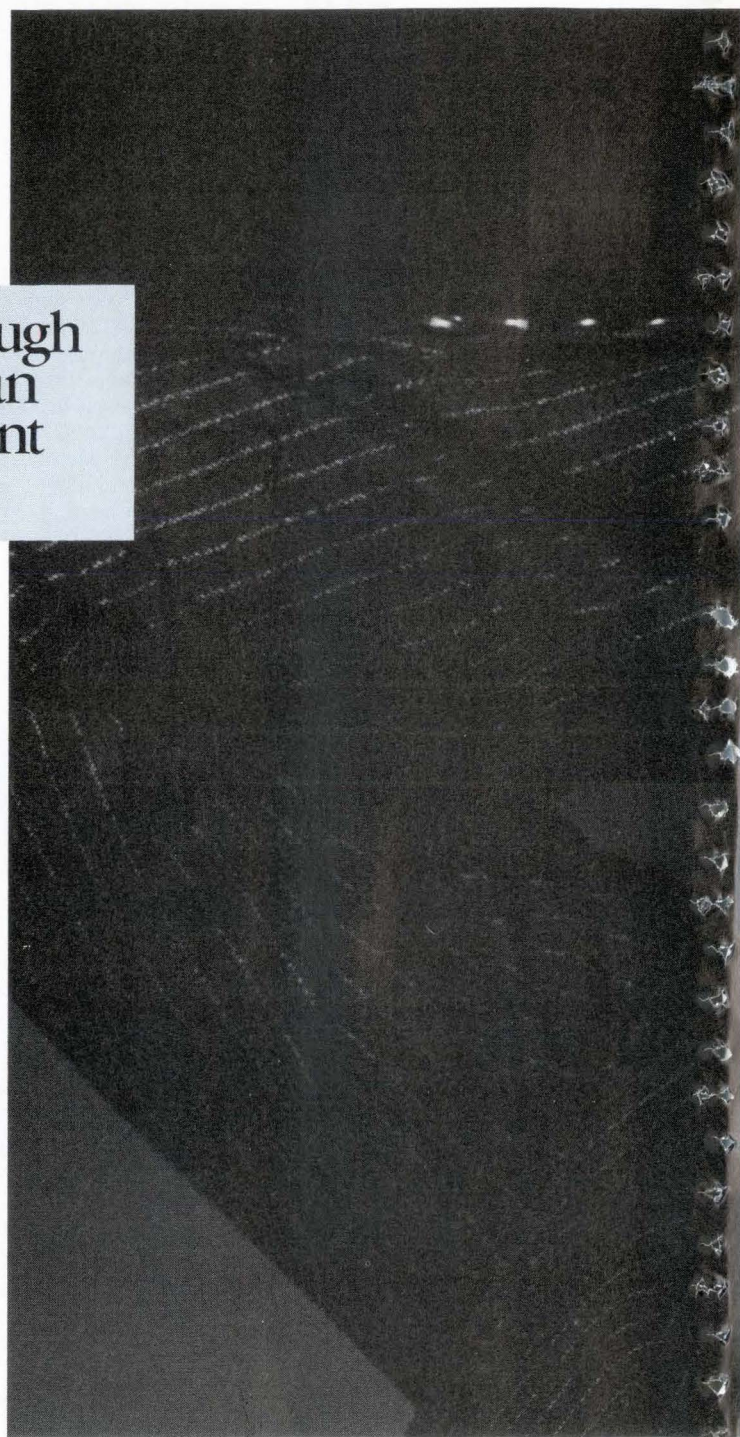
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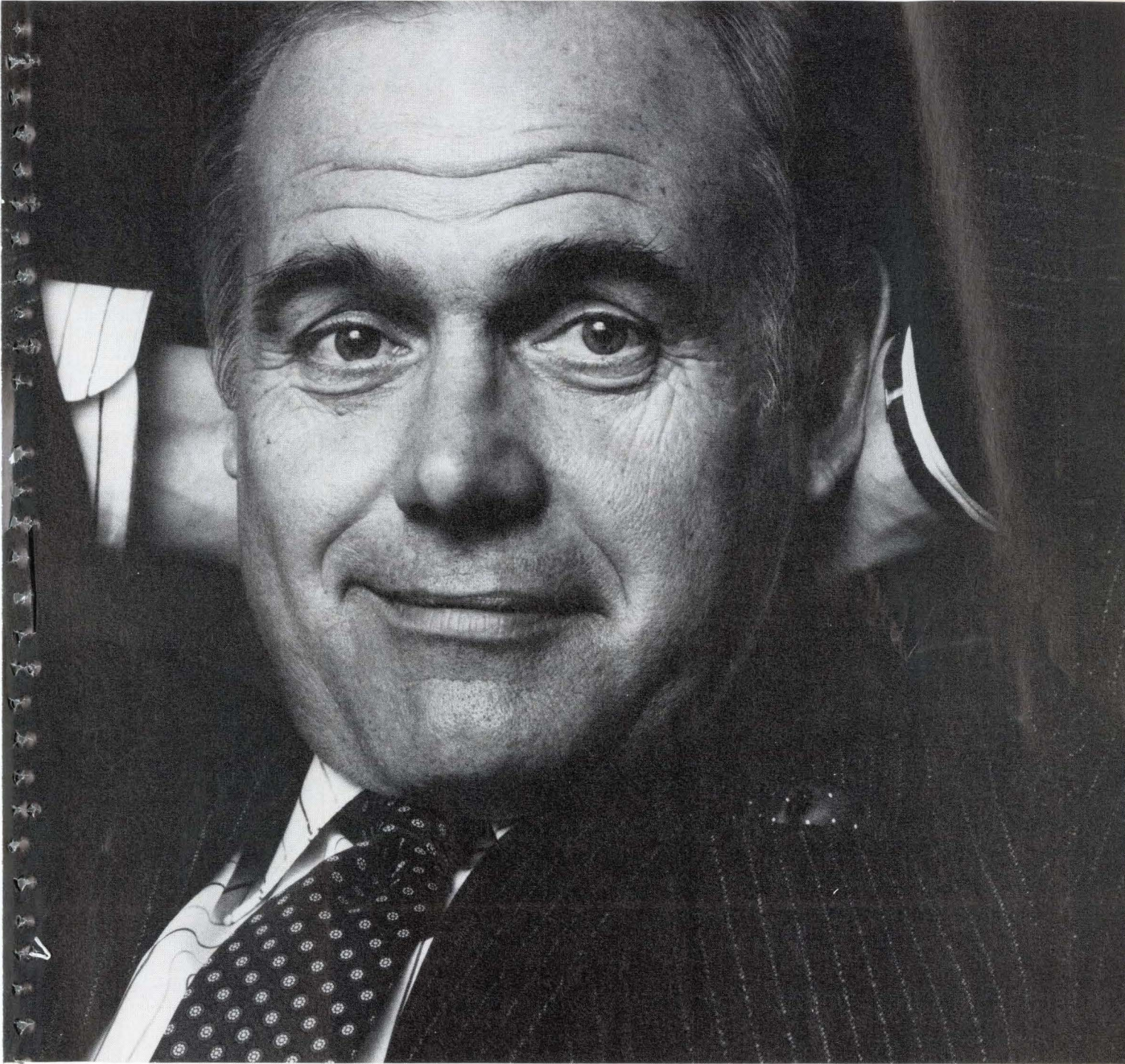


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CIRCLE 19 ON READER CARD

## News in Perspective

### MANAGEMENT

# Hartley Fine-Tunes Harris's Strategy

## The new ceo has improved profitability, but the company is still going through a time of transition.

BY GARY McWILLIAMS

For a company that grew by stacking businesses like so many children's building blocks, Harris Corp. never quite properly fit all the pieces together.

The accumulations raised Harris's revenues to \$2.2 billion last year from \$1.4 billion in 1981. But as profits dropped to \$59 million from \$129 million for the same period in the previous year, the company's directors decided some pieces had to be removed. As a result, under engineer-turned-ceo John T. Hartley, Harris has dropped out of the cellular radio business, dumped a commodity memory business, and reduced its holdings in a French semiconductor venture. A high-end PBX development similarly was abandoned in 1986 in favor of telephone switches for small- to medium-sized companies.

The financial results thus far warrant high marks for Hartley and his two-pronged strategy of selling off some businesses while continuing to acquire others considered important for Harris's growth. Harris's profits in the first nine months are up to \$58 million from \$42 million a year ago, even though revenues dipped slightly to \$1.5 billion, compared with \$1.6 billion a year ago.

During his year as ceo, Hartley also has brought a dose of restraint to a company used to more freewheeling ways. In the past, the autonomous divisions could, and did, enter some businesses only

because they fell within the company's broad communications and information processing scope. Now, the company takes a closer look at each business and the niche it occupies, Hartley said in an interview with DATAMATION.

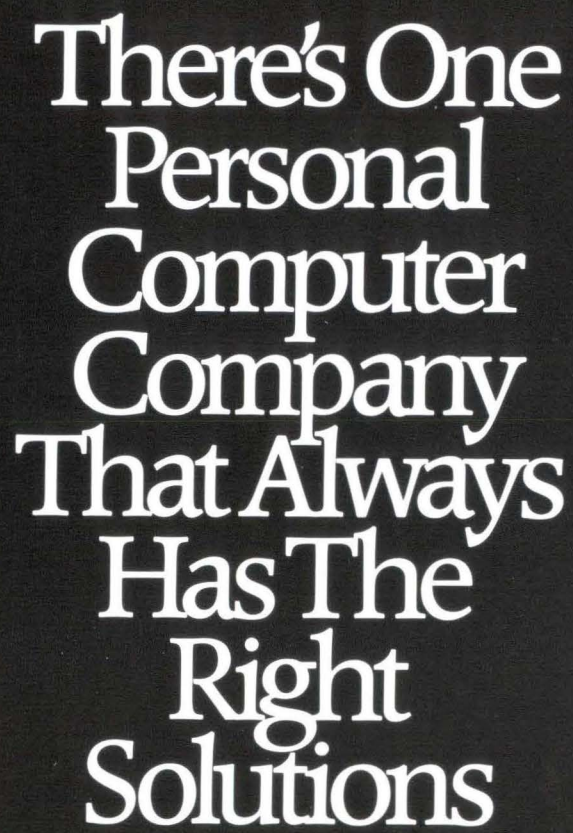
"We've reexamined the philosophy we've espoused over the years of always going for the bigger and better. We're now looking at smaller and better," says Hartley.

There are other signs of change. Harris has been a second source for the Intel 8086 and 80286 microprocessors used in portable microcomputers. Worries over commodity pricing have given the company second thoughts about building a version of the more powerful 80386. According to Hartley, "The whole question is, 'Are there some special, more unique microprocessor applications that would better fit Harris's style?'"

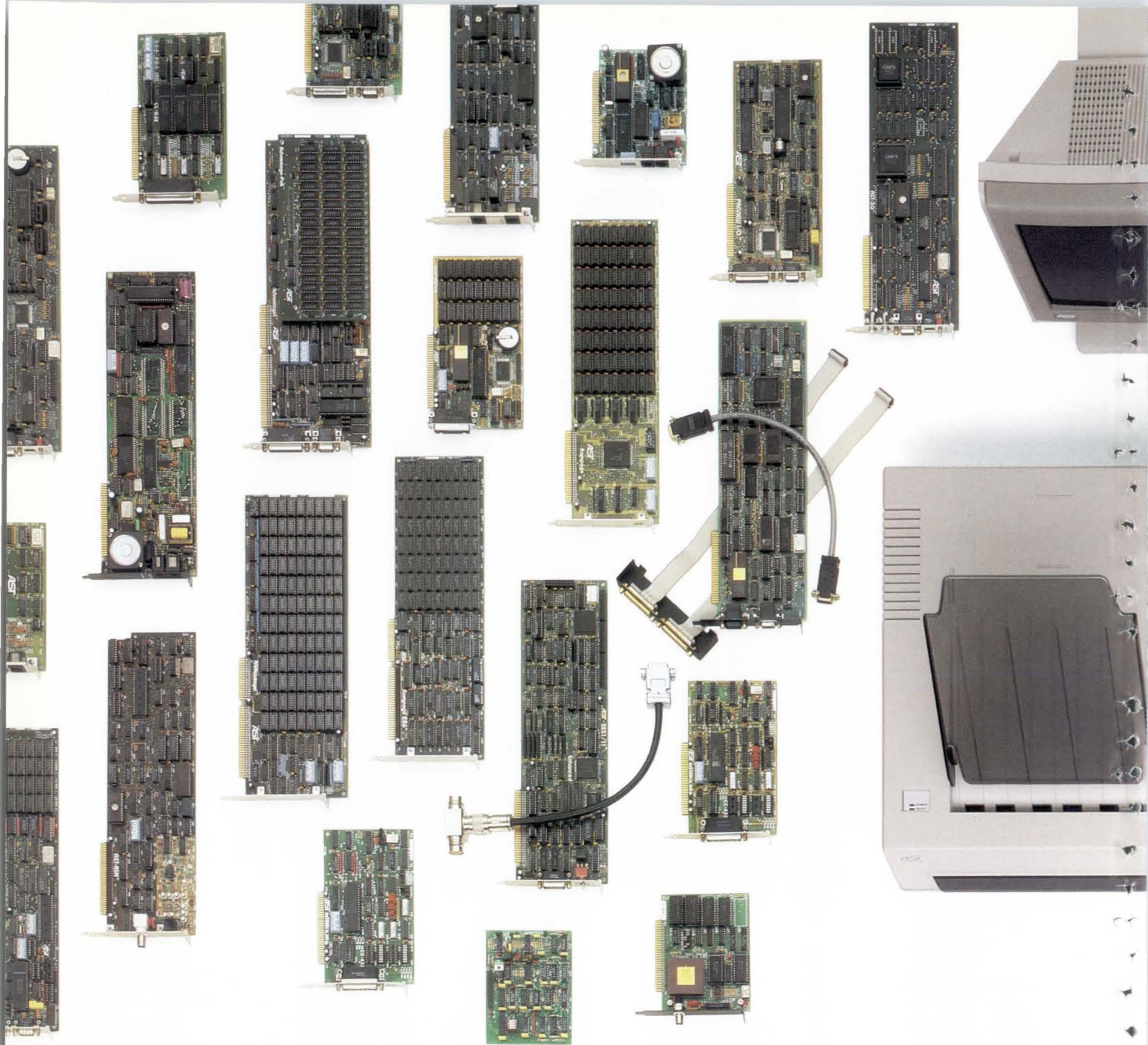
While succeeding in stabilizing a once wobbly financial picture, there is still a lot to be done. "We're in a transition phase that's still not universally accepted," says Hartley. The marketing focus he has cultivated is not an easy transition for the engineering-oriented company to make.

### A Changing Style

Such introspection is a relatively new phenomenon—the result of shrinking earnings. In March 1986, this led the company's board to appoint Hartley, then chief operating officer, as chief executive officer. Former ceo

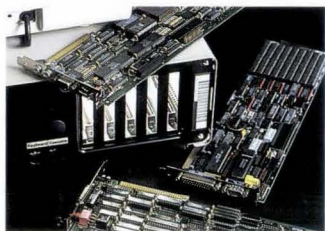


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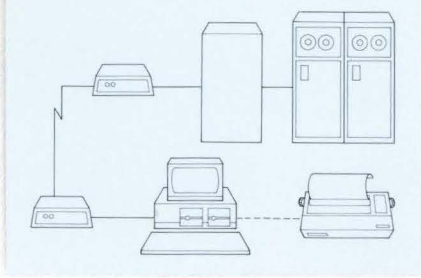
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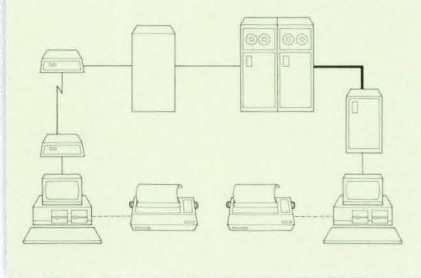
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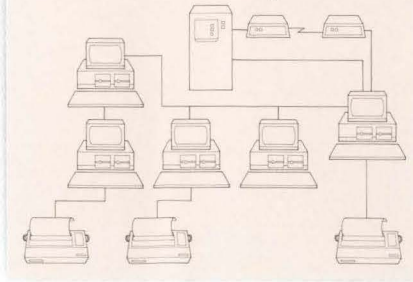
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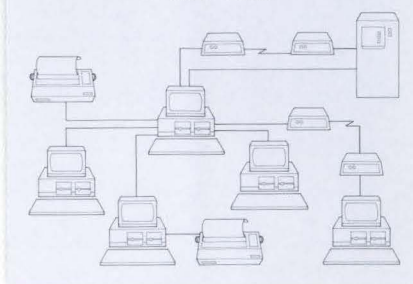
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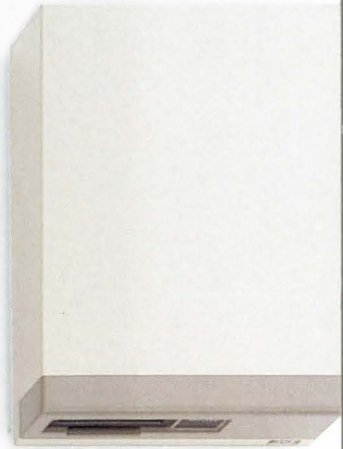
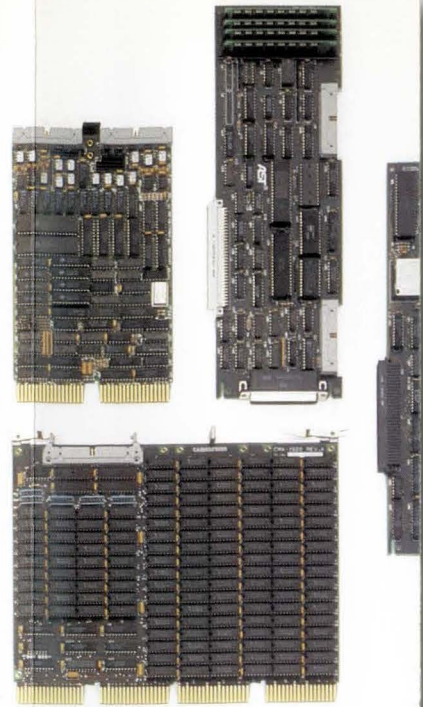
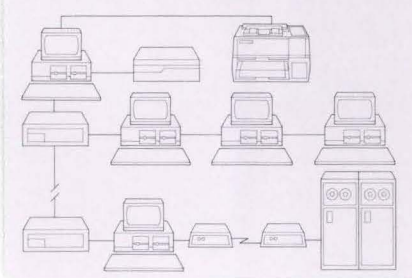
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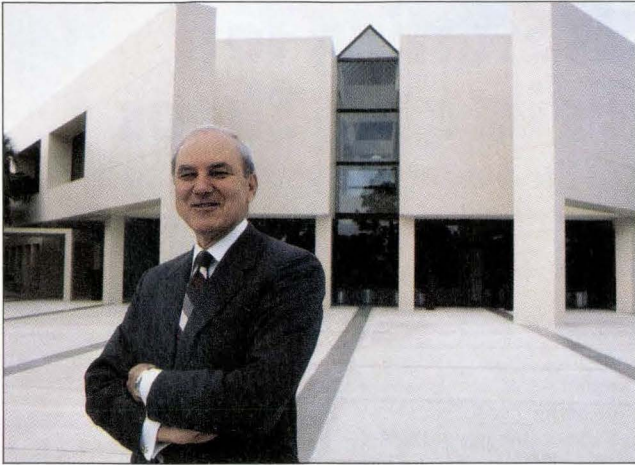
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# News in Perspective



**HARTLEY:** The Harris ceo is committed to making more acquisitions.

Joseph A. Boyd continues as board chairman. But Hartley is changing the style of the company, say analysts.

"I think under Hartley the company has become much more discerning," says Maria Sbrilli, a vice president at Smith Barney, Harris Upham & Co. Inc., New York. "Being structured [in independent business units] the way Harris is . . . there's a risk of having to screen from too many opportunities. Hartley's imposed a necessary discipline."

Hartley says that the changes won't affect the company's basic strategy of building around a collection of independent businesses. Where others, such as Honeywell Inc., found computers, controls, and defense a difficult combination, Harris has held fast to its building-block strategy. Its approach requires that each block be hewn from communications and information processing.

"I think being in related but somewhat different markets is a plus and not a negative," says the gray-haired Hartley, who speaks in a soft, southern drawl. "People argue that it's a management challenge. Yes, but that's one of the prices you pay. We're spread across so many areas, we can afford a number of ups

and downs and still come across pretty well."

In addition to computers and PBXs, the company builds small aperture earth stations, microwave transmission equipment, IBM 3270-compatible and ASCII display terminals, personal computers, microcomputer network servers, microprocessors, and tv broadcast equipment.

The array has been bolstered by some significant acquisitions, the largest being the 1983 purchase of Lanier Business Products Inc., Atlanta, which gave the company a position in office and small business computers. Last year, it bought Scientific Calculations, an electrical design software maker in Victor, N.Y., intending to give a boost to its emerging computer aided design business.

Hartley says the company is committed to actively acquiring businesses along two lines: smaller companies that can be absorbed by existing Harris divisions, and larger, \$100 million to \$200 million companies that can be set up and run as autonomous divisions.

## Unix Is Being Stressed

In its computer business, the company is rearranging the pieces in order to stress a high-performance Unix sys-

tems environment. The CX line, including Harris and oemed 32-bit Unix systems, is taking center stage away from the older H Series computers. Unlike the CX computers, the H Series employs an unusual 24-bit-word architecture and proprietary operating system.

Smith Barney's Sbrilli estimates that sales of the H Series and CX families accounted for about \$110 million of information systems group sales for the year ending in June. It's not a large amount for a \$2.2 billion company but it has been given increasing prominence through the recent acquisitions.

Information systems senior vice president James H. Oyler says the CX family now accounts for about 20% of computer sales and is expected to reach 30% for the fiscal year ending June 1988. Key markets for the Unix systems are engineering, computer aided design, aerospace, and university customers.

One reason for the refocusing is new competition. While Harris once considered high-performance computing

its preserve, it is now emphasizing attributes beyond cpu performance. Such features as software development and database handling are becoming a larger part of its sell.

As a result, the company's user profile also is beginning to change. The CX line is intended to satisfy existing customers and reach new ones who have a broader set of applications requirements. The H Series' small but loyal following has never extended much beyond the real-time and simulation applications markets. The switch has produced some gains and losses.

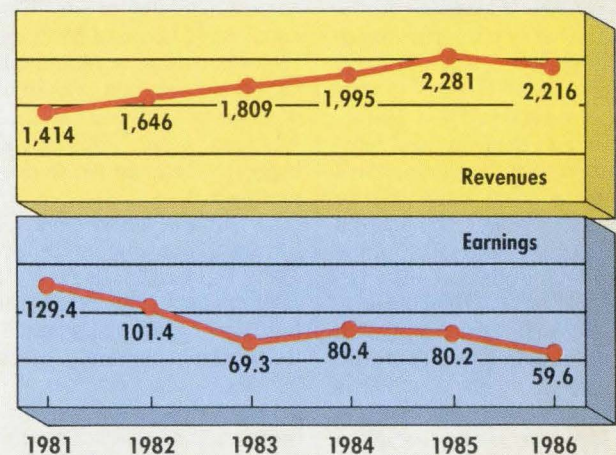
## CX Price/Performance Hailed

Stan Mozeleski is one of the newer customers to be won over by the CX. Director of information services at Guardian Industries, a Detroit manufacturer of architectural glass, Mozeleski recently chose the CX line over 18 other systems to automate several factories. "Harris just blew the doors off everyone else," says Mozeleski. "Price/performance-wise they are the best today."

Harris's support for

## Harris at a Glance

Major markets: communications, information systems, semiconductors, government systems, office automation.



(In millions of dollars; fiscal year ended June 30)

## OPERATING SYSTEMS

# The Pick OS Is Starting To Make Inroads into Big Shops

Vertical applications of the operating system, long a darling among small- and medium-sized firms, are spearheading a foray into larger companies.

Unix, which Mozeleski sees as providing vendor independence, and Belmont, Calif.-based Oracle Corp.'s Oracle database were key factors, says Mozeleski. Harris won out because its HCX model computers are tuned especially for Oracle.

Elsewhere, the conversion from H Series to CX computers is making some longtime Harris customers look at other fast machines. For instance, O'Donnell Associates, Pittsburgh, recently installed a Convex C-1 computer rather than migrate to the CX line. "They've gotten left behind a little bit," says Ron Kichko, manager of computer operations at the engineering service and consulting company.

O'Donnell chose the C-1 because it ran a widely used finite element analysis program faster than the CX. "We felt our benchmarks showed the HCX was close to four times the speed of our present [H-500] machine. I was looking for something in the area of five times [faster]," notes Kichko.

The experiences of the two customers typify the inherent opportunities and pitfalls of Harris's niche orientation. The CX computers with Oracle combined to give the company an edge on the opportunities side, while on the pitfalls side cpu performance alone proved a short-term edge.

Under Hartley, Harris has begun to glean the importance of such fine distinctions. "We've gone back to the mainstream and emphasized smaller, industrial applications and products tailored to the market need," he says. Hartley can concentrate on acquisitions now that the company's financial picture is brighter. If there is a new test of the company's stability ahead, he says its base is now strong enough to weather the storm. ■

BY EDITH D. MYERS

The 22-year-old Pick operating system, owned by Pick Systems Inc., Irvine, Calif., is in something of a born-again mode, finding its way into Fortune 1000 companies by filling niches with vertical application packages.

Among the many names given to the Pick OS by licensees and sublicensees is the SMA Standard/Pick-base System. SMA stands for Spectrum Manufacturers Association, a two-year-old, San Diego-based organization of manufacturers of Pick-based systems, which is dedicated to maintaining base-level compatibility among products. Prior to the founding of SMA, little was done to measure the size of the Pick market. Today, SMA puts it at \$2 billion annually, with half of that having grown up in the past two years.

"We've realized what had been our best kept secret, our compatibility of our products," says Leonard Mackenzie, chairman of SMA and chairman, ceo, and president of General Automation Inc., Anaheim, Calif. "This is our biggest asset, and we're promoting it.

"Before, we were all out to lock in our customers forever," says Mackenzie. "I don't think in the computer business today that's realistic, and it's certainly of no benefit to the end user. To grow in this business, systems must be flexible for the customer. This has worked for most of our members."

Warren Blossom, vice

president of the Computer Systems Group at CIE Systems Inc., Irvine, Calif., and a member of SMA, says SMA is a good thing because it "clarifies the portability of the software and helps keep the manufacturers honest."

The marketing of Pick has surely been aided by the formation of SMA, but user devotion has always been a hallmark of the Pick world (see "The Pick Push," June 15, 1985, p. 69). That hasn't changed. It's just that today there are more, and different, users. Long a darling of small- to medium-sized businesses, the operating system is now showing up in Fortune 1000 companies.

"We are learning," says a spokesman for Pick Systems, "that many of the 'blue' shops don't want anyone to know there is a Pick system installed. Since Pick is a machine-independent operating system, there is a great deal of secrecy about customers. For all we know, there could

be hundreds of installations in the Fortune 1000 group." The company knows of at least 30.

### Running Pick On an AT

A user at a Southwest financial institution, who requests anonymity, is running his organization on a Pick-based system implemented on an IBM 3081 and has been doing it for a year. "A corporate decision was made to switch to IBM from Prime Computer [Natick, Mass.]. We had been running the Prime Information System. We wanted to run the same programs on IBM, and IBM didn't have the necessary software. We tried Pick out on a PC AT and decided it would work." The Prime Information System is described by Prime as a "super-set" of Pick.

The implementation on the 3081 was done by a licensee, System Management Inc., Rosemont, Ill., which subsequently sold that portion of its



MACKENZIE: "To grow in this business, systems must be flexible."



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*"What we used to call competition,  
we're now calling prey."*

business to the Ultimate Corp., Roseland, N.J.

Ultimate, which also offers Pick on high-end IBM 4381 systems, last March announced an implementation for the 9370, scheduled for shipment to dealers in September or October.

Another Pick customer, Pillsbury Co., Minneapolis, is definitely a niche user. Ravi Kacker, information systems manager for Pillsbury, says he is using it on a series of ATs for a complete transportation freight management system. He says he discovered a modifiable Pick-based package at a transportation show in Chicago. "We were looking for Pick because it was the only multi-user environment for the PC with the availability of an English language. We'd spent \$5 million over the last five years trying to get a similar system going on a mainframe. It never worked, and we dumped it. This one's working fine."

Richard Everman, director of student information systems at the University of California, Irvine, used Revelation, a Pick-based applications environment from Cosmos Inc., Seattle, to design ASSIST (Articulation System Simulating Inter-institution Student Transfers), a system for handling the transfer of course credits, which, when complete, will be accessible via PCs at all University of California campuses, all California State College campuses, and at all of the state's community colleges. Everman says he couldn't have designed the system without Revelation.

## Easily Transportable

Mike Lackner, project coordinator of software support for census data at the United Nations, says he is using Pick on Fujitsu machines and ATs. He's found that programs are easily transported between the two types of machines. "I haven't had occa-

sion to move them to a mini or mainframe yet, but I expect we will. We're doing things now we couldn't have done before at a reasonable price."

Al Nelson, a business analyst for American Express, Phoenix, is running Pick-based systems on an ADDS Mentor 4000 and is able to send tape back and forth between machines in Phoenix and Florida.

The formation of SMA and the emergence of Pick in the Fortune 1000 world pleases licensees of the operating system. Joe Burke, marketing manager for Prime Computer, says he likes the "acceptance of Pick as a standard and the technical documented standards coming out of SMA."

McDonnell Douglas Computer Systems Co., Irvine, Calif., which, as the former Microdata Corp., was the first Pick licensee, today claims to be the largest supplier of Pick on minis. On the subject of competition among vendors marketing Pick-based systems, Otis Brinkley, president of McDonnell Douglas Computer Systems, does not see other licensees as the major competition. "Our competition is not Pick. It's IBM with the System/36, 38, and 4300. It's Digital Equipment Corp. with VAXs of all varieties and it's the Hewlett-Packard 3000."

As for its many identities in the market, there isn't much in a name when it comes to Pick, according to some observers. Gus Giobbi is the president of International Spectrum, San Diego, an organization that puts on Pick trade shows in various parts of the world. He sees the name as being less and less important with the passage of time. "We held our first show in Paris in May, and out of 1,300 delegates, 25% had never heard of Pick per se. What they were after were business solutions." ■

## BENCHMARKS

### Faster VAX-to-Cray Connection

Digital Equipment Corp. and Cray Research Inc. have introduced a front-end processor, which both companies claim will increase the speed of data transfer between VAXs and Crays by a factor of five. The product, called the VAX Supercomputer Gateway, includes a DEC hardware interface and Cray's Station software. The Station software was developed for VMS systems and enables users to submit jobs to a Cray-1, Cray X-MP, or Cray-2 supercomputer at 3MBps from any DECnet node. The Gateway, which is the first result of a two-year-old marketing agreement between Cray and DEC, will be jointly marketed by the two companies. The agreement, according to Bruce Kasson, vice president of marketing and customer operations at Cray, is nonexclusive. That leaves open the possibility of Cray entering into a similar agreement with IBM, although Kasson will not comment on whether Cray is now working with IBM. Bob Glorioso, vice president of the high-performance systems group at DEC, says the two companies are talking about other joint products, but won't comment further.

### Layoffs at Floating Point Systems . . .

Attempting to stem losses that have plagued the company over the last 18 months, Floating Point Systems, Beaverton, Ore., reduced its work force by a third and restructured the company to combine eight divisions into four units. Four hundred employees were laid off, and four corporate vice presidents—one each in manufacturing, administration, customer service, and engineering—resigned as a result of the restructuring, according to published reports. After the reorganization, each of the

vice presidents was reportedly offered a job below the level of vice president. Under the new structure, Floating Point's engineering department becomes the New Product Development group; the finance, administration, and legal departments form the new Department of Finance and Administration; and the manufacturing, product engineering, manufacturing engineering, and technical support and service departments have been combined to form the new Operations department. The current Field Sales and Service department remains the same. George O'Leary remains president and chief operating officer and also becomes the head of the New Product Development group. Floating Point laid off 200 workers in 1986 and reported a loss of \$14.3 million. The company has been under siege in the mini-supercomputer arena by such competitors as Convex Computer Corp., Richardson, Texas, and Alliant Computer Systems Corp., Littleton, Mass.

### . . . and at Sytek

Sytek Inc.'s woes continue. The Mountain View, Calif.-based network vendor has laid off at least 14% of its workers in its second cutback of the year. In addition, several top executives, including executive vice president Roger Ferguson, have left the company. General Instrument Corp., the majority shareholder in privately held Sytek, has put it on the auction block, leading observers to surmise that the layoffs were made to prepare Sytek for a new owner.

### Acquired

Computerland Corp., Oakland, Calif., says it plans to be acquired by an investment group led by E.M. Warbur, Pincus & Co. Inc., a privately owned, New York-based financial services firm. ■



*The Silent 700™ Data Terminal Series from Texas Instruments.*

## Next time you take off, take the DEC connection.

Talk about convenience for the DEC user. TI's TravelMate™ 1200 is display, printer and communications all rolled into one lightweight, go-anywhere package that emulates a VT-100™ video terminal. With it, you can access DEC computers from just about any remote location as long as there's a phone handy.\* Perfect for on-the-go DEC communications.

The TravelMate 1200 VT-100 emulation cartridge also includes auto access features such as stored phone numbers and log-on sequences. This actually makes your TravelMate-to-DEC communications easier than using a phone. And the VT-100 emulation cartridge can be programmed to fit individual applications within your DEC operating environment.

The TravelMate 1200 with VT-100 emulation capability also carries an impeccable pedigree — a 15-year heritage of reliable, rugged design and dependable operation. After all, it's a



member of the Silent 700 Series of Portable Data Terminals family from Texas Instruments. It's definitely a terminal you can trust.

So next time you have to take off, take the DEC connection.

For more information on the Silent 700 Series, TravelMate and VT-100 emulation, call toll-free 1-800-527-3500.



# TEXAS INSTRUMENTS

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VT-100 is a trademark of Digital Equipment Corporation.

\*In locations where a phone jack is not accessible, the optional acoustic coupler may be required.

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# You're looking smarter than ever, MIS!

JCPenney Company's MIS department shares the inside story on creating a successful Executive Information System using an outside data service.

"We've actually had department heads from throughout the corporation walk into MIS and say, 'Hi! I like what you're doing and we need to get on your system.'"

"All in all, I'd say we're on the right track," says Bill Friel, Vice President of MIS for JCPenney Company.

With a modest "We're on the right track," Friel sums up the tremendous success of JCPenney's Executive Information System (EIS), now serving over 30,000 users.

What's the secret to their success? And how can you make your department look as good when designing your system, the most visible MIS activity since introducing PCs to the Executive Suite?

**The secret is that there's no secret at all.**

Robert Capone, Senior Vice President and Director of Technical Operations, explains that when the EIS was designed in 1983, "We already had an extensive internal network. Our problem was how to improve the value of our existing decision support system.

"The obvious answer was to provide more of the information people really need. That meant adding external data, which led us to Dow Jones News/Retrieval®."

**Take the "easy way out."**

Capone found that Dow Jones News/Retrieval offered an easy, economical way to integrate reliable external data.

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

Dow Jones News/Retrieval is an online information service of Dow Jones & Company, Inc., publisher of *The Wall Street Journal*. It offers over 40 business and

financial databases, including exclusive online access to the full text of *The Wall Street Journal*.

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

on-the-spot analysis."

Al Lynch, Director of Planning and Research, calls it "...one of the most powerful tools in our system. Thank goodness for the corporate insider trading data. It showed us some things that

influenced a major deal. It can pay for itself very quickly."

Heather May, a coordinator for new business activities in Lynch's department, uses Dow Jones News/Retrieval because "...I believe in gut reaction.

When my instincts say 'go to Dow Jones,' that's where I go. It sounds like habit, but there's a reason it became habit: I've found it works."

"It's a definite necessity," says Raul Consunji, a financial analyst at the company. "There's a lot of credibility in the name 'Dow Jones,' and no way to get along on

the job without it."

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

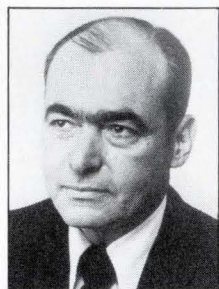
**An MIS story that always ends happily. Well, almost always.** Properly planned and implemented, an EIS is an almost sure-fire coup for MIS.

But it can quickly turn into a fiasco if just one element, such as timely external data, is overlooked.

Dow Jones News/Retrieval can help guarantee your success, giving users the information they can really use.

Capone sums up the bottom line: "I didn't have to promote it; the system sold itself. You put it up, and what's not to like?"

That's the kind of "selling" most MIS/DP executives would love to be faced with. ■



**Robert Capone**  
Senior Vice President



**Robert Northam**  
Chief Financial Officer



**Al Lynch**  
Director of Planning and Research

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

To guarantee absolute reliability, JCPenney Company pioneered the technology for connecting to Dow Jones via a dedicated line and worked out an attractive pricing structure.

Other corporations, such as ConAgra and IBM, have followed their lead.

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

**What are the users saying?**

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

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

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

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# Behind the News

## PEOPLE



## Business Focus Is Key to Success

Understanding the company business is cited by winners of the First Annual Awards for Managing Information Technology.

BY MARY KATHLEEN FLYNN

Ever get the nobody-loves-MIS blues? Take heart. The Graduate School of Industrial Administration (GSIA) of Carnegie-Mellon University and American Management Systems Inc. (AMS) have established an award that casts the spotlight upon MIS managers who have made outstanding contributions to their organizations through the effective use of computer systems and communications technology. It was a little over a year ago that AMS approached the GSIA and proposed an award for excellence in MIS. The software vendor had enjoyed a long recruiting relationship with Carnegie-Mellon, and the university agreed to cosponsor the award.

The Pittsburgh business school and the Arlington, Va.-based software company held their First Annual Awards for Achievement in Managing Information Technology dinner in New York in May to honor this year's five winners: Joseph Brophy of the Travelers Corp., Hartford, Conn.; Michael Cruskie of the New York State Division of Criminal Justice Services, Albany; Clinton Joyce of Albertson's Inc., Boise, Idaho; Ron Ponder of

Federal Express Corp., Memphis; and Michael Zucchini of General Re Corp., Stamford, Conn. Each winner received a Steuben glass eagle and a cash honorarium of \$1,000. Walter Wriston, former chairman and ceo of New York-based Citicorp, delivered an address at the ceremony.

The winners were selected by a panel of six judges—two GSIA professors, two AMS executives, and two independent industry experts. One of the judges, Charles Kriebel, professor of industrial administration at GSIA, considers the award "an excellent idea that was long overdue." The point of the award, Kriebel explains, is "to recognize individuals who use technology to improve upon the overall performance of organizations."

The judges considered 350 individuals who were nominated by their ceos. The panel looked for MIS managers whose use of technology had significant impacts on their own companies and who, in addition, exhibited "general innovation with respect to an application and professional leadership," says Kriebel. He elaborates, "By that I mean, 'Has the individual contributed more, in a general

way, to the profession, and not just to the organization?'"

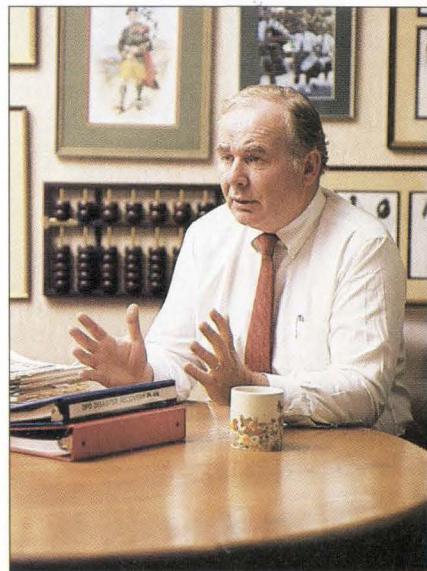
### Joseph Brophy, Travelers Corp.

While the award recognizes specific accomplishments within the last two or three years, Brophy's prize was as much inspired by achievements during his 16-year career at Travelers as it was by more recent coups. The judges singled him out for initiating changes that have had a profound effect on Travelers' business success.

In addition to this new award, senior vp Brophy previously had been named Man of the Year by the Data Processing Management Association (DPMA) for 1986 (see "Color Me Blue," Jan. 1, p. 85). Brophy's Award for Achievement in Managing Information Technology takes its place on a trophy shelf that is overflowing with accolades he's won while at Travelers.

One of the leading-edge systems that Brophy has launched at Travelers is an office communications network. It merges voice and data over T1 carriers, creating an advanced voice mail and teleconferencing system. This network, through the 17,000 micros Brophy has installed at the \$16 billion insurance giant, gives independent agents on-line access to customer and policy information that is stored in the company's 3,600 databases.

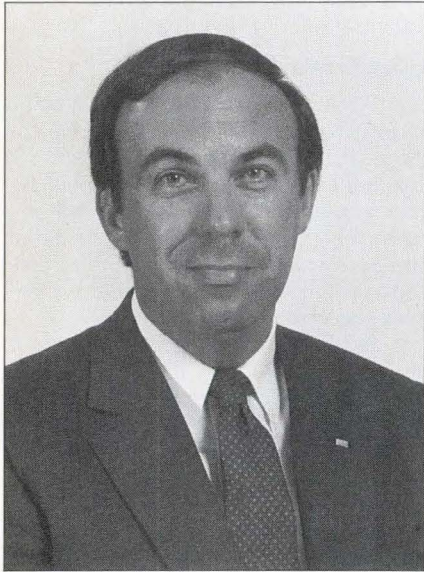
Perched at the top of the list of factors that Brophy believes have contrib-



Travelers' Joe Brophy was honored for the contributions he's made throughout his 16-year career at the insurance giant.

Photograph by James Joern

## Behind the News



**Ron Ponder helped Federal Express set the standard for delivering packages overnight and on time.**

uted to his success are "high-level champions among senior management, people with a vision who want to do things differently—to stretch technology to achieve objectives, not just automate. Most ceos don't get that vision from paper; MIS management has to work hard educating them."

Brophy himself has never lacked the management support that so many MIS execs find elusive. Confident that he's got "top management support for everything we're doing," he insists that Travelers has always been a leading-edge company. "We had the first commercial use of the telephone. We sold Alexander Graham Bell a two-cent travel policy over the phone."

### **Ron Ponder, Federal Express**

Commitment to the customer is one characteristic that made Ron Ponder stand out among the pool of nominees. Ponder, senior vice president of Federal Express Corp., developed and implemented a customer service system called COSMOS, recently upgraded to COSMOS IIB. It allows the courier service to track every package it handles every step of the way.

Each Federal Express courier carries a handheld scanner that contains a keyboard, a read-out display, and 400Kb of memory. The scanner plugs into a microcomputer on board the courier's van, which in turn sends data back to a

Digital Equipment Corp. mini at the corporate headquarters in Memphis. COSMOS IIB is the reason that Federal Express can tell you where your package is if you call up to complain that it's late or lost.

Ponder's goal in designing this system was "to make it as easy as possible to do business with us." A firm believer in "knowing as much about the business as you do about technology," he sees the role of dp at Federal Express as "adding value to our product to differentiate it from the others."

### **Michael Zucchini, General Re Corp.**

Michael Zucchini believes in thinking "beyond the traditional role of data processing." Technology, he states, can be "the driving force of product differen-



## **PONDER DEVELOPED A SYSTEM FOR TRACKING EVERY FEDERAL EXPRESS PACKAGE.**

tiation." As president of General Re Services Corp., a leading reinsurance holding company, Zucchini landed his eagle for developing a system called CONFER (Communications Network for Electronic Reinsurance).

With CONFER, General Re's 300 underwriters produce all reinsurance quotations and coverage documents, such as binders and certificates. The underwriters "talk to clients on the phone while performing services on-line," explains Zucchini. "This means faster service, better quality documents, and better accuracy. We're able to do things in minutes that used to take days."

CONFER automatically generates premium and accounting entries and handles all routine correspondence. Specialized hardware and software installed at some clients' offices provides additional customer services, such as electronic delivery of all documents.

Ronald Ferguson, General Re's

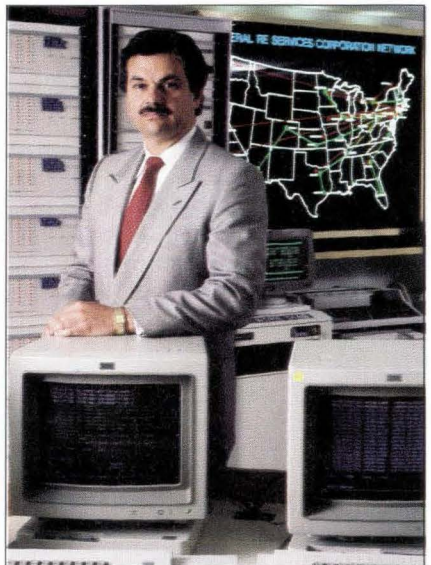
president, claims that CONFER is "as significant to us as an on-line, real-time reservation system is to an airline."

Zucchini, like Ponder of Federal Express, believes that keeping the customers in mind is a major factor in one's success. "You need to listen to your customers," he proclaims. "Most companies don't ask the customer, 'How would you like to see the bills?' Instead, they ask the accounting department. When the system's being built, there should be two orientations—to look at the internal and external benefits."

### **Clinton Joyce, Albertson's Inc.**

Clinton Joyce, senior vice president of MIS for Albertson's Inc., has concentrated primarily on internal benefits. He won the achievement award for developing and implementing several systems that allow the eighth largest supermarket chain in the U.S. to maximize profit margins. Albertson's has been maximizing for quite some time: Joyce points out that the grocery conglomerate has enjoyed "17 years of increased sales and profits."

Joyce masterminded a sales information system that closely monitors the performance of each retail department, store, district, division, and market throughout Albertson's 17-state chain. He also introduced an integrated accounting and reporting system that enables management to control expenses and track individual store performance and profitability. The most recent ad-



**General Re Corp.'s Michael Zucchini thinks "beyond the traditional role."**

Each workstation can run a variety of applications: write memos and letters, send messages, do spreadsheet planning and more.



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## Behind the News

ditions to Albertson's information systems are electronic handheld ordering devices.

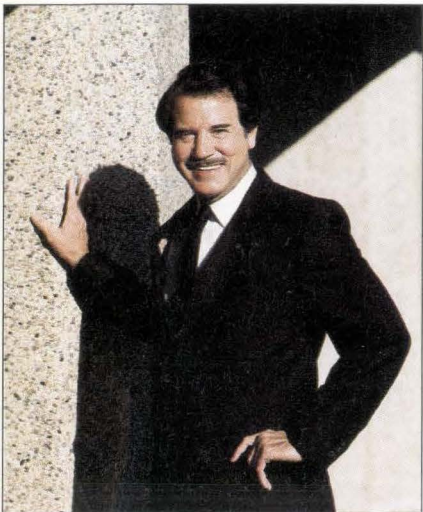
Joyce, an Albertson's veteran of 19 years, believes that information systems have contributed significantly to the chain's success. They're "at the heart of merchandising for the whole company," he states. His boss, ceo Warren McCain, says Albertson's has "the most effective information system in the retail food industry."

Joyce attributes much of his success to "staying tuned in to retail. It's just like being in the military, where your military duty comes before your specialty. Corporate responsibility has to come first." The systems he's designed are critical to Albertson's profitability. He claims they've allowed the company to develop the "right mix of products to get a higher profit margin."

### Michael Cruskie, New York State

The public service winner of the achievement award was Michael Cruskie, executive deputy commissioner of the New York State Division of Criminal Justice Services. Cruskie won the award for his role in coordinating two statewide criminal justice computer systems.

The New York State Division of Criminal Justice Services was created in the early 1970s to improve administration of the state's criminal justice system, particularly by fostering the exchange of information among more than 2,000 local and state agencies, courts, and corrections departments. Gov. Mario Cuomo appointed Lawrence T.



Clinton Joyce of Albertson's Inc. has always believed in "staying tuned to retail."

Kurlander as the division's commissioner in 1983. At the top of Cuomo's agenda for the division was the upgrading of its computer systems, and Kurlander's first step was to hire Cruskie.

Cruskie put together a task force to study different functional areas, such as prosecution, courts, and public defense. The task force made recommendations for changes to the systems already in place. The governor and legislature approved both the structure and funding for the project.

Aided by outside experts and an in-house staff of six, Cruskie coordinated a micro-based jail management system, which now enjoys 100% voluntary participation, and implemented the first phase of a statewide criminal justice data communications network.

The Systems Improvement for Enhanced Community Safety Program is a micro-based system Cruskie introduced for warrant management and tracking.

### BROPHY'S NETWORK GIVES AGENTS ACCESS TO INFORMATION IN TRAVELERS' 3,600 DATABASES.

The soft-spoken civil servant says most local police departments using it have "doubled their warrant execution."

Another system Cruskie has begun to implement is the Statewide Automated Fingerprint Identification System (SAFIS). "In the past two years," Cruskie explains, "significant developments have occurred in the imaging technology for matching fingerprints. In the 'Night Stalker' case, San Francisco police were able to solve a 23-year-old serial murder" with the aid of this improved technology (see "Cpu Nabs Suspect," Nov. 1, 1985, p. 67). Cruskie expects the full implementation of SAFIS to help solve thousands of crimes a year in New York state.

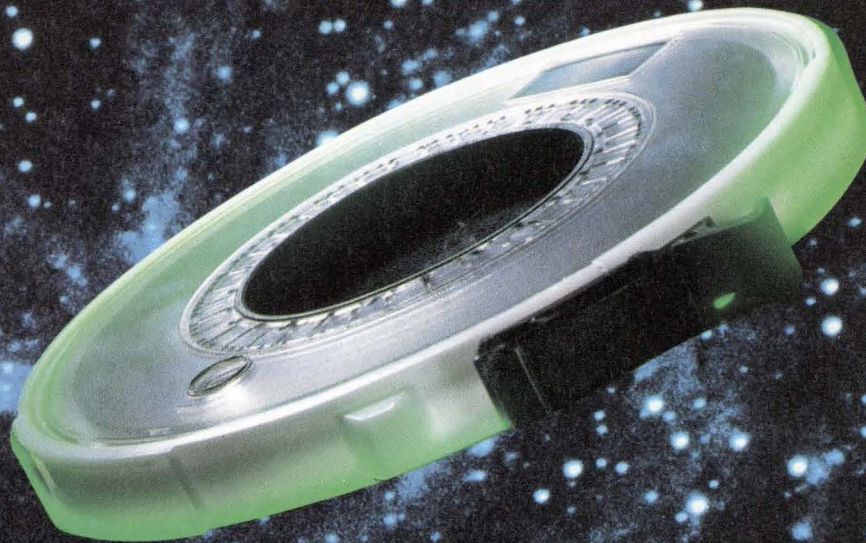


Michael Cruskie has been executive deputy commissioner of the New York State Division of Criminal Justice Services since 1983.

What impressed the dp judges most about Cruskie is his ability to get so many diverse organizations to work together. The executive deputy commissioner must contend with 1,000 locations and 1,300 agencies. He describes his modus operandi for this challenge as "not dictating solutions. It was the nature of the beast," he continues, "that I couldn't say, 'This is the way it's going to be done.' Instead, we had to create an environment in which we all worked together for solutions. We needed a buy-in on everybody's part."

Without Kurlander's support, as well as a "management commitment from the Governor's office," Cruskie believes he couldn't have launched these systems or won the achievement award.

In addition to the five winners, AMS and Carnegie-Mellon's GSIA awarded five honorable mentions. They went to Anthony Ciriano, vice president in the Trading and Treasury Services Group of Chase Manhattan Bank, N.A., New York; Anthony Herriott, senior vice president of Chemical Bank, New York; John Kerin, senior vice president of the Operations Division of McGraw-Hill Inc., New York; Col. F. Lee Maybaum, USAF (Retired) of the Defense Communications Agency, Department of Defense in Washington, D.C.; and Adel A. Zakaria, director of engineering of the Engine Group of Deere & Co., Moline, Ill. ■



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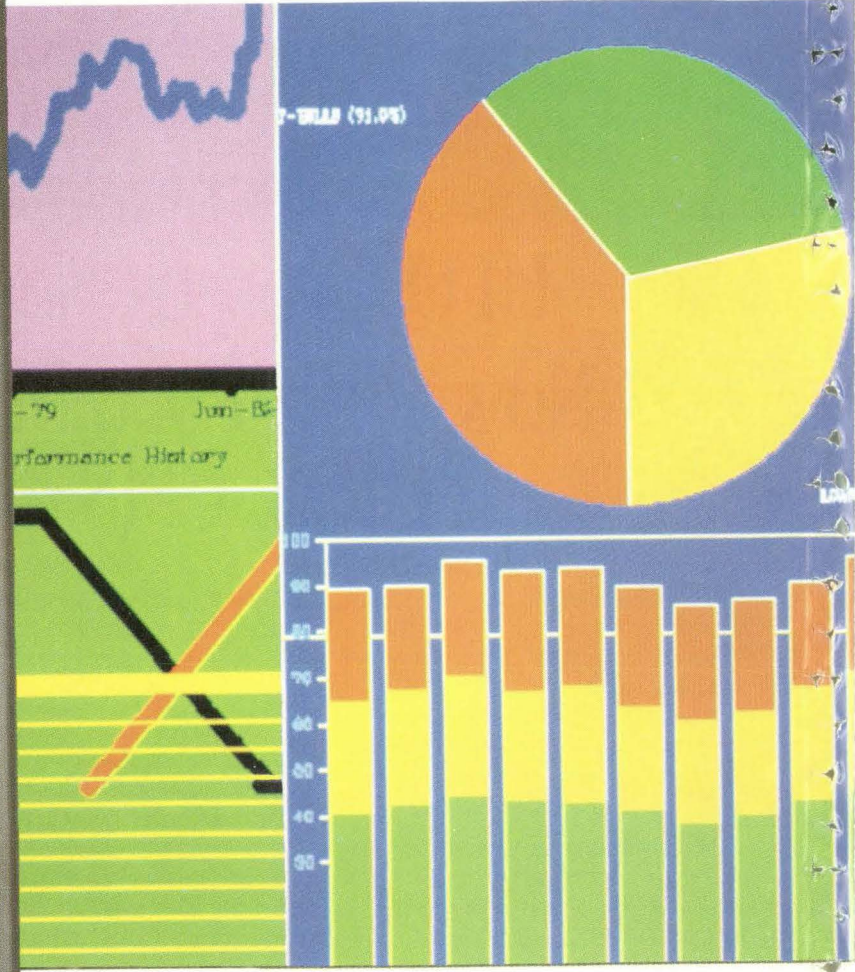
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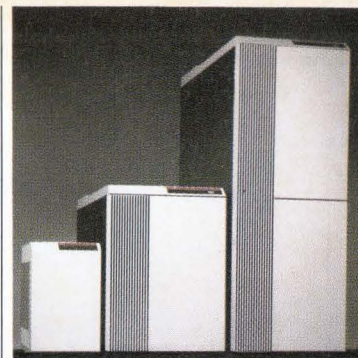
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# AT&T

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# The Computer Room:

BY PETER KRASS

Managing the operations of a large computer room can be difficult and frustrating even on a normal day, but when an organization's operations staff has to plan for a totally new computer room, a data center move, or even an equipment upgrade or change, the task can be downright maddening. Every person who's ever been involved in these thankless efforts has a tale to tell: weekends without sleep, mistakes that multiply, overlooked details that bring all work to a sudden halt. Planning is a prerequisite, but even the most careful planning can be thwarted by unforeseen circumstances.

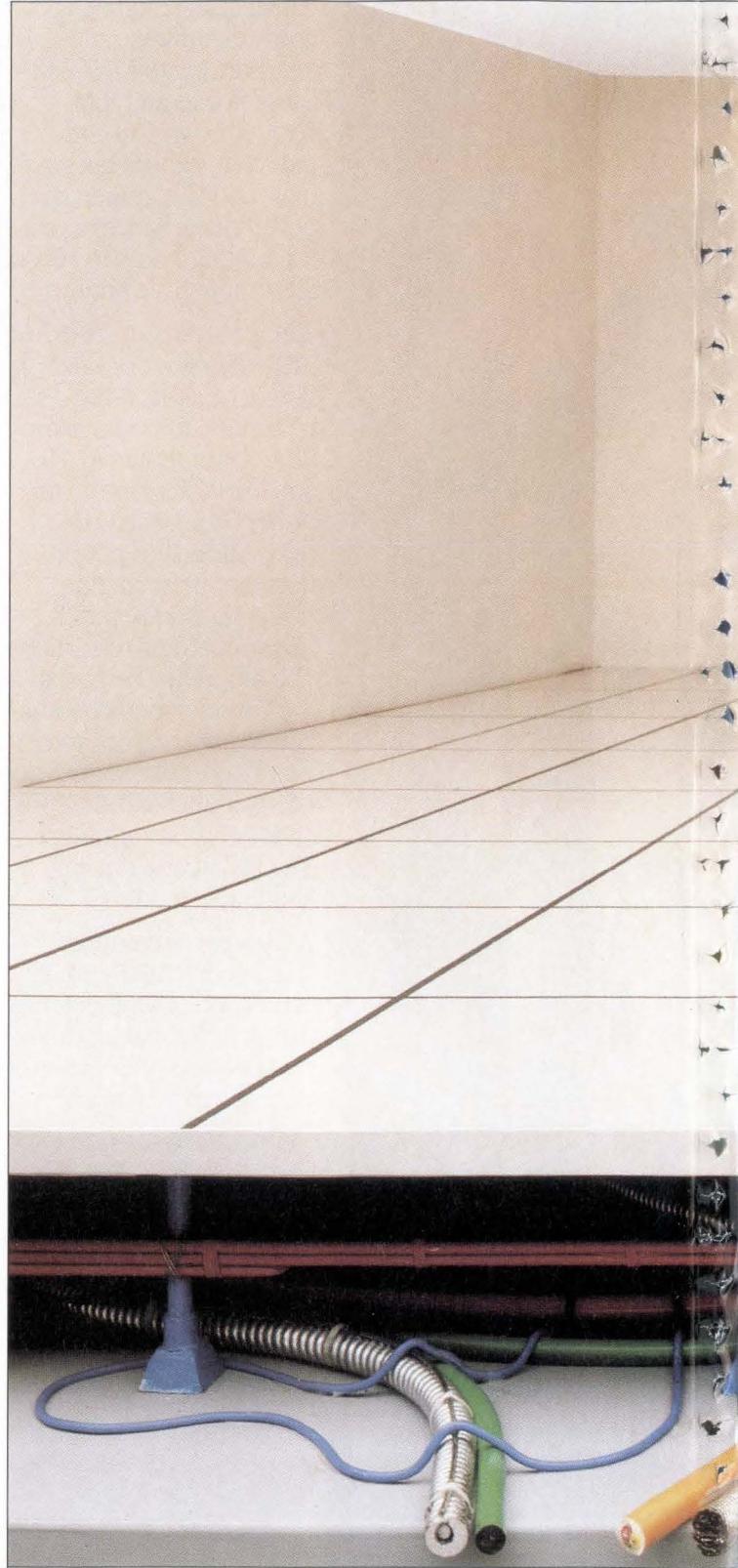
Just ask the operations manager who discovered that the truck containing his new computers wouldn't fit into his building's loading dock. Or the operations team that ordered an uninterruptible power supply (UPS) that weighed too much for the freight elevator. Or the data center manager who was shocked to find an airplane had crashed into his building—and his computers.

"What we do is a juggling act," sums up Michele Tampa-Hoag, division manager of Cablexpress, a Syracuse, N.Y., company that helps operations managers relocate and install computer rooms. "It gets pretty hairy sometimes."

Operations managers are faced with a deluge of details. Facility requirements to be considered. Appropriate sites to be selected. Space to be designed and plans to be drawn up. Building codes to be met. Fire protection and detection to be provided. Security systems, backup power supplies, air conditioning, and plumbing to be installed. Trade unions to be negotiated with. Dp equipment and acquisition methods to be evaluated. And finally, when all that is accomplished, the move, upgrade, or installation itself must be done during off-peak hours (typically weekends) in a well-coordinated effort that produces minimal interruptions.

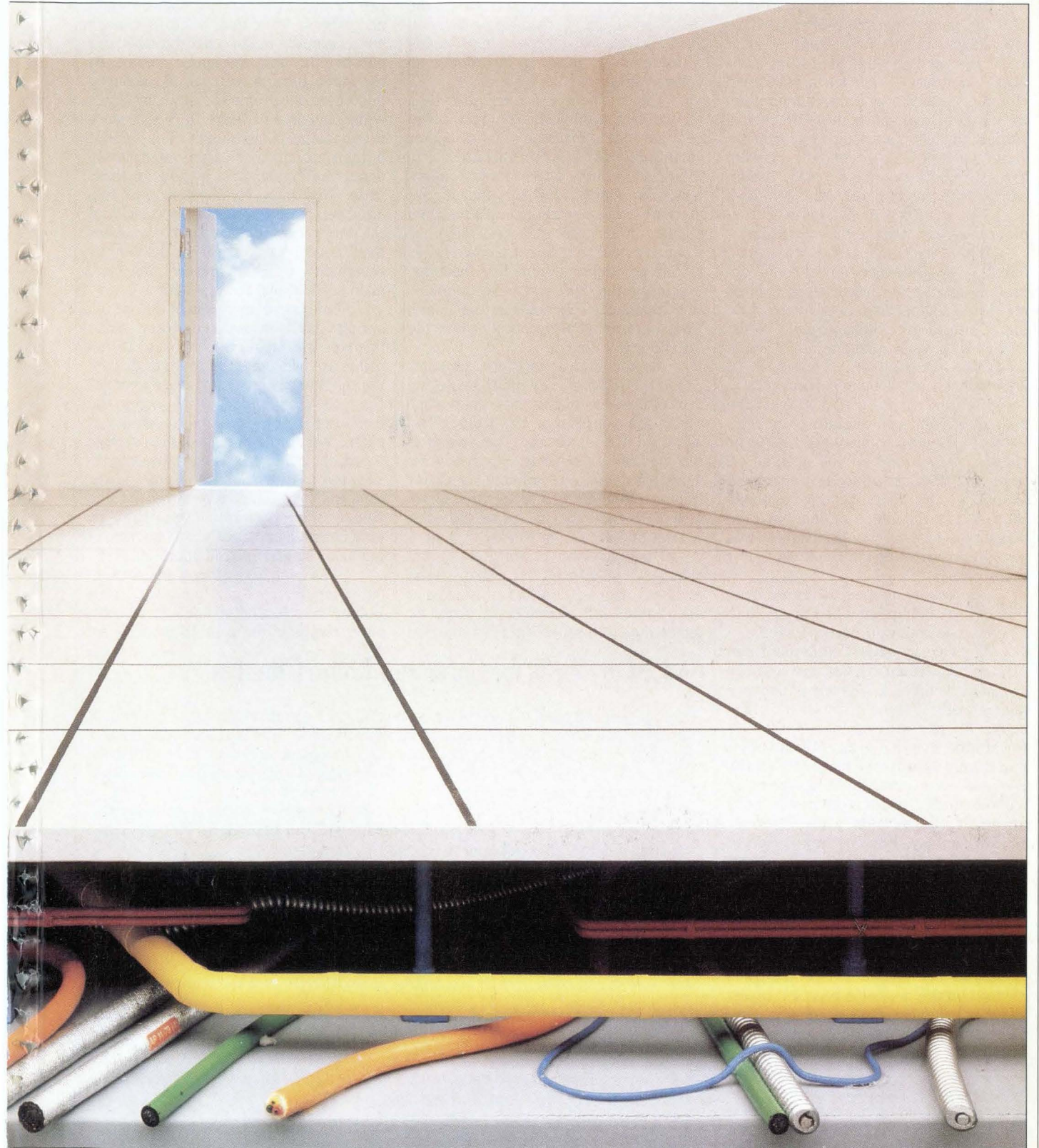
In short, upgrading, installing, or moving the computer room is much more difficult than it looks. Adding another dimension of difficulty is the fact that the computer room is more than just one isolated room. "The so-called computer room is actually a group of rooms and areas," points out Richard Halper, a senior consultant with Coopers & Lybrand in Houston. Halper, who used to head up his own computer room consulting firm, explains that staff and vendor offices,

**Putting all the complex pieces together that make a move, an upgrade, or a new equipment installation go smoothly is the tough task of the computer operator, the unsung hero of the computer room. These MISers-on-the-move, who view planning as a prerequisite to everything, must deal with a deluge of details, from site selection to plumbing. They also have to contend with a wide range of people who have different missions and mandates beyond the move. At the top of that list is the MIS exec who frequently sees only the finished product of their toil: a nice, clean box sitting on the computer room floor.**





# Putting the Pieces Together



by Walter Wick

## The Computer Room



storage areas, and separate rooms for conduits, operations control, halon, UPS gear, and fans can all be included under the "computer room" category.

Computer operations managers are often called upon to show expertise, or at least familiarity, with hardware, software, networks, electrical systems, plumbing, carpentry, air conditioning, and architecture. They must be able to work with and supervise people from diverse backgrounds, economic classes, and occupations—from print room clerks who have barely finished high school to architects, consultants, and senior managers with their own agendas.

When the time comes to install, move, or upgrade a computer room, operations managers can't be afraid to pitch in. "I don't supervise installations. I do them," declares Douglas Soeda, assistant vp of physical planning for Prudential-Bache Securities Inc., New York. "I get in there and roll up my sleeves."

Without proper planning, even the best intentions can amount to naught. "Most computer room flops," explains Halper, "are based on the attitude of, 'Well, I moved my house last year, so I should be able to move the computer room with no trouble.' People have the vision of a computer room change as five activities instead of the 25 or 30 that it really entails."

The following case histories illustrate what can happen when those 25 to 30 elements are improperly planned.

The bleary-eyed computer room planner for a New York financial services company watches as a group of delivery men unload a UPS unit in the middle of the night. As the movers wheel the UPS toward the freight elevator, the lift operator calmly informs the manager that the elevator has a maximum capacity of 5,000 pounds. "But the UPS motor alone weighs 7,000 pounds!" the manager cries in dismay. Finally, they decide to disassemble the unit, move it upstairs piece by piece, and pray that it can be put back together again.

In the offices of a computer services bureau near the Princeton, N.J., airport, the operations manager eases back in his ergonomically designed chair and rests his feet on the desk. He recently supervised the move of his company's complete computer room to this building and everything went fine. Suddenly, his peaceful mood is shattered by an explosion overhead. The lights go out. The roar of the computer room stills to a whisper. An airplane, losing control as it came in to land at the nearby airport, has

crashed into the roof of the building. It's only now, of course, that the manager remembers a consultant's warning about locating the offices so close to an airport.

The data center planning team for a midwestern publishing company is supervising the expansion of its computer room, adding a facility on the fifth floor to the present site on the fourth. Carpenters, plumbers, and electricians are working away. A foreman calls the chief planner over: the stairwell they had planned to cut to connect the two floors is out of the question. The building, erected in the '20s, was never intended to withstand large holes in the floors. The stairwell would probably cause the fifth floor to collapse.

At an upstate New York computer room, the moving crew finishes lugging in a brand-new mainframe. They place the machine on its spot, attach the cables, and load the software. The switch is thrown, and . . . nothing. Somebody ordered, or delivered, the wrong cables. A frantic telephone call to the vendor reveals that a new part can be sent all right, but not for six to eight weeks.

Planning for computer room changes is so difficult because the tasks involved are so complex. Installing a mainframe, for example, involves no fewer than 20 steps. Meetings must be

held to select the system. Delivery dates are established, and another meeting is held with all the people involved—facilities planners, the building landlord, staff, and others. After that, a site is chosen and engineers make sure the floor can support the new machine's weight. At the same time, structural and acoustic engineers determine the new machine's sound levels and make any necessary noise-abating adjustments. The vendor is then brought in to iron out ordering details and establish the installation timetable. That same vendor delivers a full-sized template that is used to mark out the floor panels that need to be cut. After that, the site prepares for the delivery by scheduling freight elevator time and making additional arrangements.

One crucial operation is that of ensuring that the right delivery route through the building is chosen. (Steel plates are laid along the route to distribute the machine's weight more evenly.) Next, the loading dock is inspected, the computer is delivered, and inventory is taken. Vendor engineers then assemble the machine, electrical generators are re-adjusted to redistribute the new power load, and the machine is powered on. The vendor then performs diagnostics on each channel, and, finally, the machine is gradually staged into full operation.

"The complexity involved in changing computer rooms is amazing," says Halper, who has helped design 10 computer rooms in the past 18 months. An

## A List to Check for Computer Room Changes

Planning on changing your computer room? There's always room for suggestions in that realm. Robert Halper, a senior consultant with Coopers & Lybrand in Houston, and the author of *Computer Data Center Design* (John Wiley & Sons, New York, 1985), has compiled the following checklist for MIS managers who have computer room changes on their minds.

- Organize the project and control staffing. Assign responsibilities to employees, construction and vendor participants, architects, and engineers. Plan regular meetings. Establish scheduling and control on-line systems.
- Create a facility requirements document that completely describes the performance aspects of the new facility, including site, fire, and security issues, and space requirements.
- Select a site, taking into consideration staff and user demographics, the capacity and quality of the utility companies, and the disaster potential.
- Design and plan the space. Create a computer equipment inventory and develop computer equipment growth projections. Design layouts for the computer room and related areas.
- Develop a mechanical plan for electrical power, heating and air conditioning systems, plumbing, fire control and abatement, security controls, and mechanical room layout.
- Devise a communications plan for the local network, for the patch panels and switching gear, and for the teleprocessing.
- Come up with a relocation plan to move or replace equipment and to provide temporary "bridge" equipment.

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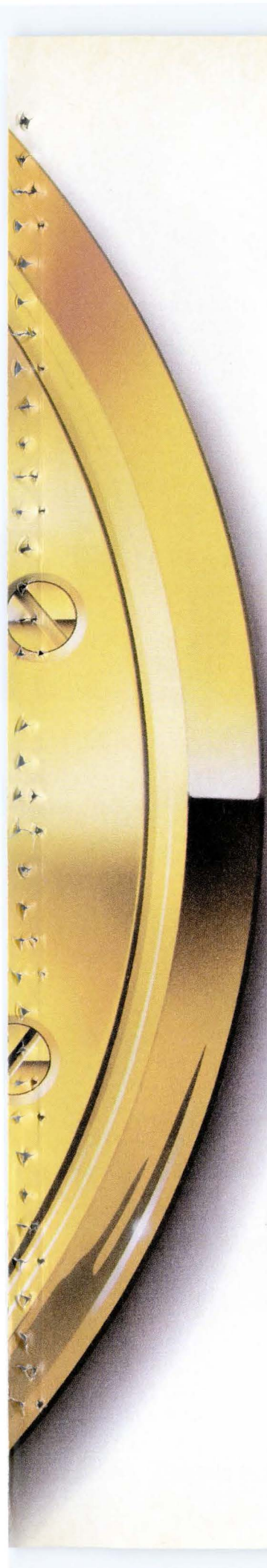
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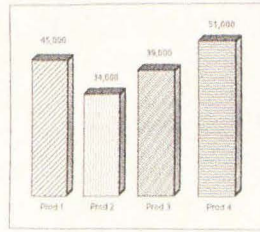
The big investments in Research and Development should pay off later this year with the introduction of the 80' product range. R&D will be reduced next of next quarter.

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CIRCLE 28 ON READER CARD

## The Computer Room



inexperienced staff can make the process even more difficult. "In many organizations," Halper explains, "the manager of operations is a nice young guy on his way somewhere else. He's doing a two- to three-year stint. Suddenly, his company decides to move, and he's never even lifted the computer room floor."

Sometimes, senior managers, both at the corporate and MIS level, can offer impediments of their own. Since their priorities often differ from those of the operations staff, conflicts arise. Even worse, senior MIS management sometimes views the computer room as one of those details beyond its purview.

These execs may take the operations job for granted. "Management doesn't see all the cables we have to deal with," says Prudential-Bache's Soeda. "They just see the finished product—a nice, clean box sitting on the computer room floor." Laughing good-naturedly, he adds, "Then they ask, 'Is that all?'"

Because the job of installing, moving, or upgrading a data center is so involved, many organizations planning such an undertaking recruit outside consultants and architects to help. But outside consultants and architects, though usually helpful, can present the operations staff with still another set of problems. "Architects don't like working on computer rooms," says one consultant who has worked with many. "They just don't like the nitty-gritty stuff."

For that, and other reasons, some companies prefer to plan their computer moves themselves. "We have a full-time technical services person who does all our planning," says Roger Claus, director of data center operations for Hallmark Cards, which recently expanded its computer room. Claus, who supervised the expansion at the Kansas City company, explained that it was the planner's "responsibility to deal with construction people, vendors—everyone."

Still, when particular problems crop up, it's good to be able to turn to specialized groups for help. The National Fire Protection Association of Quincy, Mass., for example, publishes a guide on protecting computer equipment from fire. The association also sells fire safety products and provides related services.

Vendors can also be tapped for detailed information, not only on how to install their products, but how to plan installations, moves, and upgrades. IBM, for instance, publishes a series of "Installation Planning Method" reports for its various computers, providing complete instructions on how to create, complete,

and use an installation project plan.

Help is also available from the Association for Computer Operations Management (AFCOM), based in Garden Grove, Calif. The group, which is presided over by Leonard Eckhaus, publishes a bimonthly magazine, *The Computer Operations Manager*, and sponsors an annual conference and trade show.

The most recent AFCOM conference, held last March in New Orleans, was attended by 650 operations workers who were offered a full menu of seminars. The seminars covered such topics as computer crime, managing computer operations personnel, dp scheduling, disaster recovery, hardware installation, and migrating to IBM 3480 tape drives.

The vital ingredient in a successful moving experience is always thorough planning. One who knows the value of planning firsthand is Ronald Brzezinski, vp of information systems at the Quaker Oats Co. in Chicago, which just completed moving its computer center to a new

office building in the Windy City. "We started planning last fall," says Brzezinski, adding happily, "Our move went smoothly." The Quaker Oats MIS exec and his staff had the new computer room completely wired with local area networks and fiber-optic links before any people or machines were brought in.

Rigorous planning is time-consuming, but as most veteran operations managers will tell you, practice makes perfect (or nearly so). "Planning time is a function of how frequently you make changes," points out Frank Proctor, operations manager at Honeywell's Clearwater, Fla., facility, which recently installed a new air conditioning system at the same time it was upgrading to a DPS-90 from an older Honeywell mainframe. "The first time you do something like this," says Proctor, "it requires quite a bit of planning. But after you've been at it for a while, you can take out your old plans and simply update them."

To make that updating process as easy as possible, Proctor put together a 20-page outline detailing who does what and when during an equipment upgrade.

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## The Computer Room



The outline is overlaid on a standard pc spreadsheet program, which allows Proctor and his staff to make quick changes in their plans. "It's too complex to do without a pc," he observes. "We learned that the hard way."

One variable that Proctor cannot program into his personal computer is technological change. Operations managers designing computer rooms today are encountering a new technology—automated computer room operations—that is destined to have a major impact on their jobs in the future. One operations manager, Arnold Farber, who is vice president of computer operations at Sovran Bank in Richmond, Va., has seen the future today. "Our long-term goal," Farber explains, "is to fully automate the computer room so that it runs itself."

With outside consultants, Farber and his staff are planning a new computing center that is intended to serve the bank from 1989 to 1995. He hopes to automate his tape library, printing processes, and production control. "We've been running—manually—other people's automation," he says, "and I find that strange. We have to move anyway, so this gives us an opportunity to upgrade our operations to 1980s-and-beyond technology."

Planning for the future, however, involves more than just technology. People are also a very big part of the picture. Not all companies intend to use automated operations and some even expect to have more, not fewer, employees in the future. The expansion of the work force can in turn lead to other problems, particularly in cities where rents are high.

"Real estate is one of the biggest problems in planning a computer room because it's so hard to keep enough floor space open for additional personnel," observes William Sharon, who supervised E.F. Hutton's recent dp move from one part of high-rent New York to another. "Senior management doesn't like the idea of idle space, but it's important to figure out how many people will eventually use the computer room and to keep space for them free."

Even organizations that carefully plan a move can find the going rough. "Rather difficult," is how Henry Dill, assistant vice president of data center operations for Lincoln National Corp. of Fort Wayne, Ind., describes planning the move of his data center four years ago. "We had a project plan, broken into parts, with different people responsible for different tasks. We held weekly meetings, and if someone fell behind, we'd

concentrate on getting him caught up."

Lincoln National's move was a huge undertaking. Approximately 80 tape drives, four mainframes, two minis, and other gear all worth roughly \$26 million had to be transported over a seven-mile course that crossed heavily used railroad tracks. But in the end, planning prevailed. "We moved on time," Dill declares proudly. "We did it over a three-day weekend and had only 12 hours of downtime."

Planning to install a completely new dp center can present special challenges. Such a monumental task now faces planners at Morgan Guaranty Trust Co. in New York. The firm is putting up a large office building on Wall Street to house its headquarters. The building, touted as an office "for the twenty-first century," will feature local area networks on every floor. "It's a 50-story intelligent building," sums up one executive at another Wall Street company. "Every floor will be raised to hide all the cabling."

Though Morgan officials declined to be interviewed, the pronouncements of Lewis Preston, the bank's chairman, on the subject of the move are certainly known.

Back in September 1985, when Morgan announced plans to build the new tower, Preston said that the bank needed the 1.6 million-square-foot building because its present quarters lacked sufficient space for additional electric power and computer networking cables.

Perhaps Morgan execs are keeping a low profile in order to make it all seem easy. Indeed, that's how computer operations often look to outsiders. "The work the operations guys do is like a duck swimming on the water," says Cablexpress's Tampa-Hoag. "You see this serene movement on the top—that's the smooth installation of some new computing equipment. But behind every computer room change, is all the incredible work these guys do. The duck's paddling like hell underneath." ■

*Peter Krass is a freelance writer based in New York.*

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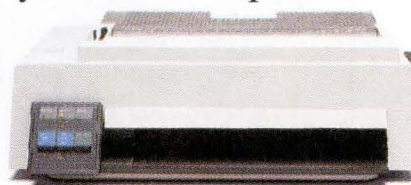
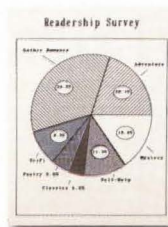
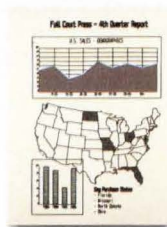
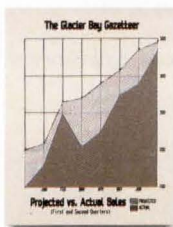
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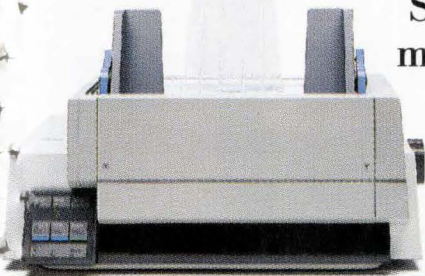
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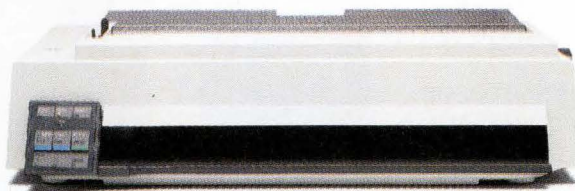
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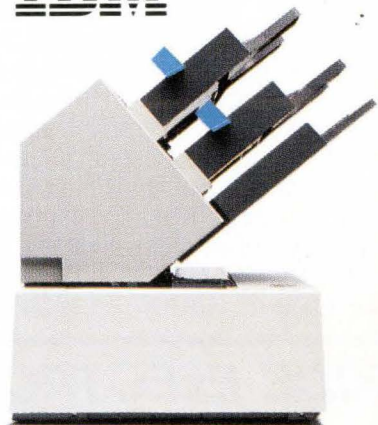
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# Keeping Up Your UPS

BY KENNETH G. BRILL

For many data processing sites, the installation of an uninterruptible power supply (UPS) has become mandatory. This is especially true in on-line transaction processing environments where downtime is a dirty word. And costly. Companies can spend hundreds of thousands—and even millions—of dollars for a UPS they think will assure uninterrupted computer operation. What many MIS managers fail to appreciate until it's way too late is that the uninterruptible power supply is just one element in a complex system.

A UPS system is an intricate and interdependent network of electrical subsystems that generate, condition, or control the flow of power to computer

utility must be stepped down to the building's internal distribution voltage. Once this is done, the flow of power through the entire building is controlled by switch gear.

*Critical power buses.* There are three power buses in most data centers. The raw power bus, which receives and distributes raw power from the electric company, serves both computer operations and the rest of the building. The uninterruptible power bus usually receives raw power from the utility. In the event of a blackout, emergency generators replace the electric utility in supplying the interruptible load for the computer room air conditioning equipment and the UPS.

The uninterrupted power bus should maintain both conditioned and uninterrupted power at all times for the

Keeping power in the system is the mandate of the uninterruptible power supply (UPS). That mandate should be especially powerful to MIS managers, who need to keep their company's critical applications up and running. To do that, MISers need to view the UPS as a total system and not just as a mere power supply. That system is made up of 11 electrical elements: lightning protection, utility-service entry

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hardware. While the UPS is the central and critical element within that network, it represents only one out of a total of 11 subsystems. Any malfunction within that network can result in a hard computer crash. The 11 elements comprising the network are described below, ordered in terms of the power flow.

*Lightning protection.* To deal with lightning, dissipate destructive energy before it enters the building. Depending on location, this usually means putting lightning arresters on each power phase at the point-of-service entry.

*Utility-service entry and building switch gear.* At major sites, the kilovolt-range power received from the electric

computer, peripherals, phones switches and communications gear, and site equipment.

*Uninterruptible power supply.* The UPS conditions the energy it receives and upgrades it to computer standards. If there is no power from the interruptible power bus, it makes up the difference through batteries. There are three types of UPS supplies available—static, rotary, and hybrid static/rotary.

*UPS air conditioning.* If air conditioning is interrupted long enough, many UPSs will eventually shut down, allowing a direct path for raw power to reach the critical load.

*Frequency convertor.* Most large

and building switch gear, critical power buses, the UPS, the UPS air conditioning, the frequency convertor, batteries, emergency generators, off-line testing, computer room power distribution, and grounding. Any malfunction within this network can result in a hard computer crash that can bring upper management crashing down upon your head.

## Keeping Up Your UPS

mainframes require 415Hz power. Since the utility is 60Hz, a frequency converter—solid state or rotary—is required. Frequency converters are usually situated in the computer room adjacent to the mainframes they power. If the 415Hz bus is situated more than 100 feet from the computer, line-drop compensation may be required.

**UPS batteries.** If utility power or emergency generator power on the interruptible power bus fails, the UPS uses energy stored in batteries, converting it to alternating current without interruption so the critical load never experiences power failure on the uninterruptible power bus.

**Emergency generators.** When utility power fails, the emergency generator assumes the load on the interruptible

power bus. Multiple generators and paralleling switch gear are used when the capacity of a single generator is insufficient to power the entire interruptible load.

**Off-line testing.** The only way to know whether batteries or emergency generators are ready is to test them off-line under conditions that simulate a real emergency.

**Computer room power distribution.** Conditioned power is derived from the uninterruptible bus and distributed to panels or power distribution modules inside the computer room.

**Grounding.** Grounding prevents operators from being shocked or, in the worst case, electrocuted. It also provides the return path for the computer's processing signals.

Overall reliability is determined by

the weakest element in this 11-link system chain. As a result, it is not at all uncommon to continue experiencing power interruptions at the point where power is applied to computer hardware despite flawless upstream performance of the UPS. After spending big bucks to eliminate power as a source of downtime, top management understandably can become very upset if computer crashes continue.

### Keep the Focus on Ultimate Goals

The only way to prevent that from happening is to approach power problems from a total system standpoint. In managing uptime production, the MIS chief is responsible for keeping everyone involved focused on the ultimate goals: uninterrupted computer operation

## FIGURE 1 Selected Uninterruptible Power Supply Vendors

Abacus Controls Inc.  
Somerville, N.J.  
CIRCLE 201

Advance Conversion Devices Co.  
Randolph, N.J.  
CIRCLE 204

American Power Conversion  
Burlington, Mass.  
CIRCLE 207

Applied Research & Technology Inc.  
Atlanta  
CIRCLE 210

AT&T Technologies Inc.  
Union, N.J.  
CIRCLE 213

Atlas Energy Systems  
Irvine, Calif.  
CIRCLE 216

Behlman Engineering  
Carpinteria, Calif.  
CIRCLE 219

Best Power Technology Inc.  
Necedah, Wis.  
CIRCLE 222

Clary Corp.  
San Gabriel, Calif.  
CIRCLE 225

Computer Power Inc.  
High Bridge, N.J.  
CIRCLE 228

Computer Power Planning  
Cherry Hill, N.J.  
CIRCLE 231

Computer Power Products  
Gardena, Calif.  
CIRCLE 234

Controlled Power Co.  
Troy, Mich.  
CIRCLE 202

Cyberex Inc.  
Mentor, Ohio  
CIRCLE 205

Deltron Inc.  
North Wales, Pa.  
CIRCLE 208

Displex Inc.  
Glen Cove, N.Y.  
CIRCLE 211

Electroguard  
Olean, N.Y.  
CIRCLE 214

Electronic Protection Devices Inc.  
Billerica, Mass.  
CIRCLE 217

Electronic Specialists  
Natick, Mass.  
CIRCLE 220

Elgar Corp.  
San Diego  
CIRCLE 223

Emergency Power Engineering Inc.  
Costa Mesa, Calif.  
CIRCLE 226

Emerson Electric Co.  
Santa Ana, Calif.  
CIRCLE 229

Energy Electronic Systems Inc.  
Timonium, Md.  
CIRCLE 232

Exide Electronics Corp.  
Raleigh, N.C.  
CIRCLE 235

General Interface Systems Inc.  
San Ramon, Calif.  
CIRCLE 203

General Power Systems  
Anaheim, Calif.  
CIRCLE 206

HDR Power Systems Inc.  
Columbus, Ohio  
CIRCLE 209

Hitran Corp.  
Flemington, N.J.  
CIRCLE 212

ICS Inc.  
Addison, Ill.  
CIRCLE 215

Imunelec Inc.  
Deer Park, N.Y.  
CIRCLE 218

International Power Machines Corp.  
Dallas  
CIRCLE 221

Isoreg Corp.  
Littleton, Mass.  
CIRCLE 224

Jefferson Electric  
Downers Grove, Ill.  
CIRCLE 227

Kalglo Electronic Co. Inc.  
Bethlehem, Pa.  
CIRCLE 230

K/W Control Systems  
Maintenance Service Inc.  
Farmingdale, N.Y.  
CIRCLE 233

LaMarche Manufacturing Co.  
Des Plaines, Ill.  
CIRCLE 236

for a predetermined period of years and restoration of uptime within so many minutes for each type of possible equipment malfunction. Only by being result oriented in this way is it possible to avoid being carried away by the sexier decision of what equipment to buy.

Ideally, a UPS system should be procured on a turnkey basis. Payments for equipment and maintenance could then be based on whether the guaranteed level of uptime is achieved. Under this approach, a single vendor would be responsible for systems engineering to optimize and interconnect each of the 11 subsystems. Other vendor duties would include providing appropriate levels of redundancy or isolation, avoiding or anticipating future problems, providing ways to bypass defective components,

and providing regular maintenance and testing without interruption or risk of disruption to the computer load.

This ideal situation, in which a factory-made UPS would come as a pre-fabricated package complete with a performance guarantee, is not the way of the dp world today. What happens now is that every UPS system is unique to its site. Much of the engineering is done by outside consultants or by manufacturers of the major components.

Based on plans and specifications, the low-bid contractor buys components from at least 15 different vendors, assembling them to construct the 11 subsystems. Assembly work is done on-site and usually under severe time pressure. Since each subsystem is one of a kind, previous experience can't be counted on

in the current effort. It's always a start-from-scratch operation.

Also, because each is a custom job, there can be no assurance that all the technical problems have been anticipated and that the subsystems actually will function as intended. Because of the time constraints and the custom nature of the work, there often is little or no quality control supervision. One can only hope that any undetected problems will become known before the site goes on-line.

#### **Uptime Performance Responsibility**

So, who is responsible for the UPS system's uptime performance? The consultants? The contractors? The 15 different component makers? Once these people are paid, they have no continuing

Lambda Electronics  
Melville, N.Y.  
CIRCLE 237

Laphone Inc.  
Walnut, Calif.  
CIRCLE 240

L.E.A. Dynatech Inc.  
Santa Fe Springs, Calif.  
CIRCLE 245

LorTec Power Systems Inc.  
Elyria, Ohio  
CIRCLE 248

Lumitrol  
Farmingdale, N.Y.  
CIRCLE 199

MAI Basic Four Inc.  
Tustin, Calif.  
CIRCLE 196

Mitsubishi Electric Sales America Inc.  
Mount Prospect, Ill.  
CIRCLE 193

Modern Power Technology Inc.  
Glendora, Calif.  
CIRCLE 190

Modular Power Corp.  
San Jose  
CIRCLE 187

MPL Power Systems Inc.  
Richmond, Va.  
CIRCLE 184

Nippon Electric Industry Co. Ltd.  
Los Altos, Calif.  
CIRCLE 181

Nova Electric Inc.  
Nutley, N.J.  
CIRCLE 178

Ohm Electronics  
Palatine, Ill.  
CIRCLE 175

Pacific Power Source Corp.  
Huntington Beach, Calif.  
CIRCLE 238

Para Systems Inc.  
Dallas  
CIRCLE 241

Perma Power Electronics Inc.  
Chicago  
CIRCLE 246

Power General Corp.  
Canton, Mass.  
CIRCLE 249

Precise Power Corp.  
Bradenton, Fla.  
CIRCLE 198

Ratelco Inc.  
Seattle  
CIRCLE 195

RTE Deltec Corp.  
San Diego  
CIRCLE 192

SAB Nife Inc.  
Lincoln, R.I.  
CIRCLE 189

Safe Power Systems Inc.  
Tempe, Ariz.  
CIRCLE 186

Shape Magnetronics Inc.  
Lombard, Ill.  
CIRCLE 183

Sola Electric/General Signal  
Elk Grove Village, Ill.  
CIRCLE 180

Solidstate Controls Inc.  
Columbus, Ohio  
CIRCLE 177

Staco Energy Products Co.  
Dayton, Ohio  
CIRCLE 174

Sun Research Inc.  
New Durham, N.H.  
CIRCLE 239

Sundanz World Trade  
Tucson, Ariz.  
CIRCLE 242

Superior Electric Co.  
Bristol, Conn.  
CIRCLE 247

Sutton Designs Inc.  
Ithaca, N.Y.  
CIRCLE 200

Technolinks Int'l Inc.  
Bristol, Conn.  
CIRCLE 197

Terado Corp.  
St. Paul  
CIRCLE 194

Topaz Inc.  
San Diego  
CIRCLE 191

Triad Power Systems  
Dallas  
CIRCLE 188

Ultimate Power Systems Inc.  
Costa Mesa, Calif.  
CIRCLE 185

Ulveco Electronics Inc.  
Foster City, Calif.  
CIRCLE 182

Upsystems  
Paramount, Calif.  
CIRCLE 179

Warren Communications  
Littleton, Mass.  
CIRCLE 176

## Keeping Up Your UPS

interest in whether or not the site runs in an uninterrupted fashion for five years. The answer is that downtime risk is ultimately borne by the user.

Another thing that should be determined early on is who will be responsible for maintaining and operating the UPS system once it is completed. Will best efforts be acceptable or will the level of up-

time actually achieved be measured and rewarded?

Operating responsibility usually ends up with the facility or building maintenance department—employees whose performance is typically measured by cost control. In contrast, one of the primary measures of the dp department's performance is the level of uptime

achieved. So, right from the start, there is strong potential for future conflict.

Whoever ends up operating the UPS system needs to be instructed that the highest priority is maximum uptime, not minimum cost. If maximum uptime results in added maintenance costs, which it will, these costs must be identified in advance and a joint facilities/data processing presentation must be made to upper management justifying the need for future budget outlays.

The critical leadership role played by top management in setting ground rules and in establishing future performance criteria cannot be overemphasized. What this leadership can add up to is downtime protection. In terms of numbers, a clear definition of responsibilities and the creation of checks and balances in the design process can be expected to eliminate, at a minimum, between one and two outages over a period of three operating years.

At first blush, eliminating one or two outages doesn't seem like much. But any outage risk that can be avoided becomes a central issue when the whole justification for the UPS system's existence lies in achieving uninterrupted computer operation over a five-year period. And attaining that goal is much easier said than done.

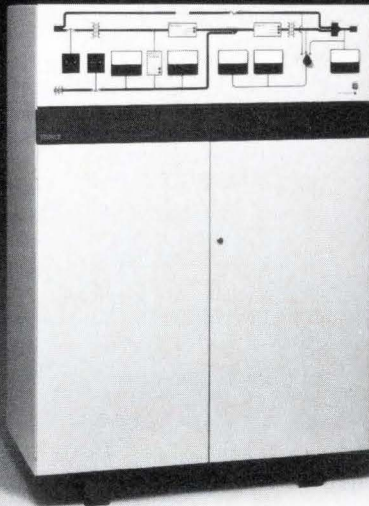
The reliability of power continuity provided by electric utilities in the continental U.S. is the envy of the rest of the world. If power quality problems such as transients, voltage sags, brownouts, single phasing, or momentary flickers are present, they are relatively simple and inexpensive to eliminate using a motor generator. Once power quality troubles are addressed, then the remaining continuity problems usually occur less than once or twice a year at most sites.

Improving on this level of reliability is a major engineering task. The failure of any of the UPS system components or their interconnections can easily offset any expected uptime benefits. As a result, the overall system reliability may not be much better than that provided for free by the local power company.

That's why careful planning is the key to successful implementation of an uninterruptible power supply system. Without that planning, you risk hard computer crashes that can bring upper management crashing down on your head. ■

*Kenneth Brill is president of Computer-site Engineering, a Cambridge, Mass., consulting firm.*

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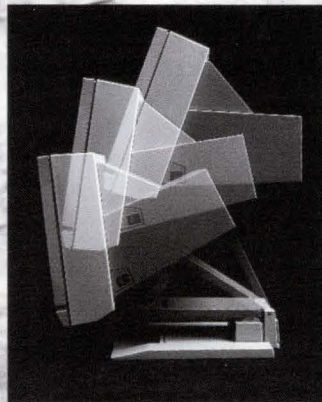
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There is no easy solution to the morale and productivity problems that tend to arise when a small staff is faced with the prospect of working night shifts, holidays, and weekends. In the following case study, the management of the corporate data center at Miles Laboratories arrived at a workable schedule that sought to address the human needs of computer operators. The key element of the 24-hour schedule involved changing from an arrangement based on three shifts of eight hours' duration to two lasting 12 hours. While all the results were not immediately rosy, the program eventually proved to be a success for everyone involved.

# Staffing Your 24-Hour Computer Center

BY MORRIS V. POLSTON

Computer operators need their sleep, like everyone else. But those MIS managers who are responsible for running a round-the-clock computer center seldom want to hear about it. The staffing of a vital, continuous, seven-days-a-week data center has no single elegant solution, especially when resources are limited.

Corporate computer centers become 24-hour operations for various reasons. In some cases, a round-the-clock effort is needed to maximize a large investment in computers. In others, it's required to meet the needs of an expanding user community. Four years ago, pharmaceutical maker Miles Laboratories Inc. in Elkhart, Ind., wanted to alleviate various problems in its full-time operation. Those of us in the corporate data center at Miles Labs had a strong commitment to humanize the operator shift schedules. While our initial results were not all rosy, we feel that, in the end, we produced a win-win solution for opera-

tors and management. Our program has improved productivity and staff morale.

The key element of our program involved changing over from three shifts of eight hours duration to two lasting 12 hours. With a staff of eight operators, we are able to keep two operators on duty for each weekday shift and one for each shift during the weekend.

Two factors were crucial to our success with this program. First, we told upper management that the change would be evolutionary, not revolutionary. Second, early on, we encouraged the operators themselves to get involved in the design of the program.

Contrary to the image represented in science fiction novels and Disney movies, computer operators locked up in the computer room fortress are ordinary human beings who prefer normal (8 a.m. to 5 p.m.) jobs. The personal isolation and the disruption of family life associated with night-shift work breeds high stress, dampens motivation, and adversely affects productivity. At their annual per-

## Staffing Your 24-Hour Computer Center

formance reviews, Miles Labs computer operators perennially voiced their discontent with shift work.

Accepting the fact that shift work could not be eliminated, we set out to improve it. Based on operator feedback, three criteria were selected to accomplish this goal. First, we wanted to minimize shift rotations and eliminate floater schedules. Second, we sought to develop a schedule that would ensure that operators had at least one weekend day off per week. Third, we also wanted to give operators a work schedule that would allow a minimum of three consecutive days off during the workweek.

The next step was to evaluate the many scheduling possibilities and to contact other computer centers providing continuous shift coverage. As a result of our inquiries, we found that other companies were also experiencing frustration in this area. The consensus was that no single elegant solution exists.

Armed with this information and a stack of scratch pads, we began to evaluate a number of different shift schedules. Many were rejected because they failed to meet the established goal. After numerous trials, we adopted a new schedule that met our original objectives and contained the following additional requirements:

- Eight full-time operators were required to cover the seven-day, 24-hour

continuous shift operation.

- Each operator would be required to work three 12½-hour days per week.
- Two operators would staff each shift, Monday through Friday.
- One operator would be assigned to cover the lighter weekend load.

The new schedule posed a drastic change from our standard eight-hour, three-shift arrangement. A number of administrative issues needed to be resolved before the new work schedule could be implemented. These issues fell into four major areas—salary administration, legalities, medical coverage, and payroll.

The new schedule raised several concerns regarding salary administration. For example, how should overtime and holiday pay be calculated when Saturday and Sunday are regularly scheduled workdays. Computation of vacation days based upon three 12½-hour workdays was another issue, as were meal and break periods for 12-hour shifts. We also had to decide how to calculate shift differential pay—that is, pay rates for the new shifts and for overtime.

The new schedule compelled us to review labor laws governing extended, 12-hour shift arrangements. And the longer shifts led us to require a medical review for all operators.

We also found we had to establish a new reporting procedure for exception

hours (those falling outside the company's standard 8-to-5 schedule) to cover the unique working hours of the new schedule. In addition, we had to convert the 40-hour base pay rate to the new schedule hours.

Once these issues were ironed out, a six-month trial was launched. The early results of the trial were not all rosy. Operator performance and fatigue levels were monitored very closely, with the finding that fatigue became a factor after three consecutive 12-hour days. This was the case when operators had to be called in to work extra shifts due either to illness, emergencies, or vacations.

Additionally, some operators exploited their newfound freedom by pursuing a strenuous schedule of off-duty activities, which began to affect performance and productivity. A status review meeting with operators was called to resolve this issue. It was discovered that the operators' heaviest workload fell on the last half of their shift, when fatigue levels were highest. Starting hours were changed to correct this condition. After a look at scheduled breaks, we found that shorter, more frequent rest periods were preferable to longer ones.

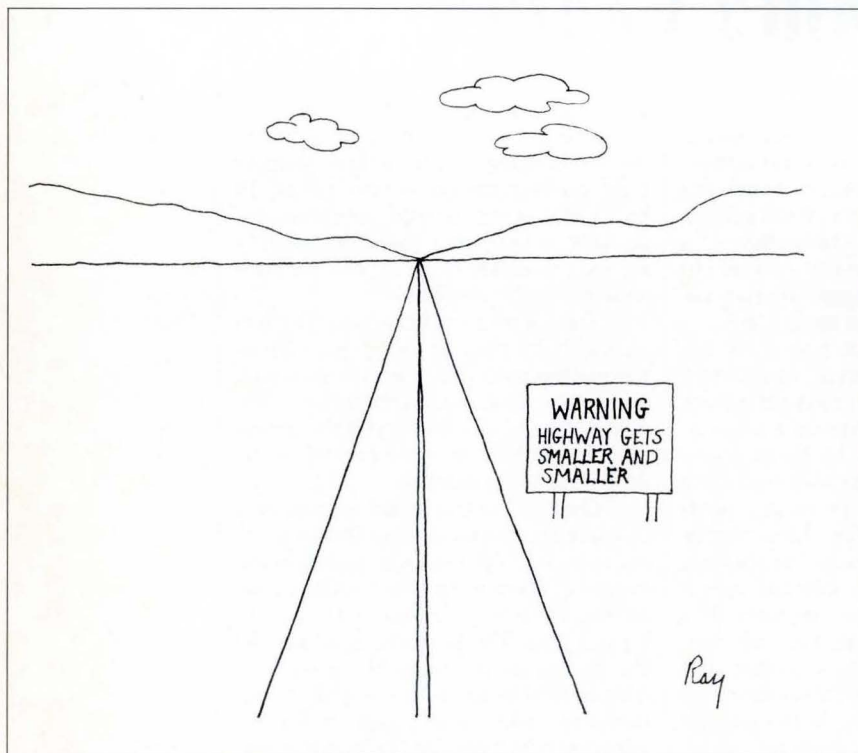
At the end of the trial period, operators and management unanimously chose to continue the 12-hour, three-day work schedule. Management's bottom-line benefits were

- the elimination of one complete shift change,
- a reduction in operator overtime and personal time off,
- the improved continuity and productivity of operations, and
- the additional recruitment incentive.

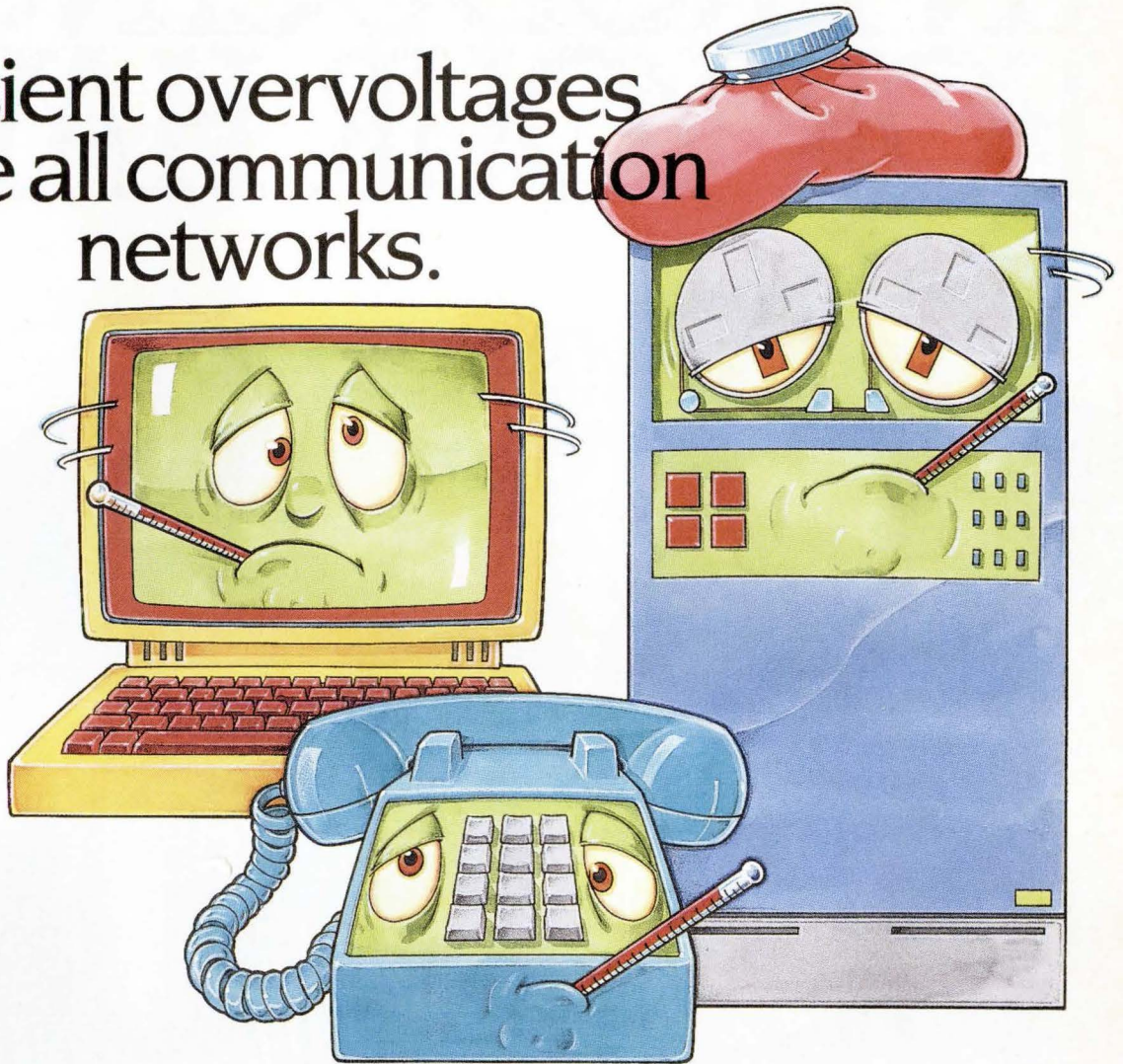
Proper preparation and justification of the 24-hour concept to management is a critical point in the successful installation of a continuous shift operation. It is essential that the changeover be presented as an evolutionary necessity, rather than as a revolutionary alternative. Operators must also be involved early in the discussions and understand that they have the freedom to recommend alternatives.

Our 12-hour schedule has now been in effect for four years and has created a win-win situation for our installation. The results were best stated by our lead operator: "I would prefer a permanent day shift, but this isn't bad—in fact, it's a whole lot better." ■

*Morris V. Polston is manager of the corporate data center at Miles Laboratories Inc., Elkhart, Indiana.*



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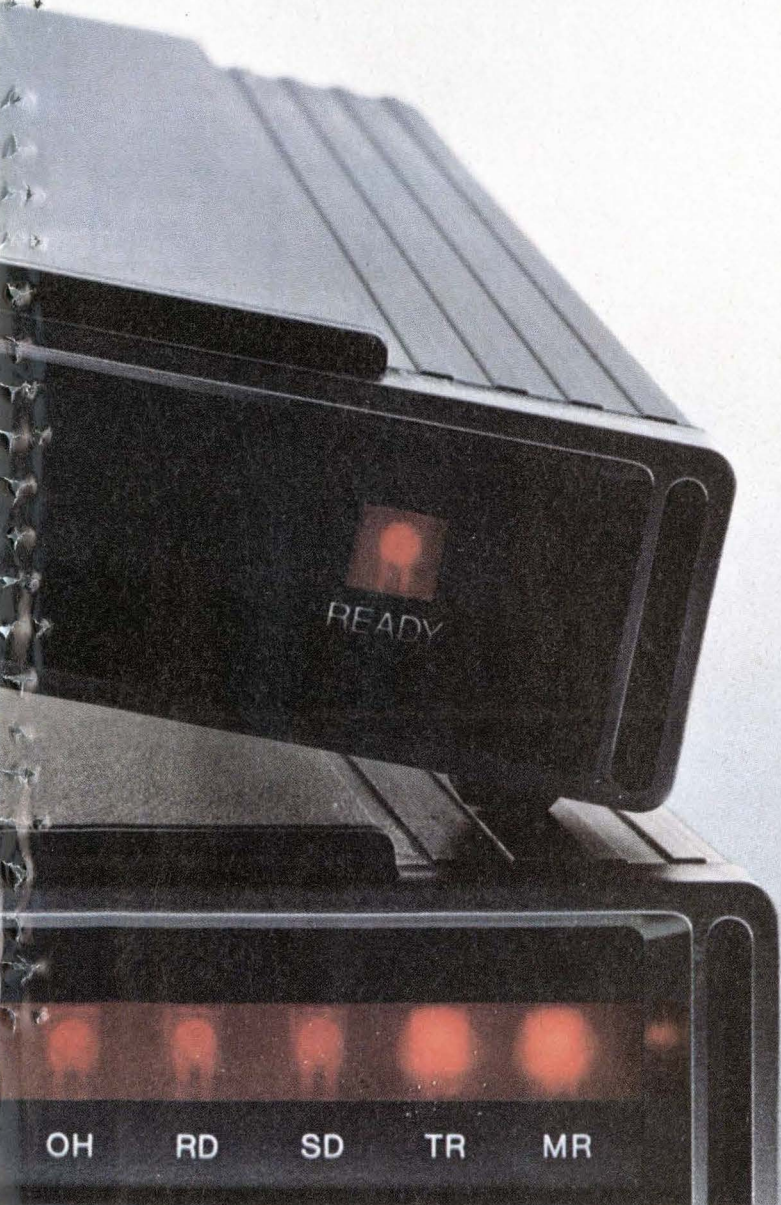
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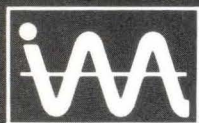
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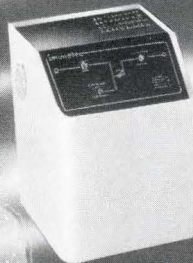
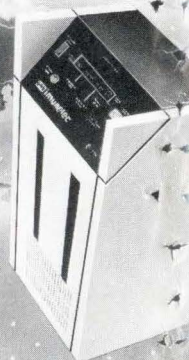
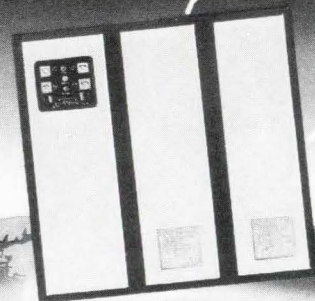
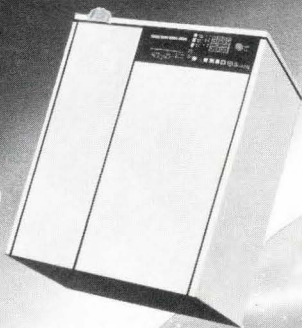
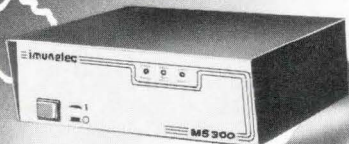
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CIRCLE 37 ON READER CARD

# Seven Ways To Cut Software Maintenance Costs

BY RAND P. HALL

Today's corporate users are spending too much time on software maintenance and not enough time devising ways to decrease the amount of maintenance that is needed. Some estimates place up to half of the total cost of computing—including hardware, software, and personnel—as being either directly or indirectly devoted to the maintenance process. Maintenance consumes up to three quarters of the total software life-cycle cost, and thus claims considerable resources that could be better used in application software development. The typical corporate application development backlog is as much as *four years*.

These high costs mean that tremendous savings are attainable by trimming the time spent on maintenance. If maintenance does in fact consume three quarters of the corporate programming effort, then reducing maintenance by one third will double the amount of time available for development. The maintenance task can be lessened by implementing strategies that focus on ways to reduce the total amount of maintenance performed.

The software maintenance process modifies existing operational software while leaving its primary functions intact. This maintenance can take many forms. Corrective maintenance remedies failures in the implementation of the system design. Perfective maintenance enhances the software by making it more efficient or more maintainable. Adaptive maintenance adapts the software to environmental changes such as new hardware or new data types. Finally, functional maintenance (sometimes called change maintenance) changes the function of the software by adding or deleting features.

There are three stages in the performance of software maintenance. First, the programmer must understand the requested change and the software that is to be changed. Second, the programmer must make the necessary changes. Finally, the software must be

revalidated to ensure that it works as it is expected to.

Unfortunately, software is difficult to maintain because those three stages are difficult to perform on yesterday's software. When the code is unstructured, it's difficult to intertwine your own modification. It's next to impossible to revalidate the software if you can't figure out what it was supposed to do in the first place.

The seven strategies described below are grouped into four different areas: strategies for maintaining existing systems, strategies for developing future systems, a strategy for managing maintenance personnel, and a strategy for managing software.

The obvious place to start maintenance reductions is in existing systems. Existing systems are not always candidates for near-term replacement, of course, which means they will be in production for at least the short term and will need continuing maintenance. The key to the maintenance of existing systems lies in making quality modifications that will lead to easier maintenance in the future.



*Strategy 1: improve existing documentation on existing systems.* According to some estimates, maintenance programmers spend between 47% and 62% of their time attempting to understand the documentation and the logic of programs. This is such an overwhelming problem that 80% of the Fortune 500 corporations have applications supported by specialists because only they understand the applications' logic.

Documentation is one of the most important tools available to assist programmers in understanding a system, but it has been a low priority among maintenance programmers as well as developers. Even when documentation was written, most often it was in terms of

**Corporate MIS departments can reap big benefits by trimming the time and money spent on software maintenance. Reducing maintenance means more resources available for development. The maintenance effort can be lessened by implementing a series of specific strategies at all stages of software operations: existing systems, future systems, personnel, and the development process itself. These strategies, which ease the economic burden on the corporation, primarily attempt to reduce the total amount of maintenance that MIS must perform. They introduce structure and reliability into the design process and elevate maintenance to its proper role of protecting software assets.**

## Seven Ways To Cut Software Maintenance

what had been done, not why or how it was done. This has had a ripple effect. A maintainer makes an undocumented change, then the next programmer comes in and must figure out what that change did. Distrusting the documentation, programmers try to interpret the scrambled source code to understand the system, if only because code doesn't lie.

Simply making an effort to improve system documentation can yield many benefits. The documenting of systems can provide information that later will be valuable in determining which application's structure has decayed enough to warrant writing. Most important, though, the documenting of systems will provide future maintainers with the tools necessary to implement quality modifications. They will be able to understand quickly how to make the changes and will be able to foresee side effects of those changes before they make them.



*Strategy 2: when maintaining existing systems, minimize corrective and perfective modifications by making quality corrections.*

The quick fix is the most structurally detrimental practice continuing today. The most prolific quick fixers are developers, who want to solve the problem as fast as possible so they can get back to development. But patches, especially when they are piled on top of other patches, create unstable systems that can never be the bases for progress.

There should be a maintenance axiom: bug fixes beget bugs. Every time you make a program modification there is a great chance of introducing more bugs. Most often, this is because corrective modifications are made hastily and in no particular order. An effort must be made to make quality corrections. Thoughtfully implemented modifications are bound to have fewer errors.

It is widely acknowledged that by fixing the most troublesome problems first, you'll avoid many more problems in the future. Some analysts suggest that by correcting the worst 20% of any code you may also be correcting 80% of future problems.

Quality corrections can also improve user relations. Users know what to expect from their systems, both good and bad. Introducing an ill-conceived patch into a system can elicit user unrest.

Software maintenance modifications should be issued in groups. Combining maintenance requests into groups for release allows change to be implemented in an orderly fashion while also allowing for more detailed problem analysis, coding, and testing.

These groupings will often alert programmers to the global impact that the problems have on the system instead of just on some portion of it. Testing time will be greatly reduced because all the modifications can be checked at once. This process should, over time, improve the reliability of the software.



*Strategy 3: plan, control, and minimize change maintenance on existing systems.*

The largest portion of the maintenance dollar goes to change maintenance, which alters the function of the system. Change maintenance is often the product of users' overactive imaginations, the result being poorly planned requests. Users often don't realize the economic impact of their change maintenance requests. The best way to reduce change maintenance is by planning and controlling user-initiated enhancements.

User enhancements can best be controlled by letting the users weigh the cost versus the benefit of each change. Most users are free to submit change requests at will, without regard for their economic impact. A maintenance chargeback system can communicate to users that their requests cost money to implement. A chargeback system encourages users to do cost/benefit analysis and be economical in their demands on the system. Ultimately, this will result in lower maintenance costs and modifications that users really need.

Management must also plan and control change maintenance. It needs to decide which modifications would be most profitable. For example, old systems that are going to be replaced soon will benefit little from change maintenance, whereas old systems that aren't scheduled to be retired for some time, or at all, are prime candidates for change maintenance.

The key to reducing long-term future software maintenance lies in developing preventive measures and practicing them. With this in mind, we'll now look at strategies for developing future systems.



*Strategy 4: when developing future systems, select and enforce structured design and programming techniques.*

It has been conservatively estimated that development using structured design methodologies will produce software that is twice as easy to maintain as today's. The key areas involved in improving the maintainability of software are designing for future change and standardizing the design and programming process.

Designing systems with modification in mind will provide the maintenance programmer with the means to effect quality modifications in a minimum amount of time. The adaptive maintenance effort can be cut by including possible future migrations in the design. For example, by isolating environmentally dependent (hardware, software) routines you have only one set of modules that will need modification if the application is moved to another environment.

Much corrective and perfective maintenance can likewise be eliminated by complying with a set of standard design and programming methodologies. If all design was done using, let's say, Warnier's Logical Construction of Programs technique (LCP), each design could be maintained easily by anyone who knows LCP. Since all applications are developed with the same thought process and since all documentation is in a standard format, modifications are easier to effect because the early effort to understand the system is reduced. Structured design and programming methodologies also produce systems with minimized system and program complexity, which will lead to fewer programming errors.



*Strategy 5: embrace the saviors of software maintenance—fourth generation languages and application generators.*

The next recommended strategy is simple. There appears to be a maintenance savior on the horizon. As use of application generators and fourth generation languages becomes more prevalent, maintenance costs will be drastically reduced.

Application generators/4GLs may

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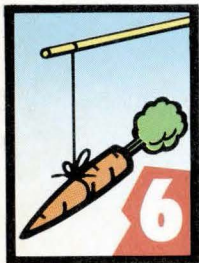


## Seven Ways To Cut Software Maintenance

ease maintenance in several areas and will all but eliminate corrective modifications because their code generators are supposed to produce error-free code. Enhancement modifications are much easier to perform on systems generated with application generators/4GLs. They are readily extensible because enhancements only involve changing the system specifications, not the source code. Adaptive maintenance will surely benefit from the use of application generators/4GLs. Because all of the environmentally dependent routines are in the application generators/4GLs, system specifications can be moved to other environments in which the unmodified application generators/4GLs also have been implemented.

Application generators/4GLs have some other interesting maintenance-related characteristics. By using application generators/4GLs, designers and programmers are forced to conform to a standard methodology. Therefore, application generators/4GLs will make specifications easy to verify. Documentation can also be automatically generated by application generators/4GLs, which will provide further assistance toward enhancing the maintainer's ability to understand the system.

Application generators/4GLs can also help developers improve relations with users. Application generators/4GLs give the developer the opportunity to provide a quick prototype, which can be used to elicit more exact specifications of what users really want in the application. This will decrease the amount of enhancement modifications in the future. There is one caveat here: it is essential that management exerts control over application development with application generators/4GLs, because it is so easy to create unwieldy applications via "seat of the pants" development.



*Strategy 6: provide maintenance personnel with a light at the end of the tunnel by giving them the proper tools and incentives to stay on the job.* Most information systems professionals view maintenance in the following ways: as intellectually and technically difficult; unfair (necessary information to do the job is missing); a no-win situation (people will only come back with more problems); a dead-end job (no noticeable

progress); and not on the technological cutting edge. These negative views, which in some cases are deserved, play an integral role in the high turnover rate among maintenance personnel. High turnover, of course, diminishes the staff's ability to produce, and hence reduces profitability. To keep maintenance personnel, management must provide a light at the end of the tunnel—that is, it must instill in maintenance programmers the incentive to stay with the department.

One way to get programmers to stay is to provide them with the tools necessary to do their work. Most programmers spend half their careers in, or in the management of, maintenance, yet few are ever trained for this task. Maintenance programmers need to be taught

### USERS ARE SPENDING TOO MUCH TIME ON SOFTWARE MAINTENANCE.

how to maintain systems. They must also be trained in the technology that is being used to develop new systems, in order to enable these systems to be maintained after being put into production.

Another way to combat turnover is to introduce change into the maintenance function. There is a high correlation between experience with a system and the ability to maintain it. Therefore, the best way to maintain a system is to have a resident expert for that system. This can be accomplished by using some form of a "maintenance escort" policy. An escort policy involves having a member of the development team "escort" the application into maintenance. The escorting developer stays with the system until the maintenance staff feels comfortable with it. In the interim (it is hoped that this would be a long cycle, with most of the staff involved), a member of the maintenance team could be freed to work in the development area. This change should provide the needed stimulus to retain maintainers.



*Strategy 7: treat software as a corporate asset.* Dp/MIS execs typically spend only 1% of their time addressing maintenance needs, yet they spend 30% of their time addressing the needs of new

applications. Dp/MIS managers are generally more interested in getting their applications off the ground and receiving pats on their backs than in looking two to three years ahead in anticipation of maintenance problems. If management were not so shortsighted, it could save a lot of money.

Software is valued at between \$5 and \$50 per line of source code. Yet only lately has management realized that software is a corporate asset. Until now, software was considered an expense item and maintenance was mostly considered a negative on a company's balance sheet.

But maintenance is not always negative. While it cannot be used to produce profit, maintenance can be essential to preserving profits. It can be used strategically to prevent major losses by avoiding the risk of failure in development efforts, and by delaying expensive re-development.

Maintenance is now beginning to mature only because companies have recognized software as an asset. This recognition necessitates a change in software management. As with any other asset, you must know what you have, where it is, and how it performs, and you must evaluate its performance and prioritize any change with respect to return on investment. This implies that software managers must plan, organize, and control their asset inventory to achieve maximum benefit to the company.

If companies are to stay profitable and competitive, they must manage software in a cost-effective manner. The strategies described form the basis of profitable software asset maintenance. They introduce structure and reliability into the design process and elevate maintenance to its proper role of software asset protection. ■

*Rand P. Hall is director of academic computing at Merrimack College, North Andover, Mass.*

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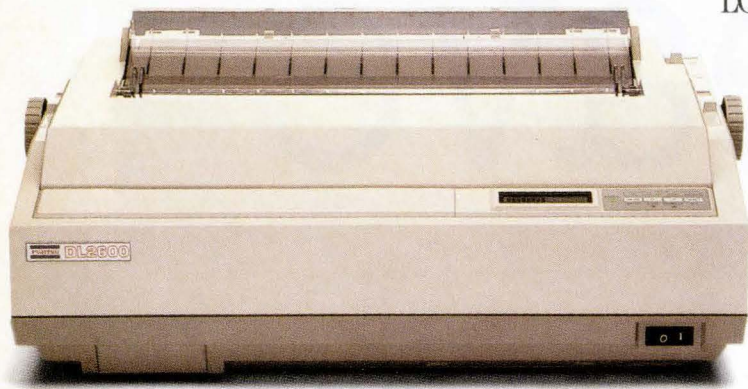
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# Real Time

## OFF-LINE

THE ADVENT OF NETWORKED pcs has caused considerable activity in the communications arena. Personal computers are incorporating more and more capabilities, turning the machines into personal communications centers. Electronic mail is becoming standard with most word processing software packages and facsimile devices are beginning to be built right into personal computers.

OAZ Communications, a Newport Beach, Calif.-based startup, recently introduced a product called Xafax, which is an add-on board for IBM PCs and compatibles that combines facsimile, electronic mail (e-mail), and telex capabilities, as well as an SCSI for a scanner.

OAZ is pushing a new term, "d-mail," referring to document mail. D-mail is different from e-mail in that it is graphics based; e-mail is only text based. With Xafax, a user can receive, create, edit, store, and transmit any document composed of any combination of images and words. The first release of Xafax, available in mid-July, will support Lotus 1-2-3 and Symphony, MultiMate, WordStar, WordPerfect, and Displaywrite. In August, support for Venture and Dr. Halo graphics will be added. Xafax is priced at \$1,195.

Ajay Batheja, president and ceo of OAZ, sees his product as the third generation of the emerging PC fax market. The first generation of products, which came out in late 1985, converted a personal computer into a fax machine, tying up the machine so the user could not perform other tasks. The first such product on the market was GammaFax, from GammaLink, Palo Alto. The second generation, says Batheja, introduced in 1986, allowed the PC to transmit or receive facsimiles in background mode, but required the PC's cpu to convert the message to fax protocols and compress/decompress the data for transmission or reception. Third generation PC fax boards handle facsimiles in a "true" background mode, says Batheja. This means they operate on an independent co-processor with its own operating system, enabling the PC user to run other software programs during fax transmissions.

Asher Technologies Inc., Roswell, Ga., recently introduced a slower (4,800 baud versus 9,600 for Xafax) board at a much lower price (\$395), and also rolled out a unit for portable PCs (\$199). Some other PC fax manufacturers include Datacopy in Mountain View, Calif., Panasonic in Secaucus, N.J., and Sharp Electronics in Mahwah, N.J.

## HARDWARE



IBM hopes to bridge the gap between its midrange and high-end systems.

## Big Blue Debuts Five New Models

Four new 4381s and an entry-level processor for high-end 3090 E.

BY THERESA BARRY

Hoping to carve a growth path from its midrange System/370s up to its high-end 3090 Model 600E, IBM has introduced five new computers: four 4381 processors and an entry-level processor for the 3090 E series.

The new 4381s are the models 21, 22, 23, and 24, which are said to offer performance improvements of up to 30% over current 4381 models. The 24 is a dual-processor model, the others are uniprocessor models. Memory capacity on the 23 and 24 has been doubled to 64MB from 32MB. This was achieved through IBM's newest 1Mb memory chip, which IBM claims takes 80ns to access stored data. Models 21, 23, and 24 have additional 3MBps channels. A serial original equipment manufacturer interface (SOEMI), which allows users to connect the 4381 with oem subsystems, is incorporated in all models. The new 4381s are supported by all IBM System/370 operating systems.

The 4381 family now consists of

eight models, providing, IBM says, up to a sixfold range of performance from the low-end Model 11 to the high-end Model 24. The Model 21 is priced at \$225,000, the Model 22 is \$350,000, the Model 23 is \$530,000, and the Model 24 is \$890,000. All will be available in the first quarter of 1988. A special installation option is being offered, which IBM says will save customers from \$20,000 to \$75,000 on the total price. Upgrades between models will be available in the second quarter of 1988.

The new 3090 E mainframe is the entry-level Model 120E. A uniprocessor, the 120E is said to have an instruction execution rate about 70% to 80% as powerful as the next largest 3090, the 150E. It uses 1Mb memory technology and thermal conduction module, and supports 32MB of central storage, with options of either 64MB or 128MB of expanded storage. There are 16 standard channels, with an additional eight available, all operating at 3MBps. IBM says the 120E is field upgradable to the 150E. An optional vector facility is said to provide vector

performance of from two to six times its scalar performance.

The 120E will be available in October and is priced at \$985,000. IBM, Information Systems Group, Rye Brook, N.Y. **CIRCLE 250**

## High-Capacity Subsystem

System Industries unveils system with 1.1GB capacity.

System Industries Inc., which says it is moving away from being solely a supplier of drive subsystems in order to become a "full solution" supplier, has introduced a family of data storage solutions based on its new SI93 C-Series disk drives. The C-Series (C stands for compatible) technology converts the SMD interface of large capacity, high-performance disk drives to Digital Equipment Corp.'s SDI (Standard Drive Interface). The drives feature 1.1GB of unformatted capacity in a half-rack design. The SI93C's average seek time is 15msecs. Formatted capacity for each is 844Mb, and the peak rate of data transfer is 2.46Mbps.

Depending on the configuration, the SI93C family ranges in price from \$48,000 to \$56,000. SYSTEM INDUSTRIES, Milpitas, Calif. **CIRCLE 251**

## Desktop Plotter

Fujitsu enters business plotter market with six-pen model.

The ImageGraph six-pen desktop color plotter for A- (8½ by 11 inches) and B-size (11 by 17 inches) business graphics and technical applications was introduced recently by Fujitsu. It's fully compatible with Hewlett-Packard's 7475A model. It executes Hewlett-Packard Graphic Language (HP/GL), making it compatible with popular graphics software packages. ImageGraph features both a Centronics parallel and RS232C serial port.

The plotter's six pens come in fine and medium-tip widths. Other features include on-line/off-line capabilities, .25mm per step resolution, 0.1mm repeatability using the same pen, a 6KB input buffer, and a top pen speed of 10 inches per second.

The unit occupies half as much desktop space as Hewlett-Packard's offering and weighs 10 pounds. It is priced at \$1,200. Fujitsu offers a one-year warranty and a toll-free service number for customers; both are features of its Fujitsu Customer Service of America

(FCSA). The plotter was developed at Fujitsu and all parts are manufactured in Japan. FUJITSU COMPONENT OF AMERICA, Santa Clara. **CIRCLE 252**

## LAN Package

Quadram introduces prepackaged, easy-to-install LAN kit.

QuadStar is Quadram's new Starlan local area network. The initial offering of the package is the QuadStarter Kit for first-time installations. The kit includes a QS-100 half-card adapter, a QS-PH6 personal hub card adapter with six ports, 50 feet of cable, Torus's icon-based Tapestry network operating system and manuals, an audio guide to networking, and various illustration maps and manuals. QuadStar has a data transfer rate of 1Mbps and is compatible with the IBM PC, XT, AT, and compatibles, and the IBM PS/2. The price of the package is \$1,095. QUADRAM, Norcross, Ga. **CIRCLE 253**

## Korean Clones

Swiss-owned company enters micro market.

Delta Computer Corp., a U.S. startup and member of Swiss-based Inspectorate International Group of Companies, recently rolled out its first product, a line of "unwrap-and-run" IBM PC-compatible micros. The Model TX is an 8088-2 machine and the Model A is an 80286 machine. The computers are manufactured to Delta specifications by Samsung Semiconductor and Telecommunications Co. of South Korea.

The Delta TX is IBM XT-compatible and comes with 640KB of RAM, two 5¼-inch disk drives, a 12-inch monochrome monitor, six full-sized expansion slots, Delta Connection integrated software, and a Hercules-compatible monochrome/graphics card. The price is



\$1,095 with a monochrome monitor, \$1,395 with a color monitor, and \$1,595 for a 20MB hard drive system.

The Delta A is IBM AT-compatible and includes a 12-inch flat-screen monochrome monitor on a swivel base, Connection software, and MGA monochrome/graphics card. It's priced at \$1,995. The computers are to be sold through dealer channels exclusively. DELTA COMPUTER CORP., Mansfield, Mass. **CIRCLE 254**

## Terminal with a Twist

Link offers ergonomic general purpose display terminal.

The MC10 is Link Technologies' newest terminal for the ASCII and ANSI environments and for vertical market applications. Link says it's particularly suited for simultaneous connection to multiple hosts using different protocols.

The terminal features a tilt, swivel, and elevate design that enables users to control the position of the unit. It incorporates two design elements for which Link has applied for patents: a clutch-and-pivot mechanism for easier adjustment, and an articulated extension arm based on a double parallelogram-based design. An optional graphics package provides all-points-addressable display resolution of 720 by 348 pixels. Two user-installable cartridge options are offered. One attaches to the keyboard and contains the operating program for the terminal. Keyboards available include DEC VT 220 and Link 125.

The second cartridge is located at the rear base of the unit, which allows users to install graphics, serial or parallel communications packages, a light pen, bar code reader, or mouse. A 14-inch flat panel crt display is available in green, amber, or soft white, and features four display windows. Other features are 10 by 16 character-cell resolution, a stopwatch, calendar, rolodex, calculator, and ASCII chart.

The MC10 is available now and is priced at \$595. LINK TECHNOLOGIES INC., Fremont, Calif. **CIRCLE 256**

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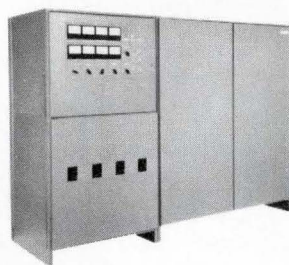
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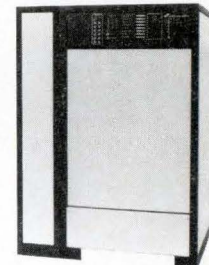
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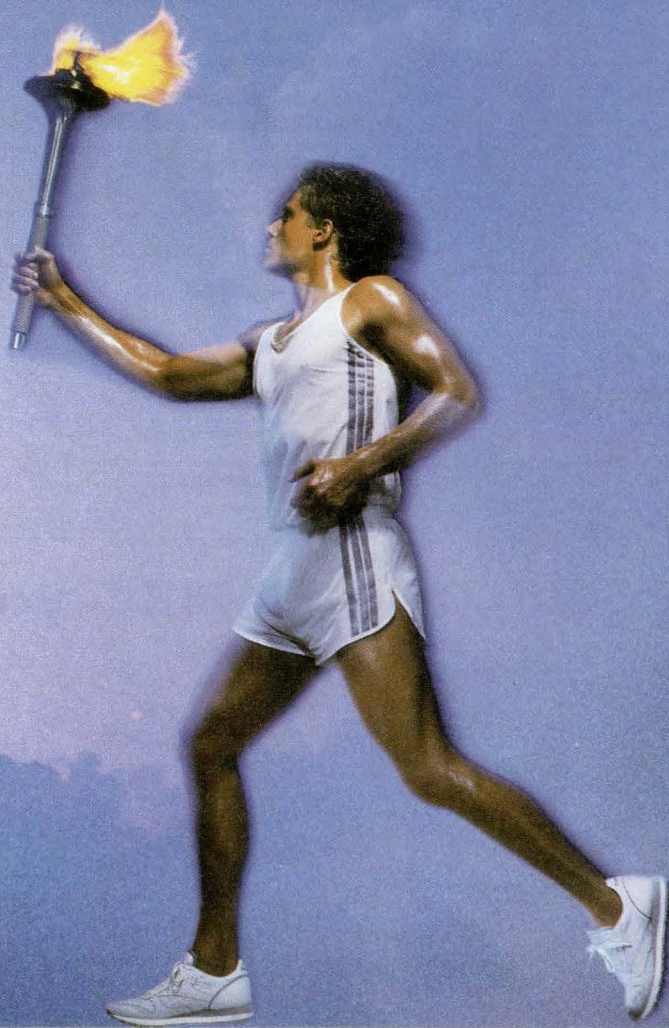


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CIRCLE 43 ON READER CARD

## UPDATES

IBM'S LATEST SERVICE pricing strategy, the Corporate Service Amendment (CSA), introduced early this year, has spurred a number of competitors to announce new service programs.

IBM's new strategy "places a great deal of responsibility on the customer," says William J. Patch, vice president of marketing and planning at Frazer, Pa.-based Sorbus, a leading computer maintenance company. To emphasize his point, Patch notes that the word "must" appears 28 times in one IBM service contract. "Customers are too well informed these days to allow themselves to be locked into things," Patch adds.

Sorbus's new program, called the Sorbus Challenge, provides what Patch calls the oldest idea in marketing—a money-back guarantee. The 90-day guarantee is for IBM 4381 users. Sorbus is also set to offer a discount for users with a help desk and is working on some alliances with software vendors so they can offer one contact for both hardware and software maintenance. "Our new program was in progress weeks before IBM made any price changes" to its CSA program, says Patch.

Another leading service organization for IBM mainframe equipment, Control Data Engineering Service Division of Minneapolis, announced a new service offering that features a discount that is 10% below the cost of IBM's CSA. The program also offers a 24-hour service, seven days a week, and, like IBM's CSA, requires users to have a help desk. Unlike Sorbus, Control Data Corp. (CDC) makes no bones about the fact that its plan came about as a direct result of IBM's revamped CSA. "Our goal is to offer services competitive with IBM on price, to take the hassle out of certification, and to return flexibility to the user," says Jim Paster, CDC's marketing manager for the IBM business segment. Paster points out that CDC's certification test has 30 questions, compared with IBM's, which has 369. He adds that Sorbus's 90-day, money-back guarantee is a "unique approach," but one that CDC has not considered.

IBM offers customers a one-, three-, or five-year CSA contract. CDC offers customers a one-year contract, with an option to renew for one year under the same terms as the first year. Sorbus recently began offering discounts to customers who sign up for two years.

## SOFTWARE

# IBM Enhances and Adds to Software Families

## Including new releases of DB2 and SQL and two new SolutionPacs.

BY THERESA BARRY

IBM has announced a series of enhancements for existing software products, as well as two new SolutionPac offerings.

The new releases are of Database 2 (DB2), Structured Query Language/Data System (SQL/DS), Query Management Facility (QMF), and Data Extract. Enhancements of DB2, release 3, and SQL/DS, version 2, release 1, for MVS/XA and MVS/370 environments include the following: support for date, time, and time stamp; enhanced American National Standard SQL compatibility support; improved integration with other hardware and software; and improvements in data recovery. Both are available now. The initial license charge for DB2 is \$16,050, and the monthly license charge is \$2,675. SQL/DS has a monthly charge of \$725.

QMF, version 2, release 2, includes support for the transfer of data into and out of QMF in the Integration Exchange Format (IXF). Monthly license charges range from \$1,250 to \$1,500.

Data Extract (DXT), version 2, release 2, includes support for new DB2 and SQL/DS-VM data types, enhanced End User Dialogs administration facilities, and full Boolean logic support for extracts from nonrelational data. It's available now, and a graduated one-time charge for a 10-processor group is \$3,600.

Some additional productivity tools that were unveiled are the Database Relational Application Directory (DBRAD), which provides an application directory and integrated interactive environment for relational application development and database administration. Available in the third quarter of this year, it's priced at \$14,000 for MVS; graduated pricing for VM starts at \$3,500. A DB2/VSAM Transparency program, which allows data stored in DB2 tables to be accessed as if they were stored in VSAM data files, is priced at \$11,000 and will be available in March '88.

The first new SolutionPac of-

fered is the Database Application Development package, which provides productivity software and expanded support services such as on-site education and consulting, and remote support. It will be available this October. The MVS version is \$74,200, and the VM/VSE version is \$72,200.

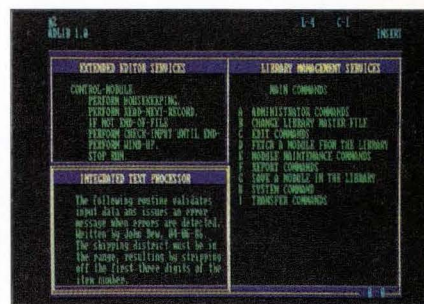
The second new SolutionPac is VSE/MVS Migration Assistant for customers migrating to MVS/XA from VSE. It provides on-site services with the MVS Migration System. It will be available in November. IBM, Information Systems Group, Rye Brook, N.Y. **CIRCLE 258**

## Development Tool

ADR announces tool for mainframes, micros, and LANs.

ADR/ADLIB is a new program development tool from Applied Data Research. The company says the tool allows programmers to select sections of a mainframe program, bring them into a local environment, work on them, and return just the changed code to the mainframe. The product provides a "self-contained" development environment for the micro or LAN, and it supports IBM's TSO and ADR's Roscoe, Vollie, and Librarian mainframe environments.

ADLIB provides editing, library management of source and object code, transparent mainframe access, and remote job entry capabilities. The program controls retrieval and editing, so that only one user can access a program at a time. ADLIB's editor can be used for source code manipulation and text edit-



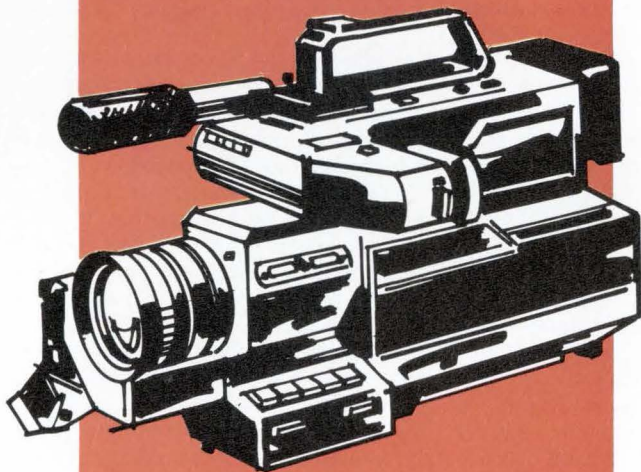
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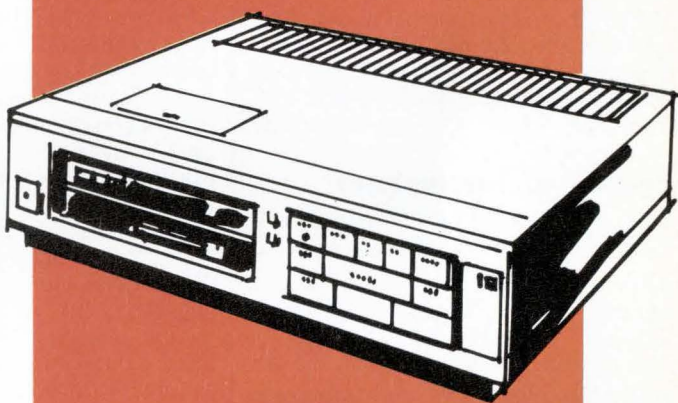
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3. To qualify, you **MUST** be engaged in information processing, supervising or managing MIS/DP personnel, or setting standards for selection of information

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4. Contest void where prohibited or taxed by law. Liability for any taxes on prizes is the sole responsibility of the winners.
5. Entries that most closely match the rank selected by *Datamation* readers will be declared winners.
6. Entry cards must be postmarked before September 19, 1987.
7. In case of a tie, the earlier postmark will determine the winner. Decisions of the contest judges will be final.
8. In the event that a prize is not available, the publisher may substitute an alternative prize of equal value without prior notice.

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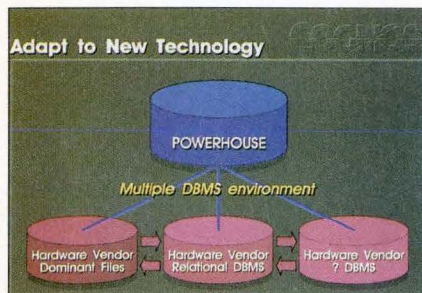
ing, and documents can be produced with it. Up to 1,000 program versions can be saved without storing multiple copies, up to seven files can be transferred concurrently between a mainframe and a micro, and up to six simultaneously active workspaces in up to 390 windows can be accessed.

The program can be purchased independently of other ADR mainframe products and a single copy is \$495. ADLIB runs on an IBM PC, XT, AT, or 3270 PC with 350KB of available memory, and it requires PC/DOS 2.0 or higher. ADLIB also supports IBM's Token Ring Network and PC Net. APPLIED DATA RESEARCH INC., Princeton, N.J. CIRCLE 259

## Application Development

New version of PowerHouse from Cognos features Digital support.

PowerHouse 5.04 is Cognos's newest version of its application development language. Originally supported only on the HP 3000 line of computers, the lan-



guage now supports Data General's relational database DG/SQL and, with this release, Digital's relational database, Rdb/VMS.

A new PowerHouse Dictionary allows users to access Digital Rdb/VMS and RMS file structures and data, so that the data can be manipulated using PowerHouse within an operation, regardless of whether it was created on RMS or Rdb, claims Cognos. Graphics have been embedded in the program, so that graphs can be routed to graphics devices. Other enhancements include a terminal handler that supports on-line entry editing, single-line entry recall, and field-full signaling. PowerHouse supports files that have variable-length records and provides 31-character entity names and 256-byte character strings for system file names. The price for PowerHouse 5.04 varies depending on the configuration. For a MicroVAX II, the price for a base configuration is \$9,500; for a VAX 750, the

price is \$27,025; and for a VAX 8800, the price is \$93,500. COGNOS INC., Ottawa, Ont. CIRCLE 260

## Project Management

Metier introduces first two PC-based packages in planned series.

Metier Management Systems, a subsidiary of Lockheed Corp., recently announced the first two packages in a family of PC-based project management software programs. Artemis Project and Artemis Link will be available in the third quarter of '87.

Artemis Project is a project management program for the XT and AT. It includes window-based network editing, which allows users to view a network and the descriptive information associated with each activity. Other features of Artemis Project include the following: pull-down menus and pop-up submenus; 400 help screens; a calendar editor that permits graphic input of project work patterns and calendar status data; resource scheduling, forecasting, and monitoring features; critical path what-if calculations; over 50 standard reports and graphs; and user-defined selection and sorting criteria options with standard defaults. The program features project tracking by both precedence-diagram and arrow-diagram methods. It also allows data export to Lotus 1-2-3 and Symphony spreadsheets and to other DIF software.

Artemis Link is communications software for data transfer from PCs to Artemis minicomputers and mainframes. It's currently compatible with IBM 3270 and Hewlett-Packard communications protocols and DCA Irma hardware. It provides color screen support and works

with IBM's EGA for graphic presentation formats.

The average price for Artemis Project is between \$2,500 and \$3,000; large volume pricing discounts are available. Artemis Link is \$300. METIER MANAGEMENT SYSTEMS, Houston. CIRCLE 262

## File Transfer and Retrieval

On-Line makes two packages available on IBM S/36 PC 5364.

Omnalink/36 and ExecuTrieve/36 from On-Line Software International are now available on the IBM System/36 PC 5364, a multiuser machine that supports up to 16 workstations simultaneously.

Omnalink is a file transfer link package that allows bidirectional data transfer between the IBM S/36 PC 5364 and an IBM PC or compatible. The data selection and extraction feature selects data at the field level that can be sorted and transferred. PC/Reporter, which is a component of Ramis/PC Workstation, works with Omnalink to allow users to reformat data for file types such as DIF and Lotus 1-2-3. It features English commands, arithmetic processing, and multiple file access, which allows PC users to download data from the host.

ExecuTrieve/36 is an information retrieval system and an ad hoc query, graphics, and reporting tool. Using English statements, it lets users select and sort information, design reports, and output them when they want. Users can perform mathematical calculations, create standard and ad hoc reports, bar graphs, and histograms.

Omnalink/36 is priced at \$700, and ExecuTrieve is priced at \$950. ON-LINE SOFTWARE INTERNATIONAL, Fort Lee, N.J. CIRCLE 261

## Looking Back

TWENTY-FIVE YEARS AGO IN DATAMATION: "Raytheon Company's Missile & Space Division, Bedford, Mass., will simulate the international power struggle on a computer, to serve as a model to test arms control plans, limited war capabilities and threats . . . and other strategic operations." (From News Briefs, July 1962, p. 55.)

TWENTY YEARS AGO IN DATAMATION: "The Pentagon expects bids this month for about 200 computers to keep track of thousands of repair parts for field equipment. Bids are expected on the NCR 500, Univac 1005, IBM 360/30, maybe others. Meanwhile, the 7th Army in Europe will test a computer that will help the field commander by plotting the tactical status of his troops against the enemy's and test alternate tactical plans. . . . Over in the artillery department, Army's Tacfire scheme has moved into the engineering phase, with production approval yet to come. Finally ARPA's Robert Taylor flew to Saigon recently to help Gen. Westmoreland over some data management problems and recommend a computer for his own use." (From Washington Report, July 1967, p. 95.)

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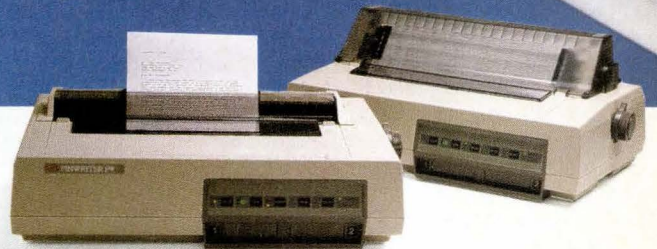
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## PEOPLE

## Man and Machine's Poetic Go-Between

Giovanni della Rossa hopes that "eidomatics" will go a long way toward improving the interpretation of the physical world on computers.

BY EDITH D. MYERS

"One day I had a dream," says Giovanni della Rossa. Then he pauses, wondering if he has the right English word. "No, maybe it was a hypothesis. Chips are getting smaller and smaller. I see them getting to the atomic level, becoming a quantum phenomenon, becoming a tool to allow humans to interpret nature, to make a model of nature. Nature is discrete, made up of finite particles. Computers will be much the same. They will allow humans to describe nature in a way never possible before."

Describing nature is, in a sense, what della Rossa's company, Eidos, is all about. Eidos is a Greek word meaning image. The company, which is based in Milan, is in the business of image synthesis, management, processing, and archiving through the use of computers. Some would call what Eidos does computer graphics but della Rossa chooses to call his company's activities "eidomatics," combining Eidos with informatics, which is defined in the dictionary as "information science."

Della Rossa thinks his word is more comprehensive a term than computer graphics. "In addition to creating, processing, and managing images with a computer, eidomatics incorporates simulation—the possibility to visualize any physical phenomenon. Eidomatics will become the best interface between man and machine."

Spoken like a true physicist, which is what della Rossa set out to be when he enrolled at the University of Milan to study radio astronomy. A native of Rome, della Rossa, 36, moved with his family to Milan when he was a boy. Even then he wanted to be a physicist.

Following his graduation from the university, though, he found the discipline had some shortcomings: "You can't make money being a physicist." It was the movie business that led him into Eidos. He was asked to do a special project for schools, compiling a directory of

movie titles. He traveled in England and America and got into the film distribution business in Italy.

His interest in films led him to an awareness of what was being done with computer graphics within the film industry.

He was thinking along these lines when he went to a computer show in Milan in September 1981, where he met a computer science ("in Italy we call it in-



**DELLA ROSSA:** His dream is to be able to describe nature in a better way.

formatics") professor he had known at the University of Milan. The professor, Daniele Marini, introduced him to a colleague whose specialty was computer graphics.

Together, della Rossa and Marini founded Eidos and coined the term eidomatics. "We had no money," he recalls. The European Economic Community helped them acquire a Data General MV 8000 II and CAD software from Computervision Italy, an affiliate of Computervision Corp., Bedford, Mass. "We had a CAD workstation, which we quickly transformed into an animation station. We had

more compute power than the university [of Milan]. They had thousands of students; we had 20."

An early project that used the workstation was an 11-minute video produced with Computervision Italy called "The Last Supper at the Computer." The objectives of the video, which was produced in November 1983, were analysis of spatial construction and the color and light sources in Leonardo da Vinci's famous painting, and the extension of the room depicted in order to better understand the visual effect the artist wanted to create.

Eidos moved from training to consulting work and is now developing products. The company, today with 69 employees, expects to complete one of its first products, the Eidostation, in December.

The product employs an Apollo DN 580 workstation. The software enables a user to create ray-traced three-dimensional images and to control the movement of objects and lights. Della Rossa says it will run on the new DN 590 introduced by Apollo Computer Corp., Chelmsford, Mass., last May and that it will be a "simple matter" to move the software to other hardware.

Next up will be a medical workstation. Work on this project began last April and is expected to be completed by late '89 or early '90. First will come TMS (Total Medical System), to be followed by THS (Total Hospital System).

Eidos secured its first venture capital in December 1984 from Eurovenca SpA of Turin, a company controlled by Italfinanziaria SpA of the Istituto Mobiliari Italiano group, a government-owned finance company. In June 1986, Ing. C. Olivetti & Co. SpA acquired a 14.5% interest in the company.

Works produced by Eidos earned honors from SIGGRAPH, the Special Interest Group on Computer Graphics of the Association for Computing Machinery, at conferences in San Francisco in 1985 and in Anaheim, Calif., this year.

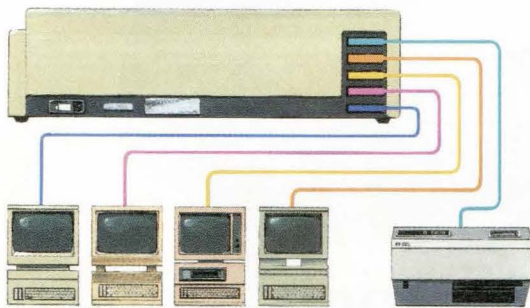
Della Rossa continues to hope the term eidomatics will catch on worldwide. "It took us five years but we got it [the word] in dictionaries in Italy. We have submitted it for inclusion in the Oxford dictionary in England. It's widely used by newspapers in Italy."

The Eidos president has one dream that definitely is not a hypothesis and that is to endow a chair of eidomatics at the University of Milan. ■



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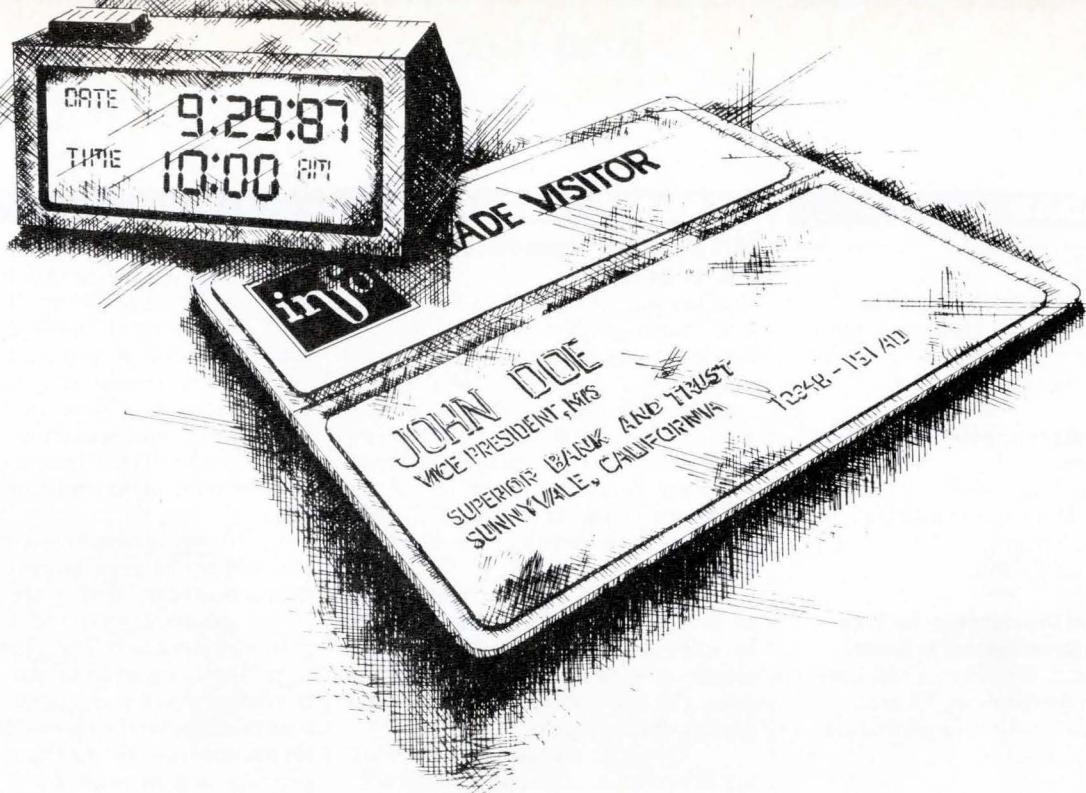
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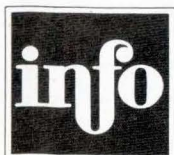
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## CALENDAR

### AUGUST

#### **Second Annual Comdex/Australia.**

Aug. 19-21, Sydney. Contact the Interface Group Inc., 300 First Ave., Needham, MA 02194, (617) 449-6600.

#### **First Conference on Speech Technology in Health Care.**

Aug. 26-27, San Francisco. Contact the Institute for Medical Record Economics Inc., 121 Mt. Vernon St., Boston, MA 02108, (617) 523-4449.

#### **International Organization for Standardization Development Seminar.**

Aug. 31-Sept. 2, Monterey, Calif. Contact Advanced Computing Environments, 21370 Vai Ave., Cupertino, CA 95014, (408) 996-2042.

#### **AIME '87 (Artificial Intelligence in Medicine Europe).**

Aug. 31-Sept. 3, Marseilles, France. Contact IIRIAM (Institut Internationale Robotique et Intelligence Artificielle de Marseille), 2 rue Henri Barbusse, 13241 Marseille Cedex 1, France.

### SEPTEMBER

#### **PC Expo.**

Sept. 1-3, New York. Contact PC Expo, 333 Sylvan Ave., Englewood Cliffs, NJ 07632, (800) 922-0324 or (201) 569-8542.

#### **Telecomp China '87.**

Sept. 8-13, Beijing. Contact Kallman Associates, 5 Maple Ct., Ridgewood, NJ 07450-4431, (201) 652-7070.

#### **DGC '87 (Fifth Annual Conference and Exhibition on Computer Graphics in Defense and Government).**

Sept. 29-Oct. 1, Washington, D.C. Contact World Computer Graphics Association Inc., 2033 M St. NW, Suite 399, Washington, DC 20036, (202) 775-9556.

#### **Federal Computer Conference.**

Sept. 29-Oct. 1, Washington, D.C. Contact Registration Director, Federal Computer Conference, P.O. Box N, Wayland, MA 01778, (800) 343-6944 or (617) 358-5356.

#### **Info '87 (14th Annual Information Management Exposition & Conference).**

Sept. 29-Oct. 2, New York. Contact Info '87, 999 Summer St., Stamford, CT 06905, (203) 964-0000.

## READERS' FORUM

### **MIS Steering Committee: Friend or Foe?**

The management of XYZ Co. recently asked their MIS chief, Robert, to join the senior management committee. To assist Robert in supporting the organization, the senior management committee also decided to establish an "MIS steering committee." To ensure that all functional areas are represented equally, all the members of the senior management committee will also sit on the MIS steering committee.

Does this scenario sound familiar to you? It should. Many organizations have begun to use the MIS steering committee as a mechanism to gain control over the MIS function within their organizations.

Several reasons are given to justify the creation of an MIS steering committee. They include the need to monitor the large and ever increasing MIS budgets, the unfamiliarity and resulting uncertainty senior management has with regard to MIS activities, the resolution of policy issues resulting from MIS projects, and the planning of MIS activities in concert with other organizational goals and objectives. In some organizations, such committees even set systems' priorities, approve MIS dollar and staffing levels, establish MIS goals, resolve policy and procedural changes, and monitor all project-level communications.

But consider what the establishment of an MIS steering committee does for an MIS chief like Robert at XYZ Co. This new committee has not only resulted in the reporting of the MIS function to what is now effectively a lower level, but it has also, by its membership and mandate, relegated Robert to the role of a defendant sitting before a jury of his peers. The committee has also taken away Robert's exclusive control over the classic management functions of planning, organizing, monitoring, and controlling, and has vested these functions equally among the various committee members. As a result, this apparently innocent and harmless structure has not only diluted Robert's membership on the senior management committee, but it has also usurped his rightful management authority over his own functional area.

In the past, such committees have all too often been the price MIS has had to pay for admittance to the senior management team. Chief information officers (CIOs), who face the same situation

as Robert does, should become aware of the effective loss of control that can result from such committees. If allowed to exist unchallenged, these committees could become a permanent obstacle to CIOs in their management of the MIS function. These committees can also reinforce the perception that the CIO, and by inference, the MIS function, is a less-than-equal member of the senior management team.

Removal of MIS steering committees will not be easy, however. The immense power wielded by the other corporate areas over MIS through such committees will not be relinquished without a fight. The CIO must be prepared to rebut the defenders of such committees, who tend to claim that they provide a common forum, ensure good communication, and provide organizational consistency. These arguments on behalf of the new status quo do not answer one critical question: if steering committees are so effective, then why are they not used to direct the manufacturing, finance, marketing, and human resource functions within organizations?

Just as large trees stunt the growth of seedlings growing under their shadow, MIS steering committees can patronize and smother the MIS function and keep the CIOs from gaining full control over their own area and becoming equal members of the senior management team. The removal of such committees would, therefore, go a long way toward furthering the growth of MIS within organizations.

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

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