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MERRILL LYNCH COPES WITH THE AFTERMATH
PAGE 36

TANDEM'S TREYBIG: No More Mister Niche Guy

PAGE 18

Crash Course: How To Avoid Computer Downtime

COMDEX REPORT: GANGBUSTERS ...USINESS AHEAD

PAGE 14

Tandem counts Bell Canada among its clients and is racking up big sales in the telecom arena

TANDEM: No More Mr. Niche Guy

Only a few years ago analysts, competitors, and users generally dismissed Tandem Computers Inc. as a niche player. "They make those NonStop computers, right?" one might hear an IS manager say. In major banks, they ran most of the ATM networks—hooked to IBM mainframes. In stock exchanges, they served as sophisticated communications processors—hooked to someone else's mainframes (see story, page 19). They picked up some airline reservation business, but IBM still dominated the field.

You bought Tandem only if you had to be sure the system *never* failed. With the exception of dumping dust on a living room carpet, the Tandem demonstration of fault tolerance may well rank as the nation's most oft-repeated sales tactic. Wherever they went, Tandem salesmen would start up a demonstration system, reach inside, pull out a board—and the system ran on!

But starting in the early 1980s, Tandem—without abandoning its roots as a fault-tolerant supplier—started pushing another phrase to describe its offerings: They were good for "on-line transaction processing (OLTP)." During this period, as revenue rose 30% per year, profits languished in the $30 million-$40 million range. Outsiders blamed it on lax management and the limits of the fault-tolerant market.

James Treybig, Tandem's co-founder and to date its only president, also found himself slotted in something of a niche: nice-guy manager from the Hewlett-Packard school. The former HP executive presided over a company in which there were beer blasts on Friday and everyone had fun.

A niche company with lax management generally finds

disaster. Instead, Tandem found a new way. Both the company and its founder broke out of their niches. There are still beer blasts, and by all accounts Treybig is still a nice guy, but he is now a noticeably tougher manager.

Walter Wriston, formerly chairman of Citicorp and now a Tandem board member, began teaching Treybig how to run a billion-dollar company. Treybig broke out of his niche, introducing budgeting and planning processes appropriate for a billion-dollar firm.

The company also escaped its niche, building a new image atop its existing stance as the leading fault-tolerant computer vendor. Tandem—and its customers—now consider the company a leading OLTP vendor. In that much broader but more difficult to define arena, few doubt it ranks second only to IBM. In short, for both Treybig and Tandem, the word is out: "No More Mr. Niche Guy."

Those who have yet to heed the word may be swayed by Tandem's 1987 financial results. The firm broke the billion-dollar revenue barrier for the first time in the fiscal year ending September 30, smashing its earnings doldrums as well by posting net income of $105.6 million on revenue of $1.035 billion, up from $63 million and $767 million the year before. Tandem has sharpened its management, broadened its market, and—by making big profits on big sales—proved that it is for real.

All indices of customer satisfaction reflect Tandem's success. The company says it has never been thrown out of a major account, and analysts concur. More than half of the *InformationWEEK* 100 operate Tandem systems. Recent major wins include Bank of Tokyo, General Motors' Chevrolet division, First National Bank of Boston, and Texaco. More than 300 banks and 250 manufacturers use Tandem systems, including 23 of the top 25 U.S. banks. All seven regional Bell operating companies use Tandem equipment, as do about 25 financial exchanges. Tandem computers also form the core of credit approval systems for several retailers and petroleum companies.

There is much evidence to support Tandem's claim that the nature of Tandem applications is changing; instead of a simple system, off to the side, Tandem computers are now often *the* system in the middle of one data center or another. It is still rare that they are the only system in a company, but as the breadth of available Tandem software widens, the company hopes to achieve that state of nirvana.

Customers have understood for some time Tandem's nature as a real, full-range computer supplier. One of the clearest explanations of how it got that way comes from computer industry analysts **Jonathan Fram** and **Louis Giglio** of Bear Stearns, a New York brokerage firm. They break Tandem's history into three waves of demand, each resulting from a different product feature the company sported all along: fault tolerance, linear growth, and geographic distribution.

The first wave of demand for Tandem came from fault tolerance. In a Tandem system, if one processor in a 10-processor complex fails, the other nine pick up the workload without interruption. Thus, instead of a total failure for 10% of the users—the typical result of such a failure in a standard system using 10 uncoupled or loosely coupled processors—there is a 10% degradation of performance for everyone.

The second wave of Tandem demand grew from customer realization that the only difference between a two-processor system and a three-processor system was one processor. That may seem tautological on the face of it, but experienced IS managers know that expanding a system usually means operating software changes, application software changes, and peripheral equipment rearrangement. Customers running Tandem systems discovered that adding a third processor to a two-processor system quickly and automatically increases performance by nearly 33%.

Tandem now benefits from what the Bear Stearns analysts call the third and most important wave—the ease of networking Tandem processors. Fram and Giglio say that Tandem is the only system with which customers can geographically distribute the processors and data, yet the user perceives that all of the data and processing power are locally attached.

All these advantages stem from a common root: the Tandem architecture. Tandem NonStop processors all offer parallel but not redundant processors and nonshared memory. The architecture has a message-based operating system capable of managing a multiprocessing, distributed environment. To the message-based operating system, it matters not a whit whether the next processor is in the next room or on the next continent; ultimately it doesn't matter to users either.

Wall Street and the analyst community clearly likes what Tandem does. Bear Stearns dismisses any short-term likelihood of Tandem being surpassed by IBM or Digital Equipment in terms of product offerings (based on those firms' planned and announced products), praises Tandem's order flow, and says the firm's expenses are un-

Exchanges Put A Lot Of Stock In Tandem Gear

Tandem securities marketing specialist **Ray Villareal,** in what must be a running joke in the halls of the California-based computer vendor, had this comment on Tandem's post-crash stock price: "We sell a lot of fault-tolerant computers to the stock market. I guess we need a fault-tolerant stock price too."

Tandem fault-tolerant computers can be found at most of the largest stock and futures exchanges in the world including the New York and American stock exchanges. Tandem has sold to about 25 exchanges worldwide. After Tandem watched its stock nose-dive on Black Monday (its stock valuation dropped from $3.1 billion to $2 billion), it probably wanted to turn those machines off. That, however, would have meant fighting past glassy-eyed IS directors who could take solace only in the fact that their Tandem machines remained reliable in spite of record volume.

Jim Squyres, vice president in charge of Siac, the transaction-processing arm of the New York and American stock exchanges, called it "a bloody miracle throughout the exchanges." Built to handle daily volume of 450 million shares, Siac's Tandem-based system saw two straight days over 600 million. Maybe there's an ad campaign here: *Tandem: Our stock may crash, but our computers don't.* ***—Barton Crockett***

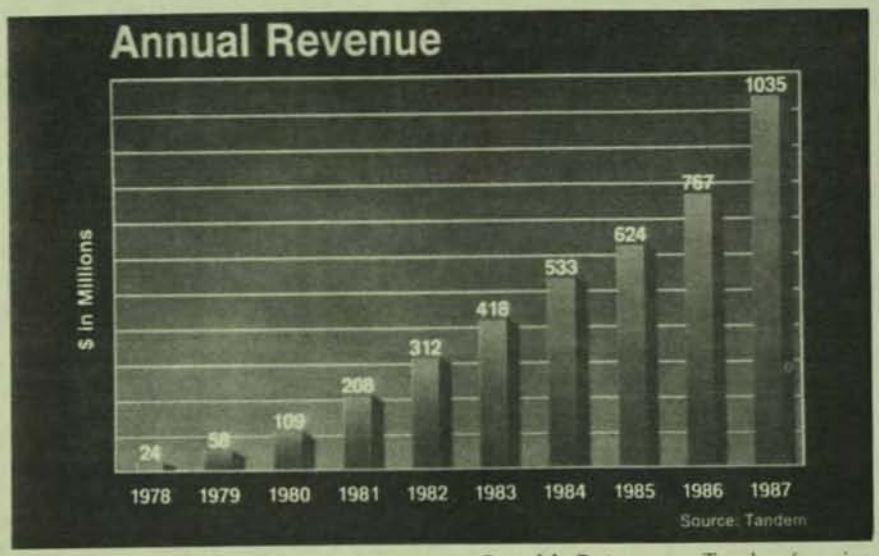
der control. **Suzanne Purnell,** of San Jose, Calif.-based Dataquest, dubs Tandem "the undisputed king of the fault-tolerant hill," and says its database management system puts it "years ahead of the competitor."

More and more analysts are viewing Tandem as a minicomputer company with some real advantages. This, after all, is a company whose stock market valuation has risen from $34.1 million when it went public in December 1977 to $3.1 billion in pre-crash September 1987.

Ask Tandem officials what makes them so popular with Wall Street and customers and they offer several explanations. Treybig cites the combination of low prices to customers and relatively high margins to shareholders. One key to that is manufacturing. *BusinessWeek* measured the efficiency in use of labor of the 1,000 U.S. companies with the highest stock valuation; Tandem was one of only five computer companies and one of only two minicomputer makers on the list (the other was Digital Equipment, which Tandem outranked on most measurements).

Stephen Schmidt, vice president of operations, heads both manufacturing and customer service—a logical combination for keeping the factory floor in touch with customer needs.

Users are happy with the arrangement: The average lead time to ship a product is one week, compared to the industry average of 14 weeks. Also, every computer is assembled and tested before leaving the factory.



But the question remains open as to how Tandem achieved $1 billion in revenue this year. **Dennis McEvoy,** Tandem's software vice president, thinks it is because "the world is moving in our direction. Everybody is saying they want to be in OLTP." As he sees it, "There are basically no new batch applications being written. A lot of people are now writing second- and third-generation on-line systems. In the 1960s, the only cost-effective on-line systems were reservation systems. In the 1970s, it became cost-effective to put financial services and inventory on line. Today, you can cost effectively put any new application on line because of declining equipment costs." What was once Tandem's little playground, in short, has now become the entire world.

Gerald Peterson, Tandem's vice president of marketing, offers a different perspective. He isn't certain what put Tandem over $1 billion last fiscal year (his sales plan called for $953 million), but he knows what didn't put it over. It wasn't just IBM's off-year, he says. "Three IBM competitors are better off than IBM at this point. Amdahl at the high end, DEC at the low end with the MicroVAX and networking, and Tandem in the middle with transaction processing. With that kind of competition, even a company like IBM has to react.

"IBM says it is reorganizing to serve the customer. IBM has had to come around and change their thinking. IBM now has some significant competition. I wouldn't say we simply benefited from their bad year."

The result was a billion in sales, he says, which in turn leads to "our being considered by customers to be in a different class. Users are now comfortable that we have critical mass." In the past Tandem has won several $10 million and $20 million bids. During 1988, Peterson says, as a billion-dollar company, it may start winning $50 million bids.

Which doesn't mean Tandem thinks it will become another IBM any day soon, but the company does have ambition. As Peterson says, "I can imagine our being a $10 billion company. It is hard to imagine reaching $50 billion. We can get in gear to think about $10 billion. I can't see any reason why, if we stay nimble and don't lose our focus on parallel architecture, we can't grow faster than the computer industry as a whole."

—Paul E. Schindler Jr.

VP Peterson (l) and CEO Treybig star in Tandem's monthly TV show for employees

James Treybig Recounts Tandem's Rise

In the early 1970s, **James Treybig** left Hewlett-Packard to join Kleiner Perkins, a then-prestigious and now gigantically successful venture capital firm. Within a year, he had an idea for a new kind of minicomputer, one that was "fault-tolerant" and capable of handling on-line transaction processing. With **James Katzman, John Loustaunou** and **Michael Green** and $1 million in venture capital, he founded Tandem Computers Inc. in 1974. Treybig became the company's first—and to date only—president, while Katzman, Loustaunou, and Green left. Long identified with its clever trademark—NonStop—the company this year established its presence as a full-line computer supplier by achieving sales of $1 billion. *InformationWEEK* senior editor Paul E. Schindler Jr. recently talked with Treybig about how Tandem put together its first $1 billion year and how it plans to put together its next one.

IW: *Do you mind being known as a niche vendor?*

Treybig: I went through two phases. When we started, I believed on-line transaction processing was a fundamental market. I felt all systems would be OLTP and networks of OLTP.

Then one time I was with an MIS director in Europe. He said our niche was ATMs (automated teller machines), and that we shouldn't even make an effort in branch automation. The point is, I wouldn't mind being labeled a niche vendor, as long as I can define the niche.

IW: *Is there any business you can't go after?*

Treybig: We face the challenge of winning $100 million deals. We see lots of deals at $50 million and up. Today, we win deals of $20 million or $30 million. To win $100 million deals, we have to get better.

IW: *Why did Tandem hit $1 billion in sales this year for the first time?*

Treybig: This was a great year for our market. This was the year the need for OLTP became clear to everyone. We have the advantage that we started 12 years ago.

We hit a billion because of good business strategy, including a good concentration on people: We attract and keep them.

IW: *Many people think you brought Walter Wriston to the board to give you a customer perspective.*

At Tandem, we believe in having a good time and in winning—I like winning

Treybig: Actually, I wanted better perspective of being president of a big company. Wriston attends all board meetings and offers perspective and strong advice. I am putting a big emphasis on adding more Wristons. He is there to be supportive of me.

IW: *It seems to take tens of millions of dollars to get into the OLTP market today. How much did it cost you to get started?*

Treybig: We raised a million from [current board members Thomas] Perkins and Pitch [Franklin P. Johnson, Jr.]. That took us to prototype, on plan. Then we raised $2 million; that took us to preproduction. We became profitable that year in December. The next year we went public at a valuation of $31 million, and the market now values us [as of Sept. 30] at $3.1 billion [$2 billion after the crash].

IW: *What is IBM to you?*

Treybig: A tough competitor. We fight for the on-line systems business, the networking and the communications business.

We believe we have something much better. We could live without them; we'd live a lot better without them. They are a tough company. We have to win every order.

IW: *When do you win against IBM?*

Treybig: For us the odds are best if the company likes distributed data and wants to put up big transaction loads; if they want to do a lot of work; if cost of system or performance is important. We win in response time, cost of transaction, networking with distributed data. We have terrific performance in that environment. If that's what the customer wants, we win.

IW: *Who do you see as your competition?*

Treybig: We believe the future is OLTP. The only exciting segments are OLTP and workstations, and workstations are part of OLTP. We see those in brokerage firms. All of these microprocessors and workstations are going to generate transactions. The question is positioning. That determines who is going to grow, what it takes to win. We have the best positioning. We may not be the biggest, but we have the best positioning and the best products.

IW: *You're said to be in the middle of a major new product-planning cycle.*

Treybig: We are really working hard on processes such as budgeting and review. Our product programs have been established through a major effort every few years. I am moving to a process of product programs every quarter, organized on a corporate level. We initiate, review, cancel, and enhance product programs, the same way as we do budgeting. At a billion dollars, you can't manage as you used to.

IW: *Do you spend less effort selling people on the idea of fault tolerance these days?*

Treybig: I am practical. Some people buy Tandem equipment because of NonStop features. That is terrific. Modular expandability is an advantage. Customers talk about expandability, but their systems never fail. When systems don't fail, people forget what it was like. All of these attributes are important.

IW: *How has Tandem changed in the last two years?*

Treybig: We are stronger in management. We now have strength in organizational and management processes. That is a big change, but it is not so easy to see. *BusinessWeek* picked us as one of the 50 most competitive companies in the country.

What we are about is having a good time and winning. You don't have a good time if you're not winning. At Tandem winning is spirit. I like winning. IW

Software sales decline brings losses for Teknowledge Inc.

By LORRAINE GENGO

Teknowledge Inc., a leading supplier of expert systems software and services, reported first quarter losses in total revenue and net income. The Palo Alto-based company attributed the losses to the anticipated release of Copernicus, a new product which will begin shipments this month.

Total revenue for the first fiscal quarter, which ended Sept. 30, was $4,438,000 compared to total revenue of $5,347,000 for the same period a year ago. Teknowledge also reported a net income loss of $1,311,000 or a loss of 19 cents a share for the first fiscal quarter, compared to a net income gain of $308,000, or 4 cents per share for the same period a year ago.

The overall first quarter loss was primarily due to a significant decrease in revenue from software products, according to Peter E. Weber, president and chief operating officer.

Revenue for software products in the quarter ending Sept. 30, was $830,000, compared to $2,142,000 in the first quarter last year.

For fiscal year 1986, product sales accounted for approximately 50 percent of Teknowledge's business, according to Michael Ayers, the company's director of corporate communications. "Clearly, the company's goal was to achieve product revenues well in excess of $830,000," Ayers said.

First quarter revenue of $3,608,000 for software services compared favorably to $3,205,000 of services revenue for the first quarter a year ago.

Teknowledge reached $20,459,000 in total revenue for the year ended June 30, 1987. Total revenue for the 1986 fiscal year was $14,563,000, a 40 percent increase in revenue, according to the company's annual report for 1987.

The decline in product sales revenue may have been due to customers waiting to see what the company would be offering with its new Copernicus product line, Ayers said.

Teknowledge, founded in 1981, is one of four companies that design artificial intelligence products. In a broad sense, artificial intelligence technology enables computers to solve problems that cannot be described mathematically. Expert systems attempt to capture human experience, knowledge and intuition on software, according to Ayers.

"We can probably only capture 80 or 90 percent of what an expert knows," he added.

The development of expert systems and other artificial intelligence tools is an emerging market, according to analysts.

"The problem has been that it's been defined as a market and it's not a market. It's a technology and that's the problem AI has had in terms of how it's been viewed," said industry analyst Beth Krasnoff of Dataquest Inc.

The overall market for expert systems development tools in 1986 totaled $140 million, according to Krasnoff who said that Teknowledge had a 14 percent market share in terms of their product revenue.

Dataquest projects the 1987 market for expert systems to be worth $225 million, Krasnoff said.

The four leading companies designing artificial intelligence tools, once referred to as "the four horsemen" or the "the gang of four," are IntelliCorp of Mountain View, Inference Corp. of Los Angeles, Carnegie Group of Pittsburgh and Teknowledge, according to Robert M. Therrien, a market analyst for Paine Weber.

Teknowledge does not see itself as competing directly against Inference and Carnegie, two privately-held companies that direct their marketing toward academic applications, Ayers of Teknowledge said.

"We rarely see them in commercial customer sites where we go," he said.

Teknowledge, which began offering stock in 1986, sells mainly to Fortune 1000 companies and the government. Users of their products are typically "responsible for data and knowledge distributed across large company organizations," Ayers said.

Teknowledge turned from what it characterized as the "Buck Rogers" aspects of artificial intelligence to focus instead on the applied technology, according to the company's report for 1987.

One of the major setbacks to the market has been a perception that the technology promised more than it delivered, according to analysts.

"It's unfortunate that it's called AI or artificial intelligence because under that umbrella many things were promised that were not brought to the marketplace," said Ayers.

Teknowledge has been trying to distance itself from that perception. "We believe we're in the data processing industry," he said.

Teknowledge's new product family, Copernicus, is designed for programmers who want to build expert systems for commercial application. The software will operate on conventional systems including personal computers and mainframes made by International Business Machines Corp., systems made by Digital Equipment Corp. and Unix-based workstations from Sun Microsystems Inc., Apollo Computer Inc., Hewlett-Packard Co., and NCR Corp.

Teknowledge's new software product is named after the 16th century astronomer Nicolaus Copernicus, who discovered that the planets revolve around the sun. Teknowledge chose the name to make a point. Thirty years ago, the developers of artificial intelligence technology "were dead certain that the whole computing world would revolve around their baby," Ayers said.

That did not happen. The technology became just another piece of the whole puzzle, according to Ayers, who said his company has taken the reverse approach —to revolve around the user's needs.

"The user's system already exists and everything that comes into his universe has to fit into his system," Ayers said.

Tandem makes English investment

Cupertino-based Tandem Computers Inc. has made an equity investment in Anamartic Ltd., a research and development firm based in Cambridge, England.

Anamartic, a privately held company founded in 1986, develops advanced computer storage products.

Under the terms of the agreement, Tandem has purchased a minority interest in Anamartic.

"This agreement will help us further advance our leadership position in technology for high-performance transaction processing, which is a key objective of our new ventures investment program," said Gerald D. Held, Tandem vice president.

Anamartic developed an architecture known as Soft Water Interconnect, considered to be a breakthrough in wafer scale integration technology.

POS NEWS

Vendor Spotlight

Atalla Looks To Tandem For Marketing Muscle

For years, observers of the EFT industry have expected Atalla Corp. to become a major player in point-of-sale terminals. It has an entree to the market with its system for securing personal identification numbers, both when they're issued and when they're used, and has a stellar reputation for turning out quality products. But Atalla has retained a low-profile image in POS, leading many of the same observers to wonder what Atalla's plan is.

Last month San Jose, Calif.-based Atalla sent a loud signal to those observers and to its competitors that it is serious about POS: It agreed to be acquired by Tandem Computers Inc., its $1 billion-a-year neighbor in Silicon Valley and the leading provider of EFT computer hardware to banks and networks. And Atalla is not shy about trumpeting its intentions with its new owner: "We no longer want to be a small-niche company," says William Atalla, Executive Vice President, Chief Operating Officer and son of founder Martin M. "John" Atalla.

Capturing More Business. The deal represents the third acquisition in the past year in the POS terminal industry and is evidence that the long-predicted trend toward consolidation is heating up. In the past year, Datatrol was acquired by Data Card Corp., and Lexicon was bought by ICOT Corp.

Until now, Atalla's size has prevented it from capitalizing on its strengths and early entry into the POS market. Atalla has sold fewer than 3,000 POS terminals in the U.S.: 2,000 to Vons Grocery Co. in California, and 800 to three other supermarket projects. There are about 35,000 direct-debit terminals and 150,000 credit-card draft-capture devices in the market today. "Atalla's sales are not big deals today," says an executive of a competing firm. "Big deals are 7,000 or 8,000 terminals at a clip. If you're not signing some of those once in a while, you have to question whether you should be in the market."

But with Tandem's resources and marketing muscle, Atalla could emerge as one of the most formidable competitors in the POS terminal industry. "Our size has limited the marketing we can do," Atalla says. "We should be able to capture a lot more business through (being associated with) Tandem."

Atalla Corp. has been a family affair. Besides son Bill, the company employs daughter Lori Abelman as Director of Marketing. Both will retain their jobs and titles after the acquisition. Martin Atalla will remain as Chairman of Atalla Corp., which will continue to operate under its own name, and will join Tandem's Board of Directors.

Atalla has been looking for a buyer for about 18 months, Bill Atalla says. It considered 16 candidates before narrowing it to Tandem. "We needed to find a strategic partner who served the financial and retail industries and one that had a critical mass that we could use in sales and marketing," he says. "We concluded early on that Tandem was the best partner for us. Their products seemed very complementary to ours. We run across them often on our sales calls."

While Atalla gets the marketing muscle and development resources of Tandem, its new parent hopes the acquisition will help it round out its EFT offering. One of the prime factors that Tandem was seeking was a security system to integrate into its network products. Tandem had sold security procedures as part of its software, but preferred the security to be in its hardware, where it is less subject to being tampered with. That is exactly what Tandem has been selling since 1974. "It was a natural fit for us," says John Kane, Tandem's Director of Marketing Communications. "We were looking for a security system and, rather than develop a whole new set of products, we bought Atalla. We are showing that we are interested in every aspect of transaction processing and have recognized the need for security."

Drop-In System. In addition to obtaining a ready-made security system, Tandem acquires a presence in the POS terminal market. While $1,000 terminals may seem like small potatoes to Tandem, which is used to dealing in machines that cost hundreds of thousands of dollars, Kane says terminals can become important to Tandem for two reasons: The potential market for the terminals is in the hundreds of thousands and being a terminal supplier rounds out Tandem's hardware line by allowing the company to sell a complete network, from the entry point for transactions at the retail location to the back-room processing horsepower for the banks. "We can see doing a complete Tandem drop-in system, all the way through from the terminals to the switches," Kane says.

Simply adding Tandem's sales force to Atalla's will suddenly give Atalla new presence in the POS market. Atalla joins Tandem with a single POS terminal salesman—Herb Williamson, Vice President of POS Payment Systems. Tandem plans to assign terminal marketing responsibilities to all 700 of its salesmen worldwide. "This gives us the foundation for growth that will be a degree of magnitude larger than the 30% growth we experienced last year," says Atalla. "The market has been growing at 45-50% a year and we are now positioned to grow along with it."

Opening Doors. Tandem believes it will not take much effort to attune its big-ticket salesmen to small-ticket terminals. "Our salespeople get involved in that end of the network already because potential buyers who talk to you about a high-ticket item eventually talk about the terminals that will be linked to that system," Kane says. He believes the integration of the Atalla line into the Tandem line will be complete within a matter of months.

Tandem and Atalla hope that their joint efforts will open doors for each other. Each company claims about 1,500 customers in the EFT arena and, while there is some overlap, there also are plenty of new opportunities for each company, they say. "There is no question that there will be substantial follow-on business for both sides," Atalla says. "We hope to see not just Atalla's customers going to Tandem and Tandem's customers coming to us, but all-new business opportunities that arise as a result of Tandem and Atalla going in to a new potential customer together." ■

POS NEWS

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POS News, Nov. 1987

Midrange Shootout: M

A revitalized IBM, the Intel 386 micro, MS/DOS, PS/2, and Unix are the big winners in DATAMATION'S latest mini/micro survey. But the real action could come in a showdown pitting hot new workstations and pcs against minicomputer traditionalists.

BY RALPH EMMETT CARLYLE

IBM, whose small and midrange systems have been wounded in recent years by clones and VAXs, may be on the mend. Big Blue appears to be the prime beneficiary of a resurgent demand in 1988 for small and mini-based systems. Sun Microsystems and Tandem also stand to grow more formidable next year as customers expand their workstation and online transaction processing applications.

These are among the trends that emerge from the 1987-88 DATAMATION/Cowen & Co. Institutional Services mini/micro computer survey, comprised of nearly 7,000 responses from U.S. end-user organizations—the largest known sampling of its kind by any business magazine or brokerage firm.

A number of trends point to a significant event: a showdown pitting workstations and pcs against minis. Projected workstation shipments alone could grow an impressive 36.3% in dollar value during the 12-month period ending June 1988. (The survey defines workstations as powerful single-user or multiuser desktops, generally selling for over $5,000 each.) The corporate pc market also will accelerate significantly over the same period, with unit growth climbing 23% during the year—much steeper than last year's 16% trek. The rapidly maturing minicomputer segment—collectively, the small business system, office system, and traditional mini—could experience a growth spurt of just under 10% during this period.

This year's survey sheds some welcome light on many controversial industry topics. Where IBM is the principal pc supplier, the survey finds that over 50% of respondents will embrace the PS/2 family of machines. But it's clear that two software standards, MS/DOS and the PS/2

Illustration by Andreas Rauth

t: Mini/Micro Survey

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operating system, OS/2, will coexist for many years to come. That's because of the perceived "proprietary" nature of IBM's upcoming version of OS/2 extended edition and its Micro Channel bus.

IBM's new 370-compatible mini, the 9370, has been tagged the "VAX killer," but it has hardly nicked Digital Equipment Corp. to date; only IBM's very largest customers are interested in it so far, and the survey shows that only one of every eight that are evaluating the 9370 currently has plans to buy it. Next year, however, interest in the 9370 is expected to pick up—so much so that it could provide 30% of IBM's midrange revenues in [illegible]. IBM has begun to ship the machine in volume: 5,000 units worldwide in this quarter alone, insiders say, and considerably more next year. However, the 9370 does not appear to be attractive to more than a small fraction of DEC's customer base at this time.

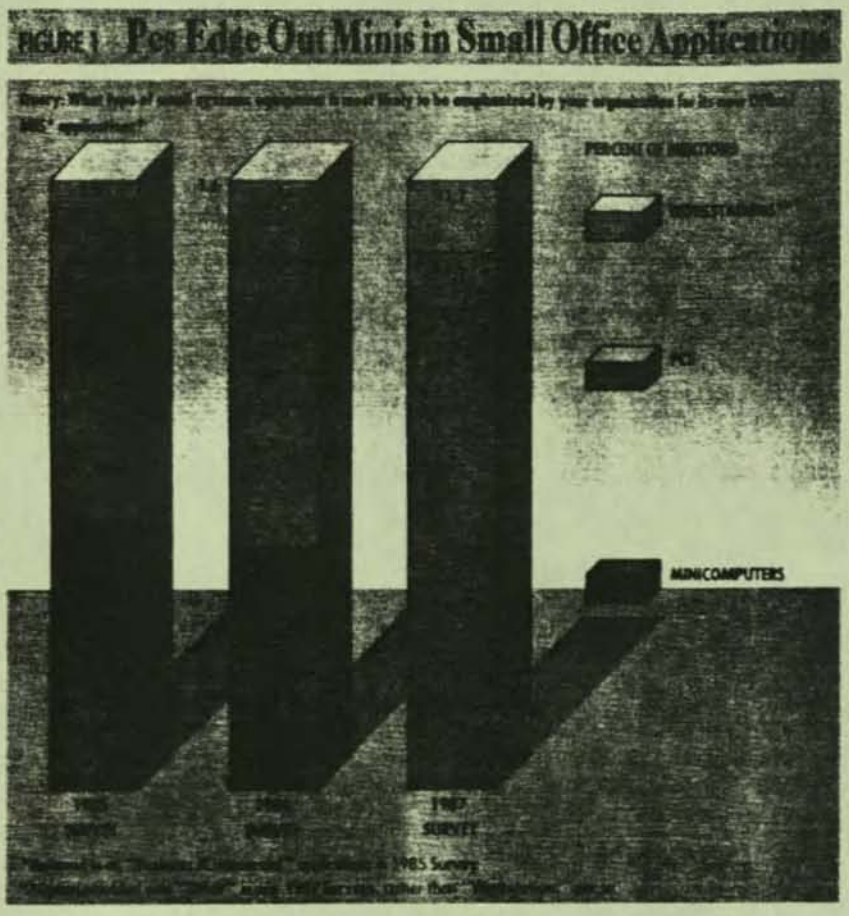
Other "hot" industry topics are proving more mythic than real at respondent sites. For the second year in a row, the AI language Lisp failed to make any headway. There was also no growth from a year ago in the adoption of multiple or parallel processing machines—the "minisupercomputers." It's not clear whether the absence of a surge in minisupers results from a lack of confidence in the handful of startups, such as Convex and Alliant, that inhabit this sector or from the dearth of compilers that make these new architectures completely transparent to programmers. Once this bottleneck is removed, it would appear likely that this embryonic industry segment will grow rapidly.

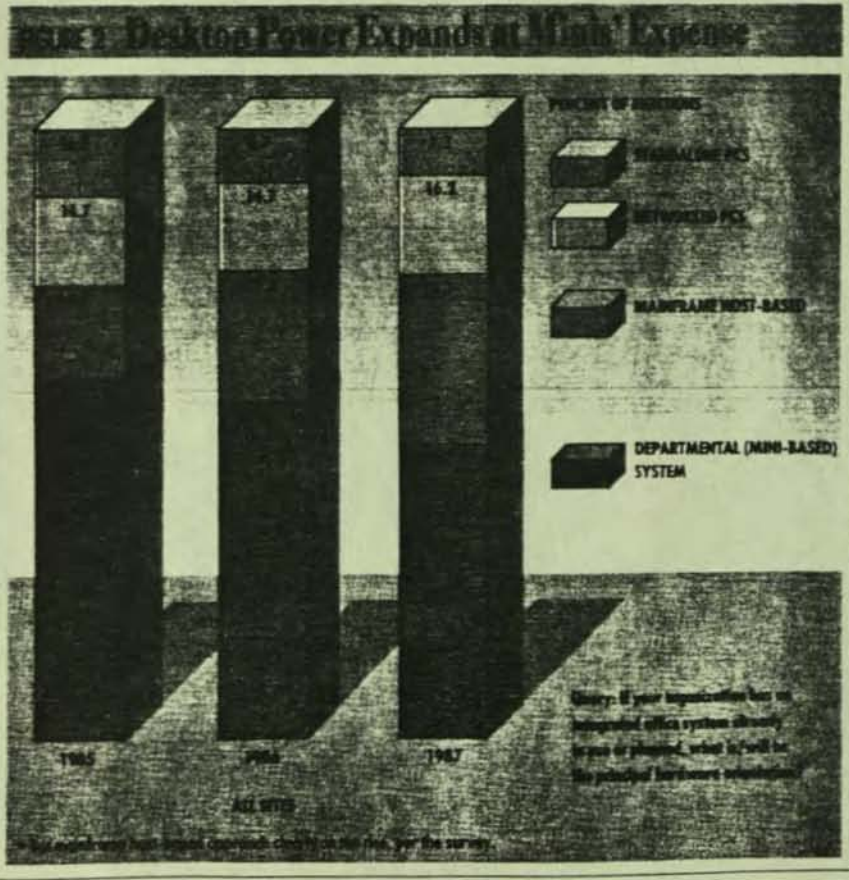
Sun, Tandem Receive Good News

Several companies emerge from the survey smelling like roses. In general, Sun Microsystems, based in Mountain View, Calif., and Tandem, in Cupertino, Calif., seem to be the most improved. DEC was tops in customer satisfaction. In pc market share, Compaq managed to consolidate its strong number two position behind IBM.

Other companies send off mixed scents. Apple, for example, doesn't show any progress in personal computer unit shipments. Its share of the 143,000 machines to be shipped between July 1987 and December 1988 remains at 7%, the same percentage it had of the 123,000 pc shipments between July 1986 and December 1987. In Apple's favor, the number of sites buying its machines is climbing: 7% today compared with 5% a year ago.

Data General, Wang, and AT&T are suffering from severe credibility problems (see "Keeping the Faith"), according to the survey. The trio must reestablish themselves in the market-





place. The same cannot be said of Hewlett-Packard, despite strong public criticism of its ambitious—and delayed—Spectrum program. The company's reputation and customer loyalty are apparently undiminished. Spectrum, especially as a Unix machine, is expected to be a strong player in the market. Hewlett-Packard, like Data General, is going back to its roots—courting oems and vars with aggressive price discounts. HP sees such alternate sales channels as major sources of future growth.

Despite DEC's stellar reputation with customers and its increasing share of the commercial minicomputer market, there are some ominous portents for it in the survey. The mini maker's oems and vars have grown dissatisfied with DEC's discount structure and its insistence on proprietary technology; their loyalty can no longer be taken for granted. DEC's preference for its homegrown VMS operating system is hurting it in workstation markets, in which, as the survey reveals, Unix has become a virtual standard and Sun Microsystems, not Digital, is the new leader.

Overall, there is a sense in the survey that even though DEC is now at the pinnacle of its success and seemingly untouchable, the company may yet become a victim of the pattern of growth and change that helped bring it to such prominence: the evolving trend of distributed processing.

The spending outlook is substantially better for pcs and workstations than it is for minis; DEC, however, has failed to make the transition to mainstream pc supplier. The survey reveals that only 2.7% of its own VAX customers will get their pcs from DEC; over 44% of their pcs will come from IBM during the 18-month period ending December 1988. As DEC continues to lose substantial dollars to noncaptive pcs, two questions arise: how long can DEC continue to forego the revenue opportunity of supplying its customers with attractively priced and featured pcs? (the company's VAXmate clearly doesn't fit the bill—only 35 sites intend to buy DEC's pc-compatible offering next year, whereas 55 sites expressed a willingness to buy it in last year's survey); and how can DEC justify spending heavily to remain compatible with IBM's emerging PS/2 standard—a drain from VAX R&D?

Unfortunately, as DEC prepares to meet this micro challenge, it's clear that the reservoir of new minicomputer users is drying up: there was only a 5% increase in new sites this year compared

with the 12% compound growth rate in the minicomputer population over the past eight years. So, while the shipment outlook for minis has improved in 1988 (and one shouldn't underestimate IBM's contribution), the long-term outlook is not so good.

Pcs Advance in Distributed Processing

Pcs are taking a bigger bite out of declining MIS budgets, and are beginning to replace minis as the preferred small systems vehicle for distributed processing. This trend is most apparent in the commercial arena. Figure 1 shows that the pc, at 61.5% of the sampling compared with the mini's 26.8%, is the overwhelming choice of IS managers and other respondents for their new office and MIS applications.

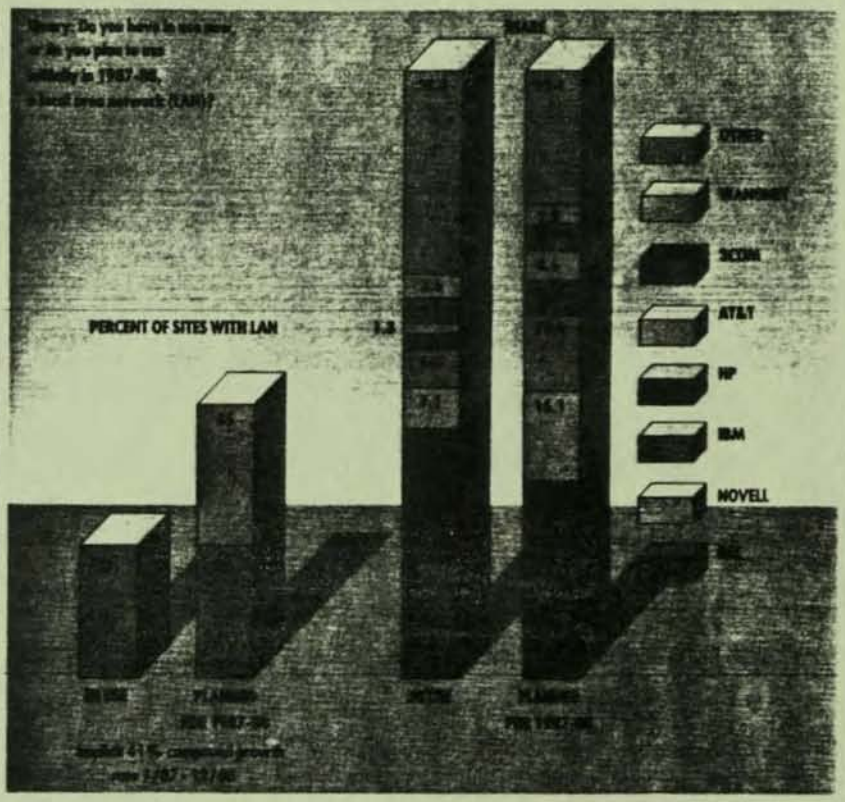
Figure 2 reveals a picture even more alarming for DEC. At these respondents' sites, pcs are creating an

WORKSTATION SHIPMENTS COULD GROW 36.3% IN DOLLAR VALUE.

increasing demand for mainframe-based services. This is something IBM has hoped for all along but hasn't been able to make happen because of its inability to offer the necessary database and communications links between the two. Now, with the advent of the PS/2, IBM has begun to supply such connectivity as part of its emerging Systems Applications Architecture (SAA) blueprint. IBM's growing network presence points to this trend: Big Blue is expected to double its share of planned LAN installations to 12.4% (see Figure 3).

Some of IBM's largest customers believe that as an increasingly intelligent network emerges between pcs and mainframes, a middle, or third tier, of minicomputers can become superfluous. IBM executives claim that half of the company's customer base has chosen this two-tier route, and this trend is certainly evident in Figure 2, from which it seems apparent that mainframes are beginning

FIGURE 3 Formidable LAN Suppliers Confront the Independents



Unix Uniformly Gains as Primary, Secondary OS

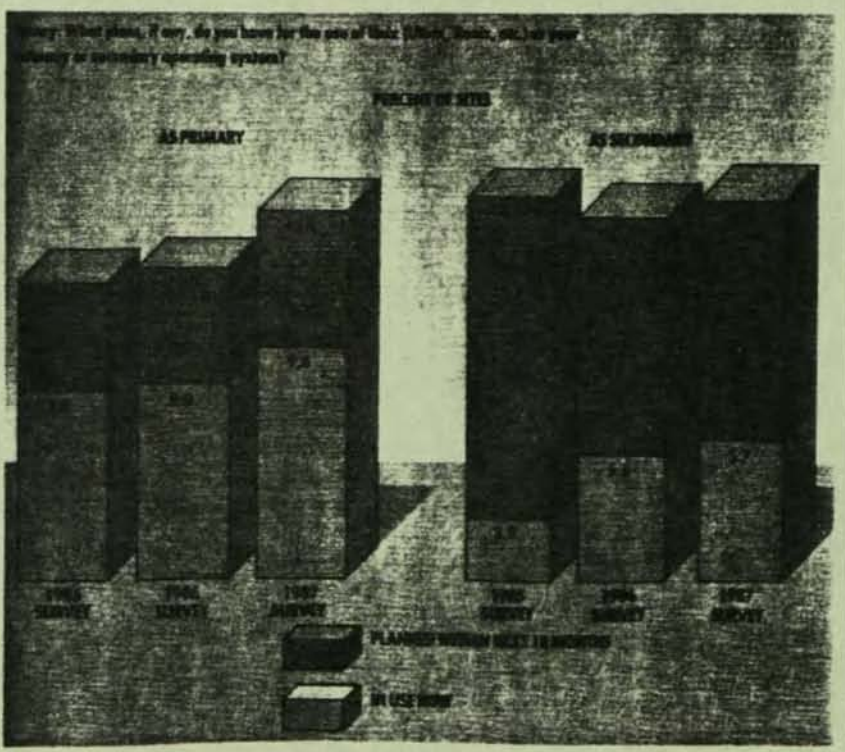


FIGURE 5 DEC Share of On-line Transaction Processing Market Improving Decidedly, Despite Lack of Product

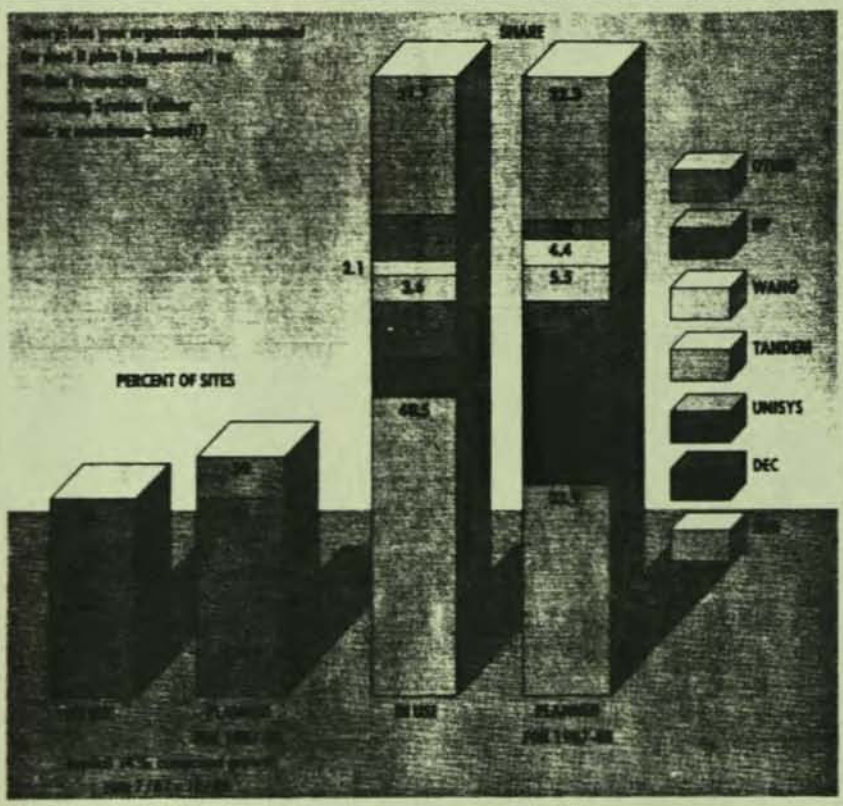
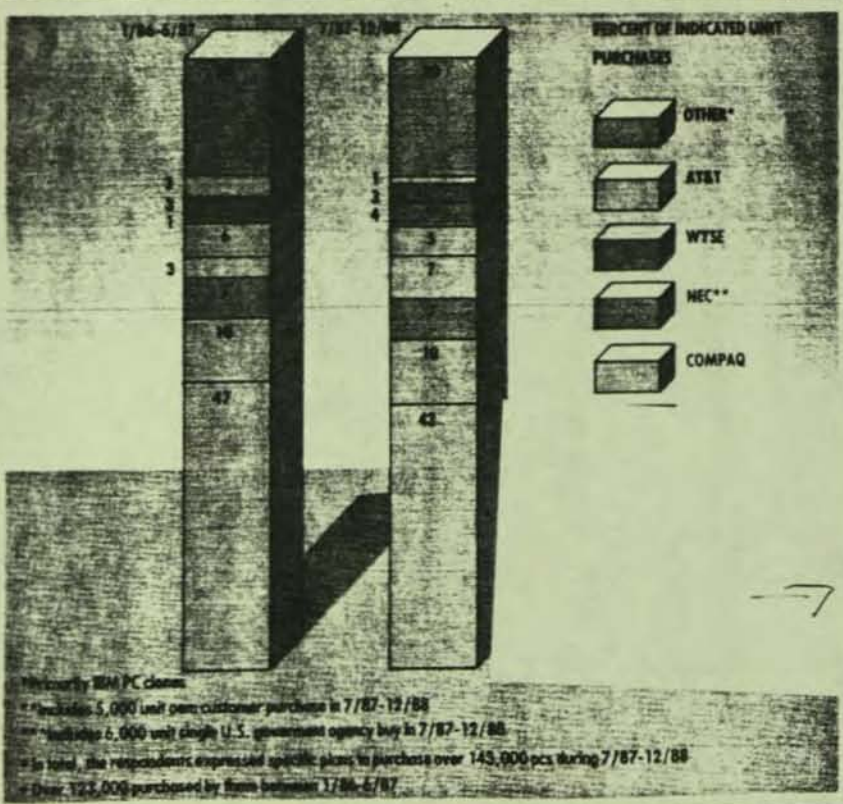


FIGURE 6 Distribution of Respondent Pc Unit Purchases



to replace minis as the host vehicle for new integrated office applications.

Future DATAMATION/Cowen & Co. surveys will show whether this two-tier phenomenon spreads beyond new MIS/office applications into technical and scientific markets. While customers in these markets are emphasizing dedicated engineering workstations over minis for new applications, they are also employing pcs to a greater degree than ever before. Compaq, which reinforced its strong number two position behind IBM in the pc survey, is already boasting that its new Intel 386-based machines have been benchmarked at whetstone levels comparable to workstations from Sun, Apollo, and DEC.

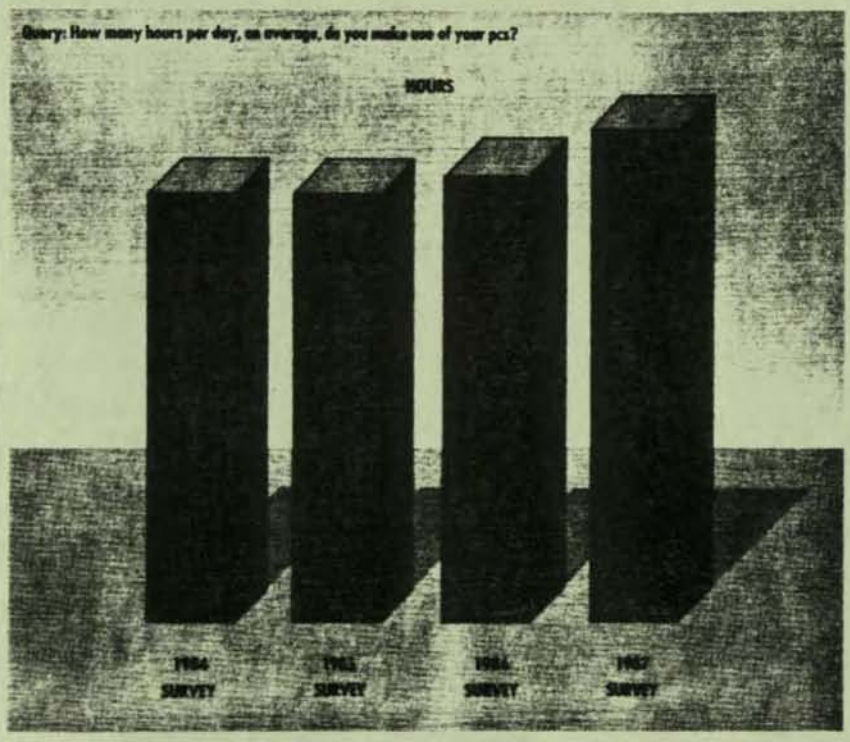
The other issue that DEC's management faces is the increasing adoption of Unix as the portable OS standard for

small and midrange systems (see Figure 4). By the end of 1988, 14.5% of DEC's customers will have some flavor of Unix as their primary operating system, and 21.2% will have it as their secondary choice. As these customers aren't effectively "locked in" to DEC's proprietary technology, they will provide fair game for competitors. In fact, one major reason for IBM's support of Unix is that it provides an entrée into DEC's technical market and its customers.

DEC, of course, is not sitting still while these threats materialize. If the mini maker is losing its grip in some markets, it can always gain a foothold in new ones; if IBM can gaze hungrily at the VAX world, DEC can in turn target the mainframer's own customers. Tandem, which recently broke through the $1 billion a year sales barrier by selling distributed on-line transaction processing (OLTP) systems to IBM's customers, has provided DEC with the perfect precedent.

As Figure 5 shows, DEC's customers now are widely anticipating the

FIGURE 7 End Users Spending a Half Hour More a Day on Their Pcs



announcement in the near future of a VAX-based OLTP challenger. DEC is expected to capture 24.6% of the respondent sites implementing OLTP systems during the survey period, up substantially from the current 6.6% level. IBM's share is projected to decline to 33.9% of the total from 48.5%, which perhaps explains the company's increasingly aggressive marketing of the Stratus fault tolerant OLTP system, which Big Blue calls the System/88.

DEC sources indicate that the company's creation of a new I/O-intensive VAX architecture for OLTP should result in a product next year. Survey respondents are demanding fault tolerant capabilities on this machine, and one must assume that DEC will accommodate them.

Since DEC's fortunes have soared in recent years while IBM's have declined, it's perhaps to be expected that when the industry leader did make a comeback it would be at DEC's expense. John Akers may, in fact, be taking business from Ken Olsen. Then again, the IBM chairman may be taking it from the likes of Edson de Castro, An Wang, and other executives

of second-tier computer vendors. The answer depends on how this year's survey data are interpreted.

IBM's Fortunes Changing in Minis

In recent surveys, IBM has been a poor second to DEC in projected spending for minis and workstations. In stark contrast, this year the mainframer could grab the lion's share of all dollars that respondents expect to spend on such systems over the 18-month period ending December 1988—if one counts a humongous IBM mini order from the U.S. Postal Service, one of the respondents to the survey. Including the postage stamp, the survey projects that IBM's share of total mini/workstation dollars will be 35.6%, compared with DEC's 33.1%. IBM, with its System/88, System/36, and 9370, has three of the top six dollar earners in this category.

If, however, the Postal Service's response is put in the dead letter file, IBM's resurgence in minis will come at the expense of vendors that can least afford competition from Big Blue—Wang Labs, Data General, and others. Excluding the postage stamp, the portion of mini/workstation spending that will go to IBM is expected to increase to 18.2% from 14.7%. But Big Blue's bigger bite clearly won't come out of the hides of DEC, Hewlett-Packard, Sun, Prime, or Tandem.

Not surprisingly, IBM's projected share of the pc pie over the same 18-month period is even more pronounced. Of the 143,000 pcs that respondents expect to purchase between July 1987 and December 1988, IBM is projected to supply 43% of them (see Figure 6; IBM insiders now claim that there is a 160,000-unit backlog of PS/2 orders from its largest customers, with names such as Ford, United Airlines, Travelers Corp., and Merrill Lynch). The other portions are primarily held by IBM PC clones, with none having a share greater than 10%. DEC, of course, is not a factor in this table.

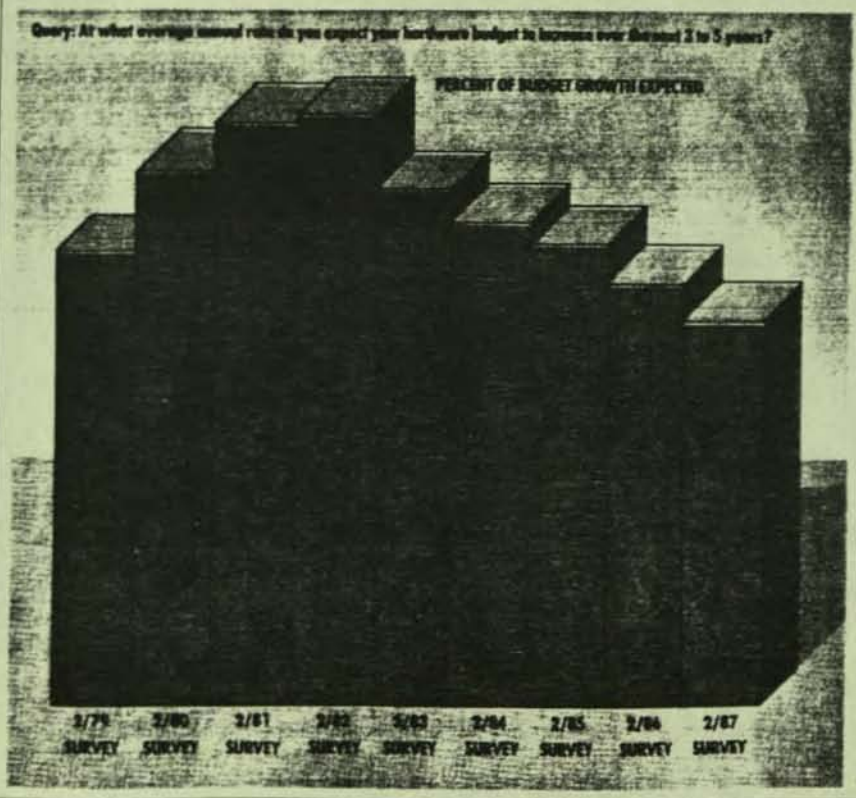
DEC's share of minis planned for use in scientific, engineering, and factory applications will decline to 53.9% from 59.7%. The big gainers here are Hewlett-Packard, Sun, and IBM, though none had more than 10% of the market.

DEC is still the big winner in office minicomputers. Its share of total dollars over the 18-month survey period is projected to grow to 29.4% from 22.4%, while IBM's share declines to 21.9% from 27.4%. A growing number of respondents are turning away from minis for office/MIS use, preferring instead a com-

FIGURE 8. MicroVAX Leads Top 12 Systems to be Acquired

1/86-6/87	7/87-12/88	
IBM System/36	DEC MicroVAX, Unspecified	
DEC MicroVAX II	DEC MicroVAX II	
DEC MicroVAX, Unspecified	IBM System/36	
HP 3000 Series, Unspecified	DEC VAX, Unspecified	
DEC VAX 8200/8250	IBM 9370, Unspecified	
DEC VAX, Unspecified	DEC VAX 8200/8250	
IBM System/38	IBM System/38	
Wang VS/65	HP 3000 Series, Unspecified	
AT&T 3B2	DEC VAX 8500/8530	+
HP 3000 70	Wang VS/7000	New
DG MV/2000, DC	DEC VAX 8300/8350	New
DEC VAX 8500/8530	DEC VAX 8700	New

FIGURE 9. Continuing Decline in Long-term Hardware Budget Growth Expectations



Keeping the Faith

Today, minicomputer suppliers are in a situation similar to the one that developed a generation ago in the mainframe industry. Digital Equipment Corp. and IBM are putting distance between themselves and other mini suppliers in the same way that IBM sped away from the mainframe pack in the late 1960s. It's not the BUNCH being left behind in the mini race, but a new cast including Hewlett-Packard, Prime, Wang, Data General, and AT&T.

IBM and DEC are to take almost 70% of the dollars respondents spend on minicomputer and workstation products in the June 1987-December 1988 period, according to DATAMATION/Cowen & Co.'s latest mini/micro survey. Just five years ago, IBM and DEC accounted for 53% of the mini purchasing power of end users surveyed.

The gap between the leaders and the laggards has widened gradually in some cases and precipitously in others. Hewlett-Packard, for instance, shows no erosion in its 5.3% market share between the previous 18-month stretch and the current one. Prime suffers a drop between the two buying periods to 4.7% from 5.3%, Wang tumbles to 3% from 9.2% and Data General slips to 2.3% from 3.4%; AT&T nearly disappears off the horizon. (The telecommunications giant acknowledges that its guns were silent for a 20-month period between 1985 and 1987, but it claims that almost 70% of this year's revenues are from products that are less than a year old. Even so, insiders don't expect AT&T's Data Systems Div. to break even until 1989.)

Tracking the actual models that customers expect to buy, Figure 8 shows this shrinking minicomputer universe in another light. Six vendors supplied the top 12 minis based on the number of respondents acquiring systems in the survey period January 1986 through June 1987. That number is down to four; by dollar value, only IBM and DEC are visible. Almost half of all sites polled say that they now consider only one supplier when making their minicomputer purchase decision.

Add to this the fact that IS budgets continue to grow at ever smaller rates—less than 8% in 1987 compared with the 11.8% reported in 1982 (see Figure 9)—and the mini BUNCH has a major headache.

If you go into greater detail, these companies' outlook is even gloomier. In office/MIS, the biggest market of all for minis, the survey projects Wang's share will decline to 7.6% from 12.1% and Data General's to 4.8% from 7.8%, with Prime's share staying about the same. Other than DEC, only Hewlett-Packard will gain ground, climbing a single percentage point to 6.2%.

In the other large market segment, scientific/engineering/factory, Data General and Wang are nowhere to be seen, and Prime will eke out a tiny 3.1% of the pie, in what is that company's major market segment. Here, all the mini makers are losing out to the workstation and to Unix. Only Hewlett-Packard, with its increased Unix/workstation orientation, is making progress in this sector among the mini BUNCH: its share could rise to 9.7% from the 4.3% in last year's survey.

In the highly competitive and fast-growing workstation sector, again, only Hewlett-Packard is expected to uphold the honor of the mini BUNCH, doubling its share to 10%. The rest are in the category of "other," as Sun, Apollo, and, of course, IBM and DEC, dominate the scene.

If the pc is set to become the workstation of the future in all markets, then once more it's a future in which the mini makers will play little role—if any—building, and here, even the mighty DEC must be included. Only Wang and Hewlett-Packard have had any success in selling homegrown pcs to their own customer base. DEC and Data General (despite the huge marketing push behind its portable computers) have been notable failures.

Even more depressing, in a sense, is the mini makers' performance in the high-growth sector of integrated office automation systems, a segment where so many of the mini BUNCH have tried to make a stand, and which has been the cornerstone of both Data General's and Wang's reputations. All mini makers—including DEC—are losing out to IBM and to an increasing two-tier blend of pcs and mainframes.

The projected erosion of Data General's base is the most spectacular. The company's share could decline to 6.6% from 13.5%; Wang's to 6.8% from 7.9%. Again, only Hewlett-Packard is expected to increase its share a touch. These depressing statistics perhaps explain why Data General seems to be embarking on a new strategy of courting oems, vars, and systems builders, rather than end users—a return to its roots. The survey shows that along with Hewlett-Packard, DG is offering huge price concessions to these middlemen in an attempt to shift its strategic course. Of course, as the survey makes plain, oems are a fickle bunch and are even turning on DEC.

All in all, there is the impression that these companies, with their proprietary technology and large installed bases, are giving way to a new industry standard platform for applications development: a combination of the Intel 386 (the overwhelming first choice micro in the survey), MS/DOS, and, increasingly, OS/2 and Unix—predominantly AT&T's flavor. Prime is trying to meet this trend with its new supermicro, the EXL 316: a combination of the Intel 386, DOS, and Unix. Based on the principle "If you can't beat 'em, join 'em," Hewlett-Packard is primarily succeeding with Spectrum as a Unix machine.

Overall, however, the mini makers, perhaps overwhelmed by the rate of evolution to micros, are seeking the sanctuary of their own base, and of mainstay high-margin products. This is reflected in all of these companies' shipment projections.

Around 47% of Prime's dollars will come from its high-end 6350 (up from 16%), a product that typically sells for an average of $450,000. Likewise, almost 57% of Wang's dollars will come from a single high-end product—its $380,000 VS7000. More than 55% of Data General's revenue from respondents will come from its high-end MV 15000, only this time the average purchase price for this machine—$150,000—is not as high as the other New England challengers' entries. The same principle seems to apply for Hewlett-Packard as Spectrum ramps up. Its aging 16-bit 3000 series family will decline to 42.4% of its total from 72.5% as Spectrum grows to almost 31% from virtually nothing.

To succeed in the future, these companies will have to do more than retrench into their own customer bases, offering products that are increasingly like mainframes. They will have to convince everyone that the mini can play a vital, vibrant role in the industry's evolution. They will have to prove that the hemorrhaging of applications to micros can be checked. Clearly, the jury is still out on the eventual outcome of these efforts.

Survey Method

The 1987-88 DATAMATION/Cowen & Co. mini/micro computer survey began July 13, 1987, when close to 70,000 questionnaires were mailed to DATAMATION readers throughout the United States. The survey audience was selected on the basis of whether minicomputers, small business systems, or micro-based systems were purchased or in use at a given site.

Replies, collected through Aug. 24, yielded 6,589 qualified, unduplicated responses. Cowen & Co., a Boston brokerage house, tallied results, analyzed data, and presented its findings to institutional investor clients on Sept. 29.

The survey defined minis as including cpus such as the DEC PDP-11, MicroVAX, and VAX 8XXX lines, and comparable systems from Data General, IBM, Hewlett-Packard, Prime, Tandem, etc.; minisupercomputers; mini-based departmental and small business systems; office systems; and workstations. The latter are single-user or multiuser desktop systems, generally priced above $5,000 each; typical examples are products from Apollo, Sun Microsystems, and the IBM RT PC and PS/2 Model 80. Pcs are single-user systems, desktop or portable, including the Apple II and Macintosh, IBM PC and PS/2, and Compaq. To order the complete survey results, please call Debbie Virtue at (617) 964-3030.

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[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Price	5/6
Cpu Performance	6/5
Field Maintenance Support	7/7
Operating System Software	8/9
System Modularity/Expandibility	9/8
Networking and/or Clustering Capability	10/10
Fully Integrated Systems Line	11/11
Strong Unix Offering/Standards Orientation	12/12

FIGURE 11 Key Criteria For Selecting A Pc Supplier

PERCENT OF MENTIONS*	ALL SUPPLIERS
Price	[illegible]
Software Availability	[illegible]
Networking Capability	4.0
Service/Support	[illegible]
Features	[illegible]
Product Reputation	[illegible]
Compatibility	17.4
Speed	[illegible]
Supplier Viability	5.2
Other†	11.0

*Each respondent asked to specify no more than three criteria.

†Includes hardware availability, ease of use, expandability/upgradability, government/company contract, size/portability, graphics display, memory/disk capacity, etc.

bination of mainframes and pc/workstations.

In the highly competitive workstation business, DEC stands to receive 22.3% of the total dollars, an increase over last year's 18.9%. The big winner in this category, however, is Sun Microsystems; its share could leap to 24% from 15.3%. Other gainers are HP and IBM, while Apollo's share is expected to decline to 10.5% from last year's 12.4%.

Personal computers and workstations are becoming the machines of choice for many applications that were once performed on traditional minicomputers, as previous surveys have shown. Respondents now claim that pc applications packages are of a far higher quality than mini-based equivalents; it should be stressed, however, that pcs are still essentially two-application machines—spreadsheets and word processors—and there are no signs in the survey of any revolutionary new applications coming along to drive the market to the triple-digit growth levels that once characterized it. DBMS, cited by nearly 14% of the respondents, is emerging as a major application for the new pcs. Also showing potential is electronic publishing: some 6% of applications packages will be used for this purpose. A significant "other" is computer aided design.

UNIX PROVIDES IBM WITH AN ENTRÉE INTO DEC'S TECHNICAL MARKET.

One of the most interesting statistics unearthed by the survey is shown in Figure 7: the increasing amount of time that people are spending in front of their pc screens. Since 1984, the average has grown to 5.6 hours a day from 4.9. With such habitual use of a crt, one has to wonder whether a resurgence of demand for home computers is just around the corner. Clearly, if some innovator can come up with exactly the right blend of price, function, and friendliness, what is potentially the biggest small systems market of all is ripe for the plucking. ■

LEVEL 1 - 4 OF 4 STORIES

November 23, 1987

SECTION: SYSTEMS & PERIPHERALS; Pg. 47

LENGTH: 771 words

HEADLINE: Curing computer room blues;
McDonnell Douglas stacks gear three stories high in St. Louis facility

BYLINE: By Jean S. Bozman, CW Staff

DATELINE: ST. LOUIS

BODY:

When a company owns dozens of mainframes and scores of disk drives, it is not enough to plan a computer room. The company plans more than one, usually on several floors of a city high rise.

In 1980, McDonnell Douglas Corp., faced with the challenge of housing 15 mainframes and 24 minicomputers, decided to build a three-story "cube" as the central site for computers at its Information Systems Group (ISG) facility here.

The design, which was created by the St. Louis architectural firm of Hellmuth, Obata and Kassabaum, Inc., stands at the heart of McDonnell Douglas's ISG complex in the northeastern part of the city. The facility, administered by personnel from the $1.2 billion ISG division, also houses computers that support the company's Aerospace Group. McDonnell Douglas's total revenue last year was $12 billion.

Record holder?

McDonnell Douglas calls its cubic computer room the largest one in the free world. While that claim may be hard to prove, one sign of the facility's size is that IBM keeps six full-time field-service engineers on-site. There is even a water tower behind the building that provides chilled water to the computer rooms in case of emergency.

The facility houses printers and plotters on the first floor, 15 IBM mainframes and 20 Digital Equipment Corp. VAX systems on the second floor and more than 400 disk drives on the third floor. A single cooling system wraps the building, with extensions to each raised-floor area. Cables and wires descend through vertical columns to make interfloor connections throughout the 150,000 square feet of raised-floor space.

"Rather than having equipment spread out, it's stacked on different floors," says Luke Abkemeier, director of production services for McDonnell Douglas's Information Processing Systems Group. "That allows us to get our CPUs closer together." That proximity was necessary when the building was designed, since peripherals could be no further than 400 feet from IBM CPUs at the time, he says.

Proximity between neighboring CPUs, however, means little, Abkemeier says. An IBM 3084 for the company's ISG can be found alongside an IBM 3090 supporting the Aerospace Division. Across the computer room, a new Tandem Computers, Inc. VLX system is next to a DEC Vaxcluster, but the two systems run different applications. The Tandem supports the company's electronic data interchange network under Tymnet, while the VAXs run applications for regional Bell operating companies.

Support and maintenance are simplified by the three-layer arrangement, as they are in other corporations' multifloor computer rooms -- whether on Wall Street or in Los Angeles's high rises. At McDonnell Douglas, a single power system, fed by two power lines, charges an array of 10,000 batteries under the computer room. The arrangement provides 45 minutes of continuous power in the event of an electrical outage. Four 950-kVA diesel generators in an adjoining building would provide continuing energy, Abkemeier says.

Personnel implications

Centralizing computer resources has personnel implications, as well. "This type of approach is heading toward the day when a small number of operators can run an entire facility," Abkemeier says. "We can get by with fewer people because each person learns how to run several types of systems. This way, people can back each other up." As it is, only seven computer operators work during the two prime shifts, and just five work during the third shift.

McDonnell Douglas has other computer facilities; the two largest are 30,000-sq-ft computer rooms in Dallas and Fremont, Calif. The Dallas facility supports some services provided by Tymnet and the Tymshare division, according to Abkemeier. The Fremont facility supports aerospace design work being done in California.

Each business unit owns, and is responsible for, its own machines in the St. Louis facility. The ISG owns no IBM 3090s, for example. It operates an IBM 3081 Model K, an IBM 3083 Model J, an aging IBM 3032 and an IBM 4381. The aerospace group owns and operates several 3090s.

Some machines are leased, and some are purchased. "We have to go through a fiscal analysis of everything we buy," Abkemeier explains. The analysis of current market conditions determines how a computer is acquired.

Computers that are no longer needed may be given to other divisions within McDonnell Douglas, Abkemeier says. Last month, the company removed six Control Data Corp. Series 170 mainframes. The applications on those machines have been replaced by others on a Cray Research, Inc. Cray-2 supercomputer and DEC VAXs.

GRAPHIC: CW Chart, by Mitchell J. Hayes, Data center design, information by Mcdonnell Douglas Corp.

LEVEL 1 - 1 OF 1 STORY

November 30, 1987

SECTION: SOCIAL ISSUES; Family & Work; Pg. 79

LENGTH: 1144 words

HEADLINE: OFF ON A BUSINESS TRIP? DON'T FORGET THE DIAPERS

BYLINE: By Sandra Atchison in Denver, with Elizabeth Ehrlich in New York and bureau reports

HIGHLIGHT:
A novel solution for traveling parents: Take the kids along

BODY:
Meghan Tawney is a practiced business traveler. She has spent more than 30 days on the road this year and belongs to a half-dozen frequent-flier programs. The convention circuit is as familiar to her as, well, Sesame Street. Meghan is 3 years old.

These days, more and more kids like Meghan are accompanying their parents on business trips. Their mothers are often working at demanding, high-level jobs. Their fathers, much more than the men of a generation ago, are seeking a better balance between work and family life. Explains Meghan's mother, Marcia L. Desmond, Denver regional director of the American Hospital Assn.: "If we want to spend time with our children, we have to take them along."

BREAKING THE ICE. As yet, the number of business travelers with kids in tow remains small. After all, coping with a child while negotiating a contract or attending business meetings is not easy. Nonetheless, the phenomenon is growing, says Dorothy A. Jordon, managing director of Travel With Your Children, a New York-based advisory service.

Many of the tagalongs are infants, traveling with mothers who return to work soon after childbirth. "The idea of not being with him at night seems awful," says Elizabeth Meyers of her son, John. Before John was three months old, his mother, an account supervisor with the public relations firm Daniel J. Edelman Inc. in Chicago, had taken him to both coasts on business. For the most part, the reactions have been positive. "It's a great way to break the ice," she adds.

Older kids benefit from accompanying their parents, too. "I'm interested im having my children understand there is a world out there," says Steve Saltwick, a marketing specialist with Tandem Computers Inc. in Cupertino, Calif. He took his daughter, Sarah, on a two-week business trip to Australia and New Zealand. The only downside, he notes, was the 2 1/2-year-old's discovery of room service in hotels.

Another father, Larry A. Webb, has taken his 9-year-old daughter, Amber, on occasional business trips for several years now. That helps Amber understand what her father does when he's away, says Webb, an Atlanta-based salesman for hospital supply and service company Primedica Inc. It also helps relieve the

strain placed on family life by his constant traveling, which averages two days a week.

The Webbs have Primedica's blessing. When father and daughter make the trek to Lexington (Mass.) headquarters, a company secretary usually baby-sits while daddy takes care of business. Amber and the secretary may go sightseeing. Webb pays the bill, then often takes Amber to dinner. "It keeps our relationship closer," he says.

Hotels have long provided free cribs for their youngest guests. Now some are doing more to accommodate tots traveling on business. On one trip to New York, Edelman's Elizabeth Meyers received a call from a hotel concierge, asking if the kitchen could warm baby bottles for little John. In Denver, the Brown Palace, a venerable business hotel, serves so many children's meals that it's considering a gourmet menu for kids. The Las Vegas Hilton has established a Youth Hotel for children of guests, providing baby-sitting and recreation for as many as 15,000 kids a year. About a quarter of the parents are in town for conventions.

McNETWORKING. Finding someone to tend the little one is the major problem for working parents away from home. Recognizing that, some organizations planning conventions now provide child care. Janet Kniffin, grants coordinator for Connecticut's Permanent Commission on the Status of Women, was one of many mothers who took advantage of baby-sitting services at one law conference in Boston. Indeed, when she took her two kids to dinner one night, she ran into numerous convention mothers with their children. "There I was networking at McDonald's," she says.

To look after the kids, some business travelers bring along a spouse. Most, however, depend on hotels for sitters. Atlanta Metro Sitters, which is bonded and works through hotels, has seen its business explode as more conventioners and conference-goers bring their youngsters along.

Not every hotel sitter is up to par, though. Judith B. Wagner, chairman of Wagner & Hamil Inc., a Denver money management company, was upset when she returned from a business evening in London to discover a note saying the hotel sitter had taken Wagner's preschool daughter, Betsy, to a disco.

'ODD LOOKS.' Myra West-Allen, a media-relations editor who works out of Northbrook, Ill., for Allstate Insurance Co., is leery of unknown sitters. So last spring, when she made a three-day trip to New York, she left her baby twins at home. Determined to continue nursing, she packed a breast pump, cooler, and blue ice along with her briefcase. Each day she presented the hotel concierge with baggies of breast milk to store in the hotel freezer. "You get used to odd looks," says the mother of three, who does take the kids if business brings her anywhere near Grandma's house.

Some of the horror stories make parents who travel with youngsters seem like gluttons for punishment. Sherry Kern, a director of automation sales for Hartford Insurance Group, once missed a connecting flight at the Atlanta airport. For 3 1/2 hours, Kern juggled a cranky infant, a briefcase, a bag containing three days' worth of formula, baby clothes, and diapers. Hobbling alongside on crutches with a broken ankle was her dentist husband, who had come along to baby-sit.

Kern still takes her daughter, Shana, on business trips whenever she can. In a job where travel is expected, she thinks she has shown her bosses that she can be a mother and businesswoman at the same time.

But Meghan's mom, Marcia Desmond of American Hospital, says business trip are never quite the same. No longer can Desmond write speeches on airplanes. "Now I'm under people's seats asking if they've seen a purple dragon." Many's the night she has returned to her hotel room worn out and intent on sleep only to find young Meghan wide awake and raring to go. And then there was the time the litttle darling squirted a container of coffee cream on Mommy's associate, who was just about to give a speech.

Such mishaps fail to deter executive parents, who revel in the close relationships that come from traveling with their kids. The key, they agree, is lots of preparation, a sense of the absurd, and knowing how much a child can put up with. Michael J. London, Lone Star Industries Inc.'s corporate communications director, once took his son to an out-of-town dinner planning session. After spending the evening playing with toy trucks to keep the overtired 2-year-old from falling apart, London rescheduled the meeting for breakfast. This time he arranged to leave the toddler back at the hotel.

GRAPHIC: Picture 1, WEBB WITH 9-YEAR-OLD AMBER: "IT KEEPS OUR RELATIONSHIP CLOSER", NELSON/PICTURE GROUP; Picture 2, DESMOND AND MEGHAN: VETERAN TRAVELERS, KEN AKERS

LEVEL 1 - 2 OF 3 STORIES

November 30, 1987

SECTION: SYSTEMS & PERIPHERALS; Hard Bits; Pg. 60

LENGTH: 369 words

HEADLINE: System/38 disk drive limitations removed

BODY:

IBM has removed limits on the number of its 9332 and 9335 disk drives that can be attached to large IBM System/38 models. The company said last month that attachment of third and fourth strings is available as a feature on System/38 Models 400, 600 and 700. IBM said attachment of the extra strings previously required removal of an installed workstation controller from the fourth position.

The attachment features cost $5,250 for the third string and $3,750 for the fourth string. IBM also launched a 15% promotional discount for customers who buy four or more 9332 Model 400 devices. With the discount, four of the 400M-byte drives cost $47,600. The discount applies to machines ordered before Dec. 31 and scheduled for shipment by Jan. 29.

Tandem Computers, Inc. recently expanded its role in the Unix world by signing joint marketing agreements with two suppliers of applications for use with Tandem's LXN Unix-based minicomputer. The agreements are with Action Software Corp. in San Diego, which develops applications for the hospitality and airline industries, and Teknekron Infoswitch Corp. in Richardson, Texas, which will supply turnkey telemarketing systems.

Harris Corp.'s Computer Systems Division extended the OEM contract under which it provides Marc Software International, Inc.'s Wordmarc word processing software on the Harris CX line of Unix-based systems. Harris also signed a joint marketing contract with Rapitech Systems, Inc. in Suffern, N.Y., to sell Rapitech's Conversionware language-conversion software technology with Harris HCX systems.

Datek Information Services, a market research company in Newtonville, Mass., recently named the Hewlett-Packard Co. Laserjet II as its printer of the year. The nonimpact printer was judged to have had the greatest impact on the industry during the previous year.

IBM fellow John Cocke won this year's Association for Computing Machinery's A.M. Turing Award at the 1987 Fall Joint Computer Conference. The award, which honors technical contributions in computing, was given to Cocke for his work in the development of reduced instruction set computing, design and theory of compilers and architecture of large systems.

file

LEVEL 1 - 2 OF 2 STORIES

Advanced Manufacturing Technology
(Formerly Industrial Robots International)

November 23, 1987

SECTION: Vol. 8, No. 22; Pg. 9

LENGTH: 239 words

HEADLINE: TANDEM'S T.I.M.E. MOVES AHEAD

BODY:

Three key agreements get Tandem Computers' T.I.M.E. (Tandem Integrated Manufacturing Environment) closer to realization on the factory floor (AMT, July 13, p. 3). Joint development and marketing agreements are with Electronic Data Systems (subsidiary of General Motors), Boeing Computer Services and MSA Advanced Manufacturing.

T.I.M.E. is a strategy to functionally integrate business planning, engineering, and factory floor devices in a distributed, multivendor environment. EDS will work with the device control and management system portion, including control of programmable logic controllers, robots, NC tools and electronic test equipment, giving management instant information about the factory floor.

MSA AMI will help develop a series of modules for the factory control and management system, providing online monitoring, traceability and control of the factory. It will handle material tracking, short-term resource scheduling, labor data collection and analysis, quality and inventory control and maintenance planning.

Boeing will codevelop the product and process document management function, giving a connection between engineering and manufacturing by hosting CAD workstations and storing engineering design information and process documents and programs.

Details: Robert T. Jolls, Director of Industry Marketing, Tandem Computers Inc., 19333 Vallco Parkway, Cupertino, CA 95014. Phone: 408-725-6000.

LEVEL 1 - 1 OF 7 STORIES

Business Wire

November 17, 1987, Tuesday

DISTRIBUTION: Business Editors

LENGTH: 338 words

HEADLINE: TANDEM-COMPUTER; (TDM) Safeway Stores Inc. installs Tandem computer systems

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) Tuesday announced that Safeway Stores Inc., based in Oakland, Calif., is installing a network of Tandem NonStop systems, in support of its U.S. retail operations.

Application programs on the Tandem systems, installed in Safeway retail divisions nationwide, will perform store polling, process orders and manage warehouse operations.

In addition, a Tandem EXPAND network will handle data communications between Safeway stores, distribution centers and divisions. The Tandem network will also provide Safeway personnel with access to applications running on IBM mainframes at Safeway's regional data processing centers.

Safeway has installed three systems, a Tandem NonStop EXT10 at its regional center, a NonStop TXP in its Phoenix, Ariz., division and an EXT10/25 at its corporate headquarters as the first step in its overall program.

Safeway will use store polling and electronic mail software provided by the Northern California branch of Systemhouse Inc., and Immedia Telematics Inc., Montreal, respectively. Warehouse management and order processing applications, scheduled for spring 1988, are being provided by Dallas Systems Corp., Dallas.

Dallas Systems, Systemhouse and Immedia are all members of the Tandem Alliance, a program to encourage the development of application software that runs on Tandem systems.

Safeway is one of the largest supermarket operators in the United States, with 127,000 employees and 1,700 stores. Safeway's total sales for 1986 were more than $20 billion.

Tandem Computers Inc. manufactures and markets computer systems and networks for the on-line transaction processing marketplace. The company's headquarters are in Cupertino.

Note to Editors: Tandem, NonStop, EXPAND, EXT, EXT10, EXT25 and TXP are trademarks of Tandem Computers Inc. IBM is a trademark of International Business Machines Corp.

CONTACT: Tandem Computers Inc., Cupertino
Glenn LaFrank, 408/725-6435

LEVEL 1 - 3 OF 3 STORIES

November 2, 1987

SECTION: TRENDS & ANALYSIS; Technology; Pg. 27

LENGTH: 114 words

HEADLINE: A system stretched to the max

BODY:

* All transactions on both the New York and American stock exchanges are handled by Securities Industry Automation Corp., New York. About 200 networked " fault-tolerant computer processors from Tandem Computers Inc., Cupertino, Calif., do the work.

Until Oct. 19, the record for transactions in one day had been 250 million. Suddenly, 700 million a day became the norm. "It was uncharted territory for us, but we sailed through it," says Raymond J. Villareal, Tandem's security-industry marketing manager.

The main problems were not computer-related: (1) The ticker can't run any faster, because humans couldn't read it; (2) The printers couldn't keep up with the order.

November 9, 1987

SECTION: NETWORKING; LAN Reliability; Pg. 19

LENGTH: 551 words

HEADLINE: Net Failures Growing Concern in Workplace;
New Products Protect Users

BYLINE: By Mark Stephens

BODY:

Dramatic growth in the use of local area networks and the advent of diskless workstations that cannot operate independently of the network have meant that LAN failures are an ever-increasing workplace concern.

But where some see trouble, others see opportunity, and new classes of hardware and software are becoming available purely for the purpose of making LAN failures survivable.

The new byword is " fault tolerance, " and in comparison to the multiuser computers they have generally supplanted, most LANs are fault tolerant, indeed. Workstations with local processors and storage can continue to operate in a strictly local mode, whether the network is operating. Still, the distribution of processing power does not preserve network communication or server-based files.

Studies by Tandem Computers Inc., a pioneering company in the manufacture of fault-tolerant mainframe computers, show that 45 percent of system faults are what Tandem calls "administrative error" -- a diplomatic way of saying that somebody made a mistake. Only 17 percent of the system faults in the Tandem studies were caused by power, disk, or processor failures, though these are the areas where most product development is taking place.

Fault-tolerant software often features transaction tracking, which is intended to preserve database consistency in case a workstation or file server fails before a transaction is completed. If a problem such as a program abort, media failure, or power failure interrupts a transaction, the software automatically aborts the database changes and rolls back to the previous point of consistency. The transaction-tracking software withdraws all database changes made by the incomplete transaction without affecting completed transactions.

Hard disk drives are the most mechanically complex elements of any LAN and are therefore the most prone to failure. For most LANs, the easiest solution to losses caused by hard disk failure is performing regular backups. Next in level of sophistication and expense is track mirroring, where network operating system software like Novell's SFT Netware 2.1 writes identical copies of each file to separate cylinders on the hard disk, with the idea that multiple cylinders are unlikely to be destroyed in a head crash.

A more sophisticated version of disk mirroring writes files to two completely independent disk drives. This type of disk mirroring does not protect against a user deleting data he wasn't supposed to, but if there is a failure of the drive itself, it will recover the disk.

Server mirroring uses not just duplicate hard disk drives but duplicate servers, which not only monitor the network but constantly monitor each other, looking for failures. The method of monitoring varies, but one example would be the monitoring of power supply voltage, a change in which might presage power supply failure in one of the servers.

Another approach is self-monitoring, where the server being monitored periodically checks its systems and sends an "I'm okay" signal to its partner server. In either case, if indications suggest that a server is about to fail, hooks in the network operating system can change the server actually operating on the network, and do it without network uses even knowing a change had taken place.

GRAPHIC: Illustration, Network Fault Tolerance, Three Ways to Avoid Slipping a Disk, The three approaches pictured above offer different levels of sophistication, but all protect against hard disk drive failure on a LAN.

LEVEL 1 - 5 OF 5 STORIES

The New York Times

November 17, 1987, Tuesday, Late City Final Edition

SECTION: Section D; Page 25, Column 1; Financial Desk

LENGTH: 761 words

HEADLINE: Careers;
Managers Found by Computer

BYLINE: By ELIZABETH M. FOWLER

BODY:

MOVE over, management recruiters. Stanford University is going to poach on your territory with a computerized system to help companies find managers.

The system, which is called Pronet and is expected to be in use by the end of the year, works this way: Into a computer go profiles of Stanford graduates, whether they are looking for jobs or happily employed. Out come the ones that match a particular job opening available at a subscribing company.

In an attempt to provide confidentiality to participants, the profiles are presented to the interested company without name, sex or age. If the company is interested, meetings with candidates are arranged.

Charter subscribers enrolled before Nov. 30 can ask for 30 searches a year over a three-year period at a cut-rate $7,000; others pay $3,500 a year to make as many as 20 requests. The fees are small compared with those of management recruiters, who might charge one-third of an executive's salary.

At first the data base will include 4,000 to 5,000 alumni with engineering, business or computer science degrees. That is expected to grow to about 10,000 at the end of the first year, out of mailings to about 51,000 graduates who majored in those areas. Later, liberal arts, law and medicine graduates will probably be added, according to Mark Jordan, director of the program. He said a few liberal arts graduates had already asked to register and he had signed them up.

The 53 companies signed up include Du Pont, Minnesota Mining and Manufacturing, Boeing, Goldman, Sachs, Genentech, ARCO, Monsanto, Ford, Tandem Computers, Wells Fargo Bank, Polaroid, Northrop and Hewlett-Packard.

Each search would provide up to 20 four-page profiles from which the company could select five individuals for interviews.

Mr. Jordan said, ''The system is in place, and we expect to be operational by the first of the year.''

Discussions are under way with other schools - the Massachusetts Institute of Technology, Harvard University and California Institute of Technology - about adding them to the program.

The idea came from a survey that showed Stanford alumni wanted such a service. ''While many graduates like their jobs they are always interested in looking at opportunities,'' Mr. Jordan said.

The introduction of Pronet comes at an opportune time. Middle managers have been facing mass dismissals, and many of them are realizing that they cannot count on staying long with a company. In fact, the average middle manager changes jobs five times in a career.

''Someone called me early one morning to tell me about this,'' Carl Menk, chairman of Canny Bowen Inc., a management recruiting firm, said of the Stanford program. ''He heard it on a 4 A.M. radio show. Stanford does have a lot of attractive, qualified people, but we have access to them from other sources. There are data banks we can tap into with well over 100,000 American and Canadian scientists, giving background, degrees and job titles, for example. This Pronet is a good idea but not unique and too narrow for us.''

Furthermore, he said, recruiters do more than just research because they dig into candidates' personalities and winnow the best to be presented to a company, whereas Pronet puts that burden on company personnel.

Recruiters usually do not have trouble identifying top managers. They tend to be visible - chief executives, financial officers and plant managers. But the lower the search into middle management the harder it is to find names and data that fill a company's specifications.

''Pronet is a good idea,'' said Dr. Martin Schatz, who heads a small business school - the Roy E. Crummer Graduate School of Business -at Rollins College, in Winter Park, Fla. However, he uses a different approach to help his graduates find jobs because the school serves a different constituency.

Many students have come from other parts of the country, he said. ''They tend to want to remain in Florida.'' He told of one graduate last spring who, although offered $38,000 by Citibank in New York, took a job with a Florida bank for $28,000. Florida housing, clothing and transportation costs are lower, and there is no state income tax.

The school helps graduates find jobs with such innovative techniques as a mentoring system, which links each student with a top executive of a Florida company. Companies also receive a resume book about the graduates. Another idea is a brochure called ''The Presidents Club.'' The pamphlet consists of pictures and data on 57 graduates who head companies, 90 percent of them in Florida.

GRAPHIC: Drawing

SUBJECT: Terms not available

LEVEL 1 - 3 OF 5 STORIES

November 18, 1987, Wednesday

SECTION: TECHNOLOGY TODAY; Pg. 14

LENGTH: 397 words

HEADLINE: Systematics Sells Trust Processing Unit;
SunGard Agrees to Provide Disaster Recovery Services

BYLINE: By DAVID O. TYSON

DATELINE: NEW YORK

BODY:

IN separate agreements, Systematics Inc. has divested its trust processing business and struck a joint marketing deal with one of the major providers of disaster recovery services.

Arkansas Systems Inc., a neighboring firm of Systematics in Little Rock, Ark., bought the trust banking software and trust service bureau operations, adding 50 customers to its existing clientele of more than 300 financial institutions. The price was not disclosed.

SunGard Recovery Services entered into the exclusive comarketing agreement to supply integrated disaster services. In time of disaster, Systematics customers will gain immediate access to SunGard computer facilities in Chicago, Philadelphia, and San Diego.

The trust products of Arkansas Systems cost between $10,000 and $28,000 for IBM System/36 and System/38 computers at community banks and between $75,000 and $150,000 for institutions with International Business Machines Corp. mainframes running the MVS and VSE operating systems.

"We feel our software, coupled with the IBM 9370, offers a great departmental solution for larger banks who want to maintain a common architecture between their main processors and departmental systems," said James K. Hendren, Arkansas Systems president, in the announcement.

The agreement with SunGard provides for that division of SunGard Data Systems Inc., Wayne, Pa., to provide technical assistance and data processing and communications backup to Systematics customers with IBM computers in the 3000 series or IBM systems using the MVS/XA operating system.

SunGard Recovery Systems has more than 420 customers in 40 states and Canada. It provides backup for Digital Equipment, IBM, and Tandem computer systems.

Systematics has 50 data processing centers and more than 7,000 software and facilities management clients. Disaster recovery has emerged as a related service. Under the SunGard agreement, Systematics will support programming, testing, disaster prevention planning, and recovering planning audits.

In another announcement, Systematics said it has entered into two facilities management agreements. One is with the Liberty National Bank and Trust Company

of Oklahoma City and the First National Bank and Trust Co., Tulsa, Okla., both subsidiaries of Banks of Mid-America Inc., Oklahoma City. The other is with Pacific First Federal Savings Bank, Tacoma, Wash.

LEVEL 1 - 1 OF 5 STORIES

November 18, 1987, Wednesday

SECTION: TECHNOLOGY TODAY; Pg. 12

LENGTH: 584 words

HEADLINE: UPDATE

BODY:

Vendors Flock to Eftpos UK

If a British proposal pans out for electronic funds transfer at the point-of-sale, a few technology vendors in on its early phases could mine gold. U.K. banks plan a three-city, 2,000-terminal test in 1989 of an ambitious, nationwide electronic payment system for credit and debit cards.

The operating entity is Eftpos U.K. Ltd. Three key vendors already selected are American, according to Eftpos chairman Richard Allen. They are Applied Communications Inc., International Business Machines Corp., and Tandem Computers Inc.

Applied Communications, an Omaha-based subsidiary of U.S. West, will supply a version of Base-24, its best-selling EFT software package. Applied announced earlier this month that it will open a London office to support Eftpos U.K. and other clients. For additional software support, Eftpos U.K. will rely on CAP Financial Services Ltd., Applied's exclusive British distributor.

IBM will provide its 4831 mainframe computer and four System/88 processors for continuous operation. These will complement two Tandem VLX NonStop systems that will support testing by participating banks.

The program will also use networks from British Telecom and data encryption systems from Plessey Crypto Ltd., a prominent British defense contractor. Terminal suppliers will include Omron Terminals (UK) Ltd. and Ericsson Information Systems (UK) Ltd., subsidiaries of Japanese and Swedish computer companies respectively.

Eurocheque Quickens ATM Pace

Eurocheque, the multinational consumer payment service that is evolving from a paper instrument resembling a travelers check into an electronic debiting system, expects to be among the top international automated teller machine networks by 1990.

It has its work cut out. MasterCard is merging its MasterTeller automated teller machine network with the U.S.-based Cirrus System and projects it will have a 30,000-ATM international network by late 1988. Visa has agreed to make the Plus ATM logo available worldwide, creating a 35,000-machine system spanning 22 countries.

With 32 million bank-issued cards, Eurocheque boasts greater consumer loyalty than either MasterCard or Visa in Europe. But its 3,000-machine ATM network in five countries has been a relative nonstarter. ATM transaction volume this

year will number "a few hundred thousand," according to Mark van Wauwe, secretary general of Eurocheque International, Brussels.

He told the recent Payment Systems International Symposium in Lisbon that Eurocheque cards will increase to a predicted 53 million in 1993, used in 6 million ATM transactions and 9 million point-of-sale transactions.

Mr. van Wauwe said the ATM network will grow to 9,000 machines in nine countries next year, and to 25,000 machines by the early 1990s. At that point the network would include more than 85% of the on-line ATMs in Europe.

Call for POS Cooperation

The chairman of an American Bankers Association task force that recently drafted technical guidelines for handling point-of-sale debit payments said that bankers and retailers must work together for the success of such systems.

William Petrarca, senior vice president of National City Bank, Cleveland, told a group of grocery wholesalers this month in Chicago that their joint goal should be to build consumer trust.

"A joint effort can optimize product integrity early on and generate the transaction volumes needed to guarantee that debit cards will benefit all participants," he said.

GE Solid State Brings Out 2 Octal D-Type Flip Flops

SOMERVILLE, N.J. — GE Solid State has added two octal D-type flip flops with three-state outputs to its advanced CMOS logic family of products.

The CD54/74AC/ACT564 provides inverting operation from input to output, while the CD54/74AC/ACT574 is a non-inverting device. Both contain eight positive-edge triggered flip flops that accept data on the low-to-high transition of an input clock pulse.

An output enable pin is also provided to control the three-state outputs, and is said to be independent of device operation. When the output enable is high, all eight outputs enter the high impedance state, isolating them from the bus or components to which they connect.

Both flip flop types meet JEDEC standards for AC/ACT. CD/74AC types are intended for all CMOS system designs while the CD54/74ACT versions are pin, function and speed equivalents of high-speed bipolar devices, the company said.

With a +5-V power supply and a 50-pF capacitance load minimum propagation delay times from clock input to data output are 2.2 ns for the ACS74 and 1.9 ns for the AC564. For the ACT574 and 564, the delay times are 2.2 ns and 2 ns, respectively.

All of the parts can sink and source 24 mA of load current, enabling them to drive 15 FAST devices or 50-ohm transmission lines.

CD54/74AC flip flops are rated for operation over a supply voltage range of +1.5 V to +5.5 V. The CD54/74ACT types operate over the TTL supply range of +4.5 to +5.5 Vdc. CD54AC/ACT parts are specified over the full military temperature range of −55 degrees C to 125 degrees C, and the CD74AC/ACT plastic-packaged commercial models operate from −40 degrees C to 25 degrees C.

In quantities of 100, the new devices are priced at $1.40 each. Two package styles are available. CD74AC/ACT flip flops come in either 20-lead plastic DIPs (E-suffix) or 20-lead dual-in-line surface-mount plastic packages (M-suffux). CD54AC/ACT types are supplied as wafers (W-suffix) or in die form (H-suffix).

The company has also introduced a tuner control integrated circuit incorporating a band switch controller and a pair of operational amplifiers.

The CA3263 can operate in either frequency- or voltage-synthesizer electronic tuner applications. Two logic select bits provide the input signals to the bandswitch controller. The four outputs of the band switch drive the supply voltages of the UHF, superband and VHF bands.

The inverting and non-inverting op amps can be used to amplify error signals or serve as active filter elements in phase-locked loop, frequency-synthesizer tuners. A 33-V zener diode is included to regulate op amp supply voltage.

The op amps provide a minimum of 29 V when activated and saturate at a maximum of 0.4 V. Input bias currents are 200 nA maximum. Output voltages from the band switch on the VHF, UHF and superband lines and are a minimum of 11.3 V at a current of 30 mA, with a 12-V supply voltage.

Packaged in a 14-lead plastic DIP (E-suffix), the CA3263 operates from zero to 70 degrees C. In lots of 100-pieces, it is priced at $1 each.

See Europe Semicon Sales Flat in '87; Up 13% in '88

By JAMES FALLON

LONDON (FNS) — Total European semiconductor sales in 1987 will remain flat at $6.25 billion before increasing 13.5 per cent to $7.09 billion in 1988, according to Motorola's annual market forecast.

In its forecast, Motorola, which had predicted a 13 per cent surge a year ago, said growth will be negligible this year because of the fall in the value of the dollar against the local currencies and an unforeseen downturn in the West German market.

The top European markets last year were the United Kingdom, France and the Scandinavian countries. The French market rose by 10.8 per cent in local currency terms to $975 million and is expected to grow another 9.8 per cent in 1988 to $1.07 billion. The U.K. market saw an 8.2 per cent hike in 1987 to $1.14 billion. Additional 10.1 per cent growth is anticipated in 1988, raising the total to $1.25 billion.

In France the sales increase came despite growth in the electronics industry that was lower than forecast. The French electronics industry is expected to undergo a slightly higher growth rate in 1988 led by the telecommunications and computer sectors. Motorola said. French public investment in telecommunications is expected to rise by 10 per cent next year, with semiconductor shipments to this market increasing by a similar amount in both 1987 and 1988.

Communications was also the main area of movement in the U.K., with a substantial backlog of lines to be installed and rapid growth in the cellular radio area, according to Motorola. The automotive and industrial segments were also strong.

Meanwhile, West Germany, despite earlier predictions that sales would jump some 12 per cent, will see its semiconductor market decline by 7 per cent this year, due in part to the high value of the Deutsche mark against the dollar, which, in turn, curtailed exports.

Home electronics sales in this market dropped by 6 per cent, communications products fell 10 per cent and sales of industrial products slumped by 20 per cent. No significant improvement is anticipated in 1988, Motorola said.

Italy was also hindered by higher currency values this year, with semiconductor sales falling 1.7 per cent to $643 million. The primary factor was a 35 per cent drop in the shipment of personal computers. Motorola, however, expects this market to grow by 10.3 per cent in 1988 to $700 million.

The forecast predicted that the Asia-Pacific market, excluding Japan, will witness a 68 per cent sales increase to $3.46 billion this year, with another 26.5 per cent hike the following year to $4.36 billion.

Growth in Japan in 1987 will be about 16.6 per cent to $12.18 billion and about 15.9 per cent in 1988 to $14.12 billion.

Tractebel Merges Hybrid Sys., Data Linear, Dielectric

BILLERICA, Mass. — Hybrid Systems Corp., Data Linear Corp. and Dielectric Semiconductor, all owned by Tractebel, a Belgian holding company, have been merged into a new entity to be known as Sipex Corp.

All three companies will retain their names as divisions of Sipex, which will manufacture analog and digital signal-processing equipment; the existing heads of each division will report to Sipex chairman and chief executive James Donegan.

Hybrid Systems of Billerica and Data Linear Corp. of Milpitas, Calif., were merged last November (EN, Nov. 3, 1986). Dielectric Semiconductor of San Jose, Calif., was acquired by the U.S. arm of Tractebel, which is owned by Societe General de Beligique, in June.

Hybrid Systems, which will be headed by Sipex senior vice-president Sam Smookler, has a 50-square-foot operation for the design and manufacture of hybrid data converters, data acquisition subsystems and thin-film products. The division carries the MIL-STD-1772 certification, and supplies components for a number of space and military programs. Mr. Smookler has been with Hybrid, as vice-president and general manager, since last year. He previously had been manager of the Alcoswitch division of Augat Corp.

Senior vice-president David Swain will continue as general manager of the Data Linear division, which operates a 31,000-square-foot plant. The division produces signal-conditioning ICs, which are used in Sipex hybrid circuits and sold as stand-alone components in packaged and unpackaged form.

The Dielectric Semiconductor division will be managed by vice-president and general manager Bill Lucas, who was a co-founder of the firm. The division makes 3- and 4-inch dielectrically-isolated wafers, which serve as a base for high-speed linear circuits and other devices including radiation-hardened ICs.

The privately-financed Sipex has about 300 employes and estimates that its 1987 sales will be about $25 million. Corporate headquarters are in Billerica, and the firm maintains a direct sales force in the U.S. and subsidiary sales organizations in Europe and Japan. Mr. Donegan, the chief executive, had been head of Hybrid Systems since April, 1985.

Also reporting to Mr. Donegan will be Fred Killinger, senior vice-president for sales; Frank R. DiPietro, senior vice-president and chief financial officer; and Richard Randlett, senior vice-president for strategic marketing. Mr. Randlett was a founder of Data Linear.

Mr. Donegan said Sipex will spend significant amounts on research and development in all three divisions. "We plan to specifically focus our efforts on base wafer cost and performance characteristics, as we feel that this effort can be leveraged across all product offerings," he said. The Sipex line includes hybrid converters, data acquisition systems and monolithic linear circuits using dielectric isolation technology.

This year Hybrid Systems has introduced a 16-bit hybrid analog-to-digital converter, the HS9476, that includes an internal 16-bit sample-and-hold (EN, March 30), and a self-contained 12-bit multichannel data acquisition system including a four-channel differential input multiplexer (EN, April 27).

Microsemi Wraps Buy of Coors Unit

SANTA ANA, Calif. — Microsemi Corp. has completed its acquisition of the Coors Porcelain Co.'s Components operation in Broomfield, Col., for $9.2 million.

The deal includes Coors Components' 115,800-square-foot plant and the rectifier and diode lines manufactured there.

Mick McKeighan, general manager of Microsemi's Scottsdale, Ariz., operation, was named general manager of the components unit, according to David R. Sonksen, Microsemi's vice-president of finance. Mr. McKeighan, who retains his responsibilities in Scottsdale, reports to company chairman and chief executive Philip Frey Jr.

Michael J. Fenerty, who was named president of the unit when Coors acquired the former Siemens' Colorado Components division last year (EN, March 31, 1986), will remain with Coors Porcelain as vice-president of corporate development.

The 100 Coors employes working at the facility will be retained, Mr. Sonksen said.

"This agreement will help us further our position in technology for transaction processing," Mr. Frey said.

Microsemi is a supplier of discrete semiconductors mainly for the military/aerospace market.

Mgr. Exits Intel For Mosaic V-P Slot

SANTA CLARA, Calif. — Intel's international sales development manager for the ASIC group, Jeff Katz, has left the company to become vice-president of marketing at Mosaic Systems, a Burroughs spinoff doing waferscale integration.

Ron Smith, director of strategic development, has been named by Intel to replace Mr. Katz. Mr. Smith, who will continue reporting to Intel's ASIC vice-president, Jack Carsten, retains his present title in addition to picking up the sales development duties.

Neither Mr. Katz nor Mr. Smith could be reached for comment.

Mr. Katz had previously been director of marketing until September when his position was split in two, with Mr. Smith assuming responsibility for strategic business development.

Nat'l Samples Com. Processor

SANTA CLARA, Calif. — National Semiconductor Corp. is sampling a communications processor which is compatible with IBM 3270, 3299 and 5250 protocols.

The DP8344 Biphase Communications Processor is designed for integration with cluster controllers, PCs, terminals and printers to access 370-class mainframes and IBM Systems 34/36/38.

The device has a 20-MHz, 50-ns T-state processor with a maximum instruction-cycle time of 200 ns. It also has direct access to 64K-by-16-bit instruction memory, access to separate 64-by-8 data memory, 30 instruction types, a 16-bit timer and a full-function arithmetic logic unit and barrel shifter.

The transceiver section of the DP8344 is software-configurable and can support IBM 3270 and 3299 coax, 5250 twinax and general 8-bit protocols. The transceiver also features fully-registered status and control capabilities and an on-chip CMOS differential line receiver.

Aside from plug-compatible terminal and printer applications, the DP8344 can be used as a gateway between a cluster controller and various local area networks. It can also function as an IBM 3270-to-ASCII protocol converter.

The device can be installed on a communications card designed for a PC-expansion slot to provide a micro-to-mainframe link. The card allows the PC to emulate a 3270 or 5250 terminal, but the computer retains its distributed processing power.

Development tools available include a DP8344-based evaluation board, a monitor-debugger program, a macro assembler with linker, network-analysis monitors and a 3178 terminal emulation board. Third-party suppliers of the tools include Capstone Technology, Fremont, Calif., and Hilevel Technology Inc., Irvine, Calif.

The device is packaged in an 84-pin, surface-mount PLCC and is priced at $50 each in 1,000-piece quantities.

Tandem Buys Stake In Brit. R&D Opn.

CUPERTINO, Calif. — Tandem Computers Inc. has purchased an equity interest in Anamartic Ltd., a Cambridge, England, R&D operation working on waferscale integration and computer storage products.

Tandem will be represented on the Anamartic board by former marketing director Dave Mackie, who now serves the U.S. firm in a consulting capacity.

Terms of the agreement were not disclosed, but Gerald D. Held, Tandem's vice-president of new ventures, said the deal includes a provision for the joint development of unspecified systems products.

"Obviously we are most interested in their transaction processing," Mr. Held said. "It is very possible that we will eventually become one of their customers."

CORPORATE INFORMATION CENTER

LEVEL 1 - 1 OF 2 STORIES

November 20, 1987, Friday

DISTRIBUTION: Business Editors

LENGTH: 338 words

HEADLINE: TANDEM-COMPUTER; (TDM) Safeway Stores Inc. installs Tandem computer systems

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) Tuesday announced that Safeway Stores Inc., based in Oakland, Calif., is installing a network of Tandem NonStop systems, in support of its U.S. retail operations.

Application programs on the Tandem systems, installed in Safeway retail divisions nationwide, will perform store polling, process orders and manage warehouse operations.

In addition, a Tandem EXPAND network will handle data communications between Safeway stores, distribution centers and divisions. The Tandem network will also provide Safeway personnel with access to applications running on IBM mainframes at Safeway's regional data processing centers.

Safeway has installed three systems, a Tandem NonStop EXT10 at its regional center, a NonStop TXP in its Phoenix, Ariz., division and an EXT10/25 at its corporate headquarters as the first step in its overall program.

Safeway will use store polling and electronic mail software provided by the Northern California branch of Systemhouse Inc., and Immedia Telematics Inc., Montreal, respectively. Warehouse management and order processing applications, scheduled for spring 1988, are being provided by Dallas Systems Corp., Dallas.

Dallas Systems, Systemhouse and Immedia are all members of the Tandem Alliance, a program to encourage the development of application software that runs on Tandem systems.

Safeway is one of the largest supermarket operators in the United States, with 127,000 employees and 1,700 stores. Safeway's total sales for 1986 were more than $20 billion.

Tandem Computers Inc. manufactures and markets computer systems and networks for the on-line transaction processing marketplace. The company's headquarters are in Cupertino.

Note to Editors: Tandem, NonStop, EXPAND, EXT, EXT10, EXT25 and TXP are trademarks of Tandem Computers Inc. IBM is a trademark of International Business Machines Corp.

CONTACT: Tandem Computers Inc., Cupertino
Glenn LaFrank, 408/725-6435

HARD BITS

System/38 disk drive limitations removed

IBM has removed limits on the number of its 9332 and 9335 disk drives that can be attached to large IBM System/38 models. The company said last month that attachment of third and fourth strings is available as a feature on System/38 Models 400, 600 and 700. IBM said attachment of the extra strings previously required removal of an installed workstation controller from the fourth position.

The attachment features cost $5,250 for the third string and $3,750 for the fourth string. IBM also launched a 15% promotional discount for customers who buy four or more 9332 Model 400 devices. With the discount, four of the 400M-byte drives cost $47,600. The discount applies to machines ordered before Dec. 31 and scheduled for shipment by Jan. 29.

Tandem Computers, Inc. recently expanded its role in the Unix world by signing joint marketing agreements with two suppliers of applications for use with Tandem's LXN Unix-based minicomputer. The agreements are with **Action Software Corp.** in San Diego, which develops applications for the hospitality and airline industries, and **Teknekron Infoswitch Corp.** in Richardson, Texas, which will supply turnkey telemarketing systems.

Harris Corp.'s Computer Systems Division extended the OEM contract under which it provides **Marc Software International, Inc.**'s **Wordmarc** word processing software on the Harris CX line of Unix-based systems. Harris also signed a joint marketing contract with **Rapitech Systems, Inc.** in Suffern, N.Y., to sell Rapitech's Conversionware language-conversion software technology with Harris HCX systems.

Datek Information Services, a market research company in Newtonville, Mass., recently named the **Hewlett-Packard Co.** Laserjet II as its printer of the year. The nonimpact printer was judged to have had the greatest impact on the industry during the previous year.

IBM fellow John Cocke won this year's **Association for Computing Machinery's A.M. Turing Award** at the 1987 Fall Joint Computer Conference. The award, which honors technical contributions in computing, was given to Cocke for his work in the development of reduced instruction set computing, design and theory of compilers and architecture of large systems.

Connolly

CONTINUED FROM PAGE 57

1100/94 designed to boost throughput in transaction processing environments.

There are a couple of strikes against that move, but the announcement gave Unisys a chance to reaffirm support for the 1100s and fueled new discussions of what Unisys can offer its high-end 1100 customers.

One strike is the fact that the 1100/94 Model II Turbo is not scheduled for delivery for more than a year. The second problem, conceded even by Unisys officials, is that it may not be cost-effective to field upgrade an 1100/94 to the new model, which means the Turbo is suited for companies that are growing into the 1100/94 and want a Turbo to replace a smaller 1100/90 or for companies willing to endure a total system replacement for a 25% gain.

Not all bad

But there is also reason for optimism. Analyst Michael Geran of E. F. Hutton & Co. in New York expects the 1100 development cycle to speed up, driven by the former Burroughs' management team. He notes that Unisys has development teams working to expand high-end 1100/90 configurations from four CPUs to six or eight processors.

At the same time, those developers are working on a more powerful version of the basic 1100/90 processor for delivery in 1988 and a successor processor for the 1990s, code-named Mercury.

Unisys wants to keep most users happy with these projects, and they probably will. But the vendor still faces roadblocks. Unisys must deal with the fact, or at least the perception, that the 1100/90 has fallen behind the A series and competitive offerings such as the IBM 3090 in terms of power.

If a large bank sees a greater growth path in the IBM world, including the IBM plug-compatible market, it may use that as a reason to abandon Unisys.

But even if Unisys holds onto its base of almost 1,000 1100/90 processors, the vendor must find a way to attract new customers, not only to the 1100 line but also to the A series.

Unisys cannot afford to lose a site here and a site there without finding replacements. And in order to do that, the company will have to keep fresh faces on both product lines.

Connolly is *Computerworld*'s senior editor, systems & peripherals.

THE VALUE LINE Investment Survey

Part 3 Ratings & Reports

EDITION 7
Pages 1000—1142

File in the binder in order of edition number, removing previous edition bearing the same number.

November 6, 1987

★★ Rank highest for Timeliness.
★ Rank above average.

ESPECIALLY NOTEWORTHY:

*We're inputting two new companies into the Computer & Peripherals Industry: **3Com Corp.** (page 1114) and **Key Tronic** (page 1101). We've also plugged **Dynatech** (page 1044) into the Electronics Industry and **Cooper Industries** (page 1003) into the Electrical Equipment Industry. And for investors interested in the Office Equipment and Supplies Industry, a copy of our report on newcomer **Dennison Mfg.** can be found on page 1121.*

***Tandem** computers kept the Big Board functioning during Black Monday, but Wall Street hardly seemed grateful. See page 1111.*

*Market crash or not, **Arrow** is still aiming to acquire **Ducommun's** distribution business. See pages 1031 and 1043.*

*Bottom fishing has been risky business for buyers of **Fischbach** (page 1010).*

***IBM's** new personal computers have yet to take a byte out of **Compaq**. We've crunched the numbers on page 1100 and 1086.*

***Digital's** still cleaning up. See our sweeping commentary on page 1096.*

*The teacher probably already has an **Apple**, so where does the company go now? We map it out on page 1082.*

*Thin film may spell wider returns at **Nashua**.* Page 1128.

In three parts: Part I is the Summary & Index. Part II is Selection & Opinion. This is Part III, Ratings & Reports. Volume XLIII, No. 7.
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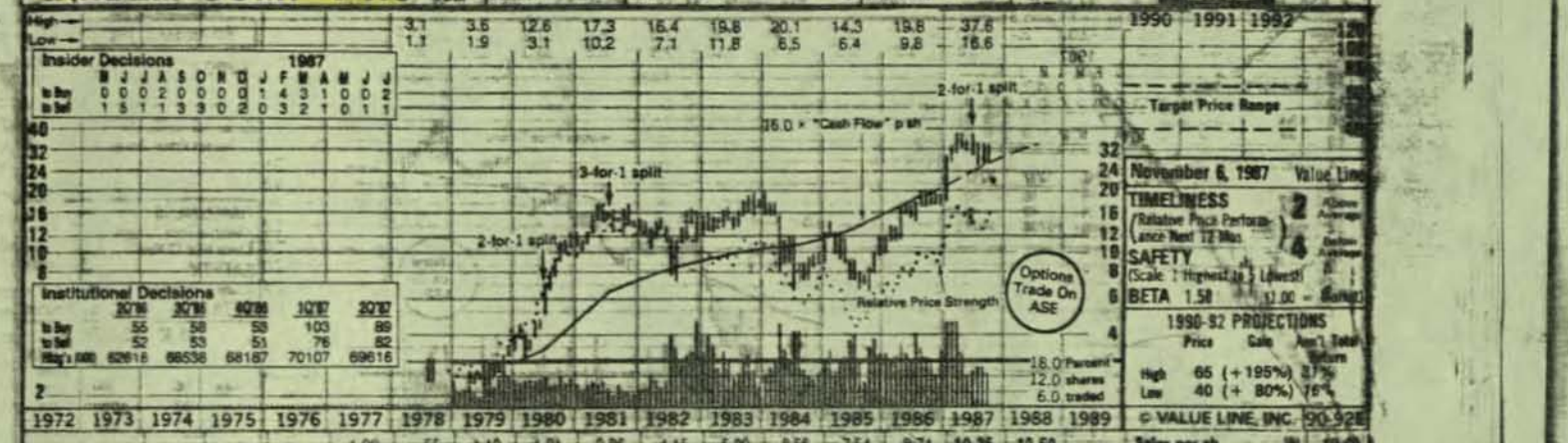
TANDEM COMP'T'RS

NYSE-TDM | RECENT PRICE 22 | P/E RATIO 18.0 (Trailing: 20.4 Median: NMF) | RELATIVE P/E RATIO 1.78 | DIV'D YLD Nil | VALUE LINE 1111



November 6, 1987 Value Line

TIMELINESS 2 (Relative Price Performance Next 12 Mos.)

SAFETY 4 (Scale: 1 Highest to 5 Lowest)

BETA 1.50 (1.00 = Market)

1990-92 PROJECTIONS

	Price	Gain	Ann'l Total Return
High	65	(+195%)	87%
Low	40	(+ 80%)	76%

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	© VALUE LINE, INC.	90-92
						1.02	.55	1.12	1.81	2.86	4.15	5.29	6.56	7.54	8.74	10.35	12.50		Sales per sh (A)	19.60
							.06	.13	.22	.42	.53	.63	.69	.85	1.22	1.55	2.05		"Cash Flow" per sh	3.40
						.01	.05	.10	.18	.36	.38	.38	.41	.41	.72	1.08	1.40		Earnings per sh (B)	2.25
																	Nil		Div'ds Decl'd per sh	Nil
							.05	.12	.17	.36	.85	.53	.88	.82	.74	.75	.75		Cap'l Spending per sh	1.35
						.36	.35	.63	1.17	2.81	3.33	3.93	4.62	5.06	6.09	10.10	11.50		Book Value per sh	17.25
						7.51	44.11	50.04	60.15	72.82	75.27	79.11	81.23	82.77	87.84	100.00	100.00		Common Shs Outst'g (C)	100.00
							35.0	23.9	25.8	35.8	33.2	37.8	33.3	23.2	18.4	25.6		Bold figures are Value Line estimates	Avg Ann'l P/E Ratio	23.0
							4.77	3.46	3.43	4.35	3.66	3.20	3.10	1.88	1.25	1.57			Relative P/E Ratio	1.90
																			Avg Ann'l Div'd Yield	Nil
							24.3	56.0	109.0	206.4	312.1	418.3	532.6	624.1	767.8	1035.5	1250		Sales ($mill) (A)	1900
							19.3%	19.8%	20.1%	21.4%	16.3%	16.4%	13.9%	13.7%	19.4%	21.0%	22.0%		Operating Margin	23.0%
							.5	1.4	2.6	4.1	10.2	16.8	22.7	35.6	43.2	50.0	65.0		Depreciation ($mill)	115
							2.2	4.9	10.7	26.6	29.9	30.8	33.2	34.4	63.8	105.6	140		Net Profit ($mill)	225
							52.1%	51.3%	49.3%	48.0%	36.1%	39.0%	41.0%	39.0%	44.3%	43.0%	38.0%		Income Tax Rate	38.0%
							8.8%	8.8%	9.8%	12.7%	9.6%	7.4%	6.2%	5.5%	8.3%	10.2%	11.1%		Net Profit Margin	11.4%
							13.7	27.1	61.3	179.1	194.8	254.2	263.4	298.6	385.2	845	970		Working Cap'l ($mill)	1490
							.7	1.1	1.7	2.1	21.1	24.0	17.2	12.4	6.5	7.0	5.0		Long-Term Debt ($mill)	Nil
							15.5	31.5	70.3	204.8	251.0	311.0	375.1	420.4	534.7	1010	1150		Net Worth ($mill)	1725
							13.5%	15.2%	15.1%	12.9%	11.2%	9.6%	8.7%	8.3%	12.0%	10.5%	12.0%		% Earned Total Cap'l	13.0%
							13.8%	15.6%	15.2%	13.0%	11.9%	9.9%	8.9%	8.2%	11.9%	10.5%	12.0%		% Earned Net Worth	13.0%
							13.8%	15.6%	15.2%	13.0%	11.9%	9.9%	8.9%	8.2%	11.9%	10.5%	12.0%		% Retained to Comm Eq	13.0%
																	Nil		% All Div'ds to Net Prof	Nil

CAPITAL STRUCTURE as of 6/30/87

Total Debt $8.4 mill. Due in 5 Yrs $8.0 mill.
LT Debt $7.3 mill. LT Interest $.8 mill.

Incl. $3.2 mill. capitalized leases.
(Total interest coverage: 59x)

(1% of Cap'l)

Leases, Uncapitalized Annual rentals $38.6 mill.

Pension Liability None in '86 vs. None in '85

Pfd Stock None

Common Stock 82,100,865 shs. (99% of Cap'l)

CURRENT POSITION	1985	1986	6/30/87
(SMILL.)			
Cash Assets	128.7	239.8	296.3
Receivables	153.4	197.7	232.7
Inventory(FIFO)	79.0	64.2	81.4
Other	14.3	17.5	21.8
Current Assets	385.4	519.2	632.2
Accts Payable	33.4	50.8	86.4
Debt Due	7.1	6.0	1.1
Other	46.3	77.2	106.7
Current Liab.	86.8	134.0	174.2

ANNUAL RATES of change (per sh)	Past 10 Yrs	Past 5 Yrs	Est'd '84-'86 to '90-'92
Sales	—	43.0%	17.0%
"Cash Flow"	—	46.0%	24.5%
Earnings	—	50.0%	28.0%
Dividends	—	—	Nil
Book Value	—	54.5%	22.0%

Fiscal Year Ends	QUARTERLY SALES ($ mill.) (A) Dec. 31	Mar. 31	June 30	Sept. 30	Full Fiscal Year
1984	126.4	111.2	141.9	153.1	532.6
1985	159.6	146.5	144.2	173.8	624.1
1986	170.1	176.3	200.9	220.5	767.8
1987	238.0	242.4	264.0	291.1	1035.5
1988	295	285	315	355	1250

Fiscal Year Ends	EARNINGS PER SHARE (B) Dec. 31	Mar. 31	June 30	Sept. 30	Full Fiscal Year
1984	.12	.09	.12	.14	.47
1985	.17	.06	.09	.13	.41
1986	.14	.15	.20	.23	.72
1987	.25	.22	.26	.31	1.06
1988	.35	.30	.35	.40	1.40

Calendar	QUARTERLY DIVIDENDS PAID Mar. 31	June 30	Sept. 30	Dec. 31	Full Year
1983					
1984					
1985	NO CASH DIVIDENDS BEING PAID				
1986					
1987					

BUSINESS: Tandem Computers, Inc., designs, assembles, and sells fault-tolerant computer systems, under the trademark NonStop, for on-line transaction processing. Also designs and sells terminal and communications controller products. About 93% of sales are to end-users; 7% to software and systems developers and original equipment manufacturers. Foreign sales, 40% of total. R&D, 11.3% of sales; payroll costs, estimated 25%. '86 depreciation rate: 15.3%. Estimated plant age: 2 years. Has 5,700 employees; 7,000 shareholders. Insiders control 4.9% of stock. Chairman: Thomas J. Perkins. President: James G. Treybig. Incorporated: Delaware. Address: 19333 Vallco Parkway, Cupertino, California 95014. Tel.: 408-725-6000.

We're estimating a 30% earnings gain in fiscal 1988, which began October 1st. Share profits surged 50% in fiscal 1987, as Tandem reached the $1 billion annual sales mark for the first time. Earnings progress slowed a bit in the second half, due to the timing of new product offerings, start-up costs, and low-margin consulting and subcontracting activities, but we don't see any slippage in fundamentals. We note that Tandem's operating margin probably exceeded 20% last year for the first time since 1981, due largely to improved cost vigilance.

The market for on-line transaction processing (OLTP) systems continues to burgeon. Fueling the expansion are the rapid spread of relatively new applications such as "just-in-time" inventory management in the manufacturing sector and electronic payment and credit-authorization systems in the retail sector. Meanwhile, more traditional OLTP applications, including the processing of securities transactions and airline reservations, continue to expand. Overall, sales of OLTP systems are likely to grow about 20% annually over the next five years. That's about twice the expected growth rate for sales of computer systems generally.

We think Tandem will retain its strong market position. Although IBM holds more than 50% of the OLTP systems market, IBM systems lack an important feature increasingly demanded by users: fault-tolerance, or the ability to continue operating in the event of component failure. (Ironically, the stock market crash underscored the importance of Tandem's design even as its stock participated in the carnage: Fault-tolerance kept the New York Stock Exchange's 200 Tandem minicomputers functioning on October 19th despite transaction volumes that exceeded what the system had been designed to handle.) In addition, Tandem filled out its product line in the past year and has competitive entries in all market segments. We think Tandem's dominant position in fault-tolerant computing will lead to steady gains in its share of the OLTP market into the 1990s.

These shares are ranked to outperform the market averages in the year ahead, after having lost about a fourth of their value in the past three months. In addition, the stock has above-average capital gains prospects to 1990-92.

Blaine Snyder

(A) Fiscal year ends September 30th of calendar year. (B) Based on average common and common equivalent shares outstanding. Excludes extraordinary gain: '78, 3¢. Excludes gain from reversal of DISC taxes: '84, 12¢. Next earnings report due late Jan. (C) In millions, adjusted for stock splits and dividends.

Company's Financial Strength	B+
Stock's Price Stability	5
Price Growth Persistence	60
Earnings Predictability	60

November 10, 1987, Tuesday

DISTRIBUTION: Business Editors

LENGTH: 437 words

HEADLINE: TANDEM-COMPUTERS/ INET; (TDM) iNet Company of America installs Tandem VLX System

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) announced Tuesday that the iNet Company of America, Chantilly, Va., has installed a Tandem NonStop VLX System, valued at $1.4 million, to offer its new INET service in the U.S. market.

According to A.L. Syberg, vice president, marketing of iNet Company of America, the new information management service, based on the Tandem VLX system, provides on-line information services, data conferencing, electronic mail, notice boards, and an electronic workspace for editing, storing and sending files to geographically-dispersed offices.

The INET service for the U.S. was developed jointly by Bell Canada and Bell-Northern Research.

The iNet 2000 Service has been commercially available in Canada since 1985, and has been operating on high-end Tandem systems since the product's inception. Envoy 100, one feature of iNet 2000, is Canada's largest public electronic mail system with more than 70,000 users.

The company is marketing the service to large organizations and associations with geographically-dispersed offices or branches. Small businesses will also benefit from access to information previously available only to companies with large computer networks, according to Syberg.

Subscribrs gain access to the INET service through data terminals, personal computers or word processors equipped with a telephone line and modem. Users can obtain information from a public database, add it to their files, publish a report with the new data, or store it in their own user files.

The Tandem system acts as the central link between subscribers and the information and public data networks provided by third parties. In addition, information is stored in the Tandem computer, including information bulletin boards and files created by individual subscribers.

Throughout the process, the Tandem system creates the image of a single computer system, regardless of where the information is stored.

Tandem Computers Inc. manufactures and markets computer systems and networks for the on-line transaction processing marketplace.

Note to Editors: Tandem, NonStop and VLX are trademarks of Tandem Computers Inc.
iNet 2000 and Envoy 100 are trademarks of Telecom Canada.
INET is a trademark of iNet Company of America.

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LEVEL 1 - 3 OF 6 STORIES

November 3, 1987, Tuesday

DISTRIBUTION: Business Editors

LENGTH: 941 words

HEADLINE: TANDEM; (TDM)(GME) Tandem Computers announces agreements with EDS, MSA Advanced Manufacturing and Boeing Computer Services for computer integrated manufacturing

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) Tuesday announced three agreements as part of the Tandem Integrated Manufacturing Environment (T.I.M.E.) strategy.

Tandem's joint development and marketing agreements are with Electronic Data Systems Corp. (EDS), MSA Advanced Manufacturing Inc. (MSA AMI) and Boeing Computer Services (BCS).

The T.I.M.E. strategy defines three prerequisites for factory control solutions: device control and management, factory control and management, and product and process document management.

These control functions will enable manufacturers to connect to and functionally integrate business planning, engineering and factory floor devices in a distributed, multi-vendor environment.

Tandem and EDS have reached an agreement in principle to co-develop and market the device control and management system (DCMS) portion of the T.I.M.E. strategy.

The DCMS application functions include connections and control of programmable logic controllers, robots, numerically controlled tools, and electronic test equipment, giving management up-to-the-minute information on shop floor activities.

MSA AMI and Tandem are developing a series of modules for the factory control and management system (FCMS). FCMS functions provide on-line monitoring, traceability and control of the factory.

Functions include: material tracking from the receiving dock through the manufacturing process and shipping; short-term resource scheduling and optimization; labor data collection and analysis; quality management; and inventory control and maintenance planning.

BCS, a division of The Boeing Co., Seattle, and Tandem will co-develop and market the product and process document management (PPDM) function of the T.I.M.E. strategy.

PPDM provides the connection between engineering and manufacturing by hosting computer aided design workstations and handling the storage, configuration

management of engineering design information, and manufacturing process documents and programs.

According to Robert T. Jolls, Tandem director of industry marketing, ''These agreements confirm Tandem's commitment to provide on-line integrated solutions to manufacturers.

''The T.I.M.E. solutions leverage Tandem's strengths and those of our co-developers to bring the best possible solutions to the end user.

''Tandem's fault-tolerant transaction processing systems and networking products provide the continuous availability, connectivity, and distributed processing necessary to fulfill the requirements of on-line factory control,'' continued Jolls.

Michael K. Bateman, Tandem vice president of third-party marketing said, ''We are delighted to have these leading providers of manufacturing solutions join us and our existing Alliance manufacturing members in bringing the T.I.M.E. solutions to the market.''

The agreements were signed under the sponsorship of the Tandem Alliance program. Tandem's Alliance program encourages application designers to develop solutions that run on Tandem systems.

Tandem and its Alliance members continue to work together to provide integrated manufacturing solutions to the end-user.

Tandem offers a wide range of products for the integrated factory. Its NonStop SQL relational database management software product provides a platform for the T.I.M.E. solutions.

A variety of applications for tracking and on-line control can benefit from the flexibility and performance of NonStop SQL software. Data anywhere in a network of Tandem systems can be read, written, or updated and the database will always reflect the current state of business.

EDS is the world leader in providing computer and communications services to the public and private sectors. With headquarters in Dallas, it is a wholly owned subsidiary of General Motors.

Its stock is traded on the New York Stock Exchange under the symbol GME.

EDS has customers in all 50 states and 25 countries worldwide. Its address is 7171 Forrest Lane, Dallas, Texas 75230.

MSA AMI is the world's largest independent supplier of mainframe applications software designed for manufacturers, with more than 3,200 installed sites.

MSA AMI is a subsidiary of Management Science America Inc., the world's largest independent supplier of mainframe applications software. Its address is 3445 Peachtree Road, Northeast, Atlanta Ga., 30326.

Boeing Computer Services, with headquarters in Bellevue, Wash., supplies the computer networking and integration services for many Fortune 500 manufacturing enterprises.

BCS supplies information systems for the diverse Boeing family of aerospace manufacturing companies. Its address is P.O. Box 24346, Seattle, Wash. 98124-0346.

Tandem Computers Inc. manufactures and markets computer systems and networks for on-line transaction processing. The company is located at 19333 Vallco Parkway, Cupertino, Calif. 95014. The telephone numberis 408/725-6000.

Note to Editors: Tandem, NonStop, T.I.M.E. and NonStop SQL are trademarks of Tandem Computers Inc.

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MSA Advanced Manufacturing Inc., Atlanta
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Tandem Buys Atalla For Financial Presence

CUPERTINO, CALIF. — Tandem Computers Inc. has signed an agreement in principle to acquire Atalla Corp., a privately held company specializing in secure transaction systems for financial and retail markets.

If the acquisition is completed, it would be Tandem's first 100 percent acquisition of a domestic company. Tandem has made a number of equity investments in companies over the past year, but all have been for less than 100 percent.

Tandem's proposed acquisition is designed to enhance its position in the on-line transaction processing (OLTP) market, where it has focused much of its efforts. The acquisition would give Tandem increased penetration in both the retail and financial segments of the OLTP market, where Atalla holds a significant market share for its systems.

A Tandem spokeswoman said the company would pay for the proposed acquisition through an exchange of stock. Other details of the transaction were not released. The acquisition should be completed by the end of the year, the spokeswoman said.

"Secure systems are especially important to the banking and retail point-of-sale industries, where both Tandem and Atalla have a strong presence," said Tandem president and chief executive James Treybig. "Other organizations such as government agencies and health care providers are also very concerned with protecting business records."

Atalla markets a range of systems including point-of-sale payment systems used in retail outlets, automatic-teller-machine (ATM) card management systems, computer security systems and ATM network security systems. The company's products include terminals, software, and specialized computers that work with a range of computer systems, including those offered by Tandem.

Atalla has more than 1,500 customers, and is the leading vendor in point-of-sale payment systems for supermarkets and ATM network security systems, said Bill Atalla, chief operating officer. Atalla's revenues were not released, but a Tandem spokeswoman said they were under $50 million. The company has been in operation since 1972.

Under terms of the acquisition, Atalla would operate as a wholly owned subsidiary of Tandem in its present location in San Jose, Calif. Company founder John Atalla would serve as a vice president at Tandem working on strategic issues, while Bill Atalla, his son, would remain in charge of day-to-day operations.

While the details of the proposed acquisition have not been finalized, Atalla would probably continue to develop and market products capable of working with a variety of computer systems, and also develop products specificaly for Tandem systems, Bill Atalla said.

Atalla agreed to the acquisition because it needs a strong partner already active in transaction processing markets to take full advantage of the strong growth occuring in those markets, Bill Atalla said. "We want to be able to sell complete systems" incorporating both Tandem and Atalla products, he said.

Jupiter To Supply Graphics Displays To Recognition

ALAMEDA, Calif. — Jupiter Systems Inc. said it has signed an OEM agreement to provide Recognition Concepts Inc., Incline Village, Nev., with display subsystems to be used in Recognition's real-time image-processing systems.

Value of the deal was not disclosed.

Jupiter said its displays will be used in systems operating in the Q-bus, Unibus and VME-bus environments, all of which are markets that Recognition addresses.

One to six displays will be incorporated in each system.

The agreement also calls for Jupiter to develop an interface to the VisiNET high-speed network used by Recognition for 10-Mbit-per-second pixel data transfer.

Tandem Optical Disk Drive Jukebox Out

CUPERTINO, CALIF. — Tandem Computers Inc. has put its stamp of approval on WORM (Write Once, Read Many) optical technology by bringing out an optical disk drive jukebox for all Tandem NonStop systems.

The Tandem 5200 Optical Storage Facility is a subsystem manufactured by Hitachi America Ltd. It includes two read-write disk drives, a formatter and an automatic changer capable of handling up to 32 2.62-Gbyte, 12-inch disk cartridges for a total capacity of 84 Gbytes.

In the on-line-transaction-processing (OLTP) market served by Tandem, optical disk libraries are particularly important, said Derek Ginger, Tandem product manager for storage products.

Now that optical drive manufacturers are bundling software with their drives, systems integrators are using the products in increasing numbers. As a result, the OLTP needs that have long existed, can now be satisfied.

Ginger noted that Securities and Exchange Commission investigations have forced some brokerage houses to spend significant sums retrieving data from labor-intensive microfiche or tape storage systems. Had optical drives been in use, the information could have been retrieved more efficiently, Ginger added.

"We've had tremendous pressure from our users to introduce [optical disk libraries]," Ginger said. "Our customers need to have new methods for archiving."

The 5200 is list-priced at $155,000. An initial software license fee (ILF) is $5300 for the NonStop VLX, TXP, II and EXT25 systems. An additional monthly license fee (MLF) for those systems is $100. For NonStop EXT10 systems, the ILF is $2650 and the MLF is $50. The 5200 will begin shipping this quarter.

Tandon Debates Its Options In Patent Dispute

TORRANCE, CALIF. — Tandon Corp. is debating how to handle a unanimous Sept. 30 U.S. Court of Appeals decision, which held that Mitsubishi Electric Corp. did not infringe on Tandon's patent for double-sided, flexible disk drives.

Tandon lawyer James Hamilton said the company has several alternatives under consideration: It can seek a rehearing by the same court, seek redress in the U.S. Supreme Court or pursue a companion action filed in U.S. District Court.

Some Settle

Tandon filed the suit in 1984 against Mitsubishi, Sony Corp. and Teac Corp. Both Sony and Teac settled out of court. The terms of those settlements have not been disclosed. Since the settlement, both Sony and Teac licensed the double-sided flexible disk drive technology from Tandon.

Mitsubishi is no longer making the drives in question. Hamilton said Tandon will decide which action to pursue within the next few months.

LEVEL 1 - 10 OF 11 STORIES

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HEADLINE: Airlines go on-line for supplies;
Specification 2000 cuts paperwork.

BYLINE: By Michael Fahey, Senior Writer

DATELINE: ANNAPOLIS, Md.

BODY:

An international group of airlines and their parts and equipment suppliers have established an electronic data interchange network designed to help air carriers cut procurement costs and trim inventories by eliminating much of the paperwork involved in purchasing.

The network, called Specification 2000, is expected to be fully operational early next year and will eventually link more than 100 airlines with several hundred suppliers. There are currently about 50 airlines and 65 suppliers involved in the project, according to Gerald Sturman of the Air Transport Association of America, which is coordinating the cooperative effort. In the U.S., participants include Trans World Airlines, Inc., Pan American World Airways, Inc. and United Air Lines, Inc.

Using an IBM Personal Computer or compatible, a Hayes Microcomputer Products, Inc.-compatible 1,200 bit/sec modem and dial-up or dedicated telephone lines, airline personnel can access a centralized data base that maintains cross-vendor information on parts availability. They can also place orders for parts. The centralized data base, maintained on fault-tolerant Tandem Computers, Inc. computers, is administered by Aeronautical Radio, Inc. (ARINC), headquartered here. ARINC and the Air Transport Association of America are nonprofit organizations that serve the airline industry.

Dial-up transmissions to ARINC are routed to a group of AT&T 3BII computers that act as front-end processors for two Tandem NonStop II computers and two Tandem TXP computers. Information is sent back to Specification 2000 users in the same manner. Traffic from dedicated links is fed directly into the Tandem processors.

The suppliers periodically provide a magnetic tape to ARINC that is loaded into the data base. "Every conceivable part that would need to be replaced on an airplane can be listed on the data base. It is like a giant electronic catalog," Sturman said. "It tells airlines, for example, all the suppliers that have part number 1234 available. They get pricing information and the lead time for delivery."

A customer wishing to purchase a part from a particular supplier can send an order, via a standard message format, through the network to the supplier, which then acknowledges the transmission. The supplier can also use a standard