

Title: Tandem's Non-Stop SQL: A Strategic Shift

Summary: Tandem took a significant step forward in becoming a mainstream midrange systems vendor and has proven relational database need not be performance-bound. IBM and DEC may be affected most.

Table I

Performance Benchmarks	
# Processors	TPS
VLX	
4	29
8	52
16	106
32	208
EXT10	3/processor
TXP	1/processor

Tandem's March announcement of Non-Stop Structured Query Language (SQL) was unquestionably a breakthrough in applying the relational database technology of SQL to a production environment. Whereas a great deal of hyperbole has been generated by some database vendors, Tandem has again quietly proven its strength in distributed database management, but now within the SQL standards universe. By cleverly offloading much of the performance dependencies from the application level to the disk process level, Tandem has achieved benchmarks up to 200 transactions per second (TPS) on a 32-module VLX complex. It has also demonstrated the first truly distributed SQL (see Table I). Moreover, Tandem has broadcast its intention to shift itself strategically into a mainstream midrange vendor as a serious competitive alternative to DEC and IBM.

In addition to the performance issue, we believe there were other significant SQL-based accomplishments: 1) the ability to partition and replicate database segments across local or geographic systems; 2) apply Tandem's integrity and consistency protection on reads, writes and updates; 3) provide node autonomy through a distributed data dictionary such that data access is not dependent on the availability of all network nodes; and 4) provide both interactive (via a command interpreter) and embedded program access (via Cobol).

We believe that Tandem's advances will negatively affect DEC, Stratus, IBM and Database software vendors such as Oracle and Relational Technology. DEC's VAX Information Architecture (VIA) is less sophisticated, lacking a distributed dictionary, network operating system, read/write/update across dispersed nodes and integrity features. Stratus is weak in database management for production environments (it currently uses Oracle, which slows TPS considerably), IBM has failed to generate the performance requirements of its DB2 and SQL/DS relational products, and lacks Tandem's distributed architecture. Oracle and Ingres have promised, but not yet delivered on the functionality



Table II

Unique Tandem SQL Extensions

Own distributed naming convention (node, disk, directory, file)
 Integrity (mirrored tables, record level lock, transaction abort recovery)
 Database partitioning (across multiple disk volumes on a network)
 Own security
 Assertions (data validation)
 Support for primary and foreign keys
 Distributed data dictionary (replicated at each node)

Table III

Tandem's future SQL work is still hefty: extensions to other languages such as C and Pascal, referential integrity, conversion utilities, DB2 extraction, IMS download, heterogeneous midrange integration, 4GL, and data replication maintenance across nodes.

Table IV

On April 20, Tandem will announce two new systems: a low-priced Unix departmental system (based on the Altos system) and a low-end system aimed at departmental and distributed environments (will run Guardian and Non-Stop SQL) -- for under \$50,000 -- over 50 percent lower price point than current Tandem systems.

Table V

Worldwide OLTP Shipment Revenues of U.S. Vendors (\$B)		
1986	1991	CAGR
25.1	61.4	19.6%

and performance demonstrated by Non-Stop SQL; their distributed SQL lacks not only performance, but also multinode update capability.

We believe it will take before Tandem and users can capitalize on the full weight of its SQL accomplishments. Tandem's existing Encompass database system users must migrate to SQL since Non-Stop SQL is incompatible and cannot coexist with Encompass. Users must rewrite Encompass applications, but Tandem will provide utilities to assist conversion of data formats and definitions in the dictionary. In addition, a utility will convert existing Cobol statements referencing Encompass. Tandem's SQL extensions (listed in Table II) are unique to its Guardian operating system environment and therefore cannot be applied interchangeably with other SQL databases (although data can be exchanged, and there is some applications portability). Tandem has also not addressed DB2 extraction, which means users must wait until future releases for heterogeneous and IBM mainframe integration (see Table III).

Tandem's performance improvements will not be easily rivaled. Operating system modifications which might have affected performance on applications were minimized. Optimization was concentrated at the disk process level. Bottlenecks at the disk level are far easier to avoid, because files can be partitioned among spindles and parallel data access can operate over multiple controller and I/O buses. Tandem also reduced message traffic -- the number of messages and number of bytes/message -- by an optimized selection process operating on fields as opposed to whole records.

Tandem has been successful in improving price/performance and lowering the entry-level pricing to its systems. As Tandem continues this evolution, while migrating its systems and users to an increasingly open architectural environment, its market opportunities should broaden. In 1986, most of Tandem's revenues were generated among existing users. With Non-Stop SQL and new low-cost departmental systems coming (see Table IV), Tandem is well-positioned to bite off ever larger slices of the OLTP market (see Table V).

80286-based 6300 Plus PC by as much as 38 per cent in an effort to reposition that product as an XT-compatible, and cut the lists of its other personal computers by up to 23 per cent to put them more in line with current market prices.

At the same time, NCR lowered prices of its PC6 and PC8 IBM-compatibles by about 12 per cent, also in response to declining tags across the PC business.

Prices of all five versions of AT&T's 6300 Plus, a 286-based machine with a PC XT-compatible bus that runs a version of Unix System V, have been dropped. With a single floppy, the 6300 Plus is now \$1,590, a more than 38 per cent cut from its previous tag of \$2,565. Other price cuts for the line are: dual floppy version, \$1,740 from \$2,790; 20-MB Winchester, 360-KB floppy, \$2,240 from \$3,215; 20-MB Winchester, 1.2-MB floppy, \$2,340 from \$3,315; and 40-MB Winchester, 1.2-MB floppy, \$3,065 from \$4,340.

512-KB RAM

All models have 512-KB RAM, and run Unix System V with Simulcast, which allows certain DOS tasks to be run under the multi-user OS.

A company spokeswoman said prices of the 6300 Plus were lowered to put the product more in

line with other XT compatibles. She said AT&T had been marketing it as an AT-like computer able to operate in an XT environment (through its bus), but has now decided to position it against other XTs. "It's priced according to what we see as the pricing trends in the XT market," she said.

She would not say whether the earlier market strategy had been successful. When asked to detail sales of the line, she replied that "sales of the entire 6300 line are on target," but would not give specific figures.

On its standard PC 6300 models, AT&T knocked down prices by 17 to 23 per cent. A single-floppy configuration goes to \$1,485 from \$1,780; a dual-floppy version is now \$1,565 from \$2,020; and the unit with a 20-MB hard drive becomes \$2,165 from \$2,620.

AT&T also reduced prices of its 6310 AT-compatible, which it brought out last February. With a single 1.2-MB floppy, the machine now lists for \$2,900, down from

\$3,800 from \$3,995, as does the 40-MB unit to \$4,700 from \$4,995.

Prices of keyboards, monitors, memory and storage options remain the same, the company said.

AT&T also extended the warranty of the 6300 from 90 days to 1 year. All configurations are covered by the extension, as are the Model 301 keyboard and monochrome and color monitors. AT&T's other PCs, keyboards and monitors already have the 1-year warranty, the firm said.

Separately, NCR last week initiated price cuts up to 12 per cent on its personal computers in response to competitive conditions in the market.

Vernon Yates, vice-president and general manager of NCR's PC division, said the affected computers are the PC8, an IBM AT-compatible, and the PC6, an IBM XT-compatible.

The price of the PC8 with 512-KB memory, a 1.2-MB floppy drive and a 30-MB Winchester is now \$4,395, down from \$4,990. A PC6, with 512 KB of RAM, a 360-KB floppy and a 20-MB Winchester, lists for \$2,695, cut from \$2,990.

processors supplied by value million U.S. Customs Service processors. IBM also is chairman.

IBM V-P to Head I

FORT LAUDERDALE, an IBM divisional operating Systems division.

Martin Axelrod, who has been vice-president of operations IBM's Communications Product division (CPD) in Boca Raton, Fla., has been named vice-president and general manager Harris Computer Systems, placing James Oyler, who summer was promoted to vice-president in charge of company's Information Systems sector.

Mr. Oyler had been oversaw Computer Systems in the interim. Mr. Axelrod reports to Oyler.

Reporting to Mr. Axelrod be all operations of the division including sales, marketing, manufacturing and engineering Harris' Unix-based system real-time computers.

According to an IBM spokesman, Mr. Axelrod is retiring the company as of May 1. He has been with IBM for 27 years most recently, as operation president of CPD, was in charge of communications work with Series/1 and System/88 processors.

Amdahl Headin

SAN JOSE, Calif. — Elx chairman Gene Amdahl has named chief executive of N Power Corp., a power supplier of which he also has been as chairman.

Mr. Amdahl, who is chairman of Elxsi, will day-to-day operations of

Tandem Offers 1st Unix-Based Product, Transaction Sys.

CUPERTINO, Calif. — Tandem Computers Inc. has moved down its computer architecture to a new entry level point, introducing its first Unix-based product along with a separate low-end version of its on-line transaction processing system.

The proprietary CLX system, based on CMOS technology, is available in one-, two-, four- and six-processor versions with performance said to range from 2.5 up to 15 transactions-per-second.

The new CLX line — the Models 610, 620, 640, 660 — will have staggered availability. The dual processor Model 620 will be delivered

during the fourth quarter, while the four-processor Model 640 will be available by the first quarter of next year. The uniprocessor Model 610 and the six-processor Model 660, as well as a 280-MB disk drive, are not slated to be available until the second quarter of 1988.

The entry-level uniprocessor CLX Model 610 does not offer fault tolerant capabilities but can be upgraded to a full six-processor model. The fully configured six-processor CLX Model 660 supports 72 MB of memory, 10 GB of disk storage and 600 communications lines.

The unit's systems cabinet includes 5.25-inch, 145-MB or 280-MB drives with SCSI controllers and a 128-MB 1/2-inch tape drive. In the multi-processor configurations, communications are handled by dual 20 MB per second interprocessor buses. The systems support 3270 terminals as well as IBM-compatible PCs.

Entry level prices for all the models, in single unit quantities, are as follows: \$57,000 for the uniprocessor; \$85,000 for the dual processor; \$161,000 for the four-processor version; and \$240,000 for the six-processor machine.

Tandem product, CLX

Tandem heads for the desks

by Gillian Cribbs

Fault-tolerant specialist Tandem has extended online transaction processing to the desk top with two products, a departmental system Non-Stop CLX, and LXN, a multi-user system.

Tandem claims these developments will reduce on-line network communication costs, offload work from the host, and improve response times for local users.

"These products will extend online transaction processing networks down to individual users throughout industry and commerce," says Derek Everitt, Tandem's UK managing director.

Tandem has turned to Unix for its first multiuser system, the 32-bit LXN. This can be expanded from one to three processors, and supports up to 32 users.

It can access all the information on Tandem networks, and supports IBM's SNA communications architecture, with the promise of X.25 packet switching support to follow.

The system can be connected to local area networks by means of an Ethernet controller.

The Non-Stop CLX departmental systems run Tandem's Guardian mainframe operating system. The

systems come in one-, two-, four- and six-processor versions, for which Tandem claims performance ranging from 2.5 to 15 non-stop Non-Stop SQL transactions per second.

Non-Stop CLX systems can be connected to lans supporting Netbios protocols via Tandem's Multilan products, launched last year.

Network quantity pricing for the LXN begins at £16,104 and single quantity pricing at £21,188. Prices for Non-Stop CLX range from £36,994 to £155,762 for network quantity and £52,848 to £220,517 for single quantity units.



EVERITT . . . Going to individual users.

Reuters adds to online services

by Gillian Cribbs

Information provider Reuters extended its global network of online services last week.

Its Country Reports Service gives subscribers online access to all Reuters latest news, and dial-up access to a 90-day historical database, on 190 countries, from a single terminal.

The company says Country Reports represents a major development of its new presentation. It parallels Reuters massive investments in new financial services.

The service supplies all Reuters' news on each country, together with information on commodity, money, shipping, energy and capital markets.

In addition, it contains details of the power structure and economy, and biographical sketches of leading political and business personalities, in 50 countries which pose high investment risks.

Country Reports can be accessed on a standard Reuters terminal auto-dial modem. Personal computers with VT100 emulation can also access the database.

COMMS BRIEFS

The 298,000 local area network nodes in Europe will quadruple to 1.4 billion by 1990. Then the market to link machines will be worth \$466m a year, according to market researcher, Frost and Sullivan.

Apollo Computer has announced that its Domain workstation will henceforth

be network independent, running directly on industry standard Ethernet networks. Apollo can now offer users a choice of Ethernet or Apollo token ring networks.

Nestar Systems has released the latest version, 3.0, of its SNA gateway.

British Telecom is instal-

ling terminals in 2,500 florist shops in the UK to speed Interflora flower orders.

US fibre optic specialist Fibertec has won a \$2.2m contract to supply what it claims will be the world's largest fibre optic datacomms network. The customer is Computer Connection of Norway

which will install the Whispernet in 125 of Norway's largest banking operations.

Telecom Gold's new Comco Smart Card will enable users to gain access to their mailbox while travelling abroad. The card communicates with computers installed within the packet switching networks, by

agreement with the local telecommunications company.

Motorola Information Systems has launched a new modem which it claims gives a 20 to 48% improvement in transaction rate over traditional 9,600 bit per second multipoint modems. The key is the trellis coded modulation error correcting system.

Tandem to up distributed computing ante

Two low-end systems for outlying offices mark firm's first entry into Unix, CMOS fields

BY JEFFREY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. today is set to make its first foray into the Unix world and CMOS technology with the introduction of two low-end systems designed to bring distributed computing to sites where it was previously impractical.

More compact and priced tens of thousands of dollars less than Tandem's existing entry-level system, the CLX and LXN

are intended for work groups and departments in the outlying offices of major user organizations.

Tandem also announced the Laser-LX, a printer compatible with the Hewlett-Packard Co. Laserjet.

But through support of several of the industry's most popular interconnection standards, the CLX and LXN machines reportedly can be integrated with and extend the company's current network of on-line transaction processing (OLTP) systems.

The LXN runs Unix and supports up to 32 users and three CPUs, with as much as 16M bytes of internal storage per machine. Using Transmission Control Protocol/Internet Protocol, the system also ties IBM-style workstations and Tandem terminals together in an Ethernet local-area network and uses IBM's Systems Network Architecture (SNA) or CCITT X.25 for its back-end connections.

Available in four configurations, a fully expanded CMOS-based CLX incorporates six processors, holds 72M bytes of

main memory and executes 15 transactions/sec. For connections to IBM mainframes and public networks, the machine supports SNA and X.25. Through the firm's Multilan interconnection product, the CLX links all Tandem Nonstop family members to any local network conforming to Microsoft Corp.'s MS-Net or IBM's Netbios standards.

Federal Compress & Warehouse Co. has served as an LXN beta-test site for two months and reportedly plans to move the system into production on July 1.

Installed in the 25 cotton-storage facilities that Federal Compress runs in the Mississippi River delta and Arizona, the LXNs collect data locally and relay key information about each incoming bale to the user's Memphis headquarters. After being processed centrally on the company's Tandem Nonstop II CPU, the data is returned to the remote warehouses in the form of finished reports.

Prior to installing their LXNs, the field locations were equipped with Mohaw Data Sciences Corp. Series 21s, which lacked the intelligence to initiate transmissions to and from the main office. Now, however, the sites can start their communications on demand and thus avoid processing delays that can prevent end users from receiving their data on time, according to Federal Compress Vice-President and Treasurer Bob Cohen.

Although the LXN supports Unix rather than Tandem's proprietary Guardian operating system, the 32-bit machine is aimed as squarely at OLTP as any other member of the vendor's CPU family.

Tandem's intent in embracing an industry-standard operating system is, at least partly, to gain entree into government installations, auto makers and other environments in which Unix support is mandatory. "If you don't offer Unix, you can't even bid on contracts from those kinds of large organizations," said Terry Retford, the vendor's manager of processor and memory products.

Technicians need not apply

Unlike the LXN, the CLX supports Guardian and is implemented in CMOS technology, which combines comparatively high component density with low heat dissipation. CMOS's inherent properties minimize the CLX's equipment failures and thus allow users to "assume increased responsibility for their own maintenance," said Tandem watcher Omri Serlin, head of Los Altos, Calif.-based Itom International Co. "Virtually any defective board or other hardware component can be replaced without tools or service technicians," he added.

For now, the presence of CMOS components makes the CLX technologically unlike Tandem's larger and more expensive systems, which include the EXT, Nonstop II, TXP and VLX. "But in the future, the company's plans call for it to make the parts in all its other systems interchangeable with the CLX's," Serlin said.

In single quantities, a minimum LXN with one 2M-byte processor costs \$23,700, compared with \$57,000 for a basic CLX with a 4M-byte CPU.

The 8 page/min Laser-LX costs \$2,595.

Although the LXN is available now, shipments of the first two CLX configurations and the Laser-LX are unlikely to begin until the second and third quarters, respectively.



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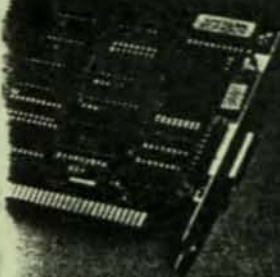
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First Unix-Based System Makes Bow For Tandem

BY ANN LOWE

CUPERTINO, CALIF. — Tandem Computers Inc. will unveil today its first Unix-based computer system, a product that represents the fruits of a year-old OEM agreement with Altos Computer Systems Inc.

The company is also expected to reveal low-cost versions of its NonStop on-line transaction processing systems.

Tandem is positioning the new systems as "network extenders," or low-end systems to be linked to larger computers in distributed networks.

The low-end products will cater to bank branches, retail chain stores, manufacturing sites and other operations that need local processing capabilities, as well as links to corporate centers, Tandem said.

In addition, Tandem is bringing out the Unix-based LNX system in order to fulfill its goal of adopting industry standards, officials said. Until now, the company has focused on its Guardian proprietary operating system.

Third-party marketing vice president Michael Bateman said the LNX will help Tandem reach new customers through Unix software vendors. He said Tandem is wrapping up a "multimillion-dollar shipping commitment" with a value-added reseller in the telecommunications industry, and has several potential agreements with Unix VARs and independent software houses.

Beyond its support of standard Unix applications, a key feature of the LNX product is its price, said Terry Retford, manager of processor and memory products. With unit prices beginning at \$18,000, the LNX—a modified version of Altos' 3086 multiuser computer (CSN, May 5, 1986)—is by far Tandem's least-expensive computer system.

Based on Motorola Inc.'s 68020 microprocessor, the LNX can be configured with one to three processors to support up to 32 users. The system has up to 16 Mbytes of main memory and 510 Mbytes of unformatted disk

storage, according to Tandem.

The system runs AT&T Unix System V.2, modified with proprietary extensions such as a "mirrored disk" facility to duplicate data. An uninterruptible power supply and auto-restart software can be added to the operating system.

Though the LNX could be used as a stand-alone system for small, independent businesses, Tandem officials said its greatest potential is as a front-end node on a distributed network. Users at remote sites can run familiar Unix applications on the LNX, at the same time sharing data with IBM and Tandem mainframes, Retford said.

The LNX supports mainframe connections via X.25, Systems Network Architecture (SNA) and Tandem's SNAX protocols. Connections are enhanced by standard programming languages such as COBOL and a relational database management system from Informix Software Inc. Informix-SQL provides an IBM-compatible Structured Query Language interface to host databases.

LNX systems also will support links to personal computer networks via an Ethernet controller, to be available in the third quarter, the company said.

The LNX is available immediately, starting at \$23,700. Unit prices for networks of 25 to 39 systems begin at \$18,000.

The new NonStop CLX systems—based on the same CMOS chip technology as Tandem's high-end NonStop VLX mainframe—extend Tandem's array of on-line transaction processing systems to the low end, Bateman said.

"Our customers would like to buy an all-Tandem solution," Bateman said. "Clearly, there are a number of cases where we didn't have a low-enough cost system to attract the customers."

The new systems, priced from \$39,900, should be competitive at the entry level, he said.

The CLX systems—available with one, two, four or six pro-

Continued on Page 8

CORPORATE
INFORMATION CENTER

Computer Systems News
April 20, 1987 p6

Tandem's First Unix System Makes Debut

Continued from Page 6
cessors—are software compatible with Tandem's Guardian-based line. Bateman said he expects Tandem's VARs and third-party software vendors to market the new systems with their existing software, and to develop new applications for departmental and branch-office functions.

Because the CLX computers

share the same operating system and support the same Non-Stop SQL relational database management system as other Tandem computers, connections to Tandem mainframes will be much smoother than connections from non-Tandem network nodes to Tandem hosts, Bateman said.

The CLX line was greeted enthusiastically by Tandem's

top third-party marketing partner, Applied Communications Inc., Omaha, Neb., a VAR and independent software vendor in the financial market.

J. Richard Abramson, an Applied Communications vice president, said recent mergers, movement toward interstate banking and other developments in the banking industry have brought a "very definite

need in most banks for distributed networks." He said even small banks and branches could justify the cost of the CLX systems.

The CLX family ranges from the single-processor 610 model to the six-processor CLX 660, which can be configured with 72 Mbytes of main memory, 10 Gbytes of disk storage and 600 communications lines. De-

signed in modular form, the systems can be upgraded by installing additional components, the company said.

The systems will come with a one-year warranty.

The two-processor CLX 620 is to be available in the fourth quarter, with unit prices for networks of 25 to 39 systems beginning at \$59,900 and a monthly maintenance fee of \$260. Single-unit prices begin at \$85,000.

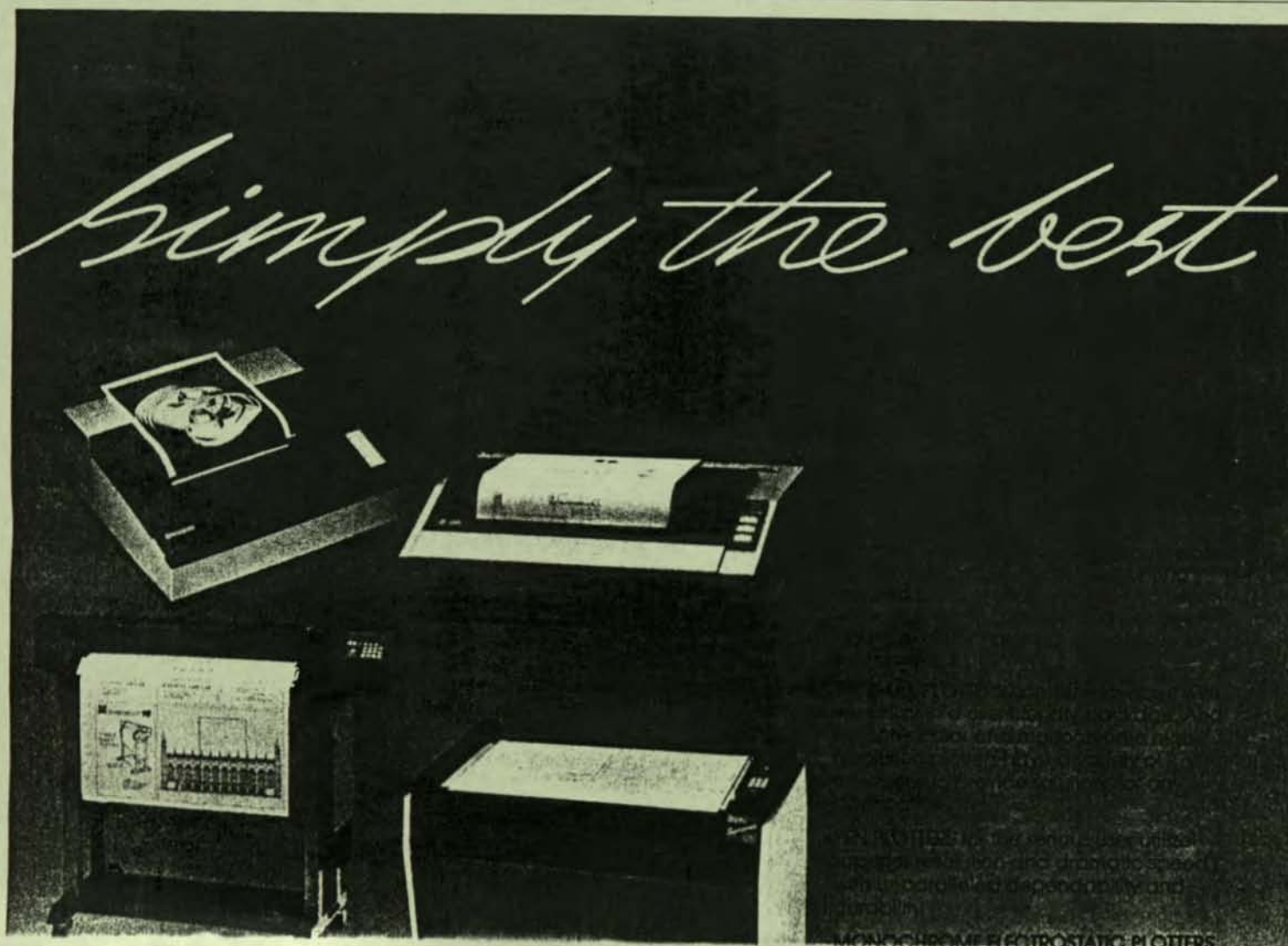
The CLX 640 four-processor model is scheduled for shipment in next year's first quarter. Network unit prices will start at \$112,700, and single-unit prices will begin at \$161,000.

The single-processor CLX 610 and the six-processor CLX 660 are both expected to be available in the second quarter of 1988. Network unit prices for the 610 will begin at \$39,000 with a monthly maintenance fee of \$190, and single units begin at \$57,000. The CLX 660 will be priced beginning at \$168,000 for the network and \$240,000 for the single unit.

In addition to the systems announcements, Tandem will unwrap a desktop laser printer, said to be compatible with Hewlett-Packard Co.'s LaserJet printer. The eight-page-per-minute printer, supplied by an unidentified OEM, is based on a Canon SX print engine, Retford said.

"If you're going to move down to the departmental level, you've got to have high-quality printers," Bateman said.

The Laser-LX printer, priced at \$2595, will be available in the third quarter, Tandem said.



MONOCHROME ELECTROSTATIC PLOTTERS

**Ansa's SQL Will
Link Up With**

INFORMATION SYSTEMS

2 Low-End Tandem Systems To Bow

By IRWIN GREENSTEIN

CUPERTINO, Calif.—Tandem Computers Inc., widely recognized for its success as a maker of fault-tolerant on-line transaction processing (OLTP) systems, this week will introduce two low-end systems—one of them its first Unix-based, non-fault-tolerant system.

That system, the Tandem LXN, is expandable from one to three processors.

The other low-end system, the NonStop CLX, which is available in configurations of one to six processors, targets smaller installations where a dedicated technical support crew and computer-room environment may not be desirable, but system requirements still require fault tolerance.

Tandem also introduced a laser printer.

Development of the LXN was in response to two issues: gripes by industry analysts that Tandem failed to expand into different technologies and the recognition that Unix is becoming a standard, a company spokeswoman said.

Non-Fault Tolerance, Too

"We've had a lot of analysts pound on us that not all customers want fault tolerance," she said. Echoing their complaints, she said, "Why don't you, at the low end, offer non-fault tolerance?"

Tandem designed the LXN as a Unix system to answer that question and because "the demand is there," she said. "We see Unix as an important standard at the low end like DOS. There was a demand to work with Unix."

Tandem modified Unix V Release 2 to make the LXN consistent with the OLTP reliability demands of its traditional customer base. A mirroring capability was added to the operating system, which copies selected files or an entire disk to a backup storage system.

As a safeguard on the hardware side, an optional uninterruptible power supply allows the LXN to shut down gracefully in the event of a power failure. When power is restored, an auto restart boots the application again and resumes operation as if the power failure had not occurred.

Positioning the LXN as a low-end system was further enhanced by having it support DOS applications. The LXN was viewed by the company "more as a workstation" than as a member of the NonStop line of larger fault-tolerant processors, the spokeswoman said.

Has Motorola 32-Bit Chip

The LXN includes a Motorola 68020 32-bit microprocessor running at 16.7 MHz. Standard main memory is 2 Mbytes, expandable to 16 Mbytes. Three expansion slots can provide more processing power, special-purpose Multibus cards, memory or terminals. It supports up to 32 users.

Access to Tandem systems is via the company's System Network Architecture software called SNAX. The LXN com-

municates to large International Business Machines Corp. systems over its System Network Architecture (SNA).

To communicate with other Unix systems, the LXN uses the Informix-SQL relational database management system (RDBMS) from Informix Software Inc. in Menlo Park, Calif., as well as several high-level languages, such as Cobol.

A Netbios server for linking with personal computer local area networks (LANs) is under development for the LXN, but a release date has not been finalized, the spokeswoman said.

Greater integration with Tandem's larger systems is still in the offing, however. The company is "talking about extensive connectivity, not total connectivity" on a level that would eventually allow the Informix RDBMS and Tandem's NonStop SQL RDBMS to exchange data, she said.

The NonStop CLX

For departmental organizations that need a conduit to Tandem's larger systems, the new NonStop CLX may be more appropriate than the LXN. The CLX offers complete Tandem software compatibility via the Guardian 90 operating system.

The CLX sports a new customized complementary metal oxide (CMOS) design that permits an entire core central processing unit to be placed on one chip. Improved throughput and reduced power consumption lets the CLX plug into any 120- or 220-volt wall socket, Tandem said.

An appliance-type power source, ability to run without special environmental controls and lightweight parts add up to a system that can be "serviced by users," the spokeswoman said. The self-service theme is carried through by expert-system software which enables system diagnoses to be performed remotely.

The CLX is available in one-, two-, four- and six-processor versions, tagged the 610, 620, 640 and 660, respectively. Performance ranges from 2.5 to 15 NonStop SQL transactions per second, depending on the number of processors.

An entry-level, single-processor 610 is not fault-tolerant. It can be built up into a fault-tolerant system without changing hardware and software, the company said. A fully configured 660 system supports six processors, 72 Mbytes of RAM, 10 Gbytes of disk storage and 600 communications lines.

In addition to supporting Tandem's Expand intersystem networking product, the CLX communicates via SNA, Open Systems Interconnection (OSI) and X.25 protocols.

Laser-LX Printer

To punctuate its low-end product flurry, Tandem introduced the eight-page-per-minute Laser-LX printer. The printer can handle DOS and Unix applications. Interfaces include support for RS-232-C, current loop and parallel.

The Laser-LX comes with 512

Kbytes of memory. Using its expansion slot, memory can be added in increments of 1, 2 or 4 Mbytes. Thirty-two fonts can be downloaded, allowing users to print 16 different fonts on a single page.

The availability of all the new products varies.

The LXN is currently available, although the multiple-processor features are slated for the fourth quarter and the Ethernet and LAN controller for the third quarter.

Single-quantity pricing for the LXN starts at \$23,700. The base LXN consists of one processor, disk and file controllers, a 60-Mbyte quarter-inch cartridge tape, a 5.25-inch diskette drive, an 80-Mbyte hard-disk drive, a 10-port communications controller and 2 Mbytes RAM. The LXN has a quantity network unit-price starting at \$18,012 for 25 to 39 systems.

Tandem has spread out the availability of the CLX line. The 620 will be available in the fourth quarter and the 640 will be shipped in the first quarter of next year.

The 610, 660 and the 280-Mbyte disk drive will be available in the second quarter of next year.

The single-quantity price for the 610 is \$57,000, for the 620 it's \$85,000, for the 640 it's \$161,000 and for the 660 it's \$340,000. Tandem's quantity network prices start at \$39,900 for the 610 for the purchase of 25 to 39 systems.

In the same quantities, the network unit price for the 620 begins at \$59,500, \$112,700 for the 640, and \$168,000 for the 660.

The Laser-LX printer will be available in the third quarter for \$2,595.

Convergent Adds To Line

SAN JOSE, Calif.—Convergent Technologies Inc. last week introduced two multi-user systems that round out the company's Unix-based S-Series family.

The new S/221 and S/222 complement the S-Series, which consists of six product groups that support work groups ranging in size from 1 to 128 users.

The S/221 and S/222 share many attributes, including a Motorola 68020 32-bit microprocessor, while differing in bus and disk configurations.

The S/221 supports disk capacity up to 420 Mbytes. The S/222 disk capacity climbs to 4 Gbytes. The S/222 has two additional VME bus slots, for a total of five slots compared with the three slots in the S/221. The S/221 and S/222 feature a 1-Mbyte RAM. Expansion boards with 2 or 4 Mbytes are available.

The base S/221 or S/222 come with a storage capacity of 50, 85 or 140 Mbytes in a 5.25-inch Winchester drive. A 60-Mbyte quarter-inch streaming tape drive is also included as part of the standard mass-storage subsystem.

Entry-level prices are \$14,000 for the S/221 and \$15,500 for the S/222. They are available immediately.

Chase Exec: Now's Time For ACH Meld Into POS

By VIRGINIA DUDEK

NEW YORK—Chase Manhattan Bank vice president James J. Hopes believes that the time has come for automated clearing-house (ACH) services to be incorporated into on-line point-of-sale (POS) transactions.

"The features are attractive to users," Hopes said at the Electronic Banking Economics Society luncheon here last week. "There is enough interest today that organizations are asking when they should implement it, not whether they should use it."

Hopes compared the pros and

checking account. Problem accounts can be detected earlier by the retailer originating the transaction than if the customer were using a credit card. Also, funds are available to the retailer in one to two days, versus a payment cycle of up to 45 days on credit card transactions.

Hopes also pointed out the costs of batch POS. One is that if the Federal Reserve Bank's Regulation E is passed in its current form, banks would be required to carry the added expense of sending out detailed transaction records to customers. The cost of telecommunications facilities and terminals then becomes a consideration.

Debit Card Benefits

Hopes said retailers stand to gain competitive benefits from using debit cards. They can foster brand loyalty if the customer perceives that one retailer offers an advantage in the convenience of debit cards over a competitor.

He also believes that debit cards can be used to gain market share for retailers, improve cash flow and reduce the risks of receiving payment compared to the longer risk exposure assumed by issuing credit cards.

Hopes said that the benefits to consumers will encourage the use of debit cards. Customers will not have to carry cash and will be lured by retailers who give cash discounts or other incentives for using debit cards. Customers can also expect to receive detailed accounting of the purchases that they make.

While retailers have to take into account the cost and requirements of offering debit and cash cards, he feels that the competitive benefits will outweigh the costs.

Also, banks need to understand how ACH services affect their role. "The banker's role is to move money," Hopes said. "But moving information also becomes important, especially moving corporate funds, and the way to move information is through ACH."

New Esprit Terminal VT-220 Compatible

MELVILLE, N.Y.—Esprit Systems Inc. here has released the Opus 220, which it claims is the first DEC VT 220-compatible terminal for VMS, ANSI, Unix, Ultrix and Xenix users, with windowing and a free 24-hour replacement service.

The windowing "allows users to suspend ongoing applications while important data is displayed on screen," Esprit said.

With a 14-inch screen in green or amber, the Opus 220 supports two asynchronous RS-232 ports, current loop or RS-422 interface and has VT 52, VT 100, VT 101, VT 102 and VT 220 emulation modes. A 256-character set supports 32 control codes, special graphics, multinational symbols and various typewriter layouts. Available immediately, it is priced at \$359.



James J. Hopes

cons of POS options for off-line batch transaction processing to on-line guaranteed funds processing using bank debit cards.

Chase is currently expanding its electronic funds transfer (EFT) operations by supporting ACH applications of retail POS cash cards and dual-usage credit cards, where the cards can be used to immediately draw funds from an authorized customer account or for automatically approved credit transactions.

Exxon USA is using Chase to process debit card ACH withdrawals for customers who have authorized payments to be made directly from their bank accounts to Exxon at the retail level.

Retailer/Bank Link

Hopes noted that the major advantages to retailers of on-line POS processing are that the retailer is tied directly to the bank. This means that the customer's account balance can be validated before the transaction is completed, which cuts down on transactions that are returned to the retailer because they cannot be authorized and therefore completed.

On the other hand, the potential problems associated with any on-line POS device are that its use is limited to the bank's customers who have signed up for third-party systems. Brand loyalty is not a benefit to the retailer offering the service because the system can be made available to competitors.

Cost is another problem, as the unit transaction cost is higher for on-line processing than for batch processing. Also, there is a capital investment required in the purchase of communications equipment and terminals.

Conversely, Hopes said that the benefits of off-line batch POS are that it is a service that can be offered to any customer with a

Computers

Hackers

Tandem's new computers plug into office market

By G. Pascal Zachary
Mercury News Business Writer

James Treybig wants to get his foot past the office door.

Until now, Tandem Computers Inc., Treybig's firm, hasn't offered a computer either small enough or inexpensive enough to find a home next to typewriters, file cabinets and personal computers. Instead, the Cupertino company's highly reliable non-stop computers, which are an essential part of on-line transaction systems such as automated tellers, invariably were kept out of sight.

Now Tandem is trying to change that. Today, it is introducing its lowest-priced non-stop computer ever. The CLX computer will allow bankers and retailers to process several transactions a second with a machine that costs as little as \$40,000. Tandem's more powerful computers range from \$80,000 to more than \$1 million.

The new computer is aimed mainly at existing customers who may see a dual value in the CLX — to process transactions at a bank branch or store and then to feed a record of the transaction instantaneously to the company's Tandem network. "If we've already sold them the network, it's a shame not to sell them the computer that goes in the office or store," says Treybig, Tandem's chief executive and president.

Tandem has built a big business during the past decade making a family of computers that shares software and costs more than \$1 million. Big banks, retailers and other firms don't mind the high price tag because the systems are

"If we've already sold them the network, it's a shame not to sell them the computer that goes in the office."

—James Treybig

designed to operate continuously. A Tandem system, for instance, keeps information flowing during trading on the New York Stock Exchange. But the system has generally been too expensive for smaller jobs.

"Tandem has always had a problem with the low end," says Omri Serlin, president of ITOM International, a market research firm in Los Altos. "This solves it — with an entry price much more agreeable to a larger class of customers."

To satisfy customers who want both a link to their Tandem network and a computer to run office software, Tandem also is unveiling today its first computer that runs standard Unix instead of the firm's proprietary software. The LXN, which is available now and sells for as little as \$23,700, is a modified 32-bit computer made by Altos Computer Systems of San Jose.

Treybig won't estimate how much business Tandem will gain from its two new computers, but he calls the more expensive CLX "the finest computer we've ever made." He particularly likes a feature that allows the computer to be repaired without anyone stopping it.

Tandem, which had revenues of \$768 million in 1986, won't ship the CLX until the fourth quarter of the year but says customer interest already is high. "Companies have looked at buying as many as 1,000 for a single network," says William Heil, CLX product manager. Still, it's unlikely that any firms have bitten yet. "They don't have any (major) orders," Serlin says.

The firm has a lot at stake: About 50 engineers spent at least 18 months developing the CLX. Because the CLX had to run on lower power to plug into office electrical outlets, Tandem needed to shrink the computer's components.

To help accomplish this, Tandem asked two small San Jose chip firms for help. Silicon Compilers Inc. of San Jose helped design the computer's chips; VLSI Technology Inc. will fabricate the chips. "This is a big deal for both those companies," Heil says.

Although both new computers are designed to be used in offices, Treybig doesn't claim that Tandem has its sights on entering the lucrative but intensely competitive office equipment market. He seems more interested in satisfying the growth needs of Tandem customers. "This allows us to have the office," he says, "but integrate it into our network."



Tandem's CLX computer



J. Ennis Kirkland

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Title: **Tandem's Nonstop SQL**

Summary: Although Tandem's OLTP-capable relational DBMS is a brilliant achievement, it does not necessarily foreshadow the introduction of similar capabilities to the S/370 environment.

Figure I

Performance Benchmarks	
No. Processors	TPS
VLX	
4	29
8	52
16	106
32	208
EXT10	3/processor
TXP	1/processor

Nonstop SQL, which was announced in March, is a breakthrough in DBMS technology. It combines the asset management and productivity thrusts of the SQL data language with high-performance OLTP facilities (see [Figure I](#)), and adds to that the most complete distributed DBMS technology available. Nonstop SQL is in the same league (alone) with IBM's IMS FastPath. This combination of delivered function is important because it seems to offer assurance that the relational model need not be forever cursed with low performance and high overhead. Delivering this technology affirms Tandem's excellent software capabilities and gives it a terrific advantage in the OLTP market. It should also stimulate other relational technology vendors such as IBM, Oracle, and Relational Technology Inc. to raise the level of their games. However, close analysis reveals serious questions concerning this lesson's relevance to the S/370 market.

Figure II

The ET1 Transaction

The debit/credit transaction is a stylized automatic teller transaction. The process consists of updating the account balances of the teller user and the branch. A historical record is inserted to complete the database portion of the transaction.

The transaction is widely accepted as "typical" of online transactions, at least for purposes of performance analysis.

Tandem showed that a configuration of four VLX systems consisting of 32 processors (with a total nominal power of 100 MIPS) and supporting 256 megabytes of main memory, yielded slightly more than 200 transactions per second (tps). The transaction was the debit/credit entity known as ET1 (see [Figure II](#)), which has also been used by IBM to measure the IMS and DB2 capabilities. Because Tandem has demonstrated linear performance capacity, this result should scale up to more than 1000 tps on a larger system, as processors are added. Tandem achieved this rate under the constraint that 90 percent of all transactions must be completed within two seconds, rather than the formal stipulation that 95 percent must be completed in one second. Nevertheless, this was a watershed event in OLTP performance, because:

- this was the largest multiprocessor system ever tested for OLTP;
- this was the largest benchmark involving a relational (SQL-compliant DBMS); and
- never before has a vendor published such exten-



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sive full disclosure data, certified by an independent agency.

Figure III

Seven Key Points for Nonstop SQL

- Practical -- Nonstop SQL has been stress-tested for high-volume OLTP
- Distributed -- Nonstop SQL allows distributed data and distributed transactions
- Inexpensive -- Nonstop SQL is no more expensive than record-at-a-time technology
- Linear -- Nonstop SQL demonstrates linear increases in throughput as additional processors are added
- Scalable -- Nonstop SQL runs on small departmental systems, as well as on large mainframes
- Flat Price/Performance -- The price/performance of Nonstop SQL-based systems is competitive for both departmental systems (EXT-10) and data center systems (VLX)
- No Performance Limit-- There are no bottlenecks in systems running hundreds of transactions per second.

Glossary

DBMS: Database management system
ET1: A stylized transaction commonly used for performance measurement
Guardian: The operating system for Tandem computers
OLTP: Online transaction processing
SQL: Structured Query Language
VLX: Tandem's high-end processor

Tandem will follow up this achievement with a deeper set of benchmarks that will conclusively demonstrate seven key points (see Figure III) strongly supported by the accomplished benchmark. Tandem's strategic shift to SQL follows the model of the similar move by IBM, except that the emphasis on customer migration is much stronger. While the visibility of SQL is important in terms of leveraging programmer skills, SQL applications portability is not a reality; it will be difficult to transplant SQL applications developed under the Tandem requestor/server model to SQL environments such as IBM's, which do not support a similar model. More important for Tandem, the reverse will also be difficult, and there is no near-term visibility of a gateway for IMS, DB2 or VSAM from Nonstop SQL.

This announcement raises a key issue: Must relational DBMSs (RDBMS) be integrated with the operating system to achieve high levels of performance, and is it necessary that the operating system be message-based? The recent (i.e., Tandem's Guardian) trade press controversy about "debunking the performance myth of relational systems" has missed these points. Tandem thoroughly altered its operating system (Guardian) to accommodate the structures necessary for Nonstop SQL. In fact, the Tandem "disk process" (roughly its VSAM analog) has been revised to support SQL operations, including: predicate evolution, selective handling of operational subsets, and assertion checking. This offloading of performance dependencies from the application level avoids the overhead imposed by modest (compared to MVS/XA) layering of Tandem's software environment, and was key to the results.

Although IBM intends to pull certain common services from DB2 and IMS down into MVS/XA, we believe it would be difficult and expensive (perhaps impossible) to integrate DB2 code with MVS/XA to the extent that Tandem has embedded Nonstop SQL in Guardian. We contend that DEC will have similar problems with upcoming OLTP and Rdb/VMS). Moreover, it might not be very effective, because MVS/XA and VMS are not message-based. Since Guardian is message-based, it works much more effectively with a high-level command facility (such as SQL) than MVS/XA or VMS ever could. Therefore, we must conclude that Nonstop SQL does not necessarily foreshadow the near-term appearance of a relational technology capable of supporting intense OLTP activity within the S/370 architecture. That will evolve gradually during the next three years.

PC/AT VIDEO BOARD GRABS 30 FRAMES/S FOR \$1,600

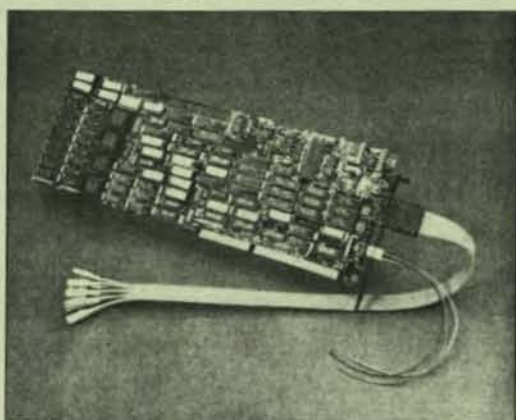
DATA TRANSLATION'S 2853 LACKS SOME FEATURES OF THE HIGH-END 2851, BUT IT COSTS \$1,400 LESS

Data Translation Inc.'s DT2853 frame grabber—a low-cost version of its full-featured DT2851—lets IBM Corp. PC/AT users acquire, store, display, and process images at 30 frames/s for less than \$1,600.

The price brings it into the market \$1,400 below the full-featured board and \$200 to \$400 under competing low-cost frame grabbers, some of which have fewer onboard functions, says John Molinari, product marketing manager for imaging products.

The DT2853 runs the company's DT Iris software and plugs into a single slot of a PC/AT. It digitizes a 512-by-512-by-8-bit image from a video signal, stores the image in one of two on-board buffers, and displays it in RGB false color or monochrome at 30 frames/s.

The DT2853 is compatible with monochrome or color video cameras and with VCRs. It includes an 8-bit flash convert-



SINGLE SLOT. The DT2853 runs Data Translation's Iris software and uses a single slot of an IBM PC/AT.

er that produces pixels in 256 gray levels. Two external triggers are available for applications such as machine vision inspection that usually require frame grabbing to occur in synchronization with one or more external events.

The DT2853's ability to process im-

ages is a bonus that Molinari says isn't usually found in a low-cost unit. Processing includes the ability to add images or subtract them from one another, multiplication or division by a constant to adjust contrast, image averaging, and image-of-interest processing.

What the DT2853 does not include are slow-scan and a direct connection to a companion frame processor—a dedicated array processor. Slow-scan allows image acquisition from sensors that are slower than TV cameras or VCRs, such as CAT scanners or scanning electron microscopes. These features are found in the \$2,995 DT2851.

SQUARE DISPLAY. A square-pixel version of the DT2853 is available for an additional \$400 for applications such as graphics, robotics, or feature measurement, which require a perfectly square display (1:1 aspect ratio). This feature eliminates the geometric distortions inherent in standard rectangular displays (4:3 aspect ratio), such as TV screens. The DT-Iris software library contains image-processing algorithms that make full use of the real-time features of the DT2853 and are callable from Pascal, C, and Fortran.

Both the DT2853 and DT-Iris are available immediately; DT-Iris sells for \$695.

—*Lawrence Curran*
Data Translation Inc., 100 Locke Dr., Marlboro, Mass. 01752.

Phone (617) 481-3700

[Circle 340]

TANDEM ON-LINE UNITS TARGET LOW END

Tandem Computers Inc. has invaded the low end of the market for on-line transaction processing with two new systems, one a Motorola Corp. 68020-based computer running AT&T's Unix V.2 and the other supporting Tandem's proprietary Guardian operating system. Both are intended to extend transaction processing to distributed environments and support multiple communications protocols. Tandem also announced a desktop eight-page/min. laser printer, the Laser-LX.

PIONEER. The LXN computer is Tandem's first venture into the Unix operating system environment, where the company hopes to gain access to a burgeoning number of applications in banking, retail sales, manufacturing, telecommunications, and transportation—all markets served by Tandem's larger minicomputer line. In keeping with Tandem's traditional emphasis on high reliability, the LXN provides disk mirroring and power automatic restart.

The LXN is being supplied to Tandem by the original-equipment manufacturer Altos Computer Systems Corp., San Jose, Calif. It represents the first of

several steps Tandem will take to integrate Unix into on-line transaction processing, a Tandem spokeswoman said.

The Motorola processor on which the LXN is based runs 2.3 million instructions per second. The machine can access Tandem's own systems via the company's SNAX communications soft-



COMPATIBLE. The LXN networks with IBM Corp. mainframes and AT&T Unix systems.

ware, or it can communicate with IBM Corp. mainframes via SNA or with other Unix systems using the CCITT X.25 packet-mode network.

The system using Guardian, the Non-Stop CLX, is intended for use in departmental and branch offices and is built around the CMOS gate-array implementation of Tandem's proprietary central processing unit. Although it is the first Tandem computer to be offered with a single processor, up to six processors may be configured in a single system.

System performance ranges from 2.5 to 15 data-base transactions per second, depending on the number of CPUs. The system supports SNA, Open Systems Interconnect, and X.25 networking, as well as connections to several commercial local-area networks.

The new laser printer is compatible with Hewlett-Packard Co.'s LaserJet Plus, giving users access to hundreds of Unix and MS/DOS applications. It is intended for desktop-publishing applications averaging 4,000 pages a month.

Available now, the Unix-based LXN costs \$18,012 each for 25 to 35 systems. Although the \$39,500 single-processor

CLX 610 will be the two-probe released at \$59,500 in LX printer

WAN CON

Office automation systems to form a formidable information base, which can be sent to a clerk, for example, of a purchase order receivable and approved the system base. A computer for the purchase can be sent to the company mail.

MINI-BASED minicomputer company's applications data-targets application insurance, and System I—an Image optical disk VS work system. Image system will sell for

The first retrieved file in 10 s; the retrieval time 20 s and 3 pages, res storage-and 30 s and 5

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UPDATE: TANDEM'S VLX RACKS UP NONSTOP SALES



Since Tandem Computers Inc. introduced its first mainframe-class of fault-tolerant computers, the NonStop VLX, a year ago, sales of the new system have soared. Now the company is getting ready to introduce new configurations of the VLX that it hopes will get the same reception as the original, which accounted for 75% to 80% of the company's growth in the past year, says Terence Retford, manager of systems products at Tandem.

The Cupertino, Calif., company began shipping the VLX in small quantities prior to its formal introduction [*Electronics*, April 14, 1986, p. 34]. Volume production began almost immediately thereafter. Customer reaction was instantaneous, and sales have consistently exceeded forecasts.

The new configurations, coming in May, will extend the system's capabilities at both the high end and the low end. They will be based on the same bipolar gate array used in the VLX, the MCA2800, which Tandem developed with Motorola Inc. One of the main challenges for the team

working on the upgrade was keeping pace with technology. Al McBride, director of technology at Tandem, says that the number of transistors on bipolar gate arrays once was doubling every year; now it's tripling.

Despite the advances that the VLX systems represent, they don't seem to compete with the older Tandem NonStop TXP system. "The TXP systems are selling at the same rate after the VLX announcement as before," says McBride. Apparently, established Tandem customers have chosen to expand their existing TXP systems rather than buy into the newer VLX product. That means that VLX is appealing largely to new customers, although existing customers can buy the new VLX and tie the new and old system together with a fiber-optics link called FOX.

What characterizes the new customers is their demand for the sheer power of the VLX—twice the transactions per second of the old TXP systems, delivered by a modular system that can contain up to 16 processors, all operating on a high-speed processor bus. To get more power, customers simply add more processor cards.

That seems to indicate that the new customers come at the expense of the company Tandem has always regarded as its prime competitor—IBM Corp. "Before, there was only one supplier of high-end transaction processing systems," says Retford, "and that was IBM. VLX for the first time gave customers an alternative, which not only offered more functionality but also came at a better price-performance." —Jonah McLeod

TECHNOLOGY TO WATCH

UPDATE: NOW LASARRAY IS READY FOR A BRISK YEAR



Lasarray Corp. got off to a slow start after the introduction last year of its laser-based method of customizing gate arrays [*Electronics*, April 21, 1986, p. 51]. The company's management has spent much of its time reorganizing its operations in Europe and setting up a U.S. sales and marketing staff. With those tasks accomplished, Lasarray is now gearing up for a brisk year in 1987.

A round of financing by private investors in Europe—where Lasarray was founded as an operation within Switzerland's FELA group—has given the company some \$15 million to work with. And commitments are in hand for the purchase of at least

five of Lasarray's turnkey mobile fabrication facilities, costing \$3 million to \$4 million apiece. First delivery of a system is scheduled for May, says vice president George Krautner.

Based on a laser pattern generator, the system uses two beams to customize circuits by exposing resist-covered connections on a partially processed wafer. A computer program directs the beams along a pattern of holes in a metal grid that is laid down on a chip design created by a silicon compiler. The technique eliminates the chromium mask required in conventional gate-array customization, making circuit-writing faster and manufacturing less expensive.

The turnkey systems include equipment for design, testing and packaging of the resulting CMOS arrays. With it, a finished prototype takes only a few hours from the completion of a design simulation.

So far, orders for the system have all come from European companies, Krautner says. But he expects an enthusiastic reception in the U.S. once a demonstration facility now being built at the company's headquarters in Scotts Valley, Calif., is completed. —Bernard C. Cole

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its stock, worth \$42 million at Wednesday's closing price of \$28 a share. Faraday lost \$1 million on revenues of \$18.6 million in its fiscal 1986, but Western Digital said the chip company is now booking orders at a rate of \$30 million a year.

FORD DOUBLES EARNINGS: Ford Motor Co., reaping the rewards of its trend-setting product design and its adherence to stringent cost-control measures, said Wednesday it earned a record \$1.5 billion in the first quarter of 1987, more than doubling last year's pace. Ford's profits for the three months were up 105 percent over its 1986 first-quarter earnings of \$728.3 million and also broke Ford's previous quarterly profit record of \$1.1 billion, set in the second period of last year. Ford's net profit soared to \$5.73 per share compared with \$2.70 a share a year ago.

EXECS PLAY WITH COMPUTERS: Computers truly are personal in the American office, where some executives are using them — sometimes for more than two hours a day — to play games, balance checkbooks and catch up on schoolwork, according to a survey released Wednesday. Two-thirds of the 750 computer-using executives who responded to the survey said they used computers at work for non-work-related purposes, according to Epyx Inc., a computer software company based in Redwood City.

IN BRIEF: Tandem Computers Inc. of Cupertino has declared a 100% stock dividend payable June 12 to holders of record on May 22. ■ J.C. Penney said Wednesday it will move its corporate headquarters and about 3,800 employees to a new headquarters in Dallas next spring, in an effort to cut operating costs and cash in on the big retailer's valuable Manhattan real estate. ■ Pacific Southwest Airlines and Teamsters union Local 2707, which represents 3,800 PSA employees, reached tentative agreement Wednesday on labor contract changes that clear the way for USAir Group to conclude its \$400 million purchase of PSA. ■ Burlington Industries accused Paine Webber of leaking inside information to several parties, including Asher Edelman and Dominion Textile, to induce them to take over the textile producer.

From Mercury News Staff and Wire Reports

MoneyList

COLLEGE HOUSING COSTS

Type of college & housing	Average student cost per year
1. Private, on campus	\$10,199
2. Private, commuter	\$ 8,809
3. Public, on campus*	\$ 5,604
4. Public, commuter*	\$ 4,467

* If resident of same state

SOURCE: The College Board



By Kirstin Downey
Mercury News Business Writer

Jeri Traub, a 34-year-old San Jose State University professor, used to commute to her job in downtown San Jose each day from a garden-style apartment complex in Willow Glen.

Now she steps out her apartment door and walks three blocks to her job at the university's special education department. Traub says the chance to live downtown led her to sign a lease at the Colonnade apartments.

"I thought it would be exciting to be in the newest building in San Jose... and because I thought downtown San Jose would be an exciting place to be in the future," she said.

Traub is not alone. After a slow start last December, business has been picking up steadily for the Colonnade, the first new apartment complex built in

More Commercial Real Estate, Pages 3E - 5E

downtown San Jose in about 20 years. The complex is now 64 percent leased.

The \$20 million apartment complex which is adjacent to San Jose State University at the corner of East Carlos and South Fourth streets, is the first completed piece of the \$500 million Silicon Valley Financial Center.

That massive project — which also contains millions of square feet of office space, a shopping center and Fairmont Hotel — is the focal point of San Jose's efforts to revitalize its city center.

From the start, the Colonnade has been considered a risky venture. It

Economic barometer rose 0.4%

Los Angeles Times

WASHINGTON — The government's chief barometer of future economic activity rose a moderate 0.4 percent in March, the Department of Commerce reported Wednesday, suggesting that the economy will continue to improve.

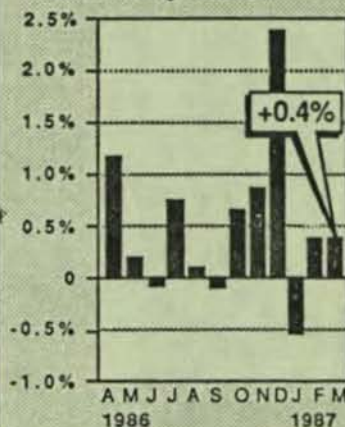
The increase in the index of leading indicators — which matched February's revised 0.4 percent increase — was powered by a jump in stock prices, as well as by several indications of stronger business demand, such as a drop in new jobless claims, a slowdown in delivery of goods and a rise in new plant and equipment orders.

"We should get a moderation in growth this quarter, but after that we see some substantial gains ahead," said David Wyss, a senior economist at Data Resources Inc., a forecasting firm based in Lexington, Mass.

Meanwhile, the nation's strong housing sector could be on the verge of a slowdown, according to the government report. Sales of new single-family homes dropped

Leading economic indicators rise 0.4%

Change from previous month in Index of Leading Indicators.



Source: U.S. Commerce Dept.

Knight-Ridder News Service

3.6 percent in March, which would produce a seasonally adjusted annual rate of 699,000 homes.

Overall, six of the nine leading indicators made positive contributions in March.

Three indicators held back a rise in the index. The largest negative factor came from a drop in the length of the average workweek, followed by changes in raw materials prices and a slowdown in growth of the money supply.

San Jose Mercury News
4/30/87 p 1E

LEVEL 1 - 2 OF 4 STORIES

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April 28, 1987, Tuesday

DISTRIBUTION: Business Editors

LENGTH: 157 words

HEADLINE: TANDEM-COMPUTERS -2; (TDM) Tandem Computers board of directors approves stock split effected in the form of a stock dividend

DATELINE: CUPERTINO, Calif.

BODY:

The board of directors of Tandem Computers Inc. (NYSE:TDM), a Delaware corporation, Tuesday announced approval of a 2-for-1 stock split effected in the form of a stock dividend with respect to the company's outstanding common stock and stock options.

Stockholders of record as of May 22 will receive a dividend for one share of stock for each share of stock held. The shares will be mailed on June 12.

Options to purchase the company's common stock will be adjusted to reflect the board's action.

Tandem Computers Inc. is a leading supplier of computer systems and networks for the on-line transaction processing marketplace. The company is headquartered at 19333 Vallco Parkway, Cupertino, Calif. 95014. Telephone is 408/725-6000

CONTACT: Tandem Computers Inc., Cupertino
Bobbi Blake, 408/725-2362 (financial)
or Gina Burr, 408/725-7455 (media)

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LEVEL 1 - 4 OF 4 STORIES

Proprietary to the United Press International 1987

April 28, 1987, Tuesday, BC cycle

SECTION: Financial

DISTRIBUTION: California

LENGTH: 195 words

HEADLINE: Tandem announces 2-for-1 stock split

DATELINE: CUPERTINO, Calif.

KEYWORD: Tandem

BODY:

Tandem Computers Inc. Tuesday announced its board of directors has approved a two-for-one stock split of the Cupertino-based company's common stock outstanding and stock options.

The news came less than a week after Silicon Valley pioneer Apple Computers Inc. announced its first ever cash dividend for the first quarter of 1987, in addition to a two-for-one stock split.

Tandem stockholders of record as of May 22 will receive a dividend for one share of stock for each share of stock they hold, the company said. The shares will be mailed June 12. Options to purchase Tandem stock will also reflect the two-for-one split, Tandem said.

Tandem reported increased earnings this year, doubling earnings per share to 58 cents in the first quarter compared to year-ago levels, and recording an 81 percent increase in net income to \$22.4 million, or 46 cents a share, in the second quarter ending March 31, compared to the second quarter of 1986.

As of March 31, Tandem had common stock outstanding of 45.7 million shares and approximately 16 million shares in stock dedicated to stock option plans. Tandem stock was up 1 to \$67.25 in early afternoon trading Tuesday.

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LEVEL 1 - 3 OF 4 STORIES

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Business Wire

April 28, 1987, Tuesday

DISTRIBUTION: Business Editors

LENGTH: 470 words

HEADLINE: TANDEM-1; (TDM) Tandem Computers and Coopers & Lybrand sign agreement to implement solutions in manufacturing

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) and Coopers & Lybrand, an international public accounting and management consulting firm, Tuesday announced they have signed an agreement under which the two firms will work together to implement on-line solutions in the manufacturing market.

Coopers & Lybrand will assist Tandem users in the development and implementation of on-line transaction processing applications for manufacturing. As part of this agreement, Coopers & Lybrand will provide services that include project management, pre-installation analysis, post-installation implementation training and support.

This agreement covers all areas of manufacturing with special emphasis in electronics, automotive, process and aerospace.

Robert Marshall, Tandem chief operating officer, stated, "Manufacturing is a strategic industry for Tandem. As a partner in this market, Coopers & Lybrand consultants have the experience necessary to address the complex issues involved in computer-aided manufacturing.

"Tandem's proven on-line transaction processing capabilities together with Coopers & Lybrand manufacturing consulting expertise will help our customers to meet today's competitive demands," noted Marshall.

Edward Pringle, Coopers & Lybrand's national director of management consulting services, said the agreement represents an important opportunity to bring additional capabilities to manufacturing clients.

"Manufacturers are the largest single market for computer and consulting services in the U.S.," Pringle said. "We are pleased to work with Tandem to provide state-of-the-art solutions to help make manufacturers competitive worldwide."

Coopers & Lybrand is one of the world's leading public accounting and management consulting firms. Its manufacturing consultants group is staffed by approximately 300 manufacturing professionals in the United States and is represented in key manufacturing sectors around the world.

The Tandem Alliance Solutions Implementer program is designed to provide a framework for teaming relationships within a specific industry. Members of this category have a strong international presence in their respective industries.

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© 1987 Business Wire, April 28, 1987

Tandem Computers Inc. is a leading supplier of computer systems and networks for the on-line transaction processing requirements of computer-integrated manufacturing. Twenty-one percent of its revenue in fiscal 1986 came from the manufacturing market. The company is headquartered at 19333 Vallco Parkway, Cupertino, 95014. Phone is 408/725-6000.

CONTACT: Tandem Computers Inc., Cupertino
Leslie Stull, 408/725-6237
or
Coopers & Lybrand, New York
Howard Bailen, 212/903-8854

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velopment and planned reduction in gross margin," according to the company. R&D expenses rose 43 per cent from the year-ago quarter as Apple continues to launch major new products throughout the year.

Gross margin as a percentage of sales was 50 per cent in the fiscal 1987 period compared with 56.6 per cent in the year-ago quarter, while the year-to-date margin was 51 per cent against 53.3 per cent.

"Results of the quarter are much better than we had expected," commented John Sculley, chairman and chief executive.

"Sales momentum has continued to build in both domestic and international markets. We are particularly pleased with the initial acceptance of the Macintosh SE.

popularity of the Apple II lines, we enter the second half of our fiscal year confident that we will show growth in both revenues and earnings," said Mr. Sculley.

For the first half of fiscal 1987 ended March 27, Apple's net rose 4 per cent to \$92.3 million, or \$1.42 a share, on volume up 31 per cent to \$1.238 billion.

In the comparable period of fiscal 1986, the firm earned \$88.7 million, or \$1.40 a share, on \$942.6 million gross.

Last week, Apple declared a two-for-one common stock split and said it would distribute its first quarterly cash dividend of 6 cents a post-split share. Both actions are to be effective June 15 to holders as of May 15 and "should allow a broader group of investors to participate in our future," said Mr. Sculley.

Profit Rises 81% In Tandem Quarter

CUPERTINO, Calif. — Tandem Computers Inc. posted a profit increase of 81 per cent to \$22,444,000, or 46 cents a share, for the second quarter ended March 31, compared with \$12,410,000, or 29 cents a share, earned in the like quarter of fiscal 1986.

Revenues increased 37 per cent to \$242,368,000 from \$176,327,000.

For the latest 6 months, net more than doubled to \$49,541,000, or \$1.03 a share, compared with the \$24,058,000, or 56 cents a share, earned a year earlier, while vol-

ume rose 39 per cent to \$480,403,000 from \$346,388,000.

James G. Treybig, president, said the firm's international business was strong. "In particular, Japan, Canada and the Scandinavian countries posted significant gains. The U.S. continued to do well across all regions of the country."

Mr. Treybig noted that during the most recent quarter the firm increased funding of third-party marketing programs.

Adage Inc.	2%	2%	—	Daisy Sysms	9%
ADC	19	19 1/2	—	Data I/O	8%
Advance Ross	6 1/2	7	—	Datametrics	31
AdvSemi Mat.	4	4 1/2	—	Datascope s.	33 1/2
AEL Indus A.	12 1/2	13	—	DataTransit s.	16 1/2
Algorex Corp.	4%	4%	—	Datum Inc.	29
Alloy Cmpl.	7 1/2	8	—	Decom Systm.	1 1/2
Alpha Microsys.	4%	4%	—	Fountain Power	1 1/2
Altos Computer	12 1/2	12 1/2	—	DensePacMic	1 1/2
Analogic	11 1/2	11 1/2	—	Digilog s.	9 1/2
Anaren Micro	6%	7	—	Dionics	2 1/2
Anderson Grp.	7 1/2	8 1/2	—	Drexler Tech	11 1/2
Andrew	14 1/2	15	—	PhiPi May30	2
Appollo Computer	18 1/2	18 1/2	—	Dynascan Cp	13 1/2
Apple Comput.	75 1/2	76	—	Dynatech Cp	31 1/2
Appid Circuit Tc.	1 1/2	1 1/2	—	Electro Rent.	13 1/2
Applied Data	3 1/2	4 1/2	—	EIL InstrmntsSk	6 1/2
Applied Matrl.	19 1/2	19 1/2	—	EIP Micro 12	6 1/2
Applied Solar	10 1/2	11	—	Eldec Corp.	11 1/2
Archive Corp.	9	9 1/2	—	Elec Nucin	10 1/2
Artel Comm.	2 1/2	3	—	Electro Rent.	13 1/2
AstroCom Cp	2 1/2	2 1/2	—	Electro Scienc.	13 1/2
AstroMid New	9 1/2	9 1/2	—	Elxsi Ltd.	1 1/2
Astrosystems	7 1/2	8	—	EMC Corp.	23 1/2
Automatd Sys.	6	6 1/2	—	Emulex Corp.	6 1/2
Auto-TrolTC	5 1/2	5 1/2	—	EricsonLM 1.20B	46 1/2
Avant Garde	3 1/2	4	—	Evans Suthro.	33 1/2
Avantek Inc.	14 1/2	15	—	Exar Corp.	9 1/2
Baird Corp.	16 1/2	16 1/2	—	Excelan Inc.	13 1/2
Banc Tec Inc.	13 1/2	14 1/2	—	Ferrofluidics	3 1/2
Base Ten A.	7 1/2	8	—	Fibronics Intl s.	7 1/2
Bio-Logic Sys.	6 1/2	6 1/2	—	Fluorocbrn 28	14 1/2
Boonton Elec	4 1/2	4 1/2	—	Graphic Scan	8 1/2
BPI Systems	1 1/2	1 1/2	—	G Tech Corp.	9 1/2
Britton Lee	4 1/2	4 1/2	—	Hadco Corp.	5 1/2
CityNatl .64	27 1/2	28 1/2	—	Hathaway 10E	6 1/2
Cadnetix	15 1/2	15 1/2	—	Herley Microw.	15 1/2
Cal Microwave	8 1/2	8 1/2	—	HoganSys Inc.	3 1/2
Cermetek Mic.	1 1/2	1 1/2	—	Hytek Microsys.	3 1/2
Certron	2 1/2	2 1/2	—	Icot Corp.	6 1/2
Cherry El 12	14 1/2	15 1/2	—	Ilex Inc.	4 1/2
Chips	26	26 1/2	—	ILC Tech.	4 1/2
Chiron Corp.	33 1/2	34	—	Inform Intl.22	15 1/2
Cipher DataP.	12 1/2	13 1/2	—	Informix Cp.	1 1/2
Coherent	11 1/2	11 1/2	—	Infotron	8 1/2
Compusen Inc.	1 1/2	1 1/2	—	Intech Inc Si	2 1/2
Computr Auto.	6	6 1/2	—	Integrt Device.	15 1/2
Computr Comm.	1 1/2	2	—	Intel	44 1/2
Computr Horzns.	11 1/2	12	—	Intergraph s.	22 1/2
Computr Mem.	3 1/2	3 1/2	—	Intermec Corp.	1 1/2
ComputrPwr s.	2 1/2	2 1/2	—	Iomega Corp.	3 1/2
Computr Pro.	4 1/2	4 1/2	—	IPLSys A.	2 1/2
Comptr Resrch.	2 1/2	3	—	Irwin Magnet.	9 1/2
Comshare Inc.	16	16 1/2	—	Jefferies Grp.	12 1/2
Concurrent C.	15	15 1/2	—	Kent Elec Cp.	6 1/2
Convergt Tec.	5 1/2	5 1/2	—	Kevlin Microw.	2 1/2
Convex Cmpl.	17 1/2	17 1/2	—	KLA Instruments	19 1/2
Corcom	5 1/2	6	—	KulickeSoffa	9 1/2

NEW REGISTRATIONS

WASHINGTON — Electronic companies filing registration statements for public offering included:

General Instrument Corp. — Up to \$150 million in convertible subordinated debentures due 2012 through Lazard Freres & Co., Salomon Brothers Inc. and Merrill Lynch Capital Markets.

Data Architects Inc. — A total of 850,000 shares of common stock,

of which 672,000 shares are to be sold by the software developer and 178,000 shares by certain holders. Dean Witter Reynolds Inc. will act as sole manager of the underwriting group.

Applied Magnetics Corp. — Up to \$45 million principal amount convertible subordinated debentures due 2012 through Goldman, Sachs & Co. and Hambrecht & Quist Inc.

International Microelectronic Products Inc. — An initial 6,500,000 shares of common stock, with an anticipated price range between \$6 and \$7 a share. Shearson Lehman Brothers Inc. and Montgomery Securities will co-manage the proposed offering, which will consist of 4,500,000 shares to be sold by the IC maker, and 2,000,000 shares to be sold by selling holders.

Machine Tech.	3 1/2
MngtSci Amer.	1 1/2
Master Syst.	4 1/2
Matrix Sci 10.	37 1/2
Maxtor Corp.	3 1/2
Maxwell Labs.	14 1/2
McI Communi.	6 1/2
Megadata CP.	4 1/2
Mento Grph.	28 1/2
Merrimac Ind.	7 1/2
Methode A .07	7 1/2
Methode B .06	7 1/2
Micom Systm.	15 1/2
Microndyne.06	4 1/2
Micron Techn.	9 1/2
Micropolis CP.	37 1/2
Microsemicp	8 1/2

80286-based 6300 Plus PC by as much as 38 per cent in an effort to reposition that product as an XT-compatible, and cut the lists of its other personal computers by up to 23 per cent to put them more in line with current market prices.

At the same time, NCR lowered prices of its PC6 and PC8 IBM-compatibles by about 12 per cent, also in response to declining tags across the PC business.

Prices of all five versions of AT&T's 6300 Plus, a 286-based machine with a PC XT-compatible bus that runs a version of Unix System V, have been dropped. With a single floppy, the 6300 Plus is now \$1,590, a more than 38 per cent cut from its previous tag of \$2,565. Other price cuts for the line are: dual floppy version, \$1,740 from \$2,790; 20-MB Winchester, 360-KB floppy, \$2,240 from \$3,215; 20-MB Winchester, 1.2-MB floppy, \$2,340 from \$3,315; and 40-MB Winchester, 1.2-MB floppy, \$3,065 from \$4,340.

512-KB RAM

All models have 512-KB RAM, and run Unix System V with Simulcast, which allows certain DOS tasks to be run under the multi-user OS.

A company spokeswoman said prices of the 6300 Plus were lowered to put the product more in

line with other XT compatibles. She said AT&T had been marketing it as an AT-like computer able to operate in an XT environment (through its bus), but has now decided to position it against other XTs. "It's priced according to what we see as the pricing trends in the XT market," she said.

She would not say whether the earlier market strategy had been successful. When asked to detail sales of the line, she replied that "sales of the entire 6300 line are on target," but would not give specific figures.

On its standard PC 6300 models, AT&T knocked down prices by 17 to 23 per cent. A single-floppy configuration goes to \$1,485 from \$1,780; a dual-floppy version is now \$1,565 from \$2,020; and the unit with a 20-MB hard drive becomes \$2,165 from \$2,620.

AT&T also reduced prices of its 6310 AT-compatible, which it brought out last February. With a single 1.2-MB floppy, the machine now lists for \$2,900, down from

\$3,800 from \$3,995, as does the 40-MB unit to \$4,700 from \$4,995.

Prices of keyboards, monitors, memory and storage options remain the same, the company said.

AT&T also extended the warranty of the 6300 from 90 days to 1 year. All configurations are covered by the extension, as are the Model 301 keyboard and monochrome and color monitors. AT&T's other PCs, keyboards and monitors already have the 1-year warranty, the firm said.

Separately, NCR last week initiated price cuts up to 12 per cent on its personal computers in response to competitive conditions in the market.

Vernon Yates, vice-president and general manager of NCR's PC division, said the affected computers are the PC8, an IBM AT-compatible, and the PC6, an IBM XT-compatible.

The price of the PC8 with 512-KB memory, a 1.2-MB floppy drive and a 30-MB Winchester is now \$4,395, down from \$4,990. A PC6, with 512 KB of RAM, a 360-KB floppy and a 20-MB Winchester, lists for \$2,695, cut from \$2,990.

processors supplied by a million U.S. Customs Service processors. IBM also is panel.

IBM V-P to Head

FORT LAUDERDALE — an IBM divisional operation Systems division.

Martin Axelrod, who has been vice-president of operation IBM's Communications Processor division (CPD) in Boca Raton, Fla., has been named vice president and general manager of Harris Computer Systems, replacing James Oyler, who last summer was promoted to vice-president in charge of the company's Information Systems sector.

Mr. Oyler has been over Computer Systems in the interim. Mr. Axelrod reports to Mr. Oyler.

Reporting to Mr. Axelrod will be all operations of the division, including sales, marketing, manufacturing and engineering. Harris' Unix-based systems are real-time computers.

According to an IBM spokesman, Mr. Axelrod is retiring from the company as of May 1. He has been with IBM for 27 years, most recently, as operation president of CPD, was in charge of communications work with Series/1 and System/88 processors.

Amdahl Headin

SAN JOSE, Calif. — Elx chairman Gene Amdahl has named chief executive of N Power Corp., a power supplier of which he also has been as chairman.

Mr. Amdahl, who is chairman of Elxsi, will take day-to-day operations of

Tandem Offers 1st Unix-Based Product, Transaction Sys.

CUPERTINO, Calif. — Tandem Computers Inc. has moved down its computer architecture to a new entry level point, introducing its first Unix-based product along with a separate low-end version of its on-line transaction processing system.

The proprietary CLX system, based on CMOS technology, is available in one-, two-, four- and six-processor versions with performance said to range from 2.5 up to 15 transactions-per-second.

The new CLX line — the Models 610, 620, 640, 660 — will have staggered availability. The dual processor Model 620 will be delivered

during the fourth quarter, while the four-processor Model 640 will be available by the first quarter of next year. The uniprocessor Model 610 and the six-processor Model 660, as well as a 280-MB disk drive, are not slated to be available until the second quarter of 1988.

The entry-level uniprocessor CLX Model 610 does not offer fault tolerant capabilities but can be upgraded to a full six-processor model. The fully configured six-processor CLX Model 660 supports 72 MB of memory, 10 GB of disk storage and 600 communications lines.

The unit's systems cabinet includes 5.25-inch, 145-MB or 280-MB drives with SCSI controllers and a 128-MB 1/2-inch tape drive. In the multi-processor configurations, communications are handled by dual 20 MB per second interprocessor buses. The systems support 3270 terminals as well as IBM-compatible PCs.

Entry level prices for all the models, in single unit quantities, are as follows: \$57,000 for the uniprocessor; \$85,000 for the dual processor; \$161,000 for the four-processor version; and \$240,000 for the six-processor machine.

LEVEL 1 - 4 OF 4 STORIES

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Advanced Manufacturing Technology
(formerly Industrial Robots International)

**CORPORATE
INFORMATION CENTER**

April 27, 1987

SECTION: AMT'S SPECIAL REPORT ON PLANT DATA FLOW; from CAD to CAM to QC Via Computer; Vol. 8, No. 8; Pg. 5

LENGTH: 200 words

HEADLINE: DATABASE SYSTEM APPLIES SQL TO CIM

BODY:

Tandem tells me about a new database management software, NonStop SQL, that is aimed right at computer integrated manufacturing (CIM). It's the first SQL (structured query language) implementation of the relational model to both provide the performance needed for high-volume, online transaction processing, and support fully transparent data distribution. Data anywhere in a network of Tandem systems can be read, written, or updated with full transaction protection, and the database will still reflect current state of a business.

It can be applied to a variety of CIM components where tracking and online control are needed: work-in-process tracking, just-in-time materials delivery, order processing, forecasting, production scheduling, and inventory control.

Audited results of a benchmark on the system showed more than 200 debit/credit transactions per second on 32 NonStop VLX processors, and demonstrated linear performance. Potential, if more processors are added, is more than 1000 transactions per second.

Details: Dennis L. McEvoy, Vice President of Software, Tandem Computers Inc., 19191 Vallco Parkway, Location 4-40, Cupertino, CA 95014-2599. Phone: 408-725-6000.

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IDB ONLINE--THE COMPUTING INDUSTRY DAILY

Thursday April 23, 1987

TANDEM BRINGS NON-STOP RUNNING TO THE LOW END

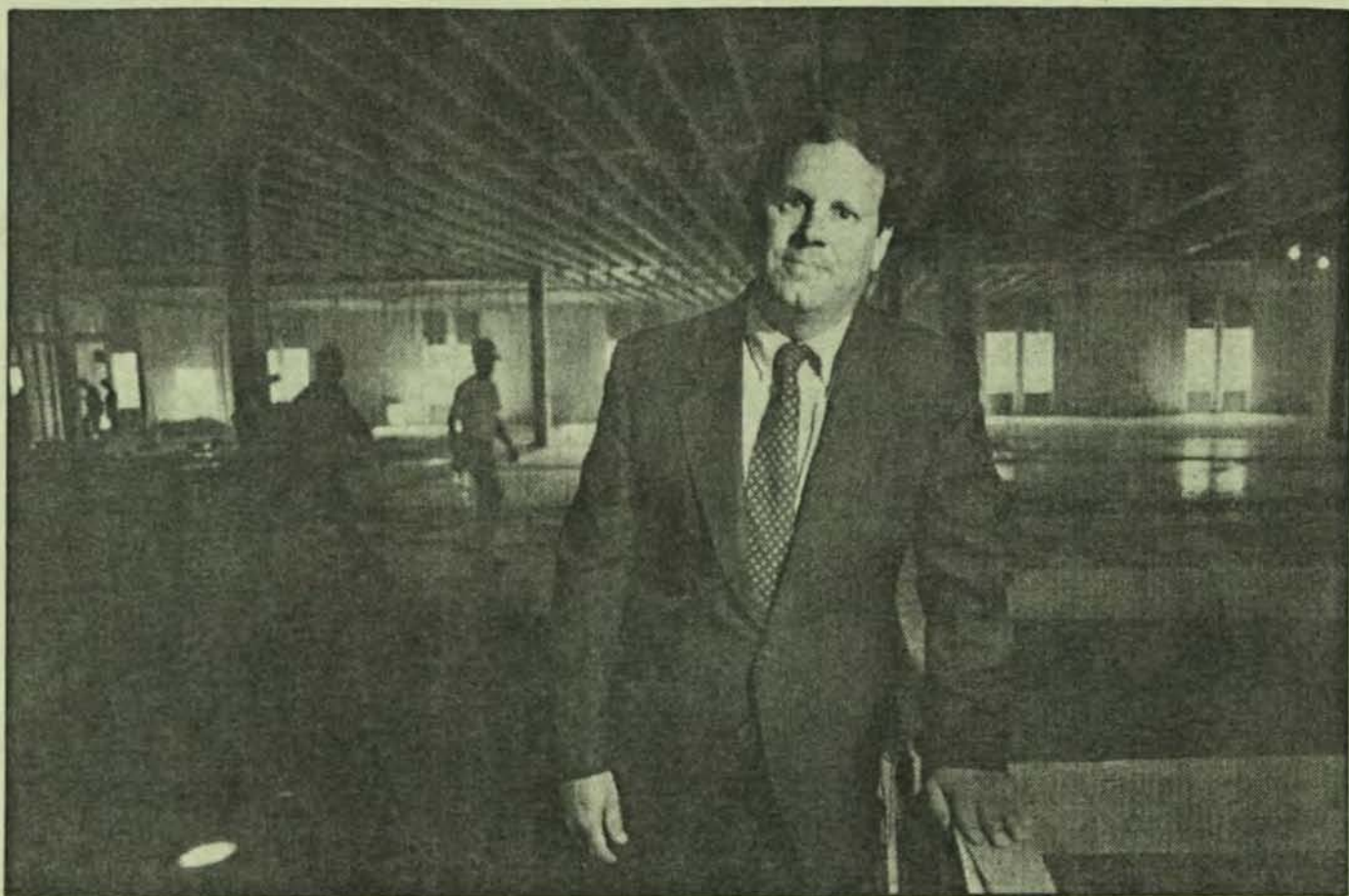
Tandem has extended its online transaction processing capability downward with the NonStop CLX family for departmental computing. The CLX range - C for the custom CMOS chips inside - comes in one, two, four and six processor configurations with performance ranging from 2.5 to 15 transactions a second. An entry level single processor CLX 610 will cost Pound Sterling 52,848 for a single unit; Pound Sterling 36,994 in network quantities of 25 to 39 systems when it ships in Q2 1988. The dual processor CLX 620 will be available in Q4 this year, followed by the 640 in Q1 1988. A fully configured CLX 660 system, also due in the second quarter next year, with six processors, up to 72Mb memory, 10Gb of disk storage and 600 comms lines starts at Pound Sterling 220,517 for a single unit, Pound Sterling 155,762 in network quantities. The family is software compatible with other Tandem Guardian machines, running the Guardian 90 operating system and Tandem's distributed relational database, NonStop SQL. The new machines can support SNA, OSI and X.25 networking and come with Tandem's Multilan capability (IDB 1336) allowing PC connectivity across a number of different lans. Since the CLX family is designed for office use, users can do up to 98% of the servicing on site, Tandem claims. Also announced was Tandem's first Unix offering, NonStop LXN, a re-engineered Altos box with added fault tolerant features. The 2.3 MIPS LXN available now, is equipped with an uninterruptible power supply that will run for five minutes in case of power failure, and a mirror disk facility. It supports SNA, X.25, with Ethernet to follow in Q3; at present, a file transfer facility links the LXN's Informix SQL database with NonStop SQL running on the Guardian machines. Tandem's goal is to integrate the two dbms environments to provide transparent distributed processing across LXN and Guardian machines. Prices for the LXN, which can support up to 16Mb memory and 510Mb disk storage, start at Pound Sterling 16,104 each for 25 plus systems. The company also announced an eight page/minute laser printer, the laser-LX, available in Q3 for Pound Sterling 2,320.

Growth spurt

San Jose Mercury News

April 23, 1987 pg 1F

CORPORATE
INFORMATION CENTER



Len Lahman — Mercury News

Work goes on behind Frank Robinson in a Cupertino building Tandem has acquired

Tandem Computers buys, leases space

By Kirstin Downey
Mercury News Business Writer

In a burst of growth reminiscent of Silicon Valley's heyday, Tandem Computers Inc. is leasing and buying office and light industrial buildings around its Cupertino headquarters.

During the past six months, Tandem has expanded by nearly 30 percent, adding a net total of about 345,000 square feet of space near its headquarters on Valico Parkway. Late last year, it bought two older buildings on North Tantau Avenue that it is now refurbishing. And it has leased 228,000 square feet in the surrounding area. Much of the space will be ready for occupancy this summer.

"That's what happens when you're

**More Commercial
Real Estate,
Pages 3F - 4F**

growing," Frank Robinson, Tandem's director of corporate real estate and construction, said. "In the last 18 months we've been growing very rapidly, and we needed to create more space to accomplish this fast growth."

The buildings will be used mainly for administrative, marketing, development and human resources departments.

And according to some real estate brokers, Tandem may expand even

more.

"Their order rate is very good, their profit rate is very good," said Coldwell Banker real estate broker Jim Schmidt, who worked with Tandem in acquiring the two buildings. "What you've seen is just the beginning."

Tandem's expansion reflects the growing use of its computers and other equipment by banks, airlines and other companies that process a lot of transactions.

In the second quarter of the year, Tandem's sales rose to \$242.4 million, a 37 percent increase from the same period a year earlier. Analysts say the firm will soon be running at a \$1 billion-a-year sales pace.

See TANDEM, Page 3F

Commercial Real Estate

Seems like old times: Tandem grows in Cupertino

TANDEM, from Page 1F

Tandem has added about 500 employees in the past seven months, to bring its worldwide work force to more than 6,200. And the company is still hiring.

Meanwhile, it success has been recognized on Wall Street, where Tandem recently began trading on the New York Stock Exchange. Its stock price has nearly doubled since the beginning of the year.

Interestingly, Tandem's expansion is all occurring in the Cupertino area. In the early 1980s, Tandem's growth plans clearly revolved around another area, the Coyote Valley, a former agricultural preserve in South San Jose. Tandem purchased 190 acres there with plans

for a large, campus-style complex.

However, Tandem has a problem developing there because its property lies partially in the flood plain and will require flood control channels to be built, according to a real estate consultant who is familiar with development in the area. In addition, the plans have met with various bureaucratic delays, he said.

"This thing (Coyote Valley) has taken a lot longer than anybody thought it would take," said the consultant, who asked that his name not be used. "It's just not ready to go."

But Tandem remains committed to Coyote Valley, according to Robinson.

"There are still some remain-

ing issues" to be resolved, Robinson said. "We're working to make the area available for our use as soon as possible."

Tandem's short-term space needs are probably paramount right now because of the company's new visibility and market growth, according to Brad Smith, a computer-industry analyst with Dataquest Inc., a San Jose market research firm.

Part of the reason for the company's upward climb is that its image has broadened from that of a maker of just "fault-tolerant" computers — computers that provide a backup in case a system fails — to a provider of entire transaction-processing systems, Smith said.

Six Flags amusement parks being sold to Simon-led group

Mercury News Wire Report

The Six Flags amusement park chain is being sold to a private investment firm headed by former Treasury Secretary William E. Simon for \$350 million in cash.

The investment firm, Wesray Capital Corp., plans to keep the seven theme parks and two water parks open and operating through a separate subsidiary, said William H. Peltier, spokesman for Bally Manufacturing, which has owned the Six Flags parks since 1982.

The theme parks include Six Flags-Magic Mountain at Valencia, north of Los Angeles; and others at Houston and Arlington, Texas; Mableton, Ga.; Eureka, Mo.; Jackson, N.J.; and Gurnee, Ill. The water

sale will result in an after-tax profit of \$100 million and wipe out \$250 million in Six Flags debt now on Bally's books, company official said.

Tuesday's agreement seems to be part of a billion-dollar buying spree for Simon and the investment firms he heads. In the last few years, Wesray has acquired more than 20 companies, including Wilson Sporting Goods Inc. and Avis Inc.

Simon also heads a separate investor group that has bought Beverly Hills-based World Trade Bank, Westcoast Savings and Westwood Savings & Loan in Southern California. The group also is waiting for approval to buy two more

ing up a significant amount of debt in the process — by purchasing the MGM Grand casino-hotel in Nevada for \$440 million and Golden Nugget Casino Hotel in Atlantic City for \$439 million.

Besides buying casinos, Bally has been busy fending off a takeover threat by New York developer Donald Trump. Bally bought back \$83.7 million worth of its shares from Trump.

Since Bally bought the Six Flags chain from Penn Central in 1982 for \$160 million, the subsidiary has proved to be a major source of sales and profit. In 1986, the subsidiary generated \$369 million of Bally's total \$1.638 billion in revenue. Six Flags 1986 operating prof-

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LEVEL 1 - 1 OF 8 STORIES

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CORPORATE
INFORMATION CENTER

April 21, 1987, Tuesday, Late City Final Edition

SECTION: Section D; Page 5, Column 6; Financial Desk

LENGTH: 152 words

HEADLINE: COMPANY NEWS;
Tandem Discloses New Hardware

BYLINE: Special to the New York Times

DATELINE: SAN FRANCISCO, April 20

BODY:

Tandem Computers Inc., based in Cupertino, Calif., announced two new computer systems and a new desktop laser printer. The 32-bit LXN multi-user system is Tandem's first based on the Unix operating system developed by the American Telephone and Telegraph Company, with prices starting at \$18,012 per unit. The Nonstop CLX system uses Tandem's Guardian operating system, with prices beginning at \$39,900 per unit in lots of 25-39, or \$57,000 for single units.

The Laser-Lx printer is priced at \$2,595 and is intended to work with Tandem's systems and work stations. The new computer systems are intended to be installed as extensions to networks of Tandem's larger computers. Tandem said the new systems would extend transaction processing closer to end users in banks, retail operations, manufacturing plants and telecommunications facilities. Budget in Washington. He was deputy director from 1974 to 1977.

SUBJECT: Terms not available

LEXIS NEXIS LEXIS NEXIS

Tandem to up distributed computing ante

Two low-end systems for outlying offices mark firm's first entry into Unix, CMOS fields

BY JEFFRY BEELER
CW STAFF

CUPERTINO, Calif. — Tandem Computers, Inc. today is set to make its first foray into the Unix world and CMOS technology with the introduction of two low-end systems designed to bring distributed computing to sites where it was previously impractical.

More compact and priced tens of thousands of dollars less than Tandem's existing entry-level system, the CLX and LXN

are intended for work groups and departments in the outlying offices of major user organizations.

Tandem also announced the Laser-LX, a printer compatible with the Hewlett-Packard Co. Laserjet.

But through support of several of the industry's most popular interconnection standards, the CLX and LXN machines reportedly can be integrated with and extend the company's current network of on-line transaction processing (OLTP) systems.

The LXN runs Unix and supports up to 32 users and three CPUs, with as much as 16M bytes of internal storage per machine. Using Transmission Control Protocol/Internet Protocol, the system also ties IBM-style workstations and Tandem terminals together in an Ethernet local-area network and uses IBM's Systems Network Architecture (SNA) or CCITT X.25 for its back-end connections.

Available in four configurations, a fully expanded CMOS-based CLX incorporates six processors, holds 72M bytes of

main memory and executes 15 transaction/sec. For connections to IBM mainframes and public networks, the machine supports SNA and X.25. Through the firm's Multilan interconnection product, the CLX links all Tandem Nonstop family members to any local network conforming to Microsoft Corp.'s MS-Net or IBM's Netbios standards.

Federal Compress & Warehouse Co. has served as an LXN beta-test site for two months and reportedly plans to move the system into production on July 1.

Installed in the 25 cotton-storage facilities that Federal Compress runs in the Mississippi River delta and Arizona, the LXNs collect data locally and relay key information about each incoming bale to the user's Memphis headquarters. After being processed centrally on the company's Tandem Nonstop II CPU, the data is returned to the remote warehouses in the form of finished reports.

Prior to installing their LXNs, the field locations were equipped with Mohawk Data Sciences Corp. Series 21s, which lacked the intelligence to initiate transmissions to and from the main office. Now, however, the sites can start their communications on demand and thus avoid processing delays that can prevent end users from receiving their data on time, according to Federal Compress Vice-President and Treasurer Bob Cohen.

Although the LXN supports Unix rather than Tandem's proprietary Guardian operating system, the 32-bit machine is aimed as squarely at OLTP as any other member of the vendor's CPU family.

Tandem's intent in embracing an industry-standard operating system is, at least partly, to gain entree into government installations, auto makers and other environments in which Unix support is mandatory. "If you don't offer Unix, you can't even bid on contracts from those kinds of large organizations," said Terry Retford, the vendor's manager of processor and memory products.

Technicians need not apply

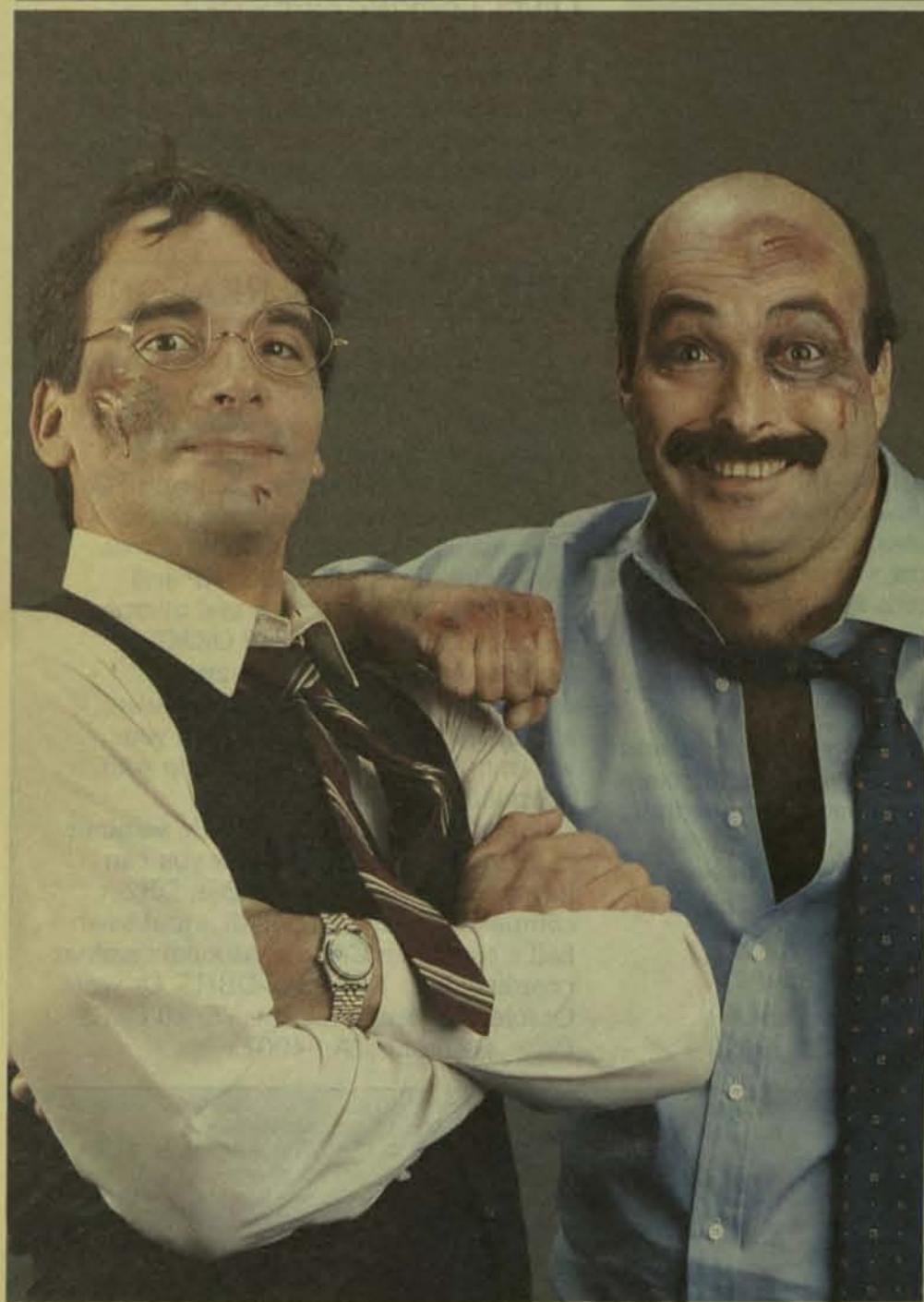
Unlike the LXN, the CLX supports Guardian and is implemented in CMOS technology, which combines comparatively high component density with low heat dissipation. CMOS's inherent properties minimize the CLX's equipment failures and thus allow users to "assume increased responsibility for their own maintenance," said Tandem watcher Omri Serlin, head of Los Altos, Calif.-based Icom International Co. "Virtually any defective board or other hardware component can be replaced without tools or service technicians," he added.

For now, the presence of CMOS components makes the CLX technologically unlike Tandem's larger and more expensive systems, which include the EXT, Nonstop II, TXP and VLX. "But in the future, the company's plans call for it to make the parts in all its other systems interchangeable with the CLX's," Serlin said.

In single quantities, a minimum LXN with one 2M-byte processor costs \$23,700, compared with \$57,000 for a basic CLX with a 4M-byte CPU.

The 8 page/min Laser-LX costs \$2,595.

Although the LXN is available now, shipments of the first two CLX configurations and the Laser-LX are unlikely to begin until the second and third quarters, respectively.



Trying with a single financial software system to meet the competing needs of two departments often comes down to a knock-down, drag-out brawl. Satisfying one group usually means compromising the needs of the other. In the end, neither group gets exactly what it wants.

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bandwidth of DS0 channels is the same as in the B channels of ISDN, but ISDN's signaling D channel calls for only 16 Kbps.

It was unclear at presstime if the 64-Kbps DS0 channel is converted to a 16-Kbps signaling channel within the card, or whether customer premises equipment would have to be support bit-stuffing or some other technique to fit ISDN signaling into a 64-Kbps channel.

The issue is important because users are said to desire full standardization of ISDN at their desktops. If bit-stuffing is required on the customers' premises for interfacing to Brite, then the user would have to purchase two types of interfaces, one for the fully standard BRI of ISDN and another to support the BRI over three DS0 channels.

T&T, RBOCs' Restrictions

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CPE subsidiaries will remain distinct, the two groups will market in concert to "present a single point of contact to the customer."

The company has established four separate marketing channels to meet the communications needs for business customers quickly and efficiently. The Premises, General Business Service Center and Intermediary channels will cater to complex communications requirements, medium and small multi-line business customers with less complex needs, small multi-line or single line business customers and inter-exchange carriers with access requirements and enhance service providers, respectively.

NSG customers will be trained in CPE by the CPE subsidiaries. Because "customers sometimes demand a single-source accountability in their telecommunications procurements," in some situations when bidding with a CPE subsidiary, NSG will then "offer to subcontract provision of the CPE" to the CPE involved.

Bell Atlantic also "delineated the means by which NSG and the CPE subs will integrate operations to provide network and CPE services" to customers. A single point of contact will reduce customer confusion, enhance quality of service and insure that ratepayers "are not burdened with costs incurred to install or maintain CPE."

Furthermore, "Bell Atlantic will continue to employ the existing Centralized Operations Groups (COGs) to process installation orders placed by unfiliated CPE vendors," the company said. "Bell Atlantic will file quarterly installation reports with the commission to demonstrate non-discriminatory treatment of CPE vendors."

US West agreed to "notify the CPE industry that a new or modified network service is under development, at the point a decision is made to internally procure, or

procure from a non-affiliated company, any product, the design of which affects or relies upon a change in the network interface."

BellSouth and Nynex argued that their current maintenance services to network customers are non-discriminatory, but will continue to train maintenance personnel under the FCC's rules as well as continue COG functions.

The North American Telecommunications Association, which opposed the original order, said its lawyers will carefully review the compliance plans. The FCC order also drew fiery criticism from the International Communications Association which said it "failed to account for the BOCs' overwhelming control of local exchange services and exchange access services."

Tandem Net Rockets 81%

CUPERTINO, Calif. — Tandem Computers Inc. last week reported net income for its second fiscal quarter, ended March 31, increased 81 percent to \$22.4 million, or 46 cents per share, versus \$12.4 million, or 29 cents a share, earned in the like quarter of fiscal 1986.

The company said revenue in the quarter, ended March 31, increased to \$242.3 million, a 37 percent jump over the \$176.3 million achieved in the year-ago quarter.

For the six months, revenue increased 39 percent to \$480.4 million, compared to \$346.3 million a year ago. Net income improved 106 percent to \$49.5 million, or \$1.03 per share.

President James G. Treybig said, "We are pleased with Tandem's performance. We achieved substantial year-over-year growth."

main systems, as this said it would "work just as well" without them.

Eugene Buechele, vice president of engineering at Communications Solutions Inc., an SNA developer in San Jose, Calif., had seen a demonstration of GNM, and called it "the greatest thing since sliced bread."

GNM cures the "fatal flaws" of IBM network management systems, he said. GNM correlates performance data from both the physical (hardware) and logical (software) parts of the network and regulates it in a way that imitates an artificial intelligence (AI) system, he explained.

IBM Does It Separately

By comparison, the IBM products generate information on the physical and logical parts of the network separately, Buechele explained. "In IBM's products, there's no screen that correlates the two." GNM "replaces that process with one common screen."

He further explained, "If you use the standard IBM approach, it's very costly. Humans have to do correlations to divine what's going on. It requires reams of data and session cycles."

Tongue in cheek, Buechele said, that with IBM's approach, "you have to make at least \$90,000 a year to correlate that (logical and physical) data."

However, GNM's diagnostics "Almost becomes AI-type," Buechele said. "It's not just a display of data, but it acts on certain data threshold limits. The fundamental need it provides is a crying need that NetView needs to address—to correlate physical data and logical sessions."

The contrast between GNM and IBM's network management software drawn by Kirk focused more on the front end, where GNM's graphics shine by comparison. The IBM products, Kirk said, "generate a lot of data about SNA networks. There's a lot of screens flashing, a lot of data, a lot of scrolling and tabular information. The information is there, but recognizing a condition code requires highly skilled technicians who are in great demand."

With GNM, that information is "encoded and regenerated in a color, graphic form," Kirk said. The colors represent conditions, where blue is normal and red, accompanied by an audible alarm, signals a node or line failure, he explained. The colors represent the network as superimposed on a map illustrating nodes

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misWeek pg8

INFORMATION SYSTEMS

2 Low-End Tandem Systems To Bow

By IRWIN GREENSTEIN

CUPERTINO, Calif.—Tandem Computers Inc., widely recognized for its success as a maker of fault-tolerant on-line transaction processing (OLTP) systems, this week will introduce two low-end systems—one of them its first Unix-based, non-fault-tolerant system.

That system, the Tandem LXN, is expandable from one to three processors.

The other low-end system, the NonStop CLX, which is available in configurations of one to six processors, targets smaller installations where a dedicated technical support crew and computer-room environment may not be desirable, but system requirements still require fault tolerance.

Tandem also introduced a laser printer.

Development of the LXN was in response to two issues: gripes by industry analysts that Tandem failed to expand into different technologies and the recognition that Unix is becoming a standard, a company spokeswoman said.

Non-Fault Tolerance, Too

"We've had a lot of analysts pound on us that not all customers want fault tolerance," she said. Echoing their complaints, she said, "Why don't you, at the low end, offer non-fault tolerance?"

Tandem designed the LXN as a Unix system to answer that question and because "the demand is there," she said. "We see Unix as an important standard at the low end like DOS. There was a demand to work with Unix."

Tandem modified Unix V Release 2 to make the LXN consistent with the OLTP reliability demands of its traditional customer base. A mirroring capability was added to the operating system, which copies selected files or an entire disk to a backup storage system.

As a safeguard on the hardware side, an optional uninterruptible power supply allows the LXN to shut down gracefully in the event of a power failure. When power is restored, an auto restart boots the application again and resumes operation as if the power failure had not occurred.

Positioning the LXN as a low-end system was further enhanced by having it support DOS applications. The LXN was viewed by the company "more as a workstation" than as a member of the NonStop line of larger fault-tolerant processors, the spokeswoman said.

Has Motorola 32-Bit Chip

The LXN includes a Motorola 68020 32-bit microprocessor running at 16.7 MHz. Standard main memory is 2 Mbytes, expandable to 16 Mbytes. Three expansion slots can provide more processing power, special-purpose Multibus cards, memory or terminals. It supports up to 32 users.

Access to Tandem systems is via the company's System Network Architecture software called SNAX. The LXN com-

municates to large International Business Machines Corp. systems over its System Network Architecture (SNA).

To communicate with other Unix systems, the LXN uses the Informix-SQL relational database management system (RDBMS) from Informix Software Inc. in Menlo Park, Calif., as well as several high-level languages, such as Cobol.

A Netbios server for linking with personal computer local area networks (LANs) is under development for the LXN, but a release date has not been finalized, the spokeswoman said.

Greater integration with Tandem's larger systems is still in the offing, however. The company is "talking about extensive connectivity, not total connectivity" on a level that would eventually allow the Informix RDBMS and Tandem's NonStop SQL RDBMS to exchange data, she said.

The NonStop CLX

For departmental organizations that need a conduit to Tandem's larger systems, the new NonStop CLX may be more appropriate than the LXN. The CLX offers complete Tandem software compatibility via the Guardian 90 operating system.

The CLX sports a new customized complementary metal oxide (CMOS) design that permits an entire core central processing unit to be placed on one chip. Improved throughput and reduced power consumption lets the CLX plug into any 120- or 220-volt wall socket, Tandem said.

An appliance-type power source, ability to run without special environmental controls and lightweight parts add up to a system that can be "serviced by users," the spokeswoman said. The self-service theme is carried through by expert-system software which enables system diagnoses to be performed remotely.

The CLX is available in one-, two-, four- and six-processor versions, tagged the 610, 620, 640 and 660, respectively. Performance ranges from 2.5 to 15 NonStop SQL transactions per second, depending on the number of processors.

An entry-level, single-processor 610 is not fault-tolerant. It can be built up into a fault-tolerant system without changing hardware and software, the company said. A fully configured 660 system supports six processors, 72 Mbytes of RAM, 10 Gbytes of disk storage and 600 communications lines.

In addition to supporting Tandem's Expand intersystem networking product, the CLX communicates via SNA, Open Systems Interconnection (OSI) and X.25 protocols.

Laser-LX Printer

To punctuate its low-end product flurry, Tandem introduced the eight-page-per-minute Laser-LX printer. The printer can handle DOS and Unix applications. Interfaces include support for RS-232-C, current loop and parallel.

The Laser-LX comes with 512

Kbytes of memory. Using its expansion slot, memory can be added in increments of 1, 2 or 4 Mbytes. Thirty-two fonts can be downloaded, allowing users to print 16 different fonts on a single page.

The availability of all the new products varies.

The LXN is currently available, although the multiple-processor features are slated for the fourth quarter and the Ethernet and LAN controller for the third quarter.

Single-quantity pricing for the LXN starts at \$23,700. The base LXN consists of one processor, disk and file controllers, a 60-Mbyte quarter-inch cartridge tape, a 5.25-inch diskette drive, an 80-Mbyte hard-disk drive, a 10-port communications controller and 2 Mbytes of RAM. The LXN has a quantity network unit-price starting at \$18,012 for 25 to 39 systems.

Tandem has spread out the availability of the CLX line. The 620 will be available in the fourth quarter and the 640 will be shipped in the first quarter of next year.

The 610, 660 and the 280-Mbyte disk drive will be available in the second quarter of next year.

The single-quantity price for the 610 is \$57,000, for the 620 it's \$85,000, for the 640 it's \$161,000 and for the 660 it's \$240,000. Tandem's quantity network prices start at \$39,900 for the 610 for the purchase of 25 to 39 systems.

In the same quantities, the network unit price for the 620 begins at \$59,500, \$112,700 for the 640, and \$168,000 for the 660.

The Laser-LX printer will be available in the third quarter for \$2,595.

Convergent
Adds To Line

SAN JOSE, Calif.—Convergent Technologies Inc. last week introduced two multi-user systems that round out the company's Unix-based S-Series family.

The new S/221 and S/222 complement the S-Series, which consists of six product groups that support work groups ranging in size from 1 to 128 users.

The S/221 and S/222 share many attributes, including a Motorola 68020 32-bit microprocessor, while differing in bus and disk configurations.

The S/221 supports disk capacity up to 420 Mbytes. The S/222 disk capacity climbs to 4 Gbytes. The S/222 has two additional VME bus slots, for a total of five slots compared with the three slots in the S/221. The S/221 and S/222 feature a 1-Mbyte RAM. Expansion boards with 2 or 4 Mbytes are available.

The base S/221 or S/222 come with a storage capacity of 50, 85 or 140 Mbytes in a 5.25-inch Winchester drive. A 60-Mbyte quarter-inch streaming tape drive is also included as part of the standard mass-storage subsystem.

Entry-level prices are \$14,000 for the S/221 and \$15,500 for the S/222. They are available immediately.

Chase Exec: Now's Time
For ACH Meld Into POS

By VIRGINIA DUDEK

NEW YORK—Chase Manhattan Bank vice president James J. Hopes believes that the time has come for automated clearing-house (ACH) services to be incorporated into on-line point-of-sale (POS) transactions.

"The features are attractive to users," Hopes said at the Electronic Banking Economics Society luncheon here last week. "There is enough interest today that organizations are asking when they should implement it, not whether they should use it."

Hopes compared the pros and



MS Week photo by Gordon Christmas
James J. Hopes

cons of POS options for off-line batch transaction processing to on-line guaranteed funds processing using bank debit cards.

Chase is currently expanding its electronic funds transfer (EFT) operations by supporting ACH applications of retail POS cash cards and dual-usage credit cards, where the cards can be used to immediately draw funds from an authorized customer account or for automatically approved credit transactions.

Exxon USA is using Chase to process debit card ACH withdrawals for customers who have authorized payments to be made directly from their bank accounts to Exxon at the retail level.

Retailer/Bank Link

Hopes noted that the major advantages to retailers of on-line POS processing are that the retailer is tied directly to the bank. This means that the customer's account balance can be validated before the transaction is completed, which cuts down on transactions that are returned to the retailer because they cannot be authorized and therefore completed.

On the other hand, the potential problems associated with any on-line POS device are that its use is limited to the bank's customers who have signed up for third-party systems. Brand loyalty is not a benefit to the retailer offering the service because the system can be made available to competitors.

Cost is another problem, as the unit transaction cost is higher for on-line processing than for batch processing. Also, there is a capital investment required in the purchase of communications equipment and terminals.

Conversely, Hopes said that the benefits of off-line batch POS are that it is a service that can be offered to any customer with a

checking account. Problem accounts can be detected earlier by the retailer originating the transaction than if the customer were using a credit card. Also, funds are available to the retailer in one to two days, versus a payment cycle of up to 45 days on credit card transactions.

Hopes also pointed out the cons of batch POS. One is that if the Federal Reserve Bank's Regulation E is passed in its current form, banks would be required to carry the added expense of sending out detailed transaction records to customers. The cost of telecommunications facilities and terminals then becomes a consideration.

Debit Card Benefits

Hopes said retailers stand to gain competitive benefits from using debit cards. They can foster brand loyalty if the customer perceives that one retailer offers an advantage in the convenience of debit cards over a competitor.

He also believes that debit cards can be used to gain market share for retailers, improve cash flow and reduce the risks of receiving payment compared to the longer risk exposure assumed by issuing credit cards.

Hopes said that the benefits to consumers will encourage the use of debit cards. Customers will not have to carry cash and will be lured by retailers who give cash discounts or other incentives for using debit cards. Customers can also expect to receive detailed accounting of the purchases that they make.

While retailers have to take into account the cost and requirements of offering debit and cash cards, he feels that the competitive benefits will outweigh the costs.

Now, banks need to understand how ACH services affect their role. "The banker's role is to move money," Hopes said. "But moving information also becomes important, especially moving corporate funds, and the way to move information is through ACH."

New Esprit Terminal
VT-220 Compatible

MELVILLE, N.Y.—Esprit Systems Inc. here has released the Opus 220, which it claims is the first DEC VT 220-compatible terminal for VMS, ANSI, Unix, Ultrix and Xenix users, with windowing and a free 24-hour replacement service.

The windowing "allows users to suspend ongoing applications while important data is displayed on screen," Esprit said.

With a 14-inch screen in green or amber, the Opus 220 supports two asynchronous RS-232C ports, current loop or RS-422 interface and has VT 52, VT 100, VT 101, VT 102 and VT 220 emulation modes. A 256-character set supports 32 control codes, special graphics, multinational symbols and various typewriter layouts. Available immediately, it is priced at \$559.

LEVEL 1 - 3 OF 8 STORIES

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INFORMATION CENTER

April 20, 1987, Monday

DISTRIBUTION: Business/Computer Editors

LENGTH: 455 words

HEADLINE: SILICON-COMPILER; Silicon Compiler Systems announces development of four VLSI chips for Tandem's new OLTP distributed computer family

DATELINE: SAN JOSE, Calif.

BODY:

Silicon Compiler Systems Corp. Monday said that its GENESIL silicon compilation system has been used to design four very large-scale integrated circuits for Tandem Computers Inc.'s just-announced NonStop CLX family of distributed online transaction processing computer systems.

The new Tandem computers use four complementary metal-oxide semiconductor chips that help reduce the size and cost of the systems, while improving throughput and decreasing power consumption.

Using the GENESIL silicon compilation system, Tandem engineers were able to design the four components -- a central processor, an interprocessor bus chip, an input/output controller and a memory controller -- in 15 months.

"The Tandem project demonstrates the effectiveness of silicon compilation for designing very complex system components and the advantage of silicon compilation over other design methodologies in meeting time-to-market requirements," said Phillip Kaufman, chairman and chief executive officer for Silicon Compiler Systems.

"Besides allowing Tandem to meet a rigorous schedule, silicon compilation provided them with four working chips the first time through."

Larry Laurich, Tandem vice president of hardware engineering and development, said, "Our new family of distributed OLTP systems had to provide our customers with a level of performance to complement our high-end systems. To do that we needed to design a system with as much performance as possible for as low a cost as possible.

Time to market was also a critical factor. We investigated various custom-chip design methodologies and found that silicon compilation would meet our performance, cost and time-to-market goals."

The four chips form the heart of the system, which delivers from 2.5 to 15 NonStop SQL transactions per second. The complexity of the devices is in excess of 100,000 transistors and all integrated circuits were successfully manufactured the first time.

Silicon Compiler Systems maximizes the productivity of IC and system designers by providing superior silicon compilation products and services for integrated circuit design. Silicon Compiler Systems is the result of a recent

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1987 Business Wire, April 20, 1987

merger between Silicon Compilers Inc. and Silicon Design Labs Inc. By merging complementary technologies and strategies, the company addresses all segments of the IC design market including standard product development, library development and ASIC designs.

CONTACT: Silicon Compiler Systems Corp., San Jose
Betty Skatoff, 408/371-2900
or
Regis McKenna, Palo Alto, Calif.
Beth Welch, 415/354-4436

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LEVEL 1 - 4 OF 8 STORIES

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April 20, 1987, Monday

DISTRIBUTION: Business Editors

LENGTH: 340 words

HEADLINE: TANDEM-COMPUTERS; (TDM) Tandem Computers extends low-end with new distributed systems, new desktop laser printer

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) Monday announced two new distributed computer systems and a new desktop laser printer.

NonStop CLX systems are based on the Tandem GUARDIAN operating system. Network unit pricing for a single-processor version begins at \$39,900 for purchase of 25-39 systems. Using CMOS technology, CLX systems are low-cost, compact and user-servicable computers for use in on-line transaction processing networks. Single quantity pricing starts at \$57,000.

The 32-bit LXN multiuser system is the first UNIX-based Tandem system. It offers a high degree of data integrity and system reliability and is expandable from one to three processors. The network unit price for the LXN system starts at \$18,012 for the purchase of 25-39 systems. Single quantity pricing starts at \$23,700.

The LASER-LX printer, designed to work effectively with Tandem distributed systems and workstations, is a reliable and compact printer that produces high quality text and graphics. Available in the third calendar quarter of 1987, the LASER-LX is priced at \$2,595. Quantity discounts are available.

"CLX and LXN systems will be installed as extensions to networks of larger Tandem NonStop systems. These systems extend transaction processing power closer to end users in departments or branch offices in banks, retail operations, manufacturing plants, or telecommunications facilities," stated Tandem Vice President of Marketing Gerald L. Peterson.

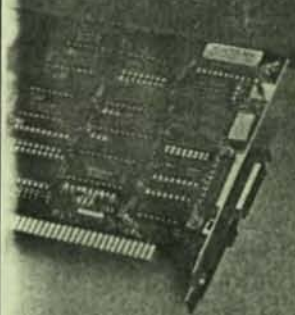
Tandem Computers Inc. manufactures and markets computer systems and networks for on-line transaction processing. The company is headquartered at 19333 Vallico Parkway, Cupertino, Calif. 95014. The telephone number is 408/725-6000.

Note to Editors: Tandem, NonStop, GUARDIAN, CLX, EXT, LXN and LASER-LX are trademarks of Tandem Computers Inc. UNIX is a trademark of AT&T Bell Laboratories.

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Sally R. Smith, 408/725-7515

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First Unix-Based System Makes Bow For Tandem

BY ANN LOWE

CUPERTINO, CALIF. — Tandem Computers Inc. will unveil today its first Unix-based computer system, a product that represents the fruits of a year-old OEM agreement with Altos Computer Systems Inc.

The company is also expected to reveal low-cost versions of its NonStop on-line transaction processing systems.

Tandem is positioning the new systems as "network extenders," or low-end systems to be linked to larger computers in distributed networks.

The low-end products will cater to bank branches, retail chain stores, manufacturing sites and other operations that need local processing capabilities, as well as links to corporate centers, Tandem said.

In addition, Tandem is bringing out the Unix-based LXN system in order to fulfill its goal of adopting industry standards, officials said. Until now, the company has focused on its Guardian proprietary operating system.

Third-party marketing vice president Michael Bateman said the LXN will help Tandem reach new customers through Unix software vendors. He said Tandem is wrapping up a "multimillion-dollar shipping commitment" with a value-added reseller in the tele-marketing industry, and has several potential agreements with Unix VARs and independent software houses.

Beyond its support of standard Unix applications, a key feature of the LXN product is its price, said Terry Retford, manager of processor and memory products. With unit prices beginning at \$18,000, the LXN—a modified version of Altos' 3086 multiuser computer (CSN, May 5, 1986)—is by far Tandem's least-expensive computer system.

Based on Motorola Inc.'s 68020 microprocessor, the LXN can be configured with one to three processors to support up to 32 users. The system has up to 16 Mbytes of main memory and 510 Mbytes of unformatted disk

storage, according to Tandem.

The system runs AT&T Unix System V.2, modified with proprietary extensions such as a "mirrored disk" facility to duplicate data. An uninterruptible power supply and auto-restart software can be added to the operating system.

Though the LXN could be used as a stand-alone system for small, independent businesses, Tandem officials said its greatest potential is as a front-end node on a distributed network. Users at remote sites can run familiar Unix applications on the LXN, at the same time sharing data with IBM and Tandem mainframes, Retford said.

The LXN supports mainframe connections via X.25, Systems Network Architecture (SNA) and Tandem's SNAX protocols. Connections are enhanced by standard programming languages such as COBOL and a relational database management system from Informix Software Inc. Informix-SQL provides an IBM-compatible Structured Query Language interface to host databases.

LXN systems also will support links to personal computer networks via an Ethernet controller, to be available in the third quarter, the company said.

The LXN is available immediately, starting at \$23,700. Unit prices for networks of 25 to 39 systems begin at \$18,000.

The new NonStop CLX systems—based on the same CMOS chip technology as Tandem's high-end NonStop VLX mainframe—extend Tandem's array of on-line transaction processing systems to the low end, Bateman said.

"Our customers would like to buy an all-Tandem solution," Bateman said. "Clearly, there are a number of cases where we didn't have a low-enough cost system to attract the customers."

The new systems, priced from \$39,900, should be competitive at the entry level, he said.

The CLX systems—available with one, two, four or six pro-

Continued on Page 8

CORPORATE
INFORMATION CENTER

Computer Systems News
April 20, 1987 p6

Tandem's First Unix System Makes Debut

Continued from Page 6
processors—are software compatible with Tandem's Guardian-based line. Bateman said he expects Tandem's VARs and third-party software vendors to market the new systems with their existing software, and to develop new applications for departmental and branch-office functions.

Because the CLX computers

share the same operating system and support the same Non-Stop SQL relational database management system as other Tandem computers, connections to Tandem mainframes will be much smoother than connections from non-Tandem network nodes to Tandem hosts, Bateman said.

The CLX line was greeted enthusiastically by Tandem's

top third-party marketing partner, Applied Communications Inc., Omaha, Neb., a VAR and independent software vendor in the financial market.

J. Richard Abramson, an Applied Communications vice president, said recent mergers, movement toward interstate banking and other developments in the banking industry have brought a "very definite

need in most banks for distributed networks." He said even small banks and branches could justify the cost of the CLX systems.

The CLX family ranges from the single-processor 610 model to the six-processor CLX 660, which can be configured with 72 Mbytes of main memory, 10 Gbytes of disk storage and 600 communications lines. De-

signed in modular form, the systems can be upgraded by installing additional components, the company said.

The systems will come with a one-year warranty.

The two-processor CLX 620 is to be available in the fourth quarter, with unit prices for networks of 25 to 39 systems beginning at \$59,900 and a monthly maintenance fee of \$260. Single-unit prices begin at \$85,000.

The CLX 640 four-processor model is scheduled for shipment in next year's first quarter. Network unit prices will start at \$112,700, and single-unit prices will begin at \$161,000.

The single-processor CLX 610 and the six-processor CLX 660 are both expected to be available in the second quarter of 1988. Network unit prices for the 610 will begin at \$39,000 with a monthly maintenance fee of \$190, and single units begin at \$57,000. The CLX 660 will be priced beginning at \$168,000 for the network and \$240,000 for the single unit.

In addition to the systems announcements, Tandem will unwrap a desktop laser printer, said to be compatible with Hewlett-Packard Co.'s LaserJet printer. The eight-page-per-minute printer, supplied by an unidentified OEM, is based on a Canon SX print engine, Retford said.

"If you're going to move down to the departmental level, you've got to have high-quality printers," Bateman said.

The Laser-LX printer, priced at \$2595, will be available in the third quarter, Tandem said.

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that sector has been difficult. For proof, just take a look at the histories of companies such as Molecular-Computer Corp., Contel Computer Systems Inc. and Pertec Computer Corp.

Fortune's own history is anything but a tale of good fortune. Despite some recent improvements in its performance, the fact remains that the company has posted losses every year since going public in 1983.

That's far from what investors such as First Capital Corp. of Chicago predicted when they threw gobs of seed money at Fortune back in 1981. At that time, the personal computer market was taking off, and people with dollar signs in their eyes thought they could achieve the success in the multiuser world that Apple had attained in the single-user market.

They were wrong.

PCs soon became so powerful that they encroached onto the turf of the supermicrocomputer companies. Minicomputers became less and less expensive. The upshot was that the market targeted by such companies as Fortune began to feel the squeeze.

But while the enthusiasm was still running high—back in 1984—SCI decided to make its own stab at bringing out a

famous customer is IBM, which has paid SCI a lot of money to build the guts of its Personal Computer family. SCI also had the advantage of having Olin King, who is widely respected in the financial community, as its founder, chairman and chief executive.

We think Fortune's management has made a wise decision in agreeing to sell its computer business to SCI. Consolidation in the supermicrocomputer sector is inevitable, and there was no need for Fortune to continue depleting its asset base just for the sake of staying in the hardware business. Waiting too long to make a graceful exit could have left Fortune no exit at all.

SCI will no doubt be able to make some use of Fortune's much-touted distribution channels. After all, that's one main ingredient of success SCI's systems sales program has always lacked. But it's difficult to say if SCI has made a wise move. Although the company would probably like the kind of name recognition that a thriving commercial reseller program can provide, it's unclear how SCI plans to turn around a business that has done so poorly for so long. The acquisition is clearly a gamble that may, or may not, pay off. We'll just have to wait and see if chairman King is holding the right cards.

• LETTERS

There's More Than IBM Behind The LAN Boom

To The Editor:

In your March 16 editorial, "The Real LAN Lord," you conclude that the recent success of independent LAN companies is directly attributable to IBM's having finally blessed the LAN concept in the fall of 1985.

You claim this is a clear indication of IBM's control over computer-related markets, and wonder whether this is good.

May I suggest that if IBM did indeed wield that kind of influence in this area, there would still be no success in LANville.

Consider the companies you listed. Both 3Com and Novell supply Ethernet networks aimed primarily at connecting IBM PCs in offices. Sure, it's no coincidence this market exploded on the heels of IBM's announcements, but IBM's goal was to stunt the growth of Ethernet, not advance it.

Let's turn to Excelan, whose success is based on its early commitment to TCP/IP and consistent focus on DEC and Unix workstation connectivity in the technical computing environment; this is the one area acknowledged to be immune to IBM's account control tactics!

In my opinion, even had IBM announced paper LAN products two years earlier, it still would have taken until 1986 to see this kind of growth; the software

just wasn't there. After all, it took our industry three years to figure out that cable type isn't the only thing that matters.

My point is that IBM's having legitimized LANs as a useful tool is only one of a large number of factors leading to today's growth. The important trend is that all the computer system vendors have added LAN capability to their product lines. They didn't wait for IBM; DEC led the way.

As with many new high-tech industries, the LAN challenge is to cope with product life cycles being shorter than product development cycles. IBM's announcements gave many people confidence that the LAN concept is here to stay. When the result is increased awareness and understanding of LAN solutions, and the opening of new markets, such influence can only be viewed as beneficial.

*Rick Losk
Product Manager
Chipcom Corp.*

Tandem Runs

To The Editor:

I have always found "Perkowski" a provocative and interesting feature of your paper. In particular, the March 16 column dealt with a topic of increasing interest to computer compa-

nies—sports sponsorships.

While Mr. Perkowski's article was tongue-in-cheek about the future prospects of sports sponsorships, the fact is that sports marketing arrived some time ago. Mr. Perkowski mused, "And what would be more appropriate than a computer company sponsoring a marathon? I can hear it now: 'Even if you stop running, your Tandem system won't.'"

It might interest your readers to know that Tandem has sponsored two marathons, the world's largest in London last April and recently the Los Angeles Marathon in March. In addition to being an official sponsor of these events, Tandem systems provided the official scoring and race results for both marathons.

We are pleased to extend an invitation to Mr. Perkowski to run as a member of Tandem's corporate team during the 1987 London Marathon in May, where we will once again be a sponsor and provide the race results for over 22,000 runners from around the world.

*Patricia A. Becker
Director, Marketing Support
Tandem Computers Inc.*

A Real Solution

To The Editor:

I read with great interest

William Shattuck's article titled "Behind the Industry Slowdown," in your Feb. 9 issue. I wholly concur with the interpretation of the cause of the computer industry slump.

Any manufacturer of computer equipment that views offerings as independent "solutions," isolated and removed from other elements of the corporate computing environment, is missing the biggest benefit computing has to offer.

We in the computer industry are really the root of the problem. We have for too long developed, promoted and sold independent computing "solutions" without concern for the overall computing environment. No single vendor can provide for the total needs of any one user, and no user should have to obsolete one set of computing tools for a new set of "latest and advanced" equipment.

It is up to us in the computer industry to offer better solutions that meet the long-term business strategy needs of end-user companies. This means looking beyond a narrow application solution, and considering the overall computing environment and how it plays a strategic role in the competitiveness of the end-user company.

*Peter J. Sil
President and CEO
Calay Systems Inc.*

CORPORATE
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Computer Systems News
Apr 20, 1987 p22

Computers

Tandem's new computers
plug into office marketBy G. Pascal Zachary
Mercury News Business Writer

James Treybig wants to get his foot past the office door.

Until now, Tandem Computers Inc., Treybig's firm, hasn't offered a computer either small enough or inexpensive enough to find a home next to typewriters, file cabinets and personal computers. Instead, the Cupertino company's highly reliable non-stop computers, which are an essential part of on-line transaction systems such as automated tellers, invariably were kept out of sight.

Now Tandem is trying to change that. Today, it is introducing its lowest-priced non-stop computer ever. The CLX computer will allow bankers and retailers to process several transactions a second with a machine that costs as little as \$40,000. Tandem's more powerful computers range from \$80,000 to more than \$1 million.

The new computer is aimed mainly at existing customers who may see a dual value in the CLX — to process transactions at a bank branch or store and then to feed a record of the transaction instantaneously to the company's Tandem network. "If we've already sold them the network, it's a shame not to sell them the computer that goes in the office or store," says Treybig, Tandem's chief executive and president.

Tandem has built a big business during the past decade making a family of computers that shares software and costs more than \$1 million. Big banks, retailers and other firms don't mind the high price tag because the systems are

"If we've already sold them the network, it's a shame not to sell them the computer that goes in the office."

—James Treybig

designed to operate continuously. A Tandem system, for instance, keeps information flowing during trading on the New York Stock Exchange. But the system has generally been too expensive for smaller jobs.

"Tandem has always had a problem with the low end," says Omri Serlin, president of ITOM International, a market research firm in Los Altos. "This solves it — with an entry price much more agreeable to a larger class of customers."

To satisfy customers who want both a link to their Tandem network and a computer to run office software, Tandem also is unveiling today its first computer that runs standard Unix instead of the firm's proprietary software. The LXN, which is available now and sells for as little as \$23,700, is a modified 32-bit computer made by Altos Computer Systems of San Jose.

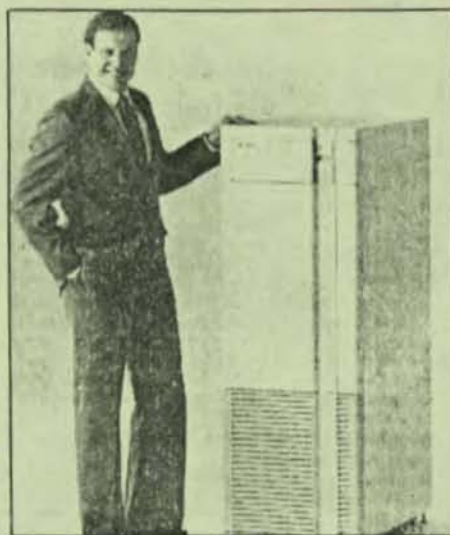
Treybig won't estimate how much business Tandem will gain from its two new computers, but he calls the more expensive CLX "the finest computer we've ever made." He particularly likes a feature that allows the computer to be repaired without anyone stopping it.

Tandem, which had revenues of \$768 million in 1986, won't ship the CLX until the fourth quarter of the year but says customer interest already is high. "Companies have looked at buying as many as 1,000 for a single network," says William Heil, CLX product manager. Still, it's unlikely that any firms have bitten yet. "They don't have any (major) orders," Serlin says.

The firm has a lot at stake: About 50 engineers spent at least 18 months developing the CLX. Because the CLX had to run on lower power to plug into office electrical outlets, Tandem needed to shrink the computer's components.

To help accomplish this, Tandem asked two small San Jose chip firms for help. Silicon Compilers Inc. of San Jose helped design the computer's chips; VLSI Technology Inc. will fabricate the chips. "This is a big deal for both those companies," Heil says.

Although both new computers are designed to be used in offices, Treybig doesn't claim that Tandem has its sights on entering the lucrative but intensely competitive office equipment market. He seems more interested in satisfying the growth needs of Tandem customers. "This allows us to have the office," he says, "but integrate it into our network."



Tandem's CLX computer



J. Ennis Kirkland

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LEVEL 1 - 1 OF 3 STORIES

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INFORMATION CENTER

April 17, 1987, Friday, Late City Final Edition

SECTION: Section D; Page 4, Column 1; Financial Desk

LENGTH: 64 words

HEADLINE: TANDEM COMPUTERS INC reports earnings for Qtr to March 31

BODY:

** COMPANY REPORTS **

	TANDEM COMPUTERS INC (OTC)	
Qtr to March 31	1987	1986
Revenue	242,368,000	176,327,000
Net inc	22,444,000	12,410,000
Share earns	.46	.29
Shares outst	49,028,000	43,385,000

The company said that certain prior period amounts have been reclassified to conform with the current period presentation.

TYPE: Statistics

SUBJECT: COMPANY REPORTS

LEVEL 1 - 3 OF 3 STORIES

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INFORMATION CENTER

April 16, 1987, Thursday

DISTRIBUTION: Business Editors

LENGTH: 1752 words

HEADLINE: TANDEM; (TDM) Tandem Computers reports financial results

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) Thursday announced that revenue in the second quarter of fiscal 1987, which ended March 31, increased to \$242,368,000, a 37 percent increase over \$176,327,000 achieved in the second fiscal quarter of 1986.

Net income for the quarter increased 81 percent to \$22,444,000, or 46 cents per share, vs. \$12,410,000, or 29 cents per share, earned in the like quarter of fiscal 1986.

For the six months ended March 31, revenue increased 39 percent to \$480,403,000 compared with \$346,388,000 in the year-ago period. Net income improved 106 percent to \$49,541,000, or \$1.03 per share, vs. \$24,058,000, or 56 cents per share, earned in the first six months of fiscal 1986.

Commenting on the quarter, Tandem President James G. Treybig said, "We are pleased with Tandem's performance. We achieved substantial year-over-year growth. Our international business remains strong. In particular, Japan, Canada and the Scandinavian countries posted significant gains. The United States continued to do well across all regions of the country.

"We are committed to providing the highest quality support to our customers," Treybig added. "During the quarter we increased our funding of third-party marketing programs and of our marketing and service organizations to support the growth we are experiencing.

"In addition, we continued to invest in development efforts that result in major contributions in products.

"During the quarter we introduced NonStop SQL software, a new high performance distributed relational database management system that incorporates the ANSI-standard Structured Query Language (SQL)," continued Treybig.

"NonStop SQL software couples the ease of use and functionality of SQL with the traditional advantages of Tandem on-line transaction processing systems including fault tolerance, expandability and data integrity.

"It is the first SQL implementation to provide the performance needed for high-volume, on-line transaction processing and to support fully transparent data distribution. Data anywhere in a network of Tandem systems can be read, written or updated with full transaction protection."

LEXIS NEXIS LEXIS NEXIS

"Our success in the first half of the year confirms our confidence in Tandem's prospects for growth," Treybig concluded. "We have made a good start toward achieving our fiscal 1987 goals of high revenue growth and sustained profitability."

"As a multinational corporation, we are concerned about potential trade barriers and unstable currency values. Despite this, we are optimistic about the future."

Tandem Computers Inc. manufactures and markets NonStop computer systems and large networks for the on-line transaction processing marketplace. The company is headquartered at 19333 Vallco Parkway, Cupertino, 95014. Telephone is 408/725-6000.

NonStop VLX and NonStop SQL are trademarks of Tandem Computers Inc.

Tandem Computers Inc. and Subsidiaries
Consolidated Interim Statements of Income-a
(Unaudited)
(In 000s, except per share amounts)

	Three Months Ended	
	3/31/87	3/31/86
Revenue		
Product revenue	\$202,010	\$146,109
Service and other revenue	40,358	30,218
Total revenue	242,368	176,327
Costs and expenses		
Cost of product	54,912	41,500
Cost of service and other	30,061	24,754
Research and development	25,867	21,287
Marketing, general and administrative	96,235	68,788
Total costs and expenses	207,075	156,329
Operating income	35,293	19,998
Interest income, net	3,233	2,362
Income before income taxes	38,526	22,360
Provision for income taxes	(16,082)	(9,950)
Net income	\$22,444	\$12,410
Earnings per share	46 cents	29 cents
Weighted average shares outstanding	49,028	43,385

-a Certain prior period amounts have been reclassified to conform with the current period presentation.

Consolidated Interim Statements of Income-a
(Unaudited)
(In 000s, except per share amounts)

	Six Months Ended	
	3/31/87	3/31/86
Revenue		
Product revenue	\$400,735	\$286,402
Service and other revenue	79,668	59,986
Total revenue	480,403	346,388
Costs and expenses		

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Cost of product	108,493	84,810
Cost of service and other	57,898	47,575
Research and development	50,182	41,134
Marketing, general and administrative	182,996	133,556
Total costs and expenses	399,569	307,075
Operating income	80,834	39,313
Interest income, net	6,080	4,035
Income before income taxes	86,914	43,348
Provision for income taxes	(37,373)	(19,290)
Net income	\$49,541	\$24,058
Earnings per share	\$1.03	56 cents
Weighted average shares outstanding	47,910	42,781

-a Certain prior period amounts have been reclassified to conform with the current period presentation.

Tandem Computers Inc. and Subsidiaries
Consolidated Interim Balance Sheets
(Unaudited)
(In 000s, except share data)

	3/31/87	3/31/86
Assets		
Current assets		
Cash and cash investments	\$285,529	\$160,767
Accounts receivable	234,751	182,577
Inventories	77,248	69,872
Prepaid expenses and other	22,476	16,739
Total current assets	620,004	429,955
Property, plant and equipment, at cost	335,135	251,199
Accum. depreciation and amortization	(125,492)	(95,110)
Net property, plant and equipment	209,643	156,089
Other assets	14,942	9,373
Total assets	\$844,589	\$595,417
Liabilities and stockholders' investment		
Current liabilities		
Current portion of long-term debt and capitalized lease obligations	\$ 1,586	\$ 7,721
Accounts payable	65,748	36,679
Accrued liabilities	91,032	45,888
Income taxes payable	13,149	3,945
Total current liabilities	171,515	94,233
Long-term debt and capital lease obligations	8,449	10,427
Deferred income taxes	30,088	34,324
Stockholders' investment		
Common stock, \$.025 par value; authorized 200 million shares; outstanding 45,761,598 in 1987 and 42,139,637 in 1986	1,144	1,054
Additional paid-in capital	339,711	250,946
Retained earnings	293,682	204,433
Total stockholders' investment	634,537	456,433
Total liabilities and stockholders'		

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MINICOMPUTERS

that pain. Think how it's going to feel if Minnesota comes up empty. One quarter of your committed orders down the tubes doesn't do much for a company's image.

"We're concerned about the enthusiasm of NSF about supporting supercomputers," says L.F. Kremer, vice president, customer and sales support. "When we see what happened to Phase I, it worries us. They're pulling away support from Cyber users. They represent potential users for us. We wish they hadn't done that."

But NSF did. That makes all the more difficult ETA's entry into the governmental marketplace, where it's got to score heavily to survive. NSF stuck with the company through tough times with the Consortium for Scientific Computing, but apparently decided it's time to let ETA make or break it on its own.

"ETA probably is viewed and treated more harshly than the average startup," says a user at a government laboratory who requested anonymity. "The in group thinks these guys have struck out two or three times. They've been freeloading off the government's inclination to support a second vendor. As long as they continue to be the only second supplier, they can continue in their current mode. The ETA-10 could end up for the persistent reasonable expert user as a supplier of cheap cycles."

"There's more bad news than good," says Patton. "They need someone like Darth Vader to speed up the manufacture of the new death star."

Maybe that person is out there somewhere. But so far the force has not exactly been with ETA.

Also contributing to the reporting of this article was associate news editor Karen Gullo.



PETERSON: The Tandem executive doesn't want to give away low-end business to competitors.

Protecting the Flank

Tandem's new low-end NonStop computers are designed to fend off the likes of NCR and IBM.

BY JEFF MOAD

You couldn't tell by looking at its financial results for the last year, but Tandem Computers Inc. has a problem.

It's not that the 12-year-old Cupertino, Calif.-based vendor is having trouble keeping up in what has always been its key markets for medium and large on-line transaction processing systems. In fact, in the last year, Tandem has ridden a new high-end product line—the 16-processor NonStop VLX—and an explosion in the market for on-line applications to record sales and earnings. While less-focused systems vendors have been bemoaning the ongoing computer industry slump, by the end of 1986 Tandem increased its earnings by 76% and was poised to surpass the \$1 billion mark in annual sales in 1987.

Forced to Walk Away

The problem is that while Tandem has been focusing successfully on the high-end products, it has been

forced to walk away from large chunks of business in the increasingly important distributed departmental low end of the OLTP market. That's because it has not had an under-\$100,000 version of its NonStop fault tolerant system to market against the likes of NCR's 9800 and Tower product lines or IBM's Series/1.

All that is about to change, however, as Tandem plans to unveil a long-awaited pair of low-end computers next week that will both cut the entry price of the NonStop product line in half and give Tandem a \$20,000 multi-user Unix-based system using standard, off-the-shelf technology. Tandem officials hope the new systems, coupled with a recently introduced distributed SQL-based relational database management system, will give it a compelling story to tell to large manufacturing, financial, and retail users ready to distribute on-line processing power to branch locations.

"That's where most of

our customers' transactions start and end, and that's where most of them want to put the computing power," says Tandem's marketing vice president Gerald L. Peterson. "We'd just as soon not give that business away to our competitors."

The Result of Hard Thinking

Of course, this isn't the first time Tandem's reliance on proprietary hardware and resulting lack of a low-end product has caused observers to predict trouble for the company. In the early 1980s, after Tandem had pioneered and proven the existence of an OLTP market, a slew of venture capital-financed competitors emerged, threatening to use lower-cost off-the-shelf microprocessor technology to bring to market on-line-oriented systems priced at a fraction of Tandem's NonStop. Tandem, however, managed to protect its seven-year lead over the startups by improving its connectivity to IBM communications protocols and by boosting high-end performance of its 16-bit multiprocessor architecture with custom ECL logic technology on its VLX and TXP systems.

This time around, the threat to Tandem is very real, and it's not coming from a competitor whose principal asset is a well-written business plan. It's clear that IBM, like NCR, has discovered OLTP in a big way. Digital Equipment Corp. has also taken steps to improve its position in the OLTP market (see "On the Beach for an OLTP Entry," April 1, p. 19). IBM has begun supporting such fault tolerant features as dual communications and disk controller ports on its mainframe computers, and has included a transaction processing protocol in the key LU 6.2 portion of its SNA blueprint. "More and more, IBM is chinking away at Tandem's OLTP lead," says Tom

Banks, a former Tandem manager and now director of marketing at Tandem competitor Tolerant Systems, San Jose.

While its 48MIPS VLX system goes up against IBM at the high end, Tandem would like to replace IBM and other vendors at the distributed departmental low end of the on-line chain where systems like the Series/1 are making gains among some Tandem customers. One example is the May Company, a North Hollywood, Calif.-based apparel retailing chain and long-time Tandem customer, which recently started shopping for ways to make data collected at its 35 stores more accessible to its 10 Tandem TXP on-line systems. Since Tandem didn't have a low-end offering, May Company decided to install a Series/1 system in each store and to develop software that would allow the IBM systems to feed sales data to the central Tandem systems continuously rather than once at the end of the day.

"Tandem didn't have a product at that end of the market, so we didn't even look at them," says May MIS director Mike King.

Tandem also has lost out on plenty of federal government business because it lacked both low-end systems and systems running Unix, a feature required by many agencies. Tandem has won some federal government business, but the company has seen much more business go to competitors—such as NCR, Tolerant, and Unisys—that were able to ship Unix-based systems.

Filling the Gaps

Tandem hopes to fill both gaps in its product line with its two new offerings. One, code-named Comet, is a multiuser Unix system using the Motorola 68000 microprocessor and based on a sys-

tem bought by Tandem from Altos Computer Systems of San Jose on an oem basis. The second and more important system, code-named Falcon, is a CMOS version of Tandem's NonStop architecture and is compatible with its Guardian 90 operating system.

While sources say the Comet Unix machine will be priced at around \$20,000, the Falcon system is expected to be priced at about \$50,000, about half the price of the eight-month-old EXT10. The Comet is not fault tolerant, but does offer data protection features such as disk mirroring, while the Falcon is said to be fully fault tolerant. It is expected to offer between two and four transactions per second compared with the EXT10 that offers from 4.3 to 8.6 transactions per second. The Falcon will be differentiated from the EXT10 by a new, microprocessor-based controller design. Sources say Tandem has at least one other smaller CMOS-based Guardian-compatible system under development.

A key to Tandem's low-end push is its NonStop SQL distributed relational database management system. Although the new DBMS won't be available until next quarter, Tandem claims it will offer performance at least equal to its less relational Encompass DBMS. It will also include Tandem's current transaction control program and transaction monitoring facility, which, unlike other so-called distributed RDBMSs, supports distributed updates and queries. Tandem says its users will be willing to build distributed on-line systems around NonStop SQL.

"With NonStop SQL we're giving users the ability to access 200 transactions per second, and with the low-end products we're giving them the ability to put that power anywhere they want it," says Terry Retford, Tandem man-

ager of systems products. "Some of our users want to put two transactions per second in 100 locations. Now they can do it."

Tandem already has attracted some interest in its low-end distributed push among resellers and systems integrators as well as users. Earlier this year, the company signed a memorandum of un-

THE THREAT AT THE LOW END IS VERY REAL.

derstanding with Boeing Computer Services, Seattle, which has been studying the feasibility of adapting its PMF manufacturing software to the NonStop hardware for marketing to distributed shop floor, CAD/CAM, and cell control applications.

Boeing has been encouraged by what it has seen of Tandem's low-end products and the NonStop SQL offering, according to Boeing's manager of strategic alliances Sanford Vanderhyde, who says the two companies could have a systems integration agreement signed by the middle of this month. According to Vanderhyde, "BCS is beginning to believe that there is a need to distribute data easier and to manage it [in a way] that is not easily accomplished on large mainframes today. Tandem seems to see the same need and to have a solution for it."

Of course, Tandem still has plenty to prove. For one thing, although it has had NonStop SQL performance figures verified by the Codd & Date Consulting Group of San Jose, competitors say they doubt the company's claim

that the product is as fast as any nonrelational DBMS. Tandem officials also acknowledge that, with increased shipments of networked distributed systems, the company will have to improve its network management software offerings. "Significant work is going into that right now," says Tandem software vice president Dennis L. McEvoy. And integration of the Unix system into the Tandem distributed architecture isn't yet complete. Initially, the Unix system accesses the new DBMS by emulating a Tandem terminal. What the company calls "seamless" integration of Unix into the Tandem network won't come for 18 months.

Tandem also will face a new set of economics and some fierce competition at the low end. To compensate for the lower average selling price of the new products, Tandem says it will focus on selling quantities of the systems to large end users and will offer more complete remote support, programming, and operation software and services.

Not easy for Tandem

It won't be easy for Tandem to compete with IBM or NCR at the shop or on the retail floor, but company officials say that if its low-end strategy works, Tandem has a chance to take another step toward being a broad-based systems vendor rather than a niche purveyor of fault tolerant systems. According to marketing vp Peterson, "We've grown well by tying into fast-growing areas like ATMs and electronic funds transfer. Now, areas like distributed retailing and CIM are becoming very big. Those new areas are more complex because the systems must be networked together. But we've got to get involved now. Any player not involved now will have a hard time catching up." ■

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CORPORATE
INFORMATION CENTER

April 13, 1987

SECTION: NEWS; Inside Lines; Pg. 118

LENGTH: 40 words

BODY:

No stopping them. Tandem Computers has scheduled a splashy product announcement for April 20 in San Francisco. The introduction is expected to include a line of Unix-based systems that can be integrated with Tandem's existing network.

THIS WEEK'S PRODUCTS

DATA COMMUNICATIONS

INTERLINK EMULATION LINKS DEC, IBM MACHINES

Interlink claims that it has the first full-screen, bidirectional terminal emulation packages for IBM-to-DEC connectivity. The 327X lets DEC VT-100/220 terminal users communicate with an IBM mainframe. And VTXX software enables IBM users to log into a VAX or RSX machine. Both programs contain a macro function that merges up to 27 commands into a single keystroke. The 327X sells for \$5,950, and the VTXX lists for \$10,950. They are available now.

"We use the 237X to send process control data from our DEC equipment to our Cullinet database, which tracks production status on an IBM 4381 mainframe," says Andy Nichols, production services manager for Fairchild Semiconductor Corp., in Portland, Me., beta site for the software. "Previously, we had to send tapes from our manufacturing division to our MIS department, batch load the process control data into the mainframe, and rekey the data that wasn't compatible with the Cullinet software. The Interlink software automatically puts the information into our database and we don't have to reformat it."

"We looked at other products before we chose Interlink," continues Nichols, "and it's much faster than communications transaction-processing software. Its only drawback is that it edits a line at a time."

Interlink Computer Sciences Inc., 47370 Fremont Blvd., Fremont, Calif. 94538

FT1300 HANDLES 16 CHANNELS

American Lightwave claims that its FT1300 fiber-optic transmitter can send up to 16 video channels or a combination of voice, video, and data over a distance of 30 kilometers at one-fifth the cost of a digital system. The FT1300 can be used for local-area networks, intercity communications links, TV broadcasts, and teleconferencing systems. It plugs into standard mainframes and requires 7.5 inches of vertical height.

The price of this transmitter varies from \$20,000 to \$100,000.

American Lightwave Systems Inc., 358 Hall Ave., Wallingford, Conn. 06492-1149

3COM INTRODUCES LOW-COST NETWORK WORKSTATION

3Station, from 3Com, is an IBM PC-compatible workstation that runs on 3Com's line of network servers and adapters. 3Com claims companies can save 30% to 50% per user by integrating these workstations into their 3Com networks in place of IBM PCs and the appropriate communications peripherals.



The 3Com workstation comes with an 80286 processor, Ethernet compatibility, four graphics adapters, and 1 Mbyte of memory expandable to 4 Mbytes. In addition, 3Com says that these machines require only 25 watts of power, which is a fraction of the power needed to operate an IBM PC. Priced at \$1,895, 3Station

will be available on May 15.

3Com Corp., 1365 Shorebird Way, Mountain View, Calif. 94043

SOFTWARE

ADVANCED SYSTEM BRINGS BANKING FUNCTIONS TO VAX

Advanced System, from Saddlebrook Corp., is a combination of hardware and software that works with a DEC VAX, turning it into a computing center for savings, commercial, and mortgage banks. The system can perform transaction processing as well as marketing-related functions.

Features of Advanced System include deposit processing, electronic funds transfer, and interest-rate calculations. In addition, it houses a customer database that stores client names, the number of people in their household, and the types of banking products they purchased. The database is further divided among demographic lines. Salespeople can query the database to find a customer's banking profile and then devise a plan to offer him additional services.

The price of Advanced System ranges from \$1.25 million to \$3 million, depending on configuration. It is available now.

Saddlebrook Corp., 101 Main St., Cambridge, Mass. 02142

TANDEM R-DBMS FOR NONSTOP

Tandem Computers has introduced NonStop SQL, a relational database program for its NonStop transaction-processing computers. The company claims that this software offers two to five times the price/performance of other SQL products.

With this package, users can read, write, or change data that resides on a Tandem network. It also comes with a data dictionary. The initial license fee ranges from \$4,000 to \$8,000, and monthly fees vary from \$375 to \$750 per processor, depending on configuration.

Tandem Computers Inc., 19191 Valco Parkway, Cupertino, Calif. 95014-2599



"You know Harry, these islands of automation need more connectivity."

LEVEL 1 - 3 OF 3 STORIES

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April 13, 1987, Monday

CORPORATE
INFORMATION CENTER

DISTRIBUTION: Business Editors

LENGTH: 457 words

HEADLINE: TANDEM; (TDM)(MOR) Morgan Keegan installs Tandem NonStop VLX system
for on-line securities processing

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computers Inc. (NYSE:TDM) announced Monday that Memphis, Tenn., based Morgan Keegan & Co. Inc., one of the largest brokerage firms in the Southeastern United States, installed a Tandem NonStop VLX mainframe, a multiprocessor system designed for large applications and high-volume transaction processing, to perform on-line securities processing. Using software from Phase3 Systems Inc., Waltham, Mass., the NonStop VLX system will display account information on vendor quote terminals for sales and marketing activities, give up-to-date account balances and activity for the firm's operations staff, handle back-office accounting and manage trading activities, including on-line order matching. Computer terminals in the firm's 16 branch offices and its headquarters will connect to the Tandem system. Morgan Keegan is replacing a system that could not grow with its needs, said Joseph C. Weller, chief financial officer of the brokerage firm. "We're experiencing 30 percent to 40 percent growth per year, and need a system that will allow growth," said Weller. "The on-line Tandem/Phase3 system will give brokers up-to-date information on clients throughout the day as we receive securities and checks and execute trades." The new system goes on-line this fall. Weller added that Morgan Keegan also selected the NonStop VLX system because of its ability to communicate with other computers and because of Tandem's presence in the brokerage industry. Morgan Keegan will also use SNAX, Tandem's System Network Architecture communications services software. SNAX enables devices and host computers using IBM's Systems Network Architecture to communicate and share applications with Tandem NonStop systems. Morgan Keegan & Co. Inc. serves individual investors in the Southeastern United States and institutional clients worldwide. With offices in eight states, the firm has more than 600 employees and had 1986 revenues of more than \$69 million. PHASE3 Systems Inc. was founded in 1983 to provide real-time securities processing services to the securities industry. Tandem Computers Inc. manufactures and markets computer systems and networks for the on-line transaction processing marketplace. The company is headquartered in Cupertino.

Note to Editors: Tandem, NonStop and NonStop VLX are trademarks of Tandem Computers Inc. IBM is a trademark of International Business Machines Corp.

CONTACT: Tandem Computers Inc., Cupertino
Tom Waldrop, 408/725-7191
or

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Morgan Keegan & Co. Inc., Memphis
Joe Weller, 901/524-4140

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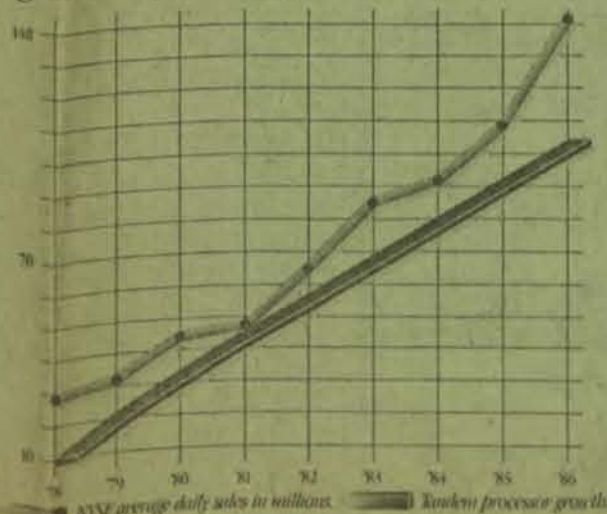


High volume transaction processing has become Tandem's stock in trade.

Tandem systems keep track of the current price of every stock on the New York, American, Boston, Philadelphia, Midwest and Pacific Stock Exchanges. We disseminate this information to NYSE floor brokers. We send the information to data vendors who display it to other exchanges worldwide. We also route NYSE market and limit orders and reports. It's one of the most intensely complex computer applications in the world. And like our work for 18 other exchanges internationally, it runs without a hitch on a Tandem NonStop™ system.

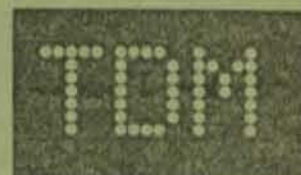
THE MARKET CAN'T OUTGROW US. Since 1978, trading volume on the

Big Board has grown from an average of under 29 million shares per day to an average of over 140 million per day. And the Tandem system has grown right along with it. Our unique,



parallel architecture and single operating system allow you to expand

in any increment you choose, without sacrificing performance. And you never have to write a whole new application.



Tandem is now listed on the New York Stock Exchange.

DO SOME RESEARCH ON US. Tandem systems are at work in finance, manufacturing, telecommunications, retailing, transportation, energy and government.

For more information, write: Tandem Computers Incorporated, 19191 Vallco Parkway, Loc. 4-31, Cupertino, CA 95014. Or call 800-482-6336.

TANDEM COMPUTERS
The technology leader in on-line transaction processing.

MUTUAL FUNDS

[illegible]

AMERICAN STOCK EXCHANGE

[illegible]

U.S. NOTES & BONDS

[illegible]

OVER THE COUNTER

Country	City	Exchange	Rate	Country	City	Exchange	Rate	Country	City	Exchange	Rate
Algeria	Algiers	100	1.00	France	Paris	100	1.00	Italy	Rome	100	1.00
Argentina	Buenos Aires	100	1.00	Germany	Berlin	100	1.00	Japan	Tokyo	100	1.00
Australia	Sydney	100	1.00	Greece	Athens	100	1.00	South Africa	Johannesburg	100	1.00
Austria	Vienna	100	1.00	Holland	Amsterdam	100	1.00	Spain	Madrid	100	1.00
Belgium	Brussels	100	1.00	India	New Delhi	100	1.00	Sweden	Stockholm	100	1.00
Brazil	Rio de Janeiro	100	1.00	Indonesia	Jakarta	100	1.00	Switzerland	Zurich	100	1.00
Canada	Toronto	100	1.00	Israel	Tel Aviv	100	1.00	Taiwan	Taipei	100	1.00
Chile	Santiago	100	1.00	Italy	Rome	100	1.00	Thailand	Bangkok	100	1.00
China	Beijing	100	1.00	Japan	Tokyo	100	1.00	U.S.A.	New York	100	1.00
Colombia	Bogota	100	1.00	South Africa	Johannesburg	100	1.00	U.K.	London	100	1.00
Czechoslovakia	Prague	100	1.00	Spain	Madrid	100	1.00	USSR	Moscow	100	1.00
Denmark	Copenhagen	100	1.00	Sweden	Stockholm	100	1.00	Yugoslavia	Belgrade	100	1.00
Egypt	Cairo	100	1.00	Switzerland	Zurich	100	1.00				
Finland	Helsinki	100	1.00	Taiwan	Taipei	100	1.00				
France	Paris	100	1.00	Thailand	Bangkok	100	1.00				
Germany	Berlin	100	1.00	U.S.A.	New York	100	1.00				
Greece	Athens	100	1.00	U.K.	London	100	1.00				
Holland	Amsterdam	100	1.00	USSR	Moscow	100	1.00				
India	New Delhi	100	1.00	Yugoslavia	Belgrade	100	1.00				
Indonesia	Jakarta	100	1.00								
Israel	Tel Aviv	100	1.00								
Italy	Rome	100	1.00								
Japan	Tokyo	100	1.00								
South Africa	Johannesburg	100	1.00								
Spain	Madrid	100	1.00								
Sweden	Stockholm	100	1.00								
Switzerland	Zurich	100	1.00								
Taiwan	Taipei	100	1.00								
Thailand	Bangkok	100	1.00								
U.S.A.	New York	100	1.00								
U.K.	London	100	1.00								
USSR	Moscow	100	1.00								
Yugoslavia	Belgrade	100	1.00								

FOREIGN MONEY

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MONEY RATES

Prime Rate: 7.50
Discount Rate: 5.50
Federal funds market rate: 7.25-7.50
High & 107 low: 6.125 and 6.1875
Dealers commercial paper:
30-180 days: 6.20 - 6.20
Commercial paper:
90-270 days: 5.85 - 5.92
30-90 days: 6.00-6.05
30-90 days, noncallable: 6.05-6.10
60-90 days: 6.14
60-119 days: 6.14
60-119 days: 6.14
120-149 days: 6.14
150-179 days: 6.13
180-270 days: 6.12
Certificates of Deposit \$100,000:

DIVIDENDS

DOW JONES BOND AVERAGES					
	IND. RATE	5th. PAY	IND. RATE	5th. PAY	25 DOW JONES UTIL
REGULAR	4.15	4.25	5.4	4.1	5.2
Highly Dividend	4.15	4.25	5.4	4.1	5.2
Midwest/Chicago	3.1	4.6	4.28	3.1	4.6
Pacific/California	3.1	4.6	4.28	3.1	4.6
Financial/Conf	7.1	4.3	4.50	7.1	4.3
South Atlantic	1.00	4.5	4.27	1.00	4.5
Southwest	1.00	4.5	4.27	1.00	4.5
Tel./Comm/Aviation	4.7	4.7	4.7	4.7	4.7
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
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Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.1	6.1	5.1	5.1	6.1
Capital Income	5.1	6.1	5.1	5.1	6.1
Stock	5.1	6.1	5.1	5.1	6.1
Convertible	5.1	6.1	5.1	5.1	6.1
Highly Dividend	5.1	6.1	5.1	5.1	6.1
Midwest/Chicago	5.1	6.1	5.1	5.1	6.1
Pacific/California	5.1	6.1	5.1	5.1	6.1
Financial/Conf	5.1	6.1	5.1	5.1	6.1
South Atlantic	5.1	6.1	5.1	5.1	6.1
Southwest	5.1	6.1	5.1	5.1	6.1
Tel./Comm/Aviation	5.				

U.S. TREASURY

Current World	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195
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EARNINGS

[illegible]

ANNOUNCING THE LATEST TECHNOLOGICAL ADVANCE ON WALL STREET.



Tandem Computers (TDM) has just joined the New York Stock Exchange. That means one of the fastest growing leaders in the high-tech industry has now advanced to new heights.

The NYSE offers Tandem the depth, liquidity and visibility that's unequaled anywhere—from the Silicon Valley to the canyons of Wall Street.

That's because at the NYSE, companies like Tandem get efficient and economic access to capital, and greater exposure to large and small investors both domestically and internationally.

Tandem and the NYSE have already worked together to develop trading and communications technology to meet the changing needs of today's investors. In fact, Tandem's systems and their technology have made it possible for the NYSE to handle equity trading volume that has tripled in just six years.

That's why the New York Stock Exchange is the best market for high-tech companies. Or for that matter any company with high expectations.

NYSE
New York
Stock Exchange

Management

Motivation will change in new workplace

Firms' fortunes, pay are linked

WORKPLACE, from Page 1C

"Many of us... complain that the playing field is not level," Perot told the Economic Club of Detroit last December. "The playing field is never level. Too many of us grew up in a world where we owned the bat, the ball, the stadium, both teams and the lights."

Behind the rhetoric are concrete policies that amount to a concession by U.S. industry that the party is over.

In place of guaranteed raises, for instance, "pay for performance" programs allow workers to earn time off if they meet production quotas. Or employees get bonuses tied to performance goals. Or companies pay all workers on a salary, instead of hourly, basis to cut costs and instill a sense of teamwork and professionalism.

'Common fate'

"The belief is if (employers) create more of a sense of common fate between employees and the company, then the company will be more competitive," says Carla O'Dell, a consultant to the American Productivity Center and author of the center's report.

"Gain-sharing" plans, an increasingly popular version of pay for performance, set production goals for a group of workers within a company. Workers in the group are paid according to whether the team meets production quotas. In this way, a company ties more of its labor costs to its bottom line.

Nucor Steel Corp. of Charlotte, N.C., has used gain-sharing since 1965, the last year the company had a money-losing quarter.

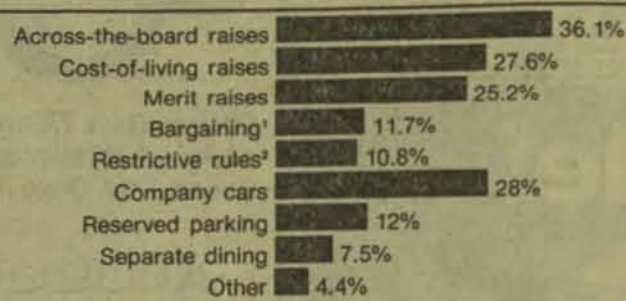
"We pay the bonuses weekly, so people can see how quickly higher production can affect their pay," says Nucor's chairman and chief executive, F. Kenneth Iverson. "It's not unusual for (bonus pay at Nucor) to exceed 100 percent of base pay."

Reward programs out

Sometimes a shift toward team pay comes at the expense of individual reward programs. McDonnell Douglas Electronics Co. in St. Louis is designing a gain-sharing plan for workers at its St. Charles, Mo., plant. At the same time, the company has scrapped its employee suggestion pro-

Out with the old

Percent of companies that have reduced or eliminated:



*According to industry standards

*Job descriptions restricted

Source: American Productivity Center

gram, which paid individual workers for bright ideas.

"We realized we were paying the individual who had the idea but not those people who made the idea work," says John Wolf, executive vice president for operations.

When gain-sharing spreads throughout an entire company, it's called profit-sharing. In some cases, profit-sharing plans are being used in place of annual raises.

In its 1982 contract with the United Auto Workers, Ford Motor Co. replaced automatic raises of about 3 percent a year with a profit-sharing plan for its union employees. So far, so good: Profits have never been better, and Ford has paid more than a billion in bonuses in the last four years, including \$371 million — or about \$2,300 per employee — last year.

Another idea gaining favor at a small but growing minority of companies is the notion of paying workers for the number of jobs they can perform, sometimes called "pay for knowledge."

The idea is that a more flexible work force allows a company to respond more quickly to changes in the marketplace. In this way, for instance, employers can avoid layoffs by switching workers to different jobs according to where they're needed.

International Business Machines Corp. in some cases increases hourly pay for workers who can do more than one job,

says Jack Stillens, manager of site planning for IBM's San Jose operations.

Ideas like pay for performance sound great while business is booming. But it's also pep-rally talk for: "The more you sweat, the more you earn." And in bad times, take-home pay shrinks along with sales. A flexible work force preserves jobs, but in practice it often means changing careers or, in the case of larger companies, uprooting the family and moving from Colorado to Florida because of a plant closing.

"It's pure economics," O'Dell says. "That may sound cold, but it's what heats our houses. If you don't pay for production, you can't make it."

To get workers to accept that arrangement, more companies are trying to boost employee loyalty and blur the line between management and the troops.

Some companies go to extremes. Friday mornings find Tom Melohn of North American Tool and Die Inc. in San Leandro at a bakery buying doughnuts for his workers. He also lets employees borrow the company trucks on weekends to run personal errands, to the horror of his insurance brokers.

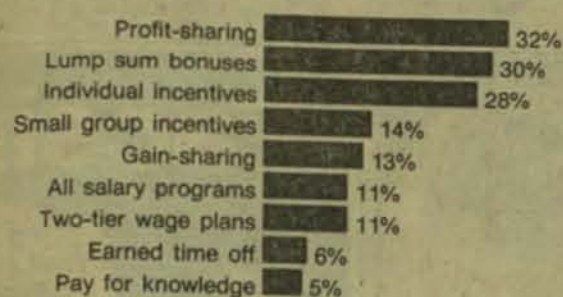
Loyalty strategies

Most strategies to boost loyalty are more formal.

About 400 Ford employees who aren't needed to build cars and trucks right now do chores for Mothers Against Drunk Driv-

... and in with the new

Percent of companies that currently use:



Source: American Productivity Center

Mercury News

ers and non-profit organizations while they stay on Ford's payroll, at virtually full salary, as part of a pilot program to avoid layoffs. Workers will be reassigned at Ford, or given their old jobs back, as work becomes available, spokesman Tom Foote says.

Nucor employees are paid \$1,500 a year for their children's college or vocational training, up to a total of four years. This year, the program will cost Nucor, with \$755 million in sales last year, about \$390,000, Iverson says.

But managers at these companies say the return on such policies is greater than their cost.

Last year, Nucor workers ground out 980 tons of steel tons of steel per employee, compared with an industry average of 375 tons, Iverson says.

Profits at North American Tool & Die are up 800 percent since 1980. Its reject rate — the rate at which customers send back faulty parts — has been one-tenth of 1 percent since 1981, unheard of in the industry.

The new management style is emerging slowly. But as competition tightens, that pace should quicken.

"A lot of these techniques have been around a long time," O'Dell says. "But they're like seeds in the desert, they don't take hold until the ground becomes fertile. In other words, (companies) are desperate now."

Memoranda

Tramiel fan joins Atari as new exec

"I'm kind of a Jack Tramiel groupie," says J.J. "Jerry" Brown, Atari Corp.'s newest vice president and general manager of the Sunnyvale-based computer maker's U.S. operations.

In Brown, Tramiel, a controversial figure who has put Atari back in the black since purchasing it in 1984, lands a seasoned computer executive — as well as a fan. "I think Jack is one of the great names in the computer industry."

Brown has seen a few of these "names" up close. He spent 18 years with International Business Machines Corp., working in a variety of capacities, including serving as general manager of IBM's general systems division in California.

After leaving IBM, Brown spent several years with Texas Instruments, where he was a vice president for corporate marketing in Dallas. Before that, he was vice president of marketing and sales for TI's Data Systems Group in Austin.

"His arrival lends a lot of credibility to Atari," says a former co-worker with another firm.

At Atari, which completed a public offering last fall, Brown has his work cut out for him. The company's sales, which totaled nearly \$260 million in 1986, come mainly from Europe. Brown's charge, one analyst says, will be to increase domestic sales of personal computers by beefing up the firm's network of independent dealers.

Although it's a tall order, Brown thinks Atari has a shot at becoming one of the "top three or four players in the computer industry."

The change in scenery won't hurt either. The Dallas doldrums wore on Brown, a native of New York who received an engineering degree from Brooklyn Polytechnic Institute. "I'm looking forward to sailing a lot here," he says.

— G. Pascal Zachary

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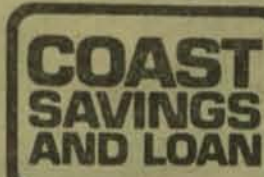
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LEVEL 1 - 2 OF 4 STORIES

Copyright © 1987 Business Wire Inc.;
Business Wire

April 7, 1987, Tuesday

**CORPORATE
INFORMATION CENTER**

DISTRIBUTION: Business Editors

LENGTH: 394 words

HEADLINE: TANDEM-COMPUTERS; (TDM) Tandem Computers stock lists on New York Stock Exchange

DATELINE: CUPERTINO, Calif.

BODY:

Tandem Computer Inc. (NYSE:TDM), Tuesday announced that its common stock is now listed on the New York Stock Exchange under the symbol TDM.

The company's securities were previously traded over-the-counter and reported on the NASDAQ National Market System under the symbol TNDM.

'This is a historic day for Tandem,' stated James G. Treybig, president and chief executive officer of Tandem Computers. 'We started 12 years ago with an idea and an opportunity. We have built a multi-million dollar international company that today joins many of the world's largest and most prestigious firms on the New York Stock Exchange.'

At ceremonies held today on the exchange floor, Treybig, acting for Tandem Computers Inc., placed the first order for 500 shares of Tandem stock. A number of these shares later were awarded to Tandem employees.

Tandem computer systems used by the Securities Industry Automation Corp. have made a major contribution in enabling the New York Stock Exchange to handle record trading volume of over 450 million shares in a single day.

SIAC is the data processing subsidiary of both the New York and the American Stock Exchanges. At SIAC, Tandem systems handle the distribution of buy and sell orders to the trading floor. In addition, Tandem systems report trades and quotes to quotation vendors for worldwide distribution.

Tandem was founded in 1974. For the 1986 fiscal year, which ended Sept. 30, 1986, Tandem reported record revenue and earnings. Compared to fiscal 1985, revenue grew 23 percent to \$768 million, and earnings per share grew 76 percent to \$1.44.

Revenue in the first fiscal quarter of 1987, ended Dec. 31, 1986, increased to a record \$238 million, a 40 percent increase over the first fiscal quarter of 1986. Earnings per share more than doubled to 58 cents, compared to 28 cents per share in the like quarter of fiscal 1986.

Note to editors: Tandem Computers Inc., a Fortune 500 company, is a leading supplier of mainframes and computer networks for the on-line transaction processing market. Tandem is headquartered at 19333 Vallco Parkway, Cupertino, Calif. 95014, telephone 408/725-6000.

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LEVEL 1 - 3 OF 3 STORIES

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Securities Week

April 6, 1987

SECTION: Pg. 3

LENGTH: 199 words

HEADLINE: TANDEM COMPUTER LISTING GOES TO NYSE SPECIALIST JACOBSON

BODY:

Tandem Computers, a much-sought-after listing, was allocated last Thursday at the NYSE to Benjamin Jacobson & Sons, according to sources. Benjamin Jacobson was ranked number two in the previous specialist performance evaluation questionnaire (SW, 2 Feb., 1) and consistently rates in the top 10.

The Tandem allocation was somewhat unique in that the stock allocation committee sent a special memorandum around to make sure that the stock went to a specialist that deals, sources said. In hindsight, this action seemed odd to some on the floor who perceived that the exchange was sending a message to other company listings. "Does this mean the other big listings went to specialists that don't deal?" a specialist asked.

Tandem is said to have sent letters to the stock allocation committee in favor of three specialist firms -- Lasker, Stone & Stern; Hirshon, Roth & Co.; and Benjamin Jacobson, sources said. This has been common practice in the past, however, and does not necessarily influence the stock allocation committee's decision.

The Tandem listing is expected by specialists to be a good long-term stock. The offering consists of over 60 million shares of common stock.

INFORMATION SYSTEMS P18

Tandem NonStop Unit Runs Motorola CIM In Hong Kong

By PAUL CHARLES EHRLICH

HONG KONG (FNS)—Motorola Semiconductor Ltd. is implementing various computer-integrated manufacturing (CIM) applications with its new \$1 million NonStop TXP system from Tandem Computers Inc.

The sale is believed to be Tandem's first in Hong Kong and is one of only a few CIM systems being used here.

"The system demonstrates Hong Kong's transition from a manual-labor-intensive to a high-technology-intensive manufacturing community," said Motorola's Hong Kong MIS director, Tom Draper.

According to Draper, the system will be used for invoice tracking and warehouse functions. It will generate information on orders and shipments and will monitor the maintenance and report on incoming equipment.

"As part of our total CIM program, the system will allow us to be more responsive to the needs of our customers, allowing us to monitor equipment and the manufacturing process as well as keep track of and improve our quality and throughput," the MIS director said.

He added that the semiconductor maker expected to see substantial cost savings due to increased inventory turnover and faster manufacturing processes, but he declined to estimate figures.

The system consists of three 8-Mbyte Tandem TXP CPUs, 3.5 Gbytes of memory, three high-speed printers, one high-speed tape drive and 70 terminals that will be used throughout Motorola's two factories here.

"We chose Tandem because of its 24-hour fault-tolerant environment. All its CPUs and power supplies are backed up to ensure that the system will run continuously," Draper said.

The newest purchase is in line with the company's plan to have a complete Tandem network, Draper said. Motorola uses Tandem computers in its manufacturing operations in the Philippines, South Korea, Taiwan, Malaysia, West Germany, Japan, France, Scotland and the United States.

"As part of our worldwide network it will allow us to exchange

Applications

key information between sites, such as parts specifications and shipment information," Draper said.

Prior to purchasing its own mainframe Motorola's Hong Kong division processed most of its information over the phone lines back to its Arizona-based headquarters.

"The procedure was slow," Draper said. "Headquarters would bring the system down on weekends and in the evening. Because of the time difference, we were often unable to obtain the information we needed."

The Tandem hardware was installed in January and an inventory-tracking system was hooked up recently. Motorola expects to have the warehouse software operational later this month.

The company is also creating a "pick" system, which compares customer demands with inventory backlog to allow parts to be picked off the warehouse shelf and a shop-order generation system. The systems are expected to be installed before year's end.

Roy Olmstead, Tandem's Hong Kong managing director, said Tandem will be providing support and training for the Motorola installation. "We've already trained the programmers, analysts and systems managers and will continue to conduct further training," he said.

VIEW FROM Warranties

MAYNARD, Mass.—Digital recently announced it is offering on all its hardware. Most other days.

Sounds good, but think about warranty may be better than most it again.

If you spend \$12,000 for an auto park outside all winter, haul lumber in, drive into the woods in the burning sun, the warranty ranges from 36 months to seven years.

A washing machine comes with a warranty and a TV has a five-year picture tube. Even a used-car dealer offers a one-year warranty. But, on a \$5,000 computer, the guarantee is 90 days.

One reason for this might be that TVs and washing machines with corporate entities, vice presidents, computer operations executives and computers with corporate monies.

People want the best bargain for their money, corporate spends offered and often take the best bargain, which is usually the most expensive.

How many departments in a company deplete their budgets in the last year they don't spend it, it will either be the corporation or next year's budget trimmed?

Lee Iacocca said for years, "The man who builds them best, look at the best." He turned Chrysler around.

Zitel Says RAMdisk Helps Unisys B

MILPITAS, Calif.—Zitel Corp. improved "dramatically" the performance of its B1000 systems, tromechanical disk drives, with a disk system, "RAMdisk/SST Tower).

The second in Zitel's family of RAMdisk products, the new unit offers average access time from 40 ms less than one ms.

Priced from \$59,995 for a 32-Mbyte RAMdisk is available with receipt of order.

MIS Week's **PERIPHERAL EQUIPMENT SURVEY**
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LEVEL 1 - 3 OF 3 STORIES

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**CORPORATE
INFORMATION CENTER**

April, 1987

SECTION: NEW SOFTWARE; Pg. 260

LENGTH: 209 words

HEADLINE: Two for batching

BODY:

Netbatch and Netbatch Plus, from Tandem Computers Inc., offer batch processing for Tandem Nonstop machines.

Netbatch is a scheduler for batch jobs that gives computing managers and operators the ability to automate batch job execution on Tandem machines or across a network of Tandem machines. It keeps a log of batch activity and can schedule according to job priority, loading, and network configuration.

Netbatch is designed for transaction-processing users who need batch or sequential processing.

Netbatch Plus offers the features of Netbatch as well as a full-screen user interface. The package bundles Netbatch with DB Batch FE, a front-end menu-driven batch product from MIS Information Systems Inc.

The initial license fee for Netbatch is \$2,700. There is an additional \$200 monthly license fee for Nonstop VLX, TXP, and II systems and a \$1,350 initial license fee with a \$100 monthly license fee for Nonstop EXT, EXT10, and EXT25 systems.

The initial license fee for Netbatch Plus is \$3,700, with a \$340 monthly license fee for Nonstop VLX, TXP, and II systems. The Nonstop EXT has an initial license fee of \$1,850, with a \$170 monthly license fee.

Tandem Computers Inc., 19191 Vallco Parkway, Cupertino, Calif. 95014-2599

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