

# **TANDEM** *update*

**TANDEM**  
COMPUTERS

Vol. 88, No. 3

**NonStop VLX  
Wins Major  
Design Award**



- ☐ **SURVEYOR**  
*Improves Resource  
Management*
- ☐ **International Stock  
Exchange Trading  
System**
- ☐ **Amherst Group  
Grows With OLTP**
- ☐ **OLTP Cuts  
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- ☐ **Tandem Quality  
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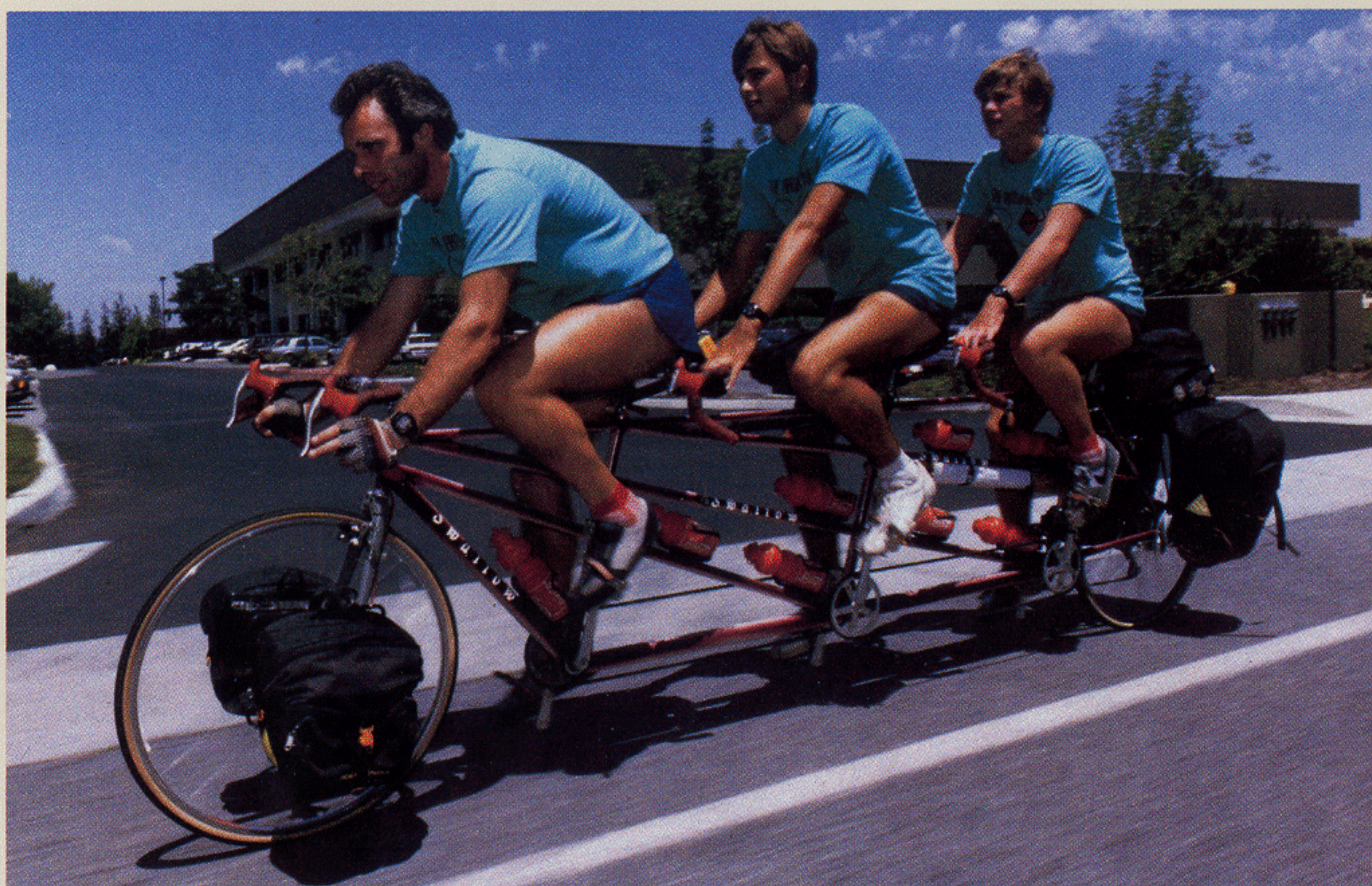
## On the cover:

*The award-winning NonStop VLX mainframe system is designed for high-volume on-line transaction processing. It combines the benefits of VLSI technology and Tandem architecture to provide high performance, high reliability, and lower service costs.*

The Tandem UPDATE is a magazine published quarterly by the Corporate Public Relations Department of Tandem Computers Incorporated for its customers and prospective users.

## Editor's Note:

### The British Are Coming!



*To promote better communication between international offices, Tandem sponsored three British Army members, Major John Gamlin, Karl Wilcox, and David Clark, in a 5,000-mile trek across the United States on a triple-tandem bicycle.*

Tandem corporate headquarters strives to work closely with its worldwide offices and subsidiaries. Sometimes, an interoffice visit becomes an opportunity to promote even better communication and understanding among distant locales. One such opportunity came when Tandem offices in the U.K. and U.S. co-sponsored a cross-country cycling trip.

Maj. John Gamlin and two junior members of the British Army traveled an eventful 5,000 miles across the United States on a triple-tandem bicycle. Gamlin, 31, Karl Wilcox, 18, and David Clark, 17, left New York on April 8, and arrived at Tandem headquarters in Cupertino, California, on Friday, June 24.

Gamlin has led expeditions through the jungles of Indonesia and the Atlas mountains in North Africa. Last year, he led a nine-man team on a cycling trip through the Himalayas to Nepal and Tibet. This trip, as with past expeditions, was accomplished without a support van, fulfilling the requirements of British Army duty.

"With a triple-tandem bicycle, it's easier and faster than on single bikes," said Gamlin. "If one of us gets tired or ill, the other two can continue with him so we do not lose any time." This basic principle of fault tolerance is inherent in Tandem NonStop systems.

Along the way, Gamlin brought some British good cheer, stopping at eight Tandem offices across the nation.

Beyond gaining media attention, the cyclists brought Tandem U.K. and U.S. employees a lot closer together. □

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# NonStop VLX Wins Major West German Design Award

*The NonStop VLX mainframe computer system won the 1988 design innovation award from Haus Industrieform in Essen, West Germany. It is the first mainframe to win this award.*

Tandem announced that its NonStop VLX transaction processing mainframe won the respected "Design-Innovationen '88" award from the Haus Industrieform in Essen, West Germany. The Haus Industrieform is a non-profit organization that is dedicated to increasing the use of good design principles. The VLX is the first mainframe system to be selected for this award.

The NonStop VLX system is designed for high-volume, continuously available processing of business transactions, known as on-line transaction processing (OLTP). The VLX is used by companies in a wide variety of industries, including finance, telecommunications, manufacturing, and retail.

The VLX was selected for the award by an independent jury of internationally recognized designers. The award is

well-recognized in Europe and includes a label that can be displayed on the product and a plaque. As part of the award, the NonStop VLX will become part of the permanent design exhibition of Haus Industrieform for one year. The exhibition will be seen by about 20,000 people in the coming year.

Award winning products are selected for design style, harmony, and ergonomics. According to Professor Stefan Lengyel, president of the Association of German Industrial Designers, "The NonStop VLX won the award for its highly functional, yet simple and elegant design. The VLX is a good combination of high technology, sensitive and sensible form. The fine details of the VLX show able lines that are not at all trendy, but are as modern as today."

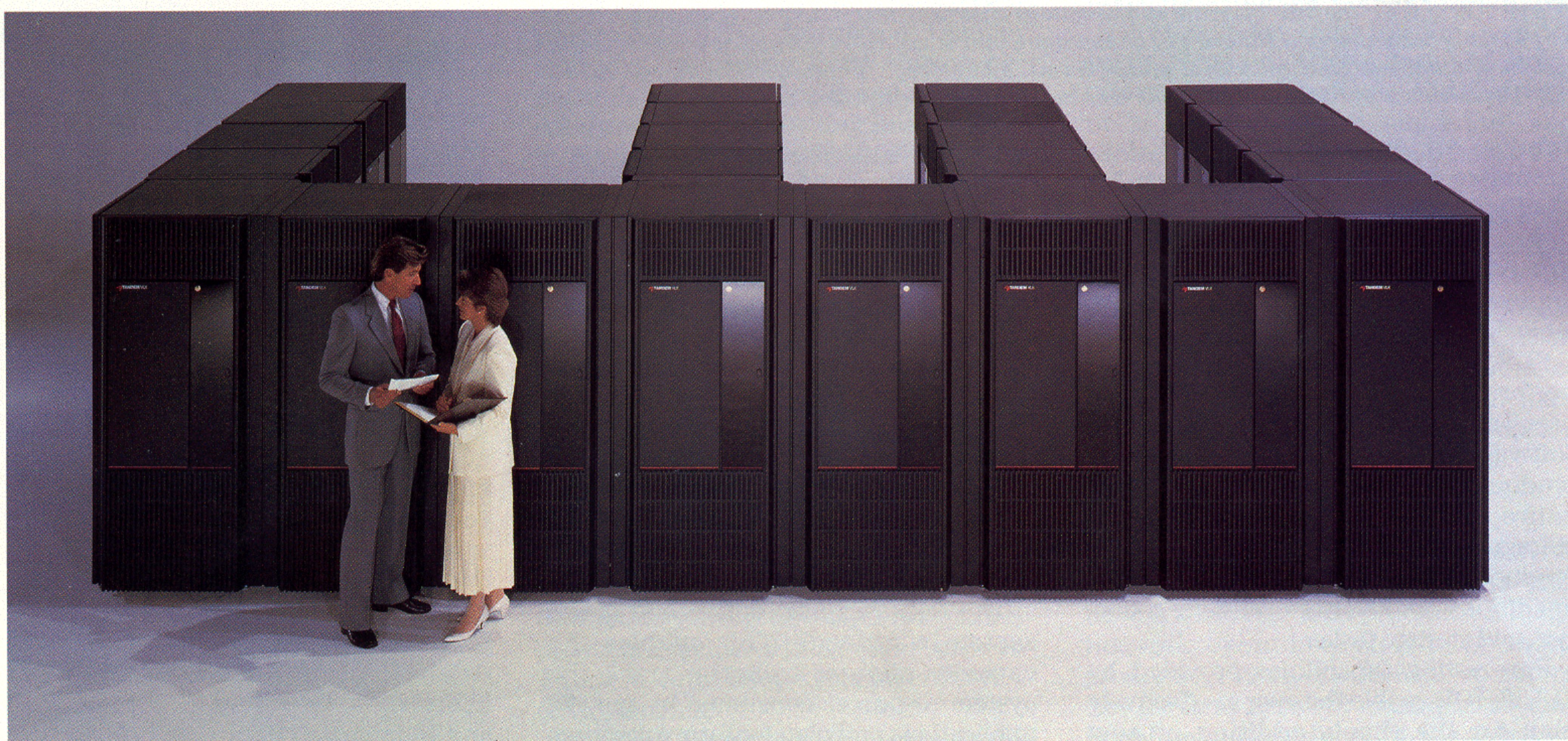
Tandem products have been consistent design winners for many years. Earlier in 1988, the NonStop CLX systems for offices and departments, PSX workstations, and V80 Disk Storage Facility won the prestigious West German Hannover Fair "Good Industrial Design" award. In 1987, the NonStop VLX won the Hannover Fair award, and it

received the "Good Design Prize for Foreign Products" from the Japanese Ministry of International Trade and Industry (MITI).

The award-winning design of the NonStop VLX is the result of teamwork between the Industrial Design and Mechanical Engineering groups at Tandem. □



*Stefan Lengyel, president of the Association of German Industrial Designers, stated, "The VLX won the Haus Industrieform award for its highly functional, yet simple and elegant design."*

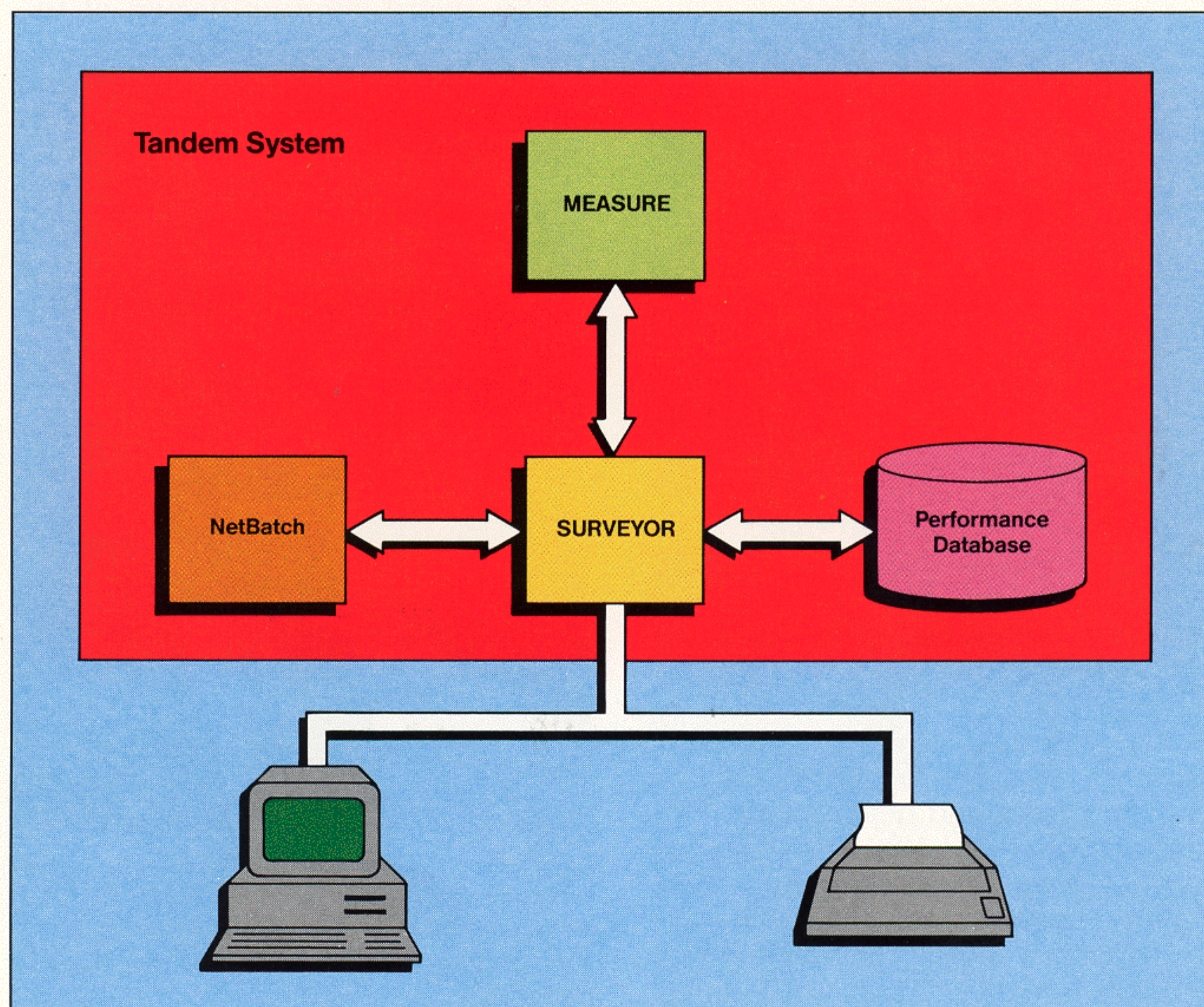


*This large NonStop VLX configuration can contain up to 16 processors working as a single system and can process over 100 transactions per second. It is used by a wide variety of industries, including finance, telecommunications, manufacturing, and retail.*



## SURVEYOR Improves System Resource Management

*Based on NonStop SQL, SURVEYOR manages system performance data and assists in capacity planning to lower operation costs.*



*SURVEYOR enables the user to create and maintain a performance database. It uses MEASURE performance measurement software to collect data, and it uses the NetBatch job management system to automate data collection, management, and storage. With SURVEYOR, operations staff can spend their time analyzing information, rather than collecting and managing it.*

Tandem announced SURVEYOR performance management software for NonStop systems. SURVEYOR manages system performance data and assists in capacity planning. This product helps improve system resource management, while lowering operation costs.

SURVEYOR manages the storage of performance information. SURVEYOR uses Tandem performance measurement software and other Tandem software products to simplify and automate the entire process of data collection and storage. Automated operations improve productivity, minimizing the demand on operations staff to perform data collection and storage tasks.

Forecasting capabilities provided by SURVEYOR enable the user to effectively plan for the timely addition of new system resources. Forecasting allows the user to predict future workload levels

and resource usage.

Based on NonStop SQL, Tandem relational database management software, SURVEYOR provides the flexibility and ease-of-use of a relational database.

### Information Evaluation and Usage

Information reduction and summarization features provided by SURVEYOR organize performance data into useful statistics. Data summarization allows the user to better view long term trends by computing user defined summaries, such as the average processor utilization on a daily, weekly, or monthly basis.

The user can also define and group system workloads. This enables the capacity planner to better track the system resources consumed by specific applications and plan for future resource needs.

SURVEYOR provides easy access to

## 5512 Serial Matrix Printer Designed For Distributed Applications

*The versatile 5512 provides multiuser environments with cost-effective printing for applications requiring efficient paper handling, print variety, ease of use, and letter quality output.*

Tandem expanded its printer line with the introduction of the 5512, a 400-character-per-second (CPS), PCL-compatible, heavy-duty serial impact printer for use with all NonStop and LXN systems.

Printer Control Language (PCL) compatibility in the 5512 allows the user to run an application to any system printer in the Tandem product family, and achieve the same results, without modifying application software.

Distributed systems enable Tandem users to have processing power closer to where the work is done. Whether these systems are located at headquarters, on the shop floor, in a warehouse, or in an office, durable, high-volume print performance is needed.

The printer uses a 24-wire dual-column head for high-speed performance

performance data through preformatted performance reports. These reports simplify performance data retrieval. Exception reports are provided to simplify the identification and monitoring of potential performance problems. Reports can be generated on command or scheduled to run at a more convenient time.

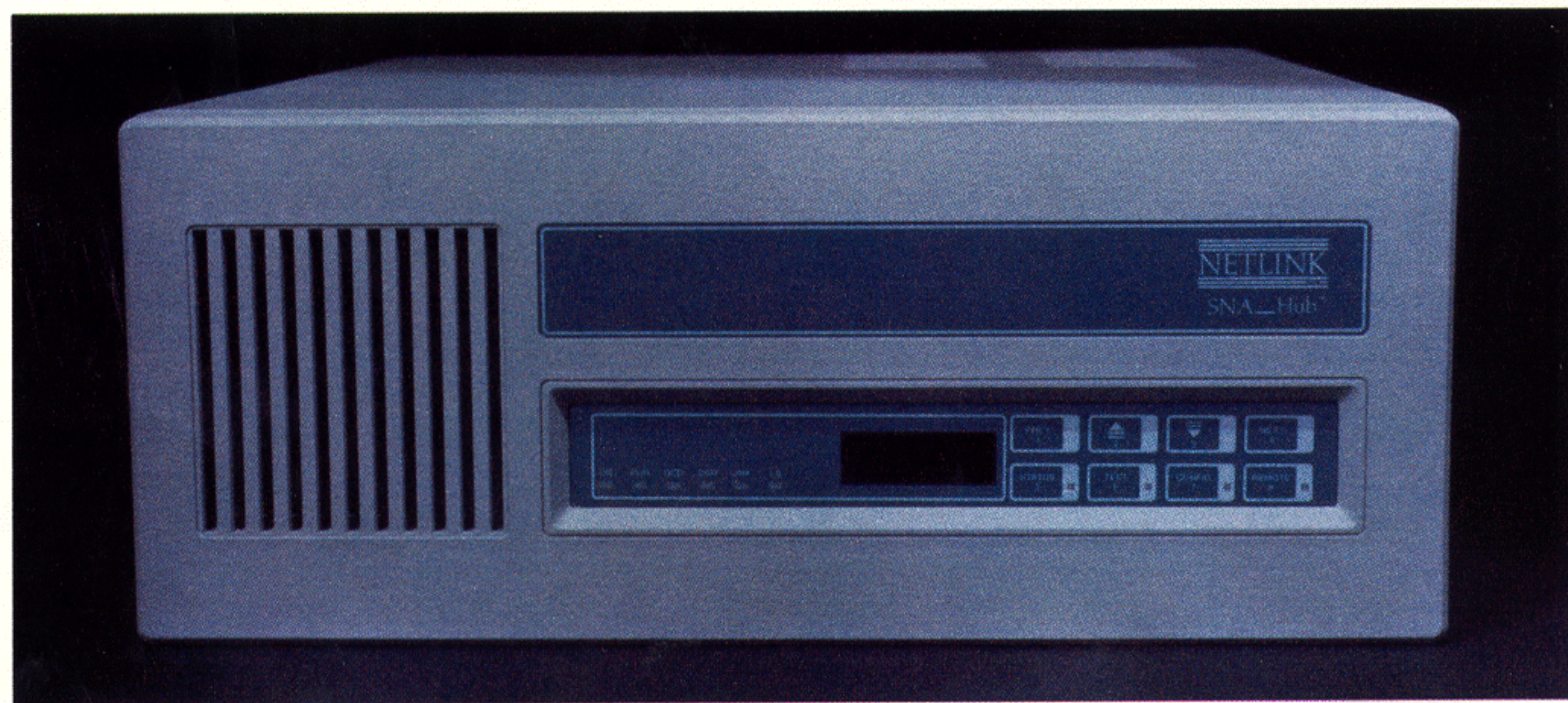
SURVEYOR adapts to a variety of customer environments. Only data appropriate to the user's specific environment needs to be stored in the system. This can be done by selecting the desired collection, storage, workload, and summarization parameters. In addition, users can control the size of a database without discarding valuable information, by archiving both detailed and summarized data to tape.

SURVEYOR will be available in the third calendar quarter 1988. □



## Netlink SNA Hub Integrates Tandem and IBM SNA Networks

*The SNA\_Hub lets SNA users take advantage of the on-line transaction processing strengths of Tandem systems, while protecting investments in IBM SNA networks and applications.*



*The SNA\_Hub provides Tandem system users with communication networking management functions. It eliminates the need for a separate Tandem network to support downstream synchronous data link control (SDLC) devices.*

Tandem has agreed with Netlink, Inc., to resell Netlink's SNA\_Hub to Tandem system users. The agreement strengthens Tandem's line of products for connecting its NonStop systems with IBM Systems Network Architecture (SNA) networks.

The SNA\_Hub lets SNA users take advantage of the on-line transaction processing (OLTP) strengths of Tandem systems, including fault tolerance, expandability, and distributed relational database, while protecting investments in SNA networks and applications. The SNA\_Hub operates with standard IBM communications and network management products, a major benefit to users with large networks of SNA devices.

Netlink has an excellent reputation as a provider of SNA connectivity products. The decision to market Netlink's SNA\_Hub underscores Tandem's ongoing commitment to provide innovative solutions for SNA networking.

In July 1987, Tandem announced it had purchased an equity interest in Netlink, a privately-held company. Tandem also said it had agreed with Netlink to jointly develop and market products to enhance integration between Tandem and IBM systems in SNA environments.

Rowland Thomas, Netlink chief executive officer, stated, "Today's announcement is the first in an ongoing product

relationship between Tandem and Netlink. The unique design of the SNA\_Hub, which can be easily integrated into SNA networks, will let SNA users quickly and efficiently add Tandem OLTP applications."

Designed and built by Netlink, the SNA\_Hub concentrates communications lines running from SNA terminals to host systems, reducing the need for costly communications lines and front-end processors. The SNA\_Hub supports up to 16 direct, leased, multi-drop, and dial-up SNA/SDLC lines. Maximum line speed supported is 64 Kbps.

The SNA\_Hub can also dynamically route communications from SNA terminals to different host computers, so devices easily can access Tandem OLTP applications or SNA host applications on demand. Because a single network of terminals can communicate with multiple hosts and applications, expensive parallel networks are not required.

### Network Management

Because the SNA\_Hub operates with standard IBM communications and network management products, it helps network operations staff to be more productive. Network control operators can perform network management and problem determination for devices attached to the SNA\_Hub using software products from IBM and Netlink.

*(Continued)*

with graphics resolution of up to 360 x 360 dots per inch, producing crisp, clear dot matrix output. The 5512 has three standard print modes: letter quality, draft, and high-speed draft.

The print rate in letter quality and draft mode is up to 160 CPS and 400 CPS respectively. In high-speed draft, the print rate is 480 CPS. The 5512 supports print volumes up to 14,000 pages per month.

Two resident fonts are supported on the 5512: Gothic and Courier. Both are available in 10, 12, 15, 17.1, or 20 pitch. True subscript and superscript are also standard features. Two font cartridge slots on the 5512 accept a choice of 10 optional font cartridges.

A 24-digit liquid crystal display (LCD) provides status information such as font style, and conditions such as paper-out and ribbon-out. The display also indicates operating modes.

The 5512 includes two paper handling features: a continuous-forms load and unload feature, which performs automatic paper alignment; and a demand-document feature, which allows a current page to be removed without advancing an additional form.

The printer supports RS-232C, current loop, and a Centronics parallel interface. The 5512 is available now. □



*The 5512 serial matrix printer enables the user to run an application to any system printer in the Tandem product family, and achieve the same results, without modifying application software.*



### SNA\_Hub Components

Components include an Intel central processing unit with one megabyte of random-access memory (RAM), and a front-panel keyboard and display for local control. Each SNA\_Hub has slots for eight intelligent port cards to link upstream hosts and downstream devices.

Two types of intelligent port cards are available. An RS-232C/V.24 card provides two SDLC communications ports for direct, dial-up, or leased line transmission at speeds up to 19.2 Kbps each. A V.35 card provides a single SDLC communication port for transmission up to 64 Kbps. Each port card has an 80188

microprocessor and 256 Kb of RAM. Any combination of these two port cards can be used. Software components include SNA\_Hub-resident software for run-time support, local control, and diagnostics; an IBM host-resident Network Support Program (NSP) developed by Netlink for dynamically configuring and loading the SNA\_Hub; and a program that assists the network operator in configuring the SNA\_Hub.

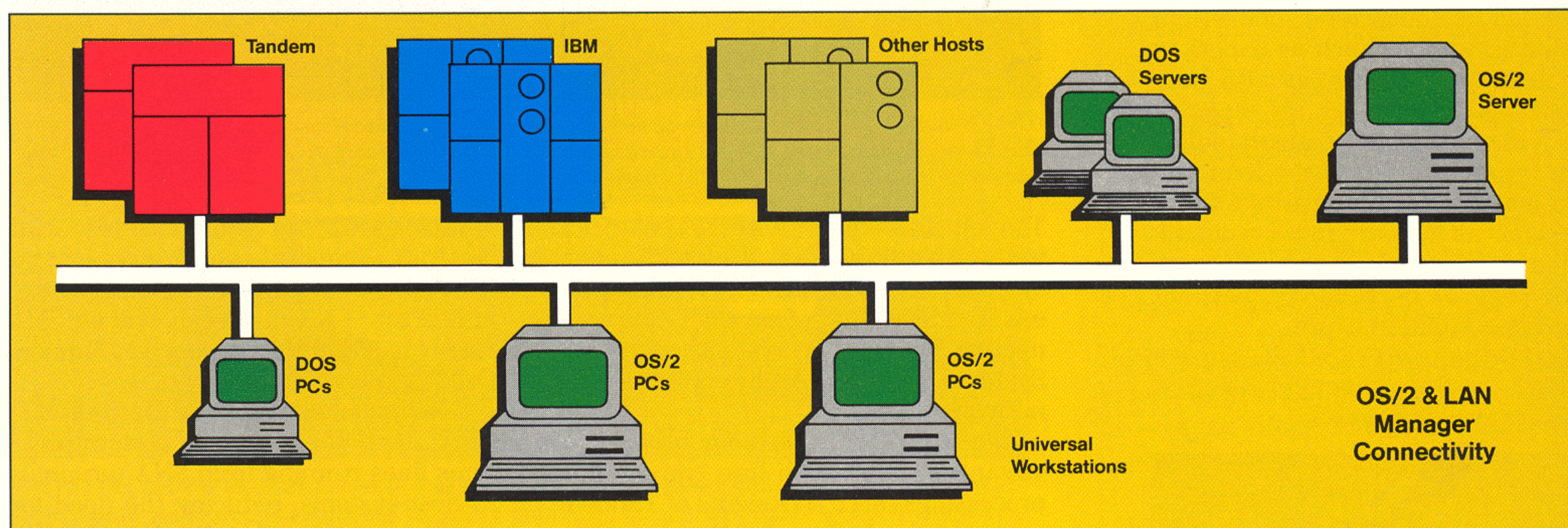
### Other Tandem Products For SNA Connectivity

The SNA\_Hub is the latest in a series of SNA connectivity products offered by Tandem. SNAX, Tandem's SNA access

services software, has provided connectivity between Tandem systems and IBM systems since 1983. In 1987, Tandem announced SNAXLINK, a direct channel-attach unit for linking Tandem and IBM systems running SNA protocols. The SNA\_Hub is available now.

Netlink, Inc., develops communications hardware and software products for enhanced SNA connectivity. Netlink networking products have been used in IBM SNA networks since 1982. Internationally, the company markets through offices in Sydney, Australia, and London, England. Company headquarters are at 3214 Spring Forest Road, Raleigh, North Carolina 27604, (919) 878-8612. □

## Tandem, Ungermann-Bass Unveil OS/2, LAN Manager Plans



OS/2 is the operating system for IBM's PS/2 personal computer and compatible workstations. Microsoft's LAN Manager provides network operating system and file services on top of OS/2. Tandem systems and Ungermann-Bass LANs will connect to both.

***Tandem and Ungermann-Bass are connecting diverse computing devices through open standards. OS/2 and LAN Manager are platforms that allow users to make full use of desktop resources in OLTP applications.***

Tandem announced plans to provide and support OS/2 and LAN Manager, the availability of PC6530 terminal emulation and file transfer software for OS/2-based workstations, and MULTILAN support for OS/2 and LAN Manager. Ungermann-Bass, Inc., a subsidiary of Tandem and one of Tandem's five operating groups, announced an OEM licensing agreement with Microsoft Corporation for LAN Manager and its intent to extend its product capabilities to an OS/2 base.

Both Tandem and Ungermann-Bass

are connecting diverse computing devices through open standards. Mutual support of OS/2 and LAN Manager lets both companies provide a platform for a variety of applications that users are starting to employ. OS/2 and LAN Manager are platforms that allow users to make full use of desktop resources in on-line transaction processing applications.

OS/2 was developed jointly by Microsoft and IBM as a next generation operating system for IBM and IBM-compatible workstations. It is becoming widely accepted as an industry standard. Microsoft's LAN Manager provides network operating system and file services on top of OS/2.

In addition to supporting PC software on an OS/2 base, Tandem and Ungermann-Bass will continue to support MS-DOS workstations and industry-standard NETBIOS protocols in both

DOS and OS/2-based local area networks. Tandem's MULTILAN product, which enables a variety of PC-based local area networks to connect to Tandem NonStop systems, will allow connection of OS/2-based workstations.

PC6530 terminal emulation and file transfer software, OS/2 on Tandem PSX and 6AX workstations, and MULTILAN support of OS/2-based personal computer networks will be available in the third calendar quarter of 1988. Certification of local area networks supported by MULTILAN will begin in the fourth calendar quarter of 1988. Ungermann-Bass's LAN Manager will be available in the fourth calendar quarter of 1988.

Ungermann-Bass manufactures and markets enterprise-wide data communications products. Headquarters are located at 3900 Freedom Circle, Santa Clara, California 95054, (408) 496-0111. □



# Tandem Welcomes New Customers

*New customers are using Tandem computers for on-line stock trading, an integrated hospital information system, an inventory and distribution system, and an on-line customer service system.*

## Methodist Hospital Implements Integrated Information System

Methodist Hospital of St. Louis Park, Minnesota, purchased a Tandem NonStop VLX system with LASTWORD health care software from PHAMIS, Inc., to automate critical functions of the hospital's operation in an integrated information system.

The system will initially connect 230 terminals at nurses' stations and in other departments throughout the hospital to provide on-line medical information to doctors, nurses, and other health care professionals in the emergency room, pharmacy, laboratory, admitting, and radiology departments.

Departmental databases will be integrated by the system allowing patient records, charging, and inventory information to be updated by each department as services or changes occur. Health care professionals will be able to examine and update a patient's up-to-the-minute medical records electronically at any point during an admission or visit.

According to Jan DeMatteo, information services director at Methodist Hospital, the Tandem system was chosen for its continuous availability and modular expandability.

"Many areas of the hospital, including admitting, nurses' stations, and emergency services run 24-hours a day, requiring immediate access to patient records and other information," said DeMatteo. "In these areas batch processing or even a midnight system backup that takes our computer down for an hour is too much downtime for a hospital system."

The Tandem system also has the capability of connecting the hospital with physicians' offices and clinics throughout Methodist's service area for remote access to patient information.

"Another benefit is that with Tandem's modular design, we will be able to increase our power by adding processors, without buying a new computer or completely rewriting the software," DeMatteo said.

Methodist Hospital is a community health care provider known for high-quality, cost-effective services. Built in 1959, the 426-licensed-bed facility has 2,000 employees.

PHAMIS, Inc., develops application software for health care facilities to collect and maintain patient information for quick access and updating throughout a single or multiple site organization. PHAMIS, Inc., is a value added reseller (VAR) member of the Tandem Alliance, a program to encourage the development of application software that runs on Tandem systems. The company is located at 419 Second Avenue South, Seattle, Washington 98104, (206) 622-9558. □

## International Stock Exchange Installs On-Line Trading System

The International Stock Exchange in London installed a NonStop VLX mainframe to run its new international equities trading system. The new system, called SEQUAL, will be developed by Logica Ltd. Twenty-nine exchanges worldwide now have Tandem-based trading systems.

Bernard Reed, director of foreign equities markets at the Exchange stated, "SEQUAL will give us instant on-line matching and confirmation of all international trades made on the Exchange. It will be able to operate 24 hours a day, every day of the year. The Tandem-based solution was chosen above five others because it was the most cost-effective, and it had the capability to expand with the Exchange's business."

The SEQUAL system will be operational by the end of 1988. Both traders and institutions worldwide will have access to SEQUAL.

Logica Ltd. provides software for the finance and telecommunications industries and is a member of the Tandem Alliance. The company is headquartered at 64 Newman Street, London, W1A4SE England, 44-1-6379111. □



Methodist Hospital of St. Louis Park, Minnesota, automated critical hospital operation functions in an integrated information system using a NonStop VLX system with LASTWORD software from PHAMIS.



## Liquor Barn Installs On-Line Inventory, Distribution System

Liquor Barn Northern California, Inc., of San Leandro, California, purchased a Tandem NonStop EXT10 system with retail software from PBL Associates to implement an on-line inventory control, distribution, and financial system.

The Tandem/PBL system is the first computer system purchased for Liquor Barn by its new owner, Majestic Wine Corporation. When complete, the company's critical business applications, including accounting, purchasing, inventory, order processing, sales analysis, and store polling will run on the Tandem system.

According to C. Giles Clarke, chairman of Liquor Barn, the system will allow the company to keep track of its total inventory by individual item, and help pinpoint which products are selling.

"We carry more than 12,000 different products, including beer, wine, liquor, and grocery items in 100 stores, and it has been difficult to track inventory by specific item," said Clarke. "Having this information will help us better serve our customers."

Jim Hay, Liquor Barn director of MIS who selected the system, commented: "The Tandem/PBL system will enable us to reduce our excess inventory to better

control our costs and offer our customers the widest possible variety of products."

According to Hay, the system's price/performance and modular expandability were among the reasons for selecting Tandem.

"We didn't want the space commitment, maintenance, and cost of a large mainframe," said Hay. "In addition, Tandem's modular expandability is important because we expect our business to grow."

Majestic Wine Corporation is based in San Francisco, California. Liquor Barn

is a discount wine, beer, and liquor specialist with approximately 100 stores in California and Arizona. Previously owned by Safeway Stores, Inc., Liquor Barn has more than 1,200 employees.

PBL Associates, Inc., designs and manufactures distribution and accounting application software for on-line transaction processing on Tandem systems. PBL, a member of the Tandem Alliance, is located at Ten Cottage Ave., Point Richmond, California 94801, (415) 234-4338. □



*By using a NonStop EXT10 system and retail software from PBL Associates, Liquor Barn can reduce excess inventory to control costs and offer its customers the widest variety of products.*

## Greyhound Lines Installs On-Line Customer Service System

Greyhound Lines, Inc., Dallas, Texas, has installed two Tandem NonStop EXT25 systems and a Tandem CLX system to improve customer service. Application software is being developed by Baldwin, Hackett & Meeks. Greyhound is the nation's largest inter-city bus company.

According to Jerry Garten, senior director of telecommunications of Greyhound Lines, it can take up to four minutes to dispense scheduling information or compute fares using guidebooks and calculators. In addition, calculations done by hand are prone to error.

"A computer-supported call takes an average of 90 seconds," said Garten. "Our previous system could only support 64 percent of all phone inquiries, which meant one-third of our customers heard reps shuffling through books of schedules and using calculators to compute fares."

Greyhound's goal is for the Tandem system to support 90 percent of all calls received. Garten hopes to expand the Tandem system to include the capability

to process and authorize advance credit card purchases.

The EXT25 systems are located in Greyhound's Omaha, Nebraska, and Charlotte, North Carolina, telephone information centers, supporting a total of 394 terminals. They will be connected in a Tandem EXPAND network with the CLX system in Des Moines, which has been installed for development and system monitoring. Upon completion, the systems will link each center in a unified database, allowing a user to obtain or update information from any terminal.

According to Garten, increased power and modular expandability were the main reasons for selecting the Tandem systems.

"The ground transportation industry is discovering what competition is all about," said Garten. "We are competing with the airline industry to some degree, but about 85 percent of intercity travel is done in private automobiles. This new system will help us provide better service to our customers and help us to

compete for new business."

Greyhound Lines, Inc., is the nation's largest intercity bus company. The company carries passengers and freight with more than 3,700 busses serving a national network of approximately 12,000 communities in 48 states.

Baldwin, Hackett & Meeks is located at 11422 Miracle Hills Drive, Suite 306, Omaha, Nebraska 68154, (402) 496-2929. □



*The Tandem systems will allow Greyhound to provide customers with current information on bus schedules and fares in less than half the time it currently takes to handle many phone inquiries.*



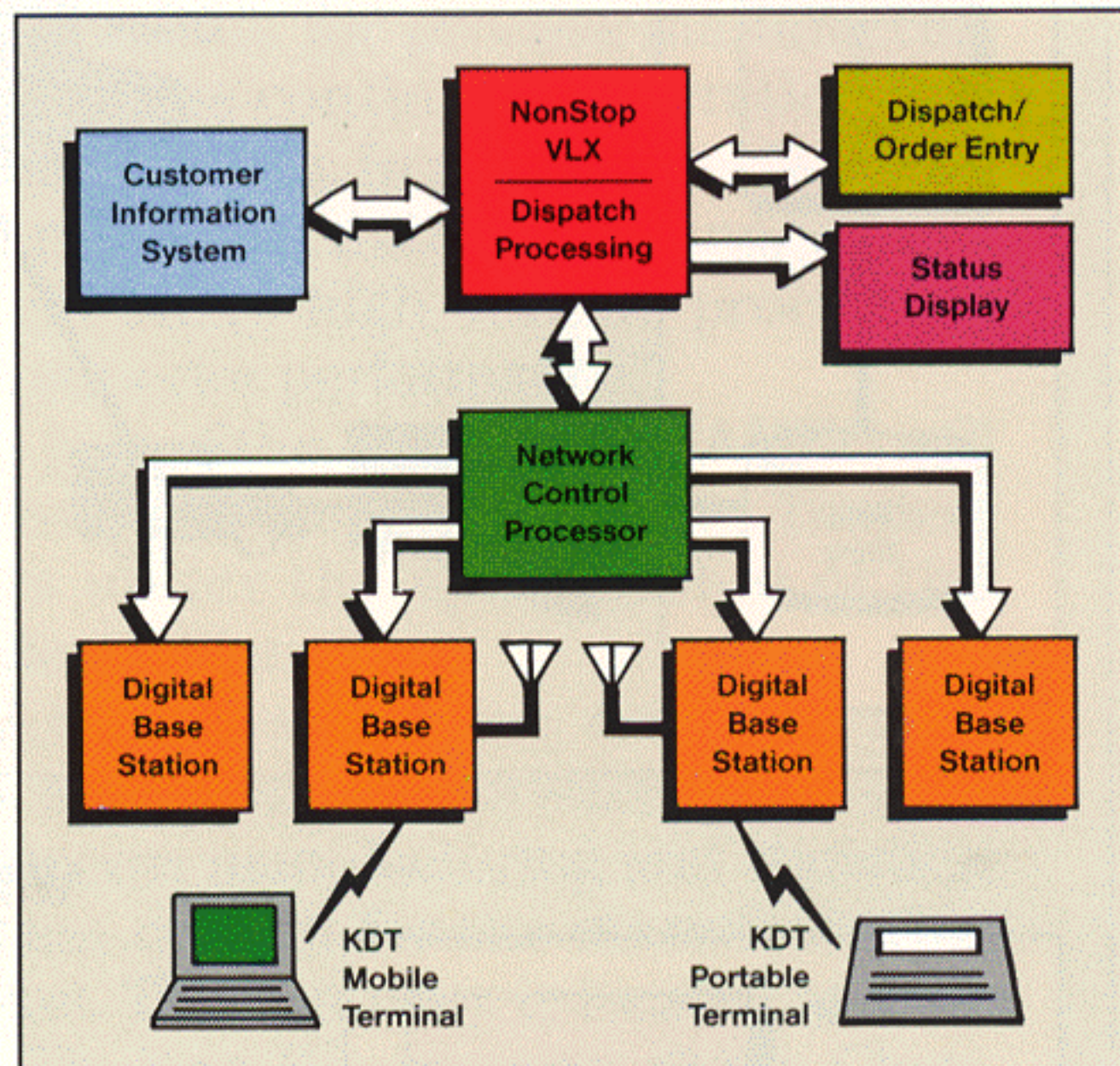
## Tandem And Motorola Offer Dispatch System

***Tandem signed an agreement with Motorola, Inc., to market NonStop computers as part of Motorola's data communications systems.***

Under the terms of an agreement between Tandem and Motorola, Inc., Motorola's Communications Sector, acting as a value-added reseller (VAR) under the sponsorship of the Tandem Alliance, will market the Resource Management System which includes Tandem NonStop systems and Motorola application products.

Resource Management is an automated dispatch system designed for the utility industry to control fleets of vehicles ranging in number from 50 to 1,000 or more units in both emergency and non-emergency situations. The product, which uses a Tandem NonStop system as its backbone, communicates with a dispatch center, field personnel, and the user's Customer Information System (CIS) computer.

According to Joe Rupe, vice president of Motorola's National Utility Market, "By taking advantage of Tandem's on-line transaction processing capabilities, the Resource Management System is continuously available. As soon as an order is entered into a database, an image flashes on a screen giving dispatchers complete information about the call and the customer's account.



*The Resource Management System from Motorola is an automated dispatch system. It enables the utility industry to control fleets of vehicles in both emergency and non-emergency situations.*

"At the same time, the system can actually recommend the exact vehicle to handle the job because it keeps track of the status of each vehicle and knows the capabilities of each service person," continued Rupe. "All details of the job can be transmitted in seconds via FM radio to the appropriate mobile or portable terminal."

Tandem is pleased to be working with Motorola, a leading contributor of portable and mobile data communications systems. This is an important VAR market for Tandem, and Motorola's Resource Management System offers a strong solution.

The Tandem Alliance is a third-party program to encourage application designers to develop solutions that run on Tandem NonStop systems.

Motorola, Inc., is one of the world's leading manufacturers of electronic equipment, systems, and components produced for worldwide markets. Products include two-way radios, pagers, cellular telephone systems, semiconductors, defense and aerospace electronics, automotive and industrial electronic equipment, data communications, and information processing and handling equipment. □

## General Data Systems To Provide New Insurance Software

***General Data Systems has agreed to provide NonStop systems users with point-of-service processing for rating and underwriting functions.***

General Data Systems (GDS), Ltd., signed an agreement with Tandem to jointly market insurance software to run on Tandem NonStop systems.

GDS RATER and UNDERWRITER software products are available for the property and casualty insurance market. GDS separates functions traditionally part of policy and management environments and distributes these functions to the district, regional, or agency level. According to GDS, by distributing these functions, business analysts can perform operations once done by programmers. This decreases costs and enables products to be brought to market quickly.

RATER is a software tool that automates the rate and maintenance of new and existing insurance products. UNDERWRITER is an artificial intelligence product that analyzes insurance

policy elements, simulating the thought processes of an experienced underwriter.

Robert Dolan, GDS insurance division senior vice president, said, "We look forward to working with Tandem because they are a focused provider of high-performance on-line transaction processing systems and because they provide cost-

***Robert Dolan, GDS insurance division senior vice president, said, "We look forward to working with Tandem because they are a focused provider of high-performance on-line transaction processing systems and because they provide cost-effective solutions that can expand as our customers' needs expand."***

effective solutions that can expand as our customers' needs expand."

Regional and agency level insurance needs increasingly are focusing on on-line services and highly available systems for applications. Tandem believes that by providing high-performance OLTP systems for rating and underwriting, it gains an opportunity to add value in the point-of-service area.

Under the terms of the agreement, GDS will market its software directly to Tandem NonStop system users under the sponsorship of the Tandem Alliance program. RATER is available now, and the UNDERWRITER software will be available by the end of calendar year 1988.

General Data Systems, Ltd., designs, develops, markets, and supports software products for business and professional use, specifically for the property and casualty industry. Company headquarters are located at 1520 Locust Street, Philadelphia, Pennsylvania 19102, (215) 985-1780. □



## EDI Software Available For NonStop Systems

*Electronic data interchange (EDI) is the computer-to-computer exchange of business documents and information. It can increase productivity, improve service, and reduce order lead time and labor cost.*

EDI is the exchange of business and strategic information prepared in standard electronic formats transmitted through dial-up and/or value-added networks. EDI is being implemented in industries such as manufacturing, transportation, retail, and others that have traditionally exchanged data using paper or telephone lines.

The EDI environment requires fault tolerance, extensive communications and networking capabilities, data integrity, and the ability to expand modularly to meet growing business needs. Tandem's fundamental strengths ideally match EDI environment needs, offering customers a unique opportunity to gain a competitive advantage.

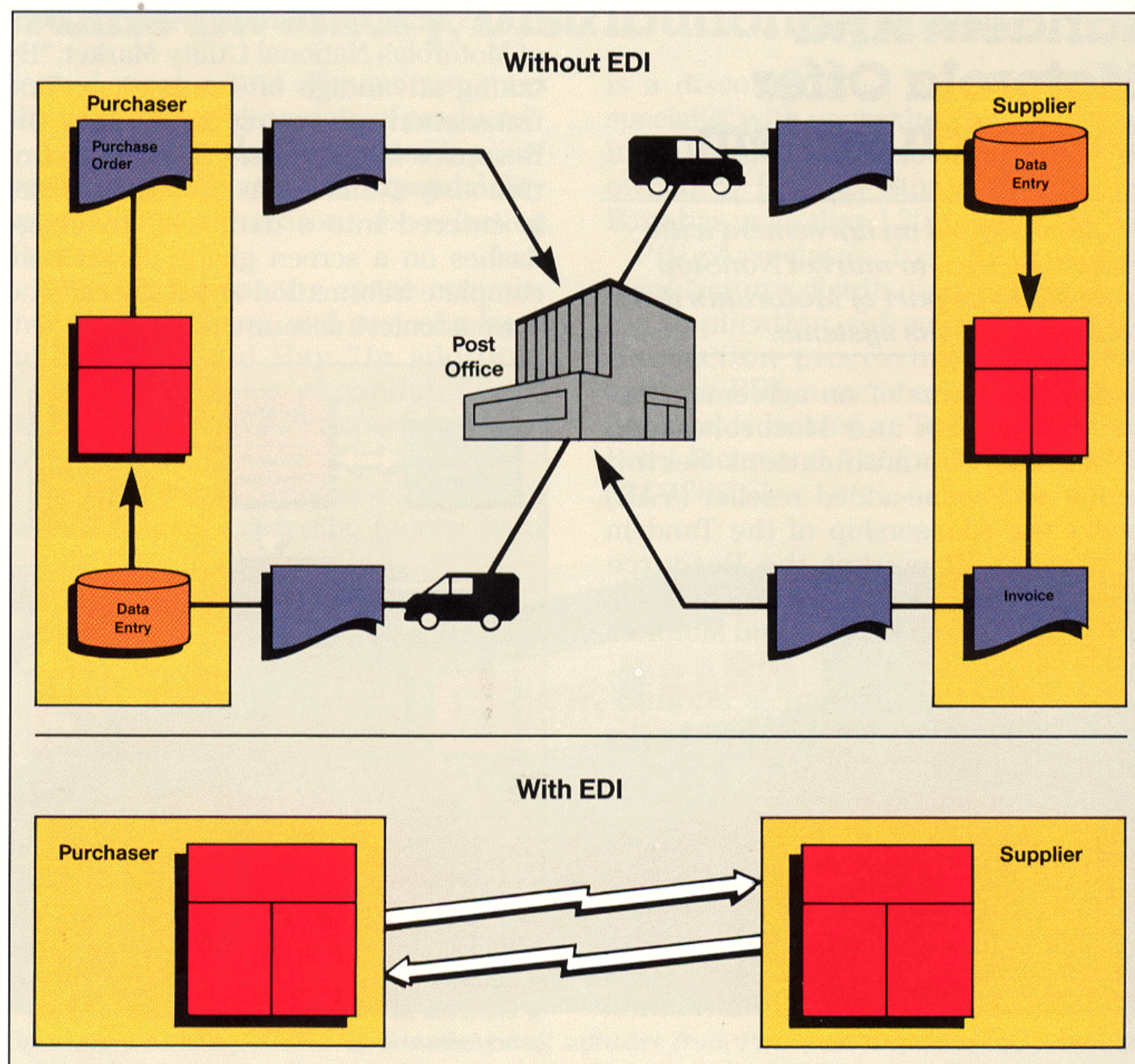
Two members of the Tandem Alliance, EDI, Inc., and TranSettlements, Inc., offer EDI solutions:

### EDI, Inc.

Tandem and EDI, Inc., will jointly market TELINK software that provides Tandem users with turnkey electronic data interchange (EDI) capability. Tandem communication tools are integrated into the TELINK system to provide efficient EDI throughput capabilities.

Each TELINK module is self-contained and can be modified or enhanced independently of the others. Functionality includes moving files to and from a host computer, EDI translation, mailbox services, utilities, audit trails, control files, and communications. TELINK supports American National Standards Institute (ANSI) X.12, Uniform Communication Standard (UCS), Warehouse Information Networking Standard (WINS), and Transport Data Coordinating Committee (TDCC) standards.

Tandem systems can easily connect to many types of computers and devices to deliver EDI data to trading partners, preserving a businesses' initial investment. The complete power of a Tandem system can be brought to bear on the translation



*EDI enables an organization to eliminate paperwork and paper transit time by electronically exchanging messages with customers, vendors, and others.*

problem in a totally transparent, on-demand manner. With the unique Tandem network operating system, worldwide virtual networks are feasible.

EDI, Inc., develops and markets electronic data interchange management software for cross-industry and international markets. The company is headquartered at 19630 Clubhouse Road, Gaithersburg, Maryland 20879, (301) 670-0811.

### TranSettlements, Inc.

Tandem and TranSettlements, Inc., agreed to jointly market TranSlate, an electronic data interchange (EDI) software product that runs on NonStop systems.

Under the terms of the agreement, TranSettlements will market TranSlate software directly to Tandem NonStop system users under the sponsorship of the Tandem Alliance program. TranSlate software facilitates company-to-company electronic exchange of business documents, such as purchase orders, shipment documents, and invoices.

TranSlate offers EDI solutions to organizations for translation between internal privately formatted data and EDI industry standard formats, such as ANSI X.12, TDCC, UCS, and WINS formats. The TranSlate software package supports many industry conventions including AIAG, EIDX, TCIF, and VICS.

These agreements will enable Tandem users in banking, retail, and manufacturing—wherever business document communication is required—to provide EDI-formatted transactions in an on-line environment.

Hank Lavery, president of TranSettlements, said, "Tandem systems are ideal for EDI software. They are designed to handle on-line transactions in a multi-vendor environment. The NonStop architecture will provide added advantages to EDI services, including ease of networking and continuous availability."

TranSettlements, Inc., is an active participant in EDI standards setting industry groups, including ANSI and the TDCC. Company headquarters are located at 1745 Phoenix Boulevard, Atlanta, Georgia 30349, (404) 996-8109. □



## Cameo Systems To Offer Lot<sup>®</sup> Process Manufacturing Software

*The first solutions that CAMEO will develop for Tandem systems will provide lot processing control for biotechnology manufacturing.*

Tandem signed an agreement with CAMEO Systems, Inc., to jointly market lot process manufacturing software applications designed to run on Tandem NonStop systems.

Lot process control is used for the scheduling and tracking of production lots in the manufacturing of food, drugs, semiconductors, petrochemicals, and primary metals. CAMEO Systems develops application software for lot processing in the semiconductor and biotechnology manufacturing industries.

CAMEO's first development efforts for Tandem systems will focus on software solutions for biotechnology manufacturing, one of the fastest growing segments within the process industries. This

agreement will help position Tandem and CAMEO as leaders in the emerging biotechnology market.

Jim Swan, president of CAMEO Systems, said, "Tandem's on-line transaction processing architecture meets all the requirements for process manufacturing. It offers continuous operation and modular growth. In addition, its NonStop SQL relational database management system offers high volume processing with superior performance."

As part of the agreement, CAMEO will market its software directly to Tandem users under the sponsorship of the Tandem Alliance.

CAMEO Systems, Inc. develops, markets, and supports software systems for lot process manufacturing and statistical process control for the manufacturing market. The company is located at 2880 San Thomas Expressway, Santa Clara, California 95051, (408) 986-9200. □

## International Tandem Users' Group Informs Customers

The International Tandem Users' Group (ITUG), established 1978, is a non-profit international organization serving over 2,000 users of Tandem systems and services in more than 25 countries. The primary objective of the group is to advance the effective utilization of Tandem computers by promoting the free exchange of information concerning the use of Tandem systems. It is the only organization that solely addresses the concerns of Tandem users.

Through ITUG, members learn about Tandem's products and have an opportunity to share approaches and solutions to both applications and technical issues.

ITUG has established national, regional, and local users' groups to enable customers to share information among themselves and with Tandem.

ITUG provides technical information through its bimonthly international publication, the Tandem Users' Journal, and two international conferences each year.

### ITUG Teleconference, September 9

ITUG, in cooperation with Tandem, will host a teleconference on "Disaster Recovery." It will be aired on September 9, 1988, from 10:00 a.m.-12:00 noon Pacific Daylight Time.

The purpose of this teleconference is to share information on planning for disaster recovery. It will present suggestions on how a customer can implement a plan unassisted, and how this service can be purchased from vendors. Speakers will include a Tandem customer engineer and software expert, Bell Operating Company representatives, an insurance agent speaking on risk analysis, and disaster recovery service vendors.

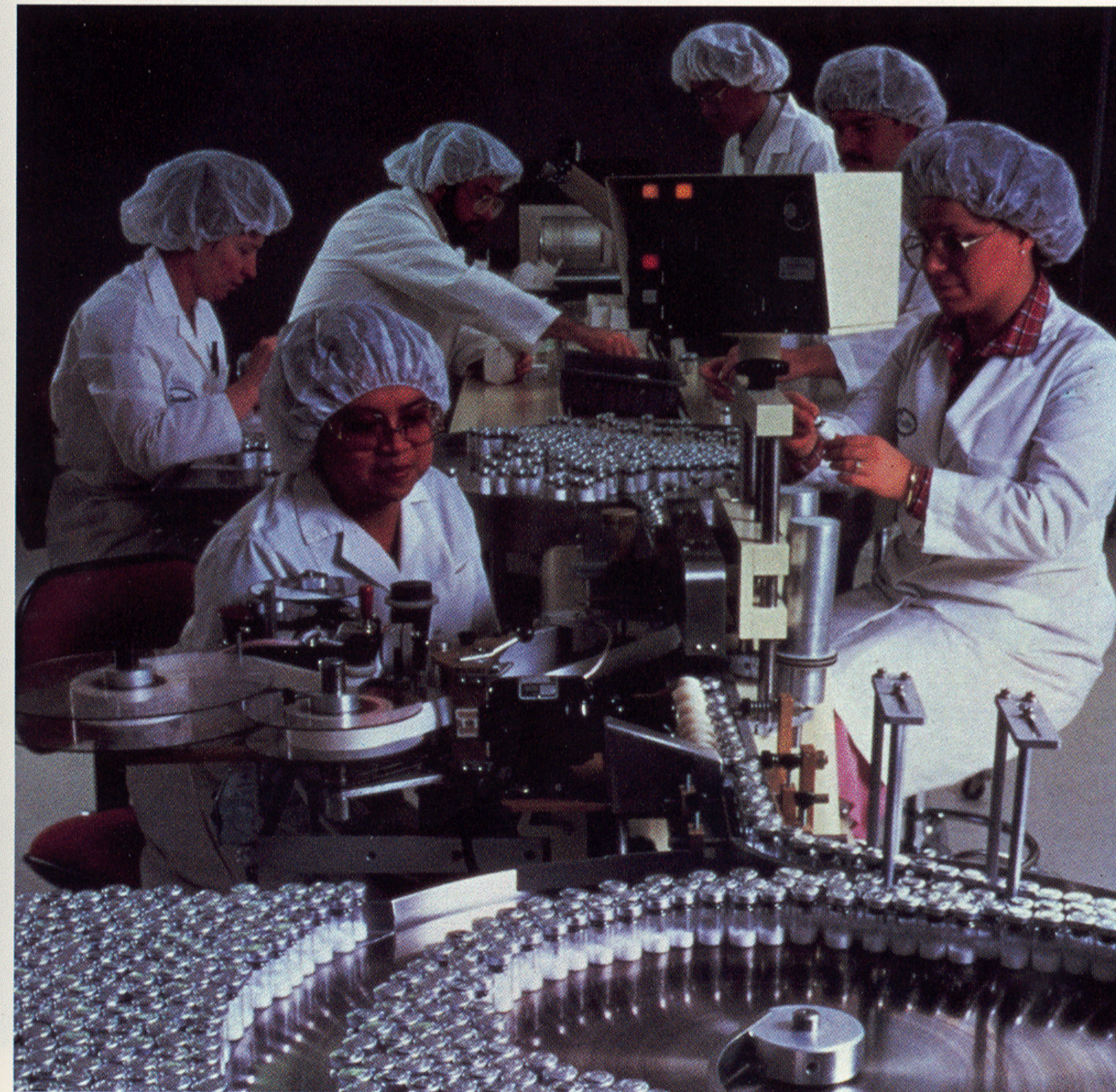
All Tandem customers are invited.

### Fall ITUG Conference in California

ITUG will hold its 1988 Fall Conference on October 16-20 at the Sheraton Harbor Island in San Diego, California.

The Conference features product sessions, workshops, a question and answer session with Tandem, as well as offering a "trade show" display from compatible software and hardware vendors.

Contact ITUG headquarters, 111 East Wacker Drive, Suite 600, Chicago, Illinois 60601, (312) 644-6610. □



*Lot process control is used for the scheduling and tracking of production lots in the manufacture of food, semiconductors, primary metals, petrochemicals, and drugs.*



# New England POS Service Provider Supports High Growth With OLTP

*A NonStop VLX system enables the Amherst Group to provide continuous retail POS services to more than 110 bank/merchant programs and makes network expansion easy and cost-effective.*

The Amherst Group Inc. (AGI) of Cambridge, Massachusetts, and North Hampton, New Hampshire, has grown since its inception in 1982 to become a leading provider of point-of-sale (POS) network services in the Northeast.

Last year alone, the company increased sales by more than 50 percent, and currently provides retail POS services to more than 110 bank/merchant programs through a network of more than 10,000 on-line terminals. To support its rapidly expanding operations, the six-year old firm installed a Tandem on-line transaction processing system with Total Payment System software from LeRoux, Pitts & Associates of Clearwater, Florida.

"AGI has developed the only fully supported authorization and draft capture network in the New England area, with services that range from installing merchant terminals, sales call support and on-site merchant training, to providing a merchant profitability analysis model for helping banks identify candidates for electronic authorization. AGI also offers an extended hours 'help desk' that users can call for answers to terminal or system related problems," said Charles W. Shields, executive vice president and chief operating officer at AGI.

"The firm was launched with a strong commitment to supply customers with the most advanced, cost-effective applications possible. The Tandem computer system has been critical to our success by providing around-the-clock network availability and a ready pathway for continued growth."

AGI's network now generates in excess of 2 million transactions monthly. It authorizes all major credit cards, including MasterCard, Visa, American Express, Discover, Carte Blanche, and Diners Club. It supports electronic draft capture, as well as three of the nation's largest check guarantee services: Telecredit, Telecheck, and J.B.S. Available anywhere in the U.S. 24 hours a day, utilizing

local nodes, packet switched networks, leased lines, or WATS, AGI-Net also supports the most extensive local line telecommunications network of its kind in New England, processing all dial transactions directly through the computer system.

"POS automation is a dynamic growth area," said Ted Keith, AGI's president and chief executive officer. "By providing banks and merchants with excellent speed, system reliability, and the most convenient way possible to process transactions, we expect to remain at the forefront of this industry."

## High Availability

AGI ensures constant system availability by running its POS services on a NonStop VLX transaction processing mainframe.

According to Shields, AGI selected the Tandem equipment based on its fault-tolerant architecture, modular expandability, flexibility, and availability of POS application software.

"We cannot afford any computer downtime in our business, and the NonStop system continuous availability eliminates this problem," Shields said. "The system also provides the flexibility to improve our billing and reporting procedures, and will allow us to expand capacity by simply adding processors and disk memory without any reprogramming."

***AGI determined that the Tandem/LeRoux, Pitts & Associates POS solution is the most cost-effective and meets AGI's future needs.***

"Another important consideration was the availability of the Total Payment System software package," Shields continued. "We approached four major hardware vendors and asked them to suggest software houses that could meet our

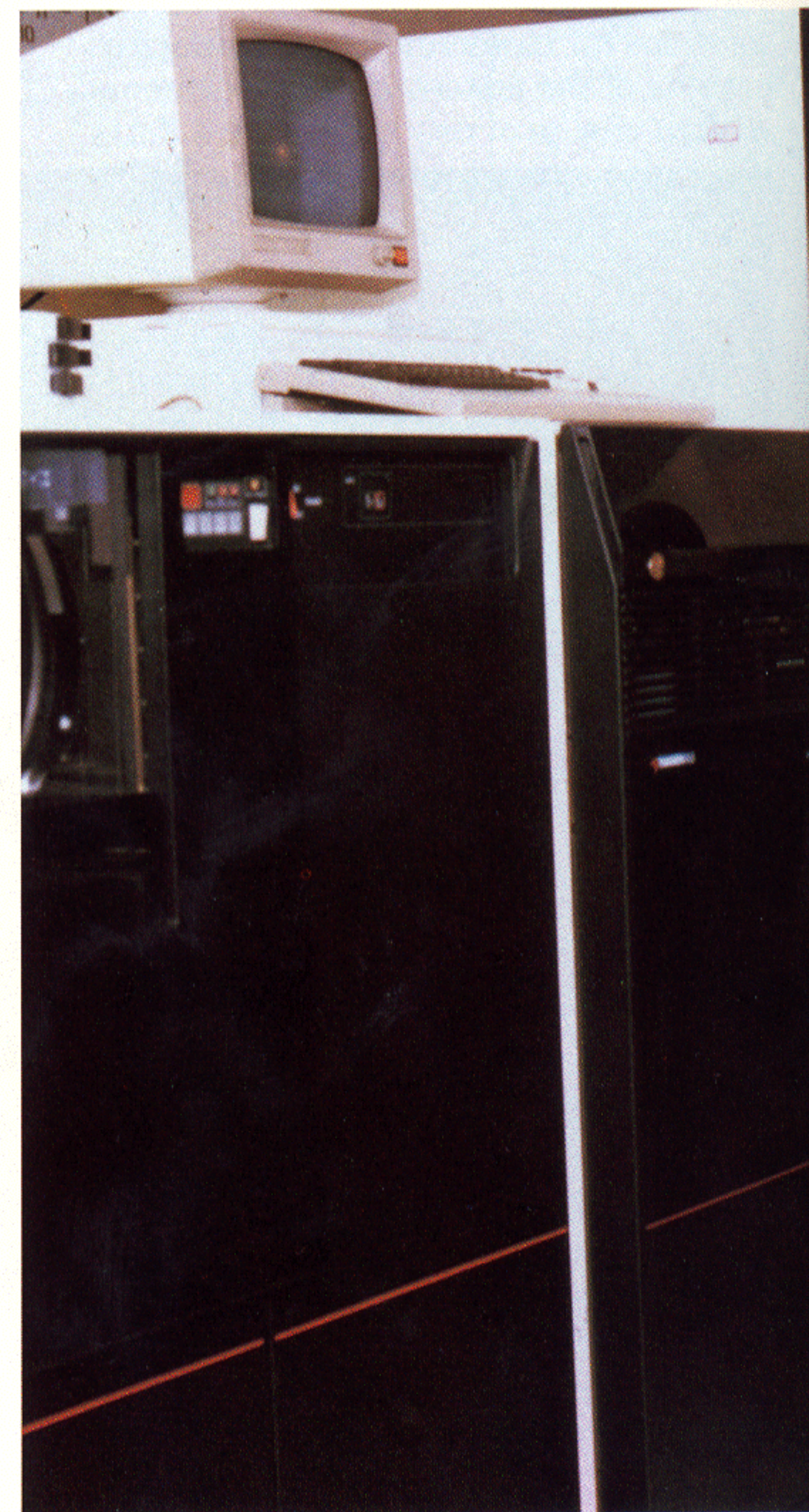
needs. The Tandem/LeRoux, Pitts & Associates combination was not only the most cost-effective, it also offered the best overall solution for the future."

Initially, AGI installed a NonStop EXT computer in May 1986, but decided to upgrade to a NonStop VLX when business climbed dramatically.

"Our projections for continued business growth and new opportunities clearly showed we needed a large increase in system capacity," Keith said. "The transition went very smoothly with no significant problems, and the VLX has been up and running since June 1987."

## A New Independence

In the past, AGI relied on service pro-





viders such as First Data Resources (FDR) to route transactions to credit card and check guarantee companies for authorization. Keith pointed out that bringing this capability in-house has helped make the firm more independent.

"We previously were tied into a single vendor for support, but having our own system has driven costs down and provided the flexibility to establish direct links with Visa and Discover," Keith explained. "Although FDR still handles settlement and interchange processing for us, we are no longer dependent on just one link, contributing further to our improved network service reliability."

In addition, Keith credits the company's growing success to dedicated management and support personnel, ongoing pursuit of new products, and AGI's strong reputation for quality service and superior support among banking institutions. For example, the firm recently introduced AGI Data Capture, a

TMP certified product that provides both credit and debit card data capture.

"The software improves accuracy and efficiency at the point of sale, as well as enhanced audit trail, reconciliation, and reporting efficiencies," noted Keith, who has accrued 35 years of senior management experience in commercial, thrift, and mortgage banking. "It also offers a funds transfer capability by electronically disbursing automated clearing house credits into merchant DDA accounts."

### **Toward a Fast-Paced Future**

Noting that the use of data communications in financial transactions has just begun, Keith forecasted that several important areas will grow in the future, including the use of debit cards, automated clearing house transactions, and corporate-to-corporate payments and information transfers.

"The entire world of information and financial transaction transfer is in its



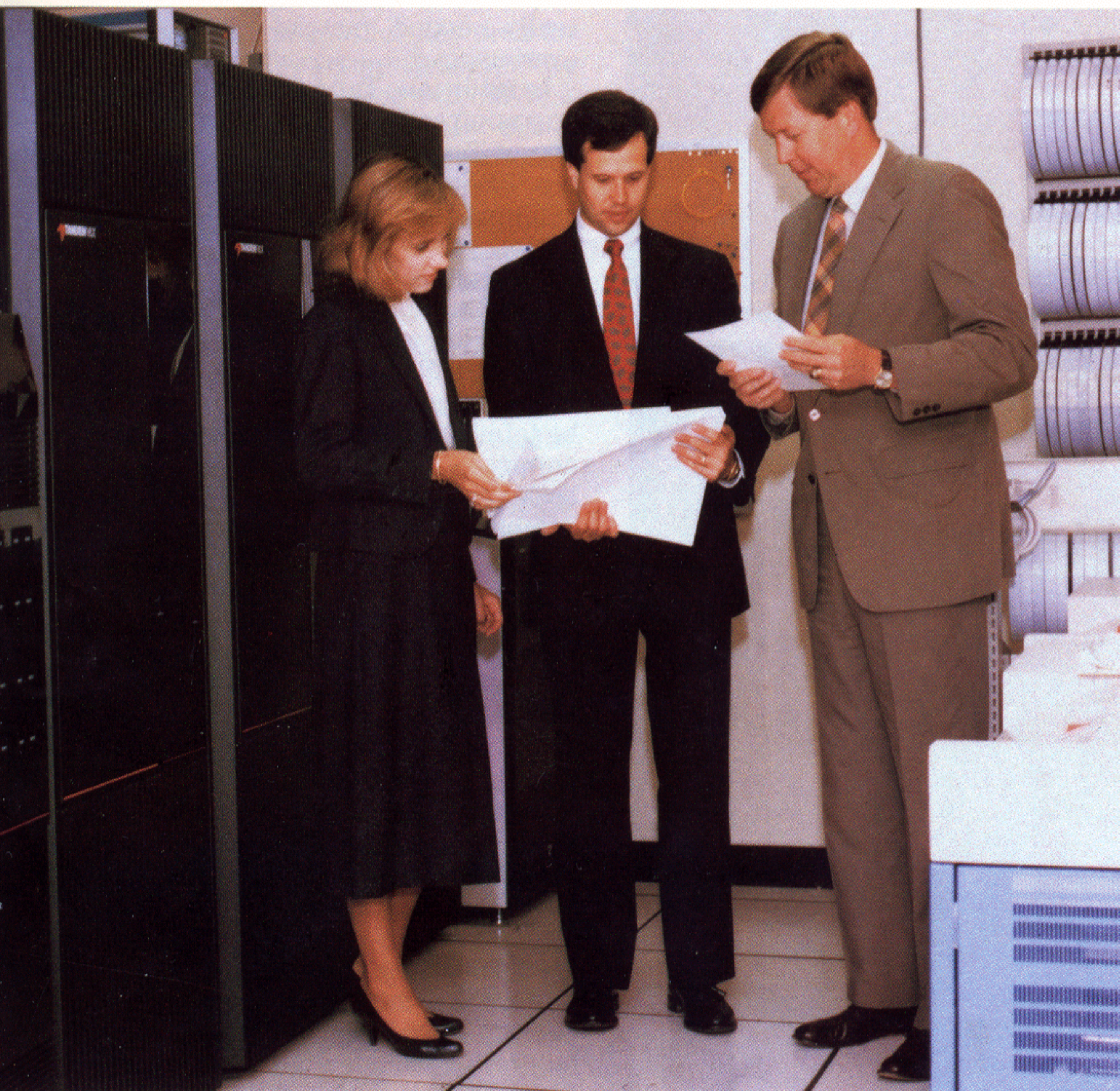
*Charles W. Shields is executive vice president and chief operating officer, and Theodore K. Keith is president and chief executive officer of the Amherst Group, a leading provider of POS network services in the Northeastern U.S.*

infancy, with perhaps five percent penetration of its potential," Keith said. "One result of this is that we anticipate a large increase in debit card use at POS terminals and a decrease in the need for ATMs. Today, ATMs hand out green pieces of paper, or cash, that people carry to a cash register. The merchant then carries them to the bank, where a teller must count the bills and put them back into a machine. Debit cards provide one-step transactions, allowing direct deduction from the buyer's account and providing a cash-back feature. In contrast, ATMs will be used more in the future as a bank teller replacement."

Automated clearing house growth also has only scratched the surface, Keith said. Created in response to the Federal Government's desire to transmit payments such as Social Security benefits and its employee payroll electronically, commercial and business use of this mechanism today represents only two percent of total check volume.

"In the coming years, all routine and repetitive payments by corporations, including dividends and interest, will be handled through an automated clearing system that eliminates the need to write checks," Keith said. "Another area of immense growth will be business-to-business payments. Instead of writing checks and depositing them, the transaction will flow through a district automated clearing house and be relayed to the recipient bank the following day with all the other transactions."

"As a major player in the financial transaction market, we expect to take a leading role in these activities," he concluded. "The Tandem system will ensure that we have the technology in place to meet these new challenges." □



*At the heart of the Amherst Group network are Janet G. Cooper, senior vice president of sales; Daniel T. Rogers III, senior vice president of operations; and Charles W. Shields, executive vice president and chief operating officer.*



# OLTP Cuts Government Costs

*Governments face the challenges of achieving higher productivity with lower labor costs.*

*A Tandem network can provide secure, current data to dispersed departments, tie together isolated systems, allow modular growth, and cut program administrative costs.*

Virtually all levels of government, international, federal, state, and municipal, face similar key issues today. Many of those challenges, already faced by private businesses, are beginning to surface in the public sector as well. On-line transaction processing (OLTP) is playing an important role for governments as they strive to improve efficiency.

Governments' greatest challenges are to seek higher productivity and lower labor costs. Due to the focus on federal deficits, governments are seeking ways to trim costs, while attempting to provide the same level of services. By moving to on-line transaction processing, governments can operate more efficiently, maintaining critical services in an era of budget restraints and cutbacks.

In addition, governments contain departments or agencies that function as

independent entities. In large federal governments there can be hundreds of these agencies. Because of this variety of agencies, from military branches to state and federal treasuries, governments have as many diverse applications as their corporate counterparts, including manufacturing, shop floor control, inventory control, finance, banking, electronic funds and benefits transfer, computer-aided dispatch, and networking—all strengths of Tandem systems.

In order to provide equal competition among vendors, the government procurement process can be burdensome, taking agencies from one to five years to acquire computer systems. Thus, many individual agencies have purchased personal computers as quick, inexpensive solutions to current departmental needs, creating isolated islands of information.

This proliferation of individual computers has created the need for computer systems which allow information to flow from different personal computers to the agency's main database.

## How Tandem Helps Government

Combined with application software from Tandem's third party Alliance members, custom software, or public domain software, Tandem systems are being used in governments for a variety of applications.

Data integrity and modular expandability, key features of the Tandem architecture, are important to government. Due to the sensitive nature of government information, Tandem's continuous availability and data integrity are critical. Tandem's modular expandability allows government agencies to purchase only the the computing power that is really needed, instead of wastefully overbuying.

In addition, Tandem's GUARDIAN operating software extends across the line of Tandem systems, ranging from the NonStop CLX that is expandable to mid-range, up to the NonStop VLX transaction processing mainframe. In a Tandem expansion, there is no downtime required, and no costly software conversions or program rewrites.

Tandem NonStop systems located in geographically dispersed areas can also be joined via the EXPAND data communications network to form a single, backbone network. Tandem's distributed database capabilities allow information to be obtained from any terminal or connected personal computer, regardless of the data's location, as if the information was located on a single system.

In addition, Tandem's Information Management Technology and networking products allow Tandem systems to connect personal computers to each other as well as to existing mainframes. These software products, which include PSMail electronic mail, PCLINK, WORDLINK, SNAX, and MULTILAN, combined with third-party applications, provide cost-saving solutions.

PCLINK personal computer interface enables users to connect IBM PCs and other MS-DOS systems to a Tandem system. WORDLINK ends business machine incompatibility by letting diverse word processors exchange documents via a Tandem network. Another Tandem net-



**Figure 1.** The State of Pennsylvania cuts the cost of food stamp distribution with an Electronic Benefits Transfer system based on Tandem systems and ACTION2000 EBT software from Electronic Data Systems Corporation.



# Customer Focus Is Key To Tandem Quality Program

*The Tandem quality program focuses on understanding customer needs, problem prevention, and process improvement. Customer feedback provides the basis for action plans and their implementation.*

Quality is integral to the continued success of any business. Tandem has developed a comprehensive program and organization to promote quality to ensure that Tandem products and services continue to meet or exceed customer expectations. The goal of the program is to put quality into every interaction that touches the customer and prospect, including products, services, and communications.

Tandem recently appointed a vice president of corporate quality, Ilene Birkwood, to oversee the program. She will act to unify existing quality programs and accelerate the extension of quality improvement to all areas of the company.

## Extending Quality Improvement

Under the new program, quality directors and managers are currently being assigned to each Tandem vice president to assist in developing aggressive quality strategies and to implement quality action plans.

These strategies will focus on problem prevention and continuous process improvement. An extensive training program will provide quality theory and practice to all employees.

The Tandem quality program is based on five principles:

- Customer Focus
- Total (100%) Involvement
- Measurement
- Systematic Support
- Continuous Improvement

The most essential of these is Customer Focus.

## Customer Focus

To identify customer requirements, Tandem uses several direct communication lines: the Customer Conference

Center, sales representatives, account analysts, and customer engineers, as well as the International Tandem Users' Group (ITUG)—an independent organization.

At the Customer Conference Center, Tandem shares strategic marketing directions and proprietary product information with its customers and encourages them to give feedback on the directions and products presented. ITUG conferences provide a forum where Tandem users discuss issues with colleagues, Tandem developers, product management, and executives.

Sales representatives and account

analysts work together to understand Tandem customer requirements and are vital links in the listening process. These requirements, together with technological innovation, form the basis for new product development.

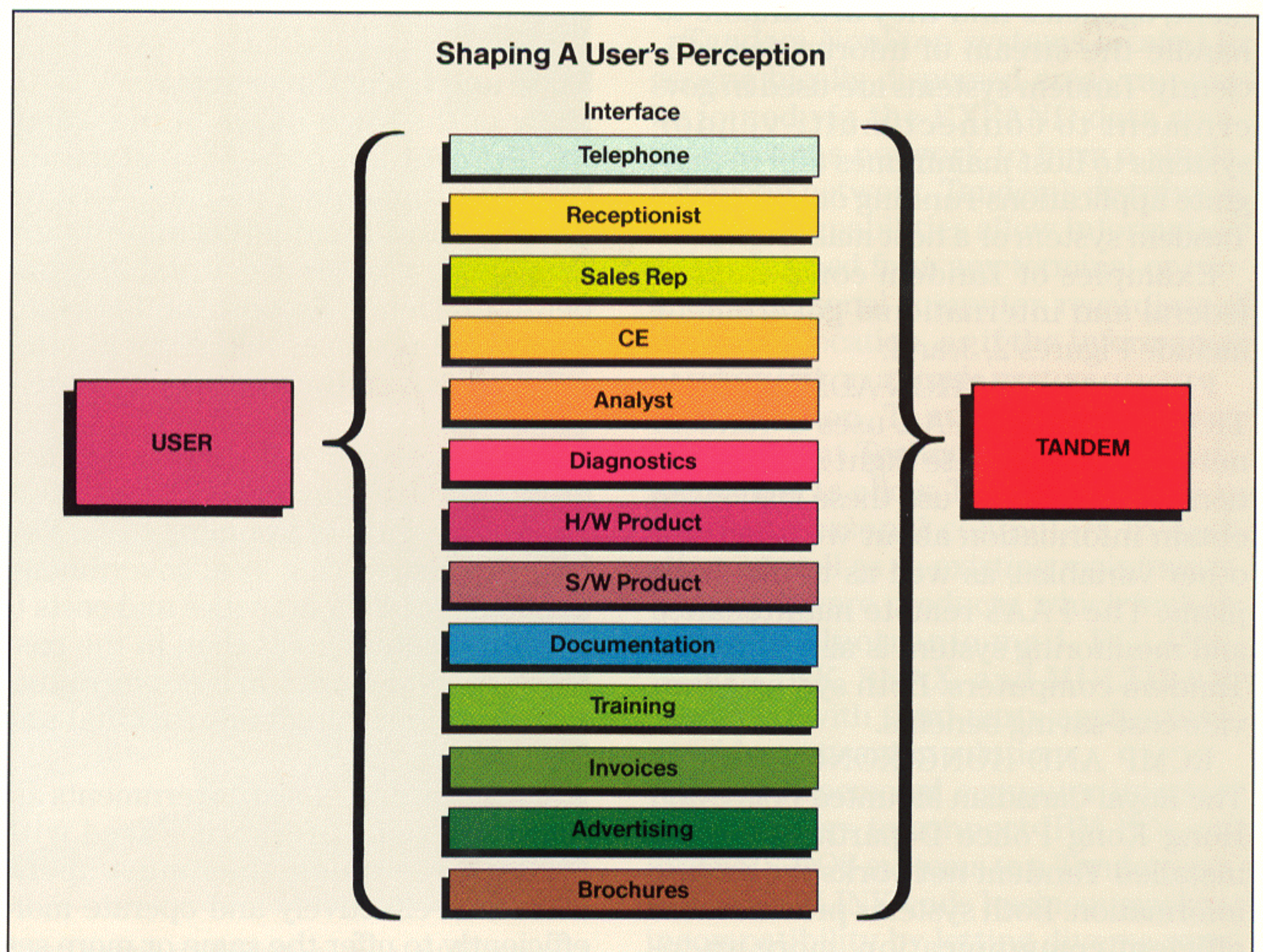
In these ways, customers take an active role in planning the future of Tandem products and services.

## Total (100%) Involvement

Every area of the Tandem organization is involved in organized quality improvement activities. Each employee is responsible for quality and will be involved in the implementation of plans to achieve high quality.

At the Tandem executive level, a recent reorganization created five new operating groups: the Tandem Systems Group, the Tandem Marketing and Sales Group, the Tandem Customer Service Group, the Ungermann-Bass Group, and

***Tandem is committed to improving each product across its entire life cycle—that means the product has better quality at first customer shipment and is more supportable and extensible over time.***



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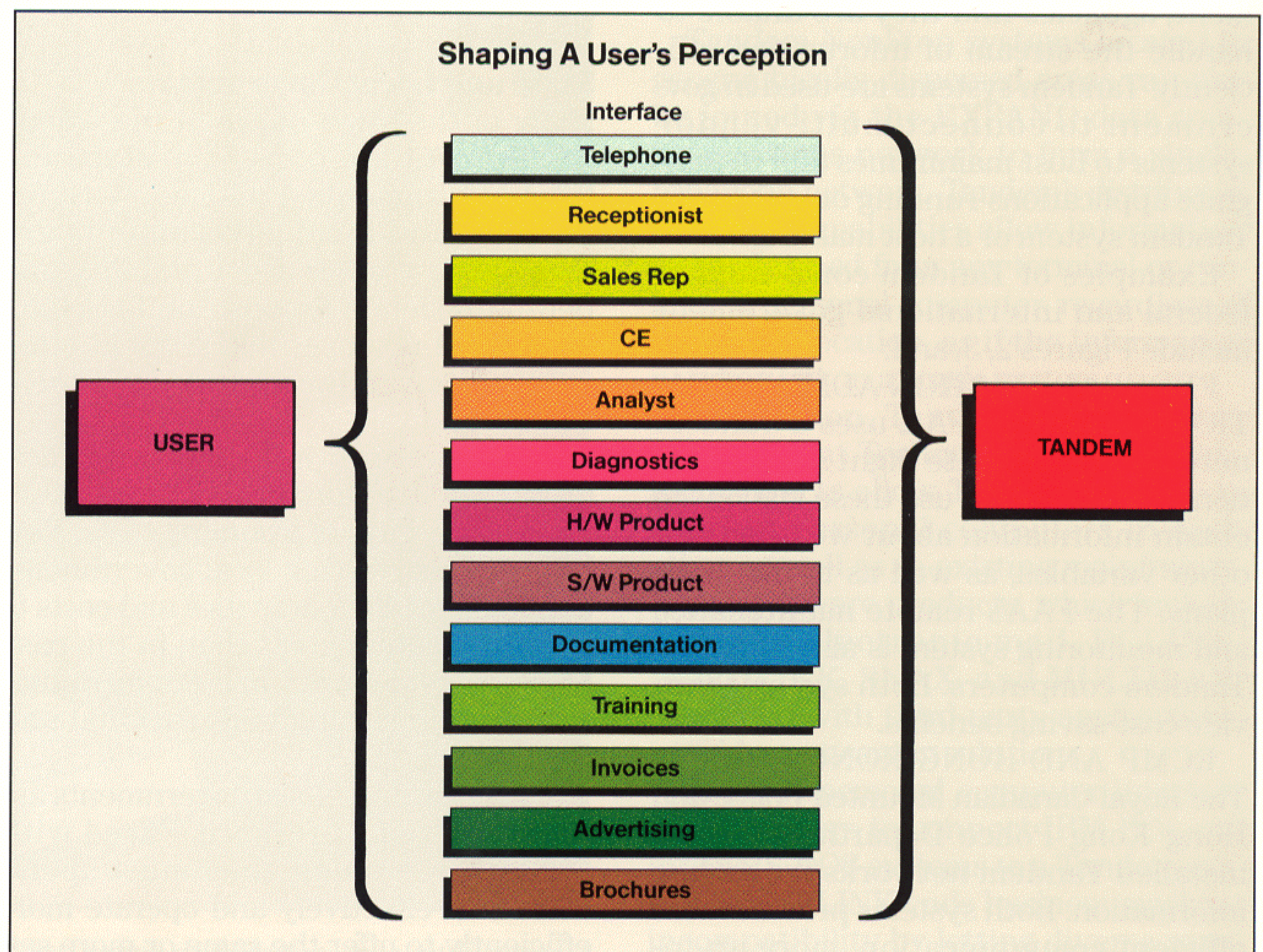
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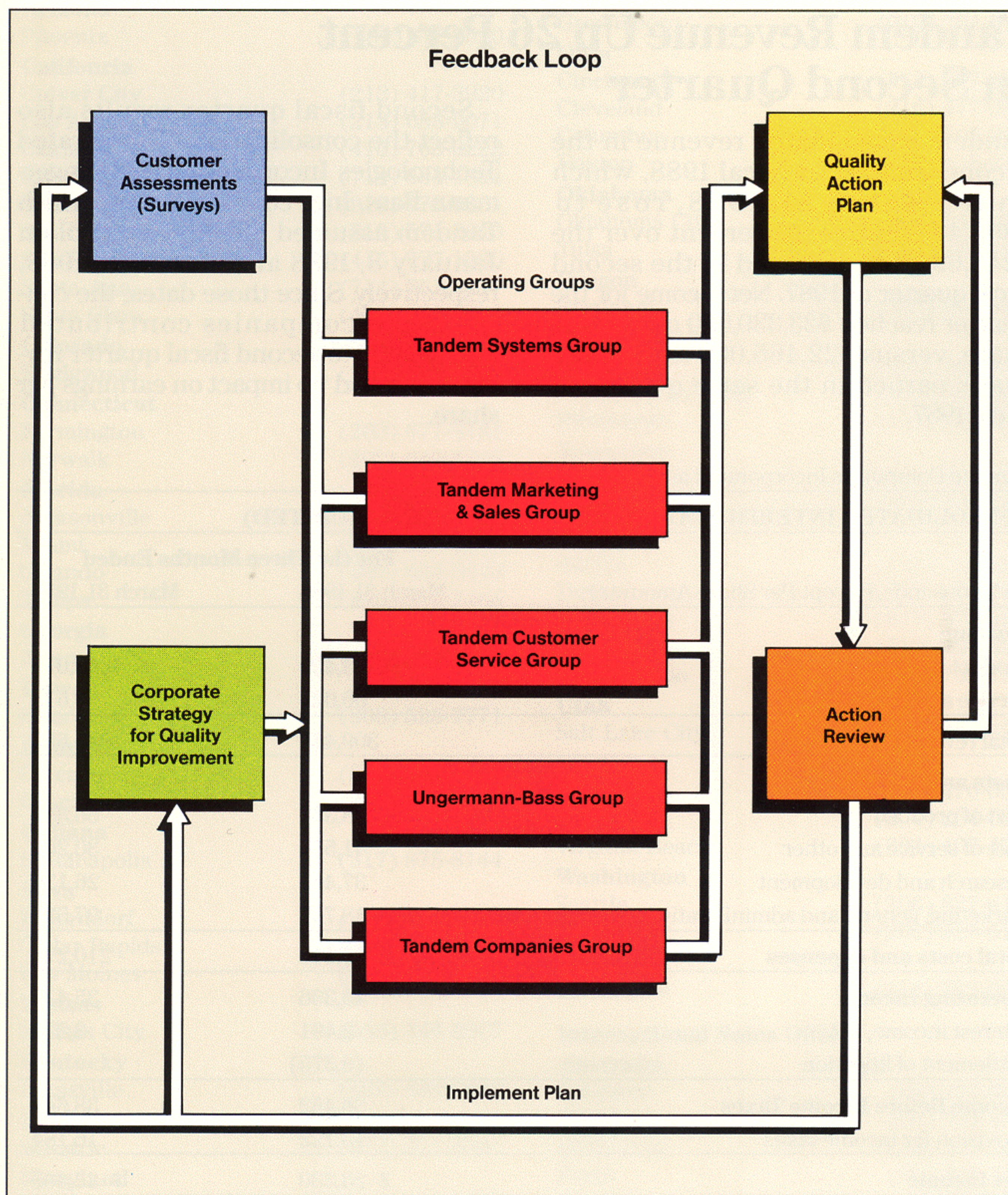
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*Tandem tracks customer satisfaction with surveys to prioritize issues, allocate resources, and increase understanding. From the surveys, each operating group and department then creates action plans. The effectiveness of these plans is measured within Tandem on a monthly basis and verified by customer surveys.*

the Tandem Companies Group. The reorganization streamlines the process of strategic and operational decision-making to improve the management of a large high-growth company and allow the kind of innovative thinking that will make the quality program succeed.

#### Measurement

That which can be measured can be improved. When quality requirements are carefully defined and specific measurable actions are taken to meet these requirements, major improvements can be made.

Using customer surveys, Tandem tracks customer satisfaction in order to prioritize which issues need to be addressed first, to allocate resources

appropriately, and to better understand customer needs and perceptions.

Each operating group and department is responsible for producing action plans from both the quantitative and qualitative measurements of customer satisfaction. Each quarter, these plans are evaluated as to their progress toward the quality objectives. The effectiveness of these plans is measured by customer satisfaction surveys.

#### Systematic Support

Quality directors and managers provide a support organization for the quality improvement plans. Their functions include developing quality strategies, educating employees on quality, providing process improvement consulting,

improving defect prevention methods, and ensuring that products meet customer requirements.

#### Continuous Improvement

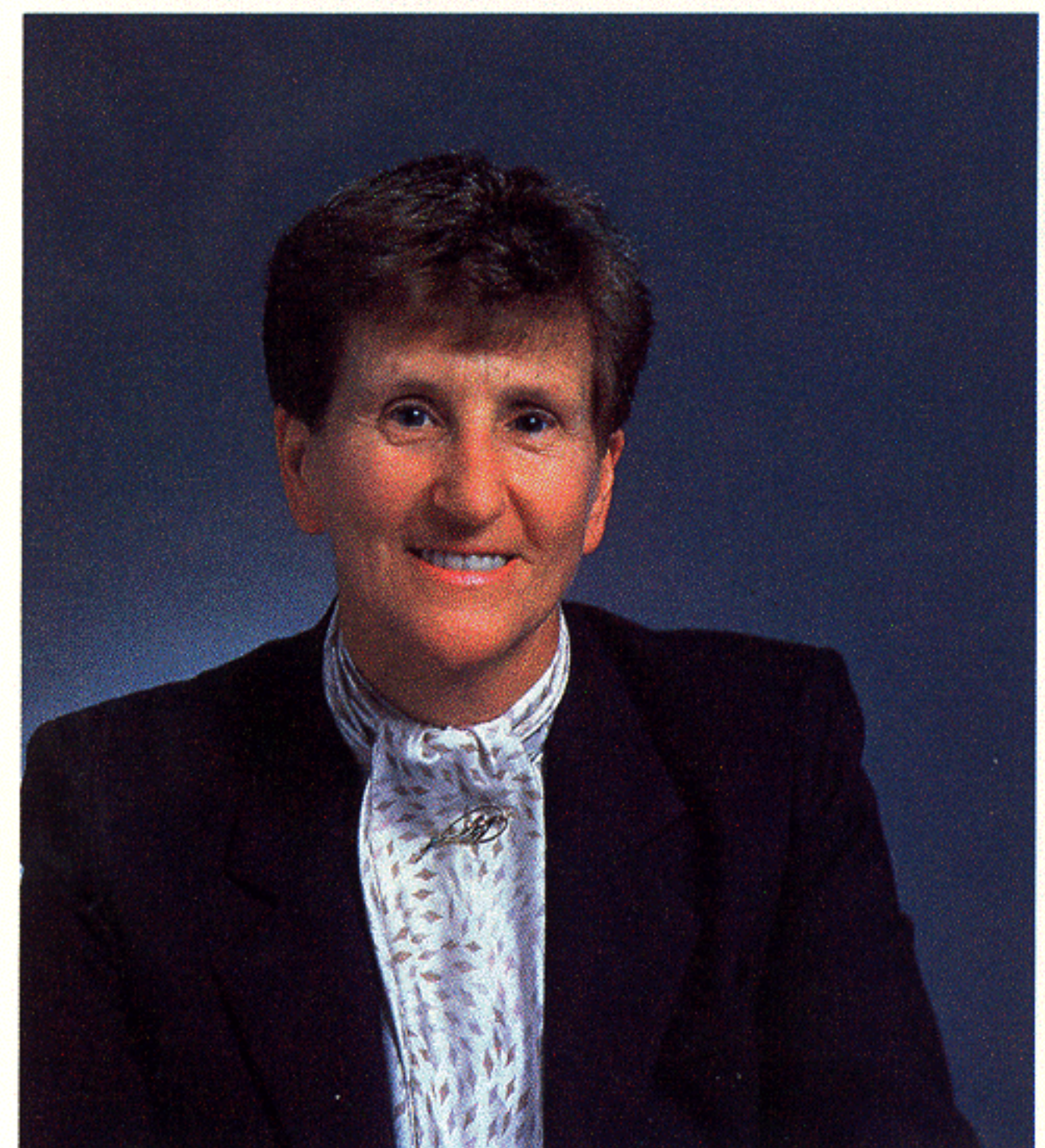
One example area of continuous improvement is in software development. In addition to the existing quality assurance program, Tandem established a department within its software development organization dedicated to the ongoing skills enhancement of software engineers and managers and improvement in the development process.

This new department is dedicated to defect prevention and early defect detection by encouraging programmers to use state-of-the-art software engineering methods and tools that bring more consistency, accuracy, and productivity to product development. This helps to free programmers from more routine tasks so they can focus on innovation.

#### Commitment to Quality

Tandem is committed to improving each product across its entire life cycle—that means the product has better quality at first customer shipment and is more supportable and extensible over time.

There is always room for improvement in a quality-oriented organization. Quality is more of a continuous journey than a destination. Thus, Tandem is constantly looking for ways to prevent problems and to make improvements. By implementing a unified and measurable quality program, Tandem can continue to deliver products and services that meet or exceed customer expectations. □



*Ilene Birkwood, Tandem vice president of corporate quality, is responsible for quality in all functional areas of the company.*



# Point To Point

On June 8, 1988, Tandem promoted five executives to senior vice president positions and consolidated its divisions into five operating groups: Tandem Systems Group, Tandem Marketing and Sales Group, the Ungermann-Bass Group, Tandem Customer Service Group, and Tandem Companies Group...Promoted are **Stephen C. Schmidt** to senior vice president and general manager of Tandem Systems Group; **Gerald L. Peterson** is senior vice president and general manager of Tandem Marketing and Sales Group; and **Ralph K. Ungermann** is Tandem senior vice president of the Ungermann-Bass Group and president of Ungermann-Bass, Inc. **David J. Rynne** is senior vice president and chief financial officer, and **Thomas J. Klitgaard** is senior vice president, general counsel, and secretary...During the coming months, industry professionals can meet Tandem at these expositions and conferences:

- Retail—**National Retail Merchants Association** show on **Electronic Data Processing (NRMA/EDP)** in Washington, D.C. from October 2-4.
- Finance—**National Corporate Cash Management Association (NCCMA)** conference in Dallas, Texas on October 23-26.
- Government—**Federal Computer Conference (FCC)** in Washington, D.C. on October 26-28.
- UNIX—**UNIX EXPO** in New York, New York on October 31-November 2.
- Manufacturing—**AUTOFACT** in Chicago, Illinois on October 31-November 2.



## Tandem Revenue Up 26 Percent In Second Quarter

Tandem consolidated revenue in the second quarter of fiscal 1988, which ended March 31, 1988, rose to \$309,449,000, or 26 percent over the \$245,695,000 achieved in the second fiscal quarter of 1987. Net income for the quarter reached \$23,330,000 or \$.24 per share, versus \$22,465,000 or \$.23 per share, earned in the same quarter of fiscal 1987.

Second fiscal quarter results also reflect the consolidation of Integrated Technologies Incorporated and Ungermann-Bass, Inc., companies over which Tandem assumed effective control on January 8, 1988 and March 18, 1988, respectively. Since those dates, the consolidated companies contributed \$13,543,000 to second fiscal quarter revenue, but had no impact on earnings per share.

Tandem Computers Incorporated and Subsidiaries

### CONSOLIDATED INTERIM STATEMENTS OF INCOME (UNAUDITED)

(In Thousands, Except Per Share Amounts)	For the Three Months Ended	
	March 31, 1988	March 31, 1987
<b>Revenue</b>		
Product revenue	\$253,429	\$205,079
Service and other revenue	56,020	40,616
<b>Total revenue</b>	<b>309,449</b>	<b>245,695</b>
<b>Costs and Expenses</b>		
Cost of product	68,347	56,357
Cost of service and other	41,555	30,204
Research and development	37,442	26,176
Marketing, general and administrative	118,769	97,539
<b>Total costs and expenses</b>	<b>266,113</b>	<b>210,276</b>
<b>Operating Income</b>	<b>43,336</b>	<b>35,419</b>
Interest income, net	2,491	3,230
Settlement of litigation	(9,375)	0
<b>Income Before Income Taxes</b>	<b>36,452</b>	<b>38,649</b>
Provision for income taxes	13,122	16,184
<b>Net Income</b>	<b>\$ 23,330</b>	<b>\$ 22,465</b>
<b>Earnings Per Share</b>	<b>\$ 0.24</b>	<b>\$ 0.23</b>
Weighted average shares outstanding	98,712	98,757

Prior period amounts have been restated to include the financial statements of Atalla Corporation acquired through a merger in November 1987 and accounted for as a pooling of interests.

## 29,980 London Marathon Runners Tracked by Tandem Systems

For the third year in a row, Tandem in the UK provided all the computing power for one of the world's largest athletic events, the London Marathon.

A Tandem team of 100 volunteers prepared a runners' database, provided backup for the television commentary teams, timed the finish, and produced the results. With 29,980 entrants, 22,400 starters, and 20,792 finishers, it was no easy task.

On the day of the event, Tandem operations were underway at four sites with two NonStop EXT10 computers, a full bar-code reading team, and computer operating staff. One system was installed close to the finish line in a room without air conditioning or other computer room amenities. Nevertheless, the EXT10 performed faultlessly.

A second EXT10 was situated at BBC TV's headquarters to deliver up-to-the-minute race progress and runner database information to the TV commentators. In the busiest hour of the race, Tandem registered about three finishers per second.

As soon as the race concluded, the race to produce results began. Using OLTP technology that provides constantly current data, Tandem team members generated reports for the first 17,000 finishers by 6:00 p.m. and completed the balance the following day.



**U.S. Sales Office****Arizona**

Phoenix (602) 417-3920

**California**

Culver City (213) 417-3920

Los Angeles (213) 688-9071

Oakland (415) 763-0222

Riverside (714) 684-1821

Sacramento (916) 971-0861

San Diego (619) 571-7610

San Francisco (415) 777-1230

Santa Ana (714) 751-3777

Santa Clara (408) 562-8700

**Colorado**

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