FBI probes piracy claim

Pagetec case represents first agency investigation

By James Martin

PHILADELPHIA — A scientific publishing firm here and a New York-based typesetting concern are under examination by the Federal Bureau of Investigation and face civil suits based on allegations that they illegally duplicated a software program sold by Pagetec, Inc. of Westlake Village, Calif.

A $3 million lawsuit, filed Oct. 4 in U.S. District Court in Philadelphia by attorneys for Pagetec, alleges that the Institute of Scientific Information publisher engaged in breach of contract and trade secret misappropriation in its software licensing agreement with Pagetec. According to the suit, the institute provided Ralph Garner Associates, a New York typesetting firm, with an unauthorized copy of the $4,800 data base publishing program licensed by Pagetec. Named as defendants in the suit were the institute and its president, Eugene Garfield, and Ralph Garner Associates and its president, Ralph Garner.

Meanwhile, the FBI said it’s investigations of the Institute and Ralph Garner Associates produced “positive results.” Industry sources said they believe these are the first formal federal probes of a software piracy case. FBI agents, after having searched data processing and management information systems departments at both locations, reportedly uncovered an unauthorized copy of Pagetec’s Versacomp at Garner’s New York office as well as an undisclosed number of allegedly pirated copies of Micropro International Corp.’s Wordstar programs.

continued on page 11

TOP OF THE NEWS

An Intel Corp. news conference this Wednesday is expected to host the unveiling of the prototype of the Intel 80386 chip, the Santa Clara, Calif., vendor’s 32-bit, 16-MHz offering. With the 80386 here, can a new IBM Personal Computer line be too far behind?

Things may still be blue at IBM with third-quarter financial results — expected after press time — predicted to be slightly below last year’s levels. Among leading IBM analysts, Morgan Stanley’s Ulric Weil expected the firm to earn $2.45 per share in the quarter ended Sept. 30, as did Frederic Cohen of L. F. Rothschild, Unterberg Towbin. Prudential-Bache’s Carol Muratore was slightly more optimistic, with a $2.55

Continued on page 11

Users tie snags to Ideal, DBMS

By Charles Babcock

NEW YORK — Idiosyncracies in the Ideal fourth-generation language can significantly impact performance when applications built with the language are employed with a relational database management system, several commercial users of the product said last week. Ideal was used to build a controversial New Jersey Department of Motor Vehicles system that has created a widely reported bureaucratic snafu [CW, Sept. 30].

But other users interviewed by Computerworld said Ideal, a product of Applied Data Research, Inc. in Princeton, N.J., performed slightly more optimistically, with a $2.55

Continued on page 8

‘USA Today’: Satellite network delivers daily...

By Paul Korzeniowski

ARLINGTON, Va. — William O. Hider knew that communications technology would play a critical role in the publication of USA Today when Gannett Co. made him the publication’s 12th employee during the paper’s formative period in 1981. Since that time, as vice-president of telecommunications, Hider has transformed a blueprint for production of a national, four-color, graphics-oriented newspaper into one of the world’s largest and most sophisticated facsimile and satellite networks.

Hider was hired by Gannett from the ranks of American Satellite Co. in Rockville, Md., which builds the transmission equipment and maintains the satellite network for USA Today. At American Satellite, he proposed the network eventually chosen to transmit the newspaper.

“Gannett’s thinking was that the person who designed the network was the best person to implement it,” Hider said. “So the company made me an offer I couldn’t refuse.”

The heart of the USA Today system is an American Satellite dish antenna, 7 meters in diameter, that sits on top of the passageway between two high-rise Gannett office buildings in a suburb of the nation’s capital. The dish, with a bandwidth of 500K bit/sec., divided into two 150K bit/sec. channels, sends data to an orbiting Western Union Corp. Westar III satellite. The satellite, in turn, relays the data to 81 print locations scattered across the U.S., each equipped with a 5-meter receive-only satellite dish.

The system can transmit a black-and-white page in three minutes and a color page in six minutes. The receiving print locations — a mix of printing companies, Gannett and non-Gannett daily newspapers — transfer the transmitted data to printing plates, print the day’s edition and distribute the paper throughout the region.

“Without our satellite system, it would be impossible to produce the newspaper,” Hider stated.

The 1.2 million copies of USA Today that are distributed to airports, hotels, street corners and households each...
Company posts $3.6 million loss in third-quarter 1985

By Clinton Wilder
SANTA CLARA, Calif. — Intel Corp. last week announced it lost $3.6 million in the third quarter ended Sept. 28 and that it will exit the hard-hit dynamic random-access memory (RAM) chip market.

Intel posted an operating loss of $22.9 million for the quarter, which was reduced by sale of assets, other income and tax credits. Revenue dropped 28% compared with last year's third quarter, from $432 million to $312 million. The per-share loss was 3 cents, compared with a profit of 60 cents per share, or $70 million, in the year-earlier quarter.

Adding to the expected dismal news from Intel was the prediction from Gordon E. Moore, Intel's president and chief executive officer, that the fourth quarter will be even worse, despite a slight pickup in orders.

"Our employees are doing an excellent job of cutting costs," Moore said. "But we're finding it impossible to keep up with the decline in revenue brought on by falling prices and weakness in the computer industry." 

Intel's third-quarter followed previous red-ink reports from fellow West Coast semiconductor leaders National Semiconductor Corp. and Advanced Micro Devices, Inc. The three firms recently joined together to call for import duties on erasable programmable read-only memory chips allegedly being sold below cost in the U.S. by eight Japanese vendors.

Burroughs launches mid-range A 10

By Donna Raimondi
A mid-range entry into Burroughs Corp.'s A series of general-purpose mainframes made its debut late last week, along with an upgrade package for the A 9 system.

The newly announced A 10 system, using emitter-coupled logic circuitry, is available in single- and dual-processor models and falls between the A 9 system, announced in January 1984 and the A 15 large-scale system released in March. The A 10 appears to be targeted at the IBM 4381-size user, according to industry analyst Dave Moschella of International Data Corp. The A series has been a good performer for Burroughs, probably contributing to the fact that Burroughs has had a "decent" 1985 in the middle of the computer industry slump, he said, although the company recently released a dismal earnings projection.

The single-processor Model A 10 F is said to offer a 12% performance improvement over the A 9 system, and it is field upgradable to the A 10 H. The unit costs $580,000 for a base system that includes 12MB bytes of main memory.

The dual-processor A 10 H is basically two tightly coupled A 10 F's and can be used as one system or partitioned into two single systems operating as independent A 10 F's. This unit is available immediately with a price tag of $662,000 for a 24MB-byte basis system.

Also released was the A 10 FXH upgrade package that allows a 9 F and a 9 FX users to upgrade their systems to A 10 H dual-processor machines.

Chip maker plans holiday shutdown

By Clinton Wilder
SUNNYVALE, Calif. — Semiconductor manufacturer Advanced Micro Devices, Inc. announced last week that it will shut down nearly all of its U.S. operations for two weeks early in the year, requiring employees to take their vacations during that time.

The company, which recently reported its first-ever quarterly operating loss [CW, Sept. 23], said most of its 7,600 domestic employees will be asked to take six paid vacation days in conjunction with official company holidays on Christmas, Dec. 30 and New Year's Day. The Advanced Micro Devices facilities will be shut down from Dec. 25 to Jan. 5.

The company also said employees can borrow up to 10 mandatory vacation days against future accumulation of vacation time to lessen the possibility of having to take unpaid vacation time or furloughs.

Most of the firm's domestic employees had already taken eight mandatory vacation days when the company shut its plants for two weeks early last summer in conjunction with the July 4 holiday period.

"This move was the latest in a series of cost-cutting measures that the semiconductor vendor has taken to avoid personnel layoffs. Advanced Micro Devices reserved its no-layoff policy in last week's announcement.

Other measures taken by the company have included a 15% pay cut for managers and other professionals, a 15% pay cut for the firm's top 100 executives, a freeze on hiring and wage increases and the elimination of nonessential expenditures. The firm has dubbed its cost-cutting program Staunch, which stands for "Stress Those Actions Urgently Needed to Check Hemorrhaging."

AT&T announced a variety of products for its Unix PC desktop, including a co-processor, new models and several software packages.

Nixdorf Computer is expected to announce that it is moving its IBM-compatible mainframes into the office environment.

Honeywell took its second step in as many weeks toward greater cooperation with IBM.

The Big Eight accounting firms face controversy over their revenues growing through MIS services.

DEC unveiled software that provides MicroVax products with a direct IBM gateway in limited situations.

Commercial acceptance of CD-ROM technology may be boosted with a forthcoming announcement from DEC.

A Minneapolis bank's word- processing functions have risen from the ashes of a disastrous fire.

The Social Security Administration's computer modernization program is faulted by a General Accounting Office audit.

In a recent exclusive interview with Computerworld, ICL's managing director, Peter Bonfield, discussed where the company is going and how it will get there.

Securing the integrity of computer data is a growth area as a recent government conference shows.

An 11-person maintenance staff has cut PSA's maintenance costs by $3 million per year.

One-third of large systems users said they feel the cost of maintenance exceeds its value, according to a recent IDC survey.

When rapid growth rendered a vehicle service contracting agency's record-keeping system obsolete, the firm cured its growing pains by installing a distributed computer-based system.

General Electric's Glass and Metallurgical Products said it is happy with its Cygent Technologies Cosystem desktop computer telephone hardware and software.

Is your DBMS really relational? Follows 72

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OCTOBER 14, 1985
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(2) **EASY HANDLING:** SYBACK and SyncSort CMS are among the most flexible, user-friendly programs ever produced by anybody anywhere. That's one reason programmers love 'em. And where does it say that backup and sort operations have to be hard to be good?

(3) **"MISTER SOFTWRENCH" SERVICE:** We've got the best pit crew in the business. More than 85% of all customer requests are resolved within 24 hours.

If you'd like to put a little high technology in your VM tank, give us a call. We might even take your used VM dump-restore or sort program as a trade-in!
Three different microprocessors power the microcomputer systems released last week by AT&T, ranging from the 16-bit Intel Corp. 80286 to the 32-bit AT&T WE 32100.

Unix PC models with additional hard-disk storage and internal memory were unveiled, along with 26 software programs and other options (see story page 5).

AT&T's new 382/310 supermicro, supporting up to 14 users, also debuted, as did several enhancements to the 382 line (see story page 5). The Personal Terminal 510A is an analog version of the Personal Terminal, which AT&T introduced last March for digital voice/data switching. AT&T said the product is the original model, the 510A features a touch-screen two-line telephone, directory dialer for voice and data, a Digital Equipment Corp. VT100-compatible terminal modem, autodialer, speakerphone, calculator and time manager. The system is available now for $1,540.

Finally, AT&T introduced the first printers that it has built internally for the small systems market. Available immediately, the dot matrix printers were designed for use with the PC 6300 Plus, Unix PC, 382 line and the IBM Personal Computer and compatible systems, the vendor said. They operate at 200 char./sec. in draft mode and 50 char./sec. in near-letter-quality mode. The Model 478, with 9-in. platen, costs $1,095, while the Model 479, with 15-in. platen, is priced at $1,265, AT&T said.
Unix PC enhancements include MS-DOS coprocessor

By Eric Bender

NEW YORK — AT&T last week boosted its beleaguered Unix PC desktop with a coprocessor running Microsoft Corp.'s MS-DOS, new models offering higher storage and internal memory capabilities, a flurry of software packages and other enhancements.

The coprocessor board for the expanded Unix PC line, the DOS-73, features an 8-MHz Intel Corp. 8086-2 chip with 16K bytes of internal memory, an RS-232 port and a socket for an Intel 8087 numeric coprocessor. The board runs under MS-DOS 3.1 and runs most IBM Personal Computer software in a window that runs concurrently with other applications.

Unix-based

3B2/310 out

AT&T Information Systems repackaged most of its AT&T Unix-based 3B2/400 superminicomputer in a smaller box for its introduction of the 3B2/310 last week.

It was an announcement that received a lukewarm response from several analysts, who concluded that it was an average upgrade from the existing 3B2/300. Designed for simultaneous support of six to 14 users, depending upon the application, the 3B2/310 is based on the same 32-bit, 10-MHz microprocessor that is included in the WE32100, AT&T's 25-user 3B2/400.

AT&T claimed that the 3B2/310 offers processing power close to that of the 3B2/400. The 3B2/310 is targeted at scientific, engineering and business graphics applications involving departmental computing where work groups share files. It offers an optional WE32106 math acceleration unit that AT&T said produced a benchmark of more than 290K double-precision C language whetstones per second.

Users with 3B2/300 systems, who also support a maximum of 10 users, can migrate to the 3B2/310 with a field-upgrade kit priced at $2,595. The 3B2/310 includes 1M byte of main memory with two expansion slots for expansion to 2M bytes, two RS-232C ports controlled by the system board, four RS-232C ports and one parallel port controlled by an I/O expansion port card and four feature card expansion slots.

The base system with a 30M-byte hard disk and one I/O card costs $13,950 and is available now. The basic system with the math acceleration unit costs $16,500, and the system with a 72M-byte hard disk and math acceleration unit costs $18,900.

The field-upgrade kit will be available in December for $2,595. An 8087 coprocessor also will be offered for $295.

The Unix PC Model 3B1 introduced last week is aimed at multiuser applications. It is based on a 10-MHz Motorola, Inc. 68010 chip and runs Unix System V Version 3. Three configurations were announced, all scheduled for delivery next month and including a 320K-byte floppy disk drive, mouse, 300/1,200 bit/sec. modem, monitor and keyboard. A configuration with 1M byte of random-access memory (RAM) and a 40M-byte hard disk drive costs $8,495, a version with 2M bytes of RAM and 40M bytes of storage is priced at $8,995, and a system with 2M bytes of RAM and 67M bytes of storage costs $9,995.

AT&T also announced upgrades to the existing Unix PC Model 7300. A 20M-byte upgrade kit costs $975 and is available now. A 40M-byte upgrade kit sells for $3,495, and a 67M-byte kit is priced at $3,995. Both will be offered next month.

Among the other options are a $1,995 23M-byte external streaming tape backup unit, available in November, and a 2M-byte RAM expansion board, priced at $1,705 and available now.

An IBM 3270 Systems Network Architecture emulator software package for the PC Unix line will be offered in first-quarter 1986 for $795, AT&T said.

The 26 new Unix PC software packages, most of them shipping now, boosts the total of Unix PC packages to 54 programs available from AT&T and 160 packages overall, the company said. Among the introductions are Ryan-McFarland Corp.'s RM/Fortran and Language Processors, Inc.'s LPI/Fortran, each priced at $795; Micro Focus, Inc.'s Level II Cobol and Cobol Runtime, which cost $1,195 and $395, respectively; Relational Database Systems, Inc.'s Informix and Informix Runtime, which cost $895 and $395; and Micropro International Corp.'s Wordstar 2000, which is priced at $495.

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From page 1

'USA Today': Satellite network delivers daily weekday carry the stamp of a number of Gannett employees. Some stories come from Gannett’s news wire, which is fed by the reporting and editing staffs of 85 Gannett newspapers and six television stations. Material not gleaned from the news wire is generated by the 400 editors and reporters who work exclusively for USA Today.

These reporters, and their editors, process copy on systems provided by Atlas, Inc. of Bedford, Mass., a leading vendor of publication word processing systems. The news staff works with 400 terminals attached to 16 Atlas systems, which are based on PDP-11 minicomputers from Digital Equipment Corp.

When editors complete work on a story, the story is transmitted electronically to a typesetting machine. News and advertising copy are then pasted up by designers, proofread and taken to a camera department. There, the pasted-up pages are transformed into black-and-white or color page prints by cameras the size of editing staffs of 85 Gannett newpapers.

From page 4

Analysts downplay 6300 Plus' Unix ability among micro suppliers in the Fortune 1,000 market, Colony said. He and Goldberg both estimated that AT&T will ship 110,000 personal computers and servers this year. However, very few of those will be Unix PCs, analysts said, with estimates ranging downward from 15,000.

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OCTOBER 14, 1985
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Users tie snags to Ideal, DBMS
formed as expected in a production environment and suggested that any performance problems they encountered were the result of predictable performance problems. Some glitches appeared to be limited to a particular site, but several were common to a sample group of nine users contacted by Computerworld. All were users of Ideal and Datacom/DB, the ADR relational DBMS.

From the outset of the New Jersey Department of Motor Vehicles' controversy, ADR officials have maintained that they lack sufficient knowledge of that particular system's design to comment on the specific problems. They are cooperating with the state to resolve the matter.

The accounting firm of Price Waterhouse & Co., awarded the contract on a noncompetitive basis in November 1983, turned to Ideal and Datacom/DB last year to develop a new system for the New Jersey Department of Motor Vehicles. When the full system was implemented in July, operating on a National Advanced Systems Corp. 3083, it ran too slowly to make the required updates. A backlog of expired registration renewals built up, and, as a result, police departments around the state were still struggling with motorists for expired registrations.

Price Waterhouse, on the advice of its state contract reviewers, has decided not to proceed with a hearing before a state Assembly committee Oct. 3 to explore the causes of the backlog. The firm is subject to extensive contract penalties amounting to $50,000 a month beginning in October for late delivery of the completed system.

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All seminars through December 31 are listed below. Call for information on later seminars.

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**CULLINET SEMINARS/U.S. FALL/WINTER 1985**

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To enroll in a Cullinet Seminar, call 1-800-225-9930. In MA phone 617-329-7700.
Nixdorf offers IBM-compatible 8890 version for offices

Beefs up system's multitasking support

By James Connolly

WALTHAM, Mass. — Nixdorf Computer Corp. will announce today that it is moving its IBM-compatible mainframes into the office environment in addition to improving the system's multitasking support and communications capabilities.

The 8890 Compact series is largely an enhancement of the existing 8890 line that competes with the IBM 3331 class of systems. The product introduction focuses on the size of the three new 8890 models — Models 32C, 52C and 72C — which are said to be 50% smaller than the previous company, which manufactures fault-tolerant, transaction processing systems, was founded in November 1974. A company spokesman said Mackie's departure was "cordial on both parts."

Mackie's domestic marketing responsibilities will be assumed by Gerald L. Peterson, Tandem's vice-president for international marketing.

Tandem exec to join Arete

CUPERTINO, Calif. — One of Tandum Computers, Inc.'s most senior executives resigned last week to join Arete Systems Corp., a San Jose, Calif., manufacturer of microprocessor-based departmental systems.

David R. Mackie, vice-president of U.S. marketing for Tandum, resigned effective Oct. 15 to assume a marketing position with Arete. Mackie joined Tandum two months after the company announced its agreement with the Pick operating system manufacturer, providing Pick as an option on Tandum's 8890 models.

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CCC is A Proven Product. Over 1,500 Softool products are installed worldwide. CCC is supported on these computers: Apollo-DCL, VAX-11/780, Gould ECL, and Honeywell 6000 series (level 66, DPS 8/68).

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There is more. CCC is a stand-alone component of Softool. An Integrated Programming Environment (IPE) is also available.

Call today for more details or a hands-on demonstration.
FBI probes software program piracy claim

The FBI received a tip "within the last 30 days" regarding the alleged Versacom piracy from a former DP manager at the institute, Joseph Gossaux, supervisory special agent for the FBI, told Computerworld last week; he declined to elaborate.

The Institute of Scientific Information had apparently "provided Garner a copy of the Versacom program, which Ralph Garner Associates had been using for business purposes," according to Gossaux. He said that Micropro had "apparently authorized five copies [of WordStar] to the institute, and we determined that far many more copies were made for commercial use outside the agreement with Micropro."

Amid the parade of IBM Personal Computer look-alikes, Future Computing, Inc. last week said it expects sales of AT compatibles to grow from 94,000 units this year to 342,000 next year. IBM, meanwhile, will sell 292,000 units of the original this year and 560,000 next year. Future Computing stressed, however, that is was only including "operationally compatible" machines. Future Computing said Hewlett-Packard's Vectra is operationally compatible with the AT, but AT&T's Vectra is operationally compatible with the Personal Computer. ITT's Xtra PC are operationally compatible with the Personal Computer XT.

Cullinet Software told the estimat-
ed 4,000 attendees at its ninth annual User Week in Boston last week that it has completed delivery of its manu-
ufacturing information system. The fi-
nal two modules -- purchasing and cost control -- of its eight-module inte-
grated manufacturing applications line were released for beta test in September, Cullinet President Robert Goldman said. Goldman also promised that Cullinet would complete its finance package with a December beta release of an accounts receiv-
able module.

At ADAPSO's fall meeting in Washington, D.C., last week, a source with ITT's Q-Sys solutions, Inc. told Computerworld that the subsidiary's parent company, Conti-
nental Telecom, Inc., plans to divest itself of two of its other subsidiaries -- Austin, Texas-based Execuseum Systems Corp. and STSC, Inc. of Rockville, Md. A Continental Telecom spokesman would neither confirm nor deny the divestiture. According to the spokesman, the company would reveal its plans for the two software and services holdings when it re-
leases its third-quarter earnings re-
port later this month.

An item that would not have made news last year, made headlines last week: Wang Laboratories is having money. The Lowell, Mass., office automation leader said it will show a profit for the first time, and ended Sept. 30 as well as a revenue increase over last year's $553.8 million in the comparable quarter. Wang may not match its first-quarter 1984 profit of $51.2 million, but its in-the-black finish this time is a decisive turnaround from the disastrous $109 million loss it posted in the quarter ended June 30.
Honeywell launches DISOSS-compatible software

Debuts point up shift to IBM coexistence

By John Dix
BILLERICA, Mass. — Taking its second step in as many weeks to co-exist with IBM, Honeywell, Inc. last week unveiled a software link to IBM’s document handling facilities and two IBM-compatible desktop microcomputers.

Included in the second barrel of the company’s product blast was a multiuser supermicrocomputer. The announcement came a week after Honeywell revamped its network architecture to provide increased communications options, including terminal links to IBM hosts (CW, Oct. 7).

Following in the footsteps of competitors Digital Equipment Corp. and Data General Corp., Honeywell pledged compatibility to IBM’s Distributed Office Support System (DISOSS), the mainframe maker’s document management system.

Honeywell’s solution is Docu-Link, a software program for its Microsystem 6/10 and DPS 6 minicomputers. Prerequisites for Docu-Link — part of Honeywell’s Office Automation System Facility — include Release 1.2 of Honeywell’s SNA Transport and Release 1.2 of its interactive terminal facility. Docu-Link must be complemented on the host side by Docupower, a software product from Software Research Corp. in Natick, Mass., that provides the actual DISOSS interface.

Docu-Link enables users to exchange reusable form documents with IBM environments and take advantage of DISOSS library and distribution services, according to Charles Ross, director of Honeywell’s office management systems division.

Ross said implementing the DISOSS link through software is less expensive and more flexible than using a dedicated processor as a gateway.

Docu-Link enables users to connect directly with IBM Systems Network Architecture (SNA) environments and obviates the need to support Honeywell’s network architecture at each node, Ross explained.

Scheduled to be available in December 1986, initial license fees for Docu-Link will cost $652 for Microsystem 6/10 systems and range in price from $2,650 to $4,850 for different models of the DPS 6 product line.

On the hardware side of the house, Honeywell unveiled two members of its new family of personal computers, the Honeywell Extended Processor (XP) and Advanced Processor (AP).

While equivalent to the IBM Personal Computer XT and AT, respectively, Honeywell’s XP is said to offer a 67% speed advantage over the Personal Computer XT, while the AP has a 35% advantage over the equivalent IBM machine, Honeywell said.

Increased speed due to microprocessors

The differences in speed are attributed to microprocessor ratings. The XP uses an Intel Corp. 8088-2, a dual-speed microprocessor that operates at the 4.7-MHz level of the Personal Computer XT, but can be switched to run at 8 MHz. Maximum internal memory is 640K bytes and 50M bytes of storage.

The AP uses the same microprocessor as the Personal Computer AT, the Intel 80286, but at 8 MHz instead of the 6 MHz that IBM uses. Unlike the XP, the AP’s 8-MHz chip cannot be slowed to match the IBM product. According to David Booth, Honeywell’s director of personal computer product line programs, during “extensive testing” of IBM software the only difficulty encountered on the AP was with a single game program. He said a switch to slow the AP to 6 MHz will be included in an upcoming version of the machine.

The AP has a maximum internal memory of 4M bytes and up to 80M bytes of disk.

The XT and AP are priced starting at $2,495 and $3,785, respectively, and will be available from the Honeywell direct sales force in November.

Terminal emulation support added

Honeywell also announced that it has added support of synchronous terminal emulation software to its Microsystem VIP Emulation software. This will enable the XP, AP and IBM XT and AT to emulate Honeywell’s family of VIP7300 or VIP7800 terminals when connected to any model of the DPS 6 family. The software and documentation has an initial license fee of $400 and will be available in November.

The OMS 22 supermicrocomputer comes with 1.75M bytes of internal memory, 60M bytes of disk storage, an integral 5¼-in. diskette drive and a 64M-byte cartridge tape backup system. It runs the GCOS 6 Mod 400 operating system and includes software for document transfer, asynchronous communications and word processing. Prices for the OMS 22 start at $24,630.

The Honeywell Time Management Facility software package reportedly provides managers with calendaring functions including a daily “things to do” list. It is priced at $1,650.

Contributing to this report was Computerworld International Editor Edward Warner.
Big Eight MIS services facing congressional scrutiny

By Bryan Wilkins
WASHINGTON, D.C. — The nation’s Big Eight accounting firms, which derive, on the average, one-third of their revenues from selling MIS and systems integration services, are facing increasing scrutiny from the U.S. Congress.

The congressional interest has developed in response to recent bank-failures that have affected investors across the country. Some of these bank failures are reportedly involved computer systems recommended by the accounting firms that also independently audit those banks’ books, as required by law.

The computer services industry has for many years raised its own questions about the fair trade issues involved when a certified public accounting firm sells computer services to a firm that it also is auditing. The industry has been warned of potential conflicts of interest in which CPA firms provide both independent audits and computer advisory services.

Last week, at a management conference of the Association of Data Processing Service Organizations, Inc. (ADAPSO), Dave Williams, leader of the association’s CPA Relations Committee, reported that the U.S. House of Representatives’ Subcommittee on Oversight and Investigations has turned up the heat in the debate. The subcommittee sent detailed requests to the top 16 CPA firms in the U.S. asking for specific information about their nonaudit businesses and for the names of companies that are making use of both computer advisory services and independent auditing services from the same auditing firm.

"No smoking gun uncovered"

"So far, no smoking gun has been uncovered" from the responses received by the subcommittee, Williams said. Those responses were due Sept. 30.

Jack Chesson, counsel for the congressional subcommittee, told the ADAPSO session that subcommittee Chairman Jonathan Dingell (D-Mich.) "is very interested in this issue because he is very concerned about the audit independence of these firms responsible for overseeing the books of companies."

Chesson pointed out the collapse of Drysdale Government Securities, a trading arm of a California bank that used a computerized financial management system recommended by the same Big Eight accounting firm that performed its audit. "Within four months after the system was set up, Drysdale collapsed, and our investigation showed that it was bankrupt from the day it opened," Chesson said.

Chesson also said that the Big Eight accounting firms have not sent in the detailed information requested by the subcommittee. He predicted that Dingell will hold follow-up hearings. The initial hearings were held last March.

SEC not concerned

Chesson said that the Securities & Exchange Commission (SEC) has not indicated that it is concerned with the audit independence of accounting firms that are also performing MIS consulting and management services. The SEC regulates the financial reporting of publicly traded companies that are required to include the independent audit with their annual filings.

"The Big Eight firms and the accounting industry in general are saying that the two businesses are kept separate and ask, 'Why do we have to prove they are independent?'" Chesson said.

The computer services industry has held up as an example of its concern the contract awarded by the SEC to the accounting firm Arthur Andersen & Co. for the installation of an electronic document filing system. Companies regulated by the SEC would be submitting their financial statements directly into the SEC system.

Chesson predicted that Congress will become more involved in the accounting industry’s role in MIS and systems integration and said it is likely that some sort of regulation or law will result.

"The issue is not going to go away. It is going forward, and we have the attention of the accounting industry," Chesson said.

Meanwhile, several of the Big Eight accounting firms have made overtures to ADAPSO about joining the association. At the ADAPSO management conference, the prevailing sentiment of the members was to admit accounting firms.

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DEC unwraps bridge for Ethernet system

By John Dix

MERRIMACK, N.H. — Digital Equipment Corp. released software last week that enables three of its supermicro products to participate directly in IBM network environments. The VMS/SNA product will provide Microvax products with a direct link into IBM’s Systems Network Architecture (SNA) that does not go through Decnet, the traditional method that DEC has used for links to Big Blue. DEC envisions that the product will be used where only occasional SNA links are required.

The minicomputer manufacturer also unveiled LAN Bridge 100, a device that can be used to connect up to eight Ethernet segments to construct a logical net spanning 22,000 feet.

Layered MicroVMS software

VMS/SNA is a layered MicroVMS software product for DEC’s Microvax I and II supermicrocomputers and for the engineering configuration of that product line, the Vaxstation II. It enables these DEC devices to emulate a multifunction version of IBM’s 3274 cluster controller, a Type 2 physical unit within IBM’s SNA.

DEC cautioned that because VMS/SNA requires the Microvax products to perform networking tasks as opposed to dedicating a processor to these tasks as DEC does with its other terminal devices, performance limitations will restrict VMS/SNA’s use to low-volume, single-system SNA links.

Emulating a controller enables the DEC processors to support IBM SNA protocol processing — a capability that Decnet, the display stations, the Remote Network Management Bridge Software, and implement distributed application programs running between MicroVMS and IBM systems.

Additionally, DEC processors with VMS/SNA can create and exchange final-form documents and electronic mail with IBM’s Distributed Office Systems Support (DISOSS). Users can also search and retrieve documents that are classified as revokable with DISOSS but cannot yet modify these documents under VMS/SNA.

The software is said to use many of the same routines and user interfaces as DEC’s Decnet/SNA Gateway, facilitating migration to this full-function gateway when and if needed. VMS/SNA will be available in December for $2,500. DEC also announced a new version of WPS-Plus text processing software.

Version 2 of WPS-Plus has been enhanced for use on DEC systems and extended for use with IBM’s Personal Computer and Personal Computer XT.

WPS-Plus enhancements include a spelling checker option, a usage alert (a linguistic feature said to help identify the misuse of such words as effect and affect) and an electronic thesaurus. The version ranges in price from $8,700 for the Microvax II to $14,200 for the VAX 8600. An optional American Legal Words Lexicon of 25,000 words, based on Houghton Mifflin Co.’s The Legal Word Book, ranges in price from $600 for the Microvax II to $1,500 for the VAX 8600. Both will be available in November.

Who is Cipher?

One of the least known names in tape drives is also one of the best known names in tape drives. Cipher Data Products isn’t exactly a household word. But among the top 10 OEs, the company is known as the leading producer of streaming tape drives.

Cipher not only developed the first low-cost streaming tape drive, which eliminated the costly mechanics of earlier start-stop drives, but also the first patented auto-load tape drive.

Innovations like these are why virtually every major computer hardware manufacturer is a Cipher customer. So even if you’ve never heard of Cipher, you’ve probably used a system that had a Cipher drive integrated into it.

If you aren’t aware of Cipher, you’ll be hearing a lot more in the not-so-distant future. If you are familiar with Cipher, you know you can expect to see more of the kind of products that will set the pace for the industry.

How to backup faster.

The best way to get both high performance and low cost on a start-stop system is to switch to Cipher’s 1/2-inch Cachetape.

This plug-compatible streamer works with existing start-stop software. It costs 40% less than traditional start-stop drives, measures only 5% high, and stores up to 92 megabytes when operated at 3200 bpi. Because data can be transferred more quickly, operating costs are lower, too.

To learn why Cachetape is the streamer that makes sense in systems that can’t stream, call 1-800-4-CIPHER, ext. 9.

Fluor Corporation chooses Cipher’s 3210.

Fluor Corporation, one of the world’s leading producer of streaming tape drives, Cipher Data Products isn’t exactly a household word. But among the top 10 OEs, the company is known as the leading producer of streaming tape drives.

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Fluor Corporation chooses Cipher’s 3210.

Fluor Corporation, one of the world’s
DEC to announce four-pronged CD-ROM campaign

By Eric Bender
MAYNARD, Mass. — Digital Equipment Corp. will thrust further into the emerging compact disk read-only memory (CD-ROM) market this week with a four-pronged announcement that may represent a major boost for commercial applications of the optical storage technology.

Hoping to lead the way to commercial acceptance of CD-ROM technology that can store 600M bytes on read-only optical disks, DEC will announce the following:

- The first commercially available data bases on CD-ROM disks from leading data base publishers in chemistry and engineering.
- Endorsement of the DEC-developed Uni-File standard file format by Lotus Development Corp., 3M Corp. and Tecmar, Inc.
- Uni-File-compatible CD-ROM units for IBM and DEC micros.
- Expansion of application development services for information distributors.

DEC will offer five data base titles, covering publications from Engineering Information, Inc., the National Technical Information Service and Chemical Abstracts Service.

The titles will be sold as yearly subscriptions with quarterly updates and will be priced between $1,100 and $1,190. The disks include DEC's Microbasis search and retrieval software for either MicroVMS or MS-DOS operating systems.

The lack of standard file formats has been "one of the issues constraining a full-fledged leap into CD-ROM technology," said Ed Schmid, compact-disk market development manager. "But DEC is the only one delivering systems products in volume," which will help to solidify the Uni-File standard, he said. Documentation on the file format is available from DEC at cost and carries no licensing requirements, he said.

CD-ROM drives for the IBM Personal Computer and DEC Rainbow 100 lines will be available in December for less than $2,300, Schmid said. Jointly developed with Tecmar, the DEC model will be sold by the Solon, Ohio, firm, while the IBM version will be offered by DEC. Both offerings are complete subsystems configured to work with Uni-File disks so that no additional hardware or software equipment is needed for customers to install and use them, DEC said.

DEC also will broaden its application development services offerings for CD-ROM to handle a complete set of data base preparation tasks, Schmid said. "We will take magnetic tape from customers, and we will develop a full suite of disks with fully usable data bases for MS-DOS or MicroVMS, all done in the Uni-File format structure," Prices for the full service are expected to range from $15,000 to $75,000.

AT&T seeks rate increase

By Bryan Wilkins
WASHINGTON, D.C. — AT&T Communications recently filed for a rate increase in its Accunet family of packet-switching services for data communications to meet Federal Communications Commission concerns that existing tariffs were subsidized and that the service was not favored for AT&T Communications and not for other users.

AT&T said it would increase its charge for entering the Accunet data communications network by 5% for 4.8K- and 9.6K bit/sec. service and by 15% for its 56K bit/sec. service. The proposed tariff would also establish a flat business day usage rate of 75 cents per kilopacket transmitted instead of its current tariff, where kilopacket rates start at 82 cents and drop to 67 cents based on volume transmitted. Other charges associated with installation and maintenance would rise by 10%. AT&T said.

AT&T said that Accunet would be available in 100 U.S. cities by the end of 1985. The proposed tariff changes would go into effect if approved by the FCC on Oct. 4.

In another significant action, the FCC on Oct. 4 established new guidelines that will permit AT&T Communications to introduce optional calling plans, such as bulk calling at discounted rates or distance-insensitive calling, under pricing mechanisms that do not require that the service pay for itself. Instead, the service must show a net contribution to the total revenues of all AT&T long-distance service categories. Specifically, the optional calling plans must show a three-year net contribution to the service revenues of the carrier offering the service.

AT&T Communications has asked the FCC for permission to introduce long-distance services to meet competitive pressures of other carriers. The FCC recently denied its permission to offer a service, Pro America, after determining that the costs of offering the service and the demand stimulated for it were not adequately forecast by AT&T. AT&T will reintroduce its Pro America tariff, which would offer users a flat 15% discount on the purchase of a block of calling time.

Cipher introduces mainframe-to-PC connection

If you have an IBM PC* XT* or AT* you can now access 9-track tape. Just insert the tape into any Cipher Series 9000 1/2-Inch Tape Subsystem. From there, you can upload and download data directly with your PC.

These subsystems act as low-cost, transportable links to large computers and tape libraries. They allow you to freely access and manipulate data, without accessing the mainframe.

Because they are tape devices, there are no expensive data communication costs, or the physical restrictions of micro-to-mainframe networking.

If you would like to access 9-track tape with your PC, call 1-800-4-CIPHER, ext. 9.

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Or call 1-800-4-CIPHER, ext. 9.

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15

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**EDITORIAL**

**Everything’s relational**

In a perfect world, all computer sales would be conducted one on one between a sales representative with a keen sense of product accountability and a user with an inexhaustible knowledge of technology. Questions would be asked and answered, claims challenged and defended, tests run and simulations performed.

In the manner one of these software feature claims, relational data base management, author E. F. Codd — who, not coincidentally, developed the concept in the pages of this week’s Computerworld to survey the terrain and report his disdain of what he sees.

"It is hard to find a vendor who does not claim his DBMS is relational," Codd asserts. "Some vendors of nonrelational DMBS have quoted a feature added to a few relational features — in some cases very few features — to be able to claim that their systems are relational, they may not meet the simple requirements for being ranked minimaly relational.

Although we urge every DBMS customer to read Codd’s article (Part Two will run next week), the regrettable truth is that there cannot be an E. F. Codd hovering over every computer software sales transaction. Consultants can be of some use, but what consultant can examine every product’s every claim?

Trade journals can be of some use, but — and we speak with some authority on the subject — what trade journal can thoroughly probe every product’s every claim? The consequence is that users must often take enormous risks in accepting vendor claims for product function and hope that the end results justify these discomforting means.

This situation is hardly tolerable. It may also be, momentarily at least, insoluble. The last thing the computer industry needs is some sort of truth-in-packaging legislation that sets up a phalanx of bureaucratic retainers to settle distinctions such as those between relational and hierarchical DBMS.

What will help is for individual users, large business organizations and elements of the industry itself to keep vendors honest by calling into question dubious feature claims and unacceptable resort to cant. We offer the pages of Computerworld to such worthy exercises and invite your contributions.

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**LETTERS TO THE EDITOR**

Track record provides viable gauge of applicant’s work performance

In the Reader’s Letter "DP employers on the wrong track with job histories" [CW, July 22], the author claimed that applicants’ job histories are inappropriate as a major tool in the selection of employees. I contend that for experienced candidates no voice speaks more clearly for their qualifications and abilities than job histories.

Although to some the expression "track record" connotes a race, to me it carries a somewhat less cynical meaning — performance. That people accomplished an assignment or demonstrated dedication to an employer or were recognized for contributions by promotions and raises leads me to expect that they might perform for me.

As to the achievement of job levels within prescribed time frames, there are many excellent technicians in the profession whose assignment as project leaders or managers would toll a death knell for their careers. Given the correct environment, these individuals can be real heroes. Spending 20 years, however, becoming the best table coder in the country does cast doubt on an individual’s drive and creativity.

U.S. business is being run on an infrastructure of billions of lines of code, many of which were designed and written by people who lacked demonstrable qualifications. To whatever degree the DP profession is responsible for the problems of the economy, it is more because of the lack of track records than of dependence on them as tools for selecting employees.

In fact, I submit the following:

- Top performers are rarely unemployed for extended periods except in geographically isolated markets.
- Top performers are the last to go when economic conditions decline and are the first to find work or to be recalled.
- Most candidates for higher level DP jobs are recruited rather than search for jobs.
- The best performers will be strongly self-motivated, and a good manager will help them develop that trait.
- A well-written resume could convey to a prospective employer any pertinent information about a candidate’s goals and preferences, as well as the dreaded "job history."

Robert A. Roy
Chatsworth, Calif.

Too much emphasis placed on systems when considering programmers for jobs

In programmer "help wanted" advertisements, too much importance is usually placed on hardware and systems, and not enough emphasis is placed on people.

If the advertisement calls for someone who has programmed on such and such a computer in such and such a system, applicants must have programmed on that computer in that system; otherwise, no matter how talented they are, they won’t be considered.

Such rigidity enables the company that ran the ad to single out eight applicants from 80. It enables the company that ran the ad to hire a programmer who will get up to speed in a matter of days, if not hours.

But such rigidity ignores the desirability of choosing the applicant whose aptitude best meshes with the long-range requirements of the job. Moreover, it ignores the desirability of picking the applicant who is the best fit in terms of personality, character and goals.

David Canfield
Los Gatos, Calif.

Foreign students with: computer access pose danger to U.S. national security

I disagree strongly with Charles P. Lecht’s column "On students, computers and the Soviets," which talks about possible dangers of giving foreigners access to very large computers in the U.S. [CW, Sept. 9].

Would Lecht advocate having a company teach sales representatives from competing companies how to be better sales representatives so that they could take away its customers? Would Lecht advocate having a company teach the engineers of its competitors to make products equal to or better than his own so his firm would lose business to its competitors? Of course not.

Then why does he advocate bringing students into the U.S. and giving them access to our best technology so that they can go home and use it against the U.S.? It does not make any sense to me at all.

Truman Hunter
Oxford, Ohio
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OCTOBER 14, 1985

COMPUTERWORLD

VIEWPOINT

The IBM-NTT connection

On SCIENCE

Charles P. Lecht

OCTOBER 14, 1985

The venture will ultimately evolve to be a mammoth international value-added network. Business will become free from the tyrannical and costly national boundaries that impede the flow of data and information.

The alleged unfriendliness of Unix, which true believers would claim is mere unfamiliarity bordering on unreasonable hostility, has been successfully hidden by the now traditional menu systems that look much like those of other approaches. Unix has become such a ubiquitous development environment that it is buried in all sorts of products and virtually all computer-aided design and manufacturing systems.

The headquarters of INS will be in Tokyo, but it is hard to imagine that IBM will leave it up to its Japanese subsidiary to control fully its NTT relationship. Armonk, N.Y., will have a lot to say about the future of INS. Why else was Shinto traveling to Armonk on Sept. 27 to confer with IBM's John Opel and John Akers when Shinto was stopped by a hurricane?

The IBM-NTT connection was made in Japan, it did not specify that INS services would be limited to the Japanese marketplace — in fact, there was no reference made to market exclusivity. This, of course, suggests that the companies intend that it will ultimately become global. However, at the onset, it is hard to envision INS extending its operations into other countries. No doubt IBM and NTT executives will have to overcome many problems to make INS a truly international and workable system. For example, IBM and NTT communications protocols are different. Apparently anticipating their eventual plan, the two companies launched a joint research project two years ago to overcome this incompatibility.

The project was successful; in December, INS will announce a software product offering IBM customers whose systems support Systems Network Architecture protocols to communicate with systems supporting NTT's Data Communications Network Architecture protocols and vice versa. Then there are both human and machine language difficulties, cost and competition problems and so on to overcome.

Those problems that originate solely by virtue of the size of the parties involved will offer IBM and NTT a great challenge. The joint venture is, after all, between the largest company in Japan and one of the largest in the United States. The combined annual sales is approximately $20 billion per year larger than NTT.

The joining of significant parts of the communications and computer systems of the U.S. and Japan must be viewed as an event of great significance in creating greater international cooperation and as an important step toward world peace.
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Along with their expanded capability, PLSORT VM and VMX are the fastest VM sorts available, anywhere. And, both PLSORTS are reasonably priced. Call us today at (800) 862-SORT* for more information and a free trial of one of our incredible new sorts.

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Two extreme viewpoints

When one steps back for a moment, one sees clearly that these two extreme viewpoints need to be rejected by practical people. However, the tug-of-war that has resulted from this ongoing data processing debate has benefited the Cobol language immeasurably. Those who claim that no revision of Cobol, however radical, could be significant, have caused the Cobol 85 language to be much more than just a cosmetic overhaul of the old Cobol. The substantial additions and improvements in Cobol 85 will make it easier to use with current software development methodologies and will ultimately ease the growing problem of systems maintenance. Nothing short of that would have been acceptable.

Those critics of Cobol 85 who demanded absolute compatibility with older versions of Cobol have caused the computing public and, per-haps more important, the Cobol language developers to be very sensitive to the impact of an evolving Cobol language on the data processing community.

We learned this lesson the hard way and caused a four-year delay in the new Cobol 85, but we did take heed. As a result, procedures now exist to assess the impact of future Cobol revisions before they are made.

Updating Cobol

The continuing task of updating the Cobol language must not slow down now, any more than that of other application development tools. If we learned one thing about software systems during the last two decades, it was that change is a natural process affecting every system, and we must design these systems with anticipated changes in mind.

The same must be said about software tools like Cobol. Cobol must be responsive to new techniques and methodologies that evolve, and it must do so in a careful, minimally disruptive fashion.

Welsh, an independent consultant based in Mystic, Conn., who was a member of the American National Standards Institute X3J4 Cobol Committee.

Some people just ask for trouble.

Isn't it amazing just how many people go around looking for trouble? Why, we're willing to bet there are people in your DP department this very minute flirting with disaster.

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All in all, our software programs offer a reliable, long-term solution for making life in the DP department a lot less troublesome.

Still, some people are destined to find these things out the hard way.

To that we can only add, better them than you.

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The Japanese connection: National Semi’s bifocal view

By Jeffry Beeler

National Advanced Systems Corp. (NAS) of Mountain View, Calif., recently found itself in the unusual position of seeing its Japanese business partner accused of violating American trade law by NAS’ own U.S.-based parent company.

NAS is wholly owned by National Semiconductor Corp., one of three U.S. chip manufacturers that on Sept. 30 accused Japan of dumping erasable programmable read-only memory (EPROM) chips into the American market.

But in a strange twist of fate, the National Semiconductor subsidiary also happens to be the exclusive U.S. outlet for Hitachi Ltd.’s medium- and large-scale line of IBM-compatible mainframes.

Hitachi figures prominently in a Sept. 30 petition that NAS’ parent company and two other U.S. semiconductor firms — Advanced Micro Devices, Inc. and Intel Corp. — filed with the U.S. Department of Commerce and the International Trade Commission. The joint petition accuses Hitachi and seven other Japanese chip makers of selling EPROMs to American buyers below cost.

But despite the legal dispute between National Semiconductor and Hitachi, NAS expects its business relationship with the Japanese company to remain fundamentally unchanged, according to a spokesman for the mainframe vendor.

A source with NAS’ parent firm agreed. “Mainframes and semiconductors are two entirely separate lines of business,” he said. “We have to pursue the EPROM issue because of its extreme importance to the semiconductor industry. But at the same time, we feel we can keep the matter totally apart from our NAS-Hitachi relationship, which we still value highly.”

California state legislators have deferred action on a proposed constitutional amendment that would strengthen the legal safeguards governing the privacy of personal computer-stored information.

Earlier in the year, the amendment breezed through two committees of the California Assembly but then recently hit at least a temporary legislative snag on the full assembly floor.

Thurman White, consultant to Assemblywoman Gwen Moore (D-Los Angeles), partly attributed the delay to the proposed amendment’s legislative novelty. “It’s new in the sense that we’re trying to make some explicit constitutional provisions apply to electronic information,” White said. “But our efforts
By Donna Raimondi

MINNEAPOLIS — A disastrous fire in Norwest Bank Minneapolis NA’s corporate headquarters three years ago led the way to a more efficient word processing system for the company.

In 1982, the word processing functions at Norwest were as much a disaster as the company’s gutted corporate headquarters building. The expenses and the need to relocate after the Thanksgiving 1982 fire caused the company to cut back on supervisory staff and increase the number of remote word processing service centers as part of the reorganization efforts.

There is now a main word processing center with 19 operators and four small satellite centers that share the services of two full-time clerks and a part-time employee. The bank will continue to occupy offices in 23 buildings in downtown Minneapolis until its new corporate headquarters building is ready in 1987, said Karen R. Miller, assistant vice-president of the operations group and manager of the word processing division.

Four different vendors’ systems and a lack of operating standards gave the more than 900 internal clients of the word processing division mixed signals about policies and about the costs that were charged back to their departments for word processing services. By the end of 1982, the word processing division was in the red, and clients of the service were starting to look at buying their own departmental systems, Miller said.

But by the end of 1984, two years after installing Wang Laboratories, Inc. VS 100 equipment and an in-house-developed Cobol word processing management system, the division had reduced its staff from 39 to 24 people, increased productivity by 6% and increased its hourly average output by 106%, Miller said. Previously, the center was uncertain about costs related to individual documents, but now it has a system of eight weighted charge types based on job difficulty and the time required to perform the job, she said.

The VS 100 has 109 devices attached to it. The 68 terminals, five disk drives, a backup tape drive, four telecommunications devices and 31 printers are spread out over several buildings because of the fire, but they are all cabled directly to the host. The devices can be a maximum of 2,000 feet from the computer, but the bank was able to hook up the devices by laying cable through the city’s extensive skyway system, Miller said.

Manual form next target

A manual input document form is used to track each piece of work from start to finish and to compile pertinent information on a particular job. The form is filled out partly by the client and partly by the operator. Miller hopes to put that form — which takes one person nine to 12 hours a week to enter into the system — on-line when her “far-flung” empire consolidates in one building in 1987.

From the information entered into the form and from a data base of pricing information, managers can access data on cost control, operator productivity and profit and loss figures for the word processing division, Miller said.

They can sort data by source, document type and site to glean information about how documents were created. One report generated by the system contains information on operator productivity. Supervisors now sit with each operator once a month to discuss whatever issues the report has raised. “It took two years to overcome operator resistance to this report,” Miller said. Each operator is now compared with his own past progress and not to other operators.

To establish guidelines for the operators, Miller and her staff reviewed industry standards and an in-house study. Continued on page 28
GAO report faults SSA system upgrade

By Mitch Betts
WASHINGTON, D.C. — The $500 million computer modernization program at the Social Security Administration (SSA) so far has not improved the agency's ability to accommodate legislative changes in the Social Security program, according to a new congressional audit.

"Although the SSA has succeeded in upgrading its hardware under the capacity upgrade program, it has made little progress in improving its ability to respond to legislative changes that require software modification to existing systems," the General Accounting Office (GAO) report said.

The reason, according to the GAO, is that the SSA has not met the software improvement goals spelled out in its 1982 Software Modernization Plan that include a complete redesign of the software, better software maintenance and proper documentation.

The agency must frequently change its software when the U.S. Congress passes a law changing the regulations of the Social Security program.

For example, 1983 legislation provided for the taxation of Social Security payments to upper income retirees, which required the SSA to create a new data base and write new software.

The GAO noted that the SSA met the deadlines for these changes. But the audit said this was because the agency diverted 40 top programmers to building the programs, taking them away from the software improvement and redesign projects.

The GAO asserted that the agency would still have trouble responding quickly to new legislation in cases where it has to modify older software, much of which is still poorly documented and maintained.

Furthermore, the GAO audit said the agency needs to implement additional security measures to protect its system from fraud. The GAO praised the SSA for implementing a logon/logoff procedure that identifies users who make data entries.

West Coast Update

The findings showed that 20% of an operator's time is spent on things other than word processing activities. Each operator produces an average of seven to 11 pages per hour, and operator standards are strictly enforced by the two supervisors.

The word processing division is now able to enter into formal billing agreements with its clients, in which it promises low-cost services at a fast turnaround time (four hours for a dictation job). Rush jobs are automatically charged an extra 25% to cover the additional time and labor and to discourage unnecessary priorities. Each quarter, reports show whether or not the division is operating within its guidelines. The automatic billing feature frees up almost half of one supervisor's time each month.

The system flags problems with operators, such as if the operator is doing too little work in a certain time period, or if certain jobs take too long to do because they come in illegible, the operator said.

Not all of the benefits of the system derive directly from the equipment and software. For example, a divisional emphasis on quality at Norwest has cut down on errors. If operators have specific problems, the operators can be trained to eliminate them.

Miller said she has worked to eliminate specialists. All operators receive training in all areas, eliminating the queues that formed because a number of clients in the trust department, for instance, might want the services of an operator who was particularly adept at handling trust documents.

The reporting system's profit and loss analysis helps zero in on costs for each category of work that the division does, Miller said. "We discovered that we were doing a lot of word-processing jobs like check printing, so we eliminated lots of extraneous jobs," she said.

After three years of using the word processing information system and without increasing pricing, the company will break even on word processing operations this year. The average turnaround time of a job has improved by 70%, error rates have dropped by 43%, and average unit pricing of a document has decreased by 6%, she said.
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ICL banks on open systems strategy

Exec claims firm has put hard times behind

After weathering hard times in the 1981 recession, International Computers Ltd. (ICL), Britain's sole mainframe computer manufacturer, has seen its revenue stream move steadily back into the black. The renewed profitability — after a 1981 loss of $64 million — was aided by a 35% reduction in the company's workforce and infusions of cash from the British government and ICL's new owner, Standard Telephones & Cables, Plc., which purchased ICL last year.

The rejuvenation is also due to the firm's new emphasis on technological partnerships, with firms such as AT&T and Fujitsu Ltd., and the products that are coming out of those joint ventures. Two new ICL mainframes are being made in Britain, using Fujitsu large-scale integration chips, and last month, the British government signed a $100 million contract for 18 of those machines for use in a nationwide data processing and communications network.

New products and a change in corporate culture have rekindled ICL's competitiveness. In a recent exclusive interview with Computerworld International Editor Edward Warner, ICL's managing director Peter Bonfield discussed where ICL is going and how it will get there.

In 1981, ICL was $64 million in the red. Are the hard times over for the company?

I think the dramatic changes are over. I don't think that we are now in a situation where we will have to lay off a third of our people. I think from this point of view, they're over. I think the dramatic changes are still going on in the marketplace, and we're still faced with dramatic changes. Considering [that] the industry this year has gone through turmoil, I think that we are [doing]credibly well.

I've heard it said by some people that your company is becoming Americanized, that your people are working longer hours, that infusions of cash into strategic business units is your corporate culture changing remarkably.

We have absolutely gone out to change the corporate culture, and we have done it several ways, actually. Part of it is bringing in management that is of a different culture. We have tried to get all of the managers that we have brought in [from] similar backgrounds. They have all worked in international companies. They have mostly worked internationally. Most of them are relatively young and aggressive, and we have also put in a major program to change the culture of our management team. I don't think that we would say that it has changed to American methods.

What we have actually tried to do is tailor American methods, Japanese methods and European methods and try to generate our own culture, one of moving fast and working long hours.

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We have [now] concentrated purely in vertical markets. The primary [vertical market] that we chose was state governments, [such as] New York state [to which we sold] a Social Security system that is similar to some of the systems [in which] we have specialized in Europe.

If one of your larger markets is South Africa, what is ICL's position regarding sales to that nation? Are you considering a ban on sales?

No. I am a businessman, not a politician. I try to remove my personal thoughts on the political situation, and we will just comply with British law. We have been in South Africa a long time. We employ a lot of people there, and we have a lot of customers there. So, at the moment, we are not thinking about it at all. It doesn't mean that we condone apartheid or anything else.

Regarding the Japanese manufacturing of semiconductors for your mainframes, is it possible that further down the road ICL could become like National Advanced Systems, Corp. in the U.S., an OEM for Japanese mainframes?

Well, we are now [an OEM] in printers. We don't design or make our own printers. We source our printers from [Japan] and the U.S. I think that [becoming a mainframe reseller] is a possibility. We will bring in pieces of hardware if they support open systems connectivity to integrate into our solutions. On the mainframe side, another interesting thing has happened over the last four years. In 1981, 76% of our business [in] hardware sales was off/mainframes, and the [revenue] was about 700 million pounds. Now the [revenue] is [split] about 50-50 between hardware and smaller systems.

Does ICL's greater emphasis on communications products come from ICL's having been bought by Storage Technology Corp. (STC)?

About half of the 1,000 people or so that we have put into this network systems [development] came from STC companies. They have been moved into this new division... called STC Network Systems, a management company of ICL. We have brought them in purely as a result of the merger. We definitely got more expertise in communications than we had as a computer company.

How else has the acquisition affected ICL?

To be quite honest, I think that [communications expertise] is the major area [in which] it has affected ICL. ICL is still run as a separate management company. We have our own board of directors (as far as ICL is concerned). It is run at arm's length from the group, and we have picked up these skills that we needed to develop our communications and communications and added them to ICL. Apart from that, which I think is a pretty significant move, actually, there are no other major changes.

ICL is an AT&T Unix booster. Does your support for that operating system go beyond Unix-based applications on ICL machines soon?

Yes. We've got some... Unix machines [now]. We signed two deals recently, one with a company called Data Media, [which] we have a partial stake in... their Unix machines. We also did a deal with Computer Consoles, Inc. for [its] Office Power, which is a software system for office systems. Again, this runs on a Unix box.

So, you've put Office Power on an ICL machine?

Yes. The other thing that we are going to do is embed Unix in our mainframe operating system so that you will be able to run Office Power in the next year, or 18 months maybe, across the total ICL line.

VME can already host Unix?

Well, it can. We haven't actually released that into the market, so we won't release that until the middle of next year. But we have told our customers that is the direction in which we are going.

What other new product directions, in the short run, might we see from ICL?

You will see enhancements to our mainframes. You will see larger machines coming out in the range. There has already been announced a Series 39, so there have already been extensions of that. You will see more networking capability on our products. You will see smaller machines that can fit into open systems networks. You will see more Unix boxes and extensions of our voice/data line, and [you] will see more applications in vertical markets.

If the reason for the erosion of your market in Europe is ICL, what steps are you taking to counter that erosion?

I think that to have a company the size of IBM, $50 billion dollars compared with our $1.5 billion, is a serious competitive threat. Our approach is twofold: not to compete head-on with IBM and to try and generate a market which is not capable of being dominated by IBM. This, we believe, [is] the open systems market. Now, I am sure that IBM will get into supporting open systems in the open market, but once they do that they won't be able to dominate it as they [do] MV3 or SNA.

Doesn't this place a lot of emphasis on the success of open systems, which is still something of a new trend?

Yes it does. [Open systems] is an increasing trend in Europe. No UK government order can be placed without complying with open systems. I think that you are starting to see this in the U.S., too.
MEXICO CITY — A week after the largest earthquake in Mexico's history rocked this city, damage to computer and communications equipment alone was estimated at more than $25 million. Many buildings crumbled, including the Telefones de Mexico S.A. and the Ministry of Communications — which together control all Mexican communications operations. Large telecommunications companies are helping the government to reestablish communications because almost all the equipment was destroyed.

TOKYO — Nippon Telephone and Telephone Corp. has decided to buy a Cray Research, Inc. supercomputer, the Cray XMP1, sometime in mid-1986. Details of the purchase, including cost, were not specified.

Nippon already owns one supercomputer, a Cray XMP2, which it purchased in August 1984 for use at its basic technology lab.

PARIS — Seymour Cray, founder and president of supercomputer manufacturer Cray Research, Inc., said that his company will respond to IBM's announcement of a vector processor with a continuation of its effort to sell to the high end of the scientific market.

Cray Research, a major player in the $1 billion supercomputer market, has several cross-development agreements with IBM but was not involved in development of the new IBM product, Cray said. In all, Cray seemed unperturbed by the IBM announcement.

LONDON — Richard Perle, U.S. undersecretary for defense, acknowledged last week that computer exports from Western nations to China were being delayed by Cocom, an agency that regulates arms sales from high-technology goods from Western countries. Cocom is made up of representatives of the North Atlantic Treaty Organization (NATO) countries and Japan.

Computer exports to China could speed up, however, if a U.S. Department of Defense proposal to expand the Cocom staff is approved. "It costs under $1 million a year. We could do that and still not create a significant bureaucracy," said Perle, adding that the large volume of international trade agreements with China hinder European computer companies when they seek export licenses.

LONDON — Integrated Business Communications, a UK-based communications company, said it is holding discussions with the British Defense Ministry about integrated Business' new encryption scheme, which has reportedly been certified by the government's communications headquarters as unbreakable.

The firm is selling the product as an enhancement to its range of plug-in communications boards for the IBM Personal Computer and compatibles. The boards reportedly permit the machines to communicate using a mix of X.25, telex and asynchronous communications interfaces.

PARIS — The French Telecommunications Association has helped support a new law — through its Minitel Videotex System. In August, an interactive data base on used cars was added to the nation's government-supported electronic information service.

The round-the-clock listing allows potential car buyers to shop at their convenience and save time. By entering any of six criteria — make, model, year, mileage, region where available and price range — shoppers can find the car they want. The seller's name and address appears automatically with the listing.

There is no fee for accessing the data base, though sellers pay between $7 and $12 to list a car for three weeks. To complement this listing, the addition of credit terms and an auto insurance service is currently being considered. The used car listing was made possible by a new law that requires used cars to pass a government inspection before being sold.

CROWS NEST, Australia — Parts of Australian Macworld, a computer magazine, have been made available on a public information network system called Teledata. Included in the information network are complete listings of Apple Computer, Inc. Macintosh hardware and software available in Australia, selected stories and a full listing of the contents from the current issue of Australian Macworld, a news summary and previews of forthcoming issues of the magazine.

This service is provided at no extra charge to the existing 3,500 members of Melbourne-based Teledata.
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<th>With CL/MENU</th>
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<tr>
<td>How Do I Log on?</td>
<td>Without CL/MENU: &quot;Hi. Is this the data center? I hate to bother you again, something is wrong. Could you tell me once more how to log on to Order Entry?&quot;</td>
<td>With CL/MENU: &quot;This is a shop, I just select Option 1, then press Enter.&quot;</td>
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<tr>
<td>Is My Application Up and Running?</td>
<td>Without CL/MENU: &quot;Hi—Help Desk? How I can't seem to log on to CICS, I wrote down exactly what you told me the last time, but it's not working, is my terminal broken?&quot;</td>
<td>With CL/MENU: &quot;I see that CICS is unavailable, guess I'll update Order Entry until it's back up.&quot;</td>
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FOREVER
Computer security issues garner industry limelight

By Bryan Wilkins

GAITHERSBURG, Md. — The National Bureau of Standards (NBS), located on a sprawling complex, was host early this month to a huge new growth industry — computer security.

More than 1,000 professionals from government and industry took over the NBS facilities at the eighth National Computer Security Conference to hear the latest theoretical developments and practical steps being taken to secure the integrity of computer data.

Dennis Branstad, head of the NBS’ Institute of Computer Sciences and Technology, noted that interest in computer security has mushroomed recently, prompted by incidents of hackers getting into data bases illegally.

Eight years ago, there were only 250 attendees interested in computer security, and Branstad noted that the issues have changed little since then.

The government is assuming leadership in educating and developing standards in the area of computer security. This leadership role has developed out of necessity, since the government is slated to spend $31 billion in the next five years on general-purpose computers and telecommunications.

Last year, President Reagan established a National Computer Security Center under the control of the National Security Agency and gave it responsibility for reducing the vulnerabilities of automated information systems in the federal government.

Col. Joseph Greene Jr., deputy director of the U.S. Department of Defense’s Computer Security Center at Ft. Meade, Md., pointed out that access control systems found in commercially available computers are adequate for certain data bases but that generally these systems are not secure enough to protect sensitive information.

According to Greene, there is a need for the development of standards that would be designed into hardware devices.

Greene cited the efforts of the DOD center to build a front-end multilevel encryption device for host-to-host use that will contain features for password keys, key distribution systems and control over access to data bases.

Airline’s on-line system grounded

By Maura McEnaney

TULSA, Okla. — A troubled computer system at American Airlines’ central data site forced regional reservation offices to do business the old-fashioned way. And for some employees, writing out airline tickets by hand is an ancient and foreign art.

American Airlines’ reservations system, which has been automated since the late 1960s, was out of commission for more than seven hours recently after a foul-up occurred during routine file maintenance.

According to an American Airlines spokesman, the problem occurred when the system recoup was not done properly, and new reservation data was written over other current records.

“Caused by human error”

“It was just a one-time mistake caused by human error,” American Airlines’ Joe Stroop told Computerworld.

But that one-time mistake created a bit of chaos at American, forcing thousands of its reservation agents in four centers across the country to handwrite ticket information for more than 30,000 incoming calls.

Reservations were later entered back into American’s IBM 9083s after the systems group wrote a software fix to correct the file maintenance problem. A backup system prevented the airline from losing any of its reservations, according to Stroop.

Nine flights delayed

The airline flew 1,300 flights the day of the computer glitch, and nine flights were delayed as a result of the computer problems, he noted.

“It was a hectic time,” Stroop said. “When you lose your capacity to work because you lose your automation, No. 1 you are out of practice, and [No. 2], a whole lot of people have to work a lot harder,” Stroop said.

“We have people here who have never had to write a ticket by hand,” he said.

To prevent the problem from happening again, American Airlines now has three operators working on its file maintenance operation and requires each operator to check the work of peers.
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Airline reduces costs by piloting own maintenance

By Paul Korzeniowski

SAN DIEGO — If you want something done right, do it yourself.

Regional airline carrier PSA, Inc., which has been growing rapidly during the past three years of deregulated competition, has applied that axiom to maintenance of its four Amdahl Corp. V8 mainframes. The results have been a substantial reduction in costs and improved service, according to Arthur Landman, assistant vice-president of computers and telecommunications at PSA, a $700 million airline that primarily serves the Western U.S.

The airline employs an 11-person maintenance staff at an annual cost of $679,000, but Landman figures that the company saves $3.8 million a year in maintenance costs. "Vendor maintenance fees can run as much as a $10,000-a-month maintenance fee for each mainframe," he stated.

In addition to eliminating the monthly fees, other results such as quicker response time and better service have saved PSA money. A vendor's maintenance technician may be responsible for a number of customers' equipment located within an area that may have a 500-mile radius. When a client places a trouble call, 4 to 8 hours may pass before a technician arrives to fix a problem.

In the airline business, an 8-hour delay can be catastrophic: "We have to be up 99.9% of the time at all locations," Landman claimed. "Even if only one of our remote locations goes down, it affects all connecting flights."

Landman claimed that his staff, with technicians in San Francisco and Los Angeles, guarantees 4-hour response time. "In most cases, we arrive within 2 hours," he stated.

Since the staff was put into place in 1981, there has been a 50% reduction in trouble calls. "Most of the calls were repeat calls," the PSA vice-president said. "Vendors had to make three or four trips to a site before a problem was corrected. We people repair equipment once, and the system stays up and running."

The airline maintains more than just mainframes. Front-end processors, an automatic call distribution system and terminals are part of the saga of David Allen, manager of field engineering. The responsibility of Allen's group will increase as it takes over maintenance of the company's Memorex Corp. disk drives later this year.

However, there are some items that will remain the responsibility of certain vendors. "We will not look over the maintenance on our [Wang Laboratories, Inc.] equipment," Allen said. "I do not think we would save any money because there are too many problems with Wang's printers — they are just not very reliable."

Because PSA services its equipment, purchases are based strictly on cost. 'We are sending to the various vendors — a practice that often locks an MIS manager into a one-vendor shop. "We spent $85,000 for a used V8 machine, and it is a $3 million machine," Landman noted.

Used equipment is one step behind state-of-the-art processors like the recently announced IBM 3080 mainframe. "Newer systems supply nothing other than faster throughput," Landman noted. "If our transactions were straining our processing resources, then we might consider a more powerful system. But that is not the case."

Corporate migraines have also come with maintenance responsibilities. The airline began planning its program in 1980 with the purchase of an Amdahl V6 mainframe. Allen stated that Amdahl had promised to supply traditional support for one year, train PSA technicians and furnish aid to the airline on an as-needed basis after the first year.

Amdahl reneges

After a year, Amdahl reneged on its promises, Allen said, and the airline was forced to turn to a third-party supplier for additional Amdahl equipment. "Our current arrangement is not perfect, and I do not sleep as well as I would if I knew the people who made the machine were available to back me up," Allen said.

Recruiting personnel presents other problems. "I have tried to hire people through newspaper ads, with little success," Allen noted. "Because he has been in the maintenance field for a number of years, most of his staff came through professional acquaintances."

Once PSA technicians are hired, they are sent to the various vendors' technical training programs. "As part of a purchase agreement, we require that the vendor provide our technicians to take its training classes," Landman said.

When the classes have been taken, documentation often holds the key to how well PSA technicians perform. "Most system documentation is quite thorough," Allen noted. "We had [Raytheon] terminals and turned to an outside vendor because Raytheon's documentation was not very good."

Should a company maintain its equipment itself? "On the one hand, it can be scary because, if we fail, there isn't anyone we can blame but ourselves," Landman notes. "On the other hand, we save money, and today there is no vendor able to supply a company with the help it needs."
Jumped from 6.6% last year to 11.7%.

Of the 293 users both of hardware vendor and third-party services responding to the survey, 34% said the value of their service was either "somewhat less" or "much less" than its cost. The dissatisfied user figure increased from 30.1% in 1984 and 25.4% in 1983. The percentage of respondents who said their service value was "much less" than its price jumped from 6.6% last year to 11.7%.

"As products show less differentiation in performance levels, service has become a much more important consideration in purchases," said IDC analyst Rebecca Segal, author of the survey. "And value vs. price is our most conclusive measure of customer service satisfaction."

Although the vast majority (98%) of respondents use their vendor's service personnel, the minority — third-party service customers — gave their service companies high marks for value. Seventy percent of third-party customers said their service was much greater, somewhat greater or equal to the price they paid, ranking third-party vendors as a whole behind only Hewlett-Packard Co. (80.7%) and Digital Equipment Corp. (72.7%) in value vs. price ratings.

IBM, however, had the highest percentage, 40%, of responses of "much greater value" or "somewhat greater value" of service in relation to price. "IBM users tend to have the highest expectations and the highest requirements, so that value/price result is encouraging for them," Segal said. But Big Blue also had the most users (20%) who rated its service value "much less" than its price.

The lowest overall marks for specific vendors went to Prime Computer, Inc. and NCR Corp. Fifty-six percent of Prime users and 51.7% of NCR users rated their vendor's service negatively (less value than cost). With the exception of HP and Burroughs Corp., most vendors did not fare well in ratings of service response time. Users of IBM, DEC, Prime, Wang Laboratories, Inc. and third-party service staffs said their vendors took longer to respond to normal and emergency service calls in 1985 than in 1984. The response times for Wang service, however, were still considerably below their extremely high 1980 levels (15.9 hours for a normal call and 8.3 hours for an emergency), which Segal said she believes contributed to falling demand for Wang products.

"Now Wang is making some incredible service offers on their VS 300s," she said. "They were significantly hurt by their service rating figures in past years. I think it hurts a vendor more to have a bad service rating than it helps to have a good one."

Burroughs users said they benefited from the industry's shortest average response time — 2.3 hours in normal situations and 1½ hours in emergencies. NCR, despite a lackluster showing in other ratings categories, was rated second with a 2.8-hour normal and 2.1-hour emergency response. Third-party vendors were said to have taken the most time to respond, 16.9 hours on normal calls and 7.3 hours on emergencies. But for third-party users, price was the most important consideration.

One fifth (21.2%) of the users responding to the IDC survey came from manufacturing organizations. Other leading user categories represented were wholesale/retail (12.6%), education (10.9%), government (7.8%), medical (6.8%), banking (6.1%) and data processing services (5.8%).

Many users report service costs more than its worth

By Clinton Wilder

One-third of business minicomputer and mainframe users feel they are receiving less service than they are paying for, according to the recently completed annual survey of user satisfaction by International Data Corp. (IDC) in Framingham, Mass.

Worse, and mainframe users feel they are being paid for, according to the recently completed annual survey of user satisfaction by International Data Corp. (IDC) in Framingham, Mass.

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A Total Information Utility has a Network behind the Network.

The National Technical Information Service in Springfield, Va., has announced that the 1985 edition of the "Directory of Computer Software" is now available.

The directory describes more than 1,900 computer programs developed by 100 federal agencies such as the U.S. Department of Defense, the National Bureau of Standards and the U.S. Department of Transportation. The packages are available to commercial businesses through the National Technical Information Service.

The offerings include an Ada compiler, computer graphics packages, modeling programs and simulation software. The software is divided into 21 categories, including aeroelasticity and fluid dynamics, transportation, nuclear science and technology, medicine, health care, engineering and communications.

The edition lists the hardware and software required to run each program and gives a brief description of its capabilities. The entries are indexed by number, subject, source agency, hardware and language.

The directory costs $40, and there is an additional $3 shipping charge.

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From A Company Called TRW.
Distributed system expands with agency's rapid growth

SCOTTSDALE, Ariz. — When the rapid growth of a nationwide agent for vehicle service contracts rendered the agency's computerized record-keeping system obsolete, the firm cured its growing pains by installing a distributed computer-based system.

In February 1984, Western National Warranty Corp., which sells service contracts to buyers of automobiles, motor homes, travel trailers and motorcycles, was growing at a rate of 10% a month. Paul Askos, president and founder of the 3-year-old firm, explained, "Obviously, we had a prior system, but based on our anticipated growth, that system was becoming obsolete. It no longer had the capacity nor the power we needed. We were unable to generate the accurate statistical data needed to manage the company well."

The firm, which had 10 employees at the time, used an Altos Computer Systems, Inc. 586 with three terminals. The system was used primarily to log a file on every customer and policy, including policy number, customer name and address, and address of the agent who sold the contract, vehicle information and claim history. According to Askos, the old system had a 32,000-record limit, and by mid-1984, "We had reached that limit," he said. The firm currently has 110,000 policyholders, with 10,000 new policies being written each month, he added.

The firm tackled the problem in June 1984 by installing a Motorola/Four-Phase Systems, Inc. 6300, which was upgraded to a Four-Phase 6600 in July of that year. The system is composed of a 2.5M-byte applications processor, five 37M-byte Winchester hard disk drives and dot-matrix and letter-quality printers. According to Askos, the original setup included four Convergent Technologies, Inc. PT terminals, and the system now supports 16 terminals.

"The ability to expand the system was a critical selection factor," Askos said. "One of the intriguing concepts of the Four-Phase 6600 was that it could keep pace with our growth without a huge front-end investment. We have had the system for 18 months and have invested $250,000 in it so far, but our initial bid was less than $100,000. From a financial standpoint, it made sense to buy a system that we could build as we grew," the president of the vehicle service contract firm said.

"When the system's expandability is critical to his business, "Looking back to when we bought the system, what we saw as our growth potential was a conservative estimate. The system has kept up with our growth and not hindered it," he said. In 1984, the firm banked $9 million in service contracts, and Askos predicted that it will bring in $15 million in service contracts this year.

The Oracle software is used to handle customer claims that come in over the firm's toll-free WATS line. According to Askos, the process begins when a policyholder takes a covered vehicle to a repair facility where the vehicle is inspected, and an estimate is prepared. The mechanic then calls a Western National adjuster, who brings the customer's contract data up on his terminal.

From there, the Western National adjuster assigns an authorization number if the repair work is covered by the policy. He then gives the mechanic verbal authorization to proceed with the repair, and he later follows this up with a written authorization. When Western National receives the invoice for the repairs, the bill undergoes a complete audit prior to payment.

System cuts WATS bill in half

"The Oracle software is custom-programmed for this application, and it enables us to complete this complicated process in a timely manner," Askos said. The system, he explained, cuts the company's WATS bill in half.

And the system has kept up with the firm's rapid growth. "We handle an average of 200 claims calls per day, using nine full-time adjusters," Western National's president noted. "With that volume, our previous system would have required 14 people to handle the calls effectively."

In addition to the custom-programmed application, the system handles other general business applications, Askos maintained. "We use packaged programs to do standard business tasks, such as word processing and general ledger," he said.

The Oracle software also produces financial status reports in 15 to 20 minutes, Askos noted. Those reports are used to take as long as two to three hours to prepare, he explained. The complete system changeover was not without a few problems, Askos said, but claimed that all of the problems have been solved.

"Looking back to when we bought the system, what we saw as our growth potential was a conservative estimate. The system has kept up with our growth and not hindered it," he said. In 1984, the firm banked $9 million in service contracts, and Askos predicted that it will bring in $15 million in service contracts this year.

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According to Mike Guthrie, software development manager for the value-added reseller Professional Business Computer Systems, one of the problems was a delay in supplying the streaming tape needed to back up the system. This was temporarily solved using 5M-byte Syquest Technology, Inc. cartridges in place of the streaming tape. "This was an inconvenience, but the streaming tape is being installed now," Guthrie explained.

Askos stressed that the system's expandability is critical to his business. ""Looking back to when we bought the system, what we saw as our growth potential was a conservative estimate. The system has kept up with our growth and not hindered it," he said. In 1984, the firm banked $9 million in service contracts, and Askos predicted that it will bring in $15 million in service contracts this year.

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GE glass division sees clear solution to network problem

CLEVELAND — The mandate was clearcut: A group of engineering, marketing and finance professionals at General Electric Co.'s Glass and Metallurgical Products Department was charged with developing a material to market to the medical equipment industry.

The methodology was less simple: Project members were widely dispersed — located in offices at Cleveland headquarters, a second Cleveland manufacturing site and a third facility in Goldsboro, N.C. — and first had to figure out how to communicate effectively among themselves.

Each project member had access to telephones with automatic dialing, an electronic mail system and IBM Personal Computers or compatibles. But communications processes were fragmented, according to Judy Fowler, a GE marketing manager and project manager for the group. "We needed a system that would link us all together," she recalled in a recent interview, "so that we could send messages and computer files easily and quickly."

Several options considered

Among the options that the group's engineers considered were modems and terminal emulation software, desktop voice/data systems and a companywide IBM mainframe that was soon to be installed.

In researching the options, the group's requirements became more clearly defined. Traditional communications and networking solutions were too complex to install, maintain and use. What the group needed was a system that would allow personal computers to communicate with one another as well as connect to the companywide mainframe; provide electronic mail and extras like mail waiting, speed dialing and communications management; and do all of this without undergoing a lot of systems conversion for installation and diskette shuffling during actual operation.

Following its research, the group decided to install a desktop computer phone system from Cygnet Technologies, Inc., of Sunnyvale, Calif. Fowler explained the Cygnet, which works in tandem with IBM Personal Computers and compatibles.

"The system was performed as touted," Fowler reported. "In one sweep it filled all of our requirements."

Thirteen Cosystems purchased

The department purchased 13 Cosystem units for installation for the two Cleveland sites and two for the Goldsboro site. Features included a 400-name directory for calls and electronic mail, automatic redialing of a busy number, a speakerphone, a personal calendar and three-way teleconferencing capacity.

It was so easy to learn the system that users were sending messages, loading directories and executing the speed-dialing feature early on the first day of installation, Fowler said.

One initial problem involved sending Lotus Development Corp. 1-2-3 spreadsheet files from one user to another. Fowler said the file first had to be retrieved from a hard disk on the personal computer, copied into a Cosystem subdirectory and then sent to its destination. A letter would take 30 seconds to send in this manner, while a large worksheet might take two minutes. Cygnet's technical support group revised their software to streamline that routing scheme and cut down on the transmission time, Fowler said.

Cosystem's bookmarking features allow the user to enter and leave an application with no systems exits and no diskette changes, Fowler said. "I might be working on Lotus 1-2-3 spreadsheet when a question comes up. I can interrupt my work and mark my stopping place with a keystroke. Then I can go into my directory for a number, make a call using my speed dialing or send a message by electronic mail and, again in a keystroke, get back into [1-2-3] at the point where I left off," she explained.

One limitation exists

Cosystem does have one limitation, Fowler said. When a personal computer user on a Lotus spreadsheet wants to make an entry into a calendar, the user must sign off Lotus and sign on to the calendar — a 30-second to 1-minute process. "It didn't take all that long, but it is a nuisance," Fowler said. Simply viewing the calendar requires only one keystroke.

Cosystem can also communicate with GE Lighting Business Group central processors, a Honeywell, Inc. time-sharing system, and a Digital Equipment Corp. VAX-11/780 supermini running VMS.

The VAX contains engineering data for the design of the new product and requires its own compatible terminal or special emulation software. In a link to the VAX, the Cosystem acts as a smart modem and can be configured to transport data at the required form and speed. In this case, the Cosystems have been configured to communicate with both large computers, eliminating the cost of the special terminals, modems and software normally required for VAX.

"It is clear that we had many varied communications needs," Fowler said. "The Cosystem has addressed them in a cost-effective manner."

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We are about to deliver Jordache’s second Millennium version, Millennium 2.0. Even more advanced than the original. With it we send our thanks for believing in Millennium the first time around.
MEL KESTENBAUM has joined The Record, New Jersey's largest evening newspaper, as director of the Information Systems Department. Kestenbaum comes to The Record from McAuto Systems Group, a division of McDonnell Douglas Corp., where he was general manager/vice-president. He played a major role in the development of the division and its data center. Prior to that, he managed a corporate data center for Bradford National Corp., acquired by McAuto Systems in 1981. He holds a bachelor's degree in electrical engineering from City College, New York, and an M.S. in computer science from Pratt Institute, Brooklyn, N.Y.

U.S. Department of Transportation (DOT) Secretary Elizabeth Hanford Dole has sworn in JON H. SEYMOUR as the department's assistant secretary for administration. As assistant secretary for administration, Seymour is responsible for institutional management functions of the department, such as personnel, procurement, data processing, administrative services and management planning.

Seymour served as deputy assistant secretary for administration for approximately two years before his appointment. He began his government career at the U.S. Department of Justice in 1969, where he held a number of administrative and personnel positions before joining DOT.

A graduate of the University of Virginia with a bachelor of arts degree, he also holds a master of public administration degree from the University of Washington.

Grand Union Co. has elected WILLIAM E. KINSLOW as corporate vice-president in charge of management information systems. Kinslow is responsible for the MIS development and the operation of Grand Union's corporate data center in Paramus, N.J.

Prior to joining Grand Union, he was vice-president of corporate and technical services with First National Supermarkets of Windsor Lakes, Conn.

He earned a bachelor's degree in mechanical engineering from MIT and a master's degree in business administration from the Wharton School of Business and Finance at the University of Pennsylvania.

**You don't need a computer to figure out which is the best word processor.**

<table>
<thead>
<tr>
<th>MultiMate</th>
<th>Microsoft Word</th>
<th>DisplayWrite*3</th>
<th>WORDSTAR*</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1.0</td>
<td>6.10.0</td>
<td>9.1.3.0</td>
<td>9.1.0.3</td>
</tr>
</tbody>
</table>

- Easy-to-remember mnemonic commands
- Opening Text for Easy learning
- Built-in Format Sheets for Easy Documents
- "Undo" to easily reverse edit
- Built-in telecommunications
- Spelling Corrector
- Mail List Manager
- Windows OnScreen
- Four Function Math Built-in
- Subtractive and Negative Sorting Within Document
- "Hurry!" for Recycling Often Used Comment Sequences
- Supports over 100 printers
- Experience with over 3.3 million users

**WORDSTAR®**

Now there are no limits.

---

**Spring 1985 exec directory now available**

The spring 1985 issue of the Applied Computer Research, Inc. "Directory of Top Computer Executives" is now available, and several features have been added.

The directory is now published in Eastern and Western regional editions. In addition, middle-level data processing management positions have been added to each individual listing. These include managers of systems and programming, computer operations, communications and other titles.

Also, it is now possible to purchase minidirectories, or special computer-produced listings of select individuals or sites.

Examples of minidirectories are available for all DP shops, as a specific ZIP code or a nationwide listing of executives holding a particular title. The minidirectories are available in one or two-column format, either continuous or bound.

The directory format remains the same, listing installations with annual data processing budgets of $250,000 or more under a revenue of more than $50 million. The current issue lists executives in more than 8,250 data processing installations.

In addition to full names and titles, addresses and phone numbers, the directory lists the makes and models of the computer systems installed in each shop. Also, industry classification codes are used to identify the specific industry type to which each installation belongs.

The directory is organized geographically, city within state, and a cross-reference index by company name is included.

Applied Computer Research's "Directory of Communications Management" has been integrated with the computer executives' data base, and will no longer be published.

The executive directory costs $175 for a single copy and $275 for both issues published in a year.

The Eastern and Western regional editions are available singly at $45 for one issue or $150 for the year.

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This update and corrects comparisons with MultiMate which appeared previously. For a computer comparison chart, send: MicroPro, Dept. 2000, 33 San Pablo Ave., San Rafael, CA 94903. Specifications are for the latest version of all products effective July 1985. MultiMate is a trademark of MultiMate Corp.; Microsoft is a registered trademark of Microsoft Corp.; WORDSTAR and MicroPro are trademarks of MicroPro International.
IF YOU WANT TO SELL BUSINESS SOFTWARE TO THIS COMPANY, YOU BETTER DELIVER.

Flying Tigers was one of the first companies to see that borderless business software was the wave of the future. Their choice: The company that invented it, McCormack & Dodge. We created Millennium, a family of financial and human resources applications that aren't just borderless in name, but in fact.

Millennium eliminates boundaries between applications, letting you search through large data bases and effortlessly pursue information trails across systems.

Millennium applications are on-line, real-time, integrated with all major data bases. The complete Millennium family includes an interactive PC link and systems development tool.

We are about to deliver Flying Tigers' second Millennium version, Millennium 2.0. Even more advanced than the original. With it we send our thanks for believing in Millennium the first time around.
WHO SAYS WORDSTAR 2000 IS SO GREAT?

"Move over MultiMate, MicroPro's back on top."
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"The new package is packed with virtually dozens of features everybody wants... Even in a dedicated machine, word processing has never been more plumply self contained and comprehensible."
— Personal Computing

"Three early users of WordStar 2000 gave the program high marks for its overall design, mnemonic command set and intelligent use of function keys."
— ComputerWorld

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— Popular Computing

"Include WordStar 2000 on your shopping list—it's competitive with anything now on the market."
— Computers and Electronics

WEEK OF NOVEMBER 10

NOVEMBER 10-13, BALTIMORE
— The Ninth Annual Symposium on Computer Applications in Medical Care (SCAMC). Contact: Gail Mutnik, Symposium Coordinator, SCAMC, Secretariat: Office of Continuing Medical Education, George Washington University Medical Center, 2300 K St. N.W., Washington, D.C. 20037.


NOVEMBER 12, NEW YORK — T-4 Carrier Strategies. Contact: DMW Group, Inc., Seminar Division, 2020 Rogback Road, Ann Arbor, Mich. 48104. Also being held Nov. 20 in Boston and Dec. 3 in Los Angeles.


RELATIONAL DATABASE MANAGEMENT SYSTEMS FOR COMMERCIAL APPLICATIONS. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.


NOVEMBER 18-19, BOSTON — Software Tools Conference. Contact: Suffolk University, Boston, Mass. 02108.


NOVEMBER 18-19, TORONTO — End-User Computing: Managing Information Centers. Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44135.


NOVEMBER 18-22, ATLANTA — The James Martin Seminar. Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402. Also being held Dec. 2-6 in Philadelphia.


NOVEMBER 20-21, ROSEMONT, ILL. — Network Management/Technical Control. Contact: Louise Myrow, Registration Manager, CW/Conference Management Group, 375 Cutchogue Road, Framingham, Mass. 01701.

NOVEMBER 20-24, LAS VEGAS Comdex/Fall '85. Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.


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Millennium eliminates boundaries between applications, letting you search through large data bases and effortlessly pursue information trails across systems. Millennium applications are on-line, real-time, integrated with all major data bases. The complete Millennium family includes an interactive PC link and systems development tool.

We are about to deliver Herman’s World of Sporting Goods’ second Millennium version, Millennium 2.0. Even more advanced than the original. With it we send our thanks for believing in Millennium the first time around.

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McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760, 1-800-343-0325
Now that there’s a standard, we’ve built it into the Net/One Personal Connection, extending Microsoft Networks with IBM’s NETBIOS interface.

Because the Net/One Personal Connection adheres to the NETBIOS industry standard network interface, it’s compatible with the applications you’re already running, as well as any you want to run in the future. It’s compatible with all your IBM-compatible devices, and with all the people who’ve already learned to use them.

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systems supplier, the Personal Connection opens doors for PCs like no mere PC net can. So now, Net/One can connect any PC to any host or any other PC, company-wide, from one environment to another, from one department to another, with the same familiar DOS commands everybody already knows.

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Like any Net/One product, the Personal Connection comes with continuing, expert support from our worldwide field service organization.

Give us a call, and let us show you how to let real productivity emerge as standard for your PCs.


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emerged for networking PCs.
LAN meets it. Net/One.
THE BEST COMPOSER
SHOULD HAVE
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"Rousing Performance"
SyncSort allows you to perform like a virtuoso, drawing out the best your IBM Mainframe has to give.

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SyncSort's features will impress even the most jaded impresarios, increasing programmer productivity and operational flexibility.

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- Record Editing—allows insertion of literals, commas, $, etc. as well as editing, repositioning or elimination of record fields, thereby reducing programming time.

- Fast File Copy—dramatically reduces the consumption of mainframe resources. All standard sorting features (Include/Omit, Inrec/Outrec, Sum, etc.) as well as SyncSort's unique features can be activated in a normal copy operation.

- Maxsort—provides powerful operational flexibility in sorting very large files. Sorting of these files is automatically broken into optimal steps, executable at different times; thus, the amount of data that can be sorted is no longer restrained by the amount of disk space available.

"Impressive Backstage Support"
Our Technical Service people, resolving more than 85% of all requests for technical service within 24 hours, will make you look like a star. A recent independent survey showed that 97% of SyncSort's users rate our product reliability as Very Good or Excellent.

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When users wed vendors

Groups' independence, equal status key for users

By John Gallant

WASHINGTON, D.C. — The relationship between a software vendor and an independent users group is best described as "like a marriage," according to Richard Accurso.

"There are certain things each party really likes about the other," said Accurso, who is executive chairman of the Software International Corp. (SI) Users Group. "And there are times when you cannot see eye-to-eye. When either party stops listening, the dialogue ends and antagonism begins." Accurso and his international counterpar- tnxr, the chairman of the UK and Australia- nian SI users organizations, spoke about the problems involved in running a users group at the recent 1985 SI Users Group conference. All three agreed that the most important asset a users group can have is independence from the vendor.

"A certain amount of the users group's power is taken away when it is vendor sponsored," Accurso said. "If the group does something that the vendor dislikes, the vendor can use its support as a lever to change things. There are things that occur at our conferences that Software Interna- tional does not like. But because we are inde- pendent, we can continue to do them. The independence puts the dialogue be- tween users and vendor on an equal ba- sis."

"I could not agree more strongly," claimed Laurie West, chairman of the Aus- tralian Users of Software International. "The users group should really strive to be independent, we can continue to do them. The independence puts the dialogue be- tween users and vendor on an equal ba- sis."

Continued on page 70
Introducing Symphony’s micro-to-

It’s called Symphony Link. And yes, in some respects, it resembles what you’ve already seen from mainframe developers.

But Symphony Link is different. First of all, Symphony Link is designed from an end-user point of view as well as a data processing point of view. It’s an Add-in product designed to work within Symphony software—Lotus’ 5-function management software for the IBM PC.

Two, Symphony Link isn’t just a terminal emulator and file transfer program. It goes well beyond that—using an IRMA™ board, it actually integrates mainframe applications into a personal computer (i.e., Symphony) application.

Three, it’s an applications development tool.

Four, it’s an open-ended product.

Now then. Let’s look at the specifics.

Users can bring any 3270 screen directly into a Symphony application.

There is no retyping involved with data capture. That, of course, translates into the obvious benefit of error-free transfer and data integrity.

As for data transmittal, whatever data is created off-line within Symphony can be sent screen by screen back to the mainframe using a single, simple set of commands. Naturally, this allows the user to make the best use of host processing time.

Symphony Link uses the standard Lotus interface to transfer files to and from the VM/CMW and MVS/TSO operating environments. At a user level, the standard Lotus interface enables people to work the way they are accustomed to—an important advantage considering all the capabilities Symphony can provide end-users.

Additionally, because Symphony Link
utilizes 3270 networking resources and protocols, it requires no network modification.

Two unusual benefits for the data processing manager.

Symphony Link has its own command language which includes 3270 key functions. This lets you customize and control the linking of PCs to your mainframe—even develop applications—all of which helps the end-user work more productively.

Also, Symphony Link is an open-ended product. This allows Lotus to work jointly with mainframe software developers to customize Symphony Link to many mainframe applications (e.g. Cullinet's Information Center Management System™).

How everyone else benefits.

Symphony Link is from Lotus. Nobody is more committed to developing effective tools for business managers, personal computer users and data processing managers than we are.

Symphony Link, like every other Lotus product, comes with the full service support and training that have become the standard in the industry.

Symphony Link isn't just another emulation product; it isn't just another link product; it isn't, for that matter, just another micro-to-mainframe product.

And that's precisely why you should find out about it. Call (617) 253-9172; outside Massachusetts, call 1-800-554-5501.

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IBM is a registered trademark of International Business Machines Corporation. Information Center Management System is a trademark of Cullinet Software, Inc. IRMA is a trademark of Digital Communication Associates, Inc.
Software available for Apollo’s Domain

Apollo Computer, Inc. has announced that it has developed software packages for use with its Domain System, a 32-bit graphics workstation and local-area network. The manufacturing packages are designed for discrete and batch manufacturing operations and address applications such as quality control, group technology, process planning, shop-floor data acquisition and control and electronic device and manufacturing process simulation.

The packages include the Stat80 information management package from Indus Systems, Inc.; The Manager II data collection package from Industrial Area Network; and the Datawatch graphics workstation and language designed for discrete and batch manufacturing operations and address applications such as quality control, electronic device and manufacturing process simulation.

Also available is the Delco menu-driven language for developing manufacturing systems that was developed by CAM Software Laboratory of Brigham Young University; Cutdata, a computerized version of a machining reference book, from Mecut Research Associates, Inc.; the Qscript statistical process control and quality assurance programs from Quality Information Systems, Inc., and Quality 1, Quality Net and Qscript statistical process control packages from Quality Information Systems, Inc.

European versions of the same programs offered by American Channels — dubbed Centre Plan, Centre Data, Diad and GNC — are being offered by Cadcentre Ltd.

All the software is compatible with Apollo’s Aegis operating system. Software from Pritsker & Associates and Quality Information Systems is compatible with Aegis and Domain/IX.

Oracle DBMS fit for Geos

Honeywell, Inc. has announced that Oracle Corp.’s Oracle relational database management system is now supported under Honeywell’s Geos 6 MOD 400 operating system on the company’s 16-bit DPS 6/70 and 6/75 small systems and on its DPS 6/85 and 6/95 32-bit minicomputers.

Dubbed MOD 400 Oracle, the software has been ported by Honeywell and is said to be compatible with Oracle implementations on other vendors’ hardware. MOD 400 Oracle is based on Oracle Version 4.1 with an active data dictionary, interactive applications facility, report writer and integrated security and integrity controls.

Optional modules include the MOD 400 program languages facility, using embedded IBM SQL statements to enable the Cobol, Fortran and C programming languages to access the Oracle database. A load facility developed by Honeywell allows interactive data loading of an Oracle database from a Honeywell DM6 1-D/S-II data base.

MOD 400 Oracle provides a set of utilities and tools to allow users to build their own information systems without traditional programming within the MOD 400 environment. The tools include a user-friendly interface, an Oracle data loader and applications development facilities.

MOD 400 Oracle is available now on DPS 6/70, 6/75, 6/85 and 6/95 minicomputers. Initial licensing fees are $7,975 for the DPS 6/70 and $14,500 for the other systems.

The optional MOD 400 program development facility has initial primary license fees of $5,425 and $9,800 for the DPS 6/70 and the other systems, respectively. The Oracle 1-D/S-II load facility carries an initial license fee of $16,200 on the DPS 6/70 and $1,500 on the other systems.

DEC RPG-II service bows

Digital Equipment Corp. has announced a service that allows users of IBM System/3, System/34 and System/36 minicomputers to transfer application programs written in IBM’s RPG-II to DEC VAX systems.

The RPG-II Migration Assistance Service is targeted to provide an alternative for IBM users who need to upgrade to a larger system or add networking capabilities to their minicomputers. RPG-II is installed in an estimated 70,000 sites, a spokesman said.

DEC provides one week of on-site planning assistance, conversion software, a manual and one year of telephone assistance. The price of the service is $15,000 for migration to the Microvax II and $20,000 for migration to the mid-range or larger VAX systems.

Converged RPG programs run under the VAX VMS operating system. The converted programs can run on any size VAX processor without modification, according to a spokesman.
Why do our customers choose Data Design financial software systems over the three largest vendors?

—David Lowry
President, Data Design

Because they did their homework. They talked to our customers and found out that for over 12 years, hundreds of Fortune 1000 companies have had exceptional results from financial software systems by Data Design.

They discovered what nationally recognized software surveys confirm year after year: that Data Design has an unsurpassed record of user satisfaction.

They learned they can expect fast, trouble-free implementation with our systems.

They were told that our systems are exceptionally flexible and easy to use.

They found out about our reputation for in-depth training and responsive, knowledgeable support.

They were told that Data Design places only management level people in customer service positions. People who average over 10 years experience—not trainees.

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And find out why 68% of our customers, who previously had other vendor's systems in place, have now decided to use systems by Data Design.

To learn more about the best financial software available, call toll-free 800-556-5511 or complete and mail the coupon today.
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Introducing the Sun-3™ series of workstations:
Maximum 68020 performance. In an open system. At a minimum price.

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Sun-3 performance enhancements include:
Increased integer performance by a factor of 3, and increased floating point calculation speed by a factor of $15^*$ over 68010-based systems. A 50% increase in I/O speed with a 32-bit VMEbus. Up to 16MB on-board RAM. Up to 256MB virtual memory per process.

And faster delivery speed by a factor of months.

Sun's Open Advantage
Sun's open attitude recognizes that technology is moving too fast, in too many diverse directions to be effectively addressed by any one computer company. So, we elegantly integrated industry standards for hardware, software and data communications throughout every Sun Workstation™ system to allow our customers to benefit from the diverse activities of every other open-minded company.

Sun made this relationship particularly attractive to end-users and third-party developers by: revolutionizing UNIX* networking capabilities, greatly increasing the number of design tools in the already comprehensive UNIX toolchest, and, improving user interfaces to allow easier control of UNIX capabilities.

Open Opportunities
Sun's Catalyst third-party referral program presently boasts over 350 advanced products. Combined with the Sun-3’s tremendous speed and enhanced capabilities, Catalyst products can open entirely new doors for your company into previously cost-prohibitive, computationally-intensive applications such as logic simulation, 3-D finite element analysis and knowledge-based systems.

Sun's Network File System (NFS) and SunLink™ products (SNA 3270 and BSC RJE IBM gateways, and Internetwork Router for linking remote Ethernets) assure that your engineering teams have access to all the computing resources they need.

Mainframes. Minis. PCs.
Local or not, UNIX or not.
With Sun, your existing computer investment is protected, your future purchase options left open.

Sun workstations: open architecture, open network, wide open possibilities. To find out more about the Sun Microsystems™ family of high performance workstations, write: Sun Microsystems, Inc., 2550 Garcia Avenue, Mountain View, CA 94043. Or, simply call (800) 223-OPEN. In California (800) 322-OPEN.
### Ucell offers management system for Sperry users

Ucell Corp. of Dallas has released the Resource Management System (RMS), a set of five integrated packages for Sperry Corp. 1100 series mainframes that is said to provide management information on data center usage.

The Resource Accounting Module, RMS-1, tracks connect time, storage use and machine cycles. System performance and use statistics are captured by the Workload Capacity Planning Module, RMS-2, according to the vendor.

The Hardware and Equipment Tracking Module, RMS-3, reportedly monitors inventory of data center hardware, remote terminals, personal computers and communications equipment.

Through RMS-4, its Problem Tracking System, the software is said to help managers follow user system or data center problems from initial report through resolution.

The Generalized Graphics System, RMS-5, displays data center information in color charts, the vendor noted.

RMS packages may be purchased separately or together as an integrated system. Individual module prices range from $10,000 to $29,000.

### DEC All-in-One users gain access to SAS System tools

SAS Institute, Inc. of Cary, N.C., announced that its SAS System software now executes from Digital Equipment Corp.'s All-In-One office software.

A spokesman said that SAS users now have the option of defining the SAS System as a menu option within All-In-One.

The menu-driven interface enables users to access SAS System graphics and analysis capabilities through the same interface used for other office functions.

The All-In-One system works with Version 5 SAS System products including base SAS software for data management, statistical analysis and reporting; SAS/Graph; SAS/AF for interactive applications development; and SAS/PSS for full screen information processing.

The system also works with SAS/OR for project planning and decision support; SAS/ETS for planning, forecasting and financial modeling; and SAS/IML for data analysis and manipulation using an interactive matrix facility.

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**THE WORLD'S MOST POWERFUL SPREADSHEET**

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**SPEED**
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- Consolidate unlike sheets

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- Users can define their own functions and procedures which are available system wide

**POWERFUL FEATURES**
- Many spreadsheets can be "PAINTED" without entering formulas
- Cells, rows and columns can be addressed using meaningful names such as SALES, COSTS, TOTALS
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- Provides data entry and ad-hoc query capabilities

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- Control Security at the spreadsheet, user or file level
- Security is easily implemented even for classes of users

**ONLINE HELP**
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- Text Editor provided to allow user-defined documentation

**MARKETING**
- FUTURE-CALC is being purchased by many companies who previously acquired other mainframe spreadsheet software because FUTURE-CALC:
  - Runs much faster and uses 80% less file space
  - Is easier to use and has much more power
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**FREE TRIAL**
- For a free 30-day trial or a brochure, contact Future Software

**EXHIBITING**
- At INFO '85 • Booth 4638 • New York Coliseum • October 14-17

### Micro-based HRMS bows

Control Data Business Centers, Inc. of Greenwich, Conn., has announced a human resources management system (HRMS) that integrates microcomputer-based personnel software with its payroll processing services.

Control Data Business Centers has contracted with Mainframe Micros, Inc. of New York to market and sublicense its HR-1 personnel application system as part of the complete HRMS.

HR-1 uses the Revelation data base manager by Cosmos, Inc. of Seattle. Revelation requires an IBM Personal Computer, Personal Computer XT or AT with a minimum of 612K bytes of memory, a hard disk and an 8087 math coprocessor chip.

HRMS links HR-1 to Control Data Business Centers' Payroll 4, a processing service that runs on IBM 4300 mainframes, using its Orcherstrator micro-mainframe link software.

HRMS is said to provide storage of more than 500 data elements on each employee with unlimited historical records, audit record and multilevel security, standard and ad hoc reports and a review of accumulated retrieval of salary, performance and other information.

There are 35 data elements that will automatically post from HR-1 to the payroll system and 108 user-defined data elements that will flow from the payroll service to the personnel file.

HRMS is available for $18,500, including installation and training. It is also available on a monthly basis for $1,200 plus a maintenance fee based on the number of employees. There are also monthly fees for payroll processing.

---

"I told you it was expandable."
PC/FOCUS outloads, outruns, outperforms and outreports dBase III™ and R:Base™ 5000.

Don't believe us. Believe National Software Testing Laboratories of Philadelphia. They proved PC/FOCUS to be clearly superior to dBase III™ and R:Base™ 5000. Here's how:

Several real-world, business situations were created to examine each system's speed and capability.

Their findings are published in an extensive report now available to you free of charge. Their results, as stated by NSTL, showed that... "PC/FOCUS was faster overall than the other programs tested."

For example... 

Database Loading:
In this test series, database loading time for each DBMS was measured by loading three transaction files. Eight separate test runs were conducted, with PC/FOCUS averaging 20.2% faster than dBase III™ and 37.3% faster than R:Base™ 5000.

Database Reporting:
Report requests of various levels of complexity were run against single and multiple databases. Eighteen separate test runs were conducted, with PC/FOCUS averaging 45.2% faster than dBase III™ and 40.0% faster than R:Base™ 5000.

REPORTING FROM DATABASES AVERAGE ACROSS 18 TEST RUNS

<table>
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<td>PC/FOCUS</td>
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</tr>
<tr>
<td>R:Base 5000</td>
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</tr>
<tr>
<td>dBase III</td>
<td>407.9</td>
</tr>
</tbody>
</table>

There's more to the study than can be described in this ad. Lots more tests...and much more proof. So, we've reproduced the NSTL Performance Comparison in full. To obtain your free copy, just fill out the coupon and mail it to Donald Wszolek, Dept. R1, Information Builders, Inc. 1250 Broadway, New York, NY 10001.

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You're more secure with TOP SECRET. We made TOP SECRET a no-nonsense security program right from the beginning. Everything you need for total MVS protection is part of the product. And it only improves with age.

At the core is a unique user-to-resource architecture that controls access to your facilities, resources and data at the people level. Where security really takes place.

With TOP SECRET, security never stops you from keeping up with processing demands. In short, we make sure the good guys get to authorized data quickly. And the bad guys get caught right away.

No fault default. ACF2's design philosophy gives you "protection by default." Everything is off limits to everybody until you give specific access authority otherwise.

Although ACF2 gives you options to relax this restriction, it still checks security authorizations for each resource—even those you chose not to protect.

TOP SECRET gives you default protection, too. But TOP SECRET lets you choose the best time to introduce it.

With TOP SECRET you efficiently secure resources and users in logical sequence without imposing unnecessary security checking and overhead.

And that's our secret: we make it easy to fit the world's best data security into the busiest dp schedules.

Fast, flexible security. For the way you do business. Whether you have 1000 branch offices in fifty states or hundreds of users in one location, TOP SECRET lets you custom-tailor security for a perfect fit to your organization.

ACF2 rules must be compiled each time they're changed, so ACF2's security is more suited to centralized administration.

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Stratagem version bows

Boston-based Integrated Planning, Inc. has announced the Screenmaster option in Version 5 of its Stratagem IBM mainframe decision support system.

Screenmaster allows users to gain interactive access to mainframe information through menu-driven commands. More experienced users can bypass the menus to work at command level. Screenmaster also includes a screen painting facility and a full screen data editor. The screen painter lets users develop custom terminal screens for data entry and executive information systems. Information can be entered anywhere on a blank screen, and programmed function keys let users to add information as a field and to give fields attributes like color, highlighting and security protection.

The full screen editor allows users to manipulate data on the screen while protecting field names. Programmed function keys control scrolling across as well as up and down the screen.

Stratagem runs on IBM mainframes under VM/CMS and MVS/TSO. It also works with Digital Equipment Corp. VAX and Prime Computer, Inc. Prime-based processors. Existing users of Stratagem will receive Version 5 at no cost. The Screenmaster option costs $10,000. The IBM version of Stratagem with Screenmaster is priced at $95,000.

From page 55

Productivity key to growth

nance, well, maintenance is a sadder story altogether.

Consider that anywhere from 50% to 75% of the software professionals at work today — valued and scarce employees whose talents could be directed toward producing new systems that address vital business functions — spend their time just keeping old software systems plodding along. And each passing day distorts the ratio of developers to maintainers, and not in a favorable manner.

Not meeting needs

These systems are already running on computers. They are not meeting new needs, nor are they prompting users to buy any more iron, so to speak. New applications meet new needs and consume new hardware.

But who's going to build them? And with what? If users continue to rely on the same tools, an ever smaller number of new applications will be built.

But even those few new systems will join the ranks of those that must be maintained, and the ratio described above shifts even more unfavorably.

Deadly cycle?

Sound like a deadly cycle? It is. Without the proving changes likely to be broken in the near future. It seems that the revolutionary software advance, the one that will provide a feasible method for drastically increasing systems development productivity, is always out of reach.

With all the so-called productivity tools available today? Good question. While the vendors must be lauded for their efforts, it seems there is no single product that can solve the problem. Each approach has its flaws or limits.

There are no standards among tools such as fourth-generation languages; many productivity products take their toll in machine performance (although, admittedly, that has become less of an issue), and there is little portability among the systems developed with said tools. In terms of maintenance of existing systems, users agree that the products to help with that task just aren't out there.

End-user computing

OK, how about end-user computing? Come on. End users, with the help of some fourth-generation languages, many productivity products, or query tools, may happily draft a quick report, design a small program or draw together some statistics in a presentable format.

But the average end user cannot and will not in the foreseeable future build the sophisticated software systems that U.S. business is going to need to compete and survive in the future.

Well, there is always artificial intelligence. Not so. The promise of AI will be quickly stilled if users and vendors cannot find a rapid way to build the incredibly complex systems that AI proponents envision.

Heart of AI is software

The heart of AI is software, not LISP machines or parallel processors. And AI software developers will suffer the slings and arrows of outrageous fortune that their earlier systems predecessors suffered.

Perhaps the problem lies in the insistence by users and vendors that all advances in software be evolutionary in nature. Vendors are so concerned with locking down their users and users so concerned with what already exists that revolutionary changes — the kind of changes that must happen if the computer industry is to smash the productivity barrier — are virtually uncontrollable.

It seems clear that if users and vendors continue along the same software path they stride today, the near future will see a vast chasm between the potential of hardware and the stunted reality of software. A lot of promising changes will be lost forever in that chasm.

OCTOBER 14, 1985
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Although we're told that saddlemakers were all for the idea, and submitted some rather startlingly innovative ideas, breeding the perfect family horse just didn't seem right to Mr. Ford. His mind took a different tack, a new line of thought. A line of assembly. A whole new approach to providing people with a way to get from where they were...to where they wanted to go.

A whole new approach. That seemed like an excellent starting point for a relational database. We did not want to simply rewrite an arcane programming language or rework an old mainframe database.

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Second, Paradox brings a rather revolutionary new concept to personal computer technology. Known in artificial intelligence circles as "machine reasoning," Paradox uses this feature to evaluate your request and, on its own, writes a program for you that seeks the answer in the fastest possible way. Paradox then exe-
cutes this program and produces the answer. You don't need to know how the information is organized, how to best approach the problem or how to write a program. The advantages of these features, aside from being rather fascinating we think, are incredible speed, an easy-going experience and a real opportunity to do more with a database than ever before.

If all of that sounds terrific but you're concerned about "driver's education," don't worry. The familiar Lotus-like menu is only one of many ways we've made Paradox easy to use. You'll hum right along.

There's a lot more we'd like to tell you about Paradox (which explains the very last paragraph), but you've really got to see it. All of this may give you that "easier said than done" feeling, when in truth, it's now "easier done... than said." We hope you'll visit your computer retailer and see it all for yourself. You'll see a lot more than just an improved breed. You'll see a whole new way to handle data on the IBM* PC line, the Compaq* line and other 100% compatibles. A new way to get where you want to go with power and ease. We started from a clean base and now, it seems, we've left the others in the proverbial dust. Paradox. The Base of Departure.

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Independence, equal status key for users

on a friendly footing with the vendor, but it has to remain totally independent if it is to have any impact. D. J. Batts, chairman of the M.S. User Group, the UK equivalent of the SI Users Group, said the most difficult problem his group faces is that it deals with an agent of SI and not the vendor itself. "Thus, the things we really push for are not so much enhancements to the products as improvements in the service we receive from the agent," Batts said. "We cannot apply the same pressure on SI that the U.S. group can. But we can influence the distributor to service our products better, to provide additional hardware support and to modify the documentation for UK users."

Accurso said approximately 40% to 50% of the proposed changes in his organization's product-specific working groups submit to SI ultimately get incorporated as enhancements to the company's packages. Although satisfied with that level of responsiveness, Accurso said the dialogue between the two parties could improve in the area of enhancements.

"There are steps that could be taken to smooth the process out," he said. "For example, we would like a little more acknowledgement of why certain proposals are not folded into the products as enhancements. We document the reasons for our proposals as very carefully, and we think they should document their responses as clearly. That is, after all, the whole basis of our relationship — understanding.

All user-suggested enhancements are forwarded to SI, Accurso said, although committee members prioritize them according to their importance for the vendor. "You have to do that," West said. "A group that is always pushing for changes that are just nice to have rather than important is not going to be effective."

Bylaws should be carefully drafted

When asked what advice they would offer others considering forming a users group, the chairman agreed that the bylaws governing committee and conference operations should be carefully drafted to ensure that a sound structure. They also advised beginners to follow the steps taken by other successful users group founders and, above all, to keep the organization's structure as simple as possible.

West said users should follow the Kiss principle. "Keep it simple, stupid," he said. "You cannot hope to accomplish everything on day one." But, Accurso cautioned, fledgling users groups should not be afraid to tackle new challenges. "You have to try new ways of doing things. Some of the efforts fail, but it is beyond what you would have imagined.

At the recent SI Users Group conference in Washington, D.C., Software International officials lauded the group's efforts and said that many of the capabilities of the company's recently unveiled Masterpiece series applications are built on proposed users group enhancements. Accurso appreciated that recognition.

"We believe that the stronger the vendor, the better off the users will be," Accurso said. "We are trying to help SI become stronger."

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Is your DBMS really relational?

Rule Zero: For any system that is advertised as, or claimed to be, a relational database management system, that system must be able to manage data bases entirely through its relational capabilities.

By E. F. Codd

In recent years, the database management system market has undergone a very rapid swing in favor of products that take the relational approach to database management. It is hard to find a vendor that does not claim its DBMS is relational. This swing has been so extensive that some vendors of nonrelational DBMS have quickly (and recently) added a few relational features — in some cases, very few features — in order to be able to claim their systems are relational, even though they may not meet the simple requirements for being rated "minimally relational." We shall refer to this kind of DBMS as "born again."

It is a safe bet that these Johnny-come-lately vendors have not taken the time or manpower to investigate optimization techniques needed in relational DBMS to yield good performance. This is the principal reason they continue to proclaim the "performance myth" — namely, that relational DBMS must perform poorly because they are relational.

One consequence of this rapid swing of the market to the relational approach is that products that are claimed by their vendors to be relational DBMS range from those that support the relational model with substantial fidelity to those that definitely do not deserve the label "relational," because their support is only token.

Some vendors claim that fourth-generation languages will provide all the productivity advantages. This claim conveniently overlooks the fact that most of these languages do little or nothing for shared data (the programming language fraternity

E. F. Codd is the originator of the relational model for data base management. He was the leader of the team that designed and implemented the first operating system with multiprogramming capability. Currently he is president of The Relational Institute and the Codd & Date Consulting Group, both based in San Jose, Calif.
still does not appear to realize that
support for the dynamic sharing of
data is an absolute requirement). In
addition, there is no accepted theo-
retical foundation for fourth-genera-
tional languages and not even an ac-
cepted, precise definition.
This article outlines a technique
that should help users determine
how relational a DBMS really is. Ac-
cordingly, I shall discuss the follow-
ing:
- The fidelity of DBMS to the rela-
tional model.
- The fidelity of the proposed
Ansi SQL standard to the relational
model.
- Conclusions regarding choosing
a DBMS product.
I shall not attempt a complete de-
scription of the relational model here
— a relatively brief and concise defi-
nition appears in the article "RM/T:
Extending the Relational Model to
Capture More Meaning," (Chapter 2,
"The Basic Relational Model") in the
Association for Computing Machin-
ery’s "Transactions on Data Base
Systems" (December 1979). It is,
however, vitally important to re-
member that the relational model in-
cludes three major parts: the struc-
tural part, the manipulative part and
the integrity part — a fact that is
frequently and conveniently forgot-
ten.
In this paper, I supply a set of
rules with which a DBMS should
comply if it is claimed to be fully
relational. No existing DBMS prod-
act that I know of can honestly
claim to be fully relational, at this
time.

The fidelity of the proposed Ans
standard to the relational model is
even less than that of
some relational DBMS products. However, the
standard could be readily modified to be more
faithful to the model, and pressure should be
brought on Ansi to do so.

The proposed Ansi standard does
not fully comply with the relational
model, because it is based heavily on
that nucleus of SQL that is supported
in common by numerous vendors.
Moreover, it takes a static, schema-
based approach to data base descrip-
tion — reminiscent of Codasyl —
instead of specifying a comprehen-
sive, dual-mode data sublanguage
that provides the powerful yet easy
access to relational data bases and
that is unique to the relational ap-
proach. Thus, the fidelity of the pro-
posed Ansi standard to the relational
model is even less than that of
some relational DBMS products.
However, the standard could be
readily modified to be more faithful
to the model, and pressure should be
brought on Ansi to do so. In fact,
vendors are advised to extend their
products soon in these respects so
that they support customers' DBMS
needs more fully and avoid possibly
large customer expenses in applica-
tion program maintenance at the
time of the improvement.

The 12 rules
Twelve rules are cited below as
part of a test to determine whether a
product that is claimed to be fully
relational is actually so. Use of the
term “fully relational” in this report
is slightly more stringent than in my
Turing paper (written in 1981). This
is partly because vendors in their
ads and manuals have translated the
term “minimally relational” to “fully
relational” and partly because in
this report, we are dealing with rela-
tional DBMS and not relational sys-
tems in general, which would include
mere query-reporting systems.
However, the 12 rules tend to ex-
plain why full support of the rela-
tional model is in the users' interest.
No new requirements are added to
the relational model. A grading
scheme is later defined and used to
measure the degree of fidelity to the
relational model.
First, I define these rules. Al-
though I have defined each rule in
earlier papers, I believe this to be the
first occurrence of all 12 of them
together.
In rules eight through 11, I specify
and require four different types of
independence aimed at protecting
customers' investments in applica-
tion programs, terminal activities
and training. Rules eight and nine —
physical and logical data indepen-
dence — have been heavily dis-
cussed for many years.
Rules 10 and 11 — integrity inde-
pendence and distribution indepen-
dence — are aspects of the relational
approach that have received inade-
quate attention to date but are likely
to become as important as eight and
nine.
These rules are based on a single
foundation rule, which I shall call
Rule Zero:
For any system that is advertised
as, or claimed to be, a relational
data base management system, that
system must be able to manage data
bases entirely through its relational
capabilities.
This rule must hold whether or
not the system supports any non-
relational capabilities of managing
data. Any DBMS that does not satis-
fy this Rule Zero is not worth rating
as a relational DBMS.
One consequence of this rule: Any
system claimed to be a relational
DBMS must support data base insert,
update and delete at the relational
It's lonely out there for the corporate PC user, isolated from the company's database. It's lonely for the DP/MIS pack, too, charged with ensuring that the proliferation of PCs promotes order, not chaos.

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level (multiple-record-at-a-time). Another consequence is the necessity of supporting the information rule and the guaranteed access rule.

"Multiple-record-at-a-time" includes as special cases those situations in which zero or one record is retrieved, inserted, updated or deleted. In other words, a relation (table) may have either zero tuples (rows) or one tuple and still be a valid relation.

Any statement in the manuals of a system claimed to be a relational DBMS that advises users to revert to some nonrelational capabilities to achieve acceptable performance — or for any reason other than compatibility with programs written in the past on nonrelational databases — should be interpreted as an apology by the vendor. Such a statement indicates the vendor has not done the work necessary for achieving good performance with the relational approach.

What is the danger to buyers and users of a system that is claimed to be a relational DBMS and that fails on Rule Zero? Buyers and users will expect all the advantages of a truly relational DBMS, and they will fail to get these advantages.

Now I shall describe the 12 rules that, together with the nine structural, 18 manipulative and three integrity features of the relational model, determine in specific detail the extent of validity of a vendor's claim to have a "fully relational DBMS."

All 12 rules are motivated by Rule Zero defined above, but a DBMS can be more readily checked for compliance with these 12 than with Rule Zero.

### Rule 1: All information in a relational data base is represented explicitly at the logical level and in exactly one way — by values in tables.

The information rule.

### Rule 2: Each and every datum (atomic value) in a relational data base is guaranteed to be logically accessible by resorting to a combination of table names, primary key values, and column names.

Guaranteed access rule.

### Rule 3: Null values (distinct from zero or any other number) are supported in fully relational DBMS for representing missing information and inapplicable information in a systematic way, independent of data type.

Systematic treatment of null values.

### Rule 4: Foreign key columns.

To support data base integrity, it must be possible to specify "nulls not allowed" for each primary key column and for any other columns where the data base administrator considers it an appropriate integrity constraint (for example, certain foreign key columns).

Past techniques entailed defining a special value (peculiar to each column or field) to represent missing information. This would be most unsystematic in a relational data base because users would have to employ different techniques for each column or domain — a difficult task because of the high level of language in
use (and a task that I believe would decrease user productivity).

Dynamic on-line catalog based on the relational model.

Rule 4: The data base description is represented at the logical level in the same way as ordinary data, so that authorized users can apply the same relational language to its interrogation as they apply to the regular data.

One consequence of this is that each user (whether an application programmer or end user) needs to learn only one data model — an advantage that nonrelational systems usually do not offer (IBM's IMS, together with its dictionary, requires the user to learn two distinct data models).

Another consequence is that authorized users can easily extend the catalog to become a full-fledged, active relational data dictionary whenever the vendor fails to do so.

Comprehensive data sublanguage rule.

Rule 5: A relational system may support several languages and various modes of terminal use (for example, the fill-in-the-blanks mode). However, there must be at least one language whose statements are expressible, per some well-defined syntax, as character strings and that is comprehensive in supporting all of the following items:

- Data definition.
- View definition.
- Data manipulation (interactive and by program).
- Integrity constraints.
- Authorization.
- Transaction boundaries (begin, commit and rollback).

The relational approach is intentionally highly dynamic — that is, it should rarely be necessary to bring the data base activity to a halt (in contrast to nonrelational DBMS). Therefore, it does not make sense to separate the services listed above into distinct languages.

In the mid-70s, the Ansi Standards Planning and Requirements Committee generated a document advocating 42 distinct interfaces and (potentially) 42 distinct languages for DBMS. Fortunately, that idea has apparently been abandoned.

View updating rule.

Rule 6: All views that are theoretically updatable are also updatable by the system.

Note that a view is theoretically updatable if there exists a time-independent algorithm for unambiguously determining a single series of changes to the base relations that will have as their effect precisely the requested changes in the view. In this regard, "update" is intended to include insertion and deletion as well as modification.

High-level insert, update and delete.

Rule 7: The capability of handling a base relation or a derived relation as a single operand applies not only to the retrieval of data but also to the insertion, update and deletion of data. This requirement gives the system much more scope in optimizing the efficiency of its execution-time actions.

It allows the system to determine which access paths to exploit to obtain the most efficient code.

It can also be extremely important in obtaining efficient handling of transactions across a distributed data base. In this case, users would prefer that communications costs are saved by avoiding the necessity of transmitting a separate request for each record obtained from remote sites.

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Physical data independence.

Rule 8: Application programs and terminal activities remain logically unimpaired whenever any changes are made in either storage representations or access methods.

To handle this, the DBMS must support a clear, sharp boundary between the logical and semantic aspects on the one hand and the physical and performance aspects of the base tables on the other; application programs must deal with the logical aspects only.

Nonrelational DBMS rarely provide complete support for this rule — in fact, I know of none that do.

Logical data independence.

Rule 9: Application programs and terminal activities remain logically unimpaired when information-preserving changes of any kind that theoretically permit unimpairment are made to the base tables.

Take the following two examples: splitting a table into two tables, either by rows using row content or by columns using column names, if primary keys are preserved in each result; or combining two tables into one by means of a nonloss join (Stanford University and MIT authors call these joins "lossless").

To provide this service whenever possible, the DBMS must be capable of handling inserts, updates and deletes on all views that are theoretically updatable. This rule permits logical data base design to be changed dynamically if, for example, such a change would improve performance.

The physical and logical data independence rules permit data base designers for relational DBMS to make mistakes in their designs without the heavy penalties levied by nonrelational DBMS. This, in turn, means that it is much easier to get started with a relational DBMS because not nearly as much performance-oriented planning is needed prior to "blast-off."

Integrity independence.

Rule 10: Integrity constraints specific to a particular relational data base must be definable in the relational data sublanguage and storable in the catalog, not in the application programs.

In addition to the two integrity rules (entity integrity and referential integrity) that apply to every relational data base, there is a clear need to be able to specify additional integrity constraints reflecting either business policies or government regulations.

Assume the relational model is faithfully reflected. Then, the additional integrity constraints are defined in terms of the high-level data sublanguage and the definitions stored in the catalog, not in the application programs.

Information about inadequately identified objects is never recorded in a relational data base. To be more specific, the following two integrity rules apply to every relational data base:

Entity integrity. No component of a primary key is allowed to have a null value.

Referential integrity. For each distinct nonnull foreign key value in a relational data base, there must exist a matching primary key value from the same domain.

If, as sometimes happens, either business policies or government regulations change, it will probably become necessary to change the integrity constraints.

Normally, this can be accomplished in a fully relational DBMS by changing one or more of the integrity statements that are stored in the catalog.

In many cases, neither the application programs nor the terminal activities arelogically impaired.

Nonrelational DBMS rarely support this rule as part of the DBMS engine, where it belongs. Instead, they depend on a dictionary package, which may or may not be present and can readily be bypassed.

Distribution independence.

Rule 11: A relational DBMS has distribution independence.

HOW TO MAKE A GREAT IMPRESSION AT THE OFFICE
By distribution independence, I mean that the DBMS has a data sublanguage that enables application programs and terminal activities to remain logically unimpair:
- when data distribution is first introduced (if the originally installed DBMS manages nondistributed data only);
- when data is redistributed (if the DBMS manages distributed data).

Note that the definition is carefully worded so that both distributed and nondistributed DBMS can fully support Rule 11, IBM's SQL/DS and DBZ, Oracle Corp.'s Oracle and Relational Technology, Inc.'s Ingres (all nondistributed in present releases) fully support this rule.

This has been demonstrated as follows: SQL programs have been written to operate on nondistributed data (using System R) run correctly on distributed versions of that data (using System R, the IBM San Jose Research Laboratory prototype), and the distributed Ingres project at the University of California at Berkeley has shown the same capability for the Ingres language of Ingres.

It is important to distinguish distributed processing from distributed data. In the former case, work (for example, programs) is transmitted to the data; in the latter case, data is transmitted to the work. Many nonrelational DBMS support distributed processing but not distributed data. The only systems that support the concept of making all the distributed data appear to be local are relational DBMS — these are prototypes right now.

In the case of a distributed relational DBMS, a single transaction may straddle several remote sites. Such straddling is managed entirely under the covers — the system may have to execute recovery at multiple sites. Each program or terminal activity treats the totality of data as if it were all local to the site where the application processes that activity is being executed.

A fully relational DBMS that does not support distributed data bases has the capability of being extended to provide that support while leaving application programs and terminal activities unchanged, both at the time of initial distribution and whenever later redistribution is made.

There are four important reasons why relational DBMSs enjoy this advantage:
- Decomposition flexibility in deciding how to deploy the data
- Decomposition power of the relational operators when combining the results of subtransactions executed at different sites
- Recomposition of transmission resulting from the fact that there need not be a request message sent for each record to be retrieved from any remote site.
- Analyzability of intent (owing to the very high level of relational languages) for vastly improved optimization of execution.

Nonsubversion rule.
Rule 12: If a relational system has a low-level (single-record-at-a-time) language, that low level cannot be used to subvert or bypass the integrity rules and constraints expressed in the higher level relational language (multiple-records-at-a-time).

In the relational approach, preservation of integrity is made independent of logical data structure to achieve integrity independence. Rule 12 is extremely difficult for a "born-again" system to obey because such a system usually supports an interface below the relational constraint interface. Vendors of "born-again" systems do not appear to have given this problem adequate attention.

Part two: the practical consequences of the 12 rules and an evaluation of certain products against the relational model.)

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The Computer Museum occupies a spacious converted warehouse on Boston's waterfront, facing a preserved wooden schooner and a series of giant wooden skyscrapers. The blend of old and new in the cityscape serves as a perfect backdrop to the museum, which contains both relics of a machine age gone by and examples of technologies still under development.

The Computer Museum houses the world's largest collection of computer industry artifacts. C. Gordon Bell helped found The Computer Museum at Digital Equipment Corp., prompted by his deep involvement in the computer industry and a fear that all the interesting artifacts would be destroyed.

Bell earned his B.S. and M.S. degrees from MIT in the 1950s and worked as a DEC engineer from 1960 to 1966, witnessing an "exponential growth" in computer installations. During this time, Bell forecast the impact of home computers and saw his chance to make it happen. Preferring his deep involvement in the computer industry to the museum, which contains both the relics of a machine age gone by and examples of technologies still under development.

Bell went to Carnegie-Mellon University from 1966 to 1972, which in his words was "perfect timing — the beginning of the integrated circuit generation when things were moving slowly" in industry. He returned to DEC in 1972 to build the first VAX and bring in a new generation of minicomputers.

After serving four years on the museum's board of directors, Bell has now retired to become a permanent trustee. The museum now flourishes under the directorship of his wife, Gwen, and Bell has begun a new project. In July 1983, Bell founded Encore Computer Corp. with fellow minicomputer giants Kenneth Fisher of Prime Computer, Inc. and Henry Burkhardt of Data General Corp. Encore seeks to challenge the industry with yet another generation of powerful small computers.

Bell gave Associate Features Editor Amy Sommerfeld a guided tour of the museum, giving his own comments on the exhibits along the way.

In a way, The Computer Museum is just like a computer. We had a prototype to test whether it was a good idea and what the clientele would be. Only DEC employees and customers visited the museum when it first opened.

The Museum started up at the DEC facility in Marlboro [Mass.] in September 1979. It was totally DEC-sponsored, not public, although three-quarters of the artifacts were made by other companies. A lot of time was spent debugging what to show about the machines and what to say about them, namely: What's the achievement? Why is it here?

When we solicited "customers," and in June '82 went public with a board of directors. We solicited members and became, in effect, a production model. The second production model is The Computer Museum here at Museum Wharf.

One hundred years from now I want people to come here and say, "Gosh, I'm glad they saved all that stuff." By then they'll understand that information processing is one of the fundamentals of society.

The goal of the museum as I saw it was to collect the first object of a given class, the last object of a given class and then the important ones — the classics. The fun is trying to find out: When is something going to be classic? When is something going to be the first one? I always tried to err on the side of collecting more — ones that I thought were really going to be important.

At the entrance to The Computer Museum stands Whirlwind, an experimental computer started in 1945 at MIT that eventually yielded the first core memory. Only one model of this 16-bit computer was ever produced; it operated from 1950 to 1959.

Whirlwind was the first real-time and control machine. It's here in part because it was the origin of the machines that came out of the new England region. It's a classic mini — as big as a house — and it has lots of firsts, including parallelism and real-time, interactive I/O.

Whirlwind was a controversial project because the machine took longer than they thought it was going to take to build, and they spent quite a lot of money doing it. But once it was up and people started using it, then everyone began to see the benefits of having a fast machine like this and what it could do compared with the traditional [John] von Neumann-style calculating machines of the time.

MIT conceived Whirlwind as a simulator for aircraft stability. That was one of the reasons it ended up with a short word length. Machines that were being built around this time tended to have 36- to 40-bit word lengths, according to von Neumann's guidelines. Whirlwind's engineers built a 16-bit computer because that was all the precision they needed. All the other machines were serial and slow, while this one was parallel and very fast.

One feature of experimental machines is that you never know exactly what you're going to get out of them. The MIT/Forrester patent for core memory came out of this project. The standard Williams tube memory in use at the time was so unreliable that the Whirlwind designers said, "We've got to have a new memory." Core memory was first tested on the Memory Test Computer [MTC], which [DEC President] Ken Olsen engineered. The MTC ran for about a month. The memory operated so well that the engineers just took it right out and put it on Whirlwind.

Around the corner sit several large pieces of equipment that together make up the U.S. Air Force's AN/FS Q-7, developed by Jay Forrester and Robert Everett of MIT's Lincoln Laboratory. Installed in 1958 and decommissioned in 1983, the 32-bit Q-7 ran longer than any other computer, and was the first to serve 100 simultaneous users.

Whirlwind also ended up being the prototype for the Semi-Automatic Ground Environmental [Sage] air defense system computer, called Whirlwind II. Later, IBM built it under the name AN/FS Q-7. MIT helped design the architecture and the circuits, and then IBM built these massive vacuum-tube machines. This was a 32-bit computer, designed to do everything Whirlwind could do and more.

It was a lovely machine because it had two 16-bit words that could be operated on in parallel. Each past used 55,000 vacuum tubes and took 150,000W of power. The machine you see here in the museum was decommissioned only two years ago, in February 1983, and still ran at a phenomenal 99.95% uptime because of careful design and an absolutely controlled environment.

Notice the way it's built — a constant stream of air blows on each tube. Every tube is running at the same temperature. In addition, the users did something called "marginal checking," which meant they varied the voltages up and down to detect whether a tube was going to fail. By the time this machine was built, its designers really understood how to build very high-reliability computers.

On a museum field trip, we saw the AN/FS Q-7 before it was decommissioned. People operated...
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For many Americans, computers in the 1950s were synonymous with Univac. "That marvelous electronic brain" was first introduced to the general public by CBS newscaster Walter Cronkite during the 1952 presidential elections.

This is the Univac I that the Eckert and Mauchly company built. It really was the first commercial computer. When I say "first," I have to be careful, particularly saying the "first commercial." There were a couple of computers already operating in England, such as the Leo computer, but it's very hard right now to pin down when those were actually shipped.

When you say "first" you're asking, "When was it that a customer had it in his site, actually using it?" You have to read all the fine print.

For many Americans, "Univac" was synonymous with "computer."
There were 46 of them, which at the time was massive volume! The price was about $890,000 initially, and it declined over time.

The way to really see machines is to see how they were used at that time. The films the museum preserves and shows are really important for just this reason. They show, for example, what key punching was really like or how Eniac was used. Here's the first film on programming, and the first AI film and one on the introduction of Fortran. We also have a film made for the museum just when the last IBM Stretch was taken out of service.

The museum has a videotape of Walter Cronkite talking about the first time Univac predicted the 1952 election results. During the election, there was concurrent reporting about the election and the computer's handling of it. I remember there was a very different attitude than you see today, when everyone says, "Computers have really fouled up elections. Computers shouldn't be allowed to predict results because that will influence the voters," and so on.

The response then was amazement, absolute amazement: "How can this thing know what's going to happen after only a few hours?" The film the museum has of Cronkite's announcing doesn't quite match the amazement of the moment.

This machine was literally telling us what was going to happen. In fact, it seemed so eerie that the networks were refusing to use the results at first. The computer made an early prediction, and the networks didn't even put it on the air until later on because they just didn't believe it.

Several exhibits show the evolution of card I/O technology, from the original sheet-fed automatic sorters to solid oak cabinets through the standard automatic sorters still found in universities to the final models of the card era. A small pile of tiny 96-column cards remains from IBM's System/3. They never caught on, and IBM introduced the first floppy disk the following year.

I was fortunate enough not to deal with cards much. I did one year as a Fulbright scholar and another all year. I swore I would never punch another card.

I went to Carnegie-Mellon University in 1966 as a professor, and they had an IBM machine with cards. I decided to write a book instead of computing — there was no way I was going to put cards in a hopper.

I was spoiled. I had just built the first time-sharing machine at DEC, so I really didn't believe in batch processing at all. All the DEC machines were interactive, and we believed in having people talk directly to computers.

But the general level of user-friendliness was still quite low at that point. The Apollo Guidance Computer here was used in the first Apollo space vehicle in 1962. Unfortunately, somebody took a piece off it, so we had to cover the console withplexiglass.

Below it, a [Hewlett-Packard] 150 computer performs the same function as the Apollo. When people play with it now, they say, "Oh, this is awful. The human interface is terrible." We answer, "Yeah, that's the way it was!" They ask, "How did they ever control the spacecraft?" With great difficulty!

Also while I was at Carnegie-Mellon in the early '70s, I went to a seminar on IBM's minicomputer. It was odd — they had a System/3, and on it was this card reader with these little, nonstandard cards IBM was introducing. And I thought, "Oh my God, don't they know? Cards are dead!"

What happens in every technology is somebody tries to make the ultimate version, and it's an absolute disaster. These cards are a perfect example. Just when it was clear that there was no use or need for cards, they introduced these new 96-column cards. If they weren't as big, the logic went, you could have a smaller card reader and it could be cheaper. That was all the little cards had to recommend them.

The trick in any technology is knowing when to get on the bandwagon, knowing when to wait for change and then knowing when it's dead and time to get off.
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The Sperry PC/IT, if we gave it any more power, we couldn't call it a PC.
That's getting on the right bandwagon. The other trick is not to get on any wrong wagons.

The Viatron 21 terminal is an example of getting on too early. Viatron introduced a CRT, a processor, a keyboard — a whole data entry device for $40 per month, which was absolutely unheard of. A $1,600 device ran in The Wall Street Journal.

This was one of the famous fiascos in selling. The company went public and sold stock, and the stock prices went out of sight because of this revolutionary data entry device. The problem was it was too early. You couldn't build it using the MOS technology they had then. They sold thousands, but they couldn't deliver any! The technology was too immature.

IBM's nonstandard punch cards were quickly abandoned.

A glass case packed full of artifacts — components, posters, books and sketches — fills one wall of the museum.

The purpose of this exhibit is to mark a period, 1950 to 1959, and to show a range of firsts, from basic technology to applications. The exhibit shows a complete census of all the machines installed by 1950.

As time went by, you can see there was an exponential buildup of computer installations. About 10 machines were installed during '51. They were all prototype machines. Twice that number were installed in '52 and twice that number again in '53.

There's another theme that's important. A time period of approximately 12 or 13 years shows up over and over again in the development of computing. It shows that things really don't change that fast. For example, it took that long to get the transistor into computers in full scale.

In this museum case lies the pattern for the first point-contact transistor, which was filed in June 1948. By 1960, all the machines were transistorized, but that was a full 12 years from the invention of the device. Twelve years of hard work and production so you could produce the transistor, so people understood them, so the circuits got done and so on. It just took that long.

In 1959, the Noyce patent was filed on a new way to build transistors — the planar process. That was the beginning of the integrated circuit, but they weren't really produced until '57 to '68 — sort of a half-cycle. On the other hand, IBM's first integrated circuit computers didn't appear until 1973. That's a full 14-year gap.

In 1960, as the exhibit shows, there was an incredible number of new machines introduced, marking the second generation: the Control Data Corp. 1604 and 160, the beginning of CDC; General Precision's new machine; Sperry Rand's solid-state machine; Univac; Philco's transistor machine that put the company at the forefront; IBM's workhorse, the 1401, plus the 7070 and 7090, a real classic; and the DEC PDP-1, the beginning of DEC.

These machines formed the basis for the next 10 years of computing. That was also the time when I said, "We're not going to have any more modified, kludgy typewriters on our computers." The next machine I designed had a Teletype on it. The next one after that was when we started using the ASR33.

We were the first ones to adopt it. The ASR33, which turned out to be a major product in marketing minicomputers. For $750 you could include a keyboard, a printer, a paper tape reader and a paper tape punch. Basically, we'd scaled the I/O problem down to something trivial. That's how DEC was able to introduce the PDP-8 at the $18,000 level, because we didn't have to charge $5,000 for a paper tape reader and punch.

In the same case, artifacts from the Atlas project include only a single board and a magazine article about the breakthrough by engineers in England.

Another fascinating introduction during this early period was Atlas, designed at Manchester University. I saw it in '61 and the museum has
The Computer Museum starts up a rare treasure hunt

The Computer Museum launches a worldwide search for rare and unusual collection of early personal computers. Catching the spirit of the industry, the museum on Charles Street has turned the artifacts drive into a competition.

In the semiconductor arena, the first processor on a chip was done in '71, and there still isn't a really good virtual memory microprocessor. National Semiconductor Corp. had a good chip set (the 32000) by '83, but they're really just delivering it now.

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The museum will also host a 19,000 sq ft exhibit called the Computer Discovery Center, created by the Boston Computer Society. Set to open next summer, the center will demonstrate the sophisticated capabilities of microcomputers.
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The glass case also contains handwritten notes from some of the industry's leading technologists.

The work for An Wang's core memory was done in '48 and '49. This is a shift register that he built for the Harvard Mark IV, which stored 64 bits of data, and those are his notes — beautiful notes.

I think there's a good story here. Wang himself is a scientist-engineer, and I really believe you have to have that kind of leadership to build technological companies. Wang Laboratories is an excellent example of a strong company with a technically oriented leader.

DEC is another good example. Ken Olsen was involved in the MTC at the outset and went on to work on Whirlwind, then TX-0. Apollo [Computer, Inc.] was started by very strong technologists. CDC, Cray [Research, Inc.] and many others have very strong technological roots.

But the company that's the most amazing to me in every respect, of course, is IBM. To me, IBM is a two-culture company: the very strong group that runs engineering/ manufacturing and the field organization that markets their machines. [Thomas J.] Watson Sr.'s incredible drive for excellence set the tone.

The interesting thing is that a marketing person runs the company. To me that's a real exception. It's very difficult for a nontechnologist to run a technology company, independent of whether it's computers or bioengineering or any other field. If the technology is moving at all fast, the management has to be able to make decisions based on what's going on in the technology.

Apple [Computer, Inc.], for example, I consider more of a marketing phenomenon. With the exception of the Macintosh, I don't really regard Apple as a technology company, because the Apple I and Apple II weren't so much technological innovations. The first personal computer was right here at the museum, and it's not an Apple. A lot of companies had built small machines at the time.

Personal computers of all shapes and sizes crowded the PC Gallery. Whereas many regard the personal computer as a relative newcomer, some of these machines have the look of old-guard computers.

The work for An Wang's core memory fill two glass cases, marking the periods 1950 to '59 and 1960 to '69.

Artifacts such as An Wang's core memory fill two glass cases, marking the periods 1950 to '59 and 1960 to '69.

In the PC Gallery we have one of the Lincs [Laboratory Instrument Computers] that came out in '64 and which I think of as the first personal computer or scientific workstation. It had a personal filing system, keyboard and interactive display, and it was transportable. It cost about $40,000. Linc marked the beginning of a line of computers that included the Linc-8 and PDP-12 for personal, scientific and interactive computing. There are still Lincs in use.

Linc has all the attributes of a personal computer. It's for one person, it's interactive, you can go automatically from program definition to execution without any intermediate paper tape or cards or anything like that. But the main thing is it was used by one individual.

I think the issue of defining a personal computer is really one of scale. How much are you going to pay for a computer for one person? And what does it do?

The purpose of this exhibit is to display things you can't see in stores or in schools. It includes the first personal computers, like Linc and Altair, Apollo's first workstations and other artifacts. All the machines should have their skins off, their insides exposed. Computerland's Bill Millard, who is on the museum's board, has given a grant to collect and to enhance the exhibit. The main thing is to have a definitive, scholarly collection.

From the outset, personal computers were driven by memory technology. In 1975, a 4K memory chip was introduced, and the Altair was built using first a 4K and then the 4K chip. In 1978, the 16K chip was quickly incorporated into the Apple II. In 1981, the IBM Personal Computer came out using the new 64K chip, and then in '84, the 256K chip begot the Personal Computer AT and the Macintosh.

Furthermore, I don't believe anyone really invented the personal computer. "Invention" is too strong a word for it. A lot of things are called inventions when, actually, they were inevitable. I believe technology is a driving devil. It conspires, and if there's a concept half-baked or a computer half-designed, technology will complete it.

In retrospect, for example, I don't look at the microprocessor as an invention. It was something we were...
A personal computer gallery displays all shapes and sizes.

all trying to do for a number of years. One day the technology reached a point where it could be done. In this case, it was a conspiracy between a good chip and adequate memory.

Apple happened to be the first to put that combination into a machine. I don't want to discredit them totally and say, "Oh, they were just a bunch of assemblers." They did a very nice job. The Wozniak disk controller was a very neat little piece of logic. But it was the 6502 processor, the 16K-byte memory chip and that disk controller that conspired, along with the idea of open architecture, in the first Apple computer.

Apple did a very neat job in pulling the pieces together and packaging the computer. If you read all of [Steve Jobs'] accounts, he really worked on the packaging. The key decisions were the user interface and good bit-map graphics. But I can show you all that same work at a laboratory at Xerox Corp.'s [Palo Alto Research Center] four or five years earlier. It was just waiting to happen.

I'm strictly an evolutionist. Get an idea and keep working on it. In the computer industry, we're not idea-limited now, it's just a question of pulling the ideas together. The machines that we can build now with the new technology are fantastic. We're anticipating machines that will execute 100 million to 1K million instructions per second.

The Computer Museum honors Seymour Cray with his own exhibit, titled "A man and his machines." Museum curators name Cray the "undisputed leader in the design of the most powerful computers."

Cray has built the world's fastest computers for 20 years. That's absolutely amazing! He has also produced an incredible string of ideas and basic technology. The reason he has been able to stems from his breadth, starting with the basic physics of the devices, of cooling, of wiring and computation ... on into knowing how to build a compiler and operating system.

If you look at Cray and what he's done, you end up with a lesson on how to stay out of organizations. People get sucked into them. Cray stayed out of large organizations: first at CDC, by getting out of Minneapolis and going to Chippewa Falls, Wis. It was far enough away that people weren't coming to visit him all the time. He couldn't go to meetings.

He could never have built the 6600 in Minneapolis, I'm convinced. And then as cray Laboratories grew, he must have seen the same thing happening again and said, "Gee, I've got lots of organizational responsibility, and the way to handle that is to split myself off again."

Organizations, no matter how tenaciously connected, all start sucking up your time, and basically people don't have enough time for both computers and organizations.

In this case, if you look at the Cray-CDC split from CDC's standpoint, the tragedy was letting him go, not being able to give him the environment he needed. But maybe it was inevitable. There's a discomfort that settles in with certain individuals in large companies. You suddenly see that it's really you who are supporting the company.

The Cray exhibit is dominated by the hulking remains of the first CDC 6600. Introduced in 1963, the 6600 was a product of Cray's Chippewa Falls lab and ran three times faster than IBM's Stretch.

CDC's 6600 No. 1 — a Cray brainchild — is preserved here. When the 6600 was announced, I remember being just awestruck by it. I put it with Atlas as one of the greats. In the development of ideas and projects at that time, these two stood out from everything else.
A section of the Cray 1 on display.

The 6600 represents special creativity in a number of aspects: It executed many instructions simultaneously, and they were all interlocked. Cray had the idea of separate I/O computers and, of course, his [reduced instruction set computer (Risc)] architecture. For the 6600, they had evolved the circuitry enormously. This was the fastest machine running at the time, with a very respectable clock time even by today's standards — almost a 40-MHz clock. The 6600 was also the first machine to employ Freon cooling.

I love [IBM President Thomas J.] Watson Jr.'s comment about the Cray 1 announcement in '63, posted here: "I understand that in the laboratory — almost a 40-MHz clock. The 6600 was also the first machine to employ Freon cooling."

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personal computers, but the company just never marketed them.

At the time, the organizational model rejected the cost structure, the culture — everything about personal computers. The organization at DEC was aimed at a certain kind of machine, and anything that didn't fit that model didn't fly.

DEC actually did put a number of PDP-8s in people's homes. I had a time-sharing terminal in my home in 1966. Our children grew up programing on a terminal. For a long time it was a curiosity. Guests would ask, "What do you do with this thing? Why would you want one?"

The semiconductor gallery includes junked semiconductor boards, a 1970s rubylith mask and several important chips under a 50X microscope: a Mostek 4K-byte random-access memory, an IBM 64K-byte RAM, an NEC Corp. 256K-byte RAM and a DEC Microvax II processor chip.

I think the semiconductor industry people will throw everything away if we don't stop them. It's important to preserve their revolution because it's really been the basis for ours.

This exhibit gives a close-up of another chapter in technology. I feel the Microvax II is the best microprocessor chip or chip set made. It includes a one-chip VAX, a floating-point chip and memory. That's a complete microprocessor. I came back to DEC partly to get the company involved in semiconductors. That was in 1972, and it took 13 years, but we succeeded.

Here's how: DEC produced what I call the first real computer. A semiconductor company produced a real computer by putting the VAX on a chip. I say the VAX is a real computer!

My criteria are the following:
1. Does it have floating-point?
2. Does it have a paging and memory management unit?
3. Is the machine capable of being used to help design itself?

Now instead of being in competition with it, let's say I'm encouraging the semiconductor industry to build better microprocessors, because Encore is predicated on using lots of microprocessors to gain power. Our whole architecture rests on parallelism using a number of processors — a new computer structure called a "multi," for multiple microprocessors.

Our success depends in part on getting good components, so it's to my advantage to encourage the semiconductor guys to come through with good microprocessors. And that's beginning to happen.

Despite Gordon Bell's official retirement from The Computer Museum board of directors, his interest in and proprietary sentiment for the museum remains lively. Even his handwriting is imprinted with the museum's logo.

By 1990, my own personal goal for The Computer Museum is to collect every major artifact. We would need a bigger building, with enough space for storage and archiving. What I'd really like to merge with the American Museum of Natural History and throw all the dinosaurs out. But don't think it'll happen... it's not natural history.

Right now the goal is to increase people's understanding of the present and future, instead of focusing on history. The museum shows how the incredible versatility of the computer. History by itself is too dry.

Others measure a museum's success? You measure attendance and the attention response. But my own measure is the collection of artifacts, including the archiving of works and lectures by the pioneers.

One hundred or 200 years from now I want people to come and say, "Gosh, I'm glad they saved all that stuff." By then they'll understand that information processing is one of the fundamentals of society.
C. Gordon Bell helped found Encore Computer Corp. in July 1983 with the purpose of creating a new type of computer: the "multi." Two years into the project, he describes how the new product will fit into the ever-changing marketplace for powerful computer systems.

At Encore, we're predicated on making computers out of the current microprocessor technology. We will use microprocessors as the base-level component to build bigger systems. We call our computer the "multi," and I claim it's a new machine class.

Over the last few years, a line of [transistor-transistor logic]-based machines has come out that show a 15% per year compound performance increase. [Emitter-coupled logic]-based machines' prices haven't gone up, and there's no real push for them to go down. Companies aren't looking for lower prices when they buy new computers because they're already committed to a certain price range. They're looking for more performance.

The minicomputer came in at the $10,000 level in the 1970s. There were 100 mini companies in that period, of which seven survived. Then the personal computers and workstations were introduced at even lower costs, based on microprocessors. I'm predicting the multi will be a mini-class machine.

The multi provides substantially more computing power than any other machine in its price range. The architecture uses a common bus with several microprocessors. It's a very simple machine, built almost like a DEC PDP-11 with Unibus.

The multi provides substantially more computing power than any other machine in its price range. The architecture uses a common bus with several microprocessors. It's a very simple machine, built almost like a DEC PDP-11 with Unibus.
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A

n abysmal number of new technologies fail to live up to their productivity potential or fail completely simply because users aren’t comfortable with change.

The obvious truth is that people are creatures of habit, scared of anything that jars their sense of balance, upsets their sense of control or disturbs their sense of purpose — exactly what new technology often does. As we continue into the information age, the consequences of not adjusting to change are grave.

Corporations studying the impact of new technologies find repeatedly that resistance, sluggish acceptance, “garbage in/garbage out” and outright sabotage cost millions of dollars. This mounting evidence shows that MIS/DP professionals, whether working for software or hardware vendor firms or inside a user company, are increasingly judged on more than an ability to design, build, install or acquire a fast, accurate machine. These professionals must also help motivate others to use the technology to full advantage — a task easier said than done, as I have discovered in more than 10 years of advising Fortune 500 companies, state governments and the U.S. military on implementing organizational change.

Most people don’t dislike or resist technology, at least not to the extent portrayed in current literature. What they generally fear are the changes technology imposes on their lives. “What will this do to my job, my security, my authority, my access to information, my relationships, my values, my life?” These concerns often lead to resistance.

Resistance need not be a malignancy. In fact, it can be viewed as an ally — a tool, which in skilled hands can facilitate technological assimilation. Many within the technical community already have become consciously competent in dealing with human responses by learning the dynamics of change, why resistance occurs and how to use it to augment, not hinder, production.

There are, however, still far too many who can only be categorized as unconsciously incompetent. They don’t know that techniques exist for easing the transitions people must make when faced with new technology. Because they are prone to implement change in a manner comparable to a bull in a china shop, these people frequently precipitate disaster.

There are those who comprehend the discipline and effort required to help people adjust but who still don’t follow through because of a lack of time or money, political support or other resources. These managers know they must make adjustments because they have not appropriately applied the ground rules for managing change.

Finally, there are those who through superior intelligence, luck, cunning or just seat-of-the-pants common sense, are fairly adroit at human relations. Their skills — learned by trial and error — are often unconscious, not a thought-out methodology that can be taught others; so application is frequently inconsistent.

DEC’s story

Marvin Collins and Kathe Tortorice of Digital Equipment Corp. were in this latter, unconsciously competent category when they approached me two years ago. They exemplify how change management can be implemented inside one of the most successful high-tech companies.

By the time I met Tortorice and Collins, the two had begun to wrestle under control a massive, cross-departmental, multifunctional change. As a team of change-oriented managers for DEC, they had figured out that major change is a sophisticated process, not a simplistic event.

They understood that every change can be designated and understood by three states: the
IN DEPTH/ADJUSTING TO CHANGE

present state — the way things are now; the transitional state — a time of ambiguity and stress when people must relinquish old habits but haven’t totally grasped new ones; and the desired state — the way we want things to be. Tortore and Collins wanted more information on how to plan for and move through these stages in environments where players and variables are numerous and complex.

Pivotal roles
They were, for instance, unfamiliar with the universality of the roles in any major change, even though they had seen them in action in their own corporation. They learned that every change effort involves the following three roles, which at first glance seem simplistic but which are pivotal and often complex in the ways they mesh.

Sponsors possess the organizational power to legitimize change. Even in the most unstructured organizations, major change is impossible without them. Generally, the term applies to upper level managers, who may not understand every detail of what they authorize.

Targets must learn new behaviors, skills or knowledge because of a change. They must accept, adjust and use the technology.

Agents are go-betweens, assigned by sponsors to implement change. These roles can and often do overlap. A senior officer, for instance, sometimes plays all three parts when pushing for a decision support system that he must also learn to use.

Role entanglement
The intertwining of roles can run amok. For example, when a sponsor tells MIS/DP personnel to force others in a company to use new equipment, sponsorship responsibilities are being pushed downward.

MIS/DP may grab at this opportunity, thinking it means more power, but a year later everyone may be wondering why the new system has failed. By failure, I don’t mean that the system doesn’t work. Unless people incorporate computers into their daily routine, all of the grand calculations of productivity increases go out the window. Sponsorship cannot be delegated.

What is needed is a sponsor who is willing to tell targets, “Watch my lips. We’ve asked MIS/DP to install the system and teach you how to use it. But make no mistake. MIS/DP is not ordering this change. I am. If you have any problems, come see me.”

Thus, sustaining sponsors are required: managers without the power to initiate change but who are close enough to targets to stay on top of the change project once it begins rolling. They have the logistic, economic and political proximity to maintain the momentum.

The change process is not unlike an ocean liner, which needs far more power in the first lurch away from the dock than in maintaining a speed of 15 knots.

Pyramid effect
Successful change begins by initiating sponsors treating potential sponsors below them as targets. Once these targets become committed to change, they become sponsors who again treat others below them as targets.

The new targets are converted into sponsors also, and so a pyramid of support is built all the way to the assembly area, the section or the branch office — in other words, to the sustaining sponsors at the implementation level.

Without this attention to development of sponsors, many strategic decisions disappear into a black hole somewhere several layers down in an organization, and no one can ever seem to put a finger on exactly what happened.

One other role should be mentioned — the advocate. Advocates want to initiate change but can’t show sufficient sponsorship power. I mention the role because some people assume they are sponsors when they are not.

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These role definitions were part of what Collins and Tortorice took back to DEC after their initial training.

**Commitment in stages**

Before any technology is introduced or any other change is initiated, people must come in contact with the idea that something new is percolating, possibly ready to burst on the scene. Preparing people for change does not end here. It is amazing how often people hear about a proposed change (or glance at a memo), and the information goes in one ear and out the other. The idea doesn't stick.

Skilled change agents know that for preparation to be complete, people must be made aware of the proposed change: “Hey, this is serious. Something new is on the way.” Only then will people grapple with what the change means to them.

Later on, confusion could be a sign of resistance, a deliberate smoke screen raised to mask noncompliance. Agents or sponsors, however, make serious tactical errors if they don’t perceive early confusion for what it is — simple misunderstanding — which is one reason clear and precise communications about new technology are so important.

**Assessments**

Once people begin to understand the ramifications of a change — why it is being introduced and what will happen because of it — they weigh the pros and cons.

Individual assessments of new technology are always a jumble of positive and negative judgments, amplified or diminished according to fluctuating moods: fear and hope, anxiety and ambition, ego deflation and inflation. These judgments radiate from individual views of reality, scrambled and shifting in every person because of their mix of emotions, philosophy and manner of analytical thought.

The best expediters of technological change are adroit at perceiving these reactions and accentuating the positive. If negative judgments predominate, resistance occurs — either overtly or in the hidden recesses of the mind; either can hamper the installation of new technology.

If positive perceptions dominate, people can decide to support installation. An actual willingness to give time, effort and other resources to installation is a big step, a threshold that, once crossed, is the first real sign of commitment. In fact, there are various stages of commitment.

As everyone involved with technology knows, early commitment is not always a good omen. Just as newlyweds need to bask in the glow of a honeymoon, employees in the early stages of change exhibit “uninformed optimism.”

Only later will they begin to spot the bugs in the new process and feel as spouses discover each other’s flaws. I call this awakening “informed pessimism” — the cracks in the new system become apparent. Let that pessimism mushroom enough, and people will begin to “check out” mentally, either secretly or overtly, and enthusiasm fizzles.

Without expert coaching, employees will generally not talk to manage- ment about their disgruntlement. Such resistance after installation is, of course, more serious — and costly — than that which occurs before.

**Resistance as change**

Still, the skilled practitioner recognizes that resistance is an inevitable part of the change process. Instead of browbeating resisters into submission, open discussion of resistance is invited, the cause is analyzed and the information used to fine-tune the new system, which can turn pessimists around toward a more realistic, optimistic view.

A thorough understanding of resistance leads to informed decisions on whether to continue the implementation. Assessment techniques and other written materials are available for gauging the type and extent of each of the many possible grievances. Some typical reasons for discontent include the following:

- People don’t understand the purpose for technology, or they don’t think the purpose is valid.
- They’ve changed their routine, or they are learning additional skills or working harder and longer without adequate incentives.
- Once they felt comfortable and successful but now are struggling to learn new ways, worrying perhaps about losing their job, their autonomy, influence or power.
- Barely able to keep up before installation, they think the new technology requires even more speed from them.
- They don’t trust or respect those sponsoring or implementing the change.
- They see the equipment as hazardous or painful.
- They believe efficiency will plummet.

Decisions to maintain the new technology for long enough to eventually make it part of established procedure, sanctioned by the entire culture. When that happens, top management has provided its highest level of commitment. A formal sponsorship is no longer needed because organization expectations and momentum take over; accompanying procedures can’t easily be scrubbed.
"Mach 2" commitment

Targets and agents can reach the highest form of commitment only if their own interests, goals and beliefs are served through optimum functioning of technology.

This "Mach 2" commitment, which I call "internalization," is contagious. It blossoms when employees believe they are doing something worthwhile and have a say in designing new procedures or molding technology to their own specifications. Thus, they have a stake in advocating the technology because they are, in a sense, praising themselves. They don't sit back as easily and say, "I could have told you what was wrong, but nobody asked or bothered to listen."

I don't mean that lower level employees run the show. When that happens, there is revolution and chaos. Creative participation reaches a zenith, however, when targets receive clear, accurate information about a change; are considered to the extent possible in planning and execution; and are rewarded for enthusiastic participation and input.

One further warning: Individuals pass through change stages at different times, intellectually and emotionally, leading to mixed signals, starts and stops. The skilled change agent learns to decipher when emotion and intellect clash.

While the various stages as a rule must be passed through sequentially, a sponsor can skip them by decreeing that the new technology is now part of established procedure, or "institutionalized," and that everyone who doesn't like it can leave.

The dictatorial style meshes nicely with that of many traditional technicians whose attitude was, "If users can't learn to operate the equipment, it's not my fault." Nevertheless, I am the first to say that jamming change down employees' throats and dictating behavior are sometimes appropriate.

This authoritarian approach, however, always costs in poor morale, firings and divisive management-employee friction.

Change at DEC

Collins and Tortorice took this knowledge and information from our initial training and inserted it into their own model for changing whole levels of the bureaucracy in a company where high-powered, fiercely independent and creative people feed off each other at breakneck speed. Irresistible change is the norm at DEC.

Collins and Tortorice applied their thinking first to an attempt to alter DEC's order administration, the step-by-step process in which an order is taken by a sales representative, scheduled and matched with the manufactured product delivered, along with an invoice to a customer. Previous attempts to tamper with the process had resulted in unexpected confusion. This process cuts across several independent departments that had to be involved in the change to achieve the desired impact.

The team decided the first step was to convince those planning the change to concentrate on the specific work or jobs they thought should be transitional. The team wanted managers to analyze in detail what work is being done now, what work needs to be done in the future and what transition steps are needed so that work continues in the interim. "Tortorice explains.

Regrettably, planning sessions often degenerated into discussions about organization, not work. As Collins put it, "As soon as somebody started to talk about change and everybody prepared to jump on the change boat, anybody who was to be affected by the change went silent and didn't say anything because they want to reorganize to protect their work segment. We had to slice out and separate discussions of what the work is and who performed the work from talk about who managed the work."

"One of the reasons you must have a discussion about what the work is today is that in a company growing 30% a year, most people don't have time to document what today is or was. You are at great risk when you change something but don't do it."

Focus on work

By concentrating on work, the two downplayed bickering and confusion and were able to help a diverse group of middle managers define the particular work they were examining as a series of 20 steps. The managers then used Tortorice and Collins to help gather more details about the work by dropping down the organizational ladder to ask questions. At each level, they quizzed personnel to learn as much about the work as possible. They knew to drop down another notch in the organization when people began answering a question with "I think that's the way it is."

Finally, by questioning employees lower in the organization, Collins and Tortorice found that what middle management perceived as a 20-step program was actually a 60-step work process...
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It simply works better.
job really involved almost a hundred steps. They began "cascading backward" these learned details through the structure, taking them to higher levels of management and making it easier for management to know exactly where change was needed and its potential effects.

Collins cites as example an order for DEC hardware: "The order may have a problem with it because of the technical nature of our product." Employees won't let the order sit idle. They move it off the official flow toward someone who can fix the problem.

"This informal flow is predictable. Every time an order has a similar problem, it will follow the same informal flow until the defect disappears." The order will then return to the formal, planned sequence.

**Formal vs. Informal**

Managerial decisions are often based on the formal sequence, which, Collins and Tortorice note, is just the skeleton of what is actually accomplished. "The insidious thing is that you end up constantly trying to get productivity improvements on the work you can see," Collins says.

"Managers often go after the formal piece, correcting deficiencies there and making it more efficient, when there is this whole chunk down there that isn't being touched," Tortorice says, adding, "That informal procedure is where the major gains are to be made."

Only after managers thoroughly discuss and understand the particular work being done and how it needs to be changed will the conversation shift to organization. Questions that arise include the following: Who are the managers involved today? Who owns the work? Who manages it? Who do you want to own it and manage it in the future? How do you make the transition?

In the informal systems are explained — whether the work is accomplished manually or mechanistically. For instance, most companies build work processes around DEC hardware systems. Collins and Tortorice want to do the exact opposite.

"What generally happens is that systems are built, and then the systems begin to define the work," Collins says. "Work, however, is dynamic. The risk of building a system around it is that work is always changing and migrating, making systems quickly unsuitable.

"Inflexible systems lead inevitably to formal work because things can't get done through the systems, through the hierarchical chain of command," he adds.

The final piece in the model is to identify the means of measuring the particular work," Tortorice says. "Many people change the work but not the measurements; therefore, the behavior stays the same. Changing measurements and integrating them into the work is the lasting way to ensure change stays."

**Milestones**

At each stage of planning, Collins and Tortorice carefully monitor that milestones are established so that the change can be assessed. "You develop a picture of today, and then you have milestone one, milestone two, milestone three, milestone N, until you eventually get to the new future," Collins explains. This breaks a massive change into manageable chunks so movement can happen over time and be altered as new data is acquired.

If at any point the milestones aren't reached, time schedules and deadlines can be moved back, something that happened several times in the initial DEC project. As in every aspect of their job, when it comes to timing, Tortorice and Collins endeavor to supply management with as many facts as possible.

"We make it a point to get the evidence so that when managers choose to stick with a date for completing the change, they understand the risk involved," Tortorice says.

Using their model, Collins and Tortorice helped bring to successful conclusions this first project and several others since. Their triumphs prompted their staff to become instructors of change programs. Using these subordinates, Collins and Tortorice now train operations employees to plan and manage major changes, a task at DEC normally reserved for staff personnel.

Individual managers assign problems to operations
personnel. They work on the change for a while, developing a set of the difficulties involved, and then are taught change management skills. This is done at DEC or one of their certified subordinates.

Environmental impact

The federal government requires a environmental impact statement before a dam is built. Businesses often throw up a "dam" of change and then see how much damage is done.

In the sessions at DEC, the in-house instructors go over procedures for planning change, such as how to analyze sponsors, agents and targets to determine whether they have skills and desires that will augment or retard the proposed change.

In effect, the trainees learn to draw up an environmental impact for change. Without adequate sponsorship, change agents are faced with choices to either train existing sponsors, find additional sponsors or prepare for the technological change to fail.

Also taught are the different forms of communication and how to optimize their use. Some people are unafraid by a so-called "charismatic message" because they repond primarily to cold, hard facts. Others are best motivated by their emotional response to the message giver or because they are thrilled by ultimate organizational purpose. Still others turn a cold shoulder to grand theories, succumbing instead to messages that specify how to get their job done.

Participants in these programs also learn the myriad forms of power and how to use each, the positive and negative sides of visible influence and managerial styles and what works best with different employees. Thus, in becoming change agents, these DEC employees are forced to consider strategies and tactics before any change effort begins.

Participants also come in contact with a spectrum of approaches to resistance and when to use them, as well as how to promote synergy between divergent groups that must work as a team in a change effort.

As change agents, they learn how to modify the frame of reference of those resisting the change. They learn that resistance in most cases is from different sources than does resistance in managers, who must take into account logistical, economic and political restraints.

Rules don't apply

This approach to managing organizational change is not presented in inflexible rules. Major change inside large corporations is too complex to lend itself to a set
Culture shock

In that position, Gramling—who has installed computers in manufacturing, healthcare, general professional office and now insurance companies—realized that resentment against technology can boomerang against the software and hardware manufacturers when promised productivity gains don’t materialize.

As he puts it, “In every case in which I’ve been involved, and in particular when it was a situation with first-time users or where large groups of people were affected by the technology, there was quite a bit of culture shock.”

As he puts it, “In every case in which I’ve been involved, and in particular when it was a situation with first-time users or where large groups of people were affected by the technology, there was quite a bit of culture shock.”

Gramling explains. Therefore, he offers to teach change management skills to potential customers to enhance the attractiveness of his products.

After the sale of software, customers who choose to learn those skills can, according to Gramling, “better understand their role in making the computer system work and better equip themselves to deal with the changes that technology will cause. Then you’ve got a better chance for a successful installation.”

“In computer installations, like anything else, you don’t sell it and walk away; you have to support it. You’ve got to maintain a relationship, a rapport and, most important, your reputation.”

Change and revolution

Thus, while the speed and complexity of technological change is outpacing the human capacity to adjust—producing intense resistance—there are numerous success stories.

Users are more sophisticated, increasingly demanding that the MIS/DP and vendor communities understand human foibles, complexities and fears. A revolution has commenced.

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Fourth-generation languages: from backwater to mainstream

By Richard Cobb

The only definition that fits all the products is, "A fourth-generation system is one that improves productivity by providing users with capabilities that are thought by the system's authors to improve productivity."

By all reports, Cobol is still alive and well as the mainstream procedural language for business information processing. An increasing number of Cobol applications are still being developed, but nonprocedural, fourth-generation languages now are being developed and at a much faster rate. In many instances, these languages are supplanting Cobol for new applications development.

Computer languages share one purpose: enabling people to talk to computers. In 30 years, these languages have already passed through three generations into the fourth. We went from machine languages to assembler languages to procedural languages, such as Fortran, Cobol and Basic, to nonprocedural languages — the fourth generation.

One of the most frequently asked questions today is, what is a fourth-generation language? There is, of course, a proper definition. But since all vendors want to say they have a fourth-generation product, the only definition that fits all the products that claim to be fourth-generation is as follows: "A fourth-generation system is one that improves productivity by providing users with capabilities that are brought by the system's authors to improve productivity." This definition, of course, doesn't say much.

True fourth-generation languages, however, share some characteristics. The first is that they are not Cobol; they all make a true break with the prior generation. Also, they are basically nonprocedural, the word that best characterizes this kind of language.

A procedural language is one incorporating the characteristics developed by John von Neumann in Princeton, N.J. Primarily, a procedural language requires its users to perform two major functions: Users must define what they want the computer to do; and they must define the flow of the program.

Nonprocedural languages

In a nonprocedural language, the concept changes. Here, users define only what they would like the computer program to do, while the nonprocedural language processor algorithmically keeps track of the program's flow. This division of labor leads to enormous increases in productivity.

Examination of a flow chart of a computer program will show about 20% of the boxes defining what the program should do. The remaining 80% defines how to keep track of the flow of the program. It is here the productivity of fourth-generation languages is reflected. By eliminating that 80% of the work, we should see at least a 5:1 productivity advantage in program development from that one point alone.

Another characteristic of nonprocedural languages is that they are user-friendly, a key concept, but one that is overused. User-friendliness
means the user finds it easy to be effective when communicating with the computer. It should be stressed, however, that user-friendliness is not what the author of the computer program says is user-friendly.

Integration

The next common characteristic is a data base foundation that integrates the nonprocedural language. The data base manager should be able to enable the nonprocedural language to access to the data base. But a data base foundation must, in fact, be there.

Additionally, the data base needs to have many common functions, all of which are integrated. These common functions include report preparation, spreadsheet analysis, data entry, micro-mainframe communications, command languages and editors. All of these are menu driven and feature extensive Help facilities. Until these integrated systems came along, organizations had to purchase a variety of software packages to maintain a range of functions. With the advent of fourth-generation systems, however, all the functions are integrated.

Although there is still resistance to change, it is important for organizations to cope with change because success is achieved through change. Only organizations that respond to change will win. Change is the key to growth.

The history

Between 1967 and 1975, fourth-generation languages were embryonic. During that period, there were pioneer developers and pioneer users. We then moved into what might be called a missionary phase. Then, from 1976 until approximately 1982, an active outreach began.

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Trends in development

Several trends will affect fourth-generation language development over the next three to five years, as we move from this generation through the main stream and on to something else.

The first trend is a broadening functional capability and tighter integration within computer software. The authors of the leading fourth-generation languages are putting increased effort into adding functionality and increasing integration of their products in an evolutionary way. The results are gains in productivity.
These authors are building on a firm foundation of data base management. They are adding consumer computing tools and applications development tools, which encourage intellectual ferment in companies.

On top of this foundation sit applications. An application has different characteristics, depending on whether it is to run in a batch, on-line, -- interactive, distributed or workstation environment. The trend is toward the expansion and integration of all these pieces.

Look at the new facilities becoming available for applications development. We are moving from third-generation languages, such as Cobol, to systems that manage transactions.

In any organization, some people are responsible for entering data into the computers. Data entry is commonly accomplished through CICS applications, using command-level languages that are designed to build applications — for example, Adds Online (from Cullinet Software, Inc.) or UFO (from Martin Marietta Data Systems).

Other facilities improving the development of applications include screen definition and management capabilities, report generators that help ferret information out of data and data analysis tools, such as spreadsheets or statistical software, that manipulate data.

The foundation facilities on which these applications development facilities depend include dialogue managers — the interactive management tools that aid users' interfacing with the system — and smart editors that have built-in intelligence.

Other foundation facilities include workstation gateways that are able to service the need for micro-mainframe links, including transfer of data; data dictionaries, both active and passive, which will help to manage the information resource; and external file gateways, which enable us to cope without having localized data extracts by permitting access to the operational data.

A few vendors of fourth-generation systems clearly know where they want to go and are working toward it. Even though the descriptions might be different, there is a common direction. The evolutionary development process is going to create increasingly better systems.

One thing unique about software is that once a product is bought, vendors continue to enhance it. It is not as though you bought a piece of equipment and had to throw it away when you wanted a new one. This evolutionary development process is very important.

Improving productivity

The second trend is the continuing shift of effort from people to computers. People want to increase their personal productivity, and great progress is being made in response to this need. Touching upon some data from the survey mentioned earlier: Of the company sites responding, 15% had only end users using these systems; 14% of the sites had only computer specialists; but 71% had both. Some systems seem to be developed primarily for the computer specialist, some for the end user.

But what kind of productivity advantages are people getting? Figure 1 shows that 89% of the people were getting 10:1 productivity advantages or more. Thirty percent claimed 50:1 productivity advantages. Those are enormous numbers.

For report preparation, 63% said they were getting 10:1 productivity or more. Remember, 5:1 is the theoretical minimum achieved. Fifteen percent claimed that they were getting 50:1 or more because of all of the other components that are in the system along with the nonprocedural languages.

Even for data maintenance, 62% said they were getting more than a 10:1 productivity advantage, and that seems to be most difficult to do. Eight percent stated that they were getting a 50:1 advantage. For building complete applications, 62%
In the first stage of person-machine interaction, the motto was, "Let the worker fit the tool"; in the second stage, "Make the tool fit the worker." The difficulty with this approach is that there are 50 million different office workers and 625,000 computer specialists in the U.S. The stage that is just now evolving is a very important one in which the worker will choose the best tool. More than one tool will be integrated into the same system, and the person can choose what is best for the particular job at that particular time. "Freedom of choice" is a term that we are going to hear more about in the next few years. Most fourth-generation systems will include the ability to specify more than one way to do the same task so that users can do their own thing in their own way. This is going to lead to enormous increases in personal productivity.

**Efficiency**

The fourth trend is attention to efficiency. The trend toward increased personal productivity becomes a bottleneck if it is accomplished at the expense of hardware. And fourth-generation languages are becoming quite efficient, to a large extent because their authors are recognizing their importance. For more applications, the languages' efficiency equals or surpasses that of Cobol.

Now how can a language possibly be more efficient than Cobol if the user has to do so much less? Cobol must be more efficient if programmers have to do more.

One reason for this apparent contradiction is a performance orientation. Vendors have been constantly increasing the efficiency of these systems. And the Cobol application program doesn't have the same kind of performance orientation — you're not returning it every year.

The second thing that is very important is that the system — the nonprocedural language processor — has knowledge of what's being done. Therefore, vendors, by building in efficiency, are able to achieve tremendous advantages from knowing what people are trying to do based on how they are doing it. Remember, we control the flow of the application.

One point that should not be overlooked is the pressure on people designing and coding computer programs. Each of the 50 million office workers wants to be more productive, but since there are only 625,000 computer specialists, each one must support 78 office workers. This high ratio puts hinders specialists in doing their best job.

But advances in software architecture and engineering systems are being developed to the point that, if the particular fourth-generation language you are using today is not more efficient than Cobol, it soon will be.

**Applications life cycle**

Most fourth-generation language productivity advantages so far have been directed at the coding process. The fifth trend is a movement away from this concentration on coding.

The applications development life cycle consists of much more: requirements definition, internal and external specifications, product debugging, unit testing.

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systems testing, maintaining the product and getting it into production. Productivity advantages need to include the whole life cycle and not just the coding process.

In order to automate more than just the coding process, computer-aided engineering has given us everything from computer-aided design and manufacturing systems to development and specification systems. We are seeing the development of what might be called knowledgeable editors that know what the user is trying to do. All of this leads to great increases in productivity and enables installations to enforce standards for structured programming.

Communications
A major key to business today is communications. Individuals and organizations that communicate well are more productive. The sixth trend applies the principles of artificial intelligence to improve people-machine communication, using natural languages like English, French and German to talk to the computer.

Several systems are available where people communicate with the computer by typing in English sentences or combinations or fragments of sentences, and the computer responds with the desired information. These technologies, built on the "knowledge-based" concept, are just emerging. These are not toys; they are, in fact, the next communications medium.

The importance of language understanding is clear, and voice recognition is coming along rapidly, assisted by several vendors, such as IBM. We can expect that the surviving form of communication with the computer is going to be largely verbal, and we can expect to see it in the next five to 15 years.

People solve problems by defining a model and then manipulating it, typically using the computer as a calculation aid. The seventh trend, the advent of expert systems, will see this change.

Expert systems
For example, we will see expert systems that can specify a data base. Today, people specify a data base largely by doing the kinds of things that are coming out of the expert systems field. Computers will do a very good job of defining data base structure, calculating the right combination of efficiency and implementation.

Advances in software and systems are at the point where, if a particular fourth-generation language is not more efficient than Cobol, it soon will be.

time and all of the different parameters.

Using an encyclopedia (expert systems all are built around a knowledge base or an encyclopedia that they use to reference their data), automatic application generation will replace even the simplicity of a fourth-generation language.

Whether the needed model is an accounts payable processor, an accounts receivable processor or an inventory control processor, we will generate the specifications and code automatically, again by making reference to the encyclopedia. These things are not yet commercially available, but great developments are being made in the field of knowledge-based systems. Knowledge-based systems will also improve the way one updates an expert system. One of the problems with expert systems is that as soon as you finish debriefing your expert and that knowledge is embodied in your computer, that expert system becomes static — the expert continues to go on and learn, but the system doesn’t keep up.

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Integrated Business Systems
The importance of language understanding is clear. We can expect that the surviving form of communication with the computer is going to be largely verbal, and we can expect to see it in the next five to 15 years.
Cauzin unveils Softstrip
Prints digital data on paper to be read by micros

By Eric Bender

WATERBURY, Conn. — A technology that permits data and programs to be printed on paper and then read by personal computers debuted last week from Cauzin Systems, Inc.

Offering cost and durability advantages over alternative methods of distributing data, the Softstrip system will find widespread use in business, the company claimed.

In Cauzin’s Softstrip scheme, ¾-in.-wide strips of encoded patterns are printed on various types of paper, either through commercial printing processes or by desktop laser or dot matrix printers. Holding up to 5.5K bytes, the strips incorporate sophisticated error-checking techniques and can be linked together for lengthy programs or files.

Softstrips can be read by the Cauzin Reader, a lightweight $200 self-aligning optical scanning device that plugs into an RS-232 port. Versions configured for the IBM Personal Computer and the Apple Computer, Inc. Macintosh and Apple II will be available in January.

“Until now, we’ve had two rather limited methods for distributing data and programs, through telecommunications or on diskettes,” according to Cauzin President Robert Brass.

Softstrips can be created with standard printing processes on ordinary paper, are more sturdy than diskettes and fit more easily into existing ways of distributing printed materials, Brass said.

Several computer periodicals will begin printing Softstrips in issues starting early next month.

Microsoft introduces enhanced mouse version

Microsoft Corp. of Bellevue, Wash., has introduced a version of its Microsoft Mouse pointing device, said to feature improved ergonomic design, higher resolution and near-silent operation on all surfaces.

Microsoft Mouse Version 5 has been reconfigured with buttons that wrap around the shell so they can be pressed from either top or end of the device, according to the vendor.

Resolution has been improved from 100 point/in. to 200 point/in., decreasing the amount of desk space required and permitting users to operate the device by moving their wrist rather than their entire arm.

Teflon runners and a rubber-coated control ball have replaced the steel ball runners and steel control ball for smoother, near-silent operation on all surfaces, the vendor said.

The revamped Mouse also features new cable connectors, with thumbscrews that eliminate the need for a screwdriver during installation.

A new version of Zsoft Corp.’s PC Paintbrush software package, improved setup program, new menu and documentation are bundled in with the mouse as are Piano and the Game of Life, two software familiarization tools, and Microsoft Notepad, a screen-oriented editor for program and text files.

The device requires PC-DOS or MS-DOS 2 or higher. Both serial and bus versions of the Mouse, priced at $105 and $175, respectively, are available now.

Sysgen unwraps hard disk drive/tape subsystems

Sysgen, Inc. of Fremont, Calif., has expanded its line of mass storage products for personal computers with the addition of three hard disk drive/tape subsystems.

All provide automatic data back-up, mirror-image or file-by-file back-up and verification on the fly. They are slated for delivery next month.

The Sygen Plus, which combines a 70M-byte hard disk drive with a 60M-byte hard disk drive system, costs $5,995. The disk drive offers 30-msec average access time, and the Plus can be suited for multi-user or network server applications, according to Richard Newsome, Sygen executive vice-president.

The AT Add-In is an internal disk/tape subsystem for the IBM Personal Computer AT that minimizes cost by using the system’s existing hard-disk controller and power supply. The AT Add-In incorporates a 60M-byte tape subsystem with either a 20M-byte, 40M-byte or 70M-byte hard disk drive.

Prices are $2,095, $2,795 and $4,955, respectively.

Sysgen’s Flat-Pak subsystem sits on top of a Personal Computer or Personal Computer XT, under the monitor, and offers either 10M bytes of disk storage with a 20M-byte cassette tape or a 20M-byte hard disk drive with a 60M-byte cartridge tape. Flat-Pak uses the computer’s existing hard-disk controller and power supply.

The two versions cost $1,385 and $2,095, respectively.
Forte PJ version supports APL for IBM micro users

Forte Communications has announced several enhancements to the Forte PJ, its IBM 3278/79 terminal emulation board for the IBM Personal Computer, Personal Computer XT and Personal Computer AT. The vendor said all the features are available as free upgrades to current Personal Computer users.

The new board, Forte PJ APL, supports IBM's APL programming language by emulating the APL extended character set and the 3278/79 typewriter/APL keyboard. APL symbols are mapped out on the microcomputer keyboard, which reportedly generates 128 characters with font support. IBM Enhanced Graphics Adapter card support allows high-resolution display of APL applications. Forte PJ APL is said to provide microcomputer users with the same APL support as VS/ APL for MV5-IBM APL Graphpac for VM users, according to the vendor.

IBM light pen support

The San José, Calif.-based vendor has also enhanced Forte PJ with IBM 3278/79 light pen support, compatibility with Topview software and 3278 Model 5 emulation. Additionally, the board now ships with Forte PJ/File Transfer Support software, compatible with the IBM 3270 Personal Computer file transfer system, that allows microcomputer users to access IBM mainframes equipped with Professional Office System/PC2 running under MVS, TSO, VM/CMS or CICS environments. The enhanced emulator board costs $1,195.

AT&T division introduces plug-in graphics board

Electronic Photography and Imaging Center of Indianapolis, a division of AT&T Information Systems, has introduced a $695 plug-in graphics board said to allow standard color monitors used with personal computers to display television-quality pictures.

The AT&T Truevision Video Display Adapter with Digital Enhancement (VDA/D) is said to increase color resolution by enabling digital red-green-blue (RGB) monitors to display 256 colors chosen from a palette of more than 2,000.

The VDA/D has eight color maps, each of which can accommodate up to 256 different colors. Four maps can be used at the same time in different areas of the screen, allowing the display of up to 1,024 colors simultaneously.

According to a company spokesman, Truevision VDA/D has a high-resolution spatial mode that enables it to display 80-col. text in 512- by 256-pixel resolution. VDA/D has less than 1% memory contention, so software packages execute without any visible delays.

VDA/D pictures can be transmitted over ordinary phone lines, making electronic mail with electronic photographs, on-line data bases with pictures and still-frame teleconferencing possible, the spokesman said.

VDA/D can reportedly display video pictures digitized by AT&T's Truevision Image Capture board frame grabber as well as images created with graphics software packages for AT&T's Truevision Video Display Adapter, including the Truevision Paint software and the Truevision PC Carousel Presentation software. It is also compatible with Media Cybernetics, Inc.'s Multihalo development tool kit and driver.

The board plugs directly into a single expansion slot of 8-bit bus, MS-DOS-compatible personal computers, and its output can be fed directly to composite video monitor output. Televisions equipped with radio frequency modulators, analog RGB monitors as well as digital RGB monitors with National Television Standard Code scan rates.

Tapestry remote link bows

Torus Systems, Inc. of Redwood City, Calif., has announced software that is said to link remote IBM Personal Computers, Personal Computer XT's and AT's to Torus' Tapestry networking program running on the IBM PC Network.

Remote Network Link reportedly allows remote users to access the Tapestry network through an icon-based interface over standard telephone lines. Access is achieved through a Hayes Microcomputer Products, Inc. modem rather than a network adapter card.

Remote Network Link provides all Tapestry features such as electronic mail, telephone management, the icon-based interface, remote printing and file sharing. The remote access is transparent, except that Tapestry operations through the link are slower at 1,200 or 2,400 bit/sec., according to the vendor.

The software requires a micro with a minimum of 256K bytes of memory. The cost of Remote Network Link is $250 per computer.

APL Plus PC version out

STSC, Inc. of Rockville, Md., has announced an enhanced version of its APL Plus PC Application Development System. Release 5 is said to include a numeric spreadsheet-like editor and full screen management.

Other enhancements include the ability to enter full screen forms fastest through multwindow input, a library of commonly used Assembler utilities and new online tutorials for producing bar and pie chart graphics and other applications.

The full screen editor enhancement allows an object to be edited while other output remains on the screen and provides for recovery of accidentally deleted data.

APL Plus features updated documentation.

APL Plus PC runs on PC-DOS or Microsoft Corp. MS-DOS 2 or higher and uses 256K bytes of memory. Version 5 costs $555, and the upgrade cost for Version 4 users is $125.
Microsoft upgrades Fortran compiler, Basic interpreter

Enhanced tools run on Macintosh

Microsoft Corp. in Bellevue, Wash., has announced the release of Version 2.1 of its Basic interpreter, as well as Enhanced tools, both for the Apple Computer, Inc. Macintosh.

The new Fortran compiler is said to be a full implementation of the Ansi Fortran 77 standard. The added features reportedly include an expanded set of sample programs, language syntax extensions such as structured programming constructs, a completely rewritten linker and optional case sensitivity.

The new Basic interpreter increases performance speed up to six times faster than Version 2, according to the vendor. Added features reportedly include use of English-like commands, Macintosh-style full screen editing, the ability to access and incorporate Macintosh features such as pull-down menus and interactive buttons and edit fields into programs, the ability to communicate through the clipboard with other applications such as Microsoft Word, Microsoft Multiplan, Apple Macpaint and Apple Macwrite, and a debugging capability.

Minimum system requirements for both the Fortran Compiler Version 2.1 and the Basic Interpreter Version 2.1 are 128K bytes of internal memory and one disk drive.

Fortran Compiler Version 2.1 costs $295. Basic Interpreter Version 2.1 costs $150. Owners of Version 2 of the Basic interpreter can purchase the upgrade for $70. Owners of earlier versions can purchase the upgrade for $75.

Security system out

Winterhalter, Inc. of Ann Arbor, Mich., has announced a security system designed to protect data on both hard- and floppy-disk-based IBM Personal Computers.

Secure, priced at $495, is said to use the U.S. government-approved Data Encryption Standard algorithm to scramble information into an unreadable and undecipherable code.

The Secure system is menu driven and enables the user to encrypt individual files, complete directories or the entire disk.

Secure is compatible with the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles. The Data Encryption Standard encryption processor on the circuit board uses direct memory access interface to the Personal Computer, encrypting and decrypting at a rate of 1.565K byte/sec.

System mart goes on-line

The Boston Computer Exchange has created a computer marketing channel by placing its complete data base of used and new computers and peripherals online on the Delphi Communications Corp. Delphi network.

For $6 per hour, or $16 per hour during business hours, computer buyers and sellers nationwide can browse through the listings and make electronic bids. Listings are updated hourly and include prices. The on-line marketing channel is also accessible from 25 countries.

The Boston Computer Exchange, which claims to be the oldest computer brokerage, lists more than 100 brands of used and new computers, ranging from the Osborne Computer Corp. Osborne 1 to IBM CPUs, as well as peripherals and software.

The rush to Revelation® has just begun.

When ordinary database management software isn't enough, enlightened users are switching by leaps and bounds to Revelation, the complete database and applications environment.

That's because Revelation includes powerful tools to create applications in no time. Plus advanced features that help users get the most from their system day in and day out.

For software developers, there's a powerful applications generator that builds files, fields, menus and reports.

For corporate users, Network Revelation is already off and running on both IBM's® PC Network and any hard- ware running Novell NetWare™.

For hard-core programmers, Revelation's R/BASIC procedural language combines the best of BASIC with the structure and logic of C.

And for everyone, there's an advanced query language and report writer that's fluent in everyday English and eager to learn new expressions.

The secret is incomparable technology: variable-length fields to conserve precious disk space; unlimited files, fields and records; data dictionaries that make it easy to change your database when you change your mind; plus a high-speed compiler to accelerate program execution. And, of course, conversion utilities for dBase II® and Lotus 1-2-3® are included at no extra cost.

Revelation isn't for everyone. But if you're ready for a database management system you'll never outgrow, rush to your nearby dealer.

Ask for an unforgettable demonstration of Revelation's superior capabilities.
**Micropro OKs sites**

Another major microcomputer software manufacturer has stepped forward with a site licensing program. Micropro International Corp. of San Rafael, Calif., is making its Wordstar 2000, Wordstar, and Chartstar packages available under the program. In addition to site licenses, Micropro will offer volume purchase discounts and optional technical support.

A site license, available for a minimum purchase of 100 units, enables a purchaser to reproduce and distribute programs within a company. Site license prices for Wordstar 2000, which is available with or without documentation, range from $135 to $225.

Volume purchases offer discounts to users who buy 25 or more copies. Prices for Wordstar 2000 range from $213 to $272.

Micropro stated that corporations' current purchases will be credited toward the licenses. Also, documentation may be reproduced by a user. The site licenses and volume purchase are available for three-year periods.

The company is also offering technical support to corporations. For a fee of $1,000 per year, companies receive a toll-free number that will connect them to the software company's technical support staff.

**Microsoft meets date**

Microsoft Corp. began shipping its Excel package for the Apple Computer, Inc. Macintosh Sept. 30, meeting the delivery schedule announced when the package was introduced in May.

The $395 package from the Bellevue, Wash., firm integrates spreadsheet, data base management and business graphics.

The spreadsheet combines macrocomputers that automatically record user actions, interactive worksheet linking and two-way file transfer with Lotus Development Corp.'s 1-2-3 package. Excel runs faster than any spreadsheet currently available on the IBM Personal Computer, according to Microsoft.

Excel requires 512K bytes of external memory and an external disk drive, according to the vendor.

Current owners of Microsoft Multimap for the Macintosh can buy Excel for $200 until Dec. 31.

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**Software directory unveiled for engineering applications**

Management Roundtable, Inc. of Chestnut Hill, Mass., has published a guide to personal computer computer-aided design and manufacturing packages.

"The PC Software and Systems Directory for Computer-Aided Engineering" details what software packages are available and on which personal computers.

It provides listings of suppliers, applications, compatible hardware and prices. Listings are cross-referenced according to applications and systems. The 82-page directory costs $79.

**IBM upgrades emulation control program for AT**

IBM Information Systems Group has upgraded its Personal Computer 3278/3279 emulation control program to add support for the Personal Computer AT.

Version 2 of the software, priced at $235, includes a new diskette and published material for the Personal Computer AT, according to the vendor.

A keyboard aid card for that machine also is provided, a company representative said.

The Personal Computer 3278/79 Emulation Adapter card, which costs $905, is unchanged.

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IBM is a registered trademark of International Business Machines. UNIX is a trademark of Bell Laboratories. EtherLink is a trademark of 3Com Corporation. Sun Workstation is a registered trademark of Sun Microsystems, Inc. Masscomp is a trademark of Masscomp Corporation.
And our CS/1-SNA-T moves IBM into the engineering/development lab.

We put you in control.

Our Management Servers help you configure, control and monitor your entire network from any terminal.

And our user interface works just the way you'd expect it to work.

It's easy, logical, complete.

You can easily change parameters, display statistics, execute command macros, and broadcast messages anywhere on your network. Anytime.
ONCE UPON A TIME THERE WAS AN EGG THAT STOOD ON ITS END.
The scene: a royal banquet with tables of food, goblets of wine and a basket of eggs.
The time and place: Barcelona, Spain, in the year 1493.
The main characters: Christopher Columbus, one of history’s boldest and most innovative thinkers, who has just returned from the New World to cheering crowds and jealous enemies. And Juan Fonseca, a Spanish noble with bushy brows and a perpetual scowl.
The story: as the guest of honor, Columbus is enjoying himself immensely. Until Fonseca, his voice reeking of envy, pounds the table with his fist.
"Señor Columbus," says Fonseca, "In Spain we have no lack of clever navigators. If you had not made this great discovery, one of our own countrymen would have done so."
A deathly silence descended upon the banquet as hundreds of ears awaited Columbus’ reply. But instead, Columbus took an egg from the basket and placed it before Fonseca and his followers.
"Gentlemen," he said, "as the first to discover the Indies, I challenge you to make this egg stand on its end—without any support whatsoever."

The Spanish nobles tried. They tried and they sweated and they cursed in four different languages—but they could not succeed.

Now it was Columbus’ turn.
Picking up the egg, he tapped it on the table, crushing a little of one end—and made the egg stand up on his first try.
"But that’s unfair," cried the nobles.
"That’s easy. Anyone can do it that way."
"Yes," replied Columbus, "it’s easy—once someone shows you how."

The above playlet was brought to you by BNR (Bell-Northern Research) for one purpose only. To dramatize our need, as well as our appreciation, for certain types of creative thinkers. Ones like Columbus, who chart their own course and champion their own cause. And ones, like our own engineers and scientists, who have made us a world leader in the evolution of telecommunications—and who have helped make our parent company, Northern Telecom, the largest supplier of fully digital communications systems in the world.

BNR has labs throughout the United States—so come join the quest. Write to: BNR; Dept. HRM-5; P.O. Box 33478; Research Triangle Park, NC 27709. And become part of a company that continues to make the competition stand up and take notice.

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ed based on word frequency in-
stead of standard word lists. It in-
cludes proper names and can be ex-
panded. Along with spelling control, 
menu-driven AI:Typist provides on-
screen Help and text merging, accord-
ting to the vendor. 
Price: At $99.95, AI:Typist re-
quires 256K bytes of random-access 
memory. The introductory price until 
Jan. 1 is $69.95.

Airus, 11380 S.W. Kerr Pkwy., 
Lake Oswego, Ore. 97034.

SYSTEMS

Continental Telecom, Inc.'s Cado 
systems Corp. has announced an 
IBM Personal Computer AT-com-
patible micro that reportedly sup-
ports up to three terminals and one 
printer.
The Contel Cado Tiger AT/4 is 
based on the Intel Corp. 80386 micro-
processor and Cados, a proprietary 
multiuser operating system running 
co-resident with DOS.
The basic system includes 512K 
bytes of random-access memory, a 
20M byte hard disk and a 1.2M-byte 
floppy or stand-alone 45M- or 
60M-byte streaming tape cartridges 
with integral power supplies.
The basic price is $8,110.

Continental Telecom, Cado Sys-
tems, P.O. Box 3759, 2055 W. 190th 
St., Torrance, Calif. 90610.

From page 73

Cauzin's Softstrip 
prints digital data 
next year, and a number of textbook 
publishers have committed to print-
ing the data strips in upcoming titles. 
Cauzin also intends to market Strip-
ware, a library of software pro-
grams, according to Neil Kleinfeld, 
Cauzin's vice-president for market-
ing and sales.

General business applications are 
likely to emerge somewhat later, 
Kleinfeld predicted, with the data 
strips most suitable for applications 
with up to 60K bytes of data or pro-
gram code.

In large corporations, a Softstrip 
set could aid in transferring data 
between incompatible machines or in 
transferring lengthy documents, accord-
ing to Kathleen Lane, software analyst 
at Dataquest, Inc. in San Jose, Calif.
"Transporting data is much easier 
than with a floppy disk," she said.
"They're not going to melt in your 
car." Additionally, users might want 
to store Softstrip data in standard fil-
ing devices rather than in computer 
files, she suggested.

The most likely competition for 
the scheme will come from other optical 
scanning devices, she suggested.
"We're going that way; the keyboard 
will not be the primary method of en-
tering data."
Cauzin was founded in 1983 by 
Brass, who previously worked at Xe-
rox Corp., as director of market anal-
ysis and of telecommunications stra-
egies, and Jack Goldman, previously 
Xerox's chief technical officer.

From page 73

Javelin, GNP 
aim high 

of business analysis and decision 
support.

Regardless, Javelin officials make 
an interesting argument that spread-
sheets in general, and 1-2-3 in partic-
ular, have been pushed far beyond 
their limits as analysis tools. Spread-
sheets stand accused of inflexibility, 
insufficient signals and diffi-
culty of use. 

These are serious com-
plaints, with considerable evi-
dence behind them, and Lo-
tus has not bothered to 
address them seriously in 
the new release of 1-2-3, which shipped 
late last month. Most of the up-
grade's improvements focus on pow-
er-user features. You can build 
bigger spreadsheets and crunch them 
fa~er — which is fine but irrelevant 
to both new users and most current 
users.

While many features are hard to 
assess quickly, ease of use seems 
both crucial and relatively straight-
forward. At least in the demo, Jave-
lin can handle commands typed in 
simple English (within limits). If it 
works as well as it seemed to, it's 
a genuine step past 1-2-3 in ease 
of use.

However, Javelin may be aiming 
at a moving target. The week of 
the Museum of Science blowout, a small 
supplier of 1-2-3 add-on software be-
gan demonstrating an impressive-
looking natural-language interface 
for 1-2-3. GNP Development Corp. 
President Bill Gross maintained that 
the HAL add-on could greatly simpli-
fy work even for existing users.

He gave the example of one veteran 
an user who called GNP's hot line 
and was flabbergasted to hear that 
the program can do sorting. Let 
through the sorting procedures, the 
user then thanked the support per-
sonnel and commented that 
he would never be able to do 
that again, according to 
Gross.

If GNP drops the tentative 
$295 price — or better yet, 
makes a deal for Lotus to dis-
tribute the software — HAL might 
spread through corporate America 
as quickly as People magazine gets 
around a lunchroom.

Or Lotus could do the job itself. 
That would be an easier transition 
than asking users to throw out a 
standard analysis tool. "It's extreme-
difficult to introduce any new 
product from a start-up," remarked 
J. Julian Anderson, chairman of Future 
Computing, Inc. "To replace 1-2-3 or 
even make a dent, you've got to be 
two to three times better.

Will users decide that the much-
hyped new packages from firms 
like Javelin and Ansa Corp. are 
caused to scrap their current soft-
ware? We're months away from find-
ing that out, but Javelin seems to 
have a fighting chance.

WHAT TO LOOK FOR 
IN ON-SITE TRAINING

With all the technical training options around today, it's hard to figure out which 
company will offer the most professional, reliable on-site training. Here's Sys-Ed's 
checklist of key benefits that will make your training investment really pay off.

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®@ Complete range of training for the IBM environment, 
including IDSMS, DATACOM, ADMS4, and SNIA!
®@ Ongoing technical support? 
®@ Satisfaction guarantee? 
®@ Additional charge for customized training? 
®@ Thousands of solid references?

YES NO

Y ES NO

Y ES NO

Y ES NO

Y ES NO

NO YES

YOU BET ?

If you ask other training companies the answers to these tough questions, you'll 
probably make the decision thousands of decision-makers like yourself made: to 
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Write Sys-Ed or call (212) 564-9479/48/49 for more information about 
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Name Company
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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM mainframes and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Oracile is the only database system that is fully IBM compatible. ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

What about Goldengate, dBase III, Symphony or Frontier? PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributed processing and local area networks.

ORACLE is currently installed on over 1000 mainframes and supermini systems around the world, as well as on IBM mainframes and superminis. Data and programs can then be shared among users of different machines, distributed processing and local area networks.

Ad for Oracle Corporation, Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS.
Modems with time division multiplexers unwrapped

Anderson Jacobson, Inc. based in San Jose, Calif., has released a Trellis-coded 14.4K bit/sec. modem and a 9.6K bit/sec. synchronous modem, both equipped with time division multiplexers.

The AJ 1411 enables six users to transmit data over a single four-wire leased telephone line. The 14.4K bit/sec. modem may be used in point-to-point or multipoint polling applications, the vendor said. When line quality problems arise, the modem has a fallback capability and will transmit at speeds of 9.6K, 7.2K or 4.8K bit/sec.

PAYROLLTAX provides the most complete tax coverage!
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There are many more reasons for using PAYROLLTAX— it’s more efficient, more complete, and more accurate than any other system. Just ask our users. And, it’s the only payroll tax maintenance system with tax table files supplied and maintained on magnetic tape. Calculation programs are completely independent of rates. Supports 401K, treasurys, cafeteria plans, etc. All the details are in our brochure, “PAYROLLTAX Magnetic Tape Service.” Just call or write today and we’ll be glad to send you a copy. Free, of course.

Vertex Systems Inc.

Independent proof shows Tandem wares follow MAP

By Jeffry Beeler
CUPERTINO, Calif. — Tandem Computers, Inc. last week became the industry’s first vendor to furnish independent proof that its hardware and software conform to key parts of General Motors Corp.’s Manufacturing Automation Protocol (MAP).

In an Oct. 8 announcement, Tandem reported recent independent test results that certify the firm’s products as compatible with the Data Link and Transport layers of the Open Systems Interconnect (OSI) model.

The results were provided by the Industrial Technology Institute, which evaluates systems for compliance with MAP 2.1, the latest version of the GM protocol.

Both MAP 2.1 and its predecessor, Version 2, use the OSI standard as their architectural model. Developed by the International Standards Organization, the OSI protocol consists of seven levels of networking specifications, the second and fourth of which are the Data Link and Transport layers, respectively.

In the view of Andy McMillan, Industrial Technology Institute’s manager of network evaluation and testing, Tandem’s compliance with the OSI model’s Transport level is especially deserving of recognition.

“The fourth layer is probably the most complex protocol in the entire OSI specification,” McMillan said during a telephone interview. “So in conforming to the requirements of the Transport layer, Tandem has taken a big step toward compatibility with the interconnection standard as a whole.”

Within about six months, in fact, the manufacturer of on-line transaction processing systems expects to announce compliance with the rest of the OSI model’s constituent layers.

“We plan to return to [the institute] and test our products for full MAP 2.1 conformance by the end of the first quarter of 1986,” according to Jim Faxon, Tandem product manager.

Possible deliveries in 1986

If the tests prove successful, the company will probably be able to begin volume deliveries of its first certified MAP-compatible products during the second half of next year, Faxon predicted.

Tandem is far from being the only systems supplier that has successfully tested its products for MAP compliance. But the firm is the first vendor that has accomplished the feat at the Industrial Technology Institute, the only MAP-conformance testing center currently recognized by the MAP Users Group, McMillan said.

To date, every other company that has tested its products for MAP compliance has done so as part of preparations for a huge, multivendor networking display that GM is readying for the Nov. 5-7 Autofact show in Detroit. The display is intended to demonstrate the purported ability of MAP 2 to link systems of dissimilar make and enable them to exchange data freely.

To ensure a successful demonstration, all the participating vendors have done their necessary MAP conformance testing under the auspices of GM.

But, according to Faxon, the days of the giant automaker’s direct involvement in compliance evaluation are numbered.

“GM has already gone on record as saying that any product it buys in the future for manufacturing purposes will have to be certified as MAP 2.1-compatible by an independent testing agency like the Industrial Technology Institute,” Faxon said.
CONTROLLERS

Perkin-Elmer Corp. has announced a 4-port front-end processor that works with its Xelos and Series 3200 computer lines.

The 3200-CP supplies up to four serial synchronous lines operating at speeds up to 19.2K bit/sec. One line can be used for an Ethernet network or direct-distance dialing. The multilink processor transmits data at speeds up to 500K bit/sec. A single connection from a host PE system to the front-end processor transmits data at speeds up to 600K bit/sec.

Each line can be configured to act as a gateway between the PE machine and a computer working with IBM Systems Network Architecture and Binary Synchronous Communications or X.25 protocols. Up to four front-end processors can be connected to host systems.

The 3200-CP hardware configuration consists of a 7-in. chassis, two I/O interfaces, universal clock module and two line communications multiplexers. Hardware costs $13,000. Prices for software that supplies support for 12 protocols range from $1,000 to $5,000.

ITT Communications Services Group has announced a business telephone service designed to enable customers to place calls automatically over its net via the least expensive route. The service can be used with any private automatic branch exchange, so there is no need to modify a customer's telephone system. It automatically finds the least expensive way to deliver calls and bills the customer at that rate, regardless of the line that carries the call.

ITT Smart-Wats service billing schedule includes monthly access charges ranging from $75 to $120, depending on the city, and graduated rates by Wats band.

ITT Communications Services Group, 100 Plaza Drive, Secaucus, N.J. 07096.

Trax Softworks, Inc. has announced a device that links IBM host communications controllers to intelligent terminals.

The Traxlink 1 works with Trax Terminal Simulation Facility software and enables local and remote 3270 series terminals running VM/370 or VM/SP operating systems to emulate ASCII terminals. The terminal can then access dial-up services such as Dow Jones News/Retrieval service.

The Traxlink 1 sits between a host's communications controller and intelligent modems and supports Terminal Simulation Facility outbound calls. The product works with IBM 3705, 3704 and 3725; Memorex Corp. 1270 front-end processors; and other compatible communications controllers.

One Traxlink 1 is required for each line in use. The device features a 1,200 bit/sec. modem, a Zilog, Inc. Z800 2.5-MHz microprocessor, 16K-bit erasable programmable read-only memory and 8K bytes of random-access memory. It is said to flush all data to ensure data integrity, to allow the use of a normal asynchronous line as a Terminal Simulation Facility line and to support these lines individually instead of allocating them in groups of four.

The processor costs $1,250, which includes one year of maintenance.

Trax Softworks, 10801 National Blvd., Los Angeles, Calif., 90064.

VOICE/DATA COMMUNICATIONS

Gandalf Computer Network, Inc. has announced a voice/data communications system and the company's first line of communications controllers.

PACXNET products allow you to make point-to-point or multipoint link via public switch network or direct-distance dialing. It will be controlled at the site or by remote terminal.

Case unveils multiplexers in 1,200 bit/sec. and 2,400 bit/sec. versions for IBM and other compatible computer systems. Each line can be configured to act as a gateway between the PE machine and a computer working with IBM systems Network Architecture and Binary Synchronous Communications or X.25 protocols. Up to four front-end processors can be connected to host systems.

The 3200-CP hardware configuration consists of a 7-in. chassis, two I/O interfaces, universal clock module and two line communications multiplexers. Hardware costs $13,000. Prices for software that supplies support for 12 protocols range from $1,000 to $5,000.

ITT, 2 Crescent Place, Oceanport, N.J. 07757.

Gandalf's modular PACXNET lets you link all your locations, whether across the street or across the country. Tailored to your needs, PACXNET gives you hands-on control of your entire system and allows you to expand, upgrade or alter in easy-cost efficient steps.

To learn why PACXNET is the right investment for your future, call your Gandalf account executive. Nobody knows networking like Gandalf.


From page 81

Case unveils multiplexers

Point-to-point or multipoint link via public switch network or direct-distance dialing. Restoration of a line can be controlled at the site or by remote terminal.

A stand-alone version of 4000-D1 costs $950, and a card version costs $900.

The DCX/T1 works with T1 lines that transmit data at speeds of up to 1.544M bit/sec. The product features a drop-and-insert capability that enables linking bundles of information by an intermediate node without demultiplexing and remultiplexing operations.

The product is compatible with AT&T's Acucnet network and supplies redundant capability for automatic switchover at every major point of concentration in the line.

Prices range from $15,300 to $22,500 for the product.

Nobody knows networking like Gandalf.
WHAT THE MOST POWERFUL, MOST FLEXIBLE COMMUNICATIONS SYSTEMS IN THE WORLD CAN DO FOR YOU.
ONLY AT&T SYSTEM 85 AND
AT&T SYSTEM 75 FULLY
INTEGRATE SO MANY VITAL
MANAGEMENT FUNCTIONS.

Decisions, decisions, decisions. It wasn’t too long ago that if you wanted the most sophisticated office communications equipment in the world, you’d get a telephone.

Now it’s a whole new ball game. You’ve got to have more than a telephone. You’ve got to have an entire communications and information system. You’ve got to choose from among a number of vendors and justify a substantial capital investment. You’ve got only one chance to make the right decision. And you’ve got to be —

Relax. The decision is easy. System 85 and System 75 from AT&T Information Systems offer you more power, flexibility and control than any other system in the world. Because they can grow and change as technology advances, you can be sure your investment is protected. And because they’re from AT&T, you know they meet the highest standards of manufacturing quality and reliability.

Here are just a few ways they can help your office operate more efficiently and effectively.

Voice Management Our experience in voice communications speaks for itself. There are over 150 calling features to choose from, so you can custom-tailor a system that meets the particular needs of your business.

Data Management This ties the whole system together. Our Digital Communications Protocol integrates voice and data transmissions, resulting in more productive use of your equipment and easy future expansion.

Networking Different businesses need different networks. Our Distributed Communications System and Electronic Tandem Network let you link all your locations, either across the street or across the country.

System Management Adaptability is the key here. You’ll have a hands-on ability to monitor and change the entire system day by day, to respond to your changing needs.

Office Management This streamlines your everyday office procedures into one easy-to-use system. By integrating Electronic Document Communication, Message Center, and Directory, you can create, store and send information easily and more productively.

Unified Messaging This complete, easy-to-use service is the answer to unanswered calls. It completely integrates all your messaging services, including Message Center Coverage, Leave Word Calling, and AUDIX, our powerful voice mail service.

100 YEARS OF EXPERIENCE

There’s another aspect of our system which you can look at as something of an insurance policy. It’s called Information Systems Architecture. It is this framework that ensures that anything new we develop for your system will fit right in. System 85 and System 75 are designed according to its guidelines, as our future products will be. That’s protection.

We’ve been the undisputed leader in communications for over 100 years, and we plan to keep it that way.

Today, more than 4000 systems designers and others formerly at AT&T Bell Laboratories are working exclusively to develop new business products at Information Systems Laboratories. And they’re supported by the largest sales and service staff in the industry to help you along every step of the way.

There are two ways you can distinguish yourself in the business world—either get a little gray at the temples worrying about it, or choose AT&T Information Systems.

To find out more about System 85 and System 75, call your AT&T Information Systems Account Executive or 1-800-247-1212.

The right choice.
E-mail messages from public systems are most often converted to telexes when they are sent to foreign destinations. E-mail systems in foreign countries. But at least one vendor, Electronic Mail Corporation of America, is offering what it claims is the capability to translate public E-mail messages from one system to another and transmit them overseas on its packet-switched network.

With the company’s GEM Service, before messages are routed overseas, they are processed at the firm’s head quarter’s office, scanned, and translated into the electronic mail form of the recipient country. In return for the high cost of transmission, Electronic Mail Corporation of America makes “everybody compatible with everybody else,” said Nina Scozzari, manager of corporate communications.

Light switching now a possibility

switching an electrical signal. A photonic switch may not be able to match the speed of an electric switch, but it does supply other benefits. For example, the increased speed connections can be maintained by obviating the need to convert light signals back to electricity for switching purposes. Additionally, photonic switching may also increase system reliability by drawing away with electronic transceiving equipment.

Large photonic switches could be made by applying a switch to fiber junctions in a switch matrix. This would enable any incoming port to be routed to outgoing ports. This same switching technology can also be used to modulate light pulses to build communications systems capable of higher operating speeds than are currently possible.

Light travels at more than 186,000 miles per second — less than a foot in a billionth of a second. Our ability to modulate or encode light signals to carry information is limited by the speed with which we can turn a light source — usually a laser — on and off. Instead of modulating the light source, Ericsson’s light switch can be used to modulate the light itself, a technique called external modulation.

By turning a laser on and off we can encode information into a binary signal (light/no light) that can be interpreted by a computer as ones and zeros. Ericsson’s switch provides the same effect as turning the light source off and on by diverting the light signal.

Envision the same simple switch example used before. If a constant light source were turned on and off, the light could be captured by a photodiode and converted to an electrical signal. Now imagine the light source were being modulated. The signal (light/no light) could represent a one.

Despite this, Winther said, “There’s going to have to be interconnection” of the public E-mail systems of different nations. That interconnection, he said, will be speeded as electronic mail vendors set up similar systems in other countries. ITT has already sold versions of its Dialcom E-mail system to both Germany and Britain for use in their national telephone systems, Winther said.

Turn on, access, and turn off your microcomputer.

From anywhere.

PRESENTING TURN-ON™

TURN-ON is a totally unique intelligent power controller that provides unattended remote access plus power protection to your microcomputer. Now you can avoid arranging "call-in" schedules or peak hour overloading. When the phone rings at your powered-down micro, TURN-ON automatically powers-up the peripherals and then the computer, puts your program in operation, and upon completion powers-down the system, leaving a visual remote that remote activation has occurred. Your computer no longer needs to be left on or attended all the time.

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TURN-ON has all the finest available telecommunications features and much more. It is available as a turn-key hardware/software system that goes far beyond power strip and other remote access devices. TURN-ON gives you automatic logon and automatic logoff, as well as Password protection. Optional dial-back confirmation. TURN-ON's file transfer program also provides transfer protection by file name. The Dyna-Talk software permits automatic recording of every incoming call on tape. TURN-ON’s software is very user-friendly, menu-controlled, easy to use, and PC DOS 3.0 and above compatible. AC line filtering gives complete power surge protection for all devices plugged into the six power outlets. No separate power strip is needed.

TURN-ON PUTS YOU IN CONTROL

Remote distributed micros are now available to you 24 hours a day for such tasks as electronic mail, transferring programs and data files, or the running of other application software. An optional 25 pin connector allows the computer to turn on your computer system.

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SEE US AT COMDEX BOOTH NO. 1876
BOSTON — Claiming to offer higher performance than supermini- computers and minicomputers, Masscomp last week introduced its Masscomp 5000 family of computers, systems based on Motorola, Inc.'s 68020 microprocessors and 68881 floating-point processors.

The product line includes the previously available MC5600, renamed the MC5300, and four other models supporting from one to 64 users in scientific and technical environments.

In a press conference telecast to about 25 U.S. locations, the West- ford, Mass., company's spokesmen compared the Masscomp 5000 fam- ily's performance to systems ranging from the size of the Digital Equip- ment Corp. Microvax II to that of the Cray Research, Inc. Cray-1 super- computer.

The Masscomp spokesmen charac- terized the machines as micro super- computers that enable scientists and engineers to perform continuous cal- culations on large sets of data in real- time — the type of applications run by superminis. In smaller scale systems and at a fraction of the cost of the Cray-1 and the DEC 8000 superminicomputer.

A spokesman said a fundamental characteristic of the Masscomp prod- ucts is their ability to bring computing to the type of applications used in environments such as those aboard ships and laboratories in the Arctic Ocean.

According to the vendor, the sys- tems feature a triple-bus architecture, including the Intel Corp. Multi- bus and the Masscomp STD+Bus. It will also feature Masscomp's Lightning floating-point accelerator and a two-way associ- ative cache that manages memory ref- erences in parallel fashion. They run Masscomp's Real-Time Unix, which is said to be compatible with both AT&T Unix System V and the Uni- versity of California at Berkeley 4.2 version of Unix.

Masscomp claimed the products provide up to one million samples per second in data acquisition sampling rates and perform 700,000 to 16 mil- lion instructions per second, 655K to 12M Whetstone operations per sec- ond and up to 13M floating-point op- erations per second.

The low-end products are the MC5300 and the MC5400. The MC5300 supports one to four users, features a 12.5-MHz 68020 CPU and 2M to 4M bytes of memory, according to Masscomp spokesmen. The MC5300's price starts at $16,000.

The MC5400 is said to support one to 12 users, and features a 16.7-MHz 68020 CPU, 8K bytes of direct- mapped virtual address cache and 2M to 10M bytes of physical memory. It is priced starting at $25,900.

The MC5300 will be available in early 1988. The MC5400 is scheduled to be available in 90 days.

The MC5600 is available as a sin- gle- or dual processor, supporting up to 18 users, and has been available since 1982. It ranges in price from $16,000 to $54,000, according to the vendor.

The MC5600 is available now in single- or dual-processor configura- tions with up to 16M bytes of main memory, 8K bytes of cache and 4G bytes of virtual address space. Masscomp spokesmen claimed. Typical configurations costs range from $77,400 to $354,750.

The four-processor MC5700 is scheduled to be available in 90 days. It supports up to 64 users with 8K bytes of cache memory, 32M bytes of main memory, and 4G bytes of virtual- address memory. A typical four- processor configuration costs $167,150.
Fairchild unveils CMOS microprocessor

Fairchild Camera and Instrument Corp. of Mountain View, Calif., last week announced its first 32-bit CMOS microprocessor, using the basic elements of a reduced instruction set computer architecture.

Clipper, scheduled for sample-quantity availability in June 1986 and volume delivery in the fourth quarter of 1986, reportedly runs at 33 MHz and uses hard-wired rather than microcoded instructions to achieve peak performance of 33 million instructions per second (MIPS). Fairchild claimed an average performance of 5 MIPS.

The three-chip module was designed as an AT&T Unix-based engine for use in both scientific and professional computing applications. The three chips include a central processor with an on-board floating-point execution unit and two cache and memory management chips, one for instructions and one for data. The cache chips are linked to a CPU via a dual-bus architecture with one 32-bit bus dedicated to instructions and one to data. Another 32-bit multiplexed address and data bus allows the chip set to interface with main memory and with industry-standard peripheral chips.

A Fairchild official said the key to the module's performance is a scoreboard mechanism that simultaneously tracks events in all resources, a feature he said was previously available only in supercomputers like those made by Cray Research, Inc. and Control Data Corp. He also said the microprocessor has a load-store architecture with instruction prefetch overlapped with integer and floating-point execution units.

The major functional blocks of the Clipper's CPU chip are an integer pipe with a three-port 32- by 32-register file, serial 64-bit double-bit shifter and 32-bit arithmetic logic; a 64-bit floating-point unit with its own eight 64-bit registers; prefetch logic to support an 8-byte instruction buffer; and a macro instruction read-only memory used to execute sequences of standard machine instructions. Clipper costs $2,451.

Tool applies AI to finance

Applied Expert Systems of Cambridge, Mass., has introduced a turnkey expert system that applies artificial intelligence to a personal financial planning product.

The system, called Planpower, will reportedly allow Planpower to use a knowledge base of financial expertise to reduce the time required for a financial planning project from 60 hours to a few hours.

Applied Expert Systems also said it has signed an agreement to allow First Financial Planner Services, Inc., a Travelers Insurance Co. subsidiary, to distribute the system to independent financial planners. The company still will market Planpower to major financial institutions, such as banks, insurance companies and brokerage firms, through its own direct sales force.

Planpower includes a Xerox Corp. 1136 artificial intelligence workstation and a coprocessor that allows the workstation to run software written for the IBM Personal Computer and Personal Computer XT. It also features the company's proprietary expert system software, data base and spreadsheet software, word processing, an English language interface and compatibility with a Hewlett-Packard Co. Laserjet printer, the vendor said.

The Planpower knowledge base is said to consist of the equivalent of 6,000 decision-making rules and more than 125 types of financial products.

Scheduled for shipment in early 1986, the system costs about $50,000.

Turnkey system out

Xerox Computer Services, a Los Angeles-based division of Xerox Corp., has released a turnkey manufacturing management and control system scaled to companies that generate up to $40 million annually in revenue.

The Entry Turnkey system, priced at $256,000, the result of a value-added remarketer agreement with IBM, combines Xerox business and manufacturing software applications with an IBM 4361 Model K3 mainframe running under IBM's SSX and DOS operating systems.

Peripheral equipment includes IBM's 3370 DASD, 8809 magnetic-tape unit, 3262 line printer, 3278 display console and a 3178 user-display terminal. Up to 20 3178 terminals can be added at additional cost.

Modules in Xerox software include management packages for inventory, orders, receivables, sales and procurement, order entry, accounts payable, general ledger and an interactive query and report generator.

The company reported that the software can be migrated to any IBM 370-compatible system as the user's needs increase.
If you're like most companies you have a phone system that works. And a computer system that works. At NYNEX Business Information Systems we can make both work together.

Because we have everything it takes to custom design an integrated communications solution for your company. First we offer a full range of products. Networking, voice and data communications, and computer products that all work together in one neatly integrated package. And our equipment solution isn't limited to one manufacturer. Instead, we've selected all the best products from all the best companies.

What's more, as authorized agents of New York Telephone and New England Telephone, we'll provide you with a network that delivers the most reliable, practical and cost effective voice and data transmission services available today. We're also in the perfect position to build your company a custom network utilizing the latest microwave and fiber optic technologies.

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Vaxstation II capacity boost tops DEC announcements

A boost in the capacity of its Vaxstation II design and manufacturing workstation headed the list of announcements by Digital Equipment Corp. The Maynard, Mass., company also announced a program to allow Vaxstation I users to upgrade to the Vaxstation II and an upgraded version of its MicroVMS Workstation Software.

DEC released a configuration of the Vaxstation II, which incorporates the company's MicroVax II computer, that has a larger enclosure with a 12-slot backplane capacity plus provisions for four mass storage units, a spokesman said. The large enclosure configuration allows three RD53 71M-byte hard disks and a tape back-up, as opposed to the standard enclosure that allows RD52 31M-byte hard disks.

In addition, the newest version of Vaxstation II includes 3M bytes of main memory, as opposed to 2M bytes in the standard version; 71M bytes of hard-disk space, said to be more than twice the capacity of the standard version; and a 7/8-in. tape cartridge. The system features a 191/4-in. floppy disk backup storage device, a three-button mouse, a 19-in. monochrome monitor, a Decnet/Ethernet interface and a graphics subsystem. The $36,980 price includes DEC's MicroVMS operating system, the newly announced MicroVMS Workstation Software Version 2 and GKS-08 graphics software licenses.

A program scheduled to close on Dec. 31 will enable Vaxstation I owners to replace their systems with a standard Vaxstation II system. The Vaxstation II configuration includes 2M bytes of main memory, a monitor, a keyboard and mouse, a video controller, a Decnet/Ethernet networking interface, RX50 and RD52 31M-byte disk drives and associated software. The exchange costs $16,500. Software in the exchange includes Version 2 of the MicroVMS Workstation Software. Owners may exchange Microvax I layered-software licenses for Microvax II equivalents at no additional charge, the vendor said.

Version 2 of the MicroVMS Workstation Software package and the graphics interface for the Vaxstation I and II systems are said to provide tools that allow programmers to write application programs in which the user can create, manipulate and draw into windows displayed on the Vaxstation screen. This capability is said to enable users to enlarge or reduce one or more windows.

The programs that can be developed will enable users to emulate different terminals on the screen on a window-by-window basis. A license for the Version 2 Microvax Workstation Software costs $1,000.

Adage offers workstations

Adage, Inc. of Billerica, Mass., has taken the wraps off four Digital Equipment Corp. Microvax II-based stand-alone workstations — two for DEC environments and two for both DEC and IBM computing environments. All of the workstations operate under DEC's MicroVMS operating system.

Each of the workstations features multwindowing, multiterminal capabilities that are said to allow users to run concurrently a Tektronix, Inc. 4100 window, four simultaneous DEC VT200 windows and the DEC MicroVMS console window. In addition, the 6580 and 6585 workstations provide an Adage 6080/IBM 5080 window. Four to eight RS-232 ports are available for additional serial devices.

An entry-level workstation consists of Adage’s Ocean Graphics Engine; a Microvax II with 3M bytes of memory and hardware floating-point processor; eight RS-232 lines; dual 800K-byte floppy disks; a 105M-byte, 51/4-in. fixed Winchester disk drive; an Ethernet interface; IM byte of graphics memory; a 19-in. monitor; and keyboard. Software includes an Adage MicroVMS library license supporting up to eight users and the Adage graphics library, including Tektronix 4100 and VT200 emulators and the Adage window management system.

The company said the 6580 and 6585 workstations provide IBM 5080 emulation and two- and three-dimensional color graphics capabilities. These models will operate with all IBM 5080-compatible software, such as Cadam, Inc.’s Cadam and IPC and Dassault System’s Catia computer-aided design and manufacturing software, as well as with most DEC and third-party software written for MicroVMS.

Prices for the 6580 and 6585 start at $66,500 and $71,500, respectively, and range upward depending upon factors that include the amount of main memory, display list memory and storage capacity.

The DEC-environment-only models provide the same 2-D and 3-D color graphics functionality as the 6580 and 6585. The 6500 and 6505 models cost $49,500 and $54,500, respectively.

The Centrex folks have you right where they want you: Plugged snugly into their decade-old technology.

That was fine when all your competitors had the same handicap. And when you had no choice.

Stop living in the past. Phone ROLM. Ask about the ROLM® CBX business communications system.

I'll put your future under your own roof.

Not theirs. And help you control unstable phone costs. Now.

What's ROLM got going for you?

True integrated digital voice and data. (We started the whole thing.) ROLM brings 56 Kbps of data right to your desktop. So you don't poke along with Centrex analog technology. Or pay the freight whenever they get around to upgrading switches. Or hassle with their jury-rigged hardware to get the features you want.

Our superb CBX comes with all the bells and whistles you've secretly craved. From call forwarding-
IBM plasma-panel display station and coupler out

IBM's Information Systems Group has announced a replacement for its 3290 Model 1 plasma-panel display station and a coupler to pair its 3480 tape subsystems.

The company said the 3290 Information Panels, Models 220 and 230, are functionally equivalent to the 3290 Model 1.

The Control Unit Coupler 3211 is said to allow customers to couple two 3490 Control Unit Models 22s to form a single magnetic tape subsystem. It is attached to only one of the coupled control units.

The Control Unit Coupler 3211 is priced at $4,045.

PROCESSORS

- Perkin-Elmer Corp. has introduced an array processor for its Series 3200 superminicomputers.

The MAP-310 processor was developed by CSP, Inc. of Billerica, Mass., to process 32-bit format floating-point calculations and control I/O in a real-time environment, Perkin-Elmer said.

Software available for the MAP-310 includes CSP's Snap II Executive, a multitasking, real-time operating system for task scheduling, monitoring and control and the Snap II Array Processor-resident library, the vendor said.

The basic MAP-310 system includes 500K bytes of data memory and 128K bytes of memory devoted to the operating system plus an interface to Series 3200 superminicomputers.

The basic MAP-310 costs $44,700. The Snap II software system costs $5,000 for a single-user license.

- ROLM has announced a tape system and a multiport electronic switch for sharing tape drives among up to six controllers.

The 9761 Winchester-type tape drive has a transfer rate of 2.5M bytes and a capacity of 680M bytes. It has an 18-msec average positioning time and a dual-channel option. The drive can be used with System Industries' 9900 series of controllers, including the cluster controllers that allow up to eight DEC systems to share a common data base.

The 9761 is said to offer a mean-time-between-failure rate of 20,000 hours. It costs $16,500.

System Industries, 1955 Barber Lane, Milpitas, Calif. 95035.

- System Industries, Inc. has unveiled an addition to its family of disk drives for use with Digital Equipment Corp. VAX and PDP series machines.

The 104-in. Winchester-type 9761 disk drive has a transfer rate of 2.5M bytes and a capacity of 680M bytes. It has an 18-msec average positioning time and a dual-channel option. The drive can be used with System Industries' 9900 series of controllers, including the cluster controllers that allow up to eight DEC systems to share a common data base.

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- Thorn EMI Technology, Inc. has announced an embedded interface card option for each of its three 16-in. streaming tape drives that reportedly makes them compatible with the American National Standards Institute's (ANSI) small computer systems interface.

The company's family of 16-in. 9-track streaming tape drives includes Models 9800, 9800A and 9900, which are said to be compatible with IBM, ANSI and European Computer Manufacturer Association systems.

The option costs $8,145.

Thorn EMI Technology, 8601 Dunwoody Place, Atlanta, Ga. 30338.

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ROLM

an IBM company

800-538-8154. (In Alaska, California and Hawaii, call 408-986-3025.)

DATA STORAGE

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Continued on page 98
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And then you can run statistical analyses. Fit functions to your data. Even turn tables into complex models, so you can run a series of “what if” scenarios.

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And you can accomplish all of the above with English-like commands, HELP and menus. So you’ll be up and running in hours instead of days. And getting work done in minutes instead of hours.

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The grizzly bear: strong, tough, impressive in appearance. This creature has long reigned as the unquestioned master of the rugged, wild domain. Just as Graham has become the unquestioned leader in the manufacture of premium-quality computer tape products.

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Graham Magnetics' ongoing commitment is to supply premium-quality computer tape products to data processing managers worldwide. Managers who recognize that data is a corporate asset worth protecting with the highest-quality, problem-free computer tape in the world. So if you've had it with costly “bargain” tapes, call Graham.

Graham Magnetics: making sure that high-quality permanent magnetic media never becomes an endangered species.
Digital Equipment Corp. Family Tree

1967
DEC opens with three employees and 8,500 sq ft of production space.

1970
DEC releases its first 16-bit minicomputer, the PDP-11/20.

1980
DEC introduces first large-scale integrated 32-bit minicomputer.

1983
Vaxcluster announced. Company breaks into top Fortune 100 industrial companies list.
crovax II, he said. "We . . . decided to get both, but it's still basically the same architecture," he said. The VAX series machines, with their VMS operating systems, are the backbone of the single-architecture, single-operating-system philosophy. Some DEC customers would disagree that the company adopted a unified approach.

One of the stormiest events in the firm's history occurred in 1983 when the company discontinued its Decmate series. The single-architecture philosophy calls for the use of only one version of each programming language, Ken Olsen said. There are about 15 languages, including Cobol, Ada and Fortran, but only one version of each that has been refined continually over the years. Another of DEC's strategies over the years has been to buy, rather than build, parts for its products that could easily be bought. However, a number of years ago it became clear that there were certain things we had to design ourselves," said Ken Olsen, in reference to DEC's semiconductor facilities. For pioneering or special devices, such as the chip for the Microvax II supermicrocomputer, DEC now has its own semiconductor design and manufacturing facilities. To talk to Ken Olsen today is to talk connectivity. Networking and clustering computers are the subjects that fire him up as well as the strategies that propel his company. "Networking is [an] exceedingly complicated business because we have got to tie everything we make together — all kinds of computers — even those that aren't in our main system line of computers running under the TOPS operating system. The decision left users without a migration path. DEC, the users maintained, promised its Decsystem-10 and -20 customers a bigger and better machine, dubbed the Jupiter project in development, but then dropped the project. The users were stranded with systems that were not easily compatible with the newer VAX line.

The single-architecture architecture, ACF2/VSE is exceptionally simple to use. Plus its design minimizes machine overhead, as well as administration. Implementation of ACF2/VSE is fast and painless, too. Critical data sets can be protected first, while less critical data can be secured in stages to avoid disruption of daily work routines. At Cambridge, we've been providing high-performance software solutions for over a decade and have achieved a reputation for excellence in security software unmatched in the industry. ACF2/VSE represents our newest solution: the ultimate in security protection for the VSE user.

For full product and delivery details, write or call Bob Wills direct. Call now and he'll also tell you about our introductory offering.

Through the years with DEC

PDP-5 can run on a PDP-8 and on a Decmate III. The earliest VAX machine's software will run on the Microvax II supermicrocomputer. DEC now has its own semiconductor design and manufacturing facilities. One of the stormiest events in the firm's history occurred in 1983 when the company discontinued its Decmate series. The single-architecture philosophy calls for the use of only one version of each programming language, Ken Olsen said. There are about 15 languages, including Cobol, Ada and Fortran, but only one version of each that has been refined continually over the years. Another of DEC's strategies over the years has been to buy, rather than build, parts for its products that could easily be bought. However, a number of years ago it became clear that there were certain things we had to design ourselves," said Ken Olsen, in reference to DEC's semiconductor facilities. For pioneering or special devices, such as the chip for the Microvax II supermicrocomputer, DEC now has its own semiconductor design and manufacturing facilities. To talk to Ken Olsen today is to talk connectivity. Networking and clustering computers are the subjects that fire him up as well as the strategies that propel his company. "Networking is [an] exceedingly complicated business because we have got to tie everything we make together — all kinds of computers — even those that aren't in our main system line of computers running under the TOPS operating system. The decision left users without a migration path. DEC, the users maintained, promised its Decsystem-10 and -20 customers a bigger and better machine, dubbed the Jupiter project in development, but then dropped the project. The users were stranded with systems that were not easily compatible with the newer VAX line.

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Announcing a new level of security protection for VSE users.

ACF2/VSE: The easy-to-use security software designed specifically for VSE in a VM environment. Backed by The Cambridge Systems Group—the trusted name in security software.

Soon VSE installations can have a new level of protection for their most valuable— and vulnerable—asset: data. With ACF2/VSE's security software, data is automatically protected against accidental or deliberate modification, disclosure or destruction.

ACF2/VSE offers complete protection for both CICS and batch job streams. For CICS, access control extends to the system transactions programs, files—and more. Because it's designed especially for VSE architecture, ACF2/VSE is exceptionally simple to use. Plus its design minimizes machine overhead, as well as administration. Implementation of ACF2/VSE is fast and painless, too. Critical data sets can be protected first, while less critical data can be secured in stages to avoid disruption of daily work routines.

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Big Blue or not Big Blue.
A decision everyone must ultimately make. And even when they choose an alternative, invariably the first question is how to connect with IBM equipment.

Our December 4th Computerworld Extra! will provide a number of perspectives on the situation. Which will be of critical interest to anyone dealing with IBM. And that’s just about everyone.

First, we’ll delve deep inside the company itself. And look at possible mergers and acquisitions, corporate structure, financial status, and the personalities involved.

Then we’ll take a hard look at the company’s products and strategies. We’ll discuss their strengths and weaknesses. We’ll look at the new hardware introductions. And explore IBM’s local area networking introductions.

Finally, we’ll cover the alternatives, from PCs to mainframes. And of course, the compatibility issue.

And all this information will go out to our 128,000 paid subscribers. Plus the hundreds of thousands of people they pass us along to.

So if you’ve got a product or service that’s IBM compatible — or an alternative — let IBM do your selling for you. In the December 4th Computerworld Extra! on IBM. But hurry, closing is October 25th.

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Mitron's STD 1600 provides an efficient method for sending and receiving data anywhere in the world. STD 1600s communicate with each other and with other companies' bisynchronous terminals and computers.

The STD 1600 solves machine compatibility problems. It transfers data reliably without mailing tapes. It can communicate off-line to relieve an overworked computer.

STD 1600s transfer data at speeds up to 56KB. Durable buffering eliminates delays caused by read/write cycle times.

The STD 1600 can be leased or purchased.

---

**MITRON'S STD 1600 TRANSFERS DATA AT 56 KB OFF-LINE TAPE-TO-TAPE**

Since 1969, Mitron's magnetic tape systems have been used in a wide variety of data communications applications. Let us explain how you can connect the STD 1600 to your system or data communications network. Call 800 638-9665 (in Maryland, 301 992-7700).

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**MITRON SYSTEMS CORPORATION**

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This is no way to manage a network.

It takes more than wishful thinking to keep a network up and running. Particularly if you're working with more than one vendor and coordinating resources in many locations. Just by adding users, small problems can turn into big ones and, before you know it, your network's down from here to Hong Kong.

Not to worry. Now, there's the new Codex 4800 Series Network Management System. It monitors your network and detects and helps correct potential problems before they foul up your operation.

There's more. The Codex 4800 Series can generate reports for tracking, analysis, and forecasting...all of which you need for making the right decisions at every organizational level.

The Codex 4800 Series Network Management System is so fast and so smart, you can spot potential problems and react much more quickly to changes in the environment. And, since it's totally independent of your mainframe, you get status information without affecting ongoing operations.

The system works with the industry's most-preferred networking modems from Codex, and includes a raft of other features to make your network more effective. You have greater operational control, improve your cost efficiency, and ensure optimum network uptime.

Whether your network is large or small, Codex has the network management system that will meet your needs and grow right along with your business.

So uncross your fingers and reach for the phone. Call 1-800-426-1212, Ext. 281, for more information on the new Codex 4800 Series Network Management System. Or write Codex Corporation, Dept. 707-281, 20 Cabot Boulevard, Mansfield, MA 02048.
In today's fast-moving business environment, you need a personal computer that has the flexibility to fit perfectly with changing business needs and opportunities. The new Hewlett-Packard Vectra PC is just such a computer: flexible and versatile.

You get the performance you need, because you can select the power, speed and memory capabilities that suit you best; the software you need, because it's compatible with the IBM PC/AT; and the hardware flexibility you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3®, MultiMate™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

There are several internal and external memory storage

---

**HP Vectra Specs:**

**MEMORY**
- 256K expandable to 3.64MB
- Intel 80286; runs at 8MHz
- Optional: Intel 80287; co-processor runs at 5.33 MHz

**MICROPROCESSOR**
- Intel 80286; runs at 8MHz
- Optional: Intel 80287; co-processor runs at 5.33 MHz

**OPERATING SYSTEM**
- MS-DOS 3.1 (compatible with PC-DOS 3.1)

**DATA STORAGE**
- 5½" internal flexible discs (360K or 1.2MB capacity)
- 20MB internal hard disc
- 3½" stand-alone flexible disc; 20MB stand-alone hard disc.
options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options, plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

In all, the Hewlett-Packard Vectra PC is superbly flexible. As a stand-alone, or as an easily integrated addition with HP, IBM and other computer environments.

And, because it comes from Hewlett-Packard, you know you're getting a quality product.

Find out how the Vectra PC can fit your needs—whether technical, professional or secretarial. Call 1-800-FOR-HPPC, Dept. 282D, for the name of your local authorized Hewlett-Packard dealer, or Hewlett-Packard sales representative. In Canada, call 1-800-387-3867. Vectra
You should never commit to a database management system without test driving the product.

There's only one way to evaluate the performance of a fourth generation language database management system. Test drive it. Put it to work developing applications for actual problems.

When you do, you'll find that no other 4GL/DBMS can beat NOMAD2. The power and richness of its language let you conquer the toughest applications with ease. And its ability to interface with your existing databases lets you read files as well as write data with barely an effort.

We're willing to run NOMAD2 through whatever obstacle course you care to set up. And against whatever products you select for comparison. Because in a comprehensive test drive situation, not only will NOMAD2 get applications up and running fast, it will leave the competition in the dust.

NOMAD2, which runs on your mainframe or ours, is another step in the NOMAD evolution that began in 1975. For information write Roger Cox, D&B Computing Services, 187 Danbury Rd., Wilton, CT 06897. Or call (203) 762-2511.

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NOMAD is a registered trademark of D & B Computing Services, Inc.
**TERMINALS**

Applied Digital Data Systems, Inc. has released its Viewpoint/122, a top-of-the-line Digital Equipment Corp. VT220-compatible terminal. The Viewpoint/122 also emulates DEC's VT100 and VT52 terminals, the company said. Features include a variable smooth scrolling, a bidirectional printer port and a nonglare screen (amber optional). All 16 of DEC's multinational character sets are accessible via a multilingual setup mode. The terminal has a 12-in. diagonal screen with a 24-line by 80- or 132-col. display.

The Viewpoint/122 costs $795.

Applied Digital Data Systems, Display Products Division, 100 Marcus Blvd., Hauppauge, N.Y. 11788.

Tektronix, Inc. has announced a member of its 4100 series computer-aided design terminals tailored to electrical engineering, mechanical drafting and structural analysis tasks.

The system can be connected to any minicomputer with an RS-232 interface, the vendor said. The 4111 terminal features graphics functions such as multiple views, local picture segments, fast panel fill and patterning. It provides 256K bytes of local random-access memory for temporary storage of picture elements.

The terminal has a 19-in. color raster display with 1,024 by 768-pixel resolution. Sixteen colors can be simultaneously displayed from a palette of 4,096 separate shades, the vendor said.

The unit costs $12,950.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Tab Products Co. has introduced a Digital Equipment Corp. VT220-compatible terminal.

The E-22 display terminal includes characters that are said to be 49% larger than the VT220 in the 80-col. mode and 47% larger in the 132-col. mode.

It features a 15-in. screen, 15 user-programmable function keys and eight soft function keys for terminal setup.

The unit costs $799, according to the vendor.

The Products, 1400 Page Mill Road, Palo Alto, Calif. 94304.

Tektronix, Inc. has released its 4100A series of computer display terminals.

The 4100A series is similar to its predecessor 4100 series but is said to have enhanced Digital Equipment Corp. VT100 compatibility. Those enhanced features include media copy and answerback and additional graphics manipulation capabilities, according to the vendor.

It also supports additional 1/0 devices such as Hewlett-Packard Co.'s Thinkjet printer, the Epson America, Inc. FX-80 printer and Centronics Data Computer Corp.-compatible copiers, the vendor said.

The series includes eight models that range in price from $2,995 to $9,995.

Three of the models are IBM 3270-compatible as well as DEC VT100-compatible.

Tektronix, P.O. Box 500, Beaverton, Ore. 97077.

Graphon Corp. has introduced its GO-200 family of terminals that emulate Digital Equipment Corp. and Tektronix, Inc. terminals.

The GO-220 terminal emulates the DEC VT220 and VT100 terminals and is said to offer one display mode using DEC's 10-by-10-char. cell and a second mode using a denser 13-by-15-char. cell. It provides 24, 25 or 26 lines of display. The GO-220 costs $995.

The GO-230 is like the GO-220 but adds emulation of the Tektronix 4010 and 4015 graphics terminals with full Tektronix horizontal resolution and one-half the vertical resolution — 1,056 by 391 pixels. Alpha and graphics planes can be simultaneously displayed. It costs $1,195.

The GO-240, priced at $1,395, is said to be compatible with DEC's Legis graphics language. It supports mouse or digitizer pointing devices. Features include up- and downloading of the 2-bit map planes and pan and zoom functions, a third communications port and 90 programmable function keys. The top-of-the-line GO-250 is said to provide all of the above with full 1,056-by-782-pixel resolution. Up to 20 pages of text and four pages of graphics can be locally held. The GO-250 costs $2,495.

Graphon, Tower One, Fifth Floor, 1901 S. Bascom Ave., Campbell, Calif. 95008.

General Electric Co.'s Calma Co. has announced a 20% average price reduction for its Apollo Computer, Inc. DN660-based computer-aided engineering (CAE) design and manufacturing workstations.

The four Calma Apollo DN660-based systems are configured with design, drafting and manufacturing software for the mechanical market; Dimension III software for the architecture/engineering/construction market; Tegastation CAE/CAD software for electronics applications; and T-Boards software for printed-circuit board design.

The new price range is from $72,000 to $112,000.

Calma, 501 Sycamore Drive, Milpitas, Calif. 95035.

Direct, Inc. has announced a Hewlett-Packard Co. 3392A-compatible terminal.

The Direct 8392 is said to offer 80- and 132-col. display and a 14-in. tilt-and-swivel monitor with a choice of green or amber display. It has an RS-232

Continued on page 108
Wang's J. Carl Masi on IBM and architectures

At the recent International Society of Wang Users meeting in Boston, Wang Laboratories, Inc. Executive Vice-President J. Carl Masi was interviewed by Computerworld Senior Editor James Connolly in connection with Wang's decisions to emphasize connectivity and to open its architectures to other vendors.

What does IBM compatibility and open architecture mean to the user?

For the last two years, millions of personal computers, most of them IBM, were pumped into the offices of businesses large and small. We were in a position before the Wang Office Center interfaced to the IBM Personal Computer where the IBM salesman would say to the customer, "You've got my IBM mainframe and my IBM Personal Computers; why not put in a System/36 to act as a departmental processor or a cluster controller and make those micros more productive?" Those very Personal Computers were sold without the need for a departmental processor; now [IBM] is putting their computer on the desks there than you Wang workstations and Wang micros. So the strategic direction, the strategic effect, was to take a case where IBM had already captured the desk with an IBM Personal Computer and to make a Wang micro by tying into a Wang VS running Wang Word Processing, Wang Office and all of the other Wang functions.

Was the decision to open the architecture made at the same time?

It was a continuation of our stated direction to open the architecture to become less of a closed company and to open up our architecture to what was available in the industrial technology.

What does that offer to the customer?

It offers him the ability to place Wang in his current environment in a way that allows all of those past investments in hardware technology and software technology to remain robust.

Wang's J. Carl Masi

I'll give you an example. In London there are many banks where I think they're selling our Wang VS with Wang Systems Networking as what we call our presentation services processor. Then you have [Prime Computer, Inc.] or [Data General Corp.] or [Digital Equipment Corp.] systems in the bank doing a number of different applications. But the actual presentation of all those services to the end user is networked on the IBM screen. The Wang VS 15s or Wang VS 65s acting as network process controllers tied into the Prime or DEC. We couldn't have done that had we not gone through the effort of opening up our networking and architecture to accommodate everyone else's product line.

So what was the role of Wang could you see us acting as the middleman?

You use the word "the"; we sell the complete Wang. We sell to two different classes of users. One is the office environment here, generally our users are nontechnical office workers, and that is our traditional market. That's where you take a technology and apply it very simply. That's where those 90,000 [Wang Office Information Systems] were placed. So part of our strategy is to continue to grow with that business, to make it happy, to expand it into more and more networked data processing applications and to attract other users.

At the same time, we must invest in the needs of the information system executive and the MIS organization managers both as end users of our products and as key decisionmakers in that MIS market.

We have a tremendously rich array of road maps and paths. I think we are much more advanced than most in the integration of all four forms of information into our data base and in our networking. So, while we are continuing to integrate and increment the basic architectures, we must focus on the areas where we can provide clear-cut and obvious market distinction, and in that area, we now are focusing on the imaging and the voice and the telephony products.

What other directions can we look for in open architecture or compatibility, looking six months or two years down the road?

Accepting as our premise the fact that data processing is moving into the office and we are there and accepting the fact that we never sell a straight word processing application any more — that we always sell an integration of data, word processing and continued on page 108

CICS TESTING TOOL

CICS/REPLAY, the first and still the best CICS regression testing and quality assurance package. It reduces program development time and cost, automates program maintenance testing and improves CICS availability.

CICS/REPLAY facilitates CICS tuning, stress testing and capacity planning. It assists with user support and training.

CICS/REPLAY records your test sessions, edits them and then plays them again.

Available for DOS/VSE and MVS, VSI, etc. For more information, contact:

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HIGH SPEED DATA ENTRY using the IBM-PC DATAFLOW

Powerful * Comprehensive * Professional * Friendly * Proven

A software package which allows very high speed key entry and key verify on the standard IBM PC, with 8088 and dual disk.

DATAFLOW operates in the spirit of the IBM 3626, 3741 and 129 using simple format and prompt records which are easily created by the operator.

DATAFLOW is a proper solution for today and tomorrow:

- data file compatibility with MS-COBOL
- the conversion utility provides plain text for transfer to mainframe
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- program compatibility with compiled format
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- file maintenance testing and improves CICS availability.
Honeywell has better office integration than Wang or IBM.
Introducing The Honeywell Office

Honeywell is about to change the way you think about office automation.

Because standalone and non-compatible product lines aren't enough to provide the most dramatic increases in productivity and corporate profitability. The biggest increases in performance can only come from office automation capabilities like integration and networking that allow all systems to "talk" to each other—which is why we designed The Honeywell Office.

The Honeywell Office integrates office processing, data processing, networking and communications, and distributes these resources across a single, compatible product line of micros, minis, and superminis.

It's the reason why one customer credited our approach to office integration with helping to increase sales by 50%.

Here's how The Honeywell Office can help you manage and direct your information resources more efficiently.

Unsurpassed Office Processing

We started with competitive word processing in virtually every area and developed superiority in the crucial area of file management.

INFOCALLC, our three-dimensional spreadsheet, lets you merge financial data and text.

Flexible Data Processing

No word processing vendor can integrate the extensive array of data processing products you'll find with The Honeywell Office.

The Honeywell Office provides unrivaled flexibility by combining office and data processing into one distributed, departmental system. It supplies integrated transaction processing, database management, program development tools, query and report, data entry and specialized industry applications.

So now your accounting, marketing, and other departments can access and control their information.

And when it comes to writing new applications, we offer a full complement of programming languages that include BASIC, COBOL, FORTRAN, ASSEMBLY, ADA, C, RPG, and PASCAL.

Quite simply, The Honeywell Office gives you a better growth path, stronger database management, and greater systems flexibility than our competitors.
Advanced networking lets you connect all your departments.

WORLDWIDE

Over 1300 Met Life district sales offices in North America are automated using our DPS 6 mini-computers, linked through an SNA network that supplies reliable branch office-to-IBM host communications.

Unlike competitors who require mainframes for network control, we aren't limited to creating star networks. Our ISO based Distributed Systems Architecture (DSA), gives you the flexibility to configure ring, mesh, peer-to-peer, and other styles of networks.

For local and remote user-to-user communications, our integrated electronic mail helps minimize network costs by letting you route your mail and documents in economical quantities, and prioritizes transmission by time of day.

Finally, The Honeywell Office lets you access network services such as CompuServe, Dow Jones, The Source and Westlaw right from your desktop.

Complete Micro to Mini to Supermini Compatibility

From the very beginning, The Honeywell Office was designed for complete compatibility from top to bottom. Compatible hardware. Compatible software. And compatible communications facilities. One consistent interface is presented to all systems, small and large, permitting the virtually limitless exchange of information. Standard menus and prompts provide major user training benefits. Upgrade options are more flexible and economical because all systems can be linked together.

Honeywell’s complete micro to supermini compatibility means flexible, economic growth.

Service and Support that Make All Systems Go

The Honeywell Office is backed by TotalCare®, our comprehensive nationwide support program.

Uptime, after all, is everything, and TotalCare® provides everything you need in programs and services that can be tailored to help meet your requirements.

The Honeywell Office The Smarter Choice

The Honeywell Office reflects a strong commitment and adherence to a standard interface, state-of-the-art technology, and a modular, open ended design, so that your office can grow as your needs do.

For more information call 1-800-328-5111, Ext 2783. Or write: Honeywell Information Systems, 300 Concord Rd., MS 810, Billerica, MA 01821.

Together, we can find the answers.

Honeywell
From page 104

Wang's Masi on IBM and architectures

networking functions — and accepting the fact that nearly all of our installed base is upgrading the systems they bought originally, we are working in the areas I mentioned to provide clear-cut, unique distinctions, and we'll be adding more and more types of users to our repertoire.

What makes Wang the company that it is today is that we focus on a specific class of worker in an office, and we develop some proprietary software and hardware. It's a complex technology, but we provide it in a simple-to-learn, easy-to-use way in an office environment, and our users just build the demand.

Our first product [a product to calculate logarithms] was aimed at a specific business problem that a particular user had. We went from there to bond traders to automobile dealers to accountants to secretaries to professionals, in each case understanding their job and understanding what we could do to provide improved productivity to their functions. In each case, the product had to be very simply applied so there wasn't a great learning curve and so it was accepted rather than taught.

Our future will involve picking out additional classes of users and doing the same thing. We are targeting this year two classes of users — the design engineer, who after all is just a professional office worker with serious productivity problems, and the software developer, another professional office worker with serious productivity problems.

When you say design engineers, you're not thinking of putting together an Apollo Computer, inc.-type of workstation, are you?

It's not an Apollo workstation, but it's a workstation that does design engineering functions. It's not an announced product, but it is shown on the third floor. It's not a [computer-aided design and manufacturing] system.

So is it more of a workstation that will add some function for that engineer?

It integrates under Wang Office, so it provides a combination of the office-type functionality and the professional-type functionality in one system. It also drives our imaging technology.

What we are doing for that, we have to do for our other imaging products because of the resolution and size of the screen sort of thing. So, it is being used as a stimulus for further direction.

There is one other thing I would like to mention in terms of where I see this development going, at least within our own company, and this is blue sky. I said we focused on the particular types of users.

More and more, with the advent of artificial intelligence and expert technology, our systems will be learning about what the individual is doing as a particular type of user in that subset. The systems will be adapting themselves over time not only to the class of user but to that individual's preferences and priorities. That is the real exciting stuff, because you can optimize and make the class more productive, but then you can really make some advantages if you can optimize for the individual.

Again, I must underline that it is blue sky and nothing you will see announcements on now, but we are doing a lot of development work on it.

Wang's Masi on IBM and architectures

continued from page 103

232 serial port and optional RS-422, printer and RS-232C bidirectional interfaces. The keyboard is said to be fully enhanced.

The Direct 8392 costs $11105.

Direct, 4201 Burton Drive, Santa Clara, Calif. 95054.

Hi-Tek Corp. has announced the PC-122 keyboard, a 122-key low-profile keyboard that emulates the IBM 3270 Personal Computer keyboard and layout.

Along with the IBM 3270 keyboard configuration, the DIN standard PC-122 adds LED indicators in the Num Lock, Scroll Lock and Caps Lock key switches and allot space for four extra keys.

The PC-122 keyboard with case and cable costs $85 in 10,000-unit quantities.

Hi-Tek, 7274 Lampson Ave., Garden Grove, Calif. 92641.

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Where graphics

It isn't that today's executives lack information. Far from it.

Fact is, they are deluged with information. The problem, of course, is getting through it all. To get at those relevant facts executives need.

Fortunately, there is a solution. The Smart Desk equipped with an IBM graphics workstation.

This kind of Smart Desk lets the user look at easily understandable pictures—such as graphs, charts and diagrams—instead of thousands of words. As a result, executives spend less time making their way through data and more time making decisions.

What's more, with a Smart Desk with graphics capabilities the time executives save isn't only their own. For they can easily translate the information they need to share into charts, graphs and the like.

The IBM graphics Smart Desk not only makes it all possible, it makes it all painless. Even if the user never used a computer before. There's an IBM graphics workstation ready to make almost any desk a Smart Desk. The IBM 3270 Personal Computer AT/G, for example, lets the user interact with the host computer or work in the stand-alone mode. With

The Smart Desk from IBM
nuclear power industries, for example, analysis of piping systems is a task that long was restricted to the mainframe. Several programs are now available on microcomputers for analyzing small-to-medium-size piping systems.

Many of the microcomputer engineering packages enable uploading and downloading to and from the mainframe for preprocessing and postprocessing of larger engineering problems. By using microcomputers for some of their analysis work, engineers can reduce their dependence on expensive mainframe hardware and can price their work competitively.

Project management and data tracking are two other areas where engineers are turning to microcomputers. With programs such as 1-2-3, engineers can estimate manpower requirements and can price their work competitively. For example, spreadsheet and business graphics software advertised as comparable to the 3-year-old 1-2-3 recently became available on microprocessors.

Software and cost are the two major factors affecting the micro/minibattleground. Despite the power of 32-bit minicomputers, the software available on these machines is generally more difficult to use and less flexible than comparable microcomputer software. For example, database management programs such as DBase II are becoming popular for maintaining lists and project records.

A major factor in the battle is the discrepancy between microcomputer and minicomputer software standards. IBM has set the standards in the minicomputer marketplace. Microcomputer software developers may have to license their software for one operating system supporting a single user, and therefore a single terminal. With IBM PC-DOS as the standard operating system, developers enjoy a market of millions of users.

Microcomputer software developers face a different operating system each vendor. In addition, microcomputer users generally support a variety of terminals, which complicates development. The larger base for each type of microprocessor is far smaller than the PC-DOS microcomputer base, making development more costly and more risky.

The cost per user on minis and minis is another major factor in the battle. Typical microcomputers are priced from $2,000 to $5,000 per machine. For $20,000, a firm can buy three hard disk microcomputer systems with three printers. The cost per user on a microcomputer system is well under $10,000.

Another consideration is the price of software. Engineering software on minis and minis is generally leased with costs ranging from $1,000 to $5,000 per month. Microcomputer engineering software is generally purchased outright for $500 to $3,000.

The more advanced applications in engineering probably will stay in the domain of mainframes for years to come. Some of the problems in the aerospace and defense industries require significantly more power and memory than are available on micros and minis. On the other hand, a growing number of problems are solved readily on micros.

In addition, the business and project management software available on microcomputers is proving to be superior to comparable products on minicomputers. As microcomputer engineers will gradually reduce their dependence on minis and mainframes and turn to microcomputers for solving their everyday tasks.
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INDUSTRY INSIGHT

Clintod Wieder
CTI Staff Writer

Meeting spurs discussion between lessors, lessees

By Charles Babcock

NEW YORK — Computer leasing is a field in which few get an education except through experience, and the experience is not always pleasant, according to attendees of the first-user-oriented Computer Leasing Conference and Expo (Comlease) held earlier this month.

The 200 representatives of companies that lease rather than buy their equipment found much to discuss at the show, which targeted first users.

The most pressing issues were the pros and cons of leasing the so-called "hell or high water" clause in leasing contracts and the proposed elimination of the investment tax credit. "When you are isolated, you don't know if you're doing it right. I've been able to verify we're not way out on a limb," said Larry Corea, project analyst for leasing at Carolina Power & Light Co. in Raleigh, N.C.

"Leasing has not traditionally been the province of data processing. In the past, somebody in purchasing or accounting has handled it," said Frank Stairiker, computer systems analyst for National Liberty Life Insurance Co. in West Valley Forge, Pa.

Both Stairiker and Corea are examples of people who have left more traditional data processing roles to become specialists in computer leasing, said they are not yet comfortable. "It takes you out of the vacuum you're operating in," Stairiker noted.

The interest in leasing issues did not carry over to the thinly attended exhibition hall, however, where only 16 companies were on display.

Continued on page 125

From president to legislator

INTERVIEW

What prompted you to leave industry to run for Congress?

Yes. I was given a lot of really good opportunities. I was, as a freshman, appointed to the Foreign Affairs Committee and the Commerce Committee. I wanted to have more experience to assess whether government was stifling it. So I felt I could make a difference.

Are you having the kind of influence you want?

Yes. I was given a lot of really good opportunities. I was, as a freshman, appointed to the Foreign Affairs Committee and the Commerce Committee. I wanted to have more experience to assess whether government was stifling it. So I felt I could make a difference.
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Then feel free to travel outward into the 1990's and beyond.
Patenting software possible but tough to accomplish

By Jerome J. Roberts and Michael P. Brownell

Patent protection enables a patent owner to prohibit others from making, using or selling a patented invention in the U.S. for a period of 17 years. This protection is available only against a person who, subsequent to the date a patent is issued, independently creates an infringing invention without knowledge of the prior patented invention. As such, a patent confers a statutory monopoly upon the patent owner.

To receive patent protection, a software owner must initially qualify its software as either a "process" or "machine" as those terms are defined by the Patent Act of 1952. Patent protection will not be awarded for ideas, algorithms, laws of nature, scientific principles or mental processes.

Because computer programs are essentially composed of logic, algorithms and mathematical formulas, the U.S. Patent & Trademark Office has characterized received patent applications for computer programs with skepticism, if not hostility. Nevertheless, software does not constitute an inherently unpatentable subject matter, and patents have been issued for processes and machines consisting of or based upon computer programs.

Even though a software application may qualify as eligible subject matter, a patent will not be issued unless such software is "useful," "novel," "not obvious" and "adequately disclosed," as those terms are defined under patent law. Unlike the originality requirement of copyright law, meeting the aforementioned patent requirements, particularly the novelty and nonobviousness requirements, imposes a substantial burden on the patent applicant.

To date, patent law has not been widely embraced as a form of proprietary protection for computer software. Several reasons underlie such reluctance:

- The eligibility of computer software for patent protection has been and will continue to be a topic of dispute, with the Patent & Trademark Office remaining generally opposed to such eligibility.
- Filing a patent application and steering it through the Patent & Trademark Office is a demanding exercise, and the attendant costs can be quite high, almost always including the service of a patent lawyer.
- The application process may consume several years. A software product may be well into its product life cycle, if not technically obsolete, by the time a patent is issued.
- Issuance of a patent does not ensure certain patent protection against infringement. Defendants in patent infringement cases have the right to prove, and are very often successful in proving, that the relevant patent was improperly issued and, therefore, that no infringement has taken place.
- Finally, patent protection for computer software may mean forgoing trade secret protection to the extent that the disclosure requirement of patent law requires disclosure of software elements otherwise eligible for trade secret protection.

Ashton-Tate buys Multimate

CULVER CITY, Calif. — Ashton-Tate put the final wraps on the microcomputer software industry's largest acquisition to date last week, agreeing to pay Multimate $8.5 million cash-and-stock purchase of software vendor Multimate International Corp.

Ashton-Tate expects to conclude the previously announced deal by the end of December. The terms call for Ashton-Tate to pay Multimate $8.5 million in cash and 983,530 shares of stock for the privately held East Hartford, Conn.-based vendor of micro word processing and other software. Ashton-Tate's stock was recently trading at approximately $12 per share on the national over-the-counter market.

Multimate Chairman Wilton H. Jones and Executive Vice-President Richard L. Lefebvre will be employed by Ashton-Tate for six months after the merger. They agreed to limited covenants prohibiting their competition against Ashton-Tate for a subsequent two-year period.

The merger, still subject to Multimate shareholder approval and other conditions, makes Ashton-Tate the second-largest micro applications software vendor behind Lotus Development Corp.
Borland/Analytica reduces Reflex price

By Peggy Watt
SCOTTS VALLEY, Calif. — Borland International, trailblazer of inexpensive microcomputer business software, recently announced it has acquired Analytica Corp. of Fremont, Calif., the 2-year-old manufacturer of the data base analysis system Reflex.

The effects were immediate: Analytica now identifies itself as Borland/Analytica and sells a repackaged, non-copy-protected version of its data base, renamed Reflex: The marketing muscle" and development resources made it an attractive parent for Analytica. "Obviously, I'm sorry we didn't reach a huge level of success, but I feel good about Borland marketing the product," Michelman said he plans to start his own company to develop business productivity software, focusing on network applications.

Jim Anderson of Merrill, Pickard, Anderson & Eyre in San Francisco, the lead investors in Analytica and also Borland stockholders, said the $500 Reflex lagged in the market but that the data base is now "potentially the largest product line Borland's ever had." "A number of people approached us about joint marketing and cooperative ventures," Anderson said. "Borland was the best of all worlds." He said Analytica considered several types of mergers, including taking over smaller companies itself.

Industry speculation was that Analytica's investors had become impatient for return on their investments. Reflex, while lauded upon its introduction earlier this year for stretching filing cabinet data base concepts into analytical tools, nonetheless is the company's long-awaited and only product. Analytica recently had run into hard times, laying off about a dozen people in the past six months and dropping some from the payroll by voluntary early retirement.

Borland, on the other hand, rapidly gained acclaim for its high-quality, pragmatic inexpensive business software. Both the hallmark Sidekick and Borland's Turbo Pascal programming language sell for $69.95, the vendor said.

Borland dealers will sell Reflex at its new price through March 1986, after which the price will increase to $149.95, the company said.

Firm collects in second suit

By James Connolly
OAKLAND, Calif. — Three years ago, the owners of a leather goods cleaning business walked out of a San Francisco federal courtroom with a shocking victory in hand, a $2.6 million win over NCR Corp., on a claim that NCR sold them a minicomputer that it knew would not work.

The Glovertorium, Inc., a wholesale leather and suede cleaner accepted NCR's payment of $2.6 million, including $2 million in punitive damages, and scrapped its faulty NCR System 8200. The award was, at the time, the largest ever assessed against a computer vendor in a fraud case.

At the time of the NCR verdict, The Glovertorium had replaced the NCR system with an MAI/Basic Four Model 410B and software supplied by Computer Systems Development, Inc. of Pleasant Hill, Calif.

Foiled again

But, once again, The Glovertorium found they had a system that did not work. The owners went back into court and recently came out with another win, this time a $130,000 judgment against Computer Systems Development.

In the latest case, presented before a jury in Alameda County Superior Court, Judge Richard Bancroft dismissed a fraud charge. The verdict came in after a 73-day trial on The Glovertorium's claims of breach of contract and negligence on the part of Computer Systems Development. MAI/Basic Four was not a defendant.

The Glovertorium's attorney maintained that Computer Systems Development officials were inexperienced and nonexperts in application software development and that previously they had not provided such customized software for businesses such as The Glovertorium.
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— Rep. Ed Zschau

Simplicity and fairness are all important. We are looking at that tax reform proposal in terms of competitiveness.

In the area of tax reform, it seemed that the high-technology industry's effort to get a 25% research and development tax credit and a capital gains tax cut was going well, but recently the House Ways and Means and Senate Finance staffs gave the industry a setback. Can you pick up the momentum?

I don't know what the rationale of the staff is — whether they just don't like proposals that take a group of people and give them in favor of tax reform and turn them against it, and then really after a whole lot of other groups, you may find that you just don't even have the support you had before.

And there wasn't a whole lot of support before.

When you visit with the American Electronics Association (AEA), what do the executives tell you about tax reform?

The American Electronics Association has been one of those groups mildly supportive of the president's tax reform proposal. But I think it feels a desperate need for tax reform.

We should not tolerate subsidies that are in clear violation of our agreements and the principles of free trade.

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**Sperry appoints chief executive officer**

NEW YORK — Sperry Corp. Information Systems Group President Joseph J. Kroger was recently named president of the corporation. He is the first executive with a sales and marketing background to reach the No. 2 post of the computer, defense systems and farm equipment conglomerate.

Observers said they believe the promotion places Kroger, 51, in line to succeed Gerald G. Probst as chairman and chief executive officer. The president’s chair had been vacant since 1982, when Probst was promoted to his current position formerly held by the late J. Paul Lytch.

Kroger, formerly also an executive vice-president of the corporation, has headed the Sperry computer group since 1981. Kroger was reported to have led the antitakeover contingent of Sperry executives that successfully thwarted the merger proposals of Burroughs Corp. earlier this year.

Kroger appears to have received the nod over Vincent R. McLean, Sperry’s other executive vice-president and chief financial officer.

**Mohawk Data sells off service businesses**

PARSIPPANY, N.J. — Beleaguered Mohawk Data Sciences, Inc. officially exited the computer service business recently, selling off all but one of its businesses to raise an estimated $15 million in needed capital.

The mainframe and minicomputer vendor retained only its Qantel Systems, Inc. computer hardware unit, announcing the sale of five divisions to a new, unnamed company to be formed jointly by two New York venture capital firms. The sale involved MDS Service, MDS Systems Division U.S., MDS Credit Corp., H. M. Stores Co. and Mohawk Data’s manufacturing operation in Herkimer, N.Y.

Mohawk Data will retain a 10% interest in the buyer, which is being formed by J. H. Whitney & Co. and Welsh, Caron, Anderson & Stowe. MDS Service will continue to be the exclusive maintenance provider for Qantel systems, and Mohawk Data will receive royalties from its current base of MDS Service customers.

Mohawk Data had previously sold its five European units for approximately $22 million.

**Zilvitis named chief financial officer**

BETHESDA, Md. — Patrick J. Zilvitis, a vice-president of Perkin-Elmer Corp. for the past two years and a 17-year IBM veteran, was recently named president of Martin Marietta Data Systems.

Zilvitis, 42, succeeds Richard J. Walters, who resigned in July. He will report to Norman R. Augustine, executive vice-president of parent firm Martin Marietta Corp.

Zilvitis most recently was vice-president of marketing for Perkin-Elmer’s Data Systems Group. He left IBM in 1983 from the position of general manager of personal computer marketing, which he attained in 1981.

**CAI posts quarter loss**

IRVINE, Calif. — Computer Automation, Inc. (CAI) announced it will report a loss of $12 million to $15 million for the second quarter ended June 30 and further losses for the third quarter.

The vendor of automatic test equipment and industrial OEM computers also announced a consolidation move, including the sale of its commercial systems division and the appointment of Douglas L. Cutsforth as president and chief operating officer.

Cutsforth had previously served as vice-president and general manager of the company’s industrial products division.

Other new assignments in the consolidation are Irwin W. Pfister to vice-president of marketing and product development, James R. Keener to director of OEM marketing and Gary R. Watson to director of operations.

**Dataquest president leaves for Pyramid**

MOUNTAIN VIEW, Calif. — Dataquest, Inc. President and Chief Executive Officer E. David Crockett has returned to the vendor side of the industry.

He recently became president of Pyramid Technology Corp., a Mountain View corporation that develops and markets superminicomputersbased on the AT&T Unix operating system.

Ed Dolinar, who cofounded Pyramid in 1981, relinquished the president’s seat for the chairmanship. Dolinar said Pyramid would benefit from Crockett’s “high level of strategic and vendor side of the industry.”

Crockett joined San Jose, Calif.-based Dataquest in 1981 and became president in 1983. Before going into the market research business, Crockett spent nine years each at Hewlett-Packard Co. and IBM. He rose to computer strategy manager at HP.
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   90. Computer/Peripheral Dealer/Distributor/Reseller
   95. User: Other (Please specify)

2. OCCUPATION/FUNCTION (Circle one)
   01. President/Owner/Partner/General Manager
   02. VP/Assistant VP
   03. Treasurer/Controller/Financial Officer
   04. Director/Manager/Supervisor OP/MIS Services
   05. Director/Manager of Operations/Planning/Admin. Serv.
   06. Systems Manager/Systems Analyst
   07. Manager/Supervisor Programming
   08. Programmer/Methods Analyst
   09. OA/WP Director/Manager/Supervisor
   10. Project Director/Manager/Supervisor
   14. Consulting/Management
   15. Medical/Legal/Accounting/Management
   16. Edu/Communications Systems
   17. Other (Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply)
   A. Mainframes/Superninals
   B. Minicomputers/Small Business Computers
   C. Microcomputers/Desktops
   D. Communications Systems
   E. Office Automation Systems

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Docutel/Olivetti Corp., headquartered in Irving, Texas, announced that it had completed its previously announced merger with a subsidiary of Ing. C. Olivetti & Co. As a result of the merger, Docutel/Olivetti has become a wholly owned subsidiary of Olivetti. Also, all of Docutel/Olivetti’s publicly held stock has been converted into a right to receive 0.6 share in cash.

Mentor Systems, Inc. of Lexington, Ky., has acquired Annray Computer Systems of Wichita and Hays, Kan. The acquisition makes Mentor one of the largest companies in the nation to specialize in accounting software for schools, governments and not-for-profit groups.

Equatorial Communications Co., located in Mountain View, Calif., and Martin Marietta Corp., of Bethesda, Md., said that Martin Marietta has completed a previously announced $50 million purchase of an equity position in Equatorial, a provider of satellite-based data communications networks.

Corporate Software, Inc. of Denver has been acquired by Integrated Management Systems, also headquartered in Denver, and will operate in the future under the name of Integrated Manage-

S后果

Sperry Corp. has announced that it has established a new International Banking Center in Belgium. The center will support each Sperry subsidiary in the financial management sector.

Tandem Computers, Inc. has signed agreements with IBM-Integrated Technologies, Inc. to develop and market advanced toll-free telephone service software for the telecommunications industry.

Hewlett-Packard Co. has established three new business units within its Design Systems Group to facilitate closer strategic collaboration among the 10 divisions, operations and laboratories within the group.

Xebec Corp. has reported that it is reorganizing its management to direct its operation toward and exploit the problems and opportunities of the current market environment in the microcomputer field. Owing to the slowdown of the company’s operations and the consolidation of Xebec’s facilities, Marcia Glow is resigning as the executive vice-president of operations.

The owner of Computer Educational Center, Shirley Dyer, has been elected president of the Independent Computer Consultants Association for the 1985-1986 term.

General Automation, Inc. has contracted the Customer Services Group of Diebold Group, Inc. to provide quality control third-party maintenance service for its Zebra line of computer systems throughout the U.S. and Puerto Rico.

Widcom, Inc. and AT&T announced they have entered into a joint marketing agreement for videoteleconferencing applications. The agreement includes the placement of Widcom equipment in SPYNET AT&T sites for customer demonstrations and other joint sales activities.

Infotron Systems Corp. has created a separate division aimed at the data communications market. Itron, the new division, will sell third-party independent distributors to small and mid-size companies.

Digital Equipment Corp. has announced plans to construct a semiconductor manufacturing facility in Dedham, Mass., under Massachusetts law. The construction of the 86-acre site is expected to begin in mid-1986 and be completed in early 1988.

Dataproduction Corp. and JMR Corp. have signed a three-year agreement for 3M’s Equipment Service and Support Division to service Dataproduction’s LEX 90 graphics display systems. Honeywell, Inc. has signed a five-year, third-party service agreement with OM Computer Corp. Honeywell’s Customer Services Division will install and maintain OM’s complete line of personal computers and associated products.

Fujitsu America, Inc. has announced the signing of a multimillion dollar contract to supply Bell Atlantic Management Services, Inc. with fiber optic transmission systems.

Initeloge Trace, Inc. and Teknekron, Inc. announced an agreement that provides for maintenance and installation services on a series of new products produced by Teknekron.
Storage Technology Corp. has announced the appointment of Richard R. Douglas as corporate senior vice-president of marketing and services. Prior to joining Storage Technology, Douglas was with Honeywell, Inc.

Cary Hobbs has been named managing director for the UK at Ashton-Tate. Previously, Hobbs had worked for IBM in marketing and management positions.

Eagle Computer, Inc. has announced the following executive appointments: Richard Sero, hired as executive vice-president and chief operating officer; John Harwer, hired as vice-president, marketing; Edmund Hornby has been hired to the newly created position of vice-president, international sales; Richard Thunen has been promoted to senior vice-president, strategic planning; and Shelley Valk has been named vice-president, finance and chief financial officer.

Carterfone Communications Corp., a subsidiary of Cable & Wireless North America, announced that it has named Paul Holmestad vice-president and general manager of its distribution products division.

Nelson L. Hanks has been appointed senior vice-president, operations, at QMS, Inc. Prior to joining QMS, Hanks was production manager for Boeing Electronics, a subsidiary of Boeing Co.

Digital Equipment Corp. has announced the following promotions of engineering managers to the position of vice-president: Robert M. Giromio, former group engineering manager, high-performance systems and clusters; William J. Jeffere, former group manager of systems software; and William D. Strecker, previously manager of engineering product strategy and architecture.

The Network Services Division of Automatic Data Processing, Inc. announced the promotion of Harold Rogers to vice-president of the hardware engineering group.
Execs form antiapartheid panel

DETROIT — IBM President and Chief Executive Officer John Akers and Burroughs Corp. Chairman and Chief Executive Officer W. Michael Blumenthal are among those who will serve on a panel of U.S. executives working toward the elimination of apartheid in South Africa.

The leading Burroughs culprit was Memorex Corp. 3680 disk drives, but calmer analysts apparently failed to convince investors that Burroughs will be alone in the bad news department. The Detroit-based vendor also pointed out that its domestic computer-shipments in the quarter were lower than expected.

Any disk drive troubles are not expected 10 times greater in Control Data Corp., where the situation is starting to improve. The firm is in the process of shedding any soundings in the financial community about a possible takeover inevitably meets the response, "Who would want it?"

The Minneapolis mainframe maker recently announced a four-day furlough for its 40,000 employees by the end of November. That's a fairly uneventful measure in the computer industry this year, except that CDC's current cash woes have some observers wondering whether the extended unpaid vacation is simply a cost-cutting move or an indication that the firm might have trouble meeting its payroll.

Other signs

A couple of other recent signs that the industry is not yet on the upswing exist. Ericsson, Inc., the Swedish communications leader, will close its Anaheim, Calif., plant that makes private branch exchanges and other switching equipment, resulting in 600 layoffs. Ericsson will also pull out of the U.S. microcomputer market at the end of the year.

In software, Ask Computer Systems, Inc. of Los Altos, Calif., said its sales and profits for the quarter ended Sept. 30 will be substantially below those of last year, when the minicomputer applications vendor posted $18 million in revenue.

Down the coast in Cupertino, Calif., however, Tandem Computers, Inc. came in with brighter news last week. The fault-tolerant pioneer announced another quarter with revenue growth, but President and Chief Executive Officer James Treybig warned, "Given the present condition of the computer industry, we remain cautious about the near-term outlook."

From page 111

Rebound may be on hold

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**Classifications:**
- All ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Basic Four, Burroughs, Control Data, Disk Drives and Tapes, AMDahl, Prime, Modems, Perkin Elms, Printers, 1110, Tapes, Wang, Qantel, Desk Top Computers, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems, Miscellaneous.

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- Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads must be given over the phone to our team of ad takers, or sent in writing, no camera ready material will be accepted. The standard size is 1 column by 1 inch deep. These units may be combined to form larger size ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

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