Hopper, Bank America split

Problems developed over $5 billion conversion effort

By Jeffry Beeler

SAN FRANCISCO — One of the best known and most distinguished executives in the information systems field, Max Hopper, has resigned his position as executive vice-president at California’s Bank of America. The resignation comes less than 10 months after Hopper was named executive vice-president in charge of the Bank of America Systems Engineering group, a $5 billion effort to expand and modernize the bank’s information systems resources.

The official reason for the abrupt departure, according to both Hopper, 50, and Bank of America, was that his former employer, American Airlines, made a job offer that he found impossible to resist.

Interviewed last week by telephone, Hopper vigorously denied widespread reports that the resignation was prompted by technical setbacks to one of his major systems projects. The alleged problems “had absolutely nothing whatsoever to do with my decision” to leave the bank and return to American Airlines, he said. Bankamerica Corp. Chief Executive Officer Samuel Armant “has always supported me completely in the directions we’ve been heading,” Hopper said.

According to sources familiar with Bank of America operations, however, Hopper’s resignation has nothing to do with his inability to oversee the information systems group. After assuming the post, Hopper told upper management that he had the ability to make the large-scale information systems group respond to the bank’s strategic business needs. However, sources say that the group was unable to respond to the direction that Hopper offered, and he was made redundant.

Bank of America, one of the nation’s largest banking complexes, has been involved in one of the largest information systems projects in the country. The bank is one of the many banks that have led the way in computerizing their operations, and the information systems group has a number of important projects under way, including the creation of a new payroll system, a new customer relationship management system, and a new general ledger system.

Hopper’s resignation was announced last week, and he will leave the bank at the end of the year. He will be replaced by Michael H. Ross, who has been with the bank for 12 years.

GM’s MAP steals show at Autofact

By Paul Kortenkowski

DETROIT — The rapidly emerging manufacturing communications standard being promoted by the nation’s largest manufacturer, General Motors Corp., moved another step forward last week.

The standard, called the Manufacturing Automation Protocol, is being held in front of the eighth annual Autofact ’85 Conference and Exposition, which drew its highest ever attendance of 30,000 people and an approximately 200 vendor exhibits featuring MAP-compatible products and other automation products.

Despite the fervent MAP-related activity, however, it was apparent that there remain several obstacles to commercial implementation of the standard. “On the show floor, there are plenty of demonstrations but few available products,” noted Peter Giuliani, a professor of electrical engineering technology at Franklin University in Columbus, Ohio, who addressed a conference session on computer-integrated manufacturing.

Activity began the day before Autofact opened, with 21 manufacturers participating in a MAP demonstration that implemented five complete layers of the seven-layer model. The first four layers were demonstrated at the 1984 National Computer Conference.

During the exposition, the largest and busiest booth was that of GM and Boeing Computer Services Co. Boeing is sponsoring the Technical and Office Protocol, a model designed by GM and Boeing. GM and Boeing also sponsored the well-attended MAP demonstration.

Language barrier: The fourth generation at work

By John Desmond

Fourth-generation languages are in the midst of an identity crisis. Vendors of the family of languages that data base theoretician E. F. Codd recently criticized as having “not even an accepted, precise definition” ([CW, Oct. 14]) are talking less these days about replacing Cobol. Today, fourth-generation language vendors spend more time talking about the need to coexist peacefully with Cobol and even assembler — the oldest language of all — to meet the full range of user needs.

Users are confused about the role of fourth-generation languages in the development of information systems and about whether the advanced languages are an adjunct or replacement for traditional languages.

Horror stories are beginning to surface about fourth-generation language performance. One example is Applied Data Research, Inc.’s Ideal, which is used exclusively by an independent consultant to develop an application for the New Jersey Department of Motor Vehicles and failed to perform adequately ([CW, Sept. 30]).

Fourth-generation languages have their roots in nonprocedural query languages, which evolved from end-user demands for more sophisticated applications. The market for language products is strong; International Data Corp. predicted total installations of the products will jump 30% in 1985 to 4,100 in IBM 4000, 3030, 3080 and 4090 series shops in the U.S. Many analysts agree with Codd that there is no universally accepted definition of what constitutes a fourth-generation language. But there have been attempts made at a definition. The “James Martin Report on High-Productivity Languages,” published by the Marblehead, Mass.-based Technology Insights, Inc., defines a fourth-generation language as a programming language that provides a 10 to one productivity improvement over Cobol or Fortran.

That means a programmer writing in a fourth-generation language should be able to write an application in as little as one-tenth the time it would have taken using Cobol.

Standard attributes of a fourth-generation language include the ability to access one or more data base management systems and features such as a data dictionary, reporting tool and query language. Some experts add that a fourth-generation language should offer all of the above.

See LANGUAGE on page 55
FBI probes DP contract award Charges favoritism by SSA officials

By Militc Betha


John A. Svahn, who was SSA commissioner at the time and is now the top White House policy advisor, was named as a target of the probe and could face criminal charges or a special prosecutor's inquiry.

In testimony at a hearing held by Brooks, investigators suggested that the team of Electronic Data Systems Corp. of Dallas and Deloitte Haskins & Sells, a Chicago-based accounting and management consulting firm, received favorable treatment before it was awarded a contract for systems integration and management support of the SSA's $863 million DP modernization program.

The contract for $63 million was the first phase of what was estimated to be a five-year effort costing $17 million; the SSA now estimates the cost will be $32 million.

An investigation by Congress' General Accounting Office (GAO) found that before the contract was awarded in December 1982, Svahn and one of SSA's special assistant vice presidents, Deloitte executives to have offices in the executive suite at the SSA headquarters. Svahn and Deloitte executives and gain inside knowledge about the agency's computer operations.

Svahn also suggested that his senior assistant accepted nearly $2,000 in restaurant meals from Deloitte executives who are personal friends, the GAO reported.

Milton J. Socolar, a GAO official, called the relationships "highly irregular" and unfair to other contract competitors. He noted that federal regulations prohibit government employees from accepting gratuities from firms seeking agency contracts.

Svahn disputed the GAO's findings and called the GAO report "very one-sided, very slanted and inaccurate." The contract was awarded on a competitive basis with safeguards to ensure fairness, Svahn told Brooks' subcommittee.

Svahn testified that he had no involvement in awarding the contract and that he did not know that Electronic Data Systems and Deloitte were bidders.

But Svahn acknowledged that he is a personal friend of James S. Dwight, a Deloitte partner who recruited Svahn to work at Deloitte from 1976 to 1979, and that he asked Vito Petruzelli, a Deloitte director, to provide advice on the computer modernization program.

Dwight and Petruzelli took Svahn and his senior assistant, Nelson Sabatini, to Maryland restaurants on several occasions during the procurement process, the GAO reported. Svahn and Sabatini both said the businessmen were personal friends and that on other occasions, they reciprocated by paying for the Deloitte executives' meals.

Svahn also disputed the GAO's conclusion that Petruzelli's high-profile SSA office for nearly two years before the contract was awarded.

The GAO report indicated that the Deloitte executives had studied the SSA's plans to modernize the agency's computer operations in 1980 and then stayed on as unpaid consultants to Svahn's request and proceeded to create what vendors call a favorable marketing environment.

After interviewing DP personnel at the agency, the GAO investigators said Deloitte's special status at the SSA headquarters enabled the SSA officials participating in the procurement process and may have skewed their recommendations.

NEWS SUMMARY

A recent survey has found that this year's increase in the average salary of computer operations employees will be disappointing. A manufacturing company is using Northern Telecom's Meridian DI-voice/data switch as its data processing communication center. Year-end price slashing is out there in the computer industry with a second-generation multi-vendor offering.

In a recent interview with Computerworld, AT&T's Eugene Eisel discussed the company's new BURPS, the 5ESS switch and life after divestiture.

Intel broadens its expanded memory line with a second-generation multibank memory for the Expanded Memory Specification. Unity announced an application development system that ties its data base management system for AT&T's Unix with a fourth-generation language and a windowing facility.

Lawrence Textile has kept pace with its growth by using its Honeywell DPS 4 system to enhance production efficiencies.

REDEPTH

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Tandon loses patent suit

By Clinton Wilder

WASHINGTON, D.C. — After previously negotiating out-of-court settlements with two defendants in its patent infringement lawsuit against three Japanese disk drive makers, Tandon Corp. suffered a major setback last week in its remaining case against Mitsubishi Electric Corp.

Administrative law Judge Sidney Harris ruled that Mitsubishi's double-sided floppy disk drives do not infringe Tandon's patent. Harris also denied Tandon's request for the U.S. International Trade Commission (ITC) to investigate alleged predatory pricing of the drives by Mitsubishi.

The ITC must now decide whether to continue the patent infringement inquiry or to let Harris' ruling stand on its own. Tandon attorney James A. Hamilton said the Chatsworth, Calif., vendor "fully expects" to appeal Harris' decision and request a full ITC review.

Earlier this year, Tandon had reached out-of-court settlements with Sony Corp. and Teac Corp. on similar charges against those two Japanese firms [CW, July 15 and Aug. 29].

But companies paid Tandon an undisclosed cash amount. Teac agreed to license its 514-in. drives under Tandon's patent. Sony made its technology available to Tandon, agreed to joint product development and agreed to pay royalties for Tan- don on sales of Sony's allegedly infringing 314-in. drives.

J. Allen said Tandon's charges against the Mitsubishi products, compared with those against Teac and Sony, differed "only in degree. The products were all somewhat different, but we continue to believe they would be sufficiently the same in that they all perform in the same manner as [Tandon's] patented technology," he said.

Teleram to be liquidated for pay creditors

By Rosemary Hamilton

WHITE PLAINS, N.Y. — Teleram Communications Corp., a company that has been in the portable computer market for more than 10 years, may soon be a memory.

According to court records at the U.S. Bankruptcy Court in White Plains, Teleram will be liquidated under Chapter 7 of the Federal Bankruptcy Code in order to pay its creditors. The company reportedly owes about $1.5 million and holds the same amount in assets.

In September, Teleram had filed for protection under Chapter 11 of the Federal Bankruptcy Code, which allows for a reorganization plan. On October 16, however, Federal Bankruptcy Court Judge Howard Schwartzberg ordered that the Chapter 11 proceeding be converted to Chapter 7 to accommodate the company's creditors.

Niche invaded by other suppliers

Teleram, founded in 1973, introduced its first portable VDT in 1974 and followed with several portable test editing models.

By 1983, the company had more than 500 independent organizations as customers and claimed to be the leading maker of such devices. But in recent years, its market has been invaded by other suppliers, most notably Tandy Corp. with its TRS-80 Model 100 portable computer.

"When [Teleram] made [its] impact, [it] was a long time ago," said Seymour Merrin, a vice-president and director of personal computing services at the Gartner Group, Inc., a market research firm in Stamford, Conn. "They had a nice niche, but they didn't have the resources to keep up with the market."

Wanted: hot news tips

Hard as we try to give our readers the most complete information available, some good news and feature stories never find us.

Are you involved in an unusual application of DP technology in your company? Know any unsung heroes? Heard any hot news about vendors?

If so, we'd like to hear from you. Call us toll free at (800) 343-6474. Ask for Peter Bartolik, news director.

We can't be everywhere — but our readers are.

CORRECTIONS

The interview with Compaq Computer Corp. President Rod Canion that begins on page 81 of this week's issue is continued on page 89.

Whitetail Co.'s annual corporate dollar volume [CW, Oct. 28] is $100 million.
If you didn't choose SYBACK and SyncSort CMS as the fastest in their categories, do not go directly to jail. But read this very, very carefully.

SYBACK, our fast dump restore for VM systems, and SyncSort CMS, the only high-technology sort for VM/CMS, represent a great technological leap forward. No other programs of their type can provide all three of the following positive advantages:

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   - 55% in TTIme;
   - 75% in SiOs.

These savings are the result of our exclusive Fluid Buffering Technique (FBT). First developed in OS and DOS sorting, we've now extended the benefits of FBT to VM backups and sorts.

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   - SyncSort CMS—Sorts CMS, SAM (OS or DOS), or VSAM files • Can be invoked from COBOL, PL/1 or BAL programs • Dynamically allocates disk space • Selects relevant records for sorting • Reformat records on output • Performs summaries of designated numeric fields • Produces reports with pagination, headings and dates • Can often produce simple reports in one day rather than, say, five. Much more, too.

(3) THE FINEST TECHNICAL SERVICE: Our Technical Service specialists are experts in their individual fields. You can count on fast, efficient, courteous service in both backup or sorting operations. More than 85% of all user requests for service are resolved within 24 hours.

CAVEAT EMPTOR: As with all performance software programs, the best way to find out what SYBACK and SyncSort CMS can do is to benchmark them yourself against your present programs.

That should help you make up your mind fast!
FBI probes DP contract award charges favoritism by SSA officials

By Mitchels


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Name the fastest VM dump restore, and the fastest VM sort program.

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**Operations departments seen absorbing divisions**

By Rosemary Hamilton

If you are an average worker in a computer operations department, chances are your salary increase will be disappointing next year. And that is a double whammy, since this year's increase was down from 1984 figures. Such are the findings of a recent survey completed by the Association for Computer Operations Managers (AFCOM).

Based on this study, the overall average national increase for employees of computer operations is expected to be 5.7%, the same average increase that was reported this year. The increase is nothing at which to scoff. But it is also 2.1% less than the 7.8% increase in 1984.

These averages, including 1986 projections, were obtained from employee surveys completed by the Association for Computer Operations Managers and received 300 responses, said Len Eckhaus, president of the Garden Grove, Calif.-based association.

While average salary increases remained static, the computer operations department experienced a much bigger change. According to the survey, more operations departments were experiencing a decrease in salaries than had traditionally been non-data-processing, namely telecommunications, systems maintenance and programming. The "new" department should have a positive effect on its members, according to Eckhaus.

As computer operations add these departments, which have been perceived as second-class citizens, its own status will be improved. "Everybody I've talked to, with the exception of one or two people, says it's a good thing. It's a logical placement," Eckhaus said. "It ups their professionalism."

Eckhaus said there was no data on this trend in 1984. However, the 1986 increase on telecommunications departments. From that survey, which had approximately 350 responses, 25% said telecommunications was a part of computer operations.

Of the 300 respondents in 1986's survey, 43.2% said telecommunications now reports to computer operations, almost twice the amount in 1985. In addition, 31.4% said computer operations software is now an arm of operations, and 5.1% said maintenance programming is part of this department.

Of the 300 respondents this year, more than half (58%) came from departments with annual budgets of $1 million to $5 million. Nearly 26% had annual budgets of more than $5 million, and 15.3% had budgets of less than $1 million.

The survey contained data on 19 job categories, from data processing and operations manager to keypunch operator. Participants were categorized by general job descriptions rather than by specific titles.

The 19 job categories fell within three departments: data entry, computer operations and data control. Of the three, data control had the highest average salary increase of 6.6%. Computer operations closely followed with an increase of 6.5%. But data entry dropped down the overall average with its slight increase of 2.7%.

**Increases for above national average**

Many positions within these departments, however, reported increases that were far above the national average. The highest increase in 1985 went to data control shift supervisors, whose salaries rose an average of 12.2%. Nationwide, their salaries ranged between $10,890 and $19,450, and with an average salary of $19,450 this year.

They were followed by tape librarians, who had an 8.9% increase in salaries that ranged from $7,040 to $27,000. Data processing managers have an average of $35,720, and data entry shift supervisors, who earned an average of $17,240, were a position with average increases of 8.2% and 7%, respectively.

An entry-level position was the only job category that reported a decrease this year. The average salary of $11,410 was a 5.6% drop from 1984.

IBM unwraps PC/VM Bond 2

IBM last week announced PC/VM Bond Release 2, an upgrade to two programs that allow IBM Personal Computer users to connect an electronic bulletin board offering to connect cable television services illegally. He did not rent this bulletin board was run by the police.

By Peggy Watt

PHOENIX — A 28-year-old electronic bulletin board system operator has pleaded no contest to charges of facilitating computer fraud in what police said they believe is the first case of an operator being held responsible for the contents of his system. A computer even assisted in the investigation. Police were tipped off to the "pirate" bulletin board's existence by a caller to the Maricopa County (Arizona) Sheriff's Office Bulletin Board System, which is an open system that went on-line last year.

Mark D. Brown, a high school industrial arts teacher who also taught computer classes, operated an electronic bulletin board called "The Phunhouse" that offered callers other people's Visa and Mastercard numbers and long-distance access codes from a handful of interchange carriers, according to Deputy Ken McLeod, also a system operator of the sheriff's office bulletin board.

Protest also arrested

Brown was arrested and his equipment seized in November 1984. At the same time, a 14-year-old bulletin board operator in the Phoenix area who turned out to be Brown's protege, was also arrested. At the time of his arrest, the former operated an electronic bulletin board called "The Phunhouse" that offered users Visa and Mastercard numbers and long-distance access codes to callers from a handful of interchange carriers.

When the youngster accepted the offer of immunity from prosecution in return for agreeing to testify against Brown, the latter entered a plea, McLeod said. He was fined $137 and sentenced to probation for one year.

The sheriff's office bulletin board has helped to uncover several other computer crime cases, including several of telecommunications fraud and one incident in which a teenager posted messages on the bulletin board offering to connect cable television services illegally. He did not rent this bulletin board was run by the police.

IBM now holds responsible for on-line crime
Dresser puts its telephone switch to data processing work

Meridian DV-1 unit to act as DP processor

By John Dix

BRADFORD, Pa. — Dresser Manufacturing's telephone switch is its computer.

The company's emphasis on repair and pipe joining products is the first user of Northern Telecom, Inc.'s Meridian DV-1 data/voice system. Dresser Manufacturing, tucked in the northwest corner of Pennsylvania, is a division of the Dallas-based Dresser Industries, Inc., a company in the petroleum industry also located in Bradford.

The DV-1, introduced in February, is a modular switch built on two separate circuit-switched buses, one a circuit-switched bus for voice communications and the other a packet bus for data. The system can be configured with various DV-1 applications processors to meet different voice, data processing and data communications requirements, explained Dick Deisher, manager of market development for Northern Telecom's Data Systems Division.

Dresser Manufacturing installed a 24-port system in October to be used in its sales department for customer service, according to Wayne Poling, director of information resource management. "We bought a three-cabinet system with an 80M-byte disk and two processors, one processor [emulating an IBM] 3274 and the other processor for applications and call processing," Poling said.

IBM 3270s on-line to host processor

Prior to the DV-1's installation, Dresser handled the financial processing associated with customer accounts with IBM 3270/a on-line to its parent company's host processor in Dallas. Some new personal computers, most of Dresser's processing is done on the remote host. Voice communications for the DV-1 users was previously supported by the company's AT&T Dimension 2000 private branch exchange (PBX), which is still used for other company employees. "We're looking to move all of our financial processing involved with customer purchasing in-house," Poling said. When it installed the DV-1, Dresser opted to replace its IBM 3270-type terminals with Northern Telecom's Meridian 4020 terminals. These terminals are connected to the DV-1 applications processor, which is software configured to emulate an IBM 3274 controller. The applications processor is, in turn, connected to the remote host. The Meridian M4020 terminals are based on a Motorola, Inc. 68000 microprocessor and "have an integrated telephone, an extremely high-resolution screen and soft keys," Poling said. They can be used to access standard 3270 applications on the remote host through the 3274 applications processor or access office applications — such as word processing, spreadsheets and mail — on the system's other processor.

That processor runs under Dvix, Northern Telecom's version of AT&T's Unix System V. It supports call processing and two programs Dresser purchased: Q-Office, an integrated office automation software package from Quadratron Systems, Inc.; and Informix, a relational data base management system from Relational Data Base Systems, Inc. Poling admits, however, that for now the primary use of the Dvix processor is to learn Unix.

As a PBX, the DV-1 provides "all the station features, such as call forwarding, and functions, like least-cost routing, that a standard switch would," Poling said.

Voices are digitized by the Meridian M4020s and interspersed with terminal data over twisted-pair wire at 2.5M bit/sec., Deisher explained. The line card in the switch splits the voice/data signal, routing the voice to the circuit-switched bus and the data to the packet bus.

Although the DV-1 can support telephone company trunk lines, Dresser routes all outbound voice traffic through its Dimension 2000 PBX, which also provides telephone connections between DV-1 users and the rest of the company.

Poling said that he is very pleased with the DV-1 and is already installing a second unit in one of Dresser's manufacturing facilities in Alliance, Ohio. He estimated the cost of the system to be $5,000 per user, including the price of the terminal and the shared processor resources.

Although all 24 ports on Dresser's DV-1 are used to support Meridian M4020s, the system can also support standard telephones or data devices with RS-232 interfaces, Deisher said. Telephones can be connected through an analog line module — which slides into the system cabinet — that supports 30 cards. Each card can support either two telephone stations or one central office trunk link.

Deisher also pointed out that the Meridian 4000 terminal line can emulate many ASCII terminals, besides 3270 devices. Emulation of Digital Equipment Corp. VT100s and VT220s and IBM 3101s is achieved by downloading the appropriate software to the terminal instead of dedicating an applications processor to the task as is required with 3270 emulation.
Mainframe user community braces for year-end sales push

By James Connolly

With the end drawing near for a year of weak earnings and major product introductions, anticipation of a bloody computer price war has grown in recent weeks.

But the bargain-basement prices predicted by some analysts apparently have not reached most of the mainframe user community, although some DP managers expect sales representatives from IBM and other mainframe companies to bang on their doors in the next few weeks.

The managers expect the year-end sales push because, they said, it happens every year, whether the computer industry is booming or slow, whether customers are in a buy mode or maintenance mode.

"I expect to hear from both sides in November. I get those calls every year, whether I'm buying or not," said one such case would be where IBM delivers a machine four months before it starts charging the customer to save the user 6% on the total cost.

Standing as it does in competition with a barely mainframe company such as Comdisco, Inc. monitors IBM's discounting practice closely. "If they are deeply discounting their mainframes, it's very selective. Their big discounting tool is the VPA, and we've seen some 5%VPAs, but it's not like they are discounting 15% to 20%" said D. Vardy, vice-president for marketing at Comdisco.

Vardy said the discounting has forced manufacturers and limited volume peripheral orders, 3080s and smaller systems. He noted that IBM cut list prices on its 3860 Model B, disk drives and 4300 Group 3 mainframes to spur sales only months after introducing those products. He said that with the high-end 3090, demand has been such that little discounting is available and that the availability of November deliveries of 3090s cannot get their machines until after Jan. 1.

IBM trims costs to attack slump

From page 1

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In light of three consecutive quarters of lowered profits, IBM's stated goal of ramping up operations for a fourth quarter turnaround has not been demonstrated in speeded-up delivery schedules for high-end hardware products, widespread hikes in mainframe software prices (CW, Oct. 21) and, last week, a hike in the costs of IBM's personal computer software packages.

Although the company affirmed earlier statements that the fourth quarter will offset the previous nine months and should result in fiscal year 1985 profits exceeding the year-1984, Krowe appeared to say. "We do not at this point see much improvement over 1984," Akers said. "We are positioning ourselves for whatever happens."

"We have not at this point see much in the way of improvement over 1985," Akers said. "We are positioning ourselves for whatever happens."

Edging slower 1986 growth

Frank Gens, an IBM analyst with International Data Corp. in Framingham, Mass., said the cost-reduction program indicates that IBM expects 1986 growth to be slower than that of the years prior to 1985.

"The cost is about the closest thing to a hiring freeze that IBM has had," he said. "The consolidation of their regional offices and the recent reorganization of their telecommunications products unit has hastened toward reducing their costs" (see story page 155).

"It is quite different from this year's level, whether customers are in a buy mode or not," said one such case would be where IBM delivers a machine four months before it starts charging the customer to save the user 6% on the total cost.

Standing as it does in competition with a barely mainframe company such as Comdisco, Inc. monitors IBM's discounting practice closely. "If they are deeply discounting their mainframes, it's very selective. Their big discounting tool is the VPA, and we've seen some 5% VPAs, but it's not like they are discounting 15% to 20%," said D. Vardy, vice-president for marketing at Comdisco.

Vardy said the discounting has forced manufacturers and limited volume peripheral orders, 3080s and smaller systems. He noted that IBM cut list prices on its 3860 Model B, disk drives and 4300 Group 3 mainframes to spur sales only months after introducing those products. He said that with the high-end 3090, demand has been such that little discounting is available and that the availability of November deliveries of 3090s cannot get their machines until after Jan. 1.

IBM trims costs to attack slump

From page 1
If VMCENTER cost a zillion dollars, you'd still find people who could justify it on price. After all, how else could anyone running VM gain so much control for so little effort? Whether the issue is security, DASD management, scheduling, billing, cost containment, or simply eliminating administrative head- aches, VMCENTER's facilities offer a degree of control that's unprecedented in the VM environment. But if VMCENTER's great at a zillion dollars, it's even better at less than 8¢ a line. That's far less than it would cost you to write the same system yourself.

It's also faster. No one can write that much code and deliver it overnight. We've been working on it for years.

But even more to the point, VMCENTER really works. In fact, it's working right now in some of the most demanding VM shops in the world. It's working to keep data and resources secure from outsiders and from those within the organization who should have limited authorizations. It's working to protect data from disaster, or the simple inadvertent deletion of a needed file. It's balancing workload by moving work to offpeak times, and accounting for all resource usage. VMCENTER is even prescribing specific actions to regain use of under-utilized disk space.

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RUN WITH THE LEADER
AT&T takes home-grown approach to MRPS with BURPS

As vice-president in the network services division at AT&T, Eugene J. Eckel oversees manufacturing at factories in Columbus, Ohio; Oklahoma City; North Andover, Mass.; and Winston-Salem, N.C. The factories produce transmission equipment for central telephone offices as well as the company's 3B line of minicomputers. Also, he supervises a network software development center in Naperville, Ill.; a technical center in Piscataway, N.J.; and factories in South Korea and Taiwan. Approximately 40,000 AT&T employees report to him, with 10,000 North Andover plant employees representing the largest portion.

Computerworld Senior Writer Paul Korzeniowski interviewed Eckel after he had addressed the Boston chapter of the American Society for Quality Control.

There has been a lot of talk about General Motors Corp.'s Manufacturing Automation Protocol (MAP), is AT&T working with MAP in its factories?

We are not. Primarily, we work with a methodology called BURPS [Business Resource Planning System]. It is our own methodology and represents an enhanced version of MRPS [Manufacturing Resource Planning System], for it includes business resource planning capabilities. MRPS is a disciplined manufacturing resource planning system that helps to plan the manufacturing process from material sourcing to delivery. BURPS is integrated, so we can track an item from material to manufacturing resource planning to business resource planning. It is a comprehensive business system that integrates many business functions... In addition to quantifying our objectives, we are using automated methods at high levels that tie into BURPS. At any time we know where a product is in the shop, what our inventory is, what our quality efficiency is, what our cost is. It is all part of one integrated system.

At what stage of development is the system?

At Oklahoma City, it is [in] a very advanced state of development. We use that facility as our laboratory. The AT&T engineering research center near Princeton, [N.J.,] has been working with our Oklahoma City personnel to develop the system. The research center works on future manufacturing tools, methods and processes and develops generic products that anticipate technical evolution. A system such as the one at Oklahoma City presents a number of advantages with the most obvious being lower cost and better quality. The system also helps us to reduce manufacturing intervals, so we can cut it from three weeks to one week and... reduce our inventory.

When will you move these systems out of test phase and into production?

We are very close to full production in Oklahoma City and have transferred its technology to our other plants. However, the job will never be finished — not even in Oklahoma City and we've been at it for a few years. There will always be new technologies and new skills that have to be introduced.

How do you introduce these advances without threatening your workers?

First, you have to be able to convince them that it is not a threat. We were able to do that in Oklahoma City. We made the union part of our team so it would understand what was at stake and what its role was. We had to persuade the union that automation would protect jobs and expand employment. There was fear at first that our overseas products would become the determinant of our domestic factory. We persuaded the union that foreign ventures were not exporting jobs. At first, we began to ship complete systems to our foreign partners. Gradually, the partner builds off of our expertise and takes over more of the production cycle. But the partner never takes over full production, and we continue to ship that product to our partner.

You stated that production of AT&T's 5ESS switch has increased thirteenfold from 180,000 lines in 1983 to 2.4 million lines in 1984 to 6 million this year. Who is buying the product?

The chief purchasers are the [seven regional holding companies] and their subsidiaries, for example, [New England Telephone & Telegraph Co.], a subsidiary of Nynex Corp. We are also selling large quantities to independent telephone companies. The international numbers are relatively small but are increasing rapidly. We are producing the switch in [the Netherlands and shortly will add facilities in Korea and Taiwan]. The federal government has purchased a number of switches and lately, major corporations are buying them and installing their own switching systems for corporate networks.

How many large companies have purchased the 5ESS, and who are they?

We have commitments from half a dozen companies. [Wang Labaratories, Inc.] is the only company I can talk about. I think this market will be growing although it is hard for me to quantify it. A number of customers are enthused about owning their own switch.

Has the production of AT&T's 3B line risen as sharply as that of the 5ESS?

To an extent, ramp up for the 3B20 has been parallel because it uses the MAP's central processor. Production for the other models has not risen as sharply. Our sales have been as quickly as we had hoped, but we are making good progress.

Since divestiture, how has your job changed?

Manufacturing has always been a bedrock of the AT&T system: a strength of the old Bell system was our manufacturing organization. But our organization has not changed at all. It is a mirror image of the old Western Electric.

Has the last reorganization taken place?

I don't think that it has taken place nor has AT&T said that it has. I hope other reorganizations would be less traumatic than the one we have seen. We want to evolve as we see our needs change.

Has the reorganization changed the way that the company operates or sees itself?

The principal change is the realization that we serve a very demanding customer who is now an arm's length away from us. Our new customer is anxious and willing to seek out competitors and buy products elsewhere. We are faced with some capable international competitors, not just in Japan but also in Europe and Canada.

Who are these competitors?

In domestic switching, our major competitor is [Northern Telecom, Inc.] They had been ahead of us, but I feel that we have caught up to them and are ahead of them in many areas. But we can't hesitate for a minute.

Internationally, [L. M. Ericsson, Siemens Communication System, ITT Telephone Equipment] and Japanese communications firms are all well run.

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All seminars through January 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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*Includes Encumbrance Accounting

To enroll in a Cullinet Seminar, call 1-800-225-9930. In MA phone 617-329-7700.
GM's MAP steals show at Autofact

From page 1

A MAP users forum was forced to move to the largest room in Cobo Hall, the site of Autofact, due to an unexpectedly large turnout. Paul Borawski, a spokesman for the conference's sponsoring organization, the Computer and Automated Systems Association of the Society of Manufacturing Engineers (SME), noted that SME's MAP users group had grown from 60 members in June 1984 to its present 1,600 members.

Reasons for the intense interest in MAP are not hard to identify, Borawski said. "Today, only 15% of the devices in a factory talk to another device."

Enabling those devices to communicate with each other costs and boosts productivity, many managers seem to believe. "Once we implement MAP, we will cut our five-year product development cycle by one to two years," claimed Autofact attendee Robert J. Maton, vice-president of GM's advanced engineering staff.

It is this need that has driven GM to attempt to forge a standard methodology for integrating factory automation devices by means of its seven-layer MAP architecture, based on the International Standards Organization's Open Systems Interconnection model. Theoretically, MAP will dictate how factory devices such as robots, vision systems, engineering workstations and computers will be linked together into a cohesive system, regardless of location or type.

Vendors participating in the show demonstrated for the first time production control systems connected to the fifth, or so-called session, layer of the MAP architecture.

Coordinate interaction

The session layer is used to coordinate interaction between applications on different machines. The demonstration also showed how applications at the uppermost layer of the model, including electronic messaging and a standard for file transfer.

Despite the vendor and user interest in MAP evidenced at Autofact, full realization of MAP's potential is still two years in the future, industry sources said.

One major obstacle is that not all seven MAP layers have been agreed upon. While some work has been completed on the seventh layer, none of the sixth has been finalized. The seventh, or application layer, is intended to overcome incompatibilities between network elements such as manufacturing systems and the factory structures. According to some vendors, the presentation layer is the toughest nut to crack.

Another obstacle is the time required by vendors to tailor their products to MAP. Until now, MAP is fully specified, products may be incompatible. A spokesman for Concord Data Systems, Inc. of Waltham, Mass., noted that two terminal servers that met MAP specifications could not talk to one another until the vendors cooperated to adapt their MAP software. Standards are like blueprints to vendors, although many products conform to the Ethernet standard, few are interchangeable.

Even if MAP objectives are met, there are limitations to the current specifications. MAP doesn't include security features," noted Thomas Harris, a manager at Binxord, Inc. in Milwaukee. Network management controls are also lacking.

Meanwhile, GM is moving ahead with plans to implement pieces of MAP in three of its plants next spring. Full implementation is expected to be completed in 1988.

Application tools lead Autofact '85

Among the products introduced at the annual Autofact '85 Conference and Exposition last week were the following:

@ Digital Equipment Corp.'s VAX Engineering Data Control System (EDCS), a hardware and software package designed to manage applications from a variety of vendors. The hardware includes CPUs ranging from the Microvax II to the VAX 8600, while the software includes DEC's VMS operating system and DEC's integrated data management and office automation products that are said to allow engineers to track and manage data files in established computer-aided design and manufacturing operations. VAX EDCS will be priced from $105,000 to $650,000 and from $12,000 to $30,000 for a software-only version.

@ Two IBM programs for the IBM Series/1 Realtime Programming Automation Protocol (MAP). The IBM Series/1 Event Driven Communications Server and the IBM Series/1 Realtime Programming Automation Protocol Communications Server were designed to support integration of computers, robotics systems and programmable controllers from different manufacturers. The applications server supports applications that require message transfer between MAP-supported applications and floor devices and file transfer applications that allow transfer and modification of files between two MAP systems. The communications server acts as a directory server for the network and as an interface to IBM 370 hosts. The application server supports the communications server, $9,500.

@ Hewlett-Packard Co.'s HP DesignJet System offers a wide range of color and black-and-white software tools. DesignJet tools are intended to speed product development processes for electrical and mechanical design engineers. Applications include electronic computer-aided engineering (CAE) for front-end product development with links to physical design systems, and mechanical CAE for two and three-dimensional modeling, solid modeling and structural analyses.

N.J. officials may invoke liquidated damages clause

By Charles Babcock

TRENTON, N.J. — The New Jersey attorney general's office will wait to see how long it takes Price Waterhouse & Co. to redo the state's Department of Motor Vehicles computer systems before deciding on whether to invoke a liquidated damages clause.

The clause provides for late fees of $10,000 to $50,000 a month if the new system was not operational by June 30; with the project already behind schedule, Price Waterhouse officials said in August it would take six months to a year for the systems to be redone, said Michael R. Cole, first assistant attorney general.

Price Waterhouse developed the system on time, using Applied Data Research, Inc.'s Ideal fourth-generation language and Datacom/DB relational database management system. As more and more parts of it went on line, however, response times plummeted, and the Department of Motor Vehicles began suffering a massive updating backlog [CW, Sept. 30].

Price Waterhouse of San Jose, Calif. — Fujitsu America, Inc. took steps to increase its direct presence in the crowded U.S. low-end peripheral market last week by forming a new business unit to market floppy disk drives domestically.

The Flexible Disk Products Group will market 3¼-in. and 5¼-in. drives and 3¼-in. diskettes to OEMs and industrial distributors in the U.S. The new unit makes Fujitsu "truly a single-source vendor" for storage peripherals, a spokesman said.

In addition to its IBM plug-compatible mainframes sold in the U.S. through stronghold Corvus Computer Corp. which currently markets Winchester hard disk drives, streaming tape drives and cartridge tape drives predominantly to Ameco.

— Clinton Wilder
Intel unveils second-generation Expanded Memory Spec board

By Eric Bender
HILLSBORO, Ore. — A second-generation multifunction board for the IBM Personal Computer offering up to 1.5M bytes of conventional and expanded memory capabilities is expected to debut today from Intel Corp.'s Personal Computer Enhancement Operation.

"The conventional multifunction card is obsolete," claimed Jim Johnson, manager of the Intel group. "In the long run, just about every [Personal Computer] that's purchased will have expanded memory.

This will hold true even for users running only one application such as word processing, he maintained. "Look at pop-up utilities and spelling checkers — those programs are taking up more and more memory, and you can put all that in expanded memory."

Intel's Above Board PS was designed to the Lotus Development Corp./Intel/Microsoft Corp. Expanded Memory Specification (EMS).

Johnson described the EMS not as a temporary fix for Personal Computer memory limitations but as a cornerstone for future enhancements, even far beyond Intel 8088-based systems.

EMS 'accepted standard'

In a joint statement, Intel and Microsoft said that the EMS, which gives Personal Computers access to up to 68M bytes of additional internal memory, "is quickly becoming the accepted standard for taking [Personal Computers] beyond the 640K-byte limit" that Microsoft MS-DOS now places on direct address memory.

"Intel and Microsoft are committed to evolving the operating environment to a multitasking environment in a way that's consistent with the operating system," Johnson said. "Controlling the allocation and management of memory is something that the operating system has to do."

The two firms today will announce a limited introductory offer that will provide a free copy of Microsoft Windows — when that multitasking operating environment software finally ships — along with any Above Board purchased from Nov. 15 to Jan. 15.

Both companies extolled the virtues of opening up Windows with expanded memory capabilities.

"Above Board provides enough additional memory to allow Windows to function at maximum performance and lets the user work with more applications than can fit in the 640K-byte limits," said Steve Ballmer, vice-president of Microsoft's System Software Division.

With numerous manufacturers providing EMS-compatible boards, several other suppliers also promised that their products will work with Windows.

"We'll be as compatible with Windows as Intel," said Tony Paradiso, senior product manager at AST Research, Inc. in Irvine, Calif.

Designed for new system buyers of the IBM Personal Computer, Personal Computer XT and compatibles, Intel's Above Board PS features a serial port, parallel port, a clock/calendar with battery backup, a random-access memory disk and print-buffer utilities.

Two models will be offered in December, one with 64K bytes priced at $445 and another with 256K bytes costing $545.

The new board conforms to EMS Revision 3.2, shipped earlier this fall, which provides improved support for multitasking environments.

Among independent software vendors that have endorsed EMS are Ashton-Tate, Borland International, Com-
Continued from page 1
storage capacity and a set
of SQL commands identi-
cal to the SQL commands
in IBM's SQL/DS and DB2
relational data base man-
agement system products.

"This product is de-
dsigned for Lotus users who
run out of gas and need
more capability but don't
want to learn a new inter-
face," Oracle President
Larry Ellison said last
week. "We're providing
basically an upgrade to
Lotus."

SQL Calc is integrated
with the Oracle relational
DBMS, which runs on IBM
mainframes in MVS and
VM environments, in
many AT&T Unix environ-
ments and on a variety of
minicomputers. SQL Calc
is being bundled with PC
Oracle for a price of $995.

The data storage limit
of SQL Calc is determined
by available disk space,
Ellison said. The product
is available now for the
IBM Personal Computer
XT and AT with 512K
bytes of main memory.

Apple Computer, Inc.'s
engineers are said to be
busily readying products
for the traditional unveil-
ing at the firm's January
shareholders meeting..
Sources point to a Turbo
Mac, which is reputed to
be the Macintosh XL that
Lisa never was, along with
a Mac with 1M byte of
memory, a larger (14-in.)
screen and even higher
resolution.

But the intriguing item
in the works is Apple's "true"
portable (not an Apple IIc),
which may not
be ready in January but is
certainly getting a big in-
ternal push.

Sources close to AT&T
said the company is sched-
uled to release today a ter-

nal cluster controller
compatible with IBM's
3274 workhorse, along
with a line of terminals.
The Multifunction Com-

munications System 6500
controller will have 32
ports like the 3274 but up
to three synchronous and
16 asynchronous host
links. AT&T will also un-
veil an interface card for
its PC 6300 personal com-

puters that will link the
microcomputer to the con-

roller.

Zilog, Inc. tomorrow will
introduce a 32-bit super-
micro that runs on AT&T's
WE32100 32-bit micro-
processor. It is the first
time the AT&T chip has
been used for non-AT&T
products and the first time
that Zilog opted not to use
its own chips in its prod-

uct line.

TOP OF THE NEWS

HANNOVER, West
Germany — The
question of who
will guide Europe on the path
to a technological renais-
sance is one of the most im-
portant issues that faces the
representatives of 18 Euro-
pean governments as they
meet this week to discuss the
future of Eureka, Europe's
nascent program for coopera-
tion in technological develop-
ment.

Eureka's proponents claim
that it must have a flexible
bureaucracy in order to re-

pond rapidly to changing
conditions in the market-
place.

However, until a few
months ago, the most vocal
candidate to run Eureka was
the European Community's
Commission, an organization,
some have said, that moves
as quickly as a snail.

MAASTRICHT, Neth-
erlands — In the
future, artificial in-
telligence technology will
mainly be used for speech
generation, factory automa-
tion and financial applica-
tions, according to artificial
intelligence expert Edward
Feigenbaum in his keynote
address to a seminar held re-
cently in order to celebrate
the inauguration of the Neth-
erlands' national research in-
stitute for knowledge sys-
tems.

Artificial intelligence
technology, Feigenbaum
said, holds the promise to
make computers easier to
use.

"Computer systems are
the most complex artefacts
that have been created in the
history of mankind, but they
are so friendly that human
beings long for them to be
sympathetic," Feigenbaum
observed.
Accell joins application development tools in unified system

By John Desmond

About twenty-five years ago something happened that changed the world of information forever. Xerox introduced the first plain paper copier, an achievement that brought xerography into almost every office. Since then, for more than a decade, Xerox has been applying the power of laser technology in high speed computer printing systems. Systems that produce superb documents of unsurpassed quality, quickly, quietly and cost effectively. Now, through this process which we've named Lasography, Xerox has come up with a revolutionary product that lets smaller offices and work groups enjoy these benefits, too.

Introducing the Xerox 4045 Laser Copier Printer. Its the desktop copier/laser printer with a totally unique dual personality. For one thing, its a sophisticated laser printer. It can print up to ten pages a minute. Which is ten times faster than standard office printers.

And while other desktop printers serve primarily one workstation at a time, the Xerox 4045 Laser CP is designed to accommodate four. All at the same time. Not only that, but with the Laser CP's graphics capabilities you can merge all the forms, logos, texts and signatures you want printed and produce documents that anyone would be proud of.

But as we said before, the Laser CP has a dual personality. It doubles as a high quality convenience copier:

The Xerox 4045 Laser CP is only one example of what Lasography has to offer your office, remote or distributed data processing environments. Because Xerox is already planning ways to apply Lasography toward an even wider selection of products.

All of which will put your office exactly where it belongs.

Light years ahead.

Call 1-800-TEAM-XRX, ext. 179 for information and product demonstration.

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XEROX
Micropro aims Wordstar 2000 Release 2 at corporate sphere

By Peggy Watt

SAN RAFAEL, Calif. — Micropro International Corp. is hoping its oft-misunderstood Wordstar 2000 will get a second chance, especially in the corporate world, with the announcement of Release 2 last week.

The product got off to a slow start after its release in October 1984, largely due to misunderstandings about its name, acknowledged Lewis C. Levin, senior product manager. Diehard Wordstar users were somewhat puzzled to find that the new word processing program was unlike its predecessor, though Micropro said the new product was aimed at a different audience and carried the Wordstar name only for recognition.

In the new version, both Wordstar 2000 and its enhanced cousin, Wordstar 2000-Plus, offer direct access to files written under Lotus Development Corp. 1-2-3 and Symphony, conversion to and from IBM's Document Content Architecture, more format choices and a new document history feature that lists each document's date of creation and modification and the number of characters in each document.

The new version also supports the IBM PC Network, Ethernet and Novell, Inc.

Netware local-area network, as well.

A program can have more than one printer installed on the machine and be customized to take advantage of unique printer features.

Pages can be designed with as many as three newspapers-style columns, and footnotes can be inserted at the bottom of each page or at the end of the document.

Micropro hopes enthusiastic comments from analysts who got a first look will prompt users to glance again.

"We want a fresh look from the people out there," Levin said. Analysts from Information Resources Inc., Wohl Associates and International Data Corp. have already welcomed the revisions as having wide appeal.

Levin characterized the user of the Wordstar 2000 line as the corporate member of Micropro's word processing line, which also includes Easy, a low-end word processing program released earlier this year.

"We always intended this for the business setting," Levin said, adding that Release 2 enhancements were intended to make the program more attractive to that market. Notably, Release 2 users can read Lotus files by named ranges without having to copy files and convert them to Wordstar 2000 format.

"Lotus is often standard" "Lotus is often standard computer equipment in a corporation. We want to adapt to that environment," he added. Wordstar 2000 should be compared not with its sibling products but with other major word processing programs, Levin said.

The company also announced a corporate site licensing program in September as another foray into the business market. Network licenses and technical support are available for new versions.

New versions of Wordstar 2000 will sell for $495, like the current product, and a hard disk is still recommended.

Upgrades to Release 2 will be available free of charge to those who bought the old Wordstar programs after Nov. 1; for other users, the cost is $60. Neither is copy protected. Though Wordstar 2000 was originally copy protected, that feature was removed last February.

Wordstar 2000-Plus, which sells for $595, offers telemerge capabilities for telecommuters and a mailing list function. The same upgrade prices apply.
Hopper, Bank America split

From page 1

Hopper's personal work style "ran counter to the bank's corporate culture," according to one source. These sources contend, led to a strained relationship with Armacost and was instrumental in Hopper's departure.

Before coming to Bank of America in 1982, Hopper had served as head of a joint development team at American Airlines that, during the 1970s, pioneered the forerunner of today's automated airline reservation systems. Hopper's pronounced capacity to take calculated risks in extending the state of technology was rewarded at American Airlines, an information systems pacesetter that reportedly rewards inventiveness and overlooks missteps on the way to success.

But the same entrepreneurial instincts that made Hopper an industry legend during his 10 years at American Airlines apparently worked to his disadvantage at the nation's second-largest financial institution. Hopper joined the bank as director of retail information and processing services, and in January was promoted to executive vice-president for the Bank of America Systems Engineering group. In this position, Hopper oversaw an innovative restructuring of the bank's information processing organization that was widely reported (CW, Feb. 4) as a model of its kind and that elevated Hopper's stature as a corporate chief information officer.

The reputed turning point in Hopper's association with the bank apparently came when, at his own personal insistence, the organization apparently came when, at his own personal insistence, the organization migrated its domestic banking applications from IBM's MVS to IBM's ACP/Transaction Processing Facilities (TPF).

Technicians had doubts about migration

"A lot of the bank's technical people had doubts about the migration project," according to a recently departed Bank of America technician who requested anonymity. "But when they got built-in data recovery capability into TPF, they were impressed with the migration and saw that TPF was ready to go.

But in return for the increased computing power, Bank of America was forced to foot a software development bill said to total $100 million to $200 million. Much of the expense resulted from the migration effort's heavy reliance on contract programmers. High hourly rates reflect their extreme scarcity.

TPF conversion fell short of goal

To make matters worse, the company's TPF migration project fell far short of the bank's expectations. One of the project's original aims was to interface TPF to many of the domestic banking operation's key applications like general ledger. But thus far that goal has remained beyond reach, a source said.

In July or August, when the extent of the migration effort's shortcomings had finally become clear, rumors of Hopper's imminent departure began to circulate among members of the bank's systems staff, the former employee explained. Within three months, the rumors became fact when Hopper and Armacost decided, apparently by mutual agreement, to part company.

On Oct. 30, bank officials issued an internal statement announcing Hopper's resignation and the appointment of a successor — Louis Mertes, operations chief at the institution's SeaFirst Corp. subsidiary.

Hopper provided a different account of the TPF migration effort. Initially, he said, the bank had intended to implement a point-of-sale (POS) system in TPF but later postponed its plans when the projected market demand for POS failed to materialize.

The deferral was also prompted by the bank's subsequent decision "to move forward with a total integrated data network" that will eventually use TPF as its hub, he said.

In short, Hopper explained, any snags that Bank of America has encountered in its TPF migration project resulted from unavoidable "resource conflicts" and fundamental changes in its business needs. "You probably won't find this kind of perspective if you talk to people down in the bowels of the organization."

One alternative theory about why the TPF migration effort has caused the bank so many headaches is that the system lacks adequate data recovery and integrity features. In applications like airline reservations or credit card authorization, where systems breakdowns are usually regarded as serious but not disastrous, the shortage of built-in data recovery capabilities is seldom a serious constraint on TPF's effectiveness.

But in financial applications, in which data bases are continually updated and where loss of customer information is intolerable, TPF is intrinsically less suitable than IMS, which does contain extensive safety precautions. To compensate for the slightness of TPF's data recovery and integrity features, Bank of America was forced to create the necessary safeguards itself, one of the sources said.

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And see which way the future of micro software is headed.
EDITORIAL

When users drive standards

"Revolutionary" is a word to be used cautiously, so we will be cautious in describing what happened in Detroit last week. The bare fact is that 30,000 people and more than 200 manufacturers turned out for the eight annual Autofact '86 Conference and Exposition largely because five years ago a group of DP professionals asserted their power over plant floor equipment vendors and demanded an automation protocol that placed users' interests over those of vendors.

How will the seven-layer MAP work once the technical obstacles are overcome? Consider the analogy of a telephone call between a party in Chicago and one in Tokyo. How can it be made possible for the two parties to understand each other? MAP Layer 7, an application layer, makes it possible for the two parties to work together actively.

Today, however, there is no presentation Layer 6, no interpreter function. MAP gets around that for now by specifying that vendors conform to a few specified formats and a few applications. For example, the U.S. and Japanese parties could communicate if they somehow agreed beforehand to work on a specific project using a small set of code words familiar to both.

Although MAP, when it is completed, may not be the last word in standardization, the fact that it was generated by users is critical. Vendors have traditionally adopted standards when they stood to benefit, as when IBM Systems Network Architecture compatibility would increase sales. In this case, a large user company told its automated equipment suppliers that their devices had to be compatible with MAP. This drove the standard much farther, much faster than would have occurred otherwise. MAP has probably encouraged more vendor activity in the last two or three years than any such comprehensive standard in history.

The model has been established. Can the MAP experience be adopted by other computer professionals? Specifically, can Boeing's proposed TOP succeed in the general OA field? Certainly there are crucial differences, given the plethora of office network and communication standards already in place.

Users should not be deterred. The success of businesses over the next decades will be determined in large part by how effectively information management decisions are made. These decisions should not be dictated by vendors' caprices.

As MAP has shown, users must act first.

LETTER TO THE EDITOR

Patent rights offer greater protection than copyrights, trade secrets laws

The article "Patenting software possible but tough to accomplish," [CW, Oct. 14], incorrectly leaves the impression that the patenting of computer software is not favored by the U.S. Patent and Trademark Office (PTO).

I conduct business regularly before the PTO and obtain patent protection for a wide variety of computer software. The ability of computer programs to be patented is not in dispute as long as the program interacts with a piece of hardware and obtains definitive results. Additionally, the software must be novel, unobvious and adequately disclosed in the patent application.

As correctly pointed out in the article, the services of a patent agent or attorney are recommended — hence the higher cost — and the application process does take about two to three years. However, the rights granted by a patent are significantly greater than the rights granted by copyright or protected by trade secret law.

For example, given a valid patent, a court can stop any infringer from making, using or selling the patented program simply by determining that the infringer uses steps A, B, C and D even if the infringer's program has significant steps A, B, C, D, E, F, G and H. This feature of patent protection does not have a counterpart in copyright and trade secret law.

Also, the patent is viewed as encompassing all equivalents of steps A, B, C and D. If step Z is equivalent to step C, then a program with A, B, Z and D infringes the patent. Copyright protection of the program would not necessarily encompass the equivalent step Z. Like many things in business, you get what you pay for; patent protection does cost more, but you get more protection for your money.

Finally, I recommend patent protection for those programs that have a long, useful business life, a product life of at least five years or those programs that are recognizable as generating a large amount of revenue.

Robert C. Kahn Jr.
Washington, D.C.

Respectibility for system security rests on data processing professionals

I was troubled by the recent column, "Computer literacy: rehabilitation or risk?" [CW, Oct. 28]. I disagree on the entire range of philosophical, social and political implications in the column. Such is the nature of democracy, and these issues would be better discussed in publications other than Computerworld.

I would suggest, however, that system security and data privacy are the responsibilities of system designers, operators and computer professionals and not the responsibility of the juvenile justice system.

Steven B. Jackson
St. Louis Park, Minn.

Secondary meaning' cannot convert truly generic terms into trademarks

I am writing to correct an error that appears in the article "Trademark law protects product names and logos" [CW, Oct. 21]. In the article, it states "an otherwise generic or descriptive mark still may receive the act's protection if it acquires 'secondary meaning,' as defined under trademark law, or if the mark is modified so as to make it distinctive."

Although secondary meaning may convert an otherwise descriptive term into a trademark that is able to be protected, no amount of secondary meaning can do the same to a mark that is truly generic.

Howard G. Zaharoff
Brown, Rudnick, Freed & Gesmer
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4. PLEASE SPECIFY THE MAIN COMPUTER AT YOUR SITE:

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3317-01145
By Naomi Karten

The poor maligned spreadsheet has a love-hate relationship it has provoked. MIS and users are particularly concerned about the danger of data management software or project management software or desk management software in the hands of fledgling users. But the idea of users cavorting with a spreadsheet in the name of better and faster business decisions sends shivers up and down the spines of MIS managers.

Users could enter a calculation incorrectly, thinks MIS. Or misplace a Management software or project numbers. And the whole company could go down the tubes as a result.

MIS managers are justifiably concerned about users' lack of applications know-how, particularly given the extent to which spreadsheets can - and conceal - errors in business logic. But sometimes it appears as if MIS wants not only to retain control of the computer but also wants to retain a monopoly on errors.

First of all, it's not really fair to hold users responsible for not being tuned into the system controls and data management. It hasn't been their job to know these things.

Programmers, certainly, are not born knowing about data edit, internal balancing and reconciliation to other systems. They learn through training and by looking over the shoulder of the MIS department. But programmers are also the kind of training and over-the-shoulder watching.

Furthermore, it's not as if the technical and organizational checks and balances in MIS' production manager can be fully blown on day one. They evolved over a long period of time - 15 years, at least. Yet, amid all this computer sophistication, even MIS blows it occasionally with systems that crash, malfunction and generally go haywire, spewing lost files and spreadsheets that do not compute. Programmers using personal computers lack the protections of new identifying codes; they promote the common demands that sometimes get some of its own colossal screwups - the generation of duplicates, the "pay up or else" notices to paid-up customers, the 30-hour-per-day daily system. An objective person could easily conclude these are reasons enough to scrap computers altogether.

The problem here is not the users of the technology - whether MIS or end users - but the technology itself in its current incarnation. MIS people are not immune to circular errors, lost files and spreadsheets that do not compute. Programmers using personal computers lack the protections of the production world just as users do. And these number-crunching wonders have become near and dear to all of us and are untrustworthy from a business perspective.

What to do? You could lock up all the personal computers for a year, but in most cases this would be neither feasible nor wise because users for outnumber MIS managers.

More reasonable strategies would involve around continuing education in the most current status report. Did you think it would be neat if...? You could borrow it?" The latter is a request for help, and you can sit down with that person and work out a solution. The requester may be legitimate but can also turn out to be an exercise in collecting information for information's sake, without mercy. It's dangerous.

Some people object that MIS would come up with the right answers if management asked the right questions. But that makes MIS no different than the computers it uses. That's just data processing. It's time to put the emphasis on the "M" in MIS.

Karten is president of Karten Associates in Randolph, Mass., a consultancy that specializes in strategies for information centers.

\[ \text{NoVEMBER 11, 1985} \]
Q I started work as a data center manager Jan. 1. I was hired after four long interviews with the MIS director. I was told he and the vice president identified me as your best candidate for the data center departure. I think that your work is the result of my manager. My presence on the MIS director's report. I believe that your presence posed an immediate threat to the MIS director's job security. This topic thrusts us into a tough dilemma, but most managers prefer the traditional approach. That is, managers make mistakes, almost miserably for their upset subordinates while secretly and subtly sabotaging their integrity among top management.

Your manager's approach to be read only, then distrib- ute a list of file names for the various on-line standards and procedures. To view a particular standard or procedure, users simply use their word processing software to call up the desired text file.

Q I heartily agree with your line "Pe" of program- ming; that is, a good pro- gramer is permeative, pati- ent, persistent, plucky, and productive [CW, Aug. 13].

One of my duties is to find good programming candi- dates. Would you share some of your experiences on how to identify people who have the "Pe"?

This topic has dissertation potential. Ultimately, it boils down to an individual and some kind of subjective if-then-else analysis. Perhaps I can offer a few suggestions. A good evaluation merits an outstanding performance review. I can offer a potential candidate is perceived and picky is for the interview to suffer pur- posefully over a very important topic, such as in-house train- ing or promotion opportunities.

If the candidate continually requests clarification and shows genuine concern about prospects for the future, the candidate becomes the interview. If the candidate listens pas- sively and only if, they are accessi- ble and always up to date. I am unaware of any soft- ware products developed specifically for this purpose, however, many companies use word processing and idea- processor software to docu- ment and make revisions to their standards and proce- dures.

To carry this automation one step further, it is a rela- tively simple matter to write a routine that presents users with a menu of available standards and procedures, then load the requested word-processor-generated or idea-processor-generated text files. In the routine, provide the user with the capa- bility to page through the entire text file. Here is an even simpler ap- proach. Create the text files, specify the on-line versions of more interest to the candi- date — such as television or sports.

Look for a history of self- improvement in any area, from music to computers. If the candidate periodically makes a course or some- thing extra just in case, then place a check in the "persistent" box, or else rec- ommend the candidate to a competing firm.

When a candidate has a college degree or experience, interviewees tend to assume that the candidate has the prerequisite technical knowl- edge. The entire interview view such that several people ask technically revealing questions.

If a candidate's credentials imply a certain level of technical expertise and this expertise does not surface during questioning, then prod- uctivity may be a problem. Play Trivial Pursuit with the candidate.

Patience is a personal trait to ferret out dur- ing an interview. I don't think it seems to be some correlation between patience and an un- witting belief that some- thing is best.

If the candidate steadfast- ly pronounces a particular language to be the only real language, then avoid discus- sion of your path. But in- generation languages; wish the new former candidate good luck and call a taxi.

Q I am responsible for ad- ministering the standards and procedures program for our data processing de- partment. We believe that by putting our standards and procedures on-line, they will be easier to access and update and, therefore, will be much more effective.

Do you know of any com- panies that have effectively automated their standards and procedures or of any software products available for providing this capabil- ity? What you propose is a good idea. Standards and procedures are adhered to if, and only if, they are accessible and always up to date. I am unaware of any soft- ware products developed specifically for this purpose, however, many companies use word processing and idea- processor software to docu- ment and make revisions to their standards and proce- dures.

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- **France:** $1.6 billion
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Jacore joins AT&T value-added resellers offering 3B minis

NEW YORK — When AT&T Computer Systems convened a meeting of its value-added resellers council recently, it included Jacore Systems of Marietta, Ga. Jacore, like 111 other AT&T value-added resellers, wants to offer its customers the 3B line of minicomputers.

Jacore’s presence was notable, however, since in the past it had been a value-added reseller associated exclusively with IBM. It was among the 10 companies IBM named in 1982 as its first value-added resellers, and with $60 million in revenue this year, it is IBM’s largest value-added reseller.

Jacore will continue to sell the IBM System/36, which constitutes the bulk of its business. But James L. Jacobson, Jacore chairman, says the firm’s small and medium-size business customers want the hardware migration path provided by the 3B. The 3B line will allow them to take their software with them as they move up to bigger models, a progression that IBM can’t match with its incompatible mid-range lines, he said... — Charles Babcock

SAN JOSE, Calif. — Former Convergent Technology, Inc. chief technical officer and cofounder Ben Weigbreit admitted his recent decision to leave Convergent along with chairman Allen Michels and two other Convergent executives to form a yet unnamed venture is certainly a bold one.

“It’s very bold, and I’m terrified,” Weigbreit told Computerworld recently. Little else about the group’s plans is clear. “We have no product plans, no funding plans and no business plans,” he said. Right now the foursome is operating out of two rooms in Weigbreit’s Palo Alto, Calif., home and is in the process of looking for office space.

Weigbreit and Michels first discussed leaving Convergent a week before their departure was announced, he said. “Each of us had been thinking about doing something else. I could sense that Allen was thinking of looking elsewhere.”

The former Convergent executive dismissed suggestions that the four could start a posh legal battle with Convergent as a result of the group’s departure and reiterated an oft-stated notion that the new company would not compete for Convergent’s business.

— Maura McEnaney

WASHINGTON, D.C. — The U.S. Department of the Army is studying the feasibility of converting the official Army personnel file, more than two million records now on microfiche, to digital optical-disk technology, according to Michael R. McGuiere, the project coordinator.

The Army is planning pilot operations at the Enlisted Records and Evaluation Center at Ft. Benjamin in Harrison, Ind., and at the Military Personnel Center in Alexandria, Va. If the evaluation is positive, full-scale conversion to optical disks could begin in fiscal year 1988.

McGuiere said conversion was recommended in a 1984 study by Austin Associates, a consulting firm in Englewood, Colo.

— Mitch Beets

WASHINGTON, D.C. — The government market for Department of Defense Tempest computer equipment, which is shielded to prevent unwanted electronic emissions at national security installations, will be cut by about 10%, according to the local office of International Data Corp. (IDC), a market research firm.

IDC’s prediction is based on the fact that the DOD has ordered plans for national security installations to restrict their purchases of Tempest hardware to office workers who have security clearances.

But IDC said the good news is that there still remains a multibillion dollar market for Tempest hardware in the government. The recent series of widely publicized spy cases is creating a heightened security awareness among security agencies to restrict their purchases of Tempest hardware to office workers who have security clearances.

But IDC said the good news is that there still remains a multibillion dollar market for Tempest hardware in the government. The recent series of widely publicized spy cases is creating a heightened security awareness among security agencies to restrict their purchases of Tempest hardware to office workers who have security clearances.

— Mitch Beets

SACRAMENTO, Calif. — Two night watchmen working for a private security contractor were arrested recently for allegedly stealing microcomputer word processing programs and user manuals belonging to the California Lottery Commission.

Armed with a search warrant, police raided a private residence on Oct. 27 and seized floppy discs on which roommates Oh Kwon and Ki Young Sung had purportedly copied the commission’s Microsoft Corp. Wordstar software. Authorities also confiscated some Wordstar documentation and charged Kwon and Sung with grand theft, conspiracy and possession of stolen property.

Kwon, 23, and Sung, 24, apparently wanted the packages for their own private use and planned to bootleg them on the black market, according to Rick Bliin, deputy chief of the state lottery’s security division.

— Jeffrey Bliin
Mac's Excel: A class act

Microsoft Corp. has finally started shipping Excel, its much anticipated integrated software product for Apple Computer, Inc.'s Macintosh, and the program conceivably could create a new standard for integrated performance in the business world.

Microsoft has quite a lot at stake with Excel, as the program treads upon Lotus Development Corp.'s turf, both in Microsoft's MS-DOS environment — Microsoft has indicated that Excel will be available for MS-DOS machines sometime in 1986 and in the Mac environment. While Excel has not affected sales of Lotus' 1-2-3 or Symphony at present, public anticipation of the product seems to have cooled sales of Jazz, Lotus' integrated product for the Mac.

Priced at $395, Excel contains three major modules — spreadsheet, graphics and data base — as well as a complete macro facility for automating repetitive tasks.

An Excel work sheet has 256 columns and 16,384 rows — over 4.1 million cells. While a Mac with 612K bytes of random-access memory (RAM) could not use an entire work sheet, it is more than enough memory for most high-powered business uses. Macintoshes enhanced with third-party boards with up to 2MB bytes of RAM can approach unlimited memory availability.

Microsoft has structured Excel with a feature called dynamic recalculating, which departs from previous spreadsheet programs. Excel also features an eight-bit state, which is called a formula bar and provides a place to type in a formula without needing to be in any mode.

High-contrast screen debuts

By Eric Bender

BEAVERTON, Ore. — The first electro-luminescent flat-panel display optimized for portable computers running Microsoft Corp.'s MS-DOS has debuted from Planar Systems.

In the coming year, three major computer vendors will introduce portable systems incorporating the display, said Planar Marketing Vice-President Steven Hix.

Planar's new ELB515B screen offers many features previously offered only in high-resolution CRT terminals in a package that weighs 16 pounds or less and is about half an inch thick, Hix said. Unlike the case with LCDs, the electroluminescent screen offers high contrast and a wide viewing range.

By Jim Johnson

Inside Alpha Software enhances its Electric Desk integrated package

Hewlett-Packard shows an eight-pen plotter for personal computers

NEW THIS WEEK

■ NCR introduces an IBM-compatible personal computer

■ Internsal announces an online customer service and support management system

■ For more on these and other new products, see pp. 111-149.

INSTANT ANALYSIS

“The Lotus/Intel/Microsoft Expand Memory Specification is a permanent, architectural extension to the Personal Computer, and with multitasking, it will be serviceable and more important.”

By Jim Johnson

Intel

Mac's Excel: A class act

A self-described "information junkie,” Chris Christiansen began experimenting with microcomputers in 1979. After studying biology and science communication, he ended up at the Yankee Group in spring 1985, just as the personal computer wave began rolling through corporate America. "I got on board at the right time,” he commented. "I'm not big on planning; I've always gotten to do a lot of amazing things by being flexible."

Christiansen, 33, last month left his role as the consulting firm's personal computer guru for other opportunities. Computerworld Senior Editor Eric Bender interviewed him during his final days at his Boston office.

Interview

How do you walk through the flood of micro products?

I keep changing the way I look at hardware and software. I hate product demos because I don't trust them, first of all. Second, they never show me what I want to see, and third, I usually fall asleep at some point. I get really antsy if I can't touch the keyboard after 10 or 15 minutes.

One trick I learned from Aaron Goldberg at [International Data Corp.] You simply ask the software vendors to start the program. You can take that even further by asking them to install it on your system. Not only do you get the package to keep, but oftentimes, the installation procedures are so arcane that they will pretty much disqualify the program right then and there.

I used to look at the documentation before I ever load the program. How do I get information out of other files, out of spreadsheets, files, out of a data base file or a text file? I don't want to rekey anything. I want to see CHRISTIANSEN on page 26

A critical eye for micros

Chris Christiansen's ideas on the state of the mart

TREASURY

Cash management, analysis typical uses

By Charles Babcock

NEW YORK — Accountants, controllers, financial staffs and treasury offices are the most intensive corporate users of microcomputers, according to a survey of treasurers and MIS managers at 325 large corporations.

Released last week, the survey was conducted by Bank Earnings International, an Atlanta consulting firm for banks and financial service organizations. It was sponsored by Manufacturers Hanover Trust Co. of New York, one of the top four banks selling microcomputer treasury workstations to corporations, according to the survey.

The survey showed that virtually all treasury offices and 90% of controllers across a broad range of companies from manufacturing to financial services use microcomputers, said Janice Sprague, vice-president for treasury consulting at Manufacturers Hanover.

Treasury staff members use micros for cash management, evaluation of the cost of borrowing, pension fund portfolio management, capital structure analysis and other functions. The controller's department, including accounting, uses micros for financial analysis of accounts receivable, payroll, profit planning and financial forecasts, Sprague said.

The typical corporate microcomputer is an IBM Personal Computer or Personal Computer XT, with some of the largest firms turning to the Personal Computer AT as a standard. Of the 65% of the companies that standardized on a particular brand, 88% of them chose IBM. The AT is especially popular at companies with more than $8 billion in sales, the survey said.

Almost all the companies have formal acquisition controls over micros, and 70% rely on the MIS department or other central group to enforce standards, the survey said.

Somewhat surprisingly, the survey also concluded that the vast majority of companies do not use microcomputers outside of the financial area. It claimed that only 8% of the respondents use micros in administrative functions such as the law department or personnel; 4% use them in production and 2% in marketing. Sprague acknowledged that the survey did not ask about research and development, an emerging bastion of microcomputing.

Once the microcomputers are in place, corporate users often turn to the information center for support. Of the companies contacted, 36% have information centers, with the bulk of them concentrated in companies with the highest revenues.

Eighty-eight percent of the information centers provide internal consulting, 90% provide hardware acquisition/support and training. But less than half provide software development and maintenance, the survey said. See OFFICES on page 29
ADR micro tool provides Roscoe access

Applied Data Research, Inc. (ADR) of Princeton, N.J., has announced ADR PC/PTE, personal computer software that gives application programmers access to Roscoe, ADR's mainframe programming system for OS/MVS environments.

PC/PTE, running under IBM's PC/DOS, can also access the master files, system sequential and partitioned files of the Librarian, ADR's source program management system, according to a company spokesman. Personal computer facilities are available for data manipulation, code editing and file transfer.

From the personal computer, data can be moved to the mainframe and stored in Roscoe's Active Work Space, Roscoe's library, the Librarian system sequential and partitioned files of the Librarian, according to a company spokesman. Personal computer facilities are available for data manipulation, code editing and file transfer.

Using a transparent data transfer facility, PC/PTE automatically converts EBCDIC data to ASCII format for use by a local interactive editor. Binary data transfer for backup purposes also is supported. Once downloaded, the program can be manipulated with personal computer editing facilities. All mainframe security and controls established through Roscoe are automatically enforced within the PC/PTE environment. All source management facilities of the Librarian also are supported. Security cannot be overridden at the personal computer level.

PC/PTE directly supports IBM PC/DOS environmental commands and executes external PC/DOS commands. PC/PTE runs on the IBM Personal Computer, Personal Computer AT and XT and 3270 Personal Computer. PC/PTE carries a one-time site license charge of $9,500 plus a charge of $195 per copy.

ALPHA SOFTWARE UPGRades automated desk

Lifts copy protection; gives PC-DOS access

Alpha Software Corp. of Burlington, Mass., has enhanced its Electric Desk package and eliminated the product's copy protection scheme. With copy protection removed, users are able to make as many copies of the integrated package as they need and to store the entire program on a hard disk drive.

Electric Desk, which runs on the IBM Personal Computer line, supplies spreadsheet, data base management, communications and word processing functions.

Electric Desk sells for $545, and current users can upgrade to the new version for $50.

The latest version features an IBM PC/DOS access service that enables users to perform operating system functions without exiting from Electric Desk.

For example, users can format directories, back up files, check disk directories or run one other program.

The product's data base service has been enhanced with a global search and replace capability, a global search and delete facility and expanded index commands for multilevel sorting.

The spreadsheet supports 2,048 rows by 255 cols., compared with 255 rows by 255 cols. in the first release. With a Sort command, a user can sort by three columns in ascending or descending order.

Other changes include the ability to save a portion or an entire work sheet and store data in IBM's Data Interchange Format.

An export command enables a user to create ASCII word processing files from an Electric Desk data file. Two keystrokes are needed to delete and copy words, lines, sentences and paragraphs.

Visible page breaks, an embedded command to change line spacing and a Hide command to suppress displays of noncontext characters have also been added.
Innovative Software unveils spelling check program

Innovative Software, Inc. of Over-land Park, Kan., has introduced a spelling check program that reportedly checks 80,000 words and works with the vendor's The Smart Word Processor module.

The $139 Smart Spellchecker features single-keystroke access to its dictionary from The Smart Word Processor module. The 30,000 most commonly misspelled words are stored in memory together with The Smart Word Processor for greater checking speed, according to the vendor.

Users may instruct the program to check single lines or paragraphs as well as entire documents. The software also is said to locate incorrect usages of prefixes, suffixes, capital letters, punctuation and abbreviation.

The Smart Spellchecker runs on the IBM Personal Computer and requires 64K bytes of memory. The word processing and spelling check programs together require 330K bytes of memory. The software is based on Merriam-Webster, Inc.'s Ninth New Collegiate Dictionary, and users can create up to five custom dictionaries.

AT&T offers digitized graphics transmission package for 6300

AT&T Information Systems recently unveiled a $695 software program for its Personal Computer 6300 and compatibles that reportedly allows transmission of digitized graphics for teleconferencing at speeds up to 9.6K bit/sec.

AT&T Truevision Still-Frame Teleconferencing Software (STS) works with AT&T's Truevision Image Capture Board and with the Truevision Video Display Adapter or Video Display Adapter with digital enhancement.

The software allows simultaneous display at remote locations of functions performed locally, including cursor pointing and text, graphics or number annotation.

With the Image Capture Board, STS can capture an image from a video source at one location and transmit it to another.

STS offers three methods of picture transmission, according to Morristown, N.J.-based AT&T. The methods offer three choices of parameters affecting the quality of the transmitted image, and the program can be switched between the three while a teleconference is in progress, the vendor said.

IBM unwraps micro printer

IBM last month introduced the Wheelprinter E, a $699 printer that uses a cartridge print wheel to produce letter-quality text on correspondence and multipart forms.

Designed for use with IBM Personal Computers and compatible systems, the Wheelprinter E prints at up to 16 char./sec. It has a 13.2-in. writing line and prints forms with up to three parts.

Features include manual insertion of paper 3 to 15 in. wide; drop-in ribbon cartridge; cartridge print wheels; automatic sensing and setting of the printer to the pitch of the cartridge print wheel in the machine; and emphasized and double-strike printing modes.

High-contrast screen debuts

From page 23

ages, Hix said. "It gives a true 2:1 pixel aspect ratio, so you can get circles," rather than the ellipses typically shown on LCD screens, he pointed out.

Planar's display draws 12W to 14W, which is considerably more than most LCDs and creates potential limitations on the use of a portable, but Hix predicted that development will drop power consumption down to 5W by mid-1986. The current OEM price also is high, at $775 each in quantities of 1,000, but he forecast that this should drop below $300 in the next two years.

The solid-state device, which can withstand shocks of 100 Gs and operate in temperatures from zero degrees Celsius to 55 degrees Celsius, should be suitably rugged for portable applications, Hix said. The display has worked in tests for more than 25,000 hours without failure.

A Tektronix, Inc. spin-off founded in 1983, Planar claims to be the only electroluminescent display manufacturer in the U.S. Its major competitor is Japan-based Sharp Electronics Corp., Hix said. Planar has built an automated, in-line assembly system for electroluminescent displays.

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Christiansen's eye for micros

From page 23
to be able to find that procedure fairly easily in the documentation right off.

After getting the program loaded, being able to load data into it is the second most important thing. Then I will go play with it, usually following menus out to the outermost branch. I'm a bad typist, which blows away 20% or 30% of the programs anyway.

How do you evaluate hardware?
You look at the specs, and you get them to send you the machine.
You take apart the machine, and you look at it. You just look at how it looks inside, to see if the parts are loose, if the case fits back onto the machine nicely. Then there's the old standard kick test.

Then you plug it in and hook it up. Running the software is most important. You run your [Lotus Development Corp.] 1-2-3, your [Lotus] Symphony. It is really interesting to take [Headlands Press, Inc.] PC-Talk and run that on a lot of machines. PC-Talk wouldn't run right on machines that have aberrations like a different clock speed. PC-Talk wouldn't run on the [Wang Laboratories, Inc.] Professional or the [ITT Information Systems] Xtra.

Why don't the manufacturers recognize these problems?
Sometimes I wonder about what the vendors do with these boxes before they send them out to the real world. It doesn't seem like they try to get some capability with them that doesn't have a real loyalty to the company.

Some of the stuff that comes out just doesn't work; they claim it is compatible when it's not. It just strikes me that a fairly high level of stupidity is involved somewhere along the line.

It's interesting that people don't blame the product [when it doesn't work]. New users often blame themselves rather than the hardware or software. They think they must be doing something wrong or they think that they are stupid: "I just can't handle this." But a lot of times the problem is just that the documentation and the instructions for assembly are really bad.

On the hardware side, some vendors such as AT&T and Wang are now offering ways to upgrade their microcomputers to an Intel Corp. 80286-based system. How important is that?

Everyone would like that as an insurance policy, but I doubt you will see large numbers of those systems go out.

Sometimes it's desirable but not necessarily wise to upgrade a machine. When you upgrade a machine you still have the old mechanical components, and that is what fails on a machine — the keyboards or the disk drives. Your total commitment is getting very close to the price of an [IBM Personal Computer AT], and you are going to have service problems along the line.

You can only drip so much coffee and spill so many doughnut crumbs on a keyboard before it starts to stick. The disk drives are going to get cranky. The screen eventually will burn in. You may not get your investment out of the machine before you start to replace those mechanical components.

It's like Volkswagen Bugs. People used to keep swapping engines out of them but then eventually things would get bad mechanically, the clutch would go, the transmission would go, the body would rust out, the electrical system would start malfunctioning. Eventually you just say, "Enough." The bad thing with Bugs, and I think this will happen with personal computers, is that people get some kind of emotional attachment to their machines.

The [Internal Revenue Service] allows you to depreciate office equipment on a minimum of three years. Most companies appear to be depreciating somewhere between four and five years. I figure the lifespan of a keyboard, depending on usage, is about 2 1/2 years. The same goes for disk drives.

Are those maintenance issues moving large corporations toward next-generation machines?

They are very concerned about maintenance and service problems. But right now none of them really wants to go out on a limb and commit to large numbers of ATs, especially if there is a relatively high cost involved.

What they want, and what a lot of them are looking at, is the next version of 1-2-3 that supports the [Intel] 8087 and supports the Expanded Memory Specification. That allows their users to run their models faster. With memory costs coming down at a horrendous pace, they can upgrade their systems and address probably 90% of their users' needs. We are only talking about 20% to 30% of the users in any one corporation here.

By moving them up to hard disks, or swapping out their IBM or [Compaq Computer Corp.] machines, they have a way of upgrading their installed base machines.

Micro managers, like everyone else, want to protect themselves. They don't want to go out and commit to large numbers of ATs and find out that IBM introduces a cheaper version next year or that there are more hidden problems with the AT hard disks. Or that after they had just signed off on a whole lot of ATs with 20M-byte disks, the new 30M-byte drive comes out for $200 more, and it is manufactured internally by IBM. Who in his right mind is going to buy the 20M-byte version?
What else do they want to know?

Is anything going to supplant Lotus 1-2-3?

On one hand, 1-2-3 is heavily entrenched. On the other hand, micro managers are getting tired of having Lotus repeatedly promise them network solutions and site licenses and then offer very tentative changes in their current licensing policy. Lotus has been saying for over a year now that they would finally come out with a networking policy.

Micro managers are concerned with what operating system is going to be part of their life. People still doubt that IBM will continue to maintain a completely open operating system at the personal computer level.

One of the major concerns is what to do about all this nonsense about departmental-level processing. Managers are really concerned about the amount of information that is being processed and stored at the workstation level. They want to centralize that information because they want to ensure that there is some degree of compatibility, so that Joe can share his data base information with Barb. Connectivity, moving that information around, using and controlling that information all are very important.

A lot of companies have simply run pilot tests for networks, [telling vendors that] "all you have to do to qualify for a pilot at our company is come in and show us the transfer of a [IBM] PC-DOS file from one machine to another across your network." The vendors bring in their equipment, and large numbers fail this simple test.

People are selling systems that are incomplete. They are not even capable of installing them.

And users often never find out what's available on existing equipment.

This is something that is very surprising about technology in general. People often leave or they discard the technology before they have even come close to fully exploring the capabilities. This Wang system [at Yankee Group] has a glossary function, which is essentially like macros. You can build whole applications inside it or run batch files.

I can set it up so that it will report a whole document exactly the way I want it, by writing this big glossary. It's a matter of simply documenting your keystrokes and also having enough imagination to string the whole thing together with a little bit of intelligence to organize it properly. The point is that most of the people in the Yankee Group don't realize that that function is available; they don't realize that this has other neat little tricks.

And all this has been reinvented for personal computer word processing? Yes, I think this has been here since 1978.

We're starting to see more and more claims of natural language interfaces for micros, from people such as Javelin Software Corp. Do any of those offerings seem genuinely useful?

The problem with a natural language is that you only use it for a very short period of time.

The thing with Javelin that surprised me is that I had seen all that stuff before. Javelin just added a really nice interface onto a decision support system. IBM's Personal Decision Series has a product which is called Plan which is allegedly their spreadsheet. It's quite similar to Javelin without the fancy graphics.

How has the industry changed in the past three years?

The worst thing about the way the whole [personal computer] area has changed is that everyone wears suits.

Another thing is that the engineers and the techies get hidden away in the back rooms. They rarely get out of their little offices, but those are the guys to talk to. Watching a marketing type in his three-piece Brooks Brothers suit do a canned demo is just disgusting.

The weird thing is that oftentimes people that sign off on major purchases don't use this stuff. They have never used it and will never use it so a canned demo done by a slick marketing type is fine.

To see Ben Rosen use [Ansa Software's] Paradox and talk about it and really get excited did wonders for me. I have always been a big fan of his, because he is one of the few people I know who has become extremely rich and powerful in this industry without getting a corresponding increase in his ego. He is always entertaining. (Rosen, a well-known venture capitalist, is chairman of Ansa Software.)

OK, so how did you like Paradox? Paradox isn't radically revolutionary. You could see how nicely it matched the 1-2-3 interface. It just struck me as a nicely tailored package that was half a step better than the market.

Congratulations.

You're qualified to operate the Hewlett-Packard 1/4" Tape Backup System.
Mac's Excel:
A class act

From page 23

sheets. Older programs, when recalculating cell values, would scan the entire work sheet and recalculate every cell. This process is time consuming, especially when working with a large spreadsheet.

With dynamic recalculation, when a formula is entered into a cell and calculated, only that cell and any other linked cells are recalculated, a process that is nearly instantaneous.

A work sheet can be used either for spreadsheet or data base purposes, with large files. A spreadsheet that comprises 1,000 cells, each consisting of a complex formula based on the cell above it, can recalculate in under a minute. Sorting a 1,000-record data base is also that fast.

Formulas are entered into a formula bar at the top of the screen. References to other cells can be entered by typing the cell reference in the formula bar or by clicking the mouse on that cell.

In addition, Excel has over 150 built-in mathematical, statistical, financial and other functions, with the added ability of being able to store a large number of user-defined functions for retrieval at any time.

Labeling cells with a name

Excel allows a cell or group of cells to be labeled with a name, which makes it easy to create formulas. For example, cell A15 might contain profit information; labeling that cell "profits" will cause every instance of that name in a formula to use that cell's contents, which is easier than searching for the appropriate row and column reference.

Excel also features the ability to split a work sheet's window, allowing the user to view and work with two different portions of a work sheet simultaneously. Different windows of the same spreadsheet can also be opened and resized, enabling a user to view more than one section of a work sheet and alternate between them.

Additionally, formulas can be linked easily to data in other work sheets, an extremely powerful tool for financial analysis. Excel also offers extensive table and array functions, which make it easy to create what-if analyses and multiple-cell calculations.

In a tip of the hat to Lotus, Microsoft included the ability to import 1-2-3's WKS-standard files into Excel, as well as the ability to save Excel files in 1-2-3's form. (Jazz lacks the latter feature.) In addition, Data Interchange Format, SYLK and normal text files can be imported and exported from Excel without having to run a conversion utility on any data files.

The chart feature in Excel is both powerful and easy to use. One need only define the group of cells to be charted and a new chart document. The chart will be drawn using that user's preferred chart format.

Charts can be easily redrawn in any format — line, bar, column, pie, area, stacked or combination — and can be added to and manipulated in any number of ways. Pie charts offer exploded wedges in many forms, with the user choosing the wedge to explode. Patterns can be changed at will. Borders, legends, titles, other text and axes can be added, subtracted or manipulated.

Additionally, charts can be frozen or set up to be updated as a work sheet is updated, and the ability to have multiple charts on the screen at one time is another plus. Users can also create overlay charts containing information from different spreadsheets.

Excel's data base function is better than is found in most integrated packages and good enough for most medium-size applications, but any large-scale data base should be used with a dedicated program.

Data is entered in the row and column format — no special forms can be created — and manipulated in a manner similar to the spreadsheet.

Sorting, selecting and reporting are handled well, and a large number of specialized functions are available for further data manipulation. There are no specialized features such as type checking, complex report or forms generation and data entry aids that are found in data base programs like Provue Development Corp.'s Overvue or Ashton-Tate's Dbase III.

Many people have faulted Jazz for the lack of a macro facility, and Lotus officials said that their research found that users were not looking for macros.

Microsoft obviously took its cue from different research. Excel offers a complex, complete and simple macro feature.

Macros are created in real time, using a special macro sheet to record formulas, the creation and opening of documents (including charts, data bases and spreadsheets), the formatting of cells and almost any operation that can be performed manually.

To create a macro, first a macro sheet is opened and named. The user then opens up either a new work sheet or an existing one, turns on the macro recorder function and performs the tasks to be associated with the macro.

When the macro has been completed, the recorder is turned off and the macro saved with an appropriate command-key sequence. Macros can also be input directly into a macro sheet and can be edited or changed at any time.

Macros can be interactive — pausing for input from the user — and can even create special dialogue boxes for input, warning messages or...
micro to mainframe

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Good staff hard to find, keep

by Bob Wallace

General Motors Corp.'s Factory of the Future program, an ambitious project launched three years ago, will reach fruition when the automaker's Saginaw, Mich., Steering Gear Plant begins initial operations in January. The 60,000-sq-ft plant will showcase a totally integrated engineering and manufacturing system for the design and production of front-wheel-drive axles. The Saginaw plant's basic manufacturing system will consist of 24 manufacturing cells. Specific manufacturing functions are performed in each cell. Some of the cells will be used to produce parts of the steering gear assembly. These pieces, along with others purchased outside the plant, will be assembled into completed front-wheel-drive axles in an assembly system that consists of 12 assembly stations.

The backbone network used to interconnect the manufacturing cells is a broadband, coaxial cable local-area network that conforms to the IEEE 802.4 standard. See GM on page 37

MAP changes spark product updates

by Paul Korzeniowski

DETROIT — Vendors of factory automation products are busy updating their products to conform with architectural specifications of the Manufacturing Automation Protocol (MAP), a factory automation standard promulgated by General Motors Corp.

One difference network vendors are moving to accommodate in Release 2.1 of MAP is the introduction of carrier-band networks. Carrier-band nets are a recent development in the evolution of MAP. Much of MAP's early standardization efforts have centered around the idea of using a single factorywide broadband network, actually an IEEE 802.4-compatible token passing bus. MAP Release 2.1 calls for use of a 10M bit/sec. IEEE 802.4-compatible network as a factorywide backbone net supplemented by carrier-band tributary subnetworks used to transfer data among small work groups called cells.

The carrier-band networks also contain an integrated set of 4th generation software tools that conforms to the IBM SQL database language. The Cullinet, ADR and FOCS offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

Why not just go with DB2 or SQL/DS? A relational DBMS simplifies but does not by itself eliminate the burden is often too much for any one individual. More and better trained people are necessary to run the communication systems of a Fortune 500 company in a cost-effective way. How does the communications manager or director find and retain the potential talent for the job? Some experience-tested methods are listed below.

Experience shows that individuals are either self-motivated or not and that much will be different in companies that can be done to change that. Behavior modification may work in an environment where employees stay with a firm for a long time but may not in an industry where the average employment cycle is two years.

Because of this, communications managers should spend their time searching for people who are already self-motivated and have a focused view of where they want to work. See GOOD on page 38

FCC clarifies $25 surcharge ruling

WASHINGTON, D.C. — The Federal Communications Commission decided recently that local-exchange telephone companies must repay customers the $25 monthly line surcharge on private lines terminating in telephone switches that cannot reroute this traffic into a local exchange.

Private branch exchange systems that conform to the IEEE 802.4 standard will connect auxiliary carriers. To recover the surcharge, customers charged that local telephone companies had collected unreasonable amounts from them to recover lost access-charge revenue when the FCC had established PBX systems blocking private lines from connecting to local lines from the switch. Yes, it's MySQL, 8080, 8081, 8082, all running on the same machine.

Bryan Willis

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's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run identically on ORACLE. ORACLE was specifically designed for IBM mainframes and DEC superminis, 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.

Why not Corollary, FOCUS or Focus? There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as the unique standard database language. The Cullinet, FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs only on IBM mainframes? Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE are identical.

FOCUS, Cullinet and FOCUS offer a different subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

Oracle 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 PCs. Data and programs can then be shared among users of different machines, eliminating redundant data, and the load on servers.

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For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

Inside

Fibertrak has accumulated enough customers to justify the construction of a nationwide fiber-optic network, but it is unclear if its founding companies will go ahead with the build. See MAP on page 37

NEW THIS WEEK

□ A hand-held terminal and communication system bowes from Motorola and Pathway Design

□ Contel Networks and Systems expands its Mind Pricer on-line circuit pricing system

□ For more on these and other new products, see pp. 111-149.

INSTANT ANALYSIS

"The design documentation for a 747 weighs as much as the plane itself." — Laura Conigliaro of Prudential Bache, at Autolact "86
Firm's search for a network leads to distributed data switch

By Bill Bindewald
Special to CW

Intel Corp. learned some interesting lessons when it set out to procure a network for its engineering group in Santa Clara, Calif. Chief among these lessons was the following: Define your network requirements and then find a solution — instead of trying to fit your requirements to a given network. Bill Bindewald, Intel senior engineer, data automation group supervisor, relates the experience.

Being in charge of a networking project can be an overwhelming task unless critical parameters are quickly defined. Our assignment was to come up with a cost-effective network that could provide access to multiple computers and link other shared resources to users in three buildings.

Although the engineering group had two Digital Equipment Corp. VAX computers in two different buildings, CPU-to-CPU communications was not a major design objective since it was already provided through DEC's Decnet. Users wanted access to computers and shared peripherals such as laser printers.

One of the first options assessed was a statistical multiplexer network. At approximately $400 per port, the cost would have been well within budget, but connection costs — as well as a lack of flexibility for additions and changes — would have substantially added to the total.

An Ethernet solution, on the other hand, presented a degree of complexity and cost that extended beyond our needs and resources.

**Distance limitations**

Our search eventually led us to a data-switched network. An investigation of available products showed that, although a data switch was a viable alternative, the distance limitations of most equipment cable rendered them impractical. Terminal cables, for example, would have to run all the way back to a centralized switch.

This led to the decision to go with a new distributed data switch approach pioneered by Metapath, Inc. of Foster City, Calif.

The system that was eventually implemented at Intel's facility consisted of four networks bridged together with a Statistical multiplexer network over a distance of one mile, and by bridging networks, we were able to extend our reach only as far as the nearest distributed data switch.

We connected approximately 70 devices to the networks, including a mix of terminals, personal computers, printers and the two VAX-11/780 systems. Data is transmitted at 2M bit/sec., and, due to the non-blocking architecture of the switch each port can be simultaneously active at maximum transmission rates.

Once the network was up and running we implemented a network management system. This system runs on a personal computer under Microsoft Corp.'s MS-DOS and is used to configure ports in the network, a task which was previously performed manually at each station. The software also acts as a network monitor, yielding usage statistics and defining security access.

We were able to perform a substantial part of the installation work as users grew. The relative ease of installation enables us to implement changes as users are added or site requirements change.

**No data degradation**

User acceptance and satisfaction have been high due to the ease of operation and fast response, with virtually no data degradation. Since each data switch is controlled by the microprocessor, bus operation is not affected by the failure of any individual switch, and failed connections can be rerouted to a predesignated alternate device.

Earlier this year, the engineering group moved to Intel's new facility in Folsom, Calif. Armed with the experience gained in implementing the Santa Clara networks, new networks were installed within a period of about eight weeks. It may be argued that in spite of all the technical achievements achieved in this application, a data-switched network is not a network in the conventional sense of the word. However, being constrained by convention in an area that is still evolving ignores the real objective: solving operational requirements.

Users connected to our data-switched networks in Folsom now have access to any one of three computers, share expensive laser printers and modems and communicate with each other. In essence, this level of functionality is all that is required.
We've been rocked by everything from a computer industry slump to foreign competition and some mistakes of our own.

But we're shaking ourselves up, rattling the right cages and getting ourselves on a roll.

We're acting on some tough decisions. Painful decisions. But decisions that had to be made as part of our plan to be a leaner, tougher, more profitable Control Data.

It means narrowing our product scope and limiting our markets to those we serve best.

It means selling some profitable businesses that no longer fit our long-term strategy. And consolidating some operations while shutting down others, to improve efficiency. In fact, we have recently completed major divestitures with more currently underway.

All tough decisions because they affect dedicated people and their jobs. All decisions, nonetheless, that are necessary to becoming more market focused, quicker to respond to our customers' needs, superior in quality and therefore, more profitable.

All tough decisions that we have made and will continue to make.

We've been rocked lately, true.

But let no one doubt our resolve.
By John Dix

After repeated delays, Fibertrak, located in Reston, Va., has reportedly accumulated enough orders to justify the construction of a nationwide fiber-optic network. The decision to build is now before the two railroad companies that founded the joint venture in 1984.

Fibertrak was formed by Norfolk Southern Corp. and Santa Fe Southern Pacific Corp. to plan the construction of a national fiber-optic network along the track beds of affiliated railroads. Unlike most of the other planned fiber-optic nets [CW, Oct. 26], Fibertrak intends to lease its capacity strictly to other carriers, making it a so-called carrier's carrier.

To ensure that the plan was viable, Fibertrak set out to "obtain a backlog of orders that would give us sufficient encouragement to build a system," according to company President Gus Grant. The critical mass of that back order — $6 billion worth of 10-year carrier contracts — was recently achieved.

The planned network will extend 7,500 miles and be within reach of roughly 80% of the population, Grant said. Each route will have 11 active single-mode fibers and 11 spares. The all-digital system will operate at 565M bit/sec. and be segmented into 45M bit/sec. increments, each providing capacity for 672 voice circuits.

Construction of Fibertrak was originally slated to begin in January 1986, with nearly 3,000 miles completed by this month. The entire network was scheduled to be completed in roughly 36 months, or by the end of 1987.

Fibertrak competitors lease only dark fiber; they do not own the electronics required, Grant says Fibertrak will have a sophisticated control system for network management and monitoring. Grant also claimed Fibertrak will have the only network shielded against electromagnetic pulse, a safeguard that would ensure continued transmission even in the most hazardous operating conditions.

Fibertrak's main carrier attraction may be, however, its low price. Grant claimed his company has the lowest costs in the industry and hence, the lowest rates. These rates are based on actual proposed construction contracts, Grant said.

While Fibertrak has no intention of leasing capacity to end users, they will be the ultimate beneficiaries of carriers that use fiber optics. Many carriers that lease facilities from the so-called carrier's carriers turn around and make that capacity available to users. Grant would not divulge which carriers have agreed to lease Fibertrak capacity.

Tymstar satellite service launched

By Paul Korzeniowski

SAN JOSE, Calif. — Tymnet/McDonnell Douglas Network Systems Co. plans to supplement its packet-switched network services with a satellite service that will use small-dish antennas.

The company has scheduled a spring 1986 announcement for Tymstar, making Tymnet the newest player in the small-dish antenna satellite transmission game, an emerging market that includes competitors such as M/A Comm, Inc. and Equatorial Communications Co.

Tymstar will differ from these established carriers because it will supply protocol conversion capabilities that the other systems lack, according to Hal Kroeger, national representative at Tymnet. The initial announcement should support asynchronous, IBM Binary Synchronous Communications, IBM System Network Architecture and Sperry Corp.'s UTS 4000 host protocols. Terminal protocols will include all of the above plus IBM RJE protocol.

"The current satellite vendors have concentrated on transmission," Kroeger noted. "Since we come from a networking background, we will focus on networking issues."

The service will consist of a master hub facility and small earth stations constructed by a McDonnell Douglas subsidiary. The company will use GTE Satellite Corp.'s G Star satellite.

Skystar will be offered in conjunction with or as a replacement of Tymnet packet services. "Tymnet tends to support lower transmission speeds such as 19.2K bit/sec.," Kroeger stated. "Tymstar will work with transmission at speeds up to [1.54M bit/sec.]."
In the world of IBM and Sperry mainframes, only one family of data communications products can bring all your local and remote asynchronous ASCII peripherals into the fold: Avatar.

The reason? No other company has devoted as much time and engineering expertise to the refinement of protocol conversion technology, micro-to-mainframe links and the integration of communication resources for people who have to use them.

The result? The most complete, most functional, most useable line of data communications products in the IBM and Sperry mainframe environments:

Protocol converters that allow ASCII terminals, personal computers, and printers to attach to the IBM 3270 network. Products like the popular PA1500 that allow virtually any ASCII printer to emulate the IBM 3287. And the RPA2000 that allows IBM 3270 terminals to be used in local area or public data networks. Micro-to-mainframe link products like Avatar's TURBO and MacMainFrame that allow personal computers tied to IBM mainframes to share files with the host and capture selected data. Network controllers such as the powerful MPA6000 which form the hub for integrating the resources of IBM, Sperry, and ASCII devices. And even the connector products you need to tie everything together.

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Ungermann-Bass unveils repeater for Ethernet-compatible nets

Tool permits various transmission media to be interconnected.

Ungermann-Bass, Inc. rounded out its line of internetwork products recently with the introduction of a network repeater for Ethernet-compatible local networks that use various higher level protocols and different types of transmission media.

The Santa Clara, Calif., company's Buffered Repeater can be used to interconnect up to 16 independent 2,800-meter Ethernet network segments to construct an end-to-end network reaching 37 miles.

The repeater can extend the geographical reach of Ethernet-compatible networks supporting any of the following higher level protocols: Digital Equipment Corp.'s Decnet; the Department of Defense's TCP/IP; Xerox Corp.'s Xerox Network Systems protocol; and comparable layers of the International Standard Organization's seven-layer network architecture model.

Media can differ

While the type of higher level protocols supported cannot vary from one net segment to the next, the media used in each segment can differ. The Buffered Repeater enables baseband, thin coaxial cable, optical-fiber and broadband systems to be interconnected.

To minimize packet collisions which increase as Ethernet-type networks are extended and more devices are added — the Buffered Repeater filters out invalid or fragmented packets between net segments. This limits the need to retransmit packets and helps network performance, the company reported.

The Buffered Repeater is available in two versions: the baseband-to-baseband version is $3,000; the baseband-to-broadband version, including internal module, is $3,800. Both units are available now.

Ungermann-Bass has also announced a Network Transceiver that is streamligned and 30% less expensive than previous transceivers.

Spartacus tool out for MVS

LOWELL, Mass. — Spartacus Computers, Inc. has announced a version of its Knet software and K300 Ethernet Control Unit for IBM MVS-based hosts, enabling these CPUs to communicate over Ethernet with other types of machines that support the Department of Defense's TCP/IP.

TCP/IP was developed for the DOD and documented as a standard for federal communications networks in 1980. It specifies how connections between devices are established and provides for the accurate delivery of data between devices.

Knet MVS extends the 4-year-old company's Knet and K-Link product lines, which include similar offerings for the IBM VM operating system.

Like Knet VM, Knet MVS is a software applications package that supports the TCP/IP protocol and works in conjunction with the K300 Ethernet Control Unit, a device that attaches to a block multiplexed channel of an IBM host and provides a connection to Ethernet.

"We've chosen to implement the TCP/IP protocol because it is offered by over 60 vendors, including [Am- dahl Computer, Inc.], Digital Equipment Corp., [Sun Microsystems, Inc.], Masscomp, NCR Corp. and a host of others," said company President James Atkins.

While adherence to TCP/IP takes care of lower level communications incompatibilities between these types of processors, end users must use TCP/IP applications to make use of the protocol. Such applications include the TCP/IP file transfer protocol, trivial file transfer protocol, telnet virtual terminal protocol and simple mail transfer protocol.

Scheduled for first-quarter 1986 availability, Knet/K300 prices for MVS systems start at $40,500.

Spartacus also announced the K310 T1/Ethernet System, a device that enables an IBM mainframe to link to a remote Ethernet network via a T1 1.544 Mbit/sec. digital communications facility.

The K310 is slated for availability in the first quarter of 1986 for use with both the Knet MVS and Knet VM systems, supporting TCP/IP and similar protocols from Xerox Corp.

— John Dix

It takes more than a PC to make a 3270 network work.

Telex understands the individual needs of managing information. That's why we've introduced the Intelligent System Series.™

The new Telex 1260/1280 Intelligent Workstations have been developed especially for 3270 users. Powerful, highly configurable workstations that adapt to your organization's personal needs. From high-end microcomputer performance to on-line host interaction, the Intelligent System Series is designed for flexibility, engineered for power.

The Telex 1260 is the low cost choice for users seeking IBM XT compatibility and AT performance. Telex's 1280 runs up to 30% faster than the AT and supports both AT hardware and software. Together the 1260/1280 offer a wide selection of memory, storage, peripheral and expansion options to provide for today's needs as well as tomorrow's growth. And they both support a choice of 3278 or AT style keyboards.

Telex is "the" single source for 3270 intelligence, performance and flexibility. From terminals and workstations to software and peripherals, Telex provides complete customer support. And we back every product with over 2000 Telex dedicated service and support people worldwide.

For more information, contact our Marketing Communications Department, 6422 East 41st Street, Tulsa, OK 74135. 1-800-331-2623 (In Oklahoma toll-free 918-628-3113).

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GM gears up Saginaw plant

From page 31

for 5M bit/sec. token bus networks.

Bob Mowers, program manager with the Factory of the Future project and a member of GM's advanced engineering staff, said the factory net systems consist of four levels.

- Device controller level. The device controller comprises the lowest level of control in the plant's hierarchical networking scheme. A device controller is attached to each piece of equipment involved in the manufacturing process, whether it is a machine tool, robot, guided vehicle or simple gauge. Each vendor provides its own device controllers.

- Factory controller level. These devices control manufacturing devices within a cell. One cell controller, for example, may command a series of welding robots. A cell controller is a combination of a programmable controller and a processing unit. Maxitron Corp. of Corte Madera, Calif., provides the cell controllers for the Saginaw plant. The base Maxitron cell controller features four microprocessors; one Intel Corp. 8156, one Intel 8085A and a pair of proprietary processing units.

- Factory control system level. This system acts as the heart of the plant network as it oversees the operation of each of the 24 manufacturing cells, the plant's automated guided vehicle system, the storage and retrieval system and the assembly system. It assigns work to all of the manufacturing cells and assembly stations. The system also keeps track of parts inventory levels at all phases of the operation.

- Divisional systems level. This highest level of control is connected to the factory control system. Each division within the factory is responsible for downloading all individual device programs. "Whenever the factory is changed over from the production of one part to another, [the factory control system] is responsible for downloading the device programs to the individual cells," Mowers explained.

According to Mowers, the factory control system consists of processing equipment provided by Stratus Computer, Inc., located in Marlboro, Mass. Spokeswoman Anne Phanemo said that Stratus supplied two XA600 processors and an FT300, a smaller applications development processing unit, to the Saginaw facility. This level of plant control is connected to several divisional networks that deal with materials management, accounting, ordering and sales.

Mowers said the factory control system will serve as the repository of all individual device programs. "Whenever the factory is changed over from the production of one part to another, [the factory control system] is responsible for downloading the device programs to the individual cells." The processors' other duties include generating financial data and information on production level and quality performance.

Wallace is a staff writer for On Communications, a sister publication of Computerworld.

MAP changes; products update

From page 31

form to the IEEE 802.4 standard but operate at 5M bit/sec. instead of 10M bit/sec. Unlike the backbone facility, carrier-band nets use only one frequency channel on the broadband cable, which is accessed using token passing.

Because use of carrier-band nets is restricted to a small site, often containing similar types of devices, the network's Enhanced Performance Architecture bypasses data from layers three, four, five and six of MAP's seven-layered network architecture. This speeds response time and provides for the real-time operating environment required by robot cells.

Concord Data Systems, Inc. of Waltham, Mass., introduced carrier-band products at last week's AutoShow in Detroit. The company featured a 5M bit/sec. modem, a token scope network analyzer and a bridge for use between carrier-band and broadband networks.

Concord Data said the market for carrier-band network connections, although relatively new, will eventually supply the company with a higher percentage of revenue than broadband nets. In a Concord Data scenario, a plant may have 10-20 areas with broadband networks. Each area may have as many as 15 cells, each with 20 devices for a total of up to 6,000 carrier-band connections.

The firm also unveiled broadband products, including a 10M bit/sec. Mapserver. The Mapserver complies with MAP 2.1 standards for the first four layers of the seven-layer MAP model. The host attaches to Mapserver by an RS-422 or RS-449 interface at speeds up to 230K bit/sec.
Good staff hard to find, keep

From page 31

to install a virtue that may not be transplantable.

With technology moving at such a fast pace and with a business climate that requires constant realignment, the communications manager needs a dynamic, self-motivated and creative staff. Look for these qualities when interviewing.

It is very expensive for an organization to have high turnover and to restaff. If search agencies are used, the fee can be as high as 30% of the base salary. A single Sunday paper advertisement may cost $25,000. Hundreds of hours are invested in the screening and interview process, all of which take away time from real business. Ultimately, several dozen people may be interviewed before the right individual is found.

Another cost to consider is that of transferring responsibilities. Departing employees are not likely to work too hard for the last few weeks, and it may take new employees several weeks before they are trained and ready to take over, resulting in lost time. Add to this the resources drained when other employees are used to coach new comers.

High turnover also takes its toll in long-term projects that suffer in quality due to the lack of continuity. Often, needed documentation is lost or, even if handed over, not used efficiently by the new recipient because of lack of familiarity.

It is for these and other reasons that it is very important to create the right, stable conditions required to retain good people while avoiding unproductive inefficiencies at the same time.

Good people sometimes leave an organization because their raises were a few percentage points less than expected, equaling perhaps $500 to $1,000 a year. One such departure required rehiring someone at an estimated expense of $60,000, including agencies' fees, manager time to interview 20 candidates, cost of securing new military clearance plus two months of departure/training costs. It would take a 60-year career to make up the cost difference between the two alternatives.

If 10 people per year left an organization — at the costs outlined — the organizations incurs a half a million dollars a year in expenditure.

A fairly well developed theory of "situational leadership" is available to the manager contemplating a methodological approach to human resource management. Situational leadership envisions a management-style matrix that takes into account the maturity level of individuals.

An entry-level professional may be initially motivated by monetary rewards. A middle-level professional may be fairly insensitive to nominal monetary differences but may value the potential exposure to executive management.

Situational leadership foresees four phases. Phase 1 for low maturity data communications professionals involves a lot of "telling" — high task and low relationship with the leader. Phase 2 for moderately mature professionals is a "selling" phase, with high task and high relationship with the leader. Phase 3, "participating," consists of low task and high relationship with the leader. Finally, for highly mature individuals there is a "delegating" phase, with low relationship with the leader and low task.

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IBM 8100 draws praise, fire

By Donna Raimondi

Despite rumors of replacement, users' reactions still strong

IBM's 8100 distributed processing system, released by Big Blue in 1978, has elicited varied reactions from its owners. Today, amid speculation by customers and industry observers that the 8100 is doomed to be supplanted by the IBM System/36 or otherwise dropped, the owners' emotions remain strong.

For example, Wright Line in Worcester, Mass., installed a stand-alone 8100 system in 1981 with the intention of having it do approximately 90% of the company's word processing, said Jim Young, director of information management systems. While Young claimed that the 8100 performs well and accomplishes the tasks set out for it, he is not happy with some aspects of 8100 ownership. At the time the 8100 came on board, Wright Line's data processing center consisted of two IBM mainframes: a 4381 for its production workload and the V 441 for backup and development work. "At the time, we saw an important need to plan the linkage of word processing and data processing into a joint network," Young said.

IBM did not offer easy networking capabilities for the 8100 at purchase time, but stated that those capabilities would be available in the near future, Young said. That still has not happened. The machine can be networked but not without a lot of inconvenience and expense that make it payback unlikely, he said.

See IBM on page 43

NEW THIS WEEK

- Burroughs begins shipping its V series
- Flexible Computer adds two rack-mountable computers to its Flex/32 line

INSTANT ANALYSIS

"I don't think we are anywhere close, but we do have to stay on top of these technologies."

By Dona Davis, Delotite, Hinkins & Sells, on the state of AI in corporate DP

See ALTSOS on page 42

Running interference: Shield your data from electronic pollution

By Mike Caruso

Key talk: Alan Paller

Limited to secret government or military operations, it is up to the manager of a company's DP operations to make sure that a facility is protected against electromagnetic interference. The best remedy is to shield the entire DP operation from electronic pollution. The question is, How can this be done properly?

This is not something one can leave up to an architect or the facility people. They do not necessarily know everything about designing something as specialized as radio frequency shielding for a DP operations room.

Since performance of the operation is very much at stake, the manager should get involved in the design of the room. In particular, the DP manager should at least take part in the process of specifying protection levels and access control. DP operations need shielding but not for the reason it was invented, which was to protect classified government operations. Today, the main reason for shielding a commercial DP operation is benign electromagnetic interference.

With the proliferation of electronic equipment, one never knows what new electronic apparatus — new emitters — will wind up across the hall from the DP operations or, for that matter, on the other side of the wall.

Moreover, the operating frequencies of much of today's electronic equipment in the microwave range can easily pass through standard, non-metallic building materials. Consequently, it is possible to retrofit radio frequency shielding into an existing building. One warning, though — it is not always possible to ensure a four- to five-month inconvenience.

See SHIELD on page 42
**FINALLY, HELP FOR THE DATA CRAZED**

Introducing Cypress*, Cedar**, and Juniper***
Three fast, friendly, infinitely applicable desktop ideas from ROLM.

It comes as no surprise that people react to technology differently. Dyed-in-the-chip techies thrive on it. True non-believers avoid it instinctively. Now you can please all of the people all of the time. Honest.

Say goodbye to complicated log-on codes. Just push a button and—woohoo!—travel all the way to a data base, talk to a mini or access your IBM mainframe.

Say hello to speakerphones, phone books, message takers and calculators. Built right in.

If you want to take snapshots of data in your mainframe, there’s Cypress.

It’s as easy as Point & Shoot. It’s a smart little ASCII terminal integrated with a fully-featured digital phone.

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*Introducing Cypress, Cedar, and Juniper.*

**By Donna Raimondi**

DETOUR — Burroughs Corp. has started volume shipments of its V 340 and V 380 medium-scale mainframe systems that will run under the company’s MCPIX operating system.

The V series is being shipped despite problems that Burroughs is having delivering MCPIX Version 1 — problems that at least one beta test site user reported were corrected by an interim solution.

The systems, announced in March, are the first entries in Burroughs’ V series, which will replace the company’s B2050, B3000 and B4000 mainframes with an extended system architecture and increased memory capacity. Along with the systems, the company is shipping a feature called Quik Disk that allows users to designate a portion of the main memory as disk storage.

The Quik Disk program is an interim solution to the problems Burroughs is having delivering MCPIX 1, an operating system ready, said beta test site user Peggy Price of Mt. Sinai Medical Center in Miami Beach. The feature is provided free, and it allows often-used files to be stored in memory for faster access. Price said she expected the operating system to be ready in first-quarter 1986, but a Burroughs spokesman said the earliest delivery date for the software will be June 1986.

Quik Disk allowed a batch program of more than 700,000 I/Os to run in two hours on Mt. Sinai’s V 380, as opposed to the eight hours it took to run on the B4900, Price said. The medical center installed the B4900 with 5M bytes of main memory last August and has upgraded to a 20M-byte V 380. Without the Quik Disk, users would not be able to tap the full 20M bytes of main memory.

The purchase price for a V 340 with 10M bytes of main memory is $390,400, and the V 380 with the same memory costs $702,600. Examples of upgrade prices are $85,000 to go from a B4925 to a V 340 or from a B4955 to a V 380 and $395,000 to jump from a B4925 to a V 380.

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**Pixel adds two supermicros to product line**

Pixel Systems, Inc. of Woburn, Mass., has announced two additions to its line of supermicrocomputers, one at the high end and one at the low end of the product line.

The P80/20 is said to be a general-purpose, multiuser, multitasking system based on a 12.5-MHz Motorola, Inc. 68020 microprocessor.

The system, available with up to 16M bytes of memory, includes Pixel’s implementation of AT&T Unix System V and includes virtual memory hardware that will be supported when Pixel releases Unix System V Release 2, Version 2.

The P80/20 has a starting list price of $23,500.

The Pixel System 4 is a four-user supermicro using an 8-MHz Motorola 68000 microprocessor and featuring 500K bytes of random-access memory, 40M bytes of hard-disk storage, eight serial ports, one parallel port, a floppy disk drive, two terminals and Unix System V, according to the vendor.

It costs $5,975.

**Prices slashed as DEC phases out VT100 VDT**

In keeping with its intention to drop the venerable VT100 VDT from its product line, Digital Equipment Corp., Maynard, Mass., has slashed prices by up to 64%, effective immediately.

The VT100 terminal price has been chopped from $1,945 to $890, the company said. Both the VT102 and the VT101 displays now cost $495, down from $1,595 and $1,695, respectively. The VT1XX-AB advance video option lists for $85, reduced from $180.

DEC will continue to support users of the VT100 line of products.

Since the VT200 family was introduced in 1983, market demand has shifted from the VT100 line to the more advanced VT200 terminal family, said Marty Towner, terminals business unit marketing manager.

The older display, introduced in 1978, spawned dozens of imitators from competing manufacturers [CW, Oct. 7].
Flexible Computer adds two low-end units to Flex/32 line

By Donna Raimondi

DALLAS — Two rack-mountable low-end computers have joined Flexible Computer Corp.'s Flex/32 line of systems, the vendor said. The new computers are packaged in 19-in. rack-mountable card cages for embedding into desk-high consoles and systems. The low-end 600 and 1200 series are said to allow systems integrators to develop parallel systems for applications that require embedded or desk-high cabinetry where processing power, memory and I/O bandwidth can be added as needed.

Software for the systems includes AT&T's Unix System V; a concurrency simulator to test parallel applications; Flexible's MMOS operating system; high-level concurrent languages such as Flexible's Concurrent C and Concurrent Fortran and Ada. The Series 600 can contain as many as four 32-bit superminicomputers. Each of those computers comes with its own operating systems, 16- or 32-bit Motorola, Inc. VMEbus I/O channels and from 1M to 24.5M bytes of memory.

After installation, the Series 600, which has a maximum capacity of four computers, can be upgraded to a Series 1200, which has a maximum capacity of eight 32-bit superminicomputers, each with as much as 56.5M bytes of memory. Each series can be upgraded to any larger Flex/32 series, and multiple series can be linked together. Flex/32 multicomputers can be integrated into larger systems through networks such as Ethernet or General Motors Corp. Manufacturing Automation Protocol.

The Flex/32 system is said to be able to execute parts of large programs simultaneously in parallel; or separate processors can execute programs independently, the company said. Memory on each computer is local but shared as needed. All memory can be accessed by all computers.

Prices for the Series 600 range from $46,000 for a two-computer, 2M-byte main memory configuration to $100,000 for a 4M-byte, four-computer system. For the Series 1200, the range is from $56,000 for a 2M-byte, two-computer system to $190,000 for an 8M-byte, eight-computer system.

Flexible Computer, started in October 1983, recently released its annual figures that showed $1.1 million in revenue during third-quarter 1985. There are currently seven installations of the company's Flex/32 multicomputers, according to spokes-

Rise Technology, publishing system makes its debut

NEW YORK — Rise Technology, Inc. introduced a $75,000 electronic publishing system for producing in-house technical documentation at the Corporate Electronic Publishing show last month.

The ETP-1 combines image handling, text processing and plain paper printing, the Cambridge, Mass., company said. The unit includes a Motorola, Inc. 68010-based workstation, a monitor, a scanner and a video camera for capturing images, a laser printer and a laser printer.

The ETP-1 is said to capture, manipulate and print photographic images as well as line art. The images are then merged with text in standard or user-developed formats.

IBM mini gets CDC disk system

MINNEAPOLIS — Control Data Corp. has announced its first 5%-in. fixed-disk memory system for IBM's Series/1 minicomputer.

The Certainty 220 disk system is based on the same technology as CDC's Wren 5%-in. Winchester disk drive. Data is reportedly stored on nine data surfaces on five platters with a 35-msec average access time.

The product was designed to allow two disk drives or a disk drive and a tape backup to be housed in a half-rack space in the Series/1 cabinet.

Prices for the disk drive with a 30-day warranty, controller, installation, cable and operating manual range from $6,500 to $8,285, depending on the quantity ordered. A table-top enclosure costs $290. The monthly maintenance charge is less than 5%, according to the company.

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Shield your data from pollution

From page 39

nence, because that is about how long a radio frequency shielding retrofit takes.

@ Shield against all radiation. There are actually two types of energy that DP operations must be protected against: radiated and conductive. But many DP managers do not realize this. Radiated energy exists in the familiar radio frequency emissions that travel through the air. But, there is also conductive energy, which travels through power transmission lines.

@ Filter transmission lines. Radio frequency filters should be specified for all incoming and outgoing power lines to guard against conductive energy. It is a safe bet to use electrical filters listed by Underwriters Laboratories, Inc. on all power lines. Also, it should be remembered that filters are needed for all new power lines added to DP after the start-up of operations.

Also, it is better to use fiber-optic isolators for data transmission in and out of the room. Because they are nonconductive, fiber-optic lines are intrinsically immune to electronic interference. With the right convertors, fiber-optic isolators are compatible with most communications and signaling systems.

@ Specify the db attenuation level according to proximity of DP operations to outside interference. The average attenuation level of a radio-frequency-shielded room is 100 db. This means that the shielding reduces a field of IV to 1 microvolt. However, one does not necessarily have to specify 100-db attenuation for DP operations. Both lower and higher performance rooms are available.

If DP operations are on the fifth floor of a facility and different companies occupy the surrounding floors, then 100 db should be specified. One company cannot control its neighbors, but it can protect DP operations against them. If operations are in a company-owned building and the nearest possible emitter is at least 50 feet away, a DP manager probably can get by with 60-db attenuation. This may save money.

@ Give careful consideration to doors, heating ventilation ducts, air conditioning ducts and other access areas. These areas represent the biggest potential breach in a radio-frequency-shielded room. Therefore, they must be handled very carefully. Depending on the traffic within a DP operations room, there are two types of doors to consider: vestibule and automatic.

A vestibule door arrangement is actually a minichamber, usually 6 ft by 4 ft, with two doors. Vestibule doors allow traffic to pass in and out of the room with both doors never being open at the same time. Therefore the shield is never broken. Automatic doors are similar to the sensitive pad-type supermarket doors that swing automatically to accommodate traffic. Consequently, the shield is broken momentarily. The cost between vestibule and automatic doors is negligible. If DP operations require 100% around-the-clock protection, then a manager ought to

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Altos systems software debut

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local-area networks, but the new models offer the faster 80286 chip for better performance in the middle price range, according to Altos. The company will continue to manufacture and sell its other mid-range products, which use the 80186 and 8086 microprocessors.

The desktop Altos 886 operates at 7.5 MHz and is available in four configurations, varying with the size of the hard disk and the addition of a streaming tape backup system. Its basic configuration comes with 1M byte of random-access memory (RAM), nine RS-232 ports, a 25M-byte hard disk drive and single floppy drive, for $7,990.

The Altos 1086 is a floor-standing supermicro that runs at 8 MHz. The basic system comes with one RAM board, one serial port, file processor, 1.25M-byte floppy disk drive, 50M-byte hard disk drive and 60M-byte streaming tape backup, for $14,990. An 80M-byte hard disk drive and second serial port are optional.

Also available this month are some applications packages to run under the Altos Office Manager (AOM), an enhanced version of the Altos Office Executive multiuser integrated software and the AOM Tool Kit for resellers to integrate their own vertical market software into the system.

Modules available and supported by Altos include the following:

@ Altos Unify and Informix, for programming with IBM SQL. Informix costs $1,295 for the 80286-based hardware and $995 for the 8086- and 80186-based systems. Unify Development Module costs $1,495 for the 80286-based products and $1,295 for the 8086- and 80186-based systems. Unify Run Time Module costs $500.

@ Altos 20/20, now available for 80286-based systems, costs $1,295 with bit-mapped graphics and $695 without. It will be bundled with the Office Manager on the 68020-based Altos 3068 system.

@ Altos Accounting Manager, an RM-Cobol-based package, is available at $3,985 for the 1086 and $3,095 for the 8086.

@ Altos Accountant, in Business Basic II, a BI-286 version with more modules, costs $490. There is also an 868 version for $3,490.
IBM 8100 draws users' praise, fire

From page 30

Wright Line's system was installed with a private operating system to do dedicated word processing, Young said. As long as the company stays with that function, the system is reliable and does exactly what it is supposed to do. If the company wants to install new functions, like electronic mail or document transfer capabilities, the problems begin.

IBM does not know the operating system, Young said. "If we have software problems on the 8100, we literally cannot get the help that we expect," Young said, adding that the same goes for the hardware.

Young had hoped to be able to put documents prepared on the 8100 into IBM's Professional Office System (PROFS) for electronic mailing and to move documents prepared in PROFS down to the 8100 for professional printing or retyping, he said. "To do that, we would have to use an additional product, IBM's Distributed Office Support System, and that is the kind of hokker I am talking about. . . . There is a big cost that we hadn't anticipated," he said.

When a need arose to put one of the 8100's terminals in a building across the street from an 8100 computer, Young wanted to use the existing leased phone lines that serve the mainframe computer system and its remote terminals. That could not be done, he said. "It gets back to IBM's strategy again. The lines we use are.

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You can train you and your people to get you up to speed, then keep you up-to-date with ongoing dealer seminars.

We can help you put together industry-specific packages, untested software, but it is primitive compared with the 8100, he said.

But, even with the 8100, he said, the insurance computer system was in batch mode unattended overnight. The unit in the U.S. headquarters of Wright Line in Boston, however, the 8100 has been a good system, said Cornelius McCarthy, applications manager. "IBM's Distributed Processing has six 8100 nodes throughout the country, he said, running under the IBM DPPX operating system.

The unit in the U.S. headquarters of Wright Line in Boston is connected to the company's IBM 3080 series mainframe through DPPX, McCarthy said. The 8100 is used interactively during the day; and the data is run through the IBM 3080 series mainframe in batch mode unattended overnight.

The system is used 24 hours a day with few problems, McCarthy said. On the run occasion when there is a glitch, IBM can get in touch with Wright Line and knowledgeable about fixing it, he said.

About 20 IBM 8775 terminals are connected to the 8100 on IBM's hard-wired connection scheme for the 8100. The insurance company uses the system to perform data entry functions for its commercial line of insurance, he said.

IBM still supports and sells lots of 8100s, said Bill Ackerman of DPX, Inc., who writes a newsletter on the system. Typical customers are large corporations with IBM mainframes and remote locations around the country or world that require distributed processing with strong centralized control, he said. It is most popular with insurance companies, he said.

Rumors abound that IBM is trying to replace the 8100 with the System/36, but customers and consultants who know the machine well said that move is not practical. According to DPX's Ackerman, the System/36 could be used in place of the 8100 for office automation or word processing functions, but the System/36 is far more than an OA system; it is a powerful distributed processor. The System/36 supports distributed network software, but it is primitive compared with the 8100, he said.

The 8100 offers downstream support for a large number of devices. For example, it supports personal computers better than the System/36 does, Ackerman said. IBM could attempt to hammer all of the tools of the 8100 onto the System/36, but it would be a major effort, Ackerman said.

Shield your data from pollution

From page 42

specify vestibule doors. Bear in mind, however, that about 24 sq ft of additional space is needed to accommodate vestibule doors.

■ Make sure the room maintains its attenuation level. Radio frequency shielding can degrade over a period of time and should be checked periodically. It is best to get the shielding supplier to perform tests on your room.

■ Upgrade shielding.

■ Go with a professional. The faithful local contractor may be all right for installing wall board and heating, ventilating and air-conditioning duct work in a DP operations room, but shielding construction is a specialty job. That is why it is best to go with a knowledgeable contractor, someone who is fully experienced in designing and installing it. Due to the fact that radio frequency shielding design is so specialized, it is a good idea to check out some of the contractor's previous customers. And, if a major capital expenditure is required, one should visit the vendors and learn firsthand about their capabilities and experience.
TACTIC #4: VALUE.

In the world of IBM/VM, real value is determined by the combination of price and performance. Today, the data systems manager's never-ending quest for VM software value has a new Grail of Sorts: PLSORT.

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Strategy for the future

From page 39

requests are automatically processed on a separate IBM computer that has the necessary hardware and software to place the charts in the correct format. Similarly, secretaries at General Motors Corp. type words and tables on their Wang Laboratories, Inc. word processors. Once they get approvals on the accuracy of the words and numbers, they transfer them to a Prime Computer, Inc. system, which has the hardware and software to convert the words and numbers into high-resolution slides for use in presentations.

These examples can help teach why cooperative processing will be so important in the future. Both the Amoco users and the GM users became accustomed to their workstations and to the computers that served those workstations. Both wanted to use capabilities that were not resident on those computers. But they faced different choices.

Amoco could have added the graphics hardware and software it needed to its large IBM computers, but this process would have cost the company nearly $200,000. In the GM's case, the high-quality graphics tools it needed were less expensive but would not work on its Wang computers.

So in the Amoco case, cooperative processing saved hundreds of thousands of dollars, while, in the GM case, cooperative processing made it possible to do a job without making it necessary to give up the Wang word processors.

Users want graphics

Today there are more than three million personal computers in industry and government on which users would like but cannot get the high-quality, high-volume computer graphics that mainframe graphics users are getting. Isn't it amazing just how many people go around asking for trouble? Why, we're willing to bet there are people in your DP department this very minute flirting with disaster.

They're running the risk of a misplaced $D override, an invalid concatenation, or some other equally obscure JCL error bringing the whole kit and caboodle to a screeching halt.

When all they have to do to keep things running smoothly is use our JCLCHECK program. JCLCHECK software catches all JCL errors and provides complete, on-line JCL validation and concise error diagnostics. Plus complete documentation on a job stream or entire production system suitable for insertion in the run book. And it can operate under TSO, TONE, ROSCOE or CMS. No more errors — no more troubles. It's that simple. And successful.

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To that we can only add, better use our JCLCHECK™ program.

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- 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.
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Relational sell really straight?

Users starved for productivity without exception the concepts of relational data base management systems and fourth-generation languages. As a result, vendors of products ranging from simple query languages to slightly modified hierarchical DBMS have revamped their marketing literature and their sales pitches so that the halls of the computer industry now echo with the battle cry of relational and fourth-generation, even fifth-generation, products. High-tech barkers bandy about phrases like "table-based" and "replacement for Cobol."

But users are wary, frustrated and confused. Press accounts and firsthand experience make it clear that fourth-generation languages have not been the panacea they were claimed to be. Cobol is not dead; it does not even appear to have contracted a fatal disease. Many of the DP shops that reportedly have come to rely on fourth-generation languages admit they still code all or portions of their heavy-duty production applications in Cobol — even assemblers for performance.

In a recent two-part Computerworld article, E. F. Codd, originator of the relational model for data base management, flatly stated, "No existing DBMS product can honestly claim to be fully relational at this time. The proposed [American National Standards Institute] standard does not fully comply with the relational model, so a DBMS' fidelity to the ANSI standard is no guarantee of relational capability." (CW, Oct. 14 and Oct. 21.)

Codd applied a dozen rules of relationality to two of the most widely installed DBMS. Although some observers claim Codd has modified his definition of a relational system, the DBMS failed to meet fully even one of those rules in his critique. But, almost without exception, the major DBMS vendors have told users say, companies need an information systems generator, and that is how they characterize their product.

"Further talk of application generators is a dead end," Hoskins said during a recent stopover at John F. Kennedy International Airport. Hoskins and Spencer were in the U.S. visiting Burroughs' headquarters in Detroit and consulting with the Ford Motor Co. and other Line II users. Though the pair has sold the rights to Line II to Burroughs, they remain active in its development and promotion.

Despite its originators' efforts, Line II has made relatively few inroads into DP shops in this country since being launched in 1982, and Spencer and Hoskins offered a critique that suggested U.S. DP managers are too conservative.

"Everyone is trying to increase the productivity of the data processing department, but data processing is the one part of the company that the chief executive can't control," Hoskins said.

In hopes of achieving a gain in productivity, companies typically buy more programming talent, processing power and

See RELATIONAL on page 54

Impact of computer-aided analysis on systems development life cycle

Computer-aided analysis shortens traditional systems development life cycle.

"Everyone is trying to increase the productivity of the data processing department, but data processing is the one part of the company that the chief executive can't control," — Peter Hoskins, developer of Logic and the Information Network Compiler

NEW THIS WEEK

Integrated Systems releases Version 2 of ALSP for VAX/ VMS

MDS Qantel upgrades QMRP software

For more on these and other new products, see pp. 111-149.

INSTANT ANALYSIS

"Everyone is trying to increase the productivity of the data processing department, but data processing is the one part of the company that the chief executive can't control." — Peter Hoskins, developer of Logic and the Information Network Compiler

BIM Spotlight

Wouldn't it be nice to have a couple more terminals on your desk?

You could eliminate the inconvenience, lost productivity, and system overhead associated with logging off and on to different applications.

BIMNETWORK permits multiple terminal sessions to be active concurrently at the same physical 2707 CRT, under DOS or OS V TMA. The user may switch back and forth instantly between the terminal sessions by hitting a PA or PF key. The terminal sessions may be in the same or in different V TMA-connected partitions/regions. For example, one session might be logged on to a CICS partition or to TSO to do program editing, and another session connected to a TEST CICS to load the application program being developed. Call for full documentation or free 30-day trial.

Price: GS $4000 or $200/mo., DOS $2400 or $120/mo.

BIM has 15 system software products for improving productivity and use of DOS/VSE, OS, and QIC and also performs systems programming consulting. Marketing agents in most countries.
If there's one thing that separates Apollo workstations from everyone else's, it's that they were designed to let people work together. As teams. Able to share all the information and resources needed to design new products, get them into manufacturing and deliver them to market.

This tradition of concentrating on group productivity as well as individual productivity has helped us sell more technical workstations than any other company. A record we plan to keep. By extending our commitment to sharing to other computer systems.

Today, every Apollo DOMAINE system, whether comprised of two workstations or 200, works with IBM PCs and mainframes through SNA networks. They work with Digital's VAX® minicomputers over ETHERNET®. And they run not one, but both UNIX® operating environments.
With Apollo, your technical people can all have their own dedicated workstations. Packed with the power of Motorola’s new 68020 microprocessor. And capable of high resolution three-dimensional graphics.

Connected through a high-speed local area network, they can transparently share the information and resources they need across multiple Apollo systems, as well as IBM and Digital systems.

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For more information on our compatible family of workstations and over 400 technical application packages, call (617) 256-6600 x4419. Or write Apollo, 330 Billerica Rd., Chelmsford, MA 01824, MS 30.
Uccel Corp. of Dallas announced that its Perfect Link Manager micro-mainframe link package can now be used to update mainframe data maintained in IBM CICS or VSAM file structures from a microcomputer. Version 2 of Perfect Link also features improved data security features at both the file and record levels as well as compatibility with terminal emulator boards from Forte Data Systems, Inc. and ITT Courier Terminal Systems, Inc., a Uccel spokesman reported.

Perfect Link Manager can be bought as a stand-alone product. The link product can also be packaged with Uccel’s financial services and general accounting software, the vendor reported.

Perfect Link runs on IBM PC-DOS, MS-DOS or Microsoft Corp. MS-DOS microcomputer operating systems and on IBM MVS and DOS/VSE mainframe operating systems, according to Uccel. Perfect Link Version 2 prices range from $20,000 to $30,000, depending on the environment, a spokesman said.

Applied Data Research, Inc. (ADR) of Princeton, N.J., has announced support for IBM’s VS Cobol II compiler with Release 9.9 of ADR/Metacobol Cobol precompiler. The Metacobol basic processor now recognizes the IBM VS Cobol II dialect, which implements the 1985 ANSI Cobol standard and structured programming language elements.

Release 9.9 provides conversion aids to the VS Cobol II dialect from either the 1968 or 1974 ANSI standard. In addition, the release provides a structured programming formatter. The formatter reformats VS Cobol II programs according to the structured programming syntax available in VS Cobol II, the vendor said.

The Metacobol conversion aids identify program code that is incompatible with the new compiler. In most cases, the Metacobol aids automatically convert the incompatibility code. If a specific function cannot be duplicated because there is no VS Cobol II equivalent, an appropriate message is generated.

Release 9.9 of Metacobol, available for IBM 370, 4300 and 3030, 3080 and 3090 series mainframes and compatible devices at $9,700 for DOS and $12,200 for OS environments.

Prime Computer, Inc. of Natick, Mass., has announced Management Decision Link (MDL), a menu-driven package that extracts data from computer-aided design drawings produced with Prime Medusa design drafting software. MDL pulls data from Prime Medusa two- and three-dimensional drawings and transfers it to various Prime data base management packages or third-party application software, the vendor said. Prime packages that support the product include Information data management software, Information Connection decision support software, MRPII manufacturing data management systems and Primenet.

MDL reportedly allows users to extract data for use in such areas as cost accounting and master product scheduling.

The product requires Prime Medusa Version 2.01 and Primos Version 19.4. MDL runs on all Prime products supported by Prime Medusa. It is priced from $5,000 to $8,000.
Control Data fortifies its computer-aided design offerings

Cybernet service, products unveiled

By John Gallant

MINNEAPOLIS — Control Data Corp. recently unveiled a new service and several products aimed at bolstering its electronic computer-aided design capabilities.

The company's Cybernet Services division introduced Cyberport, a service that, for a fixed monthly price of $15,000, gives a remote user Cyber 205 supercomputer applications processing capabilities and 10 million characters of on-line storage.

According to John Willey II, general manager of CDC's electronic CAD Program Office, Cyberport offers users roughly the equivalent processing capability of a dedicated Digital Equipment Corp. VAX-11/780 24 hours a day at a fixed monthly cost, which can be lowered through agreements for multiple months or ports.

"Most DP managers cannot afford to rely on conventional remote computing services due to the pricing structure based on usage," Willey said. "Now, applications like [electronic CAD] are more affordable because of the fixed cost."

The Cyberport service, which can be accessed through a minicomputer workstation with dial-up capabilities or a host computer through high-speed, dedicated leased lines, offers network access points in 200 U.S. cities.

Communications charges are not included in the Cyberport offer, which expires at year's end.

CDC also announced three logic design programs for microcomputers and its Cyber 205 supercomputer.

Verilog is a behavioral-level simulator that allows an engineer to combine high-level block descriptions with resistor-transistor logic, functional, gate- and switch-level circuit representations. Verilog runs on the IBM Personal Computer and costs $15,000.

Oceanview was described as a postprocessor for logic simulators that enables design engineers to compare different signals simultaneously. It graphically displays the waveforms of simulated signals and allows the designer to view key areas of the signals.

Oceanview also runs on the IBM Personal Computer and costs $1,000.

Running on the Cyber 205, Aidssim is a logic and concurrent fault simulator. It can simulate random sequential logic networks, and it provides incremental fault simulation and the capability for setting and restoring checkpoints of network state. The package costs $80,000 for a corporate license.

MIDAS enhancements

CDC also unveiled enhancements to its Modular Integrated Design Automation System (MIDAS), its electronic CAD software for the Cyber series processors.

The enhancements improve simulation efficiency and facilitate changes to gate array layouts.

MIDAS Boolean Evaluation, an added high-speed functional simulator, handles complex system designs. The gate array routing program allows a designer to modify the appropriate logic interconnect statements when changing microtypes, placement or logic.

MIDAS costs between $105,000 and $750,000.
Federal judiciary branch turns to Unix for DP operations

By Mitch Betts

WASHINGTON, D.C. —

The entire third branch of the U.S. government, the federal judiciary, will soon be using AT&T's Unix System V as the standard operating system for administrative DP operations, a Federal Judicial Center official said recently.

Robert Borochoff, research computer scientist at the center, said the federal courts are joining the ranks of a growing number of government offices that are choosing Unix. Borochoff is a leading member of Unicorn, the federal government's Unix users group.

The federal government reportedly accounts for nearly 20% of the overall Unix market, with large users at the U.S. Department of Defense, the Internal Revenue Service (CW, April 15) and the U.S. Postal Service.

Government users tend to select Unix for its portability. Borochoff explained that the portability of Unix will enable the courts to become vendor independent so that hardware procurements can attract multiple competitors.

Other advantages of Unix, Borochoff said, include the following:

- The same user training can be supplied across all systems.
- The same applications software can be supplied to all systems.
- The applications programs can be developed prior to hardware selection.

Honeywell adds tool

Honeywell, Inc. of Minneapolis plans to add a mathematical programming application for its computer systems operating under its GCOS 8, CP-6 and Multics operating systems.

Sciconic, made by Scicon Ltd. of the UK, provides mathematical programming techniques for users in the petrochemical, manufacturing, metals, food processing, agricultural, distribution and transportation industries. It is intended for such applications as blending, resource allocation, production planning, facilities location and manpower planning.

Honeywell will also offer the Sciconic-MGG option for producing reports.

Both Sciconic and the MGG option operate on Honeywell's DPS 8, DPS 88 and DPS 90 systems. They are scheduled for availability in the first half of 1986. Sciconic costs $22,500, and the MGG option costs $9,000.

EQUIsimply don't need networking.

But for all the ones that do, you need Bridge.

We offer more protocol options. And we network more systems from more vendors than anybody.

In the lab. In the factory. In the office.

The TCP/IP Connection.

The Department of Defense, UNIX™

TCP/IP for quite some time now.

So Bridge has introduced an entire family of TCP/IP terminal servers and gateways to let you access any computer running TCP/IP on Ethernet.

Our CS/100 TCP/IP lets you connect up to fourteen RS-232/RS-422 devices to a TCP/IP-based Ethernet. Without disconnecting your budget.

Our GS/3-IP is the first high-performance gateway capable of linking up multiple TCP/IP-based remote Ethernets.
Have you ever noticed that there are just two kinds of data entities in the world? Imagine a 10,000-record vendor file to which, on average, 100 new vendor names are added each month and 100 inactive ones purged. The monthly volatility of the file, represented by the turnover rate divided by population, is 1%. Now consider a file of 1,000 purchase orders where 1,000 orders are added each month and the same number closed. Its volatility would be 100%.

If you get into trouble, a single keystroke gets you “Help.” Over a hundred commands will come to your rescue.

Volatility of data files key in determining long-range plans

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.

If you get into trouble, a single keystroke gets you “Help.” Over a hundred commands will come to your rescue.

Looking for a network that can connect all your equipment? Write Bridge Communications, 1345 Shorebird Way, Mountain View, CA 94043.

Or better yet, call us at 415-969-4400.

Your network is too important to let slide.

Sweet is corporate manager of data administration for the Charter Co., a Fortune 100 firm in Jacksonville, Fl.
Relational sell really straight? 

The fact is not to say Codd is the final word on what constitutes a relation-
al system. Reasonable men differ. It is only intended to show how confus-
ing the issues of relational vs. nonre-
lation al is becoming.

But more important, confusion and the fear of purchasing very ex-
pensive products that may not live up to their advance billing may ac-
count for why many users have chosen to stick with older software tech-
nologies.

Codd is a purist. He is weighing vendor claims against the harsh analysis of experts such as

CONCEPT/32s®

PowerNodes™ and

tems made. Gould

slice it they beat

MPX/32™ operating system offers perfor-
mance that's unmatched in the industry,

and describe clearly the basic archi-
tecture of their systems.

The devil you know

The rationale that "the devil you
know is better than the devil you
don't" may explain why many users
have only dabbled with fourth-gen-
eration languages and have refused to
run production systems under a
relational DBMS.

No is this intended as an attack

on the capabilities of the languages
or DBMS. As a rule, vendors strive to
provide the best products they can
develop.

And, in general, software vendors have probably made state-of-the-art
technology as commercially viable as possible.

So, this issue is an issue for marketing,
sales and advertising. Vendors serve
no one when they oversell or apply
improper or unclear terminology to
their products. Users become skepti-
cal and leery of investing in such
products. Vendors set themselves up
for user disappointment and, in ex-
treme cases, media attention that fo-
cuses on the failings of their prod-
ucts.

Straightforward explanation

Perhaps a larger community of us-
ers would embrace these two classes
of products if vendors would explain
how they function. Fourth-genera-
tion language vendors should tell us
exactly which applications, or por-
tions of applications, the prod-
ucts can be used to develop and
which applications should not be de-
veloped with them.

DBMS vendors should discuss how their products compare with some
model for relational systems, Codd's
or some other accepted standard,
and describe clearly the basic archi-
tecture of their systems.

Users are not demanding that ven-
dors suddenly supply all the latest
technology or completely revamp all
their existing products to new ways
of thinking. All they want is to know
in advance what they are buying and
to avoid disappointment in the fu-
ture.

Need for info systems seen

From page 47

application generators to pump out more pro-
grams. But turning out pro-
grams in the absence of an informa-
tion system may make the backlog
even worse, the two said.

"Information systems are the way
to go. It is the only technology that
releases you from the bloody trap of
applications," Spencer said.

By Spencer's definition, an infor-
mation system makes use of a central
data base management system, data
dictionary, fourth-generation lan-
guage and other tools oriented to-
ward an overall business mission.

An information system keeps
"information about the business
in a common data base, it contains
definitions of business activities that
encode why the business exists, and
it is able to generate profiles or views of
the data and functions that yield
the needed business information,
Spencer and Hoskins said.

"We've worked with organisations
where three different people give
you three different answers to the
question of what were the monthly
revenues. With an information sys-
tem, you can only get one answer," Spencer said.

U.S. data processing managers are
wedded to the piecemeal applications
approach, and the major vendors are
"pandering to them" by selling appli-
cations generators, in Hoskins' view.

"We've hung on programming and
producer's productivity. The true
user is the business, not DP," he said.

While Line II has been sold as an
application generator in the past,
Hoskins and Spencer said Burroughs
is maturing in its marketing, and the
product is now presented as an infor-
mation systems generator.

Even so, not everyone is able to
use it that way. At Liberty Travel,
Inc. in Paramus, N.J. — headquar-
ters for a 150-office chain — Stephen
J. Marenco, director of technical ser-
dices, said his staff is using Line II to
rewrite the 39 applications used by
the business so that they will run on
a Burroughs A9 Model F.

In many cases, the applications
are being substantially enhanced, but
the process is still one of "chipping
away a piece at a time" rather than
producing a unified information sys-
tem, Marenco said.
Language barriers

From page 1

"A fourth-generation language is a programmer's tool. If it's simple enough for end users, it won't have the power needed for the professionals."

- Philip Domn
Dorr Computer Consultants, Inc.

Two contrasting products illustrate the identity dilemma. Management Science America, Inc. (MSA) markets its Information/Expert (I/E) product as a fourth-generation language productivity tool. Merlyn said, "I/E is a reporting system. I believe some day MSA will provide the tools to allow it to grow into a fourth-generation language, but it's not there yet."

On the other hand, IBM does not call its SQL/DS a fourth-generation language though it conforms to the Martin report definition. An IBM spokesman said SQL/DS is "a fourth-generation language-based data base manager. But it doesn't cover the complete spectrum of a fourth-generation language." SQL/DS is missing statements equivalent to Cobol IF, THEN or ELSE, "which are critical for some applications," the spokesman said. SQL/DS is mentioned in fourth-generation surveys because of its strong data manipulation capabilities. As to whether IBM will someday market SQL/DS as a fourth-See LANGUAGE on page 61

<table>
<thead>
<tr>
<th>Selected fourth-generation languages for the IBM mainframe environment*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company Name</strong></td>
</tr>
<tr>
<td><strong>Product Name</strong></td>
</tr>
<tr>
<td><strong>Mainframe Software Environment</strong></td>
</tr>
<tr>
<td><strong>Data Base Management System File Structures</strong></td>
</tr>
<tr>
<td><strong>Can Transfer Control to Programs in Other Languages</strong></td>
</tr>
<tr>
<td><strong>Can Be Called by Programs in Other Languages</strong></td>
</tr>
<tr>
<td><strong>Generates Compiled or Interpretive Code</strong></td>
</tr>
<tr>
<td><strong>Micros Supported</strong></td>
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<tr>
<td><strong>Procedural or Nonprocedural Type of Language/Target User</strong></td>
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<tr>
<td><strong>Data Dictionary Active or Passive</strong></td>
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<tr>
<td><strong>Screen-Painting Facility</strong></td>
</tr>
<tr>
<td><strong>Graphics Capability</strong></td>
</tr>
<tr>
<td><strong>Data Query Language</strong></td>
</tr>
<tr>
<td><strong>Report Writer Facility</strong></td>
</tr>
<tr>
<td><strong>Price</strong></td>
</tr>
</tbody>
</table>

* The above list is intended to represent a sampling of the major fourth-generation languages available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available market data and were not intended to be comprehensive. The products are classified according to their primary market orientation. The classifications do not necessarily reflect the manufacturers' views. Each category is divided into two subcategories: one of stand-alone products that have their own DBMS and that are meant to solve a range of data analysis problems for a variety of users; and professional transaction processing applications building facilities, meant for use by professional programmers.

But Vaughn Merlyn of the Atlanta-based Merlyn Corp., said, "A fourth-generation language is whatever a vendor wants it to be." Merlyn divides the products into two categories: one of stand-alone products that have their own DBMS — such as Information Builders, Inc.'s Focus, Martin Marietta Data Systems' Ramis and D&B Computing Service Co.'s Nomad2 — and another of products sold by the DBMS vendors — such as Cullinet Software, Inc.'s ADB/On-Line, Software AG's Natural, ADR's Ideal and Cincom Systems, Inc.'s Mantis, Application Development System.

But can end-user-oriented languages really be called fourth-generation languages? Can a language that is easily used by nonprogrammers really be a useful tool for developing computer systems? "A fourth-generation language is a programmer's tool. If it's simple enough for end users, it won't have the power needed for the professionals," said Philip Dorn of the New York-based Dorn Computer Consultants, Inc.

Conversely, the "James Martin Report on High-Productivity Languages" states that a fourth-generation language must be appropriate for use by both end users and professionals. Report editor Peter Mimno told Computerworld, "The most important criterion is the ability to get data to a personal computer and operate on it with a variety of tools."

[Image of chart showing selected fourth-generation languages for the IBM mainframe environment]
Chemical firm mixes Cobol, Ramis II for programming solution

By John Desmond

The total solution has yet to arrive for Monsanto Co. of St. Louis, a user of Martin Marietta Data Systems’ Ramis II fourth-generation language and data base management system (DBMS).

Monsanto is mixing fourth-generation language code and Cobol code in its mainstream applications. The multibillion-dollar chemical firm, ranked 51st on the Fortune 500 list, no longer writes programs entirely in Cobol, preferring to call in Cobol contract programmers when there is a major Cobol coding job.

"The historic stuff is still Cobol," said Warren Fitzgerald, internal consultant on interactive computing and data management at Monsanto, regarding his firm's essential applications. "The standard applications such as general ledger will run forever. But central MIS is getting away from Cobol as much as possible."

Interactive applications at Monsanto are concentrated in a VM/CMS environment on IBM 3080-class mainframes. Most departmental systems are Digital Equipment Corp. VAX machines. Five years ago, Monsanto made a commitment to interactive computing. Four years ago, the company evaluated fourth-generation language products and chose Ramis II.

Monsanto has since trained 1,300 employees to use Ramis II. Users can have a personal data base and, usually, access to a departmental data base. Users access this data for whatever applications they are capable of coding.

"The data bases are not for big transaction applications. The department data bases exist to have information available to managers," Fitzgerald said.

For example, no longer do standard reports on how a department spends its money each month have to be printed in batch by central MIS and distributed. Via Ramis II applications, these and other reports are available on-line, Fitzgerald said.

"Why not use Ramis to develop production applications?" The applications already exist, and there is no reason to change them," Fitzgerald said. "Most are standard IMS [IBM DBMS] applications. Ramis does not support [applications requiring] concurrent updating well, while IMS does."

Monsanto has installed a read-only version of Ramis in its mainframe MVS environment so that users can extract data from production data bases. In future Ramis enhancements, Monsanto said it would like to see support for more than one index file to speed data base searches. Every Monsanto report is listed in a data base. With the current product, a user types in a key word, and a search of the entire data base is conducted.

If the product provided a directory to indexes, a complete search would not be required. "We create our own separate index files to facilitate searches. We have to do that as a separate step," Fitzgerald said. "It would be nice if the system could handle all this in the background."

Fitzgerald said Martin Marietta has indicated this feature will be provided in future releases.

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**Selected fourth-generation languages for the IBM mainframe environment**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>IBM Use-II Version 1.2</th>
<th>IBM Use-II Version 3</th>
<th>IBM SQL/DS</th>
<th>IBM VAX/86</th>
<th>Information Builders, Inc. Focus Version 5</th>
<th>Martin Marietta Data Systems Ramis II Release 85.2</th>
<th>Software AG Natural Version 1.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainframe Software Environment</td>
<td>MVS, TSO, DEC VMS 4</td>
<td>DOS/VSE, SS/S, MVS, VM, QCS, CMS</td>
<td>MVS, DOS/VSE, VM/CMS, VM, QCS, CMS</td>
<td>QS, VSE, MVS, DOS/VSE, VM, QCS, CMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can Transfer Control to Programs in Other Languages</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can Be Called by Programs in Other Languages</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generates Compiled Or Interpretable Code</td>
<td>Compiled</td>
<td>Report writing is interpretable; Data Maintenance Language can be compiled</td>
<td>Combination — System Building Executive dialog manager compiled; nonprocedural statements interpreted</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microsoft Supported</td>
<td>No</td>
<td>Host Data Base View link optional; new personal computer version</td>
<td>Unix for reporting only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedural or Nonprocedural Type of Language/Target User</td>
<td>Neither, code generated automatically from specifications for end users and professionals</td>
<td>Nonprocedural, for end users and professionals</td>
<td>Nonprocedural, for end users and professionals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Dictionary Accessible or Passive</td>
<td>Passive</td>
<td>Active (called catalog by IBM)</td>
<td>Passive (Focus Data Dictionary) required</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screen-Painting Facility</td>
<td>VAX version only</td>
<td>DB Edit, SQL Edit optional</td>
<td>TED Editor/Screen Painter optional</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphical Capability</td>
<td>Yes</td>
<td>Query Management Facility (QMF) optional</td>
<td>Interface to GDDM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Query Language</td>
<td>No</td>
<td>Within SQL/DS (QMF for end users; Application System, interactive SQL optional)</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report Writer Facility</td>
<td>No</td>
<td>QMF optional</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>$92,000</td>
<td>$464/mo license</td>
<td>IBM: $66,000 to $110,000, with: $6,000 to $52,000; PC Focus, $1,595</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The above list is intended to represent a sampling of the major fourth-generation languages available for the IBM mainframe environment. The products described were selected for inclusion on the basis of available market research and interviews with industry consultants and users. **CW Chart**
So Six Flags said, "We need an office integration system to run our theme parks nationwide."

And we said...
Six Flags is the largest operator of themed amusement parks in the country. They need the convenience of a distributed office system and the efficiency of a centralized network. So, after evaluating 14 vendors, Six Flags decided to ride with The Honeywell Office.

THE HONEYWELL OFFICE, CONVENIENCE AND EFFICIENCY

The Honeywell Office works at any of Six Flags' 10 parks and at corporate headquarters in Chicago.

With Honeywell's versatile departmental systems, each site receives exceptional office and data processing capabilities. Without wasting costly turn-around time from a central processor.

Now departments like Employee Relations can handle thousands of personnel letters, shift work schedules, and process paychecks. Contracts Administration can create individual vendor contracts by mixing and matching stored phrases. And with InfoCalc, an integrated electronic spreadsheet, Operations can substantially reduce the time required to coordinate the parks' round-the-clock activity.

And because all the systems run through the same office software, Six Flags also enjoys many of the efficiencies of a centralized system—like standardized corporate reports.

Different departments can also share any proprietary office programs they develop, and tie everything into headquarters' IBM-compatible mainframe.

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From micros, minis, and superminis, to a complete line of integrated software, The Honeywell Office is designed to be easily upgradable and fully compatible. So your hardware and software investment is fully protected.

Plus all Honeywell products are backed by TotalCare, Honeywell's nationwide service organization that helps ensure maximum uptime. From terminal to terminal, department to department, even park to park.

After 100 years in business and more than 30 years in computers, Honeywell has earned a reputation for working with customers to solve challenging problems.

Find out how The Honeywell Office can make your information processing seem like a day at the park. Call 1-800-328-5111, ext. 2783, or write Honeywell Information Systems, 300 Concord Rd., MS810, Billerica, MA 01821.

Together, we can find the answers.

Honeywell
**Performance comparisons no easy task**

With no clear definition of what constitutes a transaction and no standard way of referring to transaction volumes, comparing the abilities of fourth-generation languages to execute high-volume, transaction-oriented applications is no easy matter. Fourth-generation language vendors do a range of figures for what volume of transaction processing their products can accommodate. Some do profess not to be in the high-volume business, such as Henco Software, Inc., which markets Info.

"In the development of a software product, many customers want to know how many transactions per unit of work while the hardware cost is going down, we like to throw as much as possible [programming] burden at the hardware, the decreasing cost factor," he said.

Morgan Stanley is not measuring how many transactions/sec. are being processed with Natural applications. "We don't measure in those terms. We do measure how many trades per day we can support," Abbey said. His machines run at 72% of capacity in peak volume today, he said. "We measure in those terms." Morgan Stanley has already had 10:1 programming productivity gains and CPU efficiency of your language vs. Cobol.

**Natural selection: Brokerage trades in Cobol**

Morgan Stanley has achieved a 4:1 productivity improvement, measured by cost per program, using Natural. The company — an IBM MVS/XA shop with 2,400 terminals on-line to IBM 3080 Model 200 and National Advanced Systems Corp. 9080 mainframes — has churned out more than 11,000 programs so far this year.

The company's major application written in Natural is its Trade Analysis and Processing System, a full brokerage processing system supporting account information, trades and orders, statements and journals. The firm employs 120 programmers.

"In Natural and Cobol, we have found that Natural applications consume more CPU cycles than Cobol applications, but the cost of necessary hardware is justified, Abbey said. "Since the people costs are going up per unit of work while the hardware cost is going down, we like to throw as much as possible [programming] burden at the hardware, the decreasing cost factor," he said.

Morgan Stanley is not measuring how many transactions/sec. are being processed with Natural applications. "We don't measure in those terms. We do measure how many trades per day we can support," Abbey said. His machines run at 72% of capacity in peak volume today, he said. "We measure in those terms." Morgan Stanley has already had 10:1 programming productivity gains and CPU efficiency of your language vs. Cobol.

"We can support order processing on a 200- to 400-terminal network with a volume of 100,000 transactions daily," he said.

**Vendors rate their products against Cobol for efficiency and transaction volume**

<table>
<thead>
<tr>
<th>Company and Product</th>
<th>Describe the programming productivity gains and CPU efficiency of your language vs. Cobol</th>
<th>What volume of transaction processing does your language support?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Data Research, Inc.</td>
<td>&quot;Customers achieve 4:1 gain in productivity gained in development. Ideal will not operate as efficiently as Cobol, [because] there is a certain overhead in determining proper [data] access paths&quot;.</td>
<td>&quot;We do measure how many trades per day we can support,&quot; Abbey said. His machines run at 72% of capacity in peak volume today, he said. &quot;We measure in those terms.&quot; Morgan Stanley has already had 10:1 programming productivity gains and CPU efficiency of your language vs. Cobol.</td>
</tr>
<tr>
<td>Amdahl Corporation</td>
<td>&quot;A 10:1 programming productivity gain ... since ADS/Online generates noninterpreted, fully compiled code, it is equal in efficiency to Cobol.&quot;</td>
<td>&quot;Customer claims run from 2:1 to 10:1; we make no claims. The gains SQL/DS provides are primarily in manipulation of data.&quot;</td>
</tr>
<tr>
<td>Cincom Systems, Inc.</td>
<td>&quot;It ranges from 5:1 to 20:1. In some cases, it performs better than Cobol [because] you can write bad Cobol. But we are not out to replace Cobol.&quot;</td>
<td>&quot;The average is 10:1 for maintaining data.&quot;</td>
</tr>
<tr>
<td>Constellation Systems, Inc.</td>
<td>&quot;We achieved 10:1 to 20:1 gain. Performance for query and reporting is equal to Cobol, while program performance is 80% to 80% that of Cobol.&quot;</td>
<td>&quot;We do not know the upper limit. It's been tested in Cobol banking applications and Fortran scientific applications.&quot;</td>
</tr>
<tr>
<td>Computer Corporation of America</td>
<td>&quot;We have achieved a 5:1 to 10:1 gain.&quot;</td>
<td>&quot;The range is 2 to 10 transaction/sec. across processors. SQL/DS can absolutely be used to develop high-volume, transaction-oriented applications.&quot;</td>
</tr>
<tr>
<td>Curtin Software Systems</td>
<td>&quot;A 10:1 programming productivity gain ... since ADS/Online generates noninterpreted, fully compiled code, it is equal in efficiency to Cobol.&quot;</td>
<td>&quot;A 10:1 productivity improvement from programming in Natural.&quot;</td>
</tr>
<tr>
<td>D&amp;B Computing Services Co.</td>
<td>&quot;A 5:1 to 10:1 gain. Performance is equal to [data] access paths.&quot;</td>
<td>&quot;The range is 2 to 10 transaction/sec. across processors. SQL/DS can absolutely be used to develop high-volume, transaction-oriented applications.&quot;</td>
</tr>
<tr>
<td>Hanco Software, Inc.</td>
<td>&quot;We do measure how many trades per day we can support,&quot; Abbey said. His machines run at 72% of capacity in peak volume today, he said. &quot;We measure in those terms.&quot; Morgan Stanley has already had 10:1 programming productivity gains and CPU efficiency of your language vs. Cobol.</td>
<td>&quot;Customer claims run from 2:1 to 10:1; we make no claims. The gains SQL/DS provides are primarily in manipulation of data.&quot;</td>
</tr>
<tr>
<td>Higher Order Software, Inc.</td>
<td>&quot;Our product can cut development time 50% or reduce required manpower by 40%.&quot;</td>
<td>&quot;The range is 2 to 10 transaction/sec. across processors. SQL/DS can absolutely be used to develop high-volume, transaction-oriented applications.&quot;</td>
</tr>
<tr>
<td>IBM</td>
<td>&quot;Customer claims run from 2:1 to 10:1; we make no claims. The gains SQL/DS provides are primarily in manipulation of data.&quot;</td>
<td>&quot;We do not know the upper limit. It's been tested in Cobol banking applications and Fortran scientific applications.&quot;</td>
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<td>Information Builders, Inc.</td>
<td>&quot;The average is 10:1.&quot;</td>
<td>&quot;A 10:1 to 15 transaction/sec. is supported. We recommend 70 to 80 on-line terminals as a maximum.&quot;</td>
</tr>
<tr>
<td>Martin Marietta Data Systems</td>
<td>&quot;We have achieved a 10:1 to 20:1 gain. Performance for query and reporting is equal to Cobol, while program performance is 80% to 80% that of Cobol.&quot;</td>
<td>&quot;The average is 10:1 for maintaining data.&quot;</td>
</tr>
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<td>Martin Marietta Data Systems</td>
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<td>&quot;A 10:1 productivity improvement from programming in Natural.&quot;</td>
</tr>
<tr>
<td>Software AG</td>
<td>&quot;We handle a network of 60 terminal processors 3 transaction/sec. on an IBM 4331 processor. With a bigger machine, we can process up to 20 terminal processors, in a network of 1,000 terminals.&quot;</td>
<td>&quot;We do not know the upper limit. It's been tested in Cobol banking applications and Fortran scientific applications.&quot;</td>
</tr>
</tbody>
</table>

**John Desmond**

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**Fourth-generation tool boosts productivity**

At the Morgan Stanley & Co. brokerage in New York, Software AO's Natural is in, and Cobol is out, although not completely.

Citing a positive experience with the West Germany-based firm's fourth-generation language, Scott Abbott, vice-president of data administration at Morgan Stanley, said he cannot understand why more DP shops do not employ a fourth-generation language.

Morgan Stanley has achieved a 4:1 productivity improvement, measured by cost per program, using Natural. The company — an IBM MVS/XA shop with 2,400 terminals on-line to IBM 3080 Model 200 and National Advanced Systems Corp. 9080 mainframes — has churned out more than 11,000 programs so far this year.

The company's major application written in Natural is its Trade Analysis and Processing System, a full brokerage processing system supporting account information, trades and orders, statements and journals. The firm employs 120 programmers.

"In Natural and Cobol, we have found that Natural applications consume more CPU cycles than Cobol applications, but the cost of necessary hardware is justified, Abbey said. "Since the people costs are going up per unit of work while the hardware cost is going down, we like to throw as much as possible [programming] burden at the hardware, the decreasing cost factor," he said.

Morgan Stanley is not measuring how many transactions/sec. are being processed with Natural applications. "We don't measure in those terms. We do measure how many trades per day we can support," Abbey said. His machines run at 72% of capacity in peak volume today, he said. "We measure in those terms." Morgan Stanley has already had 10:1 programming productivity gains and CPU efficiency of your language vs. Cobol.

"We can support order processing on a 200- to 400-terminal network with a volume of 100,000 transactions daily," he said.

For those users who have decided to implement a fourth-generation language for the first time, Abbey advised, "The best way to implement is to make a rule that you will do all your development in the fourth-generation language. Don't leave it to the discretion of the programmer, who will always go back to the tried-and-true method. Secondly, make sure that whatever environment you choose has an integrated (transaction management system) as its underpinning."
Information Builders' Focus has long been the fourth-generation language market leader, but Focus lost market share to 42.4% in 1984, according to International Data Corp. in 1983-84, falling from 49.6% of the total market in 1983.

**Language barriers**

From page 55

generation language, the spokesman had no comment. If improved productivity is the promise of fourth-generation languages, users have a range of productivity improvements from which to choose. Vendor claims range from a 3 to 1 productivity gain to 100 to 1. Gains vary by segment of the system development life cycle. Some vendors are sophisticated in their measurement of the gains, others admit off the record that their estimated gains are essentially guesses. Perhaps among the most important benefits of fourth-generation languages is a reduction in the level of future maintenance that must be performed. Vendors said productivity gains in the maintenance phase of the systems development life cycle are hard to measure. User Scott Abbey of Morgan Stanley said Software AG's Natural is easier to maintain, because each program is restricted to about 500 lines. One consultant said maintenance should not be a factor in the productivity equation, because fourth-generation languages should be used to build prototype applications, which should then be converted to Cobol (see story page 60).

IBM adroitly sidesteps the question of productivity measurement by stating, "We make no claim" while citing user reports of a 2 to 1 to 1 productivity gain with SQL/DS. Martin Marietta cited a survey of 700 users in reporting productivity gains of 25 to 1 for ad hoc reporting to 10 to 1 for building complete applications.

The great counterbalance to better productivity is performance. Can applications developed with a fourth-generation language perform as well as Cobol ones? Will performance bottlenecks stretch response times too far? Is the mainframe big enough to handle the job? Is the cost of buying the necessary hardware justified?

You can argue about the efficiencies of fourth-generation language programs versus Cobol, but the productivity gains are so great and the machines so fast that now nobody worries about losing efficiency in the program," said Warren Fitzgerald, internal consultant on interactive computing and data management for Monsanto Co., based in St. Louis. Monsanto brought in Martin Marietta's Ramis II four years ago. Today, most new applications are written in Ramis II although mainstream production applications are maintained in Cobol.

When high-transaction processing applications must be written or revised, Monsanto relies on Cobol contract programmers. "We don't do much Cobol programming ourselves anymore," Fitzgerald said. "It's so much easier and faster to develop an application with a fourth-generation language" (see story page 66).

One way the vendors are trying to improve performance and satisfy better the demand for a high-level language for high-transaction applications is by converting language statements into a code more closely resembling fast executing machine instructions. See LANGUAGE on page 62.
Language barriers
From page 61:

From page 61:

The next release of Natural will mix machine code with p-code, Page said. The same concept is called something different by Computer Corporation of America whose User Language is "tokenized," meaning the code is interpreted once and embedded with tokens. During execution, the tokens point to subroutines in the company's Model 204 DBMS.

Exactly where the performance bottleneck of a fourth-generation language occurs — and whether the fourth-generation code either makes it or falls short in a full production system — is not related to CPU cycle speed so much as to the number of I/Os that language functions require between the CPU and DBMS, according to several vendors and analysts.

According to Martin Kral, product manager for Cincom's Mantis, which generates interpretive code, "An interpretive version needs to reference data — that's I/O. The degradation problems have to do with I/O, not with cycles.

One vendor maintained that the bottleneck is an operating system limitation. Robert Vonderharr, sales manager for Nomad2 product manager for D&B Computing, whose product is available for IBM MVS, TSO and VM/CMS operating systems, said, "Those pipes are slow by definition. Neither operating system provides good ways to do high-volume, multiple access to a data base [transactions] such as 200 users trying to update at the same time."

Another vendor maintained that the performance bottleneck is DBMS-dependent, hinging on how many users can concurrently update the DBMS. Jim Arquaviva, director of product marketing for Cullinet, said, "Concurrent updating is solved in DBMS/R."

Performance aside, more DP managers are using personal computer versions of fourth-generation languages in the continuing effort to whittle application backlogs.

If fourth-generation languages are an important key to improving productivity, and if productivity is the No. 1 issue in most DP shops today, why are the languages not being accepted more quickly by managers?

"The biggest obstacle is the stubbornness of the DP manager who insists on doing everything in Cobol. In small and medium-to-small-size shops, there is a tremendous resistance to accepting modern productivity tools," Dorn said.

According to Mimno, nearly every topical issue facing DP managers today is embodied in the decision of why or how to incorporate a fourth-generation language. "The fourth-generation languages should be used in a way that produces a benefit for the business — not just a change from Cobol. The strategy should be, How can these products be used to make information a strategic resource? Organizations need to understand what the end users are doing and target them. MIS departments do that extremely poorly. The challenge is getting MIS to be more business oriented."

Whether the fourth-generation languages can replace Cobol or should coexist with Cobol is an evolving question. Dr. Schusiel said, "A combination of principal fourth-generation language products can eliminate all Cobol in most shops today."

But the Morgan Stanley experience shows otherwise. Even though the New York-based brokerage firm has implemented thousands of applications in Software AG's Natural, for high-volume transaction-oriented applications, Cobol still has an important role in the shop. According to Morgan Stanley's Abbey, "There are things you should not do in a fourth-generation language. If you're careful about your [application] design, you can identify those things after the application is running and fix them."

That apparently is taking place now at the New Jersey Department of Motor Vehicles, where, according to an ADR spokesman, bottlenecks in the ideal application are being rewritten in a lower level language to boost performance.
The time has come for straight talk about database management systems.
Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. Building applications—efficient, online applications, faster, with fewer people—is the only real issue.

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. It is essential that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a step beyond today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a strategic asset instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEOs of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

John J. Cullineane
Chairman of the Board
The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of online and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/I, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS
WASHINGTON, D.C. — A hospital here found a way to get around the problem of upgrading to IBM 3380 disk drives while running two operating systems not supported by the new drives.

The data processing department of George Washington University Hospital is currently involved in a number of priority projects, according to David Campbell, VM senior systems programmer. The hospital uses a 16M-byte IBM 3083 Model EX computer and an 8M-byte 4341 Model 2 mainframe processor, both running IBM's VM facility, which, in turn, allows them to run multiple IBM operating systems. Both systems run IBM's DOS and OS/VS1 operating systems under VM, and the 3083 also runs MVS. Under DOS, both machines also support the IBM CICS environment, Campbell said.

Doctors at the hospital can gain access to individual medical histories, and administrators can perform patient registration and billing from any of the more than 200 terminals located throughout the hospital, Campbell said. Programmers increasingly are kept busy developing new systems, which include automating pharmacy order management, he said. DP is also incorporating financial systems, such as insurance claims processing, into the on-line environment.

Key to the continued success of these functions are plans to complete a migration to IBM's MVS operating system, a task already begun, Campbell said.

Dowell, assistant director for MIS, said. The hospital first emulated one spindle of the 3350 on the newly installed 3380s about a year ago, while the 3350s remained as backup, he added. After running for free for approximately one week, the 3350s were carted out to the hall, and the whole disk system was converted to 3380s, he said.

Within a month, the 3375s had also been removed from the computer room, Campbell said. The medical center has eliminated all of the old disk drives and replaced them with 214 strings (40 addresses) of 3380s. The anticipated benefits of saved computer room space and cost justification have come true, he said.

Computer room space was saved by eliminating one of three 3380 storage directors, Campbell said, and by the smaller size of the 3380s. The new freezer-size 3380 contains four spindles and 2.5G bytes of data, he said. About four 3350s fit on a 3380, he added, and two 3375s take up the same floor space as a 3380.

Dollar savings are harder to pinpoint, Campbell said, but the cost savings more than offset the cost of VM/Magic, he said.

When we installed VM Magic, it was still a relatively new product, and there were some rough areas in the installation documentation. But they [BDI] listened to what I had to say and actually incorporated my comments into the manual.
Playing card supplier cuts staff, expenses with in-house system

Users were able to teach data base their language

CINCINNATI — The world's largest supplier of playing cards was able to cut its clerical staff and its operating expenses when it brought a computer system in-house.

U.S. Playing Cards, Inc., the manufacturer of Bicycle, Bee, Congress and other playing card brands, celebrated the 100th anniversary of its bicycle brand this year. Around the same time, the company investigated computer systems that would help upgrade it to a fully automated corporation, according to Ingrid Fabian, corporate data processing manager for the company.

In an effort to help its employees make a smooth transition from old-fashioned office machines to high-tech equipment, Mike Schlarmann, who was then DP manager of the company, chose to install McDonnell Douglas Computer Systems Co.'s (formerly Microdata Corp.) Sequel 3240. The system runs Mandarin, Inc. of Cincinnati's Manage-2000 manufacturing package as a skeleton system, Fabian said. She and her staff customized the Manage-2000 package to meet the firm's needs.

Modules in the package originally included accounts receivable and payable, general ledger and inventory. Since then, the company has added payroll and purchasing functions, which have also been customized, she said.

System learned users' vocabulary

Users can query the data base using Microdata's Natural English software, which permits users to teach the computer to learn their vocabulary. The system's capability of using everyday language in queries was a major factor in user acceptance of the equipment, Fabian said. She developed a common glossary of terms for users and has limited the number of people who can make changes to the glossary because there are now too many people on the system for everyone to be making changes, she said.

"I can say, "How many Bee cards did Joe Smith sell last month?" and the computer knows Joe Smith, Bee and the time period, and it will give me a listing," Fabian said.

U.S. Playing Cards initially purchased the Sequel 3240 system with 1M byte of main memory, 128M bytes of disk storage, a tape drive, two printers and 10 terminals in November 1983, and the system was fully operational by the end of December. Since then, the company has enhanced the system to 5M bytes of main memory, 10G byte of storage, eight printers and 52 terminals, she said.

The additional users are people who asked to be added to the system, she said. "The staff who requested things discovered I could fill their requests in 10 minutes to two hours, so they wanted to learn," she said. Fabian said she has a waiting list of people to train.

The company eliminated an outside service bureau that had been keeping track of the company's records. The service bureau was a division of Diamond International, the company that formerly owned U.S. Playing Cards, Fabian said. When Diamond sold the card company, its division informed the card company that it had three months to get off its time-sharing system. At that time, U.S. Playing Cards submitted handwritten forms once a day to the time-sharing service, and the jobs were run in batch mode overnight. "We didn't even have a keypunch machine," she said. Errors had to wait to be corrected until the next night, she added.

The company initially looked at IBM's System/38 as well as the Microdata machine, Fabian said. They chose the Microdata unit because it was a flexible machine that could be added to and because it ran the software package that they wanted, she said.

The criteria has been validated, Fabian said. The system has doubled in capacity without having to sell or exchange any of the original equipment.

The initial equipment investment was $250,000, which the company recovered in seven months, Fabian said. The cost of the system has doubled since the first installation, but she said she expects those costs to be recovered by the end of this year.

The clerical staff has been reduced by about 10%, according to Fabian. Orders that used to be taken manually are now entered on-line while the clerk takes the order on the telephone, she said. When the order is finished and verified, labels and packing slips are printed out in the shipping department at the same time, she said.

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BPCS...Absolutely Control For Your System/38.
GREENWICH, Conn. — When a large packaging company diversified into new and unrelated businesses, the controller's office was faced with treble the amount of financial information it was expected to produce on a monthly basis.

Directors and executives wanted more and better analysis, but until the department obtained an electronic publishing system, analysts were too busy with cutting and pasting to attempt trend analyses and forecasts.

American Can Co. began its diversification drive in 1981, moving into the complex and competitive fields of information-based financial services and specialty retailing. As these businesses were added, the controller office’s monthly briefing books, provided as decision aids for the executive committee and board of directors, swelled from 20-page booklets to 70-page tomes.

Production, which involved the pasting together of typewritten text and plotter-produced charts and graphs for assembly on a Xerox Corp. color copier, became a logistical nightmare.

"When I came to the company a couple of years ago, I wanted some additional trend charts added into these books," said David Chemerow, vice-president and corporate controller. "What I discovered was that it would take 48 hours just to run the extra information through the plotter. We were simply running out of days in the month," according to Chemerow.

The mainframe plotters were not the only obstacle to progress, according to William Lowry, director of corporate systems development and analysis.

Color copiers slow

The Xerox color copier that represented the final leg of production also ate up volumes of time that could have been devoted to analysis. "Color copiers are pretty slow," he said. "Ours produces and reads this copies a minute... when it worked.

At the beginning of this year, Lowry decided that it was time for the controller's office to capitalize on the growing trend toward distributed microcomputer systems. American Can Co. purchased an Interleaf Electronic Publishing System for the department from Interleaf, Inc. of Cambridge, Mass.

The system, which cost the company $40,000, is an interface software running on a Sun Microsystems, Inc. Sun 2/120 workstation with a 130M-byte disk drive and an Imagen Corp. 8/300 laser printer equipped with Interleaf fonts and graphics software.

Lowry considered other publishing systems, including those from Xerox and Compugraphic Corp., but Interleaf, he said, offered the functionality that was needed in terms of graphics creation and integration "at a cost we felt was appropriate to the function."

Two people manage the system

Two people manage the system's operation: one secretary and one analyst, who is primarily responsible for updating the monthly numbers in tables and charts and creating new displays as they become necessary. Although more than 40 different chart and graph styles are available through the system, design innovation is a low priority for this application.

"One of the major reasons that I pushed this project," Lowry said, "was the improved readability you get with typesetting. I've seen a lot of studies that show that documents can be read more quickly and with better comprehension than typewritten material."

Although affordability definitely entered into the purchase decision, cost savings were not a major goal in the acquisition.

"I'd say we are realizing at least six to eight man-hours a month in savings," he estimated. "But the real benefit is that we are producing a bigger and better book at no additional cost."

Beyond the elimination of time-consuming cut-and-paste work for analysts, the Interleaf system has the potential of cutting down on information entry redundancies. It accepts text and data files transferred from remote personal computers through an Ethernet network to an AT&T 3B2/300 computer.

Eventually that capacity may facilitate the flow of financial information from the company's various business divisions to the controller's office, but, as yet, the only remote communicators are two analysts, according to Lowry.

The only negative trade-off resulting from the switch-over has been the loss of color capability. The board does miss having its charts in color, Lowry said.
Supermicrocomputer network hoists forklift firm's business

CHARLOTTE, N.C. — The demand for materials handling equipment such as forklift trucks is a cyclical one, and what would otherwise be a cyclical rise and fall in its employment levels, Carolina Handling, Inc., a forklift sales and service firm, turned to a communications network to link computers at the firm's four locations.

"Communication between offices and with customers has been our key to staying in business and to continuing our growth," according to Donald Pratt, president of Carolina Handling. In May 1982, the company installed a Zilog, Inc. System 8000 supermicrocomputer network to keep track of client information and inter-office records.

Carolina Handling has branch offices in North Carolina, South Carolina and Georgia, each with a Zilog Model 11+. "These models have added new power and speed to our business environment," Pratt said. The time-sharing computers, small enough to fit under a desk, reportedly can support up to eight users.

A Zilog Model 31, meanwhile, was installed at headquarters. Capable of handling up to 24 users, the Model 31 supports 320M bytes of Winchester disk storage and 4M bytes of main memory, typical of the requirements that Carolina Handling needed for its new system.

"We needed a monstrous data base. Our forklift equipment records are maintained for 25 years, instead of the usual 10," Pratt explained.

Carolina Handling further strengthens its client relationships by using the Zilog system to help it prepare two free proprietary reporting services for customers: PUSH, or Parts Usage Sales History, and MASH, or Monthly Analysis of Service History.

Installation of the supermicrosystem has also benefited Carolina Handling directly. "We attribute our growth during the capital goods recession to the Zilog equipment," Pratt said. "We have 125 employees and never had to lay anyone off because of our success. During this time, we maintained our customer base, even adding to it."

The Zilog supermicro computer network provides Carolina Handling with a comprehensive data processing environment and interstate communications. The system is multiuser capable, multifunctional and totally upgradable.

"The capabilities of our present system are critical to our continued success as a business. As offices grow, our system can grow," Pratt said.

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Textile firm keeps pace with growth through system advances

LAWRENCE, Mass. — In an industry where most U.S. competitors have been decimated by foreign competition, the 45-year-old Lawrence Textile Co. has seen its business grow 60% in 1983 and 40% last year. To keep pace with this growth, the firm has been using its computer system to gain production efficiencies.

Lawrence Textile, founded in 1939 by Sam R. Benigno, serves the textile industry by inspecting incoming unfinished cloth against more than 100 defect codes, performing any of more than 800 different fabric treatments and then shipping the uncut cloth to finished goods manufacturers. In a typical made possible year, Lawrence Textile reportedly will process more than 11 million yards of fabric in 50 different types and colors from a dozen mills.

According to company Vice-President Thomas Benigno, "Advances in inventory management and production control, by computers, have enabled us to offer mills as well as finished goods manufacturers an unsurpassed degree of quality control safeguards."

The company has used Honeywell computers exclusively since installing its first, a Model 58, in 1974. That system was replaced in 1976 by a Level 62 computer, which, in turn, has been replaced by a new DPS 4 system, installed last year when a new 60,000 sq-ft add-on facility attached to the company's original building was opened.

Thomas said that he chose Honeywell to supply his computer needs, in part for a geographical reason: The Honeywell plant is located just up the road from him in Lawrence. As a result, he said, factory service workers usually respond to his calls within two hours. He considered switching to IBM at one time, he said, but found IBM could not help him with his Cobol-based programming needs.

Thomas' calls for service have been few, another plus for the equipment, he said. "For the most part, in all the years I've had Honeywell, I think the system was down three times," he said.

Another plus for the textile firm was Honeywell support, Thomas said. During the installation of the Level 62 mini, Honeywell provided conversion aids as well as a "technical aide who worked side by side with me" to bring the system up, Thomas explained.

When the company moved up from the Level 62 to a DPS 4, Thomas said, "There was practically zero [time spent] for conversion."

Thomas said that he has performed all the computer programming on the Honeywell systems, although he has no formal DP training. "The computer posts all details relative to shipper, customer, date received, quantity, description of cloth, treatments to be performed and more," he said. "We also installed a smaller Honeywell computer in 1983 to generate bar code labels, which, once attached to all separate goods, help us track the cloth throughout our treatment and storage processes."

Lawrence Textile has more than $250,000 invested in Honeywell computer equipment, Thomas reported. "The DPS 4 system in use at Lawrence Textile is configured with 1M byte of memory and five Honeywell 330 80M-byte disk drives. Mass memory can be expanded to 12 disks, something that, Thomas said, he especially likes about the system.

The DPS 4 uses the same software, terminals, printers and mass storage devices as the Level 62 machine.
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WEEK OF NOVEMBER 17


NOVEMBER 18-19, SAN FRANCISCO — Real Estate Investment Conference Chairman, Suffolk University, Mass. 02108. Contact: Alice Gibons, Inter-Financial Opportunities for Financial Institutions, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 18-19, STAMFORD, CONN. — Software Management Strategies Conference. Contact: Mimi Ford, Gartner Group, Inc., P.O. Box 10212, 72 Cummings Point Road, Stamford, Conn. 06904.


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

NOVEMBER 20-24, LAS VEGAS — Comdex/Fall '85. Contact: The Interface Group, Inc., 300 First Ave., New York, N.Y. 10016.


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


WEEK OF NOVEMBER 24


NOVEMBER 29 - DECEMBER 1, PACIFIC GROVE, CALIF. — Fort Modification Laboratory Conference. Contact: Fort Interest Group, P.O. Box 8231, San Jose, Calif. 95155.

WEEK OF DECEMBER 1

DECEMBER 2, NEW ORLEANS — VSAM Foundations. Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.


DECEMBER 2-4, DALLAS — CICS Command-Level Programming. Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 2-4, HOUSTON — IBM Large Computer Market Conference. Contact: Aleba Gartner, Gartner Group, Inc., P.O. Box 10212, 77 Cummings Point Road, Stamford, Conn. 06904.

DECEMBER 2-4, NEW YORK — How to Select and Implement a Telephone System. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 2-4, SAN FRANCISCO — Data Communications I — Basic Concepts. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 4, WEST PALM See CALENDAR on page 77
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SEE US AT COMDEX BOOTH #W806
CALENDAR from page 72

NOVEMBER 8-10, WASHINGTON — Optimizing Long Distance Services. Contact: Business Communications Review, 960 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, NEW YORK — SAS Macro Language Course. Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Dec. 13-14 in New York.


DECEMBER 6-8, BOSTON — Local Area Networks. Contact: Business Communications Review, 960 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, NEW YORK — Opportunities for Professional Development. Contact: Masterminds, Inc., 29 Technology Park/Atlanta, Norcross, Ga. 30092.

DECEMBER 5-6, SAN FRANCISCO — Integrating Voice and Data in the PBX. Contact: Business Communications Review, 960 York Road, Hinsdale, Ill. 60521. Also being held Dec. 12-13 in New York.

DECEMBER 6-8, WASHINGTON, D.C. — Analysis of Research Data: Development and Practice. Contact: Education Coordinator, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.


DECEMBER 6-8, NASHVILLE — ATMS, The Electronic Delivery Systems Conference. Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 6-8, CHICAGO — Data Communications II — Digital Communications Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 6-8, PALO ALTO, CALIF. — California Computer Show. Contact: Norm DeNardi Enterprises, Suite 204, 229 S. San Antonio Road, Los Altos, Calif. 94022.

DECEMBER 6-8, PHOENIX — Arizona Electronics Expo. Contact: Motts-Gramplan Expositions Group, 1650 Commonwealth Ave., Boston, Mass. 02215.

DECEMBER 6-8, FORT LAUDERDALE, FLA. — CICS Internals for Systems Programmers. Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 11-17, CHICAGO — 1985 Fall Industrial Engineering Conference. Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.


DECEMBER 9-10, LOS ANGELES — Introduction to VIS/SP 2.1 for Systems Programmers. Contact: Betty Bruce, Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

DECEMBER 9-10, ORLANDO, FLA. — Satellite Communications. Contact: TMSA Seminars, c/o Technology Training Corp., P.O. Box 3608, Dept. SATCOM, 3420 Kashiwa

See CALENDAR on page 78
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Not surprisingly, the Compaq Computer Corp. corporate headquarters are unobtrusive, hidden in 55 acres of nondescript woods just outside the Houston city limits. But once inside the campus, visitors see a rare sight among computer suppliers this year — construction crews finishing off giant new buildings.

Four years ago, Compaq did not exist, and this year it expects to join the Fortune 500. Annual sales approach half a billion dollars, employment nears 1,700, and sometime next year the personal computer firm will sprawl over almost a million square feet of space worldwide.

This is the most successful computer start-up in industry history, a company that grew far faster than did Apple Computer, Inc., bumping Apple to third place in the micro standard as Instruments, Inc. Eating out one day, they sketched the outline of their first product, the Compaq Portable, on a place mat.

In typical Compag style, that liaison came across as a quiet statement of fact rather than a boast, and it draws very little criticism. "They have done an incredible job," says Michelle Preston of L. F. Rothschild, Unterberg Towbin. In all aspects of building a computer supplier, "Compaq has had a near-perfect record of execution," she says.

"Compaq has done an amazing number of things correctly," agrees Margaret Rodenberg, manager of product management at Entre Computers, Inc. in McLean, Va. "They have far more dealer loyalty than any other manufacturer in the industry."

"They are the recognized, acceptable second source to IBM in big corporations, and that says it all," comments Everett Merseve of Arthur D. Little, Inc. in Cambridge, Mass.

Of course, there's an obvious note of caution, which information systems expert Michael Hammer recently expressed in another context: "An industry in which you can go from zero to a billion dollars in five years is one in which you can go the other way just as fast."

But that's nothing new, points out Kevin Ellington, senior vice-president of Compaq's Personal Computers Division. "Our demise has been forecast every quarter since we began in business."

Compaq was founded in February 1982 by Canion, Jim Harris and Bill Murto, who had worked together at Texas Instruments, Inc. Eating out one day, they sketched the outline of their first product, the Compaq Portable, on a place mat.

Early on, the start-up gained the backing of industry guru Ben Rosen, who became Compaq's chairman. "First, we thought highly of the people," Rosen says. "Second, we knew from our own experience that what the world really needed was a full-function portable with no compromises."

With initial support from venture capitalists Sevin Rosen Partners, Compaq raised $10 million of venture capital in its first year. The computer company's product and distribution strategies, unchanged since the first day, differentiated Compaq from the pack of personal computer vendors.

Like other start-ups, Compaq quickly realized that the IBM Personal Computer had set a standard. Unlike most vendors, Compaq labored to produce truly compatible systems that were not IBM clones. "Offering totally compatible systems with enhanced value — that was different from other manufacturers in the early days," Preston says.

Just as important, Compaq bypassed conflict among distribution channels with the unique strategy of selling its products exclusively through dealers.

The Compag Portable, introduced in the fall and shipped in early 1983, was the first significant IBM-compatible portable system, and it quickly became a best-seller.

In 1983, Compaq's first full year of sales, the company established a record in U.S. business by exceeding $111 million in revenue. That explosive growth stretched the company thin.
A conversation with Rod Canion

"We had to decide whether we went where IBM was or where IBM wasn't. We decided to execute a strategy that would allow us to coexist with the dealers where IBM was. If we had gone the other path, we wouldn't be here today."

[for high-tech public offerings], and then it started diving, and we caught it right on the edge.

Compaq has maintained consistent policies in product design and distribution since inception — IBM-compatibility and dealer-only. How did those two come about?

[In distribution,] almost any company gave you some examples of what not to do and what to do. Xerox Corp. just happened to be the most outstanding example because they had such a good opportunity and almost nothing came of it.

There was nobody going exclusively through dealers. That was our own invention. But how to deal with the dealers — what they expected and what they needed — we had to get from the dealers themselves and from observing what other people had tried.

We were starting from the point of "Don't create conflicts in your distribution channels." That led us to go exclusively through dealers initially, and then our experience confirmed that we would be much better off to focus on and extend the capabilities of the dealers as opposed to try to go and do something else on our own.

One of the fundamental issues we had to decide was whether we went where IBM was or where IBM wasn't. That was really a critical decision.

It was hard to make a case, at first, to go where IBM was because IBM would keep moving around and eventually step on you. The other side was that if you went where IBM wasn't and you had an IBM-compatible, those dealers needed to compete against the dealers who had IBM.

We didn't do that. That was a declining position in terms of strength. The biggest opportunity you'd ever have would be on Day One, because as IBM kept expanding its dealer base, if you were in the market where they weren't, you would either shrink back or later try to come to where they were.

So we finally decided that if we were going to be successful, we were going to have to execute a strategy that would allow us to coexist with the dealers where IBM was. That was fundamental.

If we had gone the other path, which a lot of our competitors did, we wouldn't be here today.

But you still have requests from corporate accounts who want to buy direct.

Yes. I think they would get mad at us if all we said was "No, we don't want your business." We explain to them why it makes sense for them and for us to have the dealer there.

We don't supply some of the things a dealer supplies. There's a whole set of things that are needed, from the product all the way through to long-term service and support, and it takes both of us to do the job right.

Compaq is forever addressing two bigger issues: IBM is going to beat Compaq to death through price, or IBM is going to beat Compaq to death through proprietary architectures.

In the case of pricing, we believe that our costs are competitive with IBM. We don't feel like we have to have a big cost advantage to be able to compete because we've built a different kind of an image or a different kind of position. We can sell more value, more function in a product for a comparable or a higher price, which puts us in the position of simply needing to have competitive costs.

The question then becomes, how low a margin will IBM take in order to, let's say, drive their competitors out of the marketplace? That becomes a lot of different theoretical arguments. If [IBM] tries to sell [a product] at a loss or give it away, I think the company would be in a lot of legal problems, and IBM is very sensitive to that.

The other side is that they're having profits problems now, and part of the reason is because of the low margins they've already had on Personal Computers. So if anything, I would say that they're going to be moving into improving their margins on the Personal Computers, not to get lower margins. It would be a poor business decision for them to sacrifice their profits across the board...

How quickly will IBM move away from the basic Personal Computer XT and go into other markets?

I think they'll reach the point where they try eventually to replace the Personal Computer XT with some new product, and that's going to be hard for them to..."
"Hiring was a real challenge," says Cecil Parker, vice-president for human resources. "Who had ever heard of Compaq?" Houston, Texas, you kidding me?"

And the company's hiring policy — "It's easier to do without than to make a misfit work into a well-working situation" — compounded the short-term problem, he observes.

The long-term impact of just getting warm bodies would be damaging," but the lack of personnel was extremely painful, Ellington notes. "We had key areas that needed attention, and we couldn't find the right person, so we wouldn't hire."

From a financial control point of view, "You have to, from day one, have the people and processes in place," says John Gribi, senior vice-president for finance. "You can't insert it later on."

"So before we shipped products, we had all of our computerized systems that we use today in place and had the appropriate financial staff... That fit well with Ron [Canion's] concept as we set up a large company in its formative stages."

Maintaining controls would have been impossible without personal computers and packaged MRP and accounting software, Gribi declares.

"Without those, "At the speed we were going, I would have had to hire programmers before the company was formed," he jokes.

**Fighting the tide**

Early in 1983, Compaq tapped venture capitalists for another $40 million, but it soon required even more funds to fuel expansion. The company was gearing up to launch its first desktop system.

In December 1983, Compaq fought against the ebbs tide for high-tech public offerings and raised $66 million. Simultaneously, it released the Portable Plus, a hard-disk version that, again, had no significant competition at birth.

Six months later, the firm rolled out the Deskpro line, a broad family of modular desktop systems based on the more powerful Intel 8088 chip but offering the same IBM compatibility.

In March, the company's Dallas-based Compaq Telecommunications Corp. subsidiary (see story, p. 91) announced its initial product, Telecompaq, a personal computer/phone combination.

In April, Compaq rolled out its long-awaited series of Intel 80286-based systems in an extravaganza broadcast live to 10 cities worldwide, with entertainment headlined by the Pointer Sisters. The new products allowed the company to make the

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**Guess who just unveiled seven**

The new IBM 3160 ASCII Display Station is really seven different ASCII displays in one. In addition to its own function-rich native mode, the new IBM 3161 can emulate:

- IBM 3101 Model 881
- ADDS Viewpoint
- Hazeltine 1500*
- Lear Siegler ADM-3A*
- Lear Siegler ADM-5*
- TeleVideo 910*

Besides fitting nicely into existing systems, the IBM 3161 also offers impressive improvements in ergonomics.

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Take the 102-key ASCII-style keyboard, for example. Its low profile, gentle contour and typewriter touch make for faster keying with fewer errors. The keyboard has programmable function and editing keys so it can be customized to meet your application needs.

Then, for comfortable viewing, there's the tilt and swivel of the 12" display. And the sharp, clear 8 x 16 character matrix for easy reading. Plus cursor, character and field attributes (blink, reverse video, underscore, dual intensity, etc.). And scrolling. And partitioning. And lots more.

The IBM 3163 with Plug-in Cartridge

And, as if that weren't enough, we're also announcing a second new ASCII display station with even higher function—the IBM 3163.

Outwardly, these two new displays look alike. But the 3163, in addition to its built-in emulation of the IBM 3101 Model 881, also offers the ability to emulate the DEC VT 52 and VT 100* by means of a plug-in cartridge.

And while you'll like the power and flexibility of the 3161, for your high-function applications the 3163 goes even further. For example, a 7,680-character buffer and up to three windows enable you to view and modify portions of different host data bases. The 3163 lets you redefine and even recapse the keys.

On both displays the setup is menu-guided and written in plain English, so it can be done easily and quickly. The point is, both are designed to improve your user productivity.

**Very Attractive Prices**

The price per terminal is $895 for the 3161 and $1,095 for the 3163. Quantity discounts are available. What's more,
somewhat debatable claim that it offers the broadest line of business personal computers on the market. Compaq executives often talk about the IBM Personal Computer standard with the reverence investment counselors once reserved for tax-free municipal bonds.

"What if IBM goes to a proprietary operating system?" Ellington asks. "I would pray they would. That would be wonderful. IBM has too much sense for that."

"Open architecture is what has made them successful," he observes. "There is such a huge ground swell of third-party hardware and software that the standard is going to continue to grow."

**Reputation and rumors**

Compaq products earn a solid reputation for compatibility and good engineering, analysts and dealers say.

"Word of mouth really sold them initially," observes the Yankee Group's Chris Christiansen. "A lot of these machines still go to technical engineering people who admire the fact that the machine consistently works, and they also admire the elegant simplicity of the construction."

Compaq's "greatest perceived challenge was the advent of the IBM Portable [Personal Computer]," Rosen says. "But the industry consensus is that the IBM device, which debuted in February 1984, is just not as good a machine. Compaq's portable line continues to outsell the IBM entry by 10:1, according to most estimates."

"It's always nice for any company to have luck," Preston says. "The IBM Portable was as much a failure as the PCjr." Today, rumors center on laptop micros. "People have been asking us where our laptop is since January 1984," Ellington says. "We continue to say that we are not going to bring out a laptop until we can bring out a full-function device. Since that time, our competitors have continued to bring out machines that do not sell."

**Fine-tuning**

Compaq currently is fine-tuning its third laptop design. "We developed two and shot both of them," Ellington says. "The software that takes advantage of that architecture isn't out there," Ellington notes. Like all its major competitors, Compaq tightly guards details on upcoming products. Rosen notes only that "generally, we try not to provide things that are available elsewhere and in good supply."

**Tip of the iceberg**

Clearly, however, one major thrust is into communications. Preston describes the Telecompaq "as just the tip of the iceberg."

Compaq also will work to ensure its basic product line takes advantage of IBM and third-party options. In one case, the company offered a retrofit Basic I/O Subsystem chip that made its existing systems compatible with the IBM PC Network. Compaq is currently checking compatibility on IBM's token-ring network.

By concentrating on enhanced features and selling within IBM's price range, Compaq avoids most of the bloodletting that occurs among vendors competing on price. As long as Compaq can keep its manufacturing costs competitive, Canion believes, it won't be vulnerable in pricing.
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Compaq currently fills 241,000 square feet of manufacturing space. Its highly automated new factory, now being expanded by 107,000 square feet, is designed for flexible production schemes and ships machines directly out the door to dealers.

The company evaluated offshore production alternatives but decided against them for the moment. This decision was made because overseas suppliers would lock the company into set production volumes rather than letting it respond to the market variations on short notice, Canion emphasizes.

Avoiding conflicts

"Any moves you make in distribution are going to be with you for a long, long time," Canion points out. With more than 2,500 outlets worldwide, Compaq's basic dealer-only distribution scheme remains unchanged.

Compaq's setup pleases dealers who are tired of going up against IBM's direct sales force. They also like a second source. "No businesswoman wants to have an 80% dependency on one vendor," Cooley points out.

Compaq: Starting big from the beginning

"There are no textbooks on how to go from zero to 111 million to 359 million dollars in a fiercely competitive business," according to venture capitalist Ben Rosen. A prime reason Compaq pulled off that start in less than three years was that "the company hired the management of a billion-dollar company as a start-up," according to Rosen.

"We started at the beginning knowing we were going to have to be big to succeed," Kevin Ellington, senior vice-president of Compaq's Personal Computers Division, explains.

"We structured an organization chart and recruited a lot of people who were really overqualified for their jobs at that time. ... We hired people who had scars; people who had paid the price and made mistakes, who had some experience and knew where the problems were going to be."

And they hired people they knew.

Most of the senior executives had worked together at Texas Instruments, Inc. "We have been through some hard times and some good times," says Murray Francois, head of Compaq Telecommunications. "We know each other. You don't have to figure out what the hidden agenda is."

Old friends

Ellington points out that three of the six executives reporting to President Rod Canion — himself, John Gribli, senior vice-president for finance; and James Eckhart, corporate operations vice-president — have known each other for 20 years.

"To an outsider, our organization may look a little funny," he says. "That is not really a factor because it works very well."

Compaq also reached out for talent. Both H. L. Sparks (who played a crucial role in recruiting dealers and now heads Compaq Telecommunications' sales effort) and Corporate Communications Vice-President Jim D'Arezzo came from IBM.

Like most other top recruiters, D'Arezzo says he had an excellent job and had no intention of leaving IBM when Compaq first called. Like Sparks, however, he was an early member of the IBM Personal Computer team, and he missed the feeling of entrepreneurship after being "pulled back to the monolith." In Rye Brook, N.Y.

Once they took the leap and moved to Houston, top personnel stayed. Cofounders Bill Murto and Harris have filled various roles; Murto works in marketing while Harris remains in development.

"Compaq did not lose any senior staff until this September, when IT&T Information Systems made Compaq sales vice-President Max Toy an offer too good to refuse."

Consensus with leader

Canion attributes much of Compaq's success to its decision-making process, which he defines as "consensus with a leader." The approach minimizes unnecessary contention and helps to ensure that all angles of a decision are covered, he says.

Once decisions are made, the company moves quickly, Ellington explains. In a favorite example, Compaq defined the Deskpro line around Christmas 1983 and shipped the whole product family from a new factory six months later.

Compaq also gives top staff a great deal of autonomy, the most striking example being Compaq Telecommunications. "If we need support (personnel), we pick up the phone, and they are here that same day," Francois says. "If we don't ask for help, we don't see it."

"They give us good advice and feedback and cut our budgets constantly, just like typical investors, and that's it," he says. "As long as we meet our commitments, I don't expect to see a bundle of Compaq executives here helping us out."

"Our biggest internal challenge is to enhance the culture we have," Ellington explains. "That may sound trite, but as long as we can keep that culture alive, I think people will be able to cope with changes in the external market."

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'Compaq is] still very small relative to the competitors: IBM, AT&T and Apple. We have to show agility and a keen understanding of the market and provide what the market needs without compromising. Any mistake could cost the company dearly. . . . Our products have to be right.'

The policy clearly pays off for Compaq as well. "Some people confuse channels with markets," Ellington says. "You can look at too many examples of conflicting channels; that has been the major reason why most of the minicomputer suppliers were not successful in micros. IBM is the only company that has been successful at having multiple channels.

"We don't set out as a goal to keep dealers happy," Ellington declares. "There have been many cases where temporarilly they have been very unhappy with us." Instead, he says, Compaq aims to put together a complete strategy for manufacturer, dealer and customer and sell that strategy to the dealer. "We probably spend a disproportionate amount of resources on market research and marketing efforts, and we use that data to try to educate the channel." In one case a few months ago, market research picked up a massive shift in user experience, he says. While a year ago first-time users accounted for three-quarters of sales, second-time users now buy the majority of Compaq micros.

Compaq's overall performance garners some kudos from dealers—an unusual occurrence in the dog-eat-dog market. The supplier "has consistently demonstrated commitment and understanding and flexibility in dealing with the dealer network," Entre's Rodenberg says. "We like to deal with Compaq."

Meeting all expectations

Despite the bleak industry headlines, sales of business personal computers grew about 30% this year, Preston estimates, noting "the outlook for the industry and Compaq next year is even better. Compaq has met or exceeded all our financial expectations. Confidence in Compaq has increased significantly on Wall Street."

"If something goes wrong, it will be executive failure," Preston augurs. "There's not a whole lot of room for error but probably a little more than there was a year ago."

"We are still very small relative to the competitors: IBM, AT&T and Apple," Ellington notes. "We have to show agility and a keen understanding of the market and provide what the market needs without compromising." Any mistake could cost the company dearly, he says. "We couldn't afford a PCjr. . . . We don't have that deep a pocket. Our products have to be right."

But if Compaq continues on course, Rosen says, its potential is huge. "The business personal computer is only about five years old, and the market is far from saturation," he maintains.

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do. So it may be a long time before they approach that barrier.

The PC1, whatever it is to them in the future, is, has got to come sooner or later. But even after it comes, I don't think it will be at the end of the Personal Computer XT architecture; I think that's going to be around for a long time. But think it will be the end of the Along with open architecture?

There have been some recent announcements that say a lot about what IBM is intending. Also, look at it from a business-sense standpoint for IBM. Nobody expected IBM to do as well as it did. It chose a path in order to overcome all the barriers and become a leader in the market. That path was the open architecture approach. This was the right decision, because it worked. It got to the 60% or 70% market share, and it guarantee you that nobody thought it could get that high that quick.

But in doing that, IBM also locked itself in because it was so successful. If it tried to cut [the open architecture off], it would have great difficulty getting the users out there to follow it into this incompatible path because there would be a lot of people like Compaq giving the users a way to keep going down this compatible path. From a business decision standpoint, it's almost inconceivable that IBM would try to cut off compatibility with the standard.

IBM doesn't want the industry to be nervous and to be taking actions to prepare for this eventual cutoff, because this would hurt it. It's the right thing for IBM, but it's also good for everybody else in the industry. It sets a stable path that's going to be good for the end users.

To some degree, this is theory. A year ago, it was a lot more theory than it is now, because the pieces keep falling in place. If IBM were ever going to make this cutoff move, the [Personal Computer AT] was the last possible time they could have done it. They started a new generation, another six years of architecture, that was open and compatible, there was no turning back.

Who is your brain trust, and how does Compaq make decisions? The brain trust is the management team of Compaq. We use a process that is very much like consensus. It's sort of consensus with a leader.

All the hard decisions, all the long-term, far-reaching implications kind of decisions we put a lot of time into. We don't put the burden on any one individual to have to be right.

What we do is bring the right set of people who have different views, different backgrounds, different sets of experience, different expertise in on the process. Whenever you get people like that together on a critical issue, there are always disagreements. And it's in those disagreements where you find the answers to what you really need to know. You don't just argue until somebody wins. We use this consensus process to find out where there's a disagreement, on what assumption or fact is there a disagreement. When you tear a top-level argument down to its basic level and you get agreement there, then you almost always end up agreeing on the thing you disagreed on before.

How did that approach come about? It sort of started back when Jim [Harris] and Bill [Murto] and I began to work on a strategy on how to get Texas Instruments into the disk business. There were no taboos. We
went in any direction — anybody could ask any question — and we kept working at a problem until we knew we had the answer. When you got to the right answer, the beauty of it is that you know you've got the answer because all the significant questions have been taken care of.

We evolved into that [process], and it made sense. It was never a theory, we never sat down and figured out that was the right way, it just felt like that worked.

Then, as we began bringing new managers into the company and [the process] was not familiar to them, they would ask questions about it and wonder about it. It was frustrating to a degree during the process because it takes some time.

The spirit of the process is that if anybody on the team isn't satisfied, he either learns what you know or he convinces you the other way. That's why the process works so well.

There's no reason that the process can't work as the company gets bigger, except for communicating and educating the people in that process. It makes good sense to people after they know it and especially after they've seen it operate.

No matter how good you are, you're going to make a mistake from time to time. And in some areas, like in manufacturing or operations, where you're making day-to-day decisions, one of the underlying values of being in a small company is that you have a sense of what's going on. Communications happen very quickly; if something happens over in sales, you know over in manufacturing real quick. So we work hard to keep all the people in the company generally informed about what's going on.

One of the real underlying values of being in a small company is that you may have a sense of what's going on. Communications happen very quickly; if something happens over in sales, you know over in manufacturing real quick. So we work hard to keep all the people in the company generally informed about what's going on.

Will that job get difficult as Compaq's growth slows?

I think [motivation] is less dependent on expanding a person's job than it is on the person's knowing that job is important. People are looking for satisfaction, and a lot of people believe that their satisfaction is going to come from getting that promotion or getting that bigger job. But people can be very happy in the same basic job for a long time if they really know it's worthwhile.

That's the key underlying principle in the company, even for the people in the production line. We switch the mix on them during the middle of the month; they go work hard, and they make it happen. Then we end up with a good quarter, and they see the results. They know [they're] part of that; they know if they hadn't stretched to make it happen, we wouldn't have been able to deliver those results.

That's something you can't buy with money, with stock, with promotions. It's artificial to try to keep growing and keep promoting people because you can't keep that up indefinitely.

Do you wake up in the morning and say, here I am, chief executive officer of the fastest growing company in history? No, not really. [laughs.] I wonder why.

I wake up in the morning impressed at how far Compaq has come. At any given point in time, when you've got good tight control, you know what's going on and you know why you're doing things, you don't have this feeling of wonder. It makes good sense to you.

You've got to look back over a long period of time and say, "Gee whiz, we really have come a long way, but when I look forward, I feel no wonder or fear because, for however far out we can see, we have things planned and identified.

For all of that planning, there's also an underlying element of constant openness to change. We've got to plan for what we're going to be doing nine months from now. But everybody knows that's the wrong plan. It's just the best thing we know right now.
Compaq’s telecom approach bold but conservative

Compaq is as closemouthed about specific product plans as any other major computer company — much more often than laptops or 32-bit chips — communications.

While telecommunications is “a relatively small driving force in personal computing,” we are about to see an information services revolution,” President Rod Canion predicted earlier this year at Comdex/Spring.

“Compaq Telecommunications Corp. has stuck to them,” he adds. “They haven’t let anything change their mind, and they have given those strategies enough time to come to fruition.”

Compaq Telecommunications has signed reseller agreements with Bell Atlantic Corp., GTE Corp., Pacific Telesis Group, Tel Plus Communications, United Technologies Communications Co., Mitel, Inc. and others.

“If you add up the revenues of our channels, they are at about $60 billion a year, with 2,500 to 3,000 field sales people that sell data products,” Francois estimates. That will help to give Compaq good market position before the big guys — IBM and AT&T — jump in.

“I’m very pleased, but frankly the whole process of closing these channels has taken much longer than we anticipated,” he remarks. However, personal computing is “a large amount of education to convince people that Telecompaq is really an effective business tool and to explain to them exactly what it is.”

Once again, [Compaq] has adopted a distribution strategy and a sales/marketing strategy, and they have stuck to them,” he adds. “They haven’t let anything change their mind, and they have given those strategies enough time to come to fruition.”

Compaq Telecommunications is planning for the long haul. One key ingredient is its large company, but everyone has had about 20 years of experience.

“Everyone has had training at a large company, but everyone has had a start-up in between the large company and this company,” Francois says. “[And they know] that when the truck pulls up at the back dock to unload the first load of furniture, you stop your strategic planning, and you go unload the truck.”

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Software that learns

Artificial intelligence languages such as LISP, Forth and Prolog improve as they are supplied with more data. Someday, expert systems will go beyond determining "true" vs. "unknown" and register degrees of belief and confidence, but not without new memory technology.

By David Wyland

To design artificial intelligence hardware today means to design a computer to support an AI language such as LISP, Forth or Prolog. LISP is the premiere AI language, and the terms "AI hardware" and "LISP machine" are practically synonymous.

Forth is similar to LISP and in some ways bridges the gulf between LISP and conventional programming. Forth has begun to be used for some applications-oriented AI work and has also begun to receive hardware support.

Prolog is a relatively recent invention in the AI field and is well suited to the design of expert systems. It is intended to be the core language of the Japanese fifth-generation effort and is also the subject of hardware development effort.

The simplest definition of AI is "software that learns." A conventional program, such as a payroll program, is like a machine with constant, reliable characteristics. The way the payroll is calculated this week must be exactly the same as it was calculated last week. Such programs are specified, designed, coded, tested, installed and maintained like hardware.

But AI programs learn. This means that their performance improves with time as they are supplied with more information. AI programs often look like a prototype of a conventional program in the midst of debugging. For this reason, AI program development and environments tend to be oriented toward prototyping and interactive debugging.

When a development problem is not well understood, a prototype can be used to explore and understand the problem. For example, in designing an expert system for medical diagnosis, the first task is to acquire the medical knowledge from the experts and build it into the expert system in the form of rules.

But this knowledge is often imprecise and contradictory. Not only do experts disagree, but they may include conflicts within their own stated rules. The rule they think they use is often different from the unstated rule they actually use.

Conflicts can be resolved by building an AI system, trying it out on case histories and refining the rules with the help of the experts until the diagnoses come out right. Then the software will have "learned" to diagnose properly. In this way, prototyping and debugging are actually the tools for writing the program.

The LISP difference

LISP is the primary AI language and has a long and rich history of development. Many people are not aware that LISP and Fortran were created at approximately the same time in the early days of computing during the late 1950s. Whereas Fortran was put forward by a business machines company to make writing programs for computers easier for people, LISP was created by a university professor as a notation for advanced problems in mathematical logic. This very different orientation led to a very different language.

LISP has four major features that make it radically different from Fortran:

- Its primary variables are symbol structures
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Although it is unconventional, ... the heap approach solves the memory allocation problem that often plagues conventional systems. Any part of this system can expand or contract as needed without requiring that data in memory be moved around to make room for the change.

LISP deals with symbol structures as its variables. An example of symbol structures are hierarchical file directories such as those used in AT&T Unix and Microsoft Corp.'s MS-DOS. A path name can refer to a file, a directory of files or a directory containing a mixture of files and other directories. What is of interest is not the content of the files but the structure of the directories.

In LISP, the bottom elements are "atoms" instead of files, and users deal with lists of atoms in the same way they deal with directories of files. The lists in LISP, such as hierarchical file directories, can be any combination of atoms and lists, from a single atom to an arbitrarily large nested structure.

LISP represents list structures by lists of pointers, in the same sense that Fortran represents numbers as patterns of bits in a word. LISP's basic functions allow creating, modifying, taking apart and testing these structures. This is important to AI work because one of the methods of representing knowledge is to build a structure of relationships among various concrete facts.

The heap memory of LISP is radically different from the linear memory concept underlying conventional programming languages. In LISP's heap memory, words in memory are not part of a large, contiguous block of memory but are individually assignable and may be linked together to form lists. Each list becomes, in effect, its own memory, independent of other lists in the system. There is no global memory address, only the position of a word within a list.

Heap memory is built from conventional memory. Each element of the heap memory consists of a data word and a link pointer, called a pointer pair. The link pointer points to the next element in the list or to a terminator element, "nil." Memory assignment in LISP begins with the "free" list, or heap — the list of unused memory elements.

Creating a new list is done by taking elements from the free list and linking them together to form the new list. When a portion of the list is discarded, its elements are returned to the free list.

The heap approach to memory has one major, necessary advantage for LISP: With this system, any list can expand or contract independently of any other list. This is essential, since the list structures grow and change as a result of program manipulation, and it is impossible to predict beforehand the amount of space to be allotted to any given list.

Although it is unconventional and requires perhaps twice as much physical memory space because of the link pointer, the heap approach completely solves the memory allocation problem that often plagues conventional systems. Any part of this system can expand or contract as needed without requiring that data in memory be moved around to make room for the change.

Programming in LISP is done by defining functions in terms of previously defined functions or primitive machine code. Once defined, a new function is indistinguishable from any other previously defined function, including the original set supplied with the language. A primitive function is invoked in the same manner as an extensive procedure or program.

In LISP, users write a program by extending the language and creating a new vocabulary for the current problem. The function approach to programming derives in part from the discovery that programs can be defined by a list structure of the same type as the data structures manipulated by LISP. The program is a structure of primitive operations, in effect similar to a set of nested subroutines, where the atoms of the list are the primitive operations of the machine.

This concept was given theoretical backing by the development of the signal flow graph concepts that provided the basis for structured programming.

Finally, LISP is interactive. This means that the functions defined in LISP, including the ability to define new functions, can be invoked immediately from the keyboard. The interactive quality supports prototyping and debugging by allowing the programmer to modify and test functions quickly and to build accurate answers and originate, and complete diagnostics.

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A list is a collection of atoms connected by pointers. Atoms are interesting in another sense: They can have values and can also be the names of functions. An atom, in fact, is just a name or word. A list structure defines the relationship among the atoms in the same sense as a sentence defines the relationship among the words it contains.

In LISP, the features that support structure manipulation are also available for program analysis during debugging.

**LISP: Implementation**

Symbol structures in LISP are made up of lists of pointers. In one example there are two lists: the free list and a set of atoms. The lists can be described in tree structure form, in the pointer-pair form and as they are implemented in physical memory. Increasing the list of atoms in size by one atom illustrates the transfer of a memory element from the free list to this list. Note that the free list includes the list of atoms as one of its elements. Here, we come to our first problem. There is nothing obvious to distinguish a pointer to an atom from a pointer to a list. This implies that we will need some additional information to distinguish atoms from lists, since one of the basic operations is to find an atom in a list and compare it with another atom. This is often done by dividing the physical memory address space into two sections, one for atoms and one for lists, and using the physical address of the pointer-pair element to distinguish between an atom and a list.

Atoms are interesting in another sense: They can have values and can also be the names of functions. An atom, in fact, is just a name or word. A list structure defines the relationship among the atoms in the same sense as a sentence defines the relationship among the words it contains.

An atom in LISP can either have no intrinsic meaning (to the program, only the programmer), or it can be the name of a list structure or the name of a function. This allows one until, the atom, to be used for all three functions. The value and the function of a list atom are identified by pointers to a value list and a function list, respectively. Two atoms can have the same value as their value has. This is allowed in part because list structures can be arbitrarily large, and copying them to provide each atom with its own copy of a list would be impractical.

This leads to our next problem. If an atom has its value pointer changed from one list to another, it is not clear whether the elements of the old list can be returned to the free list because it may still be the value of another atom. Garbage collection is done in two phases. In the first pass, each value and function list for each atom is scanned, and each element in the list is marked. In the second pass, the whole physical memory is scanned, and unmarked memory elements are returned to the free list.

Garbage collection relies on the idea that every valid list is the value of some atom. In a simplified explanation, the list is pointed to by the value or function pointer of some atom, and every memory element in use must be a member of such a list.

In LISP, the problem of changing pointers is handled in the traditional manner: Ignore the problem until a crisis results.

Garbage collection is done in two phases. In the first pass, each value and function list for each atom is scanned, and each element in the list is marked. In the second pass, the whole physical memory is scanned, and unmarked memory elements are returned to the free list.

This brings up our second problem: Users need some method of marking memory elements without disturbing the pointers the elements contain.

Programs in LISP have the same form as any other list structure. The only difference is that the atoms on the list point to primitive functions, which are executed as machine code. Executing a function means going to the list point indicated by the function pointer of an atom and executing each atom in that list in sequence.

Considering the function list as a tree structure, execution of the list involves going from the root to each of the leaves on the tree in succession until the last leaf has been reached.

The evaluation rule is that the first item of each list is assumed to be a function, and the following items are assumed to be arguments. An example of a LISP function is shown in Figure 1. This brings up the third problem: identifying primitive functions. Not only must we be able to tell the difference between an atom and a list, but we also must be able to tell the difference between a primitive function atom and a regular atom. The evaluation scanner must scan through the nested lists of functions until a primitive function atom...
is found and executed as machine code.

**LISP: hardware design**

The problems of identification described above are generally solved by adding identification bits to the pointers in the memory elements. These identification bits are used to identify atoms and primitive functions and as a flag bit for garbage collection. The physical memory word that holds the pointer is therefore divided into two sections: the pointer itself and the additional flag bits. Once tag bits have been included in the design, their functions can be expanded beyond those described above. One of the most important of these functions is type checking. This is an extension of the concept of identification, which allows the programmer to differentiate between different classes of data structure — data types — by setting the tag bits.

This is an important debugging function, since it allows the programmer to catch a function in the midst of attempting to use the wrong data type at the time it happens.

Another hardware feature characteristic of LISP machines is the availability of microcode to the programmer. Microcode provides direct programming of the internal hardware of the machine and results in the fastest program execution. Since LISP programming is done by creating functions, it is uniquely suited to be used of microcoded routines. Microcode can be used to speed up the execution of heavily used functions to achieve an overall performance improvement in a program. LISP has the advantage of allowing this conversion to microcode to be done incrementally. Functions can be converted to microcode without disturbing the rest of the program by simply changing the function pointers on the associated function atoms.

A third value hardware feature in LISP machine design is a large virtual memory. A large virtual memory allows users successively to run programs that build a list of memory structures. There are programs that take the better part of a gigabyte of memory to run to completion.

Virtual memory also provides speed indirectly. Garbage collection, although occasionally necessary, is time consuming. It may take one machine cycle to execute a primitive function, eight machine cycles to allocate a new memory cell from the free list and 35 cycles per element to return it to the free list as a result of garbage collection. If the virtual memory is large enough, the program may never exhaust the free list, making garbage collection unnecessary.

The problems described above were addressed by a group at MIT in 1979 and resulted in the design of a LISP machine having the design of a LISP chip called Scheme 79. The MIT LISP machine design is based on a micrologic domain and serves as the foundation for most of the LISP machines in production today.

Some of these include the LISP-1 system, Memacry, Inc.; the Symbolics, Inc. machines; and the Texas Instruments, Inc. Xerox Corp. also has been an active developer of LISP machines, notably its 1100 RISC series machines based on its work with Interlisp-D. Getting tag bits used as identifiers represent the principle design difference between LISP machines and standard computers. They provide a performance advantage by performing the heavily used identification functions in hardware rather than in software, as had been done in the past.

There is some potential for trade-off in this area. Some companies are investigating the middle ground using a fast conventional machine in conjunction with less ambitious methods of identification.

**Forth: implementation**

Forth is an interesting blend of the features of LISP and those of conventional languages. It has the functional approach to programming and the higher expressive character of LISP, but it uses conventional variables instead of stacks or environment variables and conventional memory instead of the linked-list memory of LISP. Use of conventional memory addressing and variable storage allows direct access to the hardware features of most machines. Because of this combination of conventional memory usage with interactive programming, Forth has become popular with people doing prototype hardware developments.

Forth's recognition as an AI language came when a team at General Electric Co. used it to create an expert system for locomotive maintenance. It is also used in robotics research, an application field of AI.

Forth uses the same type of functional approach as LISP. Functions are defined in terms of other functions or as primitives in assembly code. The difference is that Forth lists in the conventional sense, as a set of contiguous memory locations. An example of a Forth function is shown in Figure 2.

Forth avoids the identification problems of LISP, since there is no need to identify the difference between a list and an atom for data manipulations and there is no garbage collection. Also, the distinction between a list of functions and a primitive function in the program is handled differently, by providing an extra pointer at the head of each list to provide this identification.

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**Forth uses conventional variables for data storage. It also uses a data stack and reverse polish notation as the basis for accessing and manipulating these variables, in a manner similar to a reverse polish notation calculator. The reverse polish notation provides a uniform method of parameter passing among the various functions.**

**Forth: hardware design**

Because of the simple structure of Forth and its use of conventional memory without requirements for tag bits, the design of a Forth machine can be relatively straightforward.

Forth uses a small list scanner, called the inner interpreter, to scan through nested lists and execute primitive operations. Implementing this inner interpreter in hardware yields a major improvement in Forth execution speed. This is usually implemented within a small amount of microcode — three additional instructions in a conventional instruction set, for example. Because Forth uses a return stack and a data stack in its basic operation, speed can also be gained by making these true hardware stacks capable of operating in parallel with memory accesses.

Traditionally, Forth has been associated with computer system hardware development, so the concept of Forth hardware has focused on chips capable of being used as components in a hardware system using Forth. Rockwell International Corp. pioneered in this area by bringing out the 65F11 Forth chip — essentially 6502 microprocessor with the Forth interpreter in an on-board read-only memory. Also, Zilog, Inc. has introduced a version of the Z8 microprocessor chip with built-in support for interpretations of the internal interpreter of Forth built into the chip instruction set for speed.

Recently, Novix has created a good deal of interest by making a Forth chip out of a gate array. This chip directly executes Forth primitives and is capable of 5 million instructions per second (Mips) performance, as measured in Forth instructions.

**Prolog: logic programming**

**Prolog, a relatively new language in the AI world, is based on the concept of logic programming. Logic programming eliminates a direct dependence on program sequencing. A Prolog program is a set of rules that perform “this fact is true if these facts are true” operations.**

In this kind of inference, the program uses a rule to infer that some fact is valid based on other facts being valid. A newly valid fact can also be used in other rules to infer yet more things.

Prolog is exciting because it allows users to create and add to a set of rules and then have the machine deduce things from those rules that may not have been obvious before. Although logic programming sounds very exotic, a practical example of logic programming hardware has been in use in the factory for years — the programmable controller.

A programmable controller contains statements such as “If switch 7 is on and switch 9 is off and switch 13 is off, turn on pump 3.” This might be shown as follows:

```
SW7/SW9 SW13 PUMP3
```

A programmable controller program consists of a list of logic statements, such as this one, that turn things on or off, including flags that can be used as inputs to other logic statements.

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The advantage of backward chaining is that when the program has inferred a fact to be true, users have a path for tracing the specific rules that made it true. This allows users to ask why that particular statement is true and to get an answer in terms of the rules that proved it true.

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Prolog rule evaluation

```
Example rule set
1. (son Jim George):-
2. (son John George):-

Evaluation sequence
Step Action
1 Testing (brother Jim John)
2 Get first term, (son Jim George)
3 Find matching rule: rule 1
4 Put term on stack, test rule 1
5 Rule 1 valid, therefore term valid: pop stack
6 Get second term, (son John George)
7 Find matching rule: rule 2
8 Put term on stack, test rule 2
9 Rule 2 valid, therefore term valid: pop stack
10 End of terms, rule still valid, (brother Jim John) now fact
```

Figure 3

brother of John, as shown in Figure 4. This might be expressed as (brother Jim John). In attempting to prove this, the machine will encounter (brother A B), where A and B are logical variables. Upon first encounter, A and B are uninstantiated: They have no assigned value (have not been represented by anything concrete). When

Prolog with logical variables

```
Example rule set
1. (son Jim George):-
2. (son John George):-

Evaluation sequence
Step Action
1 Testing (brother Jim John)
2 Get first term, (son A X)
3 Find matching rule: rule 1, (son Jim George):-
4 Put term on stack, test rule 1
5 Rule 1 valid, therefore term valid: pop stack
6 Get second term, (son B X)
7 Find matching rule: rule 2, (son John George):-
8 Put term on stack, test rule 2
9 Match of B because B uninstantiated
10 Rule 2 valid, therefore term valid: pop stack
11 End of terms, rule still valid, (brother Jim John) now fact
```

Figure 4

searching rules for a match, uninstantiated variables will match anything. Therefore, (brother Jim John) matches to Jim and John until that statement is proven or disproven for the case of the match. Thus, the rest of the statement would read: (son Jim X) and (son John X).

Evaluation proceeds further with a search for a match with (son Jim X). In this case, (son Jim X) matches (son Jim George). When the match is made, X is instantiated to George. The next fact to be proven is (son John X), since X has been instantiated to George. We find (son John George) and the second, concluding fact is proven. As a result, the whole rule (brother Jim John) is proven.

Prolog is usually built from or in conjunction with LISP, where LISP provides functions and actions complementary to Prolog. This is because pure Prolog deals only with logical statements and does not perform any operations. LISP machines therefore served as the first Prolog machines.

Prolog can execute at high speeds by taking advantage of the opportunities for parallelism suggested by the method of evaluation of its rules. One method is to evaluate all the facts of the rule in parallel. This is called AND parallelism. Another method involves attempting to prove a given fact by trying to prove all the related rules in parallel. This is called OR parallelism. This method is complicated by the assignment of logical variables.

There is a great deal of fervor in the area of developing Prolog hardware, and it is early yet to see how it will all turn out. Some Prolog machines have been developed to the prototype stage, and work is proceeding on others.

For AI hardware in the near term, we will undoubtedly see more of the same: faster LISP machines and Forth chips and perhaps Prolog chips. There is also some interest in taking expert systems hardware beyond the binary evaluation of a "true" or "unknown" and into degrees of belief and confidence based on techniques such as the Dempster-Shafer method.

Optical disks may provide an interesting adjunct to large LISP systems. Optical disks have the potential to provide gigabytes of storage at low cost. If programmers can assume gigabytes of write-once storage, they may have the basis for a system with no garbage collector.

The essence of all computers is memory. Computers can be considered, to a great extent, as memory controllers. They function by moving bits around in memory and the memory's nature has a lot to do with the nature of the machine. Radical change in AI hardware is likely to come from new types of memory. AI machines, while unusual

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The essence of AI is learning; the industry is investigating other techniques of memory and memory organization to serve this learning function. If this kind of memory can be translated into hardware, it can provide a method of dealing with approximates, of teaching the computer to understand "similar to" rather than "same as.

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Dressing up SNA

Heavier communications demands are driving IBM to enhance SNA. Features such as APPC, DCA and DIA link remote resources for cohesive distributed processing.

By Donald Czubek

Systems Network Architecture (SNA) has been the cornerstone of IBM's communications strategy for more than 10 years. During that period, SNA technology has evolved in every way except one — it has not really affected the way applications are designed.

However, over the last year or two, IBM has introduced changes to SNA and other communications architectures that allow the creation of true distributed applications with formal architectural interfaces.

The driving force in IBM's marketplace is the migration from dumb terminals to intelligent workstations, such as the IBM Personal Computer, configured in large networks. IBM and most other workstation manufacturers modeled early implementations of SNA after IBM's old terminal products, most notably the 3270. These products were designed to do one thing — to communicate with mainframe-based applications.

IBM's new workstations and multiuser systems, such as the System/36 and 5520 Administrative System, are designed to bring computing power directly to the user, who no longer relies solely on mainframe-based applications. These workstations have completely different communications requirements from those of their predecessors. In addition to mainframe access, the workstations require direct peer-to-peer communications between themselves and a standard applications program interface to the network. IBM enhanced SNA to meet...
these new networking requirements.

**Distributed networks**

Even though SNA was originally designed to support communication between intelligent systems, early SNA networks also supported the connection of dumb terminals to IBM mainframes. The main reason for this was to maintain compatibility with existing bisynchronous communications products such as the Interactive 3270 and the 2780/3780 batch workstations. There was, and still is, a large installed base of these dumb terminals that IBM had to protect.

Most of the early SNA workstation products were really just SNA versions of the bisynchronous products. The bisynchronous 3270 was replaced with a functionally equivalent SNA 3270, and the 2780/3780 workstations were succeeded by the 3770 batch workstations.

The resulting early SNA networks were hierarchical structures that relied heavily on an IBM mainframe for both network control and applications processing power. The various SNA workstation products also used incompatible subsets of SNA protocols, which meant that dissimilar products such as the 3270 and 3770 could not communicate with each other.

**Changing requirements**

The widespread use of intelligent workstations is changing both the structure of the SNA networks and the way that the networks are used. Now, each workstation is capable of performing local processing and does not have to rely on a mainframe computer. This leads to a new set of communications requirements:

- Compatible protocols between all types of workstations.
- Standard application program interfaces to the network.
- Direct peer-to-peer communication between workstations in addition to mainframe access.

These requirements are addressed by a set of enhancements to the original SNA architecture that are known as Advanced Program to Program Communication (APPC). APCP is now being supported by a wide range of IBM products such as Displaywriter, Scanmaster, 5220 Administrative System, the System/36 and 38, CICS/VS, the 8100 series and Series/1.

In addition to enhancing SNA, IBM has developed two architectures that are aimed at the office automation marketplace. These architectures, Document Interchange Architecture (DIA) and Document Content Architecture (DCA), coexist with SNA and provide services that are required for document distribution and retrieval. While most IBM products that support DIA and DCA also use SNA as their underlying transport protocol, DIA and DCA are separate architectures and do not require the use of SNA.

**Document Interchange Architecture**

Document Interchange Architecture defines data structures and protocols that support such office communications functions as electronic mail, document retrieval, and library searches. DIA provides services in four major categories:

- Document distribution.
- Library.
- Application processing.
- File transfer.

DIA defines protocols for distributing documents to one or multiple recipients; SNA alone would require multiple transmissions by the sender to accomplish this. DIA also supports functions such as the retrieval of messages from "mail boxes."
and confirmation of the receipt of documents.

The library functions of DIA allow a user to store a document along with a description of the document in libraries. It also defines protocols for searching document descriptions in libraries and then retrieving the appropriate documents. A user could, for example, ask to see all documents written by Smith during July on the subject of data communications.

The application processing facilities of DIA allow a user at one workstation to invoke the execution of a program at a remote workstation. The file transfer services define architectural protocols for moving files to and from file servers.

Document Content Architecture describes the data streams that represent documents. DCA usually describes text documents but can also be used to represent other types of data such as graphics and user-defined bit streams.

There are two types of text data streams that are currently supported by DCA: Revisable Form and Final Form. Revisable Form DCA conveys all of the original intent of the document's author. This is similar to the internal data forms used by word processing systems. Revisable Form documents can be created at one workstation and then sent to another workstation for revision.

Final Form DCA documents are data streams that are in a format for final display or printing; they cannot be revised in a meaningful way. Final Form is typically used when sending documents to a printer for output.

The use of DCA within IBM's diverse product line ensures that documents created on one type of workstation can be sent to a different type of workstation for further revision or display.

This provides document compatibility across IBM and IBM-compatible products.

The current host-based applications that are designed to support dumb terminals such as the 3270 will not be immediately and directly affected by these new technologies. There is no real migration path for these applications because they were not designed with distributed transaction processing in mind.

Technology impact

Over a longer period of time, many of these applications will probably be redesigned to take advantage of these new technologies. These new technologies will affect two categories of user applications. The first category is office automation applications that are designed to support intelligent, distributed workstations. These applications are already available from IBM in its DISOSS and Personal Services software packages. Other manufacturers such as Digital Equipment Corp. and Data General Corp. have also announced products that support APPC, DIA and DCA.

The second category affected is the next generation of user-designed and written applications that are designed from the beginning as distributed applications. These applications will almost certainly use APPC as their base.

Several IBM products, including the System/36 and 38 and CICS/VS already support "open box" interfaces that allow users to write their own distributed applications. These applications will use APPC to tie together remote resources such as data bases, I/O devices and processing power into cohesive distributed applications. These distributed applications will not replace host-oriented, 3270-based applications in the near term. To make use of these technologies, users will have to redesign applications, meaning that 3270 compatibility will coexist with these newer technologies for many years to come.
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Randy T. Andes, Director of Marketing, Enertronics Research, Inc., St. Louis, Missouri.
IBM users get hand-held terminal

Users can access an IBM mainframe from up to a mile away with a new wireless hand-held terminal and communications system that obviates the need for the usual dedicated coaxial cable or telephone line and modem.

The wireless communications system is the product of a joint development effort between Motorola, Inc., which provides the terminal and radio communications gear, and Natick, Mass.-based Pathway Design, Inc., which contributes an IBM gateway.

The wireless system is intended for use in field applications, such as in warehouse and distribution operations. For example, a fork-lift operator could use the system to query a database and determine where to pick up and where to drop off.

A Motorola hand-held terminal, the KDT 800, contains a two-way FM radio internal antenna; a two-line by 54-character screen; 160K bytes of read-only memory, of which 96K bytes can be used for customer programs; and up to 80K bytes of random-access memory.

The terminal can reportedly run applications while transmitting or receiving.

The hand-held terminals communicate with a Motorola base transmitter in full-duplex mode at speeds of up to 4.8K bits/sec. at distances up to one mile. The base transmitters, which sit next to an NCP 500 network controller, translates radio frequency waves into asynchronous characters.

The NCP 500 can support up to three base transmitters. It emulates an IBM 3270 page controller, which provides the conversion from asynchronous communications to IBM's Synchronous Data Link Control and supports up to 32 Systems Network Architecture sessions. The NCP 500 controls network processes and features error checking and message queuing capabilities.

The price of a system ranges from $50,000 to $60,000, depending on the number of terminals and controllers required.

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Tandem disk, tape units bow

High-end storage subsystems boost Nonstop line

Tandem Computers, Inc. of Cupertino, Calif., in an attempt to improve its Nonstop superminicomputer system performance in transaction processing, has announced high-end disk and tape storage subsystems.

The products are the XLS Disk Storage Facility, the 5130/31 Tape Subsystem and very large-scale integration (VLSI)-based controllers for each.

The XLS Disk Storage Facility features up to eight 8-in. sealed Winchester 520M-byte drives. It is capable of storing up to 4.25G bytes of data and has a seek time of 15 msec per access arm, according to the vendor.

It incorporates the 3108 VLSI-based controller and the company's parallel data access architecture that uses multiple disk modules to minimize queuing, to optimize disk space use and to allow concurrent access to multiple data files to enhance throughput, the vendor said.

The XLS was designed for use with Tandem's TXP and Nonstop II systems. The minimum configuration, which includes a cabinet with 2.1G bytes, costs $168,000.

The 5130/31 Tape Subsystem uses a new controller that enhances data integrity by incorporating high-density VLSI gate array technology to provide error checking, fault detection and recovery and faster data rates. It has a tape speed of 200 in./sec., and it reads and records data at densities of ANSI-compatible 6250 and 1,650 bit/in.

The tape subsystem permits automatic tape threading, power windows, tape quality monitoring and automatic cleaning. The tape path was designed to minimize tape friction and wear, the vendor said.

The 5130 subsystem with cabinet, one tape drive and a formatter that supports up to four tape drives costs $58,000. Additional drives are priced at $29,500 each.

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NCR offers IBM-compatible PC41 personal computer

NCR Corp.'s Personal Computer Division of Dayton, Ohio, has introduced a version of its IBM-compatible NCR PC41 personal computer. Called the PC41, this version is compatible with the IBM Personal Computer and the Personal Computer XT. According to a spokesman, it will run IBM PC-DOS-based software without adaptation.

The PC41 provides 640-by 400-pixel resolution on both monochrome and color versions. It features eight expansion slots and has boards mounted on a pullout drawer to facilitate quick and easy board upgrading.

It contains a 16-bit Intel Corp. 8088 processor and, in the basic configuration, comes with 256K bytes of internal memory that can be expanded to 640K bytes on the main board. A parallel printer interface and an asynchronous communications interface are standard.

Other features include a detachable keyboard that has separate cursor keys, 10 programmable function keys and a numeric keypad; either a monochrome or color 15-in., 80-char. by 25-line monitor; software, including NCR DOS and on-line Help, a random-access memory disk; and the Basic programming language.

The PC41 can be configured with one or two 5%-in., 48 track/in. 360K-byte disk drives or one flex drive and one 5%-in. 10M-byte hard disk drive. The PC41 costs $2,485.

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IBM micros get Intersol TSM

Intersol, Inc. of Braintree, Mass., has announced an on-line transaction-oriented customer service and support management system that runs on IBM Personal Computers and compatibles.

Telephone Support Manager (TSM) was designed for manufacturing, distribution, service and sales organizations. It allows the collection of marketing and technical information, which is then available to the user via function keys. Users can keep service histories and generate credit card slips, cash receipts, invoices, mailing lists and labels. Management reports available include customer usage, open calls/pending trouble tickets, and revenue by day or month.

TSM contains eight user-definable Help screens, 90 user-definable problem codes, 99 user-definable product codes, 99 user-definable service codes and two miscellaneous information codes.

TSM is available in single-user and multiuser versions. System requirements are an IBM Personal Computer, Personal Computer XT, XT AT or compatibles with between 256K and 640K bytes of memory.

One-time licenses for TSM cost from $1,200 for a single-user to $5,000 for a multiuser system. Additional one-time licenses cost $500.

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NEW PRODUCTS

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**SOFTWARE**

**Systems Software**

Integrated Systems, Inc. has released Version 3 of its Applications Level Security Package (ALSP). ALSP is a host access-control package for all models of Digital Equipment Corp.'s VAX/VMS computers. It provides security at the menu level or for a specific application program. Security is based on defining secured applications at installation and assigning ALSP user identifications, passwords and application-related permissions to users of the secured applications.

The cost for a single-site, single-CPU license is $650. For a single-site, multiple-CPU license, the cost is $800. The source code is available for $2,000. The cost for an unrestricted license, including source code, is $3,500.

Integrated Systems, P.O. Box D, 170--Algonquin Pkwy., Whippany, N.J. 07981.

**Signal Technology, Inc.** has ported its Smartstar applications development and information management system software to Digital Equipment Corp.'s Microvax II. Smartstar comes in two configurations. Smartstar/Office gives visual programming tools for developing and using applications. Multiple integrated applications on a single screen can be created with up to 31 windows.

Smartstar/Toolkit components work with the office components to provide support for developing complex programming applications via a structured coding environment. Prices for full Smartstar range from $9,000 to $30,000. For Smartstar/Office, prices range from $4,000 to $16,000. For Smartstar/Toolkit, they range from $4,000 to $18,000.

Signal Technology, 5861 Encina Road, Goleta, Calif. 93117.

**Professional Software Programs, Inc.** has added two versions to its Project Control and Accounting System (PROCAS), PROCAS-100 and PROCAS-45.

PROCAS-100 was downsized to accommodate firms with up to 100 active employees in a single office environment. PROCAS-45 is geared to companies with a maximum of 45 active employees and offers the ability to budget projects by individual staff position within departments.

All PROCAS systems provide project control, payroll, accounts payable, accounts receivable and general ledger/financial reporting. Prices are $10,000 for PROCAS-100 and $3,500 for PROCAS-45.

Professional Software Programs, Suite 200, 618 U.S. Highway 1, North Palm Beach, Fla. 33408.

**Safeword Unix-Safe,** a security system for computers supporting the AT&T Unix operating system, has bowed from Enigma Logic, Inc.

The system protects dial-up lines and local terminals by controlling access to mainframes, minicomputers and microcomputers and their programs and data bases.

Safeword Unix-Safe software is compiled into the protected computer's operating system. Unix-Safe protecting access must provide a Safeword password that changes with each request and must be generated by the decoder and key. Communication between the decoder and the software is logical through the protected computer's terminal keyboards.

Software prices start at $3,500. The decoder and key typically sell for $110 per user, depending on functionality and volume.

Enigma Logic, Suite 301, 2151 Salvio, Concord, Calif. 94520.

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Signal Technology, 5861 Encina Road, Goleta, Calif. 93117.
With our software support, you’re never in over your head.

When you install NOMAD2, even on a trial basis, you'll quickly see the difference between inflated promises and support programs that give you and your users a real lift.

Because in the world of 4GL/DBMS products, no one provides a level of support comparable to NOMAD2.

For both your end users and programming staff, we offer some of the most comprehensive and flexible education in the industry—including computer-based courses and on-site training classes.

We maintain a customer support center that makes the word hotline obsolete. With knowledgeable high level technical assistance always available. And our documentation, both at end user and system level, spares no effort in achieving thoroughness and clarity.

Combined, our support programs are designed to provide you something that no other software company offers. The peace of mind you need to enjoy a different kind of support program.

NOMAD2, which runs on your mainframe or ours, is another step in a NOMAD evolution that began in 1975. For information write Roger Cox, D&B Computing Services, 187 Danbury Road, Wilton, CT 06897, or call (203) 762-2511.

NOMAD is a registered trademark of D&B Computing Services, Inc.
Introducing the TI 880 AT Printer. Because you need a multi-user printer that works overtime.

The last thing you need is the wrong printer. A printer that quits when your work is nonstop. Or one that burns out from overwork.

Let's say you have a typical multi-user environment or a local area network. It includes IBM Personal Computer AT's, PC/XTs or compatibles. What you need now is a printer that can handle your system's entire workload. A printer you can trust your business to.

You need a high-speed printer that's software compatible with PC industry standards and capable of sustaining 300cps. It should have straight paper paths to eliminate jams, changeable fonts and enhanced print modes to take care of draft, correspondence and graphics.

Cosmic Computer Service Annex has announced IGES 2 test file for use by computer-aided design systems designers. The data file contains CAD data formatted according to the National Bureau of Standards Initial Graphics Exchange Specification (IGES). Each CAD system must convert the IGES format data to and from its native internal formats.

IGES 2 contains 28 different IGES entities defining the geometric, annotation and display formatting information that is important in CAD information transfer. Documentation costs $8.50. The program costs $175.

Cosmic, University of Georgia, Athens, Ga. 30602.

BMC Software, Inc. has released Prefix Resolution Plus, software designed to reduce the time of reorganizing logically related IBM IMS data bases.

Resolution Plus breaks the resolution task into several logical subsets that can run concurrently. If a software failure occurs during this process, only those subsets incomplete at the time of the failure would need to be rerun.

A perpetual license on the first CPU costs $12,500 until Jan. 1, when the price will rise to $14,750.

BMC Software, P.O. Box 2002, Sugar Land, Texas 77478.

American Research Corp. has released Version 1 of Instraface, a file interface program that links Tandem Computer, Inc.'s report generator, Enform, with the Tandem version of SPSS, Inc.'s SPSS data management, data analysis, statistical and report generator package.

The program uses the data dictionaries users develop in Enform and other Tandem software to create an SPSS instruction file that can be edited and modified.

A first-year license for Instraface costs $4,500 for up to 16 Tandem CPUs.

American Research, Suite 20, 2885 E. Aurora Ave., Boulder, Colo. 80303.

M. Bryce & Associates, 777 Alderman Road, Palm Harbor, Fla. 33563.

Business Information Systems, Inc. has announced an Information Management System (IMS) version of Screens Made Easy (SME), its interactive screen design tool for IBM's CICS and IMS users.

SME-IMS develops message format service code for IMS users and produces copy books for applications programmers.

With the package, users can prototype applications once screens are defined but before code is written or generated.

Fully documented screen definitions can be used on either CICS or IMS, according to the vendor.

Business Information Systems, 3442 Stilborn Road, Fort Wayne, Ind. 46815.
So the MIS exec said, "We have a mixed bag of PCs all over the map. Can Honeywell service them?"

And we said...
"Any kind. Any place."

No matter who made your PCs, or where you use them, you should consider TotalCare® Single Source Service from Honeywell.

A company with dozens, hundreds or even thousands of PCs scattered around the country has very special needs. That's why Honeywell TotalCare service was created.

We provide a comprehensive service program that helps assure you:

- Customized Service—A program tailored to your company's needs.
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- Professional Service—Experienced computer service engineers fully equipped to meet your every service need.
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Honeywell TotalCare Third-Party Service is a comprehensive program provided by an organization of service professionals in more than 250 locations plus a network of walk-in/mail-in service centers. Ready to serve you in every phase of computer maintenance. Ready to provide total care for all your PCs. Any kind. Any place.

For more information on TotalCare for PCs, call 1-800-328-5111, ext. 2751 or write: Customer Services Division, Honeywell, MS 440, 200 Smith Street, Waltham, MA 02154

Together, we can find the answers.

Honeywell
Para Research, Inc. has released its Accounts Payable Version 2 financial software.
The product, for IBM System/34 and 36 computers, processes invoices from one-time vendors, automatically deleting the vendor and master file when all invoices are paid. It handles manual check information, does individual payments to one invoice to as many as 99 general-ledger accounts.

Accounts Payable Version 2 is priced at $3,000. Current users of earlier versions can upgrade for $500.

Para Research has also announced that all of its software products are now available on 5½-in. diskettes for the IBM System/36 Model 8364 personal computer.


MDS Quantel, Inc. has announced Release 6.1 of QMRP-Plus and Release 1.3 of QMRP-38, new versions of its QMRP manufacturing software systems.

Release 6.1 of QMRP-Plus supports single and multiple distribution entities from one manufacturing location. It has the ability to link with Q-Auto, the electronic business data interchange system.

Release 1.2 of QMRP-38 handles single manufacturing locations as well as fractional inventory to account for cut sheets or partial containers of ingredients. It offers larger field sizes for parts description and security controls.

Enhancements common to both include improved inventory handling, improved bill of materials handling, expanded labor reporting, enhanced financial functions and order entry improvements.

The basic QMRP-Plus software ranges in price from $5,000 to $10,000, depending on the MDS Quantel processor in use.

QMRP-38 ranges in price from $10,000 to $20,000.

MDS Quantel, 4142 Point Eden Way, Hayward, Calif. 94549.

Phase Linear Systems, Inc. has released Plasort, a VM/CMS sort/merge system for IBM mainframes.

Plasort is available in two versions, PlaSort VM and PlaSort VMX. Both versions feature VSAM support plus data management and report writing capabilities, the ability to use all control statements with high-level language calls, Cobol sort/merge verbs, PL/I sort calls, Fortran sort/merge calls and 13 user exit written in Cobol, Fortran and Rexx languages.

The one-year license for PlaSort VM costs $1,975 and for PlaSort VMX is $3,500.


Britz Publishing, Inc. has announced Bpay, an accounts payable system for IBM System/34 and 36 computers.

The package is said to offer selective payment by vendor or invoice, check writing, history reports, multiple mailing lists, tickler files, hard copy printouts, over 300 users and company processing, variable interval payment cycles, general ledger interfacing and vendor labels.

Bpay, written in RPG-II, costs $109.

Britz Publishing, 1814 Capital Towers, Jackson, Miss. 39201.

Raxco, Inc. has announced Rabbit-1 Release 4.1, an upgraded version of its Rabbit-1 resources accounting and billing system for Digital Equipment Corp. VAX/VMS computers. The upgrade handles cluster, network and site computer billing and reporting.

Release 4.1 accommodates different rates and discounts applied to each VAX CPU. Pricing variables are said to include environment usage of network, detached, interactive and multibatch activities.

Other functions include a shift monitor, electronic mail billing and report pack. The shift monitor allocates VMS resources across shift boundaries. Electronic mail billing places a copy of the user's bill in his electronic mailbox on a daily, weekly or monthly basis. A menu-driven report pack produces 10 standard system status reports, including Shift Utilization Recap, Profile Recap and Environment Recap.

Rabbit-1 Release 4.1 costs $995 for VAX and Microvax versions.

Raxco, 1870 Piccard Drive, Rockville, Md. 20850.

An enhanced version of Spectrum/Estimator that allows users to perform "what-if" studies while simulating budget and time resources for system development projects is available from Spectrum International, Inc.

This latest release provides the ability to change parameters according to the assumed scope and environment of the system. It operates under TSO and CMS environments on an IBM mainframe.

The enhanced version, price is approximately $23,400, depending on implementation and training.

Spectrum International, Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

Uccel Corp. has enhanced its Fixed Assets Manager software.

The upgrade lets users maintain asset information, inquire and search, perform "what-if" analysis and plan activities. Formatted screens prompt users for the information necessary to execute tasks.

Fixed Assets Manager provides project accounting, tax reporting, multiple book processing, forecasting and simulation and general ledger interfacing in compliance with requirements established by the Internal Revenue Service, Securities and Exchange Commission and Financial Accounting Standards Board.

The enhancement costs from $14,000, depending on the environment. The total software package price starts at $39,500.

Uccel, Uccel Tower, Exchange Park, Dallas, Texas 75235.

Soft Solutions Corp. has released...
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.

Graham tape has exceeded three million passes with no functional deterioration. This durability, combined with low abrasivity, assures you of error-free performance time and time again.

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.
Continued from page 118

Fieldfacts, a field service management system for IBM System/34 and 36 computers.

The program functions as a comprehensive scheduler for remote field service centers within a single company or multiple-company operation. Users can also input and access the program with the IBM Personal Computer.

Features include call and message handling, call escalation, performance reporting, logistics management and purchase and parts order handling.

A report writer gives users the ability to design individualized reports for one-time or repeated use.

The package costs $49,500.

Soft Solutions, 3476 Hamilton Ave., Wayzata, Minn. 55391.

Data base management systems

Esvel has ported its Stellar/DB data base management system to Digital Equipment Corp. VAX computers operating under VMS, AT&T Unix System V or University of California at Berkeley 4.3.

Stellar/DB is implemented as three tiers of software. It supports enhancements such as outer joins, a complete set of indexes, temporary tables and indexes, bulk row data transfer, parent-child relationships and dynamic storage allocation.

Prices for VAX versions range from $28,000 to $55,000.

Esvel, Suite 200, 2005 De La Cruz Blvd., Santa Clara, Calif. 95050.

Methodologies

Technology Information Products Corp. has announced both the TIP Plan Starter Kit as well as a software product for entity relationship modeling that provides automated support for the vendor’s TIP Plan Business Information Planning methodology.

The interactive graphics tool offers organizations performing data modeling a capability for on-line graphic design. It allows users to build an entity model by identifying primary and secondary entities.

The TIP Plan Starter Kit includes a project case study that demonstrates how to start and complete an information systems plan. The kit includes information on project organization and provides generic business models and generic data models as starting points in the analysis process.

TIP Plan, which includes both enterprise business modeling and information modeling methodologies as well as the entity relationship modeling software, is available for any IBM OS mainframe environment for a license fee of $60,000. The software tool may be purchased separately for $40,000. The TIP Plan Starter Kit, a component in TIP Plan training free to current users, is available for $95.


Spectrum International, Inc. has added three capabilities to its project development methodologies — Conventional Design Process, Structured Analysis and Design and the Productivity Life Cycle.
Softkey Software Products, Inc. has announced a Keychart driver for its Keychart Presentation Graphics software package for use with the Hewlett-Packard Co. 7550 and Nicolet Computer Graphics Co. Zeta-8 plotters.

The Keychart driver for the HP 7550 and the Zeta-8 plotters reportedly provides batch processing of graphics presentations. This allows a list of predefined charts, multiple copies of a chart or any combination of the two possibilities to be plotted while the plotter is left unattended, Softkey Software Products maintained.

The Keychart batch processing module costs $275, the vendor reported.

Softkey Software Products, Suite 604, 280 Richmond St. W., Toronto, Ont., Canada M5V 1W5.

Cyngnet Technologies, Inc. has added The Little Black Book Label Maker and File Converter to its Little Black Book family of IBM Personal Computer software.

The Little Black Book Label Maker uses the entries in The Little Black Book — a telephone/address book system — to print mailing labels, index cards and envelopes.

The Little Black Book File Converter automatically transforms database entries from other software programs containing names, telephone numbers and addresses into entries in The Little Black Book, and vice versa.

Cyngnet Technologies, 1296 Lawrence Station Blvd., Sunnyvale, Calif. 94089.

Symcon Software has released C Windows, a windowing utility for use with C Ware Corp.'s Desmet C language family models of Lattice, Inc.'s Lattice C; Computer Innovations, Inc.'s CI-C86; and Microsoft Corp. C.

C Windows allows C programmers to incorporate on-line Help, pop-up windows or pull-down menus in new or existing applications. It is written in assembly language and includes modules for every C compiler, complete source code, documentation and a tutorial on windowing. C Windows costs $99.95.

Symcon Software, 320 W. Oak St., El Segundo, Calif. 90245.

Marketoels, Inc. has unveiled Gruntworks, a marketing software system designed to be used with Lotus Development Corp.'s 1-2-3 on IBM Personal Computers and compatibles.

Gruntworks finds the price/valuation relationship for products or lines, enabling the marketer to set prices where maximum profits exist. Gruntworks then assists in evaluating promotions used to match a changing demand to the steady output of the factory. Finally, Gruntworks combines historical data with current management inputs to forecast future demand.

The complete Gruntworks software system costs $499.95.

Marketoels, P.O. Box 1178, Barrington, Ill. 60010.

Santa Barbara Software Products has announced Indexaid, a software program designed for use in preparing indexes to books, business publications and instruction manuals.

Indexaid contains an editor designed for writing index entries. It can import word processor files or phrases, automate the frequent task of producing transposed forms and handle three levels of subentries. Other features include automatic capitalization and the ability to deal automatically with indexing rules.

Indexaid runs on any IBM Personal Computer or compatible with at least 256K bytes of memory, IBM PC-DOS 2 or 3, an 80-colt. monitor and a printer. The program can handle up to 6,000 index entries if the Personal Computer has 640K bytes of memory and a dual-sided floppy or hard disk drive. Indexaid is priced at $499.

Santa Barbara Software Products, 1400 Dover Road, Santa Barbara, Calif. 90103.

Recognition Equipment, Inc. has announced Tartan PC Data Entry software, a tool designed to increase data entry productivity.

The package is for use with Recognition Equipment's Tartan Personal Computer, IBM's Personal Computer and compatibles. It allows data entry to be distributed to virtually any location. An operator can key data batches on a personal computer in a stand-alone mode without requiring connection to a Tartan system. The batches are stored on floppy disks in a Tartan-compatible format. The cost for Tartan PC Data Entry is $1,500 for the first fully paid license and $750 for additional licenses.

Recognition Equipment, P.O. Box 660204, Dallas, Texas 75266.

Applied Micro Business Systems, Inc. has released Version 4 of Stock-Master, its inventory management system.

Stock-Master 4 runs on the IBM Personal Computer, Personal Computer XT and AT and Altos Computer Systems, Inc.'s 586/886 series running under Microsoft Corp.'s Xenix. It contains 143 programs subdivided into several major sections, including transaction entry/editing, stock status reporting, transaction history detail analysis, trend analysis and purchase order tracking. It costs $495.

Applied Micro Business Systems, 177-F Riverside Ave., Newport Beach, Calif. 92663.

See MICROS on page 122

DATABASE: PC/1
Q Management, Inc. has unwrapped Drawmate, a keyboard-based graphics software system for IBM Personal Computers and compatibles. Drawmate requires 128K bytes of random-access memory. Output of graphics images may be written to disk or printed to printers, video recorders or to 35mm camera equipment. It costs $49.95.

I-Bus Systems has introduced Promdisk, a package that enables users to put any code, including IBM PC-DOS, in the erasable programmable read-only memory (EPROM) on a single-board computer. Promdisk permits the use of any compiler to produce read-only memory code. It will create one to four personal computer look-alike disk drives in EPROM, from 32K bytes up to 356K bytes of memory, using the I-Bus Y86 Personal Computer-compatible board-level computer. The user can also load additional random-access memory disks into memory from the EPROM disk drive. Promdisk costs $1,995.

I-Bus, 9235 Chesapeake Drive, San Diego, Calif. 92123.

North Edge Software Corp. has announced Timeslips, a time tracking system that includes its own reporting, billing and business graphics generators. Timeslips was designed for use in tracking time-related costs for specific projects, measuring employee productivity and producing business usage logs for Internal Revenue Service claims. Timeslips permits the use of any compiler to produce read-only memory code. It will create one to four personal computer look-alike disk drives in EPROM, from 32K bytes up to 256K bytes of memory, using the I-Bus Y86 Personal Computer-compatible board-level computer. The user can also load additional random-access memory disks into memory from the EPROM disk drive. Promdisk costs $1,995.

I-Bus Systems has released Point, a mouse-based screen editor for the IBM Personal Computer. Point features overlapped windows. The unlimited size can be edited simultaneously in 20 windows. Editing features include flexible copy and moving between windows, undoing up to 200 previous edits and redoing the last edit. Point is priced at $125.

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Maple Leaf Technology

What's Maple Leaf Technology?
It's Canadian data communications technology from Develcon Electronics.
Develcon has been at the forefront of data communications for years.
But not just in Canada.
We've been operating in the United States since 1978. And we've been selling around the world since 1979.
Designing and installing systems of all sizes. For people like NASA, the United States Senate and General Electric in the U.S., Volkswagen in West Germany, and Hong Kong Telephone in Hong Kong, to name just a few.
All of which isn't really surprising. Fact is, Develcon engineered the very first intelligent data switch in the late 1970s.

In 1983, we were one of the first companies to offer a truly distributed data networking product.
Little wonder our success has spread beyond our Canadian roots.
So if your needs call for a small switching system, there's no better company to call.
Develcon has modems, multiplexers, switches, and the experience to give you the best solution.

If you require advanced and sophisticated networking technology, there's Develnet—today's most flexible and adaptable data communications network.
Still, you should see for yourself why so many companies are looking north to Saskatoon for the answers to their data communications needs.

For free brochures detailing our transmission, switching and networking products, call our toll-free number:
1-800-667-3740 or write to:
Develcon Electronics
856 51st Street East
Saskatoon
Saskatchewan S7K 5C7
306-933-3300
Find out how Maple Leaf Technology can help your company grow.
When your networking equipment is designed to build on itself, there's nowhere to go but up.

Because they're so easy to upgrade, DCA's flexible network processors and statistical multiplexors can easily grow with your company. So can our modems, our network management software and our advanced 56KB-to-T1 time division multiplexors.

You see, ever since 1974 when we introduced the first commercial stat mux to the marketplace, we have built our entire product line around modular hardware and software. Every network we sell incorporates error-controlled transmission, and virtual circuit switching. Plus every...
so it's no wonder DCA customers feel they've made a wise, long-term investment. They have. To find out more, call DCA at 1-800-241-4762.

And what's more, DCA network protocols, X.25 interfacing, camp-on-broadcast and contention functions are supported. So everything is compatible.

Part of our network is transparent, so your network is transparent.
We're in the IBM plug-compatibles business. And when it gets down to a question of them or us for terminals, more and more mainframe users are choosing us. C.Itoh.

They choose C.Itoh not just because of our lower prices. It's also because of our greater versatility, long list of extra features, and more compact design.

Our IBM plug-compatible terminals are so versatile that they can be ordered with alternate personalities and changeable keyboards.

The list of extra, built-in features ranges from a printer port to a time-of-day clock.

And our compact design, a footprint of just one foot by one foot, means our terminals take up less desk space than an in and out basket.

To help you make the right choice, simply contact the Plug Compatibles Division of CIE Systems, 2515 McCabe Way, Irvine, CA 92713-9628. Call toll free 1-800-854-5959. In California, phone 1-800-432-3687. Service nationwide.

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IT'S OUR BUSINESS TO SHARE OFFICE SPACE WITH IBM.
MICROS from page 122

Fox & Geller, Inc. has announced Quickcode, an enhancement for Lotus Development Corp.'s 1-2-3 Release 2, to help users create Lotus 1-2-3 applications like data entry forms and data bases.

Quickcode contains a learn mode, which creates keyboard macros from user keystrokes; a macro library for storing up to 100 macros; a menu builder; a programming language with a pop-up text editor; and a debugger. System requirements are an IBM Personal Computer, Personal Computer XT, AT or compatible, 348K bytes of random-access memory and Lotus 1-2-3 Release 2. Quickcode is priced at $189.

Fox and Geller, 604 Market St., Elwood Park, N.J. 07407.

Lahey Computer Systems, Inc. has released Version 2 of its F77L, an implementation of the ANSI Fortran 77 standard for IBM Personal Computers and compatibles.

New features include completion of source on-line debugger, new user manual, unlimited size of commons and arrays and unlimited name length.

System requirements are a personal computer with an IBM PC-DOS or Microsoft Corp. MS-DOS operating system, 320K bytes of memory and an Intel Corp. 8087/80287 math co-processor. F77L is priced at $477.


Sourceview Software International has released Micromind Knowledge Engineering Tool software for creating knowledge-based expert systems on the Apple Computer, Inc. Macintosh.

Micromind is an interpreter that operates on a rule base and a data base containing true/false premises and conclusions. The format of the rules is an IF-THEN-DO construction. Micromind contains a full screen editor.

Micromind is priced at $495.

Sourceview Software International, 835 Castro St., Martinez, Calif. 94553.

Intelligent Choice Software has introduced Micro Log, the first in a series of timekeeping, reporting and costing aids.

Micro Log permits timekeeping of microcomputer usage. It generates a log that can be used to obtain statistical reports.

System requirements are an IBM Personal Computer or compatible with 320K bytes of random-access memory and one minifloppy disk drive. It is priced at $29.95.

Intelligent Choice Software, 12 Back River Road, Merrimack, N.H. 03054.

Geocomp Corp. has released Version 3 of its Geograf graphics software library utility for the IBM Personal Computer and compatibles.

Geograf prepares customized graphs of any type from within the user's program. It is available for Microsoft Corp. Fortran, IBM Professional Fortran, IBM Basic and Summit Software Technology, Inc. Betterbasic.

New capabilities allow flexible formatting of axis labels, addition of grids to plotted data, windowing, scaling and 12 optional character fonts. Geograf costs $375.

Geocomp, 342 Sudbury Road, Concord, Mass. 01742.

Mouse Word, a word processing package for Apple Computer, Inc. Apple II personal computers that includes an integrated communications function and Apple Macintosh-like mouse-driven interface, is available from International Solutions, Inc.

The package contains mail merge and mathematical functions plus others the capability to combine documents with spreadsheets created on Mouse Calc, a companion product. The mouse controls all commands such as cut, copy, paste, emphasize in boldface, center and underline.

The communications function operates with Hayes Microcomputer Products, Inc-compatible modems at 300 or 1,200 bit/sec. Mouse Word requires 128K bytes of memory and a peripheral mouse. A second disk drive is recommended.

The package costs $129.95. International Solutions, 910 W. Mande Ave., Sunnyvale, Calif. 94086.

Help Technologies has enhanced Helpdos, its Help system for IBM PC-DOS- and Microsoft Corp. MS-DOS-based computers, by adding the ability to select a Help menu or item when the program has started.

Version 2 of Helpdos allows users to expand its Hints feature, which lists MS-DOS or PC-DOS commands by category of activity. Helpdos Version 2 provides Help files and menus for MS-DOS or PC-DOS 3.1 as well as MS-DOS or PC-DOS 2 and 3. Helpdos Version 2 costs $49.95. Existing users can upgrade to this release for $7.50.

Help Technologies, Suite O, P.O. Box 50834, 4274 Wilkie Way, Palo Alto, Calif. 94303.

Executive Presentation Systems, Inc. has released the EPS-3000, a presentation graphics system designed to produce graphics on all media in continued on page 128.
Continued from page 127

including 35mm slides and plotted film overhead transparencies, plotted paper copy up to 36 by 48 in., inkjet copy and video output.

The system processor is a 16-bit Intel Corp. 8086 along with an 8087 math coprocessor running at a clock rate of 6 MHz. The system has 40K bytes of available random-access memory, and standard storage is a 10M-byte hard disk and a 360K-byte, 5.25-in. IBM Personal Computer-compatible floppy drive. There are seven serial and three parallel ports.

The software is written in the C language and runs under Microsoft Corp. MS-DOS. There are 13 fonts available.

The standard EPS-2000 system is priced starting at $9,995. EPS, 5854A Peachtree Corners E., Norcross, Ga. 30092.

Telesensory Systems, Inc. has announced the Vista System, which enables the visually impaired to use an IBM Personal Computer by producing enlarged characters and images on the monitor.

The Vista System consists of a printed circuit board, a software program and a standard mouse with three buttons. The size of the screen enlargement can be adjusted from three to 15 times.

The system works with a monochrome or full-color monitor, shows all attributes such as highlighting, blinking and underlining, works with data transfers over the phone and with terminal emulators and enlarges graphics as well as text.

The Vista System costs $1,700. Telesensory Systems, P.O. Box 7455, 455 N. Bernardo Ave., Mountain View, Calif. 94039.

Sun Microsystems, Inc. has announced two programming environments, Sunpro and Sun Visual/Integrated Environment for Workstations (SunVIEW), which offer programming utilities and a user interface for developing Sun-2 and Sun-3 workstation software.

Based on the AT&T Unix operating system, Sunpro supports rapid prototyping, a program development methodology based on repeated testing of quickly constructed prototype software. Users can then use Sunpro utilities to perform test and tune the prototype into a finished product.

An integrated interface is provided.

SunVIEW lets software engineers create interfaces that use windows, scroll bars, pull-down menus and pointing devices.

Sunpro and SunVIEW come bundled with Sun's workstations and Unix-based operating systems. The systems range in price from $8,900 to $50,000.

Sun Microsystems, 2550 Garcia Ave., Mountain View, Calif. 94043.

Support Technologies, Inc. has announced the ST3000 test system for electronic systems and printed circuit boards.

The ST3000 contains a Motorola Inc. MC68010 microprocessor running at 10 MHz and comes standard with 1M by 4K random-access memory plus 256K bytes of read-only memory.

Two built-in disk drives provide mass storage for test programs and measurement data bases. A detachable display/keypad console can be positioned up to 6 ft from the test unit.

The ST3000 operating system offers a line-oriented editor, pop-up menus and softkey selectable functions. Three modules can be used with the test system: a select emulation system for software-selectable microprocessor emulation, a bus emulation system for testing industry-standard bus-based products and a measurement system that integrates six instruments.

The system has two RS-232C ports and an IEEE 488 port.

The ST3000 costs approximately $20,000. Support Technologies, 7105 S.W. Farms Ave., Tigard, Ore. 97223.

Communications

Phoenix Computer Products Corp. has enhanced its Ptel communications package.

New features include an on-line software update capacity and support, a line-oriented script language and forward and backward scrolling.

Piel runs on IBM Personal Computers, Personal Computer XT's and AT's and compatibles running under Microsoft Corp. MS-DOS 2 or higher.


CXI, Inc. has announced a family of coaxial and remote micro-to-mainframe local-area net gateway connections called Pcox/Gateway.

The gateway family includes the Pcox/Gate Coax connection, which is a gateway between a local net and an IBM 3274 cluster control- ler; the Pcox/Gate-16 and Pcox/ Gateway-64 remote connections, which emulate 3274 units; and the Pcox/Gateway WS workstation software that provides emulation of IBM's 3276 and 3277 terminals, 3278 printers and 3270 Personal Computers.

The workstation software also includes the Pcox/Gateway WS capability, which enables users to upload and download data to and from CMS and TSO host systems.

The price for the Pcox/Gate Coax, the Pcox/Gate-16 and the Pcox/Gate-64 are $2,595 and $4,595, respectively. Pcox/Gate-64 software kits cost $275 and the Pcox/Gate-64 Coax upgrade for Irma costs $2,100.

CXI, 3006 W. Bayshore Road, Palo Alto, Calif. 94306.

Please see MICROS on page 133
Why do our customers choose Data Design financial software systems over the three largest vendors?

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 learned that Data Design places only management level people in customer service positions. People who average over 10 years experience—not trainers.

And more.


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.
With its NOS/VE operating system the Control Data Supermini can take you in any direction.

Look inside the Control Data Supermini—star of the CYBER 180 line—and you'll find the most dynamic, most advanced architecture in the world.

Multi-state architecture. Today it runs two operating systems—NOS (6-bit/60-bit words) and NOS/VE (8-bit/64-bit words) simultaneously in the same memory and CPU without penalty to the user.

It also lets you switch machine states for future capabilities like artificial intelligence.

This advanced architecture gives you all the freedom of a virtual environment without all its problems because now you can easily access the real memory to maintain critical performance response times.

This system will manage all your present applications, whether Control Data or not. And it'll grow with you, extend itself to support the applications of tomorrow. Something you can't count on from land-locked cluster systems.

Add dynamic architecture to a 1 to 600 performance range, total binary compatibility and high levels of security, and with a Control Data Supermini you're free to take any course.

Learn all about the freedom the proven technologies of Control Data can bring. Call your local Control Data sales office or 800-253-4004 Ext. 374 for complete information.

Then feel free to travel outward into the 1990's and beyond.

CONTROL DATA
THE GREAT ESCAPE!

FROM IVORY TOWERS AND COLD COMPUTER ROOMS TO THE WARMTH OF YOUR OFFICE.

Artificial intelligence for business has arrived in a revolutionary new product... Guru.

At last, artificial intelligence designed especially for business! Guru brings together expert system capabilities of artificial intelligence, the productivity of familiar business computing tools and the ease of communicating with your computer using menus, commands or plain English. All available in a single, integrated program.

Guru works like human experts, considering uncertainties, reasoning through forward and backward chaining, asking for more information when needed, and explaining its recommendations.

Guru's expert system works hand-in-hand with all the familiar business computing tools like spreadsheets, statistical analysis, business graphics and a programming language, always available for both expert consultation and your everyday business computing needs.

Best of all, you won't need to learn LISP or PROLOG or buy fancy computers. Guru runs on your PC and communicates in plain English! Guru is artificial intelligence that means business.

For more information, call or write Micro Data Base Systems, Inc/Marketing & Sales, P.O. Box 248, Lafayette, IN, 47902, 317/463-2581. Telex 209147 ISE UR.

GURU

ARTIFICIAL INTELLIGENCE THAT MEANS BUSINESS.
**NEW PRODUCTS**

**MICROS** from page 128

Hammer Computer Systems, Inc. and Advanced Telecomputer Systems have announced Ultralink II, a voice and communications system that incorporates concurrent processing, allowing users to partition memory and work on more than one task at a time.

Ultralink II allows users to run three applications simultaneously with the ability to exchange screens with another user even if the other user is running a different program.

The Ultralink II system costs $699.95.


RAD Data Communications, Inc. has added Model MIC-P/S and Model MIC-S/P to its family of serial/parallel converters for personal computers.

Model MIC-P/S is used to connect a printer with a serial interface to an IBM Personal Computer. The Model MIC-S/P is used to connect a printer, with a Centronics Data Computer Corp.-compatible parallel interface, to an Apple Computer, Inc. machine or another personal computer with a serial interface.

The interface converters operate without ac power, and they come with a 6-ft cable.

Each model costs $89.

RAD Data Communications, 40 N. Van Brunt St., Englewood, N.J. 07631.

Fox Research, Inc. has introduced 10-Server, a file server designed for its 10-Net local-area network.

The product features an 8-MHz Intel Corp. 80186 processor, 512K bytes of random-access memory and an integral 60M-byte streaming tape. It offers an IBM Personal Computer AT-compatible bus with six IBM-compatible expansion socketa and on-board serial, parallel and keyboard ports. It works with all IBM Personal Computer-compatible local-area network hardware and software.

The 10-Server, with built-in 10-Net board, is available with a 45M-byte hard disk for $8,995.

Fox Research, 7006 Corporate Way, Dayton, Ohio 45459.

Network Research Corp. has ported its Fusion software to support XNS and TCP/IP protocols running simultaneously on UC/Com Corp.'s Model 3CS505 intelligent board Ethernet controller for the IBM Personal Computer, Personal Computer XT and AT.

Fusion for the 3CS505 is priced at $750.

Network Research, 2380 N. Rose Ave., Oxnard, Calif. 93030.

Polygon Associates, Inc. has ported its Poly-Com software package to the Data General Corp. Data General/One portable personal computer.

The Poly-Com program allows the user to use a laptop as a Digital Equipment Corp. VT100 or VT102 terminal and to transfer ASCII or binary files between the complete line of DEC minicomputers.

The program supports all DEC full screen editors. It operates at speeds up to 9.6K bit/sec. through the RS-232 port or through the internal modem port.

Poly-Com for the DG/One comes in a 3¼-in. diskette format and costs $200.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

A new intelligent modem, the Mercury 1200 Intelligent Modem, that continually searches for the cleanest part of the telephone line's center track is out from Mercury Modems.

The Mercury 1200 Intelligent Modem reportedly has less noise and other line problems than modems that use a preset center-line location. The Mercury 1200 works with modem software from AT&T and Hayes Microcomputer Products, Inc. and is compatible with most computers, including the IBM Personal Computer. Internal software provides commands, a Help feature, telephone line access, dial tone, number called and busy or received status on the computer monitor screen.

The Mercury 1200 Intelligent Modem costs $300.

Mercury Modems, Building N-2, Spokane Industrial Park, Spokane, Wash. 99216.

Storage

Ideaassociates, Inc. has announced Diskit, a series of internal disk drives for the IBM Personal Computer XT and Personal Computer AT.

The Diskit product line includes an upgrade policy that allows users to trade up as their storage requirements increase.

Diskit drives for the Personal Computer AT range in price from $1,065 for 20M-byte capacity to $5,995 for 120M bytes. Personal Computer XT models range from $1,495 for 10M bytes to $9,995 for 120M bytes.

Ideaassociates, 35 Dunham Road, Billerica, Mass. 01821.

Pacific Micro Systems has introduced the Pelican 8.3, a mass storage system for IBM Personal Computers and compatibles running IBM PC.

Consider the possibilities. Here we have two of the most technologically advanced, yet easy-to-use, plain-paper products in all of image management. The Kodak Starvue II reader-printer speeds through load, search, index, scan, and print functions. It produces positive prints from other positive or negative films. Not in back, not on the side, but right up front. Controls are close at hand, too. Work flow is improved, productivity potential is enormously increased, and plain-paper prints cost less than 2¢ each.

The Kodak IMT-350 microimage terminal provides exactly the same features and advantages. In addition, it automatically sets up jobs, monitors its own operations, instantly obeys up to 250 commands, and delivers directions to operators in plain language.

And if all the efficiencies and economies of these Kodak products weren't impressive enough, there's more. An image-length selection feature lets you select and print image of various sizes. So you can save on toner costs by choosing that portion of the image you want to print. No more. No less.

For best results, interface the IMT-350 microimage terminal with your computer or any of the family of Kodak KAR information systems. And for high-speed, low-cost retrieval, consider the Kodak KAR reader-printer. Both use plain paper. Both are plainly outstanding.

For details on the lowest-cost retrieval you can buy, just return the coupon.

Plain-paper printing now with image-length selection.
A no-risk offer for IBM PC-to-VAX users!

How to turn life's little shortcomings into a $100 savings.

The PC to VAX world is populated with communications products that don't quite fill the bill. While each may have one nice feature or another, they also have their shortcomings. You've undoubtedly discovered a few yourself:

- VTERM's confusing setups.
- Crosstalk's missing printer port and delete key.
- SmartTerm's snail-paced screen repaint.
- XMODEM's unreliability.
- VTERM's part-time "hotkey."
- SmartTerm's misplaced keypad keys.

If you've found yourself frustrated by these deficiencies, or others, then it's time you move up to Polygon communications software. Because our terminal emulation and file-transfer products allow an IBM PC to perfectly emulate a wide variety of DEC terminals (including the VT240) and achieve easy, error-free data exchange.

For a limited time, we've added two "enhancements" to our communications products that are sure to make them even more popular with PC to VAX users:

- Trade-up to poly-COM/220 or poly-COM/240 before December 31, 1985 and qualify for a $100 discount from our regular prices. Plus get our Guarantee that if you're not completely satisfied, you can return your purchase within 30 days for a 100% refund.
- Make sure you're not shortchanged on this no-risk offer. Call us today for Trade-Up details.

$100 Discount. 100% Guarantee.

$12,650. The 3270-PC/G interface costs $775, the 3270-PC/GX interface costs $850.

Micro Instruments U.S.A., Inc. has announced CH-5201B, a thermal transfer technology color copier for IBM's 3270-PC/G and 3270-PC/GX graphics workstations.

The CH-5201B was designed to produce images on plain paper or transparency film. It is equipped with the Adaptable Video Interface, which allows images to be downloaded to the frame buffer in less than 1 sec. Copies with a resolution of 152 dot/in. are produced in about 1 min.

The 3270-PC/G interface costs $775, the 3270-PC/GX interface costs $850.

Micro Instruments, 1623 Buckeye Drive, Milpitas, Calif. 95035.

Texas Instruments, Inc. has added the Model 857 color printer for personal computers to its family of Omni 800 printers.

The Model 857 provides letter-quality and graphics printing with a four-color ribbon that blends to seven colors. It features draft printing at 150 char/sec. and letter-quality printing at 35 char/sec. and offers interchangeable typeface fonts along with raster and mosaic graphics. The Model 857 comes standard with friction and tractor-feeder mechanisms, parallel/serial interfaces, a Gothic font module and a screen-dump utility device. It costs $899.

Texas Instruments, Inc. has introduced a data processing version of its Omni 800 Model 880 printer called the Omni Model 880 DP.

The Model 880 DP throughput capability is affected by print-head movement, intelligent data handling, overhead and paper handling capabilities. An enhanced motor improves the paper-feed mechanism, increasing the form feed from 2 in./sec. to 8 in./sec.

The Model 880 DP prints 200 char./sec. bidirectionally in draft mode and 150 char./sec. in enhanced mode.

Continued on page 138
"Computers that work hard are great. But how do I get them to work together?"

"Work with us."
The success of any computer system will depend as much on easy data access as on the quantity and quality of data.

With this in mind, AT&T now offers you an exceptionally powerful and flexible computer line based on two fundamental and related strengths:

1. Comprehensive communications and networking expertise.
2. Full commitment to the protection of your current and future investments.

We have products, not promises, to connect PCs at the local level; PCs, supermicros and minis at the departmental level; and the connectivity to mainframes at the corporate level.

Communications Starting at the Desktop

AT&T envisioned the ideal computer system as the one most responsive to the user's needs. Since most people frequently have to do several tasks at once, we designed our communications-based equipment to give you that ability.

We offer the AT&T PC 6300 and the new AT&T Personal Computer Model 6300 PLUS (both with the optional Communications Manager), as well as the AT&T UNIX™ PC, Model 7300 or the new Model 3B1 with increased storage capacity—all of which let you connect a telephone directly to the computer for integrated voice and data capability.

For example, you're working on a spreadsheet and the phone rings. No problem—your AT&T Computer "bookmarks" your place. You can answer the phone, record call notes on the computer, store them for reference and then go right back to your place on the spreadsheet.

Pulling the Department Together

Our enhanced 3B Computer line stretches from supermicro
communications-based computers connectivity for a system investment as a business tool.

to supermini—all true 32-bit machines which run the popular UNIX System V. The latest addition to this family is the 3B2/310 which accommodates 6-14 simultaneous users.

The multi-user, multi-tasking 3B's are powerful departmental computers that can communicate with any other UNIX Operating System-based machine as well as personal computers and mainframes that support 3270 SNA or BSC protocols.

To round out a full computer system, AT&T offers a broad line of feature-rich terminals, printers and plotters.

Not to mention the 5300 line of teleprinters. Each one delivers high-performance dot matrix printing in a variety of input/output situations.

Based on accepted industry standards, AT&T Computer products work with what you have today, and will be enhanced and supported tomorrow. That's what we mean when we promise "The Computers With The Future Built In."

Local Networking

AT&T connectivity starts with a complete line of LAN's for both local and departmental environments.

Orderable now, networks like the AT&T STARLAN NETWORK and 3BNET can tie together computers, peripherals and terminals. With our Information Systems Network (ISN) you can even connect through digital PBX switches. You can build and control the network best suited to corporate requirements without sacrificing local processing capabilities.

And when that network needs to reach beyond the departmental level, AT&T's connectivity puts your system in touch with any computer—mainframe or not—that supports industry standard protocols.

The Bigger Picture

Add AT&T 3270/SNA or 3270/BSC Emulator Software to your 3B Computer system, and you can access applications and features traditionally reserved for 3270 display station users. One desktop terminal can now give you the ability to perform multiple computer functions.

For larger networks, the AT&T Application Program Interface lets 3B users process mainframe data with 3B resident application programs.

The final link in the connectivity chain is data communications equipment, and AT&T has it all. From the low-cost Model 4000 asynchronous modem to our enhanced DATAPHONE system family.

The DATAPHONE product family ranges from DATAPHONE I synchronous modems for basic diagnostics on private line networks right up to the evolving DATAPHONE II line of analog modems, DSUs and multiplexers for complete control of the most sophisticated networks.

Make the Right Connection

By designing "The Computers With The Future Built In", AT&T supports those industry standards that encourage open architecture, thus protecting your investment.

It makes good business sense to make computers work together. Old or new, our own or somebody else's.

As your needs grow and as technology changes, AT&T Computers will give you expansion without obsolescence.

Before you make your next purchase decision, let us show you what the future can hold for you. Call your AT&T Information Systems Account Executive, your authorized AT&T Supplier, or simply call 1-800-247-1212.

THE COMPUTERS WITH THE FUTURE BUILT IN.
Continued from page 134

print mode. The adjustable tractor and bottom paper-feed mechanism allow handling of forms of up to five parts and between 3 and 15 in. wide.


The Model 880 DP costs $2,195. TI, P.O. Box 809063, H-8820, Dallas, Texas 75380.

The M-1509, a 136-col. dot matrix printer that prints at 180 char./sec. for drafts and 45 char./sec. for near-letter-quality output, is available from Brother International Corp.

It provides Centronics Data Computer Corp.-type parallel and RS-232C serial interfaces, plus it allows users to switch between IBM Personal Computer and Epson America, Inc. FX 100+ protocols and character sets.

Other character sets accommodate multilanguage, scientific and mathematical printing.

The printer can handle 5- to 16-in. fanfold paper and 4- to 16¼-in. cut sheets. A bottom-feed push-up tractor allows printing on the first continuous form. An automatic-cut sheet feeder is available as an option.

Operating at a 55db noise level, the M-1509 sells for $499.

Brother International, 8 Corporate Place, Piscataway, N.J. 08854.

The SG-1500, a 12-in. monochrome green monitor for IBM Personal Computers and compatibles that provides 800- by 750-dot resolution, has bowed from Sakata U.S.A. Corp.

The monitor provides 80 columns by 25 lines of 5- by 7-dot characters. Horizontal frequency is 18.43 KHz and vertical frequency is 60 KHz. The SG-1500 will operate in temperatures ranging from -10 degrees Celsius to 40 degrees Celsius and in humidity levels between 10% and 80%.

The SG-1500 lists for $169. Sakata U.S.A., 661 Bonnie Lane, Elk Grove Village, Ill. 60007.

Ultre-Setter, a laser raster imager for graphic arts, typesetting, medical imaging, computer-aided design and manufacturing and facsimile applications, has bowed from Ultre Corp.

Using a laser diode as its light source, it offers 2,400 dot/in. resolution for halftone photographs or typography.

The board supports a data transfer rate of 7.5M bit/sec. using 2,7 KLL and a 13-microsec step rate, according to the vendor.

Other features of the board include autoconfiguration, sector-level defect handling, large-disk logical partitioning and preprogrammed BIOS.

In 1,000-piece quantities the ACD-2070A boards are priced at $165 each. Adaptec, 580 Cottonwood Drive, Milpitas, Calif. 95035.
area can be used as a print
spooler or a random-access
memory (RAM) disk.

The Half Megaboard costs
$249.

Dow Ave., Tustin, Calif.

Dow Ave., Tustin, Calif.

$249.

$249.

NOVEMBER 11, 1985

HR-2, a monochrome
graphics card for the IBM

Personal Computer, Personal
Computer XT and AT that of-
fers Hercules graphics com-
patiblity has debuted from
Applied Computer Products
Corp.

HR-2 supports personal
computer business applica-
tions programs such as Lotus
Development Corp.'s 1-2-3
and Symphony, Ashton-
Tate's Framework and Micro-
soft Corp.'s Word.

Designed to replace the
IBM Monochrom Display/Printin
gable adapter, the HR-2


tures a graphics mode
with 720- by 348-pixel reso-
lution and a text mode with
7 by 9-pixel characters in a
9- by 14-pixel box.

The graphics card also
supports flicker-free text
mode scrolling plus such vid-
eo attributes as blink, re-
verse and underline.

Priced at $196, the HR-2
comes with a 64K-byte dy-
namic random-access memo-
y screen buffer and operates
at the IBM Monochrom Dis-
play's synchronous frequen-
cy of 18.4 kHz/50Hz.

Applied Computer Prod-
ucts, 1633 Republic Road,
Huntington Valley, Pa.
19006.

Auxiliary equipment
Omnium Corp. has re-
leased its Mini-Static Pad for
protecting personal comput-
ers against static electricity.

Omnium's Mini-Static Pad is
only 3 by 4½ in. in size,
and it comes with an 8-ft
grounding cord, according to
the vendor.

WITIA A REAL
EYE OPENER

THE ELECTROHOME
EDP-58 MONOCHROME
COMPUTER PROJECTION
SYSTEM.

As modern business continues
to recognize the effectiveness of com-
puter-projected data and images, The
Squints continue to wreak havoc in
boardrooms, classrooms, commod-
ity exchanges, and trade shows.

Wherever people are forced to view
small CRT screens or dull and often
fuzzy projected images, you'll find
The Squints running rampant.

STOP THE SQUINTS
BEFORE THEY START.

The Electrohome EDP-58 is a real
eye-opener — in more ways than
one. To begin with, it's easy to use
and interfaces with virtually all
computer terminals and PCs, mak-
ing it the most versatile mono-
chrome projector on the market.

In performance, it's the heads-up
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A super-bright P53 phosphor delivers
an image that's up to 60% brighter
than any we've used before. (You get
a maximum brightness rating of 500
lumens.) Its green projection image
is comfort-engineered for complete
viewing ease and exceptional read-
ability on up to 10° diagonal curved,
flat, or rear screens. The EDP-58 also
delivers less than 4% distortion
from curved to flat screens — and no
one else can match that.

The acknowledged leader in
monochrome projection since 1980,
Electrohome confidently offers a full
year's warranty on parts and labor.
(When it comes to the EDP-58's
dependability, we put our warranty
where our mouth is.)

Electrohome Limited, 800 Wellington Street North,
Kitchener, Ontario, Canada, NOE 4H0
Telephone (519) 744-7777 Toll Free 1-800-560-5800

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Kitchener, Ontario, Canada, NOE 4H0
Telephone (519) 744-7777 Toll Free 1-800-560-5800

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methods allows easy ceiling or desk-
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ed carriage-mount enables
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Department, Postal Station D,
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1420-053.

U.S. customers call toll-free
1-800-265-2171

American Power Conversion
Corp. has added the
Model 330XT+ to its line of
personal uninterruptible
power source products.

The Model 330XT+ is a
standby uninterruptible
power source designed for
use with IBM Personal Com-
puter XTs and Compaq Com-
puter Corp.'s Compaq por-
table computers.

It features phase-synchro-
nous transfers and scaven-
gers. Transfer time is typical-
ly 0.0002 of a second.

It is capable of powering a
fully configured Compaq port-
table or IBM XT for 10 to 15
minutes during an outage.

It also provides surge pro-
tection and noise and inter-
ference filtering.

The 330XT+ is priced at
$640.

American Power Conversion,
89 Cambridge St., Bur-
ington, Mass. 01803.

Curtis Manufacturing Co.
has introduced a tilt-and-
swivel base, called USB-4, for
IBM and Compaq Computer
Corp. portable personal com-
puters.

The portable pedestal tilts
22 degrees and swivels a full
360 degrees, allowing the
user to reposition the moni-
tor to eliminate glare with
changes in lighting.

The pedestal is priced at
$46.96.

Curtis Manufacturing, 305
Union St., Peterborough,
N.H. 03458.

Microscience Corp. has
announced Q-Net Resource
Manager, an intelligent
switch that enables users to
add workstations to saturat-
ed multiuser microcomputers.

The switch also intercon-
nects dissimilar computers,
operating systems, termi-
nals, printers, modems, cash
registers and other peripher-
als.

A basic system provides
32 stations — expandable to
128 — and makes all idle
computer capacity available
to all users.

When the system operates
at full capacity, the switch
automatically queues addi-
tional service requests for
first availability.

The 128-port configuration
sells for $12,795.

Microscience, Suite 136,
9601 Dunwoody Place, At-
tlanta, Ga. 30338.
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...
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 office. In Canada, call 1-800-387-3867. Vectra

See Us At Comdex Booth #3616
COMMUNICATIONS

Controllers

Teleprocessing Products, Inc. is offering TP-2/435, an interface sharing unit that allows up to four terminals to share simultaneously one modem or interface. Targeted for use in multi-drop polled networks with CCITT V.35 interfaces, the TP-2/435 broadcasts polls to all terminals. The first terminal that raises Request to Send is selected and connected, eliminating access from other terminals until Request to Send is lowered.

The Model TP-2/435 costs $750.

Teleprocessing Products, Building 7K, 4565 E. Industrial St., Simi Valley, Calif. 93063.

Voice/data communications

Wang Laboratories, Inc. has announced that its DVX voice mail service has been integrated with Northern Telecom, Inc.'s Meridian SL-1 private branch exchange. Message waiting indications can be made on either a Northern Telecom SL-1 handset or standard 2500 series telephone using a lamp or interrupted dial tone.

The Meridian SL-1 automatically forwards a party's extension to the DVX, which then identifies the called party's extension to the person calling.

Integrating the DVX with the SL-1 requires hardware and software for both systems. Additional DVX costs will be $5,000. SL-1 costs depend on the system's configuration.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851.

Conatel Networks & Systems has expanded its MindPricer on-line circuit pricing system with a new module that reports for voice circuits. The Voice Private Line Pricer will complement its existing data circuit pricing system.

Mind-Pricer reports recurring costs such as channel mileage, termination charges, signaling charges and special access surcharges.

Conatel Networks & Systems is a subsidiary of Continental Telecom, Inc. Its Mind-Pricer costs $550 per year on a time-sharing basis.

Conatel Networks & Systems, 130 Steamboat Road, Great Neck, N.Y. 11024.

Protocol converters

Adapta, an interface converter that offers parallel-to-serial and serial-to-parallel data conversion, has debuted from Performance Interconnect, Inc. Adapta comes with a switchable 2K-byte buffer and its own AC adapter. Serial features include eight selectable bit/sec. rates from 110 to 19.2K bit/sec., seven or eight data bits, one or two stop bits and selectable control signal polarity.

The parallel interface uses ACK and BUSY to control the parallel port data stream. It uses a Centronics Data Computer Corp-type parallel connector.

The Adapta interface converter costs $89.95.

Performance Interconnect, Suite 2133, 8850 Villa La Jolla Drive, La Jolla, Calif. 92037.

Serial-to-parallel and parallel-to-serial plug-in converters are available from Inmac Corp.

Offering a way to get serial and parallel signals in one computer system, the converters let users mix such devices as parallel dot matrix printers, letter-quality printers, serial X-Y plotters, line drivers and modems.

The devices are one-way converters with RS-232 25-pin female and Centronics Data Computer Corp-type 36-pin male connectors. Providing transmission speeds from 50 to 38.4K bit/sec., the converters support XON/XOFF, ETX/ACK and DTR/DSR flow control handshaking.

A 16K-byte buffer model costs $149; a 64K-byte buffer unit sells for $229.

Inmac, 2466 Augustine Drive, Santa Clara, Calif. 95054.

Multiplexers/modems

Electronic Vaults, Inc. has added the Fastcomm 96 series to its line of 9.6K bit/sec. asynchronous dial-up modems. Fastcomm 1296/S is a stand-alone model that oper-
It also has ensured data integrity and is compatible with both AT&T 212A and CCITT V.22. The Fastcomm 2496/I is an integral piggyback version of the 1296/I, designed for micro applications.

Fastcomm 2496/S is a stand-alone model that operates at 300/1,200, 2,400, 4,8K, 7.2K and 9.6K bit/sec. The Fastcomm 1296/I is an integral piggyback card version of the 2496/S.

The Fastcomm 1296/I costs $1,085, and the 2496/I costs $1,295. The Fastcomm 1296/S and 2496/S cost $1,195 and $1,395, respectively.

Electronic Vaults, 12347-E Sunrise Valley Drive, Reston, Va. 22091.

Fastcomm 2496/I is an integral piggyback card version of the 2496/S. It supports up to 10 IBM Personal Computers and is compatible with Nestar’s Plan 3000, 4000 and 5000 file servers. The Plan 3000B file server provides 688M bytes of formatted disk storage capacity. It is priced at $15,995.

Nestar Systems, 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

**Local-area networks**

Nestar Systems, Inc. has bundled its Plan 3000 file server into a local-area network system called Plan 3000B.

The local-area net product supports up to 10 IBM Personal Computers and is compatible with Nestar’s Plan 3000, 4000 and 5000 file servers.

The Plan 3000B bundles the file server with a CITI console, Nestar’s Shadow software providing fault-tolerant features, Planpak multi-user application software, an integrated print server or processor, 10 token-passing network interface cards and a 16-port hub. The local network also includes a 45M-byte streaming tape drive backup.

The Plan 3000 file server provides 688M bytes of formatted disk storage capacity. It is priced at $15,995.

Nestar Systems, 2585 E. Bayshore Road, Palo Alto, Calif. 94303.

**Test equipment**

A hand-held device called Twin-Tester that analyzes twin-axial cable and cable assemblies for continuity, polarity and shorts is offered by North American Computer Resources.

The device can analyze cables that are already run in walls or ceilings and can analyze without a computer and terminal.

Functions are said to include an ability to check polarity and continuity of conductors, the vendor said.

The Twin-Tester sells for $219.

North American Computer Resources, 611 Holley St., Houston, Texas 77002.

**Telecommunications**

Techniques Corp. has unwrapped T-Berd 105, a T-Carrier monitor that tracks errors, alarm conditions and signal quality on operating T1 and T1C communications links.

The hand-held test set monitors and displays signals and alarm conditions while simultaneously measuring 11 error parameters, the vendor said.

The unit supports framed (D4), extended super-frame (P6) and clear channel (3082) signal formats.

T-Berd 105 is priced at $1,895.
The new ITT XTRA XP is definitely out to break some barriers.

Thanks, in part, to the added muscle of an Intel 80286 chip buried deep inside, the ITT XTRA XP runs circles around the competition.

It is, in fact, over three and a half times faster than the IBM XT.

And twenty-five percent faster than the AT on a Lotus recomputation.

And as if speed alone weren't enough, the new XP actually speaks and listens.

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Leaving your hands free to go about their business.

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Call today. Time is definitely money.

And time is something the XP can save you a lot of.

ITT
PERSONAL COMPUTERS
Test equipment

An asynchronous interface line unit for connecting asynchronous ASCII-compatible terminals directly to a standard telephone jack is available from Northern Telecom, Inc.

The unit consists of a cable with a male or female RS-232C connection on one end and a standard RS-11 telephone connector on the other. It was designed to connect asynchronous data terminals to the vendor's Meridian SL-100 integrated services network Lanstar data services. A circuit performs the necessary interface functions between the terminal and asynchronous interface line card in the Meridian SL-100. Terminals can be located up to 4,000 ft from the Meridian SL-100 and can communicate at speeds up to 19.2K bit/sec.

Other features include speed calling, autodialing and queuing on busy facilities such as computer ports and modem pools. These facilities are accessible from the terminal keyboard through responses to menus and prompts. The product is priced at $89 in single quantities.

SYSTEMS & PERIPHERALS

Turnkey systems

Compucan, Inc. has introduced a family of laser data entry systems (LDVS) that scan paper-based information and enter, validate, edit and process the data. The systems are composed of the Laser III Formsreader scanner, a 32-bit superminicomputer with 32M to 4G bytes of memory, a system console, a 50M- or 80M-byte disk and a VDT. The scanner electronically reads typed, machine-printed, numeric handprinted, mark sense and image data. It reads the data from paper documents ranging in size from 2.9 in. by 2.5 in. to 8.5 in. by 14 in. and inputs it to computers at speeds up to 4,400 documents per hour.

Capabilities include the ability to correct unrecognized characters, capture field-of-image information such as signatures and support asynchronous, synchronous and bisynchronous protocols.

There are four models: LDVS Model I through Model IV, each having a different number of input and editing stations.

The LDVS Model I with a Laser III Formsreader, 32-bit CPU, 2M bytes of memory, a system console, 50M-byte disk, VDT and an audit printer process the data.

Compucan, Building 2, 81 Two Bridges Road, Fairfield, N.J. 07006.

Arcad Co. has expanded its Architectural Interactive Design System to run on the Digital Equipment Corp. 32-bit Microvax II supermicrocomputer. The Microvax II can be configured to operate up to eight graphics terminals simultaneously, a spokesman noted.

A complete system, including a Microvax II, graphics display terminal, pen plotter and Arcad software, sells for approximately $50,000, the vendor said.

Arcad, Suite 800, 811 W. Seventh St., Los Angeles, Calif. 90017.

Processors

Burr-Brown Corp. has upgraded its TM900 Transaction Processor for its distributed factory data collection systems. Enhancements include the following features: the RS-422-compatible, factory multidrop network has been optionally isolated; the removable termination assembly allows easy servicing; powerful conditional tests and transaction branching instructions have been added to the unit's command language; and a link port allows two TM900s to be connected to each other with automatic or host-controlled switch-over in case of failure.

The TM900 is available in two configurations: a four-line configuration supporting up to 64 microcomputer terminals and an eight-line configuration supporting up to 128 microcomputer terminals, according to the vendor.

Single-unit pricing is $7,500 for the four-line configuration and $10,000 for the eight-line configuration.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

Terminals

MSI Data Corp. has announced the PDT III, a programable, portable data terminal that offers storage capacities ranging from 16K to 256K alphabetic characters, the equivalent of 32,000 to 512,000 numeric digits. Designed for applications such as order entry, hospital data collection, electronic ordering and price audit, the terminal comes with a 51-key color keyboard that includes 128 ASCII characters plus scanning peripherals that can read most bar codes.

The terminal transfers collected data to a host computer over standard telephone lines. Other features include a Dual Tone Multi-Frequency circuit that enables the terminal to dial a predetermined phone number from memory automatically plus a real-time clock that enables the terminal to dial a phone number at a preset time. Accessories include a 24-col. integral printer and peripheral input ports that connect the terminal to the printer.

The PDT III can also be programmed to answer a call from a polling computer.

Users can develop terminal software in the vendor's UBASIC language on the IBM Personal Computer XT or AT and on Digital Equipment Corp.'s VAX or Microvax computers. Depending on how much memory the PDT III is configured with, the terminal ranges in price from $1,110 to $2,010.

MSI Data, 340 Fischer Ave., Costa Mesa, Calif. 92626.
IF YOU WANT TO SELL BUSINESS SOFTWARE TO THIS COMPANY, YOUR TECHNOLOGY BETTER NOT BOG DOWN.

Ocean Spray 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.

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We are about to deliver Ocean Spray'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.

McCormack & Dodge Corporation, 1225 Worcester Road, Natick, MA 01760, 1-800-343-0325
Printers/plotters

BDT Products, Inc. has ported its Lettermate series of sheet feeders to the Diablo Systems, Inc. 630 printer; the NEC Information Systems, Inc. 8800 printer; and the Itoh Electronics, Inc. F10 printer.

For both the Diablo 630 and the Itoh F10, there are new models of the Lettermate III/A triple-bin sheet feeder. They have two paper or multiple form bins that hold up to 230 sheets of paper and one envelope bin that holds up to 60 envelopes. They are both priced at $1,195.

For the NEC 8800 printers, there are Lettermate sheet feeders with a single bin, dual bin or dual tray with an envelope bin. Prices range from $495 for the single-tray, demand- feed Lettermate I to $1,195 for the triple-bin Lettermate III/A.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

Burroughs Corp. has introduced the AP 9208 Laser Printer.

The AP 9208 is a nonimpact, desktop laser printer that can reportedly print at a speed of 8 page/min. According to a company spokesman, it can print letter-quality documents, spreadsheets, transparencies and graphics. It operates with Burroughs workstations, terminals and entry-level and small systems.

The AP 9208 costs $3,395.

BDT Products, Inc. has introduced the Laserfeeder, for use with laser printers that use the Canon U.S.A., Inc. laser print engine, such as the Hewlett-Packard Co. Model 2866.

The Laserfeeder is an automatic triple-bin sheet feeder featuring dual paper bins and an envelope bin. It plugs into the printer's manual paper-feed port. It can pull from any one of its bins as determined by commands from the computer terminal to the sheet feeder's interface system.

The Laserfeeder costs $1,695.

BDT Products, 17152 Armstrong Ave., Irvine, Calif. 92714.

Okidata Corp. has unveiled the Microline 182 TTY, a dot matrix printer that offers bit image graphics, utility mode printing and selectable intelligence levels that let one printer function in multiple applications.

Users can select several modes of operation including teletypewriter, CRT, basic printer and intelligent printer.

Prices are $349 for a parallel 120V model, $385 for parallel 220V and 240V models, $409 for a serial 120V model and $450 for serial 220V and 240V models.

Okidata, 532 Fellowship Road, Mount Laurel, N.J. 08054.

TGV Vitesse, an electronic composer/printer that lets users integrate graphics elements with text, has bowed from Commercial Scientific Corp.

The system combines word processing and page makeup with up to 16 computer-aided design workstations. Other components include an 8 page/min laser printer, networking capability and an optical scanner to convert photographs and other artwork to digital data.

TGV Vitesse can integrate text with halftone photographs, technical drawings, signatures and fingerprints.

Options are a multiuser mode, video slide function, plotter, electronic impact printers and remote communications. It costs less than $40,000.

Commercial Scientific, 165 University Ave., Palo Alto, Calif. 94301.

Graphics systems

Image.Peripherals, Inc. has added IDT2000, a double-page model, to its Displayscan series of image display terminals.

The IDT2000 features 2,048-by-1,024 pixel 1 display capability on a 19-in. monitor. This allows the use of the screen for full 11-by-17-in. page operation. Two 8½-by-11-in. pages can be displayed simultaneously as well.

Other features include a graphics controller with video frequency up to 200 MHz; programmable screen format; bit-map addressing capability to 16 M bytes; cross hair, panning and scrolling in each individual window; and flicker-free display.

The price is $14,900.

Image Peripherals, 42 Nagog Park, Acton, Mass. 01720.

Lasergraphics, Inc. has introduced its own intelligent color printing system called the CPS-200.

The system consists of a Lasergraphics rasterizing computer and a high-resolution, high-speed color...
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Comdisco, Inc., 1400 Shafter Court, Rosemont, IL 60018 312/698-3000
Continued from page 147

thermal transfer printer. It connects to any color graphics-capable host computer through an RS-232C serial communications line and accepts graphical information in Lasergraphics Language, a high-level graphics communications protocol common to many graphics software packages, such as Inso Corp. Graphics; SAS Institute, Inc. Graphi; IBM Graphic Display Data Manager; Precision Visuals, Inc. DI-3000; and Microsoft Corp. Chart 2.

The thermal transfer printer produces paper and overhead transparencies at 200 dot/in., in color or black and white, with more than a million possible halftone colors or 100 shades of gray. The printer uses cut-sheet stock fed through a cassette. The system costs $14,950.

Lasergraphics, 17671 Cowan Ave., Irvine, Calif. 92714.

Southwest Technical Products Corp. has introduced CAD South- west, a computer-aided drafting system. CAD. Southwest offers a CAD Zoom feature that allows users to zoom in to individual sections or view multiple sets of drawings on one screen. The system supports up to 256 overlays for the same drawing.

The drafting system runs on the Southwest line of computers operat- ing under Unix, an AT&T Unix-like operating system, the vendor said.

A complete multipurpose package costs $12,500 for CPU, digitizer, eight-color pen plotter and dot matrix printer plus the capability of adding up to 18 terminals.

Southwest Technical Products, 219 W. Rhapsody, San Antonio, Tex- as 78216.

Board-level devices

Emalex Corp. has announced the QD01/D disk controller for the Digital Equipment Corp. Q-bus.

The dual-height microprocessor-based controller is designed to inter- face any two ST506 5½-in. Winchester disk drives to the DEC Q-bus. The QD01 emulates DEC's Mass Storage Control Protocol and is compatible with DEC's Microvax I and II, LSI-11 and Micro/PDP-11 products. It offers adaptive direct memory access, non-interleaved sectors, 22-bit addressing, nonvolatile static random-access memory, internal self-test, block-mode direct memory access and 48-bit error-correction code.

The 100-unit price for the QD01/D is $1,122.

Emulex, P.O. Box 6725, 3545 Har- bor Blvd., Costa Mesa, Calif. 92626.

Emulex Corp. has introduced the CS40 switch interface to connect Dig- ital Equipment Corp.'s VAX Unibus to the Emulex Commun Exchanger Data Private Automatic Branch Exchange.

The CS40 uses one cable to connect 48 asynchronous terminals. It automatically routes up to 1,500 terminal and computer port lines in the same man- ner that a telephone private branch exchange switches telephone call connections. A standard model in- cludes a central unit, a power supply and central board set.

The CS40 costs $7,500.

Emulex, P.O. Box 6725, 3545 Har- bor Blvd., Costa Mesa, Calif. 92626.

Auxiliary equipment

Computer Stuff has announced the Rightray replacement output tray for use with the Hewlett-Pack- ard Co. Laserjet printer and compatibil- ity printers using the Canon U.S.A., Inc. LBP-CX printing engine.

Rightray is designed to stack docu- ments in the correct collated order. It installs between the printer and its support stand or table. It does not inter- fere with the input paper tray.

Rightray costs $38.96.

Computer Stuff, 1001A Windy Trail, Austin, Texas 78758.

Data Devices International, Inc. has announced the Mark 300 portable tape cleaner.

The Mark 300 features the Intel 8749 microcontroller, speed of 350 in./sec., automatic marker place- ment detection, automatic unload feature, self-diagnostic tests and quick-release hubs, according to the vendor.

The Mark 300 costs $1,995.

Data Devices International, 20235 Bahama St., Chatsworth, Calif. 91311.

Dynapac Systems has unveiled the Multi-Packet X.25 Load Simula- tor for testing and calibrating X.25 circuits.

The simulator generates a variable rate of packets per second to measure the performance of packet-switched networks. Performance statistics are calculated by sending and measuring delays associated with packet data and displaying a roster of informa- tion for up to 256 virtual circuits or for the global aggregate.

A complete unit, including cabinet and amber video terminal, costs $8,995. An optional printer sells for $599.

Dynapac Systems, 5419 Backlick Road, Springfield, Va. 22151.

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...if Phil in Accounting needs information on page 63, item 178...

...and so does Ted

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Now you can dramatically increase productivity on your 327x terminal. Press a key to switch between environments (TSO to CICS or IMS), systems (MVS to VM to DOS), CPU's (Chicago to New York to Los Angeles), etc.

PIE's advanced software technology provides multiple sessions using your normal single sign-on ID. No other hardware or software solution offers PIE's high performance and reliability.

When you log on to your "preferred environment" (TSO, CICS, VM) PIE automatically establishes your multiple sessions. You control who uses PIE, how many sessions they are allowed, what applications they can use and more.

You can switch back and forth between up to 16 sessions with a simple keystroke. Displays are saved exactly as you left them — even the cursor is in the right place.

Sessions can be started automatically or selected from a menu of available applications. PIE enhances any security system by allowing you to automatically LOCK your terminal if you step away for a few minutes.

"For less than the cost of a couple of 3290 terminals, PIE provides more facilities than a 3270PC without the overhead or expense."

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On takeovers and tumult: Sterling Software president tells all

Sterling Software, Inc.'s $145 million buy-out of Informatica General Corp. made headlines last summer and not just because its $20 million price tag was 10 times the size of Sterling but also because the deal represented the software industry's first hostile takeover attempt. Recently, Sterling Software President Sterling L. Williams talked with Computerworld Senior Writer Clinton Wilder about the software industry's largest acquisition to date, as well as Sterling's future goals and directions.

How have you consolidated the two companies, in organizational terms?

We've aligned the Informatica division with our newly acquired software companies. We've integrated Sterling's management with Informatica's management. But Informatica is not a collection of companies; it is a single company. spoon reported last month. Approximately 450 Hillsboro workers will be laid off as a result of the closing, with the remainder scheduled to be transferred to other jobs in the company, a spokeswoman said.

In February, Intel laid off about 900 employees, and another 860 workers were laid off in June following the closing of its "Fab" manufacturing facility in Santa Clara. The soon dormant "Fab" manufacturing plant has been operating since 1978 and is one of two facilities at the Hillsboro site. Work at the plant will be phased out through the rest of the year. However, the facility will continue to manufacture high-speed memory devices, a spokeswoman said.

Intel currently employs approximately 23,000 people worldwide.

Tandem last week turned in a respectable fourth-quarter financial report. Data General unveiled a major reorganization intended to integrate its marketing efforts.

"IBM will be the major force in defining most systems products. Apple, on the other hand, can be the leader in bringing together a superior human interface with real functionality in an IBM-defined systems world," John Sculley, president and chief operating officer of Apple Computer, said in a Wall Street Journal interview.
The data that can fit in your pocket today can have an impact on what goes into your pocket tomorrow.

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FOREVER
Pacts of nondisclosure protect confidentiality

Richard Raysman

I

n the software industry, it is essential that proper steps are taken to maintain the confidentiality of technical advancements. Coupled with the rewards of advancement are the potential hazards of revealing confidential proprietary trade secrets and materials to the competition.

Therefore, confidential and nondisclosure agreements are an important factor to be considered in negotiating employment and consultant contracts. In addition to the great demand for permanent employees, many firms find it necessary to hire independent computer consultants to develop new applications or reduce the workload of existing employees. Some data processing personnel enter into their own computer businesses after a period of time during which they were employed by others. These businesses often come to compete, directly or indirectly, with the former employer's business.

When employers or independent computer consultants leave their jobs for new ventures, it is not unusual for them to use information that their former employer considers proprietary and confidential trade secret information. Frequently, the former employer is particularly concerned with preserving valuable proprietary information and lead time gained through the development of new software technology.

A typical confidentiality agreement for an employee or consultant in the software industry acknowledges the confidentiality of the information. The consultant should recognize, in this agreement, that he is receiving confidential information concerning the company's business affairs, finances, methods of operation and other data.

The agreement should set forth that unauthorized disclosure of the confidential information will irreparably damage the company. This agreement should define all such information as confidential information.

With respect to nondisclosure, the agreement should specify that the consultant will not disclose any confidential information to anyone other than the term of the agreement or afterward. The nondisclosure provision should also require the consultant to turn over to the company, at the termination of the agreement, all documents in his possession relating to the confidential information.

To qualify as a trade secret, confidential information must give the employer a business advantage over competitors; the confidential information must be unique or not commonly known; and the employer must treat the confidential information as secret and must bind the employee either expressly or implicitly to preserve the trade secret status of the confidential information.

One of the greatest dangers to the trade secret is the employee/consultant who assisted in the development of a product or hardware technology, because he is familiar with new answers necessary in the operation of the particular system and can easily misappropriate the information.

Where the employee/consultant is given access to existing trade secrets, the law imposes a duty of nondisclosure with the existence of confidentiality agreements. Where, however, the employee/consultant develops the trade secret on behalf of the employer, no such duty exists.

When the employer is a large organization and the employee or independent consultant is a lone individual, a restrictive agreement can severely limit the employer's mobility in the individual. For such reasons, courts are reluctant to enforce restrictive agreements unless the employer can meet certain judicially imposed tests, including adequate consideration, limitations in time and restrictions in the geographical area or market.

Nevertheless, from the employer's perspective, confidentiality agreements are an important means to prevent theft of trade secrets that may have taken many years to develop. It is easier for the employer to prove that an employee breached a written agreement than to prove that the employee used misappropriated trade secrets based on an oral understanding. For a practical point of view, see PACTS on page 154.
Lab puts usability to the test

Psychologists evaluate documentation, tools

By Mitch Betts

WASHINGTON, D.C. — Hoping to help software developers make their software products and manuals more user friendly, an independent laboratory focused on Nov. 1 with a staff of psychologists to test the usability of software, from the prototype to the finished product.

"This type of testing has far-reaching implications," according to Carol Mills, director of the American Institutes for Research (AIR) usability test laboratory. "Users are assured of products that work well. Manufacturers benefit by uncovering problems before products hit the market," she said.

Usability testing leads to improved computer documentation and software products that are accurate, easier to use and easier to sell, Mills said. Furthermore, by catching problems early, software companies can avoid costly revisions to software and manuals and reduce customer service calls.

The lab’s competitors in independent software testing are National Software Testing Laboratories, Inc. in Philadelphia and International Bureau of Software Test, Inc. in Boston, a spokesman said.

AIR is a nonprofit organization that conducts research and development under negotiated contracts with clients, a spokeswoman said.

The lab is part of AIR’s Document Design Center, which specializes in helping clients transform legal, technical and bureaucratic writing into plain English. Most documentation on the market today is not tested for usability, resulting in manuals where customers find disorganized and in language best understood by programmers, according to AIR.

A spokesman explained that AIR psychologists test manuals, tutorials and software by analyzing the behavior — such as facial expressions and body language — of 10 to 20 typical users as they work with the product. For example, they count the number of Help requests and errors, and they calculate the time taken to accomplish tasks.

All of this is recorded on videotape, which, along with the user’s evaluation, is analyzed to identify problems and suggest corrections.

The AIR lab has an evaluation room, where the user completes tasks using the manuals and software, and an observation room for trained observers to monitor user performance.

A one-way mirror allows the observers to watch test subjects and operate the remote-controlled video cameras, officials said.

The lab can also conduct studies that compare two or more alternative software packages or hardware devices as well as study whether users prefer to operate a mouse, touch screen or light pen, a spokesman said.

Facts protect confidentiality

From page 153

view, a written agreement can also have a discouraging effect upon an employee who is considering entering into competition.

The case of Structural Dynamics Research Corp. vs. Engineering Mechanics Research Corp. provides a good example of trade secret protection of software where an insider misappropriates confidential information. The disputed programs involved an advanced analysis tool that was faster and more accurate than other systems.

The three defendants, while at Structural, developed and helped to market a sophisticated structural analysis program for sale to large automobile manufacturers. They resigned to enter into competition as principals and officers in Engineering Mechanics. The program being sold by Engineering Mechanics, although not identical, was substantially similar to that which was developed at Structural.

The court found that since the individual defendants used their own skills to develop the program without any appreciable assistance, expense or supervision of the employer, absent a written agreement they would have an unqualified privilege to sue and disclose the trade secret so developed. The court noted that an employer had an interest in the subject matter at least equal to that of the employer or, alternatively, such knowledge became part of the employee’s skill and experience and, therefore, was not subject to the employer’s control.

Fortunately for Structural, the three individual defendants had entered into confidentiality information agreements in which they agreed to refrain from divulging privileged or confidential information. The court concluded that the written agreements were valid and enforceable.

A typical confidentiality agreement should contain an acknowledgment that certain information is considered confidential. This would include all work developed, under development or to be developed by the employee/consultant during the course of the employee/consultant’s engagement by the employer; all items of software and supporting documentation in the employer’s possession; and all employer customer lists and supplier lists.

The agreement should also include an acknowledgment that the employee/consultant has had access to confidential and proprietary information belonging to the employer and will participate in the development of confidential and proprietary information on behalf of the employer and a commitment that the employee/consultant will not in any way disclose that information to others.

Confidentiality and nondisclosure clauses should be structured to reflect the general purpose of protecting trade secrets and trade secrets. But because companies have invested so much of their resources, it is critical that serious efforts be made to protect such confidential information with written agreements.
NOVEMBER 11, 1985

BY MITCH BETTS

ARLINGTON, Va. — Eastman Kodak Co. recently unveiled its plans to capture more of the U.S. government market for its information technology products with the opening of the Kodak Imaging Systems Center, a flashy office across the Potomac River from the federal agencies in Washington, D.C.

The new center, which serves both as a showcase for Kodak products and as headquarters for the firm’s Government Systems Division, is the result of a company reorganization last January, according to Kodak officials.

Because government agencies are urging vendors to "speak with one voice" and offer integrated systems, Kodak decided last year to abandon its traditional, multifaceted sales effort in favor of a consolidated one, said John R. Robertson, vice-president and general manager of the Government Systems Division.

"In the past, the same government agency might have seven or more Kodak representatives from our different market divisions calling with some regularity. Now, the single Government Systems Division is charged with total responsibility for an agency’s needs," Robertson said.

Furthermore, Robertson hinted that Kodak may act more like a systems integrator in the future when responding to government bid solicitations.

The new division, he said, has the authority to “make quick decisions and start the wheels rolling immediately, whether the request involves special work within Kodak or purchasing something from a third-party supplier.”

Among the products that Kodak will be marketing to the government sector are the Kodak Image Management System, which allows users to retrieve digitized microfilm images and other data at computer terminals; the Kodak Electronic Publishing System; computer-assisted microfilm retrieval systems; on-line processors that convert computer output into microfilm; data communications software from Kodak’s Eastman Communications Division; and ink-jet printers from Diconix, Inc., a Kodak subsidiary.

At the Kodak Imaging Systems Center, these products are on display in working configurations for demonstration to government customers and other prospects.

The equipment is tied together by a local-area network developed by Kodak and Electronet Information Systems, Inc. of Washington, D.C. officials said. The network, based on a private branch exchange with an open architecture, links the Kodak information systems with IBM hardware and Wang Laboratories, Inc. word processors. It also provides smart building functions, such as controlling the product demonstration rooms and maintaining a building inventory.

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IBM SHuffles Executives, Organizations

ARMONK, N.Y. — Intensifying the marketing push for its newly announced Token Ring area network products, IBM last week announced several executive and organizational changes.

IBM announced the breakup of its year-old Telecommunications Products Organization into product development and marketing functions.

Telecommunications development work will now be handled under the Communications Products Division, and telecommunications marketing was transferred to the Information Systems Group.

In executive changes, former System Products Division President H. Mitchell Watson Jr. was named vice-president of marketing, succeeding Terry R. Lautenbach. Lautenbach was named Communications Products Division president.

The former president of the communications products group, James A. Bitonti, was named assistant group executive of the Asia/Pacific Group.

Completing the changes, Corporate Vice-President Stephen B. Schwartz succeeded Watson as System Products Division executive. Schwartz had been assistant group executive of the Telecommunications Products Organization.

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Quarterly figures strong for Tandem

By Rosemary Hamilton
CUPERTINO, Calif. — Tandem Computers, Inc. finished up fiscal 1985 with a relatively strong fourth quarter that boosted its year-end results above year-earlier totals.

For the year ending Sept. 30, Tandem reported profits of $34.4 million on revenue of $624.1 million. In 1984, the firm earned $33.2 million on sales of $532.6 million. The year-end net income comparison does not include a $9.7 million one-time tax benefit that was added to 1984's results. The tax benefit was represented entirely in 1984's fourth-quarter net income.

The company reported revenue of $173.8 million for the fourth quarter that ended in September, a 14% increase from the $153 million in revenue reported in the same period a year ago.

Net income for the quarter, however, dipped slightly from the previous year. Tandem reported earnings of $11.1 million, compared with the $11.9 million (or $21.6 million with the one-time tax benefit) reported in September 1984.

Tandem is the maker of Nonstop and other fault-tolerant computers, which are designed for continuous data processing. President and Chief Executive Officer James G. Treybig said that while the company's balance sheet is stronger than ever, he is also hoping that 1986 will be a period of higher capital spending.

Wang to combine three separate divisions

Software Solutions Group will seek better business relationships

By Rosemary Hamilton
LOWELL, Mass. — Wang Laboratories, Inc. plans to combine its software vendor, value-added reseller and dealer marketing divisions into a new unit called the Software Solutions Group, which should be in full operation by Dec. 2.

The group will institute a number of policies designed to beef up relationships with software vendors, value-added resellers and dealers.

In general, the policies will offer a "variety of financially attractive options to encourage [software vendors and value-added resellers] to position their companies in a complementary business relationship with Wang," the company said. Software providers that do business with Wang are expected to receive some discounts and added benefits.

Value-added resellers that need assistance from Wang sales representatives when selling value-added software, for instance, can participate in a complementary value-added reseller program. This allows value-added resellers to trade discount percentage points to compensate Wang for sales and support assistance.

Under a new marketing assistance agreement, value-added resellers have the option to work with the Wang sales organization on a software-only basis and still get a hardware commission.

A Software Solutions program will also be added to strengthen business relationships with software vendors. A technical hot line into Wang's research and development department will be provided. Initially, about 50 software vendors and value-added resellers will have access. By April, Wang hopes to expand the hot line to all software providers.

In addition, the company plans to recruit additional value-added resellers for markets not being covered by its direct-sales organization.

Adage reduces work force 8%

By Rosemary Hamilton
BILLERICA, Mass. — In response to pricing pressures, most notably from IBM, and diminished product demand, Adage, Inc. trimmed its work force by 8% to 490 persons.

The 44 employees were let go from all departments, according to the workstation manufacturer. The move is expected to help align Adage's expenses with its current business outlook, according to John P. Cunningham, executive vice-president of finance and administration. No further cutbacks are expected, he added.

The layoff comes after the company reported a net loss of $726,000 for the first six months of the year on revenue of $20.2 million. The net loss was only the second in eight years. During the same period in 1984, the company earned $1.3 million on sales of $22.4 million.

Adage recently announced that it would acquire Lexidata Corp., also of Billerica [CW, Nov. 4]. Cunningham said the layoffs had no relation to this pending acquisition.

Cunningham said that the company's most recently introduced product — the Cadstation 2/50, the 9080 graphics system and the 6500 workstation family — will be the "basis for renewed corporate growth.

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On takeovers and tumult
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strategy, which is consistent with the strategy that Informatics had in the first place.

As far as the debt [from the acquisition] itself, we expect to have it reduced from $100 million to $50 million within a year. That will come from cash flow from operations as well as the proceeds from divestitures, but it also means that we intend to conserve cash for a while. We have $25 million in cash in the bank now so we're not strapped.

There really is no significant risk that we won't be able to meet our debt obligations, but on the other hand, we want to reduce even that risk. So in the future, we will maintain an aggressive acquisition program, but it will be predominantly with stock and other securities.

How did you go about reducing expenses at Informatics?

Primarily people. We went from 208 people to 114 people in one day, which sounds a little coldhearted. However, I say an expense momentum had built up over the years, and the revenue momentum hadn't kept pace with it. It was simply a necessity to get the costs back down under what we were describing as dependable revenue levels.

Have the personnel cuts been completed?

They are over.

Sterling's acquisition of Informatics seemed like a clash of two very different types of corporate cultures. Have you found that? Has there been any friction?

The answer is very much yes. There were two different cultures at what I would call the top. I would say the cultures are very much in common at the operating-unit level. Many of the divisions either sprung up from small groups in the company earlier, or more specifically, many of them were acquired small companies. They had the culture they were looking for. We are returning that culture, and they find that is very, very refreshing.

Now, at the top, on the other hand, there has been the biggest single change of philosophy because we are going through a very aggressive decentralization program for Informaties. Last year their corporate staff spent $9 million, not counting all the expensive ads that they ran [in fighting Sterling's takeover bid], and we are reducing that to zero. To accommodate the needs that we still need to address, we are going to head back around $3 million. We simply intend to let the companies operate themselves, but we intend to maintain a watchful eye and help wherever they need help. They don't need help as often as the old Informatics [management] thought they did.

What assurances can you give Informatics users that they will continue to get support and that their products will not be phased out?

We acquired the company to grow it and build it. It was not a financial play. We didn't acquire the company at the detriment of either the customer or the shareholder. I know that sounds like a lot of motherhood, but we very strongly believe that if you leave the product development activities and decisions to the local level, then products will get developed faster and enhancements will get developed earlier. The people with their ear closest to the customer are the people that are now making those decisions.

I think our philosophy is one primarily established to listen to, and to address the customers' needs more quickly than in any other way. Then we make money that way.

But as far as assurances are concerned, if certain products are going to be phased out, we can't give those assurances 100%.

Would you say that this acquisition has sent a message throughout the software industry to companies that are not doing so well and maybe are not managed as well as they should be — no matter how big they are — that a merger like this can happen?

The answer is unequivocally yes. The old concern about a takeover was that you would disrupt all the employees and all the customers and all the prospects and disrupt the entire industry. I think we have disproved that myth.

I think if there is a public company out there that has succeeded in providing disappointments to stockholders, and if the management doesn't have control of the company, then they ought to do one of two things. They ought to either get control quick or they ought to eliminate the disappointments.

The prevailing wisdom on hostile takeovers in the computer business used to be that things were inherently bad. It's not like you are buying tangible assets like warehouses and factories. You are acquiring people, and people, if they are not happy, can go to another...
Sterling buys software house

DALLAS — Sterling Software, Inc. continued its trademark pattern of acquisitions with the recent purchase of a closely held banking and insurance software house.

Sterling acquired Dallas-based Decision Systems, Inc. for $3.6 million in Sterling common stock. Decision Systems, which will become part of Sterling’s Financial Software Group, recorded sales of approximately $1.4 million for the fiscal year ended Sept. 30.

Decision Systems products will be marketed by Sterling’s Bank Software Marketing Division, which also markets products of two other firms acquired by Sterling. Directions, Inc. and Check Consultants, Inc.

more interested in being a company that is generating $100 million in profits than a company that is generating a billion in revenue.

When you wrote that business plan, did you envision that there would be as great a leap as this in one shot?

No. We thought we would do it through a series of acquisitions that would grow rapidly after we acquired them. It becomes kind of a geometric progression. Of course we didn’t envision that we were going to go out and acquire a $200 million company.

You lost $3.7 million in a year. Were you going to do about it?

I would submit that what we are doing for the company, looking at what the results have already become, is motivational rather than a depressant. We also believe that the key assets in the company are the people, and we think that we are treating them better now than they were treated before — if you look at it from that point of view.

What are Sterling’s long-term revenue goals now?

It is nice to be able to look back in the business plan we wrote in August 1981. We said we wanted to be a $300 million company within five years. We will do that. We think that we can be a billion-dollar company within a decade. However, we are a whole lot more interested in being a company that is generating $100 million in profits than a company that is generating a billion in revenue.

When you wrote that business plan, did you envision that there would be as great a leap as this in one shot?

No. We thought we would do it through a series of acquisitions that would grow rapidly after we acquired them. It becomes kind of a geometric progression. Of course we didn’t envision that we were going to go out and acquire a $200 million company. On the other hand, we did acknowledge the fact that if such an opportunity presented itself, we would do it. We never avoided that.

Does the Informatics acquisition mean they are going head to head with IBM at all?

God no, with a capital “G” and a capital “N.” We have some philosophies that we very strongly believe in and adhere to, and one of it is that we swim in an IBM ocean. The best way to fail in this business is to go after IBM. A lot of people do it and do it successfully, but we think the odds are against it.

Dr. Bauer and his board had carefully prepared a pretty attractive severance package in the event something like this happened. We recently wrote a very, very sizable check to Dr. Bauer.

In the software industry climate right now for a lot of acquisition activity, not just by Sterling, but by other companies?

I think so. There is a major opportunity for both small companies to be acquired by larger companies to kind of assure their future, and for the large companies to find good, small companies. I think there is a lot of activity going on. The initial public offering market is not as good as it once was. Mergers and acquisitions represent perhaps the safest and maybe the most economically advantageous way for a small company to go forward.

In the last Informatics annual report, [former Chairman] Walter Bauer wrote that they were going to reposition the Mark IV and Mark V products for improved performance. Was that happening at all?

No. When you lose $3.7 million in a division, you hire people to write some pretty good words about what you are going to do about it. I would say the repositioning was not on schedule.

Was Bauer given any severance benefits other than the standard Informatics package?

Indeed he was. Dr. Bauer and his board had carefully prepared a pretty attractive severance package in the event something like this happened. We recently wrote a very, very sizable check to Dr. Bauer. He had worked a lot of years in founding and building and making successful a company that we obviously thought was very attractive. We think he deserved it.
Having experienced a slump in 1985, the entire computer industry is looking toward 1986 with particular interest and renewed hope. Computerworld's December 30/January 6 Forecast '86 issue will cover the industry's most timely topics while providing a sneak preview of the year ahead.

**General:** We'll take a look at...the effects of the slump on corporate culture and strategy...MIS/DP management viewpoint of problems and issues...trade wars between the U.S., Europe, and Japan...pending legislation on computer-related issues.

**Hardware:** We'll discuss...major mainframe vendors and strategies...viability of AT&T in the real computer world...status of the chip industry and new technologies...the encroachment of supermicros on mini and mainframe territories.

**Software/Operating Systems:** We'll also look at...user acceptance of IBM's software pricing strategy...the world of multi-user micro software...expectations for the micro-mainframe link world...utilization of Unix in Europe...efforts for boosting programmer productivity.

**Other:** And we'll examine...alternatives for users in data and voice communications...GM's Manufacturing Automation Protocol...and more!

Here's your chance to get a jump on the 1986 computer market. You'll capture the attention of Computerworld's audience of over 687,000 computer-involved professionals when you advertise in the December 30/January 6 Forecast '86 issue. Simply return the coupon below or call Ed Marecki, Vice President/Sales, at (617) 879-0700.
Du Pont enters joint venture

By Charles Babcock

NEW YORK — The Du Pont E. I. De Nemours & Co. of Wilmington, Del., and N.V. Philips of the Netherlands have teamed up to form a joint venture to produce optical disks in the U.S., spokesmen for the two firms announced recently.

Both companies are doing development work in different areas on erasable optical disks and are combining their resources in hopes of becoming the world's largest supplier of optical disks, said Edgar S. Woolard Jr., vice-chairman of Du Pont.

Philips, which introduced the first digital compact disks in 1983, holds patents on the 4.72-in. devices. Du Pont is a manufacturer of high-density, 14-in. optical disks used in mainframe computer storage systems.

Both parties indicated that they hope to dominate the emerging market for audio disks, which use laser beam pointers to play musical recordings, and move from that base as a major manufacturer of data storage devices.

Together, they will lease a 160,000-sq-ft facility in Kings Mountain, N.C., for the production of 50 million compact audio disks a year. The joint venture plans to have a capacity to produce 200 million disks a year at plants worldwide by 1986, Woolard said.

Philips produces compact audio disks at its Polygram recording subsidiary in Hannover, West Germany, and video and data disks in Blackburn, England. It does development work on both audio and data disks in Eindhoven, the Netherlands.

Du Pont is conducting research on erasable optical disk technology based on organic materials.

Philips is planning a joint venture to develop magneto-optic and phase change technology for erasable disks.

The C3M Corp. in St. Paul, Minn., is also a U.S. producer of read-only, or write-once, disks.

The Du Pont-Philips combination will also be producing optical disk drives. Other optical drive manufacturers include Storage Technology Corp. in Louisville, Colo.; the British-French consortium Thompson-CSF; and Japanese manufacturers Sony Corp., Hitachi Ltd., Matsushita Electric Industrial Co. and NEC Corp.

Televideo Systems, Inc. has signed a five-year manufacturing/marketing agreement with Ambi Corp.

The agreement will give Televideo access to Ambi's national direct sales and marketing force for the company's product lines. Televideo will provide Ambi with its manufacturing resources.

Analogic Corp. has signed a three-year strategic marketing agreement among its Computing Systems Group and the Data Systems Division of Hewlett-Packard Co.

Philips International B.V. and Signetics Corp. have announced the formation of a U.S.-based venture to design, manufacture, and market products for users of the industry-standard VMEbus. The venture will be called Philips/Signetics Microsystems.

Nynex Corp. has formed a new subsidiary, Nynex Credit Co., which will provide financial services to other companies in the Nynex family beginning in January 1986.

Ashton-Tate has formed a corporate advisory board with a charter membership of 14 major U.S. corporations. The board will assist the microcomputer software company in developing products that meet the needs of corporate users.

Olivetti Corp. has signed an agreement with Computerland Europe Sarl for the worldwide distribution of its various models of personal computers in countries outside the U.S.

Summagraphics Corp. has entered into a settlement and cross-license agreement with Hitachi Seiko Ltd. after an alleged patent infringement. Both parties agreed to cross-license certain patents relating to tablet digitizers.

Intecom, Inc. has announced its contract with Planning Resource Corp. for one switching system and associated peripheral equipment with options for an additional five systems.

How to get:

P.C.'s sharing data with mainframes sharing with printers sharing with Legal sharing with Marketing sharing with Sales sharing with Personnel sharing with Finance sharing with Research sharing with P.R. sharing with Administration sharing with Engineering sharing with Word Processing sharing with Upper Management sharing with Planning sharing with Treasury sharing with Development

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News from the computer world
From page 151
with General Electric Co.

Vector Graphic, Inc., which is in the process of merging with Dual Systems Control Corp., announced last week the layoff of 12 people. That may not seem like a lot, but at the one-time high-flying micro company it amounted to one-third of its work force.

Xidex Corp. of Santa Clara, Calif., has reached a preliminary agreement to acquire hard-disk manufacturer Charlton Associates of El Toro, Calif. Under the terms of the agreement, Charlton will release all of its outstanding shares of stock in exchange for 2.2 million newly issued shares of Xidex common stock, as well as warrants to buy 4.6 million shares of Xidex stock at 120% of fair market value at the time the merger is completed. Xidex, a manufacturer of computer storage systems, recorded annual sales of $380 million last year. Charlton recorded annual sales of $36 million.

Print head manufacturer DH Technology, Inc. of Sunnyvale, Calif., got the green light recently to acquire bankrupt Micro Peripherals, Inc. of Salt Lake City. A Utah bankruptcy court approved the acquisition just one month after the printer manufacturer filed for protection under Chapter 11 of the Federal Bankruptcy Act. Under the terms of the acquisition, DH Technology will pay secured and unsecured creditors $428,000. A portion of the creditors will receive a deferred payment of $320,000 based on future Micro Peripherals sales. DH will also acquire all of the outstanding shares of Micro Peripherals in exchange for 40,000 shares of DH common stock.

Micro Peripherals will be operated as a wholly owned subsidiary of DH Technology.

The Japanese invasion continues. Toshiba America, Inc. has announced plans to build a $35 million facility on 26.2 acres in Irvine, Calif., for research and development and manufacturing of telecommunications and medical systems. The move marks the first time a U.S. subsidiary of a Japanese company will manufacture medical systems in the U.S. The Japanese company will manufacture medical systems in the U.S. The building will also serve as headquarters for Toshiba's industrial business for operations, and it will house sales and distribution facilities for telecommunications and other office automation products.

Another small electronics firm suffered the consequences of the computer downturn recently when Digital Applications, Inc. of Phoenix shuttered the doors of its printed circuit board and manufacturing operations and laid off 40 employees.

A spokesman for the company said the subsidiary of Aero Scientific Corp. of Anaheim, Calif., recorded a net loss of $85,000 on sales of $865,000 compared with $81,000 in profits on $1.9 million in sales for the same period a year ago.

DG forms group, reorganizes units
By Clinton Wilder
WESTBORO, Mass. — In a move designed to improve coordination and consolidate product marketing to its target customers, Data General Corp. last week announced the formation of a Business Group Marketing Division. DG is attempting to tighten its marketing approach on diverse products by offering "total integrated system solutions" to customers in business, design and industrial automation markets, according to Business Group Senior Vice-President Robert C. Miller. Miller said DG believes those three markets have shown "increasing convergence," necessitating a more consolidated marketing strategy.

J. David Lyons, former vice-president of DG's Information Systems Division, will head the new division as vice-president of Business Group Marketing and will report to Miller.

Business Group Marketing will have responsibility for DG's current industrial automation and office automation divisions, as well as a new Product Marketing Division. John H. Scanlon, formerly director of software development for the company's Systems Development Division, will head Product Marketing.

The industrial automation group changed its name from the Technical Products Division to the Technical Systems Division. It is headed by Vice-President Donald L. McDougall. Lyons will serve as acting head of the Information Systems Division, which is responsible for DG's Comprehensive Electronic Office Automation system and related OA products.

In a connected move, DG consolidated all of its product distribution, except the direct sales force, under its former Desktop Division, renamed the Distribution Division.

The new group, headed by former Desktop Division Vice-President Cliff Bream, will continue to handle the retail channel but will also take over industrial distribution from Technical Products and the value-added reseller and OEM channels from Information Systems.

In addition, DG announced the formation of an independent business unit for expert systems, headed by Peter G. Jessel.
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For more information on the N2420/30 and its remarkable options, call 1-800-538-8166. (In California, 1-800-672-3309.)

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Comp-U-Card International, Inc. of Stamford, Conn., and Financial Institution Services, Inc. of Bellefonte, Wash., and Votrax, Inc. of Troy, Mich., announced the completion of merger negotiations and the signing of an agreement. The agreement calls for CMC’s acquisition of Votrax for about 7.7 million shares of CMC common stock and $1.47 million in promissory notes. The agreement also calls for a third party to buy approximately 195,000 shares of CMC common stock for $120,000 cash. The firms decided against including Ixo, Inc. of Culver City, Calif., in the merger, as was previously announced.

Tailgrass Technologies Corp. of Overland Park, Kan., announced the acquisition of Gemini Software, Inc. Gemini Software has become a Tallgrass subsidiary and will operate under the name of Tallgrass Software Technologies, Inc., located in Providence, R.I.

Software Publishing Corp., the successful Mountain View, Calif., vendor of the PFS microcomputer software series, reported a 14% drop in profit on a 12% revenue decline for its fourth quarter ended Sept. 30. Publishing earned $846,000, or 12 cents per share, on $71 million in sales.

But the firm ended its first year as a public company with 42% growth in revenue and a 47% profit increase. Software Publishing earned $58.5 million, or 83 cents per share, on 12-month revenue of $377 million.

Fortune Systems Corp. reported a third-quarter loss of $4.4 million, or 21 cents per share, a steeper drop than its $3.7 million, 17-cents-per-share loss a year ago. Revenue dropped by some 50% from $16.7 million a year ago to $8.2 million.

The Belmont, Calif., Unix system maker had been profitable in the second quarter, but posted a 37% decline in quarter-to-quarter sales in the third. But its loss for the nine months ended Sept. 30 mounted to $7.9 million, or 38 cents per share, compared with a loss of $7 million, or 32 cents per share, in the same period in 1984.

Thomson bets on chip revival

The Japanese computer buyer is targeting U.S.-made products!

Japan, the world’s largest computer market outside of the U.S., will eliminate all import tariffs on computers, peripherals and parts early next year. The Japanese Prime Minister and government trade ministries have instructed Japanese companies to substantially increase their purchasing of U.S. goods to lower the Japan-U.S. trade deficit.

And, you can reach the MIS/DP directors and key technical staff at virtually all the major computer-using sites in Japan, when you advertise your products in Computerworld Japan—Japan’s leading computer news publication. Computerworld Japan’s readers account for over 75% of the Japanese end-user computer market.

Modeled after its’ sister publication in the U.S., Computerworld, Computerworld Japan covers the latest developments in the Japanese computer industry. Each week, over 35,000 readers turn to Computerworld Japan for information on new products and services, current applications, industry trends and international events.

Drive maker posts profits

From page 151:

counting for 78% of the total demand.

Chairman and Chief Executive Officer Irwin Rubin said Computer Memories management “is directing a major effort” toward developing alternate sources of demand when the IBM contract expires Dec. 31.

In other financial news, an artificial intelligence systems firm continued to grow, a micro applications vendor slowed down and a vendor of multilayer systems based on AT&T Unix software continued to suffer losses.

Symbolics, Inc., a Cambridge, Mass.-based AI vendor, reported a 71% jump in revenue to $24 million for its first quarter ended Sept. 29. Profits quadrupled from the year-earlier period to $2.4 million, or 9 cents per share.

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Director of Communications Technology Planning

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Candidates for both positions should have proven records of success, supporting and communicating with senior management and users as well as communicating and influencing vendors. Well-developed interpersonal and communications skills also are important.

Based on a solid understanding of technology, candidates need to have the capability to project plans into the future, communicate their perspective to others, and translate them into action.

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Please send resume and salary requirements to Fred A. Taverne, Corporate Recruiting, DO409, Aetna Life & Casualty, 151 Farmington Avenue, Hartford, CT 06106, or call him at (203)273-6828. Aetna is an equal opportunity/affirmative action employer.

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**BOSTON**

- PROJECT MGR
  - One of this areas leading retailers seeks a merch pro to manage people & projects in a key role. Environ is IBM pro to move into a hi visi MVS DBMS COBOL. If you have at least 5 yrs exp in this area seek this opportunity. Salary to $40,000.

- PROD ANALYST
  - Recognized Boston multi-dio corp seeks strong #2. Salary to $45,000.

- MANAGER
  - Recognized BOSTON multi-dio corp seeks talented leader. Desire to manage prod devel. in this growing environ. Must have 2+ yrs experience in data bse group to the point they are made available. Fee Paid. $50,000.

- DATA CENTER MANAGER
  - The "keys" that unlock the MVS, TSO environment are the skills, knowl of hdwr/sfwr. The salary to $45,000.

- SYSTEMS ANALYST
  - The keys to this position are sys analysis & COBOL. Rapidly growing co seeks Sr Bus Analyst w/APICS cert. Salary $40-50,000.

**HARTFORD**

- SYSTEMS PLANNING SR P/R
  - Reinsurance broker has the following requirements: Insurance Backend Design. Fast-growing Twin Cites location. Applications: Back up manager to 4381, COS/VSE, VSE/SYS VSE. Must be off-line.

- SYSTEM SPECIALIST
  - Dvlp software for MVS/370. IBM maintained OS/360. On-line sys exp on a Terrific foods wholesaler/retailer w/ IDMS-ADSO, ASSEMBLER. 5+ yrs sys analysis & COBOL exp. To $40,000.

- PROGRAMMER
  - CT corp has immediate need for a PERFORMCO yr's exp. Weekly salary to $17,000.

- SYSTEMS ANALYST
  - Dvlp software for MVS/370. IBM maintained OS/360. On-line sys exp on a Terrific foods wholesaler/retailer w/ IDMS-ADSO, ASSEMBLER. 5+ yrs sys analysis & COBOL exp. To $40,000.

- DATA BASE ANALYST
  - Experience with significant systems development. Experience in design/anat of data systems. Salary to $55,000.

**NEW YORK**

- SR P/R
  - Insurance broker has the following requirements: Insurance Backend Design. Fast-growing Twin Cites location. Applications: Back up manager to 4381, COS/VSE, VSE/SYS VSE. Must be off-line.

- CAPACITY PLANNING/MODELING SPECIALIST
  - Devlop appl for use w/strong COBOL/MS/IBM/SMF. IBM/SMF is key to this position.

- SYSTEMS SPECIALISTS
  - Dvlp software for MVS/370. IBM maintained OS/360. On-line sys exp on a Terrific foods wholesaler/retailer w/ IDMS-ADSO, ASSEMBLER. 5+ yrs sys analysis & COBOL exp. To $40,000.

**SOUTHERN CALIFORNIA**

- SYSTEMS PROGRAMMER
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

- SYSTEMS ANALYST
  - Experience w/COBOL and some S/38 exp preferred. Weekly salary to $35,000.

- PROGRAMMER
  - Must have 2 yrs RPGII, CICS, IMS exp. Weekly salary to $32,000.

- DATA BASE MANAGER
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

- SYSTEMS ANALYST
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- PROGRAMMER
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

**SOUTHERN ILLINOIS**

- SYSTEMS PROGRAMMER
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

**ST. LOUIS**

- PROG/ANALYST
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

- SYSTEMS ANALYST
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

- PROGRAMMER
  - Needed immediately sysprog experience for MVS/370. Weekly salary to $30,000.

**ATLANTA**

- ED AUDITOR
  - Salary to $32,000.

- SYSTEMS ANALYST
  - Salary to $32,000.

- PROGRAMMER
  - Salary to $32,000.

**MINNESOTA**

- ST. PAUL
  - PROJECT MANAGER
    - Providence Hospital is seeking a Sr Project Manager. Must have significant experience in data systems design and production of new and financial applications using data base techniques. To $38,000.

- MINNEAPOLIS
  - SYSTEMS PROGRAMMER
    - Fortune 500 firm is searching for an experienced IMS System Programmer to move to a Project Lead role. This is a high visibility position. To $40,000.

**WISCONSIN**

- SYSTEMS ANALYST
  - System analysis & design experience preferred. Domestic or international travel expected. Salary to $40,000.

- SYSTEMS PROGRAMMER
  - Fortune 500 firm is searching for an experienced IMS System Programmer to move to a Project Lead role. This is a high visibility position. To $40,000.

**OKLAHOMA**

- HOUSTON
  - SYSTEMS PROGRAMMER
    - Strong RPG II & super exp req to join this dept. To mid-$30's.

- SAN ANTONIO
  - SYSTEMS PROGRAMMER
    - Strong RPG II & super exp req to join this dept. To mid-$30's.

- SAN FRANCISCO
  - SYSTEMS PROGRAMMER
    - Must have 2 yrs RPGII, CICS, IMS exp. Weekly salary to $32,000.

- NEW YORK
  - SYSTEMS PROGRAMMER
    - Must have 2 yrs RPGII, CICS, IMS exp. Weekly salary to $32,000.

- NEW YORK
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    - Must have 2 yrs RPGII, CICS, IMS exp. Weekly salary to $32,000.

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- NEW YORK
  - SYSTEMS PROGRAMMER
    - Must have 2 yrs RPGII, CICS, IMS exp. Weekly salary to $32,000.

**SEATTLE**

- DATA BASE ADMINISTRATION
  - Manager seeks a data base administrator w/ 2+ yrs DBM exp. Weekly salary to $35,000.

- SEATTLE
  - DATA BASE ADMINISTRATOR
    - Micronet and Data Base Administration is seeking a experienced data base administrator. Salary to $35,000.

- SEATTLE
  - DATA BASE ADMINISTRATOR
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