FCC Decides To Reduce Access Charge

By Phil Hirsch
CW Washington Bureau
WASHINGTON, D.C. — Local exchange network users will pay about $3.5 billion more for service next year instead of $4.8 billion more — under a decision adopted by the Federal Communications Commission last week.

The new ruling replaced an access charge decision the commission promulgated last December which would have increased subscribers' direct charges by about $4.8 billion next year. The December decision was widely criticized in Congress and by U.S. Federal District Court Judge Harold Greene, who is presiding over the settlement of the U.S. vs. AT&T antitrust case.

Greene and the congressional critics felt the December ruling jeopardized the U.S. Treasury's aid bill for Caribbean nations.

At press time, neither the House nor the Senate had voted on the compromise worked out last Wednesday, but the large majority support for the repeal measure in both houses made passage all but assured.

While President Reagan had earlier threatened to veto repeal legislation, he was expected to sign this bill without making sure it floats. So why do so many DP departments release programs to users without testing their performance in an intensive business environment?

In interviews with Computerworld last month, consultants and analysts agreed that software testing and debugging still rank disappointingly low on most DP shops' list of priorities. In the face of large application backlogs and frequent problems from fighting, "testing is still one of those things that seems to get cut out too frequently in an attempt to meet a delivery deadline," said William Duncan, president of Duncan Associates in Beverly, Mass.

As bugs begin to turn up in production programs, consultants said, a classic snowball effect often develops. Programmers are hastily pulled off important projects to fix defects in existing software. Development projects consequently fall behind schedule, leading departments to trim testing in order to meet deadlines. The result is more bugs, more fire fighting and more neglect of testing procedures.

"Any rational manager should believe we're talking an average of 50% of the project time for testing and debugging," said Boris Beizer, a consultant and author of the book Software Testing Techniques. "They take half of the software effort and apply absolutely no methodology to it. They talk about structured programming, data dictionaries, but when it comes to where the real bucks are spent, every programmer does his own thing.

Letting programmers do their own thing is one of the major problems, according to consultants. For a variety of reasons, programmers of—

(Continued on Page 11)

NCR Again Found Guilty Of Breach of Contract

By Bill Laboris
CW Staff
SAN FRANCISCO — For the second time in a year, NCR Corp. has been found guilty of breach of contract, this time by a court-appointed arbitrator, and ordered to pay damages to a minicomputer user.

In reaching his decision, Karl A. Limbach of the American Arbitration Association set aside a charge of fraud lodged by Peerless Electric Co. of Berkeley, Calif., against NCR. The final settlement decision was scheduled to be reached late last week, in time for a July 30 deadline.

Limbach ruled, in essence, that although NCR breached its contract with Peerless, it did not do so willfully. Rather, the arbitrator found that NCR's decision to cancel development of a particular software capability was done without knowing that the same capability had been promised to Peerless by NCR's regional sales staff.

The arbitrator's decision, handed down June 30, ordered NCR to repay $160,000 to Peerless in exchange for an I-9040 minicomputer purchased from NCR in 1981. The court also ordered to pay Peerless a total of $56,000 in legal fees and damages suffered as a result of the contract breach.

Alternatively, Peerless was given the option of retaining the equipment, in which case NCR would be ordered to pay nearly—

(Continued on Page 8)

Congress Poised to Repeal Withholding

By Jake Kirchner
CW Washington Bureau
WASHINGTON, D.C. — The U.S. House of Representatives and Senate late last week agreed on a final version of a bill to repeal the controversial interest and dividend withholding law set to go into effect Aug. 1. Final passage and presidential approval are expected by the end of this week.

The often-delayed law would have required corporations and financial institutions to withhold 10% of interest and dividend payments and had been expected to raise an additional $13.4 billion in five years for the U.S. Department of the Treasury. It was slated for implementation July 1, but was delayed until Aug. 1 and then, last week, to Aug. 5 in anticipation of the repeal legislation.

At press time, neither the House nor the Senate had voted on the compromise worked out last Wednesday, but the large majority support for the repeal measure in both houses made passage all but assured.

While President Reagan had earlier threatened to veto repeal legislation, he was expected to sign this bill because it contained several additional provisions. Chief among those provisions are increased enforcement of existing withholding statutes and greater penalties for violators. Congressional estimates placed the increased income from these measures at more than $4 billion.

The bill also includes the president's aid bill for Caribbean nations. The withholding law was a key part of the 1982 Tax Equity and Fiscal Responsibility Act. But the measure, which would have cost some large organizations millions of dollars to reprogram their record keeping systems, was attacked by the banking industry, which mounted a huge and successful lobbying campaign against it.

M&D Offers Integrated Applications For IBM Sites

By Lois Paul
CW Staff
NEEDHAM HEIGHTS, Mass. — McCormack & Dodge Corp. last week introduced a group of on-line, real-time financial applications packages based on its Advanced Financial Systems design methodology.

Called the Millennium series, the packages are an on-line environment which includes a database management system; a fourth-generation programming language; a screen and forms generator; and a Pal lite, the vendor's on-line query system. The Millennium series, which runs on IBM and plug-compatible mainframes operating under OS and DOS, is intended to replace McCormack & Dodge's current on-line packages.

Millennium reportedly is an integrated series of products that incorporates uniform structure and consistent features across all applications. The first products in the series, which will be available in the fourth quarter, are fixed assets (FA: Millennium); accounts payable (AP: Millennium); general ledger (GL: Millennium); accounts receivable (AR: Millennium); and purchase order (PO: Millennium).

Scheduled for release in the first quarter of 1984 are human resources (HR: Millennium) and capital project analysis (CPA: Millennium).

Applications within Millennium will share common system functions, such as data entry, update and query.

(Continued on Page 9)
Marketing Effort Also Announced Tandem Adds Basic to Repertoire

By Jeffry Beeler
CW West Coast Bureau

CUPERTINO, Calif. — Tandem Computer, Inc. today added Basic to one of the four programming languages supported by the company's Non-Stop systems and initiated a marketing effort aimed at encouraging third-party software vendors to develop applications for its processors.

Tandem's Extended Basic is said to be a superset of ANSI X3.6 Basic, which the vendor has reportedly modified to support its standard software offerings, including the Encompass relational data base management system and Transaction Monitoring Facility.

With an additional language now available with the Non-Stop systems, users of rival processors for the first time can transport their Basic applications to Tandem's hardware without reprogramming, Tandem said. Extended Basic thus creates an upgrade path for non-Tandem users who have exhausted or are nearing the limits of their systems' capacity, a spokesman said.

For Tandem's own customers, the availability of Extended Basic is expected to expand greatly the number of users who can take advantage of the firm's systems. The reason for the projected increase in use is that Basic is better suited for nontechnical personnel than the other, more structured languages that have traditionally been available with Non-Stop processors, the spokesman explained.

The modified language is also likely to appeal to independent software vendors that write applications in flavors of Basic other than Tandem's own.

In its interpretive version, Extended Basic is available immediately for $2,500 per processor. A compiler extension is slated for release during next year's first quarter.

'Tandem Alliance' Plan

The addition of Extended Basic to Tandem's lineup of software development tools coincided with the announcement of the 'Tandem Alliance,' which will aid third-party application program suppliers in marketing their products.

Under the plan, Tandem intends to package its own hardware with other vendors' application software and then sell the resulting systems through its worldwide marketing organization directly to end users.

Every time it installs such a system, the processor manufacturer will provide the cooperating application developer with a share of the revenue, the spokesman said.

Terms of the Tandem Alliance also call for independent suppliers of Tandem-compatible applications to receive:

- Unsolicited discounts for their Non-Stop development systems.
- Twenty-five weeks of free technical training.
- Application design support.
- A reference catalog describing all user programs capable of operating with Tandem's equipment.

More information is available from Tandem at 19333 Valloke Pkwy., Cupertino, Calif. 95014.

In Depth

DURHAM, N.C. — A former IBM employee was recently found guilty of murdering another employee during an armed rampage through a company plant last year. The jury that rejected his insanity defense also later denied his plea for the death penalty and sentenced him to life imprisonment.

Leonard D. Avery, 39, of Raleigh, N.C., was found guilty July 22 of the first-degree murder of 53-year-old Ralph Glenn last Aug. 30 during the rampage in which four other employees were injured at IBM's manufacturing facility in Research Triangle Park, N.C.

Avery was found guilty of 13 additional charges and was to be sentenced on those charges later in the week.

Stress Cited in Defense

Employed at IBM for almost 12 years before his dismissal as a keyboard assembler less than two weeks before the incident, Avery claimed in his defense that post-traumatic stress from his Army service in Vietnam had driven him insane. He served in Vietnam during 1966 and 1967, and for four months in 1968.

After the jury rejected that argument and found him guilty, one of Avery's lawyers told the jurors during the sentencing hearing that the defendant desired to be sent to the gas chamber rather than prison; the jury decided on prison. Avery was armed with three weapons and walked into Manufacturing Building 201 intending, Stephens said, "to burn up the IBM plant and to shoot it up." Stephens said, "to burn up the IBM plant and to shoot it up."

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Almost everyone agrees a data dictionary is essential for integrating fourth-generation systems. No one knows that better than ADR®. We pioneered product integration built around ADR/DATADICTI ONARY™ years ago.

But true integration goes far beyond using a data dictionary — it includes software engineering throughout the product line. It utilizes entirely new concepts in systems software technology for mainframe and personal computers.

A Completely Integrated Environment
ADR has spent 80 man-years and millions of dollars on a project that redefines the software industry's concept of integration. Interproduct components engineered into ADR products create a completely integrated environment — relational data base, interactive application development, fully audited online programming, decision support, graphics, word processing, electronic mail, distributed processing and performance measurement software. In short, an environment capable of supporting an organization's complete information management requirements.

This reduces training time, increases staff productivity, eases access to information, and allows complete resource control and access to data and programs.

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ADR's integrated software performs at peak efficiency in any environment. An application can be transferred from one TP monitor to another, or from one operating system to another, without changing it in any way. Similar operating characteristics enable mainframe and personal computer users of one ADR product to quickly become proficient in other ADR products.

ADR products are easily integrated into Information Centers and Application Development Centers, enabling end users and developers to access the same current data, test new applications and produce vital information.

To learn more about the completely integrated solution that only ADR can deliver, call or write today. Applied Data Research, Route 206 & Orchard Road, CN-8, Princeton, NJ 08540, (201) 874-9000.
Few New Products Introduced at Show

By Ed Scannell

DETROIT — Visitors to the Association for Computing Machinery's Special Interest Group on Computer Graphics (Siggraph '83) last year's show may have felt a bit disoriented by the kaleidoscopic display of computer-generated colors, fewer system and workstation announcements were made than at last year's show.

Most of the systems and workstations demonstrated last week had already been introduced at the National Computer Conference in May or at the mammoth National Computer Graphics Association show in Chicago just four weeks ago. However, there were some unveilings of note, including two 16-bit micro-based systems, a fistful of color display terminals and what is reported as the industry's first electronic color plotter.

Three Rivers Computer Corp., complemented its Perq 1 and 2 graphics workstations with the Perq Color system, which offers a 19-in. monitor displaying up to 256 colors and a memory consisting of eight planes, each with 1,024 by 1,024 bits. Four sizes of Tektronix character sets are included in the standard configuration along with two graphics character sets. Purchased in 100-piece quantities, the terminal lists for $3,995. Intecolor is based at Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

Versatec's electrostatic color plotter produces the full color spectrum, via translucent toners, onto standard 42-in.-wide roll paper. The unit generates color Es-size drawings in eight minutes and black-and-white drawings in under 90 seconds, according to the vendor.

Aimed at applications involving CAD and geophysics, a plotter uses Versatec's standard interfaces to plot in monochrome. Color plotting requires modifications to software, the company noted.

The unit is expected to cost $80,000. Versatec is a Xerox Corp. subsidiary, is located at 2710 Walsah Ave., Santa Clara, Calif. 95051.

Vendors Show Standards Bias With Software

By Ed Scannell

DETROIT — Several major players used new software products to demonstrate a further commitment to their favored graphics standards at this year's conference.

DeFanti said the Association for Computing Machinery's Special Interest Group on Computer Graphics (Siggraph '83), the conference held here last week.

Tektronix, Inc.'s Information Display Division unswapped a version of its Plot 10 library of graphics software tools that is compatible with the National Association of Manufacturers Standard. The company said it will continue to support other Plot 10 development tools, including Plot 10 IGL, which adheres to the Core standard.

Plot 10 GKS supports two-dimensional graphics functions, color panelfilling graphics segments capabilities, graphics and nongraphics input and the fundamental workstation services that the standard accepts employed by GKS. The basic package licenses for $7,500, with a more typical configuration, which includes Fortran 77 source code, costing $8,070.

Tektronix can be reached through P.O. Box 500, Beaverton, Ore. 97077.

Precision Visuals, Inc., introduced a device-independent device driver that makes its DI-3000 and Grafenaker packages compatible with the North American Presentation-Level Protocol (NAPLPS) videotex standard. NAPLPS, which encodes text and graphics in a terminal-independent format, has been endorsed by AT&T; Digital Equipment Corp.; Tektronix; Honeywell, Inc.; and Digital Research, Inc., among others. A Precision spokesman pointed out.

Among those at Siggraph '83 trying to cash in on the success of IBM's Personal Computer (Pc), several companies introduced Advanced Color Technology and Aztek, Inc.

Advanced Color Technology unveiled two software driver products, one of which will connect the company's color ink jet printer to the Personal Computer. The second will link the printers to Zenith Corp.'s Z-1010 line of microcomputers.

The driver, dubbed the ACT-COM, was designed to reformat colored screen data and output it to either the ACT 1 or the ACT 11 Chromat printer.

Cost of the slide-making product, which connects to any computer with 256K bytes of memory, dual disk drives, color monitor with adapter, communications adapter, modem and pen plotter, is $595. Aztek is located at 52565 S. Pointe Drive, Laguna Hills, Calif. 92653.
MARTIN MARIETTA DATA SYSTEMS
BRINGS A TOTALLY NEW DIMENSION TO THE SOFTWARE MARKET.

ON JULY 22, MARTIN MARIETTA DATA SYSTEMS TOOK ANOTHER GIANT STEP FORWARD IN TODAY'S INFORMATION SERVICES INDUSTRY.

Martin Marietta Corporation and Mathematica, Inc., of Princeton, N.J., concluded a merger that brings together Martin Marietta Data Systems' decade of experience in information services with the industry's premier supplier of systems software products.

Now Martin Marietta Data Systems is positioned to offer customers a complete range of software solutions to meet their information management needs—whether they are buying standard applications, or building custom applications using systems software productivity tools.

Companies around the world now have a single source for all their software needs... Martin Marietta Data Systems. With RAMIS II, the leading fourth generation language and data base management system, we are now even better equipped to streamline software development time and costs, and to pass along these productivity improvements to customers: meeting hardware requirements that range from mainframes to desktop computers.

This partnership is a key building block in Martin Marietta Data Systems' strategic architecture for the '80s and beyond. We are not only living up to our commitment to stay on the forefront of today's explosive information services marketplace... we are taking the lead.

If you would like to know more, please call us at 800-638-7080, or write me at Martin Marietta Corporation, 6801 Rockledge Drive, Bethesda, MD. 20817.

Richard J. Walters
President
Martin Marietta Data Systems
Money Not the Reason

Top DP Execs Tell Why They Took the Job

By Tom Henkel

It's the job — not the promise of more money, better benefits or tantalizing perks — that convinces top-level DP executives to change jobs.

Four out of five DP executives who were recently promoted to the top decision-making slot in DP operations were not looking for a new job when opportunity knocked, they recently told Computerworld. Two of them heard about their current positions when they received telephone calls from professional recruiters; two others were in the right place at the right time. The fifth, an executive for a vendor firm flumed by managerial and financial troubles, heard of a current job as manager of a DP shop from a friend.

One of the two executives who received a call from a headhunter was Michael N. Thompson, who received a promotion to computer operations manager at Mutual Benefit Life Insurance Co. in Newark, N.J., along with the opportunity to write his own job description. "I was very happy where I was," Sullivan recalled.

Calls from headhunters trying to find jobs for their clients are commonplace at Mutual Benefit, and Sullivan generally refused their calls. He is not sure why he took the recruiter's call that particular day.

The recruiter presented a rosy picture of a position that offered divisional responsibility for DP operations in a food distribution firm. Sullivan decided to go for an interview and was subsequently offered a job as manager of DP operations for the Information Services Division of Western Food Corp. in Elizabeth, N.J.

"Offer I Couldn't Refuse"

"They made me an offer I couldn't refuse," Sullivan said, noting his current position offers him more responsibility and broader opportunities than his old job. In addition, his new position offers the challenge of leading his department through the conversion from IBM's DOS to MVS operating system, as well as a relocation of the firm's data center.

Garwood E. Erickson, an office systems manager for Ford Motor Co.'s Parts and Service Division in Dearborn, Mich., was not unlike Sullivan. Generally happy with his job of 14 years, Erickson found his position interesting and challenging. Furthermore, he felt he had established a solid growth path within Ford.

Erickson received an unsolicited call from a recruiter telling of an opening with a contract engineering firm in Ann Arbor, Mich. Erickson talked with the recruiter, insisting he did not want to make a move. But the recruiter was persistent, and the job sounded interesting. Erickson finally consented to go on an interview.

The job was director of MIS with Hoover Universal, Inc., a much smaller firm than Ford. However, Erickson was offered control of the firm's DP operation. It was an opportunity to make his own decisions and have a say in company policy. The position also offered promotion to a level that could take years to achieve at Ford.

Erickson accepted the position at Hoover Universal, but the decision to leave Ford was not an easy one to make. Erickson had already made a long-term commitment to Ford and he felt he was on his way to becoming a top executive. But it was a "long, stony road," he said.

Hoover Universal "didn't buy me away," Erickson insisted, adding that moving was only a short-term enticement because "you quickly discover a higher level of income." It was the scope and challenge of the job that lured Erickson away from Ford. The chance to speed up his career growth by several years and have a personal impact on his company's direction were also big selling points.

In a way, John Highbarger's former employer set him up in his current job as director of MIS at Dallas-based Diamond Shamrock Corp. Highbarger was a senior manager in the management advisory group with Price Waterhouse and Co. — in short, a consultant — and had been assigned to Diamond Shamrock for four of his five years with Price Waterhouse.

During those four years, Highbarger had the opportunity to evaluate Diamond Shamrock — its policies, its management, its style. He liked what he saw.

"Offer I Couldn't Refuse" and "Opportunity Knocked" were the motives of the other two DP executives who were recently promoted to top decision-making jobs in DP operations.

Survey Profiles: DP Job Hunters

AKRON, Ohio — The job is boring. The managers lack leadership. The managers lack sensitivity. Sound familiar? These are the most common complaints made by at least 3,000 high-tech professionals who are currently in the job market, according to a recent survey.

Founded in 1975 as an employment service, Price Waterhouse & Co. conducts a survey of its clients regarding their job satisfaction every four years. This year's survey was conducted in late 1982 and included 3,059 job seekers in late 1982 and early 1983.

Nearly 80% of the job hunters surveyed by Sanford Rose Associates, Inc. were 25 to 35 years of age and had incomes ranging from $25,000 to $40,000. Only 27% of those polled said money was their primary motivation for seeking a new job.

"The survey dramatically indicates that companies [that] must count on the brain power of key professionals and want to attract and retain quality people, must make a serious effort to keep jobs gratifying and meaningful to workers," according to San- ford Rose's divisional president.

"No longer can income advances alone be considered sufficient to assure the allegiance of the modern generation of workers."

A whopping 80% of those polled said their employers had failed to define adequately their job responsibilities and authority. Further, 75% said they had lost faith in their employer's leadership and general management abilities.

More than 2,000 of the job seekers said their current jobs were boring. Sixty-six percent said their jobs were neither creative nor challenging. And 58% said they were stuck performing routine work.

Fifty-eight percent also complained of being denied the opportunity to travel, to attend conferences, to serve on committees, to demonstrate executive potential, to work on large projects of national or international significance.

More than 80% said their current jobs failed to provide adequate use of their education and experience.

When the vice-president of MIS in one of his company's other divisions was "out-placed," Michael N. Thompson lobbied for the job. He is not sure why he took the recruiter's call that particular day.

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QUESTION: Which is a bigger headache? The COBOL-documentation problem or the high-cost-of-maintenance problem?

ANSWER: Both.

We're not kidding. Documentation and high maintenance costs are both parts of the same big headache. Here's why:

1. THE PROBLEM BEGINS WITH DOCUMENTATION: And it begins right at the program-development stage.

Most programmers hate to document. And although they may think they are producing well organized programs, they really have no way of judging. If they produce badly organized programs, they will inevitably produce badly organized documentation, too.

One always equals the other.

2. BAD DOCUMENTATION LEADS TO COSTLY MAINTENANCE: Even if the documentation started out being accurate, it's probably never been updated. When modifications occur, someone's got to go back and attempt to divine the underlying logic before new code can be inserted. A long and costly operation.

No wonder COBOL maintenance may consume as much as 75% of your entire budget!

FAST RELIEF WITH SYDOC: Our Structured Documentation System takes the documentation problem off the shoulders of your programmers and puts it where it belongs—on the computer:

• SYDOC HELPS YOU DEVELOP STRUCTURED PROGRAMS. It not only provides structured documentation, it is also a very useful guide for the production of structured COBOL programs. Flaws and inconsistencies can be spotted at the development stage. And corrected before they start driving your maintenance costs up.

As a manager, you will—for the first time—have a tool to standardize both your documentation and the quality of your programs.

• SYDOC MAKES IT EASY TO MODIFY EXISTING PROGRAMS. It can analyze "orphan" programs without adequate documentation and tell you everything you need to know about the programs's structure, logic, variables and relationships. Armed with this knowledge, the maintenance problem shrinks.

No longer is it necessary for skilled programmers to spend days searching for clues about the program's logic. SYDOC makes all necessary information available quickly and easily.

But the best way to find out about SYDOC is to try it. If this remedy doesn't work you'll just have to try another—A-S-P-I-R-I-N.
Issue of Wideband Interfaces Heats Up Again

By Phil Hirsch
CW Washington Bureau
WASHINGTON, D.C. — Although the Federal Communications Commission (FCC) decided two months ago to let independent manufacturers supply the interfaces linking user terminals to wideband digital access channels, the issue resurfaced last week. Several Bell operating companies asked the commission to reconsider and/or defer its June decision.

Also at the FCC last week, AT&T objected to a related decision. Together, these moves signal the re-emergence of a bitter, protracted battle between the telephone carriers and competing suppliers over who will control access to the integrated services digital network (ISDN) that AT&T is beginning to deploy across the U.S.

Specifically, the battle is over who should supply channel service units (CSU) and network channel terminal equipment (NTSE). These interfaces connect a user's digital terminal with such wideband offerings as integrated T-1 (DDS), Terrestrial Digital Circuits (TDC) Service and High Speed Switched Digital Service (HSSDS). These services are expected to be part of the AT&T ISDN when it final-

ly emerges.

The battle concerns users as well as suppliers. Until it is resolved, users will have to wait to exploit fully the ISDN, the commission warned. AT&T and some settling assignments assign NCTE to the operating companies and customer premises equipment -- that is, terminals -- to AT&T. Consequently, the treatment of NCTE under the [anti-trust] decision might be changed. The interfaces prescribed by the commission are at odds, the petition said.

As long as NCTE is provided by the carrier, the Bell operating companies can "optimize their local networks by use of the latest and most efficient technology without rendering the customer's equipment obsolete." The petition contended that interfaces to older NCTEs can be maintained while the newer devices are gradually introduced.

The operating companies also argue that technical differences in wideband access circuits make it necessary to adjust NTCEs and CSUs to meet individual requirements. Their petition points to a provision of the FCC's June decision that allows a carrier to become the exclusive NCTE supplier "in specific circumstances" if it can show that the differences are substantial and subject to constant change.

Charge for Local Exchange Access Cut

(Continued from Page 1)

dized universal telephone service since it imposed a surcharge on all local exchange users.

Last week's revised access charge ruling retains but reduces the surcharge.

Business linesubscriberswill pay a maximum monthly surcharge of $4/line beginning in January. This charge will continue until the end of 1986. The original plan called for a minimum monthly charge of $4/line, but additional monthly charges of up to $40/line were possible.

A $2/mo charge for the "closed end" of every private line that can provide a bypass around long-distance telephone network facilities. One example of such a bypass would be private branch exchanges (PBX) in two or more cities connected to each other as well as to the adjacent local telephone networks by private lines.

An access charge imposed on long-distance carriers. Levied until the end of 1986, this charge will make "moderate" rates for access between the local carriers' costs of providing access, plus the subsidy that interate subscribers have historically contributed to local telephone service. The FCC said that the charges to be levied directly on residential and business users are expected to supply about $4.5 billion, leaving $6.2 billion to be collected from long-distance carriers in the form of access charges. The latter amount will come from AT&T's Long Distance Division.

Many users of Centrex-Central Office equipment were unhappy with the FCC's December access charge decision because it charged the same rate on all lines between the user's premises and the telephone company's central office. As a result, Centrex-Central Office users would have paid far more than users of PBX equipment.

In the new decision, this same basic charging scheme has been retained, but instead of paying the business line charge -- $6/line per month during the years 1984 to 1988 -- the rate would be $2/line. Residential users would pay the residential rate: $2/line in '84, $3/line in '85 and $4/line in '86. The commission said it was offering this discount only to those with Centrex-Central Office users as wanting to give these subscribers "an opportunity to compare the advantages of Centrex-[Central Office] . . . against the advantages of PBX and to act on that assessment."

NCR Found Guilty of Breach of Contract

(Continued from Page 1)

$20,000 in equipment and expenses incurred by Peerless to gain the computing capabilities it claimed NCR promised but did not provide, as well as $31,000 in legal fees. At press time, Peerless had not decided whether to exercise its option to exercise and was believed to be still negotiating with NCR.

Last September, a U.S. appeals court upheld a lower court's decision ordering NCR to pay $2.3 million to Peerless, the computer giant's former systems engineer, for a data cleaner that a minicomputer, which the courts found NCR knew would not work as promised. NCR had offered a similar machine to the court as evidence at the arbitration hearing to link Warman to a pattern of fraudulent behavior going back to his involvement in the Glosstanium case.

The commission presumes that these [unstated] exceptions are the exception rather than the rule," the operating companies said.

AT&T's Action

TETT referred to this same section of the FCC's June decision when it filed a statement last week objecting to a related decision. The related decision requires that until the commission ordered AT&T to remove restrictions limiting the use of its group and super group channels. The decision was made in response to complaints from specialized carriers.

The group and super group channels are long-distance analog rather than digital facilities. A group channel is 48kHz wide and averages up to 12 analog voice circuits or data transmission at speeds up to 56K bps/ sec. A super group channel is 240kHz-wide and accommodates up to 60 analog voice circuits or data transmission at 230K bps/sec.

AT&T required those who use the group and super group channels to pay a $20,000 in equipment and specialized carriers can lease group and super group channels.

There is simply no way to provide a generally applicable set of specifications for all criteria of group and super group NCTEs that could be followed to build a single piece of equipment which, when attached to any local distribution facility, will provide an acceptable group or super group signal," AT&T said.

AT&T's Tariff No. 260, in effect for years, was recently changed so that most equipment can be used on group and super group channels.

In its June decision, the FCC told AT&T and TCI that the telephone companies' design rules for these facilities still have to be supplied by AT&T.

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Peerless claimed it was promised. Peerless claimed it was promised. Peerless claimed it was promised.

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M&D Unwraps On-Line Series Of Packages

(Continued from Page 1)

This consistent structure is intended to facilitate integration of applications, as well as to provide the ability to query across application data bases regardless of system borders. The vendor noted that this feature allows the user to follow an audit trail of information through the integrated Millennium systems.

A screen-linking feature reportedly allows the user to save screens and return to them and to transfer information automatically from screen to screen. In addition, a security system, called Secure, is incorporated in all Millennium systems. It provides user-defined security at the applications, function, screen, field and query levels.

On-line, real-time design and update of screens also are available with the Screenpaint feature which, the vendor said, eliminates the need for coding and batch runs. On-line Help documentation is provided with the Millennium series in both system-defined and user-defined formats.

The Interactive PC Link, which will be available in October, is an option with all Millennium applications. Interactive PC Link was designed to allow users to download selected records and fields from mainframe files to an IBM Personal Computer and, following manipulation with Lotus Development Corp.'s Lotus 1-2-3 software, upload the updated information back to the mainframe.

Current users of McCormack & Dodge applications packages who are under the maintenance agreement will be upgraded to the Millennium series at no additional charge. All users of the firm's software must convert to the new on-line system within a year.

For new users, the approximate pricing for the Millennium series, which is dependent upon configuration and options selected, is: GL: Millennium, $50,000 to $90,000; AP: Millennium, $31,000 to $55,000; PO: Millennium, $30,000 to $50,000; HR: Millennium, $80,000 to $115,000; FA: Millennium, $38,000 to $55,000; and CPA: Millennium, $15,000 to $24,000.

McCormack & Dodge is based at 560 Hillside Ave., Needham Heights, Mass. 02149.

Integrated Systems' Topic of Briefing

SAN FRANCISCO — Techtran, a subsidiary of the Gartner Group, will present a technical briefing on "Integrated Information Systems" here Sept. 15-16 for data processing, office automation and communications managers and professionals.

Techtran said that pioneering experiences, commercially available products, the future shape of the industry and the role of IBM will be discussed.

The fee for the session is $595. More information is available from Bob McKenzie at Techtran, 72 Cummings Point Road, Stamford, Conn. 06904.

M&D Not Becoming Data Base Company

By Lois Paul
CW Staff
NEEDHAM HEIGHTS, Mass.— Despite the fact that its Millennium series of applications software incorporates data management capabilities, McCormack & Dodge Corp. is not planning to become a data base company.

"In fact, I think the data base companies are becoming application systems companies," according to John B. Landry, senior vice-president of research and development for the firm.

"People want applications," Landry said in a recent interview. "They are not necessarily interested in buying a data base management system."

Millennium eventually will be sold as a development environment, Landry said, although at this point its fourth-generation language cannot be used to build new systems. Currently, Millennium is functioning as an environment under which preprogrammed applications are being executed, Landry explained.

Total Code Delivery

When a user buys fixed assets (FA: Millennium), for example, he receives all of the assembler and Cobol code that will ever be used in any Millennium application. If the same user then wants to add general ledger (GL: Millennium), he essentially is buying more data in the form of screens, data dictionary elements and fourth-generation language code.

"So what they are getting for their money is the implementation of general ledger using Millennium, but they don't get any more code," Landry explained. The biggest change in the software is the introduction of additional on-line capabilities to all of the systems for access to and maintenance of data. In the case of the FA: Millennium package, this is the first on-line version of McCormack & Dodge's fixed assets system.

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At speeds of 80 to 300 CPS.
Software Testing

Experts Say Micro Packages Poorly Tested, Bug-Ridden

Your testing headaches are bound to ease as users begin to employ all those nifty micro software packages with easy-to-read documentation, right?

Don't be so sure, said microcomputer consultants interviewed recently by Computerworld. As a rule, micro packages are more poorly tested than their mainframe counterparts and, in many cases, even more bug-prone than programs written in-house, the consultants said.

In short, the state of micro software testing is "pretty grim," according to Harry Brawley Jr., president of Sigea Systems, Inc., a micro software design and documentation firm in Weston, Mass. "Time spent testing is frequently perceived as time not in the marketplace," Brawley said. "There is tremendous pressure on our clients to deliver stuff to the market, whether or not it has been test- ed, and face the consequences."

Testing Not Budgeted

Until two years ago, many microcomputer hardware and even software makers "just didn't do software tests, period," said a West Coast consultant who asked not to be identified. "They'd bang on it [in-house] for a week or two and release it before it was done. Testing was never in the budget or time schedules."

Sigea Systems never intended to get into testing, but, Brawley said, "we've fallen into testing by virtue of products coming in to be documented and turning out not to be tested. For example, we had a job on a small financial package for the Apple Computer, Inc. computer, and the menus were so bad that a condi- tion of our taking the documentation job was that we had to redesign the user interface."

Unfortunately, such poor quality could escalate tensions between us- ers and DP as users continue to buy their own software, the West Coast consultant noted. "People will buy a lot of software packages that don't do what they want, then they'll turn to the DP department which will say, 'Well, you didn't ask us first!' But even if they had asked, the typical large corporation DP department isn't ready to answer the questions."

Consultants Urge Involvement

Of More People in Testing Effort

Software consultants contacted recently by Computerworld differ on which software testing methods are best, but all agree that the more peo- ple involved in the process, the bet- ter the final product.

Testing is becoming even more of a concern as end users increase their involvement in program design and implementation, consultants noted. "If you give a user a system that doesn't work 100% correctly on day one, they may see that as a system that will never work," said William R. Dun- can, president of Duncan Associates, a consulting firm in Beverly, Mass.

But the most popular concept involves pre-test metrics, which uses an independent group for evaluation and testing. "It involves the whole cycle from requiiments preparation to accep- tance of the system at the end and in- cludes a focus on general company standards, quality and output," ex- plained Joseph Siroker, an indepen- dent consultant in Los Altos, Calif.

The advantage of the independent group is twofold, Siroker said. It eliminates the bias that is inherent in companies that use the same program or work. It also enforces company stan- dards by creating a repository of in- formation about development ef- forts.

Another thing companies don't do is keep a log of the project and then go through a review with an eye toward profiling the company so it knows where there is more work and where there is none," Siroker said. "This is the pur- pose of the software metrics group."

For custom programming in partic- ular, "it's essential to define a sep- arate team to create test data, define inputs, create streams for job data en- trance and independently run pro- gram modules," said Jack Bader, vice-presi- dent of The User Group, Inc., a St. Louis-based consulting firm. The in- dependent group can be made up of programmers or end users, Bader said, as long as the members can logi- cally create and verify data.

"You're looking to do a beta test before you put the system in live," he said. However, few shops now employ the concept of a separate testing group, "probably because they don't think it's cost-effective," Bader said. "But I submit that if you have one of these groups, the amount of testing that per- forms is a value judgment," the man- ager said. "I could be philosophical about it, but the real-world goal is to get the job done."

Most managers said that testing has taken on more importance as their shops have moved from batch systems to online ones. "They have become more complex and inter- related," Waters said. "Now as you go into an entry, you can mess up invoicing."

Testing Better Out of House?

SUNNYVALE, Calif. — Testing software against documentation and procedures that are poorly designed screens, as are poorly designed screens.

Different Perspective

Independent testing "relieves de- signers who are unhappy doing test- ing," Goss said. "We also look at [the software] from a different point of view. We have no ax to grind, no pride of authorship. We can find the bugs which a user-oriented group might overlook or take for granted."

IBST charges by the hour for its services, and it has done jobs ranging from $750 to $20,000, Goss said. The firm uses a uniform base of test data for standard applications or will run custom tests. Customers receive a test book that provides all test cases, planned and scheduled performance, a list of files, tests and output and bug reports.

All testers work from a standard manual of test procedures, Goss said. The five available levels of testing can encompass testing, verification, validation, certification and compari- son.

IBST claims its costs are competi- tive, and at least one customer agrees. "In the short term, it's proba- bly cheaper for us to go to them," said Jack Hogan, manager of soft- ware development at General Elec- tric Co. in San Jose, Calif. "What's important to us is having indepen- dent verification, and we are not totally not involved with programming. We plan on using them for testing on an- other project."
Testing, Debugging Low Priorities

(Continued from Page 1)

ten test software they have written, making a fair and exhaustive test im-
possible.

"If I wrote a program, my mind set isn't to find bugs — it's to prove that
the program is correct," observed Joseph Siroker, an independent con-
sultant based in Los Altos, Calif. "I am not a very good tester in that
case."

"Most people do testing almost as an afterthought, and their single
purpose is to demonstrate that the software works," added George Hei-
drich, president of Sofqual Corp. in Briarcliff Manor, N.Y. "The pur-
pose of testing really is to break it while you can still fix it."

Necessary Evil

Another problem is that testing is considered a necessary evil by many
in DP. "When you start talking about testing and debugging, you start get-
ing very nasty reactions from pro-
grammers and analysts," Beizer said.

"Everyone from the individual pro-
gramer up to the technical director
feels threatened by testing. The psy-
chological problems that inhibit test-
ing are the major barriers to develop-
ing effective methodologies."

Beizer said many managers do not
understand testing and therefore re-
gard it as a black hole in the develop-
ment cycle. "Management has to stop
saying, 'Well, here's 50% of the pro-
ject we're just frittering away,' and recog-
nize testing and quality assurance
as line items."

He noted that "less than 5% of the
literature of software is devoted to
testing. And yet the bucks are spent
50-50 between testing and program-
ming."

The solution, in Heidenrich's
mind, "is to test smarter rather than
deeper." Decrying what he called "a
whole lot of inertia in this business,"
he said that most programmers still
look at testing as an afterthought. "A
programmer writes the program, runs the test, picks up huge stacks of
output and says, 'I guess it works.'"

DP needs to restructure its attitude
toward programming in order to test
more effectively, Heidenrich said. The
first step is to gain a more realistic
understanding of the organiza-
tion's requirements. "DP is spending
too much time trying to meet unreal-
istic requirements," he said. "A user
says he can't afford to have the sys-
tem go down, but maybe he can live
with five minutes of downtime. There are a wide range of tolerances,
rules that are unwritten but implic-

it." Heidenrich continued.

DPer's also rely too heavily on out-
put to make test decisions. "People
assume they're testing because
they're getting the proper result," 
Heidenrich said, "but you're really
testing data paths through a process-
ing system, and there are a lot of po-
tential short circuits."

An encourag-
ing development has been the recent
release of testing aids like Manage-
ment and Computer Services, Inc.'s
Tracmac, which looks at data paths
rather than output, the consultant
noted.

"One thing you can do is cut the
number of decisions in a given piece
of code," he said. "If you keep that
factor less than 10, you're much bet-
ter off. Structured programming is
absolutely a step in that direction,
and structured walk-throughs are
also absolutely necessary."

By Peter Bartolik

DENVER — A financial consortium launched a national network of automated teller machines (ATM) last month that links more than 1,000 banks and customers in 47 states. Called the Plus System, Inc., it is said to be the largest transcontinental network of computerized teller machines to date.

Six other national networks are at various stages of implementation; hundreds of regional networks are currently in operation.

Based here and backed by 34 major banking companies, the Plus System network presently consists of about 2,000 ATMs. However, the consortium plans to inflate that number to 3,000 by year-end and expects to have 10,000 ATMs installed within the next five years, according to Plus System's Executive Vice-President Denny Dumler. Dumler is also president of the Rocky Mountain Bank Card Association, a five-year-old regional ATM sharing network that has reportedly agreed to provide switching facilities to Plus System.

ATMs in the Plus System network — manufactured by IBM, Diebold, Inc., NCR Corp., Burroughs Corp. and Docutel Corp. — communicate over dedicated telephone lines with dual Perkin-Elmer Corp. Model 3241 superminicomputers based here. Transactions are passed through to the customer's bank via an IBM Series/1 minicomputer that interacts with the 3241s through specialized software provided by Systems Design and Development Corp. of Boulder, Colo.

According to Dumler, the Series/1 can interface with whatever system proprietary members are using: mainframe hosts, a regional switching station or a third-party processor. The network incorporates a code access security system that encrypts and decrypts transaction messages three separate times along the network, Dumler noted. The Atalla Security Module was developed by Atalla Corp. of San Jose, Calif.

Formed in April 1982, the Plus consortium is composed of 34 proprietary or "owner members," including Bank of America and Chase Manhattan Bank. Those founders sponsor other banking companies which are entitled to use the network but have no ownership interest in the organization.

Plus has a different approach from its leading competitors, Dumler said, in several ways. First, it is self-managing; proprietary members have elected a board from among themselves to manage the service. Second, it does not allow a proprietary license area to encompass more than one state.

In contrast, another ATM network called Cirrus, operated by Cirrus Systems, Inc., permits larger exclusive territories to proprietary members. The Exchange/ADP, still another ATM network, is operated by a third party processor for a profit since New Jersey-based Automatic Data Processing, Inc. (ADP) last year purchased the right to market on a national basis the regional network that had been formed by Pacific Northwest banks.

Two factors provide the motivation for banks to join a network, Dumler said: to bring "some national acceptance...rapid development of national networks, but just which is No. 1 is hard to determine;...Plus System, Inc. last month activated what some reports termed "the first [ATM] system to go transcontinental." Plus System has 34 proprietary members, including Bank of America and Chase Manhattan Bank, and more than 1,000 institutions who have been "committed" as members, according to Executive Vice-Presiden Denny Dumler. Customers of each member institution have access to funds through about 2,000 ATMs in 47 states.

Thomas Bass, president of The Exchange in the Pacific Northwest, claimed the first national coast-to-coast system late last year, after a marketing arrangement with Automated Data Processing, Inc. of New Jersey, hooked up 14 states in a system stretching to Florida. As of June, according to ADP marketing representative Marianne Simms, 534 institutions with 1,867 ATMs in 33 states were "committed" to The Exchange/ADP.

Cirrus System, Inc., the Chicago network with Manufacturers Hanover Trust and First Interstate Bank Corp. among its members, will have 930 members with a total of 5,000 ATMs in 41 states by the end of 1983, according to Cirrus Sales Manager Henry Lunt.

Then there is Nationet, Inc., which has linked several regional networks. According to Executive Director Paul Kramme, Nationet encompasses 3,300 participating institutions covering 25 states with 4,500-4,600 ATMs, including Tyme Corp. of Wisconsin and Iowa Transfer System, Inc., both of which have approximately 450 ATMs.

And, according to Efta's Moroney, the credit card giants of American Express, Mastercard International and Visa USA all are attempting to build their own networks.

Dumler replied, "Certainly." William R. Moroney, president of the Electronic Funds Transfer Association agreed, telling Computerworld that national and regional networks "make prohibitions against interstate banking a little more ludicrous...

With ATMs, there is very little that banks can't do for customers across state lines."

Both Moroney and Sheldon B. Golub, assistant public relations director for the American Bankers Association, believe that the true value of ATM networks may be in what they promise for the future. Banks, Golub said, "are putting into effect technology which later on down the road may be propitious." Moroney predicted, "In the next two or three years, I think we're going to see a number of (ATM) hybrids."
Datacomm Briefs

Justice Takes Stand On BOC Payment

By Phil Hirsch

WASHINGTON, D.C. — The Department of Justice said last week that AT&T should not be required to reimburse the divested Bell operating companies for losses they may incur in reconfiguring their networks to comply with settlement of the government's antitrust case against the phone company.

The settlement agreement requires the Bell operating companies to install new switches and to string new lines between their wire centers and the end points of long-distance carrier networks. AT&T has estimated the total cost at more than $3 billion.

The Bell operating companies will try to get this money back from the long-distance carriers by imposing access charges on them. Last month, however, Judge Harold Greene, who is presiding over implementation of the settlement, indicated this plan might not work. The long-distance carriers might evade the charges by using bypass facilities, for example.

Greene, therefore, said that if the Bell operating companies have not recovered their reconfiguration costs by the beginning of 1994, AT&T would have to make up the loss. AT&T objected, maintaining that Greene's order would encourage the Bell operating companies and/or state regulators to impose lower access charges on the long-distance carriers. This would reduce the bypass threat, according to the phone company, but would force AT&T to pay more than its fair share.

The Department of Justice agreed, pointing out that if AT&T is not required to insure the Bell operating companies against loss, they, as well as state regulators, will "have every incentive to ensure" that the costs are recovered from access charges imposed on long-distance carriers.

AT&T Proposes Conference Service

WASHINGTON, D.C. — AT&T last week proposed an international video conferencing service based on the use of digital circuits and data compression. If the service is approved by the Federal Communications Commission, it will begin in September between New York City and London.

The service is being offered jointly by AT&T and British Telecom, which is offering the service in the United States, Canada, Japan, France, Italy, Switzerland, the Netherlands, and Belgium.

British Telecom will charge $712.50 for a 30-minute teleconference. A lower rate — $612.50 — will be charged if the customer's signal is delivered in digital form.

Although international video conferencing service already is available, it costs much more than the proposed service. One reason for the reduced price is its data compression scheme: Only the changing information in each frame will be transmitted rather than the whole picture.

Citicorp Opposed In Bid as Carrier

WASHINGTON, D.C. — Plans by Citicorp, the New York-based banking conglomerate, to become a communications carrier are being opposed by a prospective competitor.

Icom, Inc. of Parsippany, N.J., has asked the Federal Reserve Board to issue a cease and desist order barring Citicorp's subsidiary, Citicorp Digital Exchange, Inc. (CDE), from moving ahead with plans to build digital termination systems in several cities, including five where Icom plans to establish competing facilities (New York, Chicago, Dallas, San Francisco and Houston).

In a petition filed with the Fed earlier this month, Icom contended that "although Citicorp has been authorized by the Board to conduct certain strictly limited data transmission activities . . . it has never received Board authorization to . . . include the type of common carrier service it is now proposing to offer through CDE."

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Head of UK’s ‘Alvey Directorate’ Details Plan

By Susan Blakeney

ST. PAUL DE VENCE, France — "Cartels for economic disarmament" is what Brian Oakley calls fifth-generation computer projects.

Oakley is the head of the recently established Alvey Directorate in London, the U.K.’s five-year technology research project. The directorate is a collaborative composed of members of industry, academia and government. Alvey’s specific purpose, Oakley said at a "Seminar for the Press," held here recently by Sperry Corp., is to examine four basic areas of technology: very large-scale integration (VLSI), knowledge-based or expert-type systems, the man-machine interface and software.

Oakley predicted that the future of VLSI technology will be governed by three basic principles:

• Moore’s Law: The complexity of a chip doubles every year.

• Cost Law: The costs per memory unit have decreased about every six years.

• Smaller device dimensions lead to higher speed, lower prices and fewer impurities.

The trend toward smaller devices is also fueled by increasing consumer demand for more portable systems, Oakley added.

Oakley holds little hope that the UK will even come close to beating Japan in the development of the supercomputer or expert system. When asked why the UK did not team up with its Japanese rivals, Oakley replied, "We’d get raped."

Alvey’s man-machine interface research "will most likely be the most visible part of the Alvey program," Oakley said. He argued that the future of the interface would be determined by the demise of the cathode ray tube and by the growing perversiveness of speech input and voice output.

In terms of a computer interface, with general hearing and interpreta-
tive speech capabilities, Oakley was quick to warn that "we’ve got a hell of a long wait." He maintained, however, that speech input and output is the reason the Alvey Directorate is pursuing an interface.

When Oakley broached the subject of Alvey’s software research and development, he remarked that "there’s a very great deal to be done here. I’m suggested, in fact, that there is so much work to be done in this area that "people will look back on this period in awe and in horror, on the way we’ve had early engineering." He maintained that these formative years are the most difficult and the most critical.

The field of software, he admitted, is currently led and dominated by the U.S., a fact Oakley attributed to "either a fear of the Soviet bloc or of the Japanese threat." However, he concluded his talk on an optimistic note. "We [the UK] can do well in this market," he said.

Proliferation of EFT Called ‘Unstoppable’

By Chief of Telecommunications Firm

By Susan Blakeney

CW Staff

ST. PAUL DE VENCE, France — Michael Rappolt compared electronic funds transfer (EFT) to the nuclear arms race, calling it "an unstoppable bandwagon of vested interests with the majority of us not even bothering to think about the broad social and economic implications."

Rappolt, director of the Complex Systems Division of London’s PA Computers & Telecommunications, spoke at Sperry Corp.’s "Seminar for the Press," which was held here recently.

Rappolt noted that "the key trend over the next 10 years or so will be the availability of intelligent switched networks, on both a local and a wide-area basis." These networks will store information, convert data and interlink almost every type of device from simple terminals to video conference systems, he maintained.

"They will carry voice, data, text and image, using satellites to interlink key financial centers around the world. Developments in cable TV and satellite services will make it possible for these networks to be accessed from the home. Developments in cellular radio and FM sideband techniques will also allow these networks to be accessed on a mobile basis."

Eightfold Growth

Citing statistics from the American Bankers Association, Rappolt said that annual electronic transactions will leap from 2 billion in 1981 to 16 billion in 1986 — an eightfold growth.

This explosive increase, he contended, will spark fierce competition among financial institutions, and related companies will jump into the game as well.

According to Rappolt, the financial industry is only on the threshold of a bandwagon on which banks will have to compete head-on with third-party computer service groups, in addition to traditional computer and communications vendors.

"Third-party firms will continue to provide centrally located computer switching devices to route money transfers from one place to another, and they will build on these systems to develop information products for customers," he said.

The structural changes in the financial industry will be immense and will become increasingly more pronounced over the next decade. "Time-honored divisions of functions are all but disappearing," Rappolt said. "One-stop' or 'supermarket' financial services for both the corporate and the individual — are the goal, as typified by [Merrill Lynch & Co.]," he said.

However, Rappolt noted that there are several obstacles to EFT to be overcome. Two of these obstacles are security, and cultural considerations.

"The Fraud Squad of the Metropolitan Police [in London] — which occupies eight floors of a building — recently set up a specialized computer crime unit. The head of that unit is reported as stating that in 10 years’ time, every fraud investigated in the building will be a computer fraud," Rappolt said.

To minimize risks, Rappolt claimed the industry is relying mainly on secret codes and encryption. "But at present," he argued, "it seems that the laws of security in the financial market systems are not, in practice, all that high."

He said there is an urgent need to develop more comprehensive security features and facilities for EFT systems to protect the financial houses and, more importantly, convince the end users to put their trust in them.

HP 1000 Users Meeting

Scheduled for Oct. 18-21

FORT WORTH, Texas — Users of the Hewlett-Packard Co. HP 1000 will meet here Oct. 18-21 for their sixth international conference.

The theme of the HP 1000 Interna-
tional Users Group (HP 1000 IUG) conference is "New Frontiers." Dur-
ing the four-day meet, users will dis-
cuss professional tips, tricks and techniques to clear the way to higher system performance.

In addition, delegates will deliver technical papers on topics such as computer, instrumentation, sys-
tems software, data communications and a wide range of other subjects.

There will also be a question-and-
answer forum during which HP managers will respond to delegates’ questions on product services and development. Additionally, a vendor exhibit will run throughout the conference.

The HP 1000 IUG is an independ-
ent, nonprofit association. Besides its annual international conference, it offers members a bimonthly technical magazine called TC Interface and a library of contributed software.

Full conference registration will cost $300. More information is available from HP 1000 IUG, 289 S. San Antonio Road, Los Altos, Calif. 94022.
AUSTRALIA
RUSHCUTTERS BAY — Gestetner Pty. Ltd. plans to replace its one-
year-old IBM System/38 with equipment from Prime Computer, Inc. be-
cause of the high cost of software
development and the difficulty of
tailoring the IBM machine to its own
requirements. The company had up-
graded to the System/38 only a year
ago from a System/34 because it was
unaware of the impending an-
nouncement of the IBM System/36.
Mike Sulkin, Gestetner managing di-
rector, said.

PYMBLE — Despite a lack of ven-
ture capital funds in Australia, Digi-
tal Electronics Pty. Ltd. has acquired
over $400,000 in funding from a
newly formed venture capital com-
pany called Business Loans and Equi-
ty Capital Ltd. The money has re-
portedly been earmarked for market-
ing Digital Electronics’ exist-
ing product line.

MELBOURNE — A software pro-
ductivity aid for creating and modi-
ifying test data on an on-line basis for
use with DL/1 data bases under
IBM’s CICS was developed here by
Peter Simons, a software specialist.
“There were IBM batch utilities, but
nothing specifically on-line to access
IBM’s operating systems, VOS3 and
VM. Industry watchers contended that
VOS3 would become a strong
weapon in the war to resolve very
large memory requirements.

ADELAIDE — The South Austra-
lian Public Service Board has award-
ed preferred supplier status to SI
Products (Australia) Pty. Ltd. After
competing head-on with American
software houses, including Manage-
ment Science America, Inc. and Mc-
Cormack and Dodge Corp., SI’s fi-
nancial software was chosen for 20
Australian government departments.

CANBERRA — A federal govern-
ment contract for microcomputers valued at over $1 million is up for
grabs. The Australian Computer
Equipment Manufacturers Associa-
tion has voiced concern that the con-
tract might be lost to a foreign manu-
facturer.

FRANCE
PARIS — The number of data pro-
cessing sites in France as of Jan. 1
was 134,317, the French Association of
Data Processing and Office Autom-
tion Equipment Manufacturers de-
termined after surveying manufac-
turers and importers. The breakdown: 92,479 microcomputers and
small business systems; 36,686
minicomputers; and 5,152 medium-
to-large-scale processors. The total
dollar value of these installations
was estimated at $926 million.

JAPAN
TOKYO — Hitachi Ltd. has intro-
duced two products here that are said
to fill the gap between main memory
and disk drives. The first product, H-
3538-CI, is a disk controller with
cache memory; it is reportedly simi-
lar to IBM’s 3880-13 and supports Hi-
tachi’s IBM 3380 equivalent, the H-
8598 disk drive. The second product,
Hitachi’s H-6915-1 solid-state disk
drive (SSD), has a memory capacity
ranging from 32M to 128M bytes,
with access time of 3 nsec using 64K-
bit chip technology, Hitachi said.
The SSD will reportedly not be mar-
teted to users of IBM’s MVS and VM
systems, but only to users of Hita-
chi’s operating systems, VOS3 and
VM. Industry watchers contended that
SSD could become a strong
weapon in the war to resolve very
large memory requirements.

TOKYO — IBM Japan, Mitsubishi
Corp. and Cosmo Eighty Corp. have
signed an agreement to establish two
new joint venture companies that
will concentrate on digital communi-
cations network technology. The
start-ups, whose main goal is to com-
pete with Nippon Telegraph and
Telephone Public Corp. in the com-
munications marketplace, are expected to begin operations in October.
For IBM Japan, this marks the fourth
partnership venture with other Japa-
nese firms. Industry watchers pre-
dicted that IBM’s fifth move will
come in the near future to develop
Japanese personal computers with
Matsushita Electric Corp.

TOKYO — Panafacon Ltd., a com-
puter company owned jointly by Fu-
titsu Ltd. and Matsushita Electric In-
dustrial Co. Ltd., will increase produc-
tion of its PFC-200 personal
computer, which was announced last
April to compete against the IBM
Personal Computer. Panafacom plans
to manufacture approximately 2,500
units per month as of Septem-
ber.

TOKYO — The custom software
and applications software markets
showed the most rapid growth in Ja-
pan’s information service industry in
1982, according to a survey conduct-
ed by the Ministry of International
 Trade and Industry. The survey indi-
cated that service bureau companies
and software houses increased their
profits by 31.9% to $1.36 million. In
contrast, the data entry market grew
only 7% to $381 million; consulting
services increased 23.2% to $402 mil-
lion; and data base services declined
by 13% to $238 million. The total
1982 DP industry was valued at $4.1
billion, which represents growth of
13.2% over the previous year.

TOKYO — NEC Corp. unveiled a
proprietary standard for its line of
integrated office automation equip-
ment. The standard for message for-
matting and protocols is called Office
Automation Architecture. According to
to a company spokesman, the great-
est attribute of the new architecture
is wider support for Kanji characters
and an ability to handle image and
voice processing in addition to word
and data processing.

TOKYO — Mitsubishi Electric Co.
Ltd., an electronics manufacturer for
home appliances and office automa-
tion, has joined forces with Commo-
dore Electronics Ltd. to establish a
company specializing in peripherals
for home computers. The company,
Newtonics Co. Ltd., will produce
floppy disk drives. First shipments
are scheduled for October.

TOKYO — Nippon Univac Kaisha
Ltd. has reorganized its data proces-
sion operations — which include
small business computers, personal
computers, word processors and data
table equipment — and formed a
new subsidiary called Nippon Uni-
vac Information Systems Kaisha, Ltd.

TOKYO — Japan Information Ser-
vice, Ltd., one of Japan’s largest ser-
vice bureau companies, is reportedly
replacing all its large mainframes
with newer models in order to keep
up with user requirements for more
on-line services. The firm is expected
to install two Hitachi Ltd. H-6860
systems and IBM 3083 and 3033 sys-
tems.

WEST GERMANY
DUSSELDORF — The Supreme
Court of West Germany has sent-
tenced Gennadi A. Batalashov to pris-
ion for 2½ years. Batalashov, a member of the Soviet Representation of Com-
merce in Cologne, was accused of
high-technology spying for the Rus-
ian Secret Service. Batalashov report-
edly was trying to procure circuit de-
signs from Racal Milgo GMBH of
some data encoding equipment
called “Datacyptor” that is being
used by North Atlantic Treaty Orga-
nization officials.

FRANKFURT — The small busi-
ness systems industry here seems to
be playing a game of economic musi-
cal chairs. After going bankrupt, Da-
vid Computer GmbH was absorbed
by Swedish Ericsson; the Norwegian
Norsk Data A.S. has taken over 80% of
Dietz Computer Systems AG; and
HP Computer GMBH, formerly Hermes Precisa Rug GMBH, has filed
a petition for liquidation.
Lockheed Makes DP Personnel Moves, Layoffs

By Jeffry Beeler
And Lois Paul

SUNNYVALE, Calif. — A major aerospace company has laid off a small fraction of its information processing staff and has reassigned about a dozen other such employees in a purported effort to boost its systems productivity.

Reported to be part of the personnel moves at Lockheed Missiles and Space Co. first surfaced during late June and were later confirmed by one of the firm’s press contacts, Liz Jackson. During a July 21 phone conversation, Jackson estimated the total cut in Lockheed’s systems staff at 36.

Of that number, “fewer than two dozen” have been identified as “surplus” employees and, therefore, are being let go, Jackson said. The remaining dozen or so employees were given the option of seeking reassignments. In Morrone’s own immediate area, for example, he said, “there are at least three systems where their skills are needed more. In this instance, there was just no longer a call for us to hold on to about two dozen people in information processing.”

Asked whether the layoffs and reassignments coincided with the completion of a major systems development project, Jackson replied with an emphatic “No.”

Another Explanation?

Jackson’s explanation for the recent personnel moves conflicts sharply with a theory advanced by a well-placed source who continues to work in Lockheed’s Information Processing Department. The source, who asked not to be identified, described the layoffs and reassignments as an economizing move aimed at offsetting the high cost of transferring employees to a newly opened Lockheed Division in Austin, Texas.

Jackson flatly denied any connection between the job cutbacks in Lockheed’s information processing staff and the recent startup of the company’s Austin division.

Word of the personnel changes began circulating inside Lockheed on June 15, when the company issued a “Notification of Availability for Reassignment” to selected members of its systems organization. The document, signed by Product Data Systems Manager R.E. Wasson, the document voiced “regret” about the reassignments, which it blamed simply on a “decrease in . . . personnel requirements.”

Although Lockheed promised in its notification “to make every effort” to find replacement jobs for the surplus DPers, the memo contained a blunt warning: “In the event that no placement is possible, it will be necessary to lay you off on June 17, 1983.”

One of the recipients of the reassessment notice was data systems programmer George Morrone, who worked in Lockheed’s information processing organization for four years before he was laid of on June 17. Morrone characterized Lockheed’s handling of the personnel reassignments as “pretty bad.” The firm gave him and other recipients of the memo only a week’s notice of their impending job changes and “made no attempt to explain” the layoffs other than to cite unspecified “budget cuts,” he said.

In Morrone’s own immediate work group, Lockheed was forced to lay off six programmers, primarily because the unit “blew [its] budget for the whole year by April 30,” he said.

DP Crime Prevention Bill Gains Momentum in House

By Jake Kirchner

WASHINGTON, D.C. — A recently introduced bill to help small businesses deter computer crime has gained considerable momentum in the last few weeks since it was introduced.

Representative Ron Wyden (D-Ore.), sponsor of the Small Business Computer Crime Prevention Act, has been pushing the legislation hard, and his efforts to get the bill on the legislative fast track have started to pay off. Introduced only a month and a half ago [CW, June 13], the bill has already received the support of the relevant House of Representatives subcommittee chairman, who quickly scheduled a hearing on the bill. Rep. Thomas A. Luken (D-Ohio), chairman of the House Small Business Subcommittee on Antitrust and Restraint of Trade Activities Affecting Small Business, said at the July hearing that “we are very serious about [the bill], and I’m hopeful that we will move this bill or something akin to it.”

The bill would establish a federal task force to study the problem of computer crimes in small businesses and recommend appropriate security measures. It would also direct the Small Business Administration to set up an information clearinghouse to help small businesses protect themselves.

At the hearing, Wyden announced that his bill has received the support of the International Association of Computer Crime Investigators. In addition, according to Wyden and Dr. Stuart A. Katzke, an official with the National Bureau of Standards’ Institute for Computer Sciences and Technology, the Reagan administration supports the bill because there needs to be some way “to alert [small business] management to problems and recommend potential solutions; no other effective functions are in place to serve this purpose.”

Computer industry support for the bill came from Comshare, Inc. Group Vice-President Donald Devine, who testified on behalf of the Association of Data Processing Service Organizations. He praised the bill’s approach, saying that fostering education is the most important aid the government can provide.

Retailers Meet
Set for Oct. 9-12

CHICAGO — The National Retail Merchants Association (NRMA) has announced that its 25th annual Retail Systems Technology and Communications Conference will be held at the Conrad Hilton Hotel here Oct. 9-12.

Carroll E. Ebert, chairman of Carson, Pirie, Scott & Co., will deliver the keynote address Oct. 9 on “A Retail Chief Executive’s Perspective of Technological Opportunity.”

About 50 working sessions will deal with all types of retail operations. A mini series will focus on the problems of automation for specialty chains.

More than 60 suppliers will demonstrate equipment, products and services at the conference. Vendor registration fees are $369 for NRMA members and $599 for nonmembers; one-day fees are $185 for members and $300 for nonmembers. Further information may be obtained from John E. Chay, vice-president, NRMA, 100 W. 31st St., New York, N.Y. 10001.
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Congress Urged to Update Copyright Laws Soon

By Jake Kirchner

Duke University Law Prof. David Lange agreed that there is need for updating copyright laws. "The law of copyright has failed to respond adequately to the challenges posed from time to time by new technology," he said. But he added, the issue is so important that changes must be made carefully.

He proposed a system in which "the burden of proof for extending copyright protection to new areas be placed on those seeking the change. A good case for that extension could be made, he suggested, if the matter is "conceptually akin to the established subject matter of copyright, if it meets at least the established minimum requirements of originality." and if it is "reasonably analogous to the established 'writings' which are the province of statutory copyright." Lange added, however, that "even when these threshold requirements have been met, the new interests ought to face a stiff challenge amounting to a heavy burden of proof and a clear presumption against [copyrightability]."

In general, Lange said, any new subject of copyright protection should have a clear definition and "common conceptual understanding," so that the dimensions of the resulting copyright are intelligible.

"An interest that cannot be defined and cannot be understood probably should not be the subject of copyright protection," Lange said, adding "computer programs in Fortran or Basic, for example, probably meet this test; but programs in microchip reduction may not."
Federal Systems Controls Found Inadequate

By Jake Kirchner
CW Washington Bureau
WASHINGTON, D.C. — A special task force investigating government computer fraud and abuse has reported that federal systems controls are so inadequate that half of all reported cases were discovered by accident.

A task force survey of 13 federal agencies and departments found 172 cases of computer-related fraud and abuse reported between Jan. 1, 1978 and March 31, 1982. But because the government has 16,000 computers, the task force concluded it had only identified a small number of these cases and said the true extent of the problem could not be gauged because agencies did not systematically track these cases.

Despite those constraints, the report said the picture that emerged of federal computer fraud and abuse was not unexpected: “The frauds are characterized by low-level employees in functional areas committing input types of frauds in government payments systems. The abusers usually involve higher paid, technically sophisticated employees using computer resources. Both types of acts are usually detected accidentally by insiders.”

The survey was the first phase of the program undertaken by the task force, which is headed by Richard P. Kusserow, inspector general of the Department of Health and Human Services. The task force was formed by the President’s Council on Integrity and Efficiency, which includes inspectors generals and their equivalents from 20 federal agencies. The task force included computer auditing and security experts from several departments.

In its preliminary findings, the task force said the fraud cases, which carried losses up to $177,383, primarily involved theft of cash or diversion of other assets. More than three-fourths entailed a fictitious or unauthorized benefit claim or an unauthorized payroll payment.

Fictitious Beneficiaries

In one case cited in the report, a Social Security Administration claims technician created fictitious beneficiaries to obtain benefits payments for her co-conspirators, netting at least $102,000 and perhaps as much as $500,000 before being arrested and convicted in 1980.

Computer abuse cases, with loss estimates up to $5,214, primarily involved theft of computer time (57%), theft of data (12%) and/or destruction or alteration of data (17%). Typical examples of this kind of case are those of a programmer running a football pool on his agency’s system and an engineer using his agency’s facilities to maintain the records of his after-hours customers.

The task force survey found that the majority of both fraud and abuse cases involved in-house facilities (89%) and occurred during normal processing (89%). The systems involved employed a variety of processing technologies: batch processing (48%); on-line, real-time processing (41%); on-line inquiry capabilities (33%); centralized processing (28%); remote batch processing (22%); and data base management systems (16%).

Describing the perpetrators, the task force said that while four out of five in the fraud cases had salaries of $20,000 or less, almost half the abuse perpetrators earned more than that amount. In both kinds of cases, approximately three-fourths of the perpetrators were nontenured employees.

Almost two-thirds of the fraud perpetrators were system users, but almost three-fifths of the abuse perpetrators were DP personnel. The report added that although three-fourths of the fraud perpetrators were subjects of judicial action of some sort, only about one in 10 abuse perpetrators were subjects of any judicial action.

The report called it “alarming” that half the cases were discovered by accident and concluded that better systems controls and training for auditors and investigators are necessary.

All these people agreed to do something about communication chaos.

ANSI was the answer. In the computer industry, compatibility between terminals, computers, and printers is so vital, fifty well-known computer firms, major customers, user groups, and trade associations decided to put an end to the communications chaos. They met under the auspices of the American National Standards Institute (ANSI) and developed ANSI X3.64—the most comprehensive standard for information interchange yet devised.

ANSI X3.64 insures code compatibility between diverse peripheral devices. It prevents users from being locked into single vendors. It reduces the cost of programming, and makes software portable from machine to machine. At TeleVideo, we believe ANSI X3.64 will be the dominant communications standard—now and in the future. If everyone will abide by the standard, the chaos in peripheral communications will come to an end. For more information about how the ANSI Standard can help you, call TeleVideo at 800-538-8725 (in California call (408) 745-7760).
Committee hearing on industrial policy. Leveson was joined at the hearing by John Naisbitt, chairman of the Naisbitt Group in Washington, D.C., in urging that government not interfere with the development of the information-based services economy now emerging in this country.

Naisbitt, whose very successful book Megatrends identifies the shift from an industrial to an information society as a key trend of modern America, said that "in the new economy, there is a shift from institutional help to self-help. After World War II, in the '50s, we sort of turned our backs over to the corporations, our health to the medical establishment, our children to the schools and our welfare to the government. We are now in the process of reclaiming all of these as we move back to an old-fashioned self-reliance."

Similarly, Leveson said the new economy requires far more decentralized decision making than the economic system of most of the post-war period. "This decentralization is necessary so that economic actors can respond to rapid changes, take advantage of decentralized technologies and "operate when a regulatory system no longer provides the nice neat boundaries that were designed for another era," he said.

"The flexible environment of an information economy calls not only for reduced structural regulation," he said, "but also for greater privatization. The private sector, while not always quick on its feet, has shown itself far better than the public sector in responding to new conditions, in placing emphasis on efficiency with-out politicization and in keeping up with new technologies."

A prime example of the need to restrict government influence, Leveson said, is in the current debate over the efficiency of government research and development. "Public and publicly funded R&D has been too slow to reallocate resources, to take advantage of new technologies or to deal with new problems," he said. "If government R&D converts innovators into bureaucrats, it will have done a great disservice to the industrial progress of this nation."

The Joint Economic Committee is holding a series of hearings on new technologies and the possible need for a national industrial policy. Chairing last month's hearing, Rep. Chalmers P. Wylie (R-Ohio) expressed a fear that established, smokestack industries and their employees might be left behind in the rush to an information-based service economy.

Leveson said it is not true the new technologies will destroy more jobs than they create or that they will create "a permanent underclass that is unable to cope" with the changing economy. He added that "it is essential that we not tax service industries ... in order to support activities of the goods-producing sector."

He suggested government will have to play an important role in such areas as education and retraining. In addition, the private sector must also be encouraged to take on additional responsibilities, he said. "But," he concluded, "it is essential that we allow full reign for the dynamic sector to create new jobs, raise income and develop opportunities to bring displaced workers into the mainstream of economic life, rather than to once again [create] an artificial class of dependent citizens through government programs which reduce self-help and individual initiative."
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Network for Realtors Going On-Line Today

By Patricia Keefe

PALM BEACH GARDENS, Fla. — A telecommunications-based, problem-solving network, slated to go on-line today, Aug. 1, is expected to address a dramatic change in the real estate business — a move toward "counseling" to solve the problems associated with the sale of property.

The result of five months of intensive planning, the Exchange Network is structured to meet the needs of licensed realtors nationwide who often look for alternatives to cash sales — swapping properties, for example, or swapping mortgage notes for property.

Realtors today are no longer just brokers, they are problem consultants, according to Charles Huggins, the real estate entrepreneur behind Exchange Network, Inc., based here.

With his network — made up of portable microcomputers linked to the 58-plus city telecommunications network of Compuserve, Inc. — realtors will be able to offer their clients options that could include a multiparty bartering of real estate, mortgage notes and other real properties (see box).

Realtors will be willing to share their ideas and experience through the network because "they understand that it is easier to close a transaction with someone who is informed than with someone who lacks the information and knowledge necessary to understand the transaction," Huggins said. Other benefits to the users include reduced postage and telephone costs in addition to access to marketing ideas.

The Network Exchange is unlike the National Association of Realtors' Real Estate Information Network, which functions primarily as a national multiple listing service for certain classes of property.

While subscribers to the Exchange Network are not required to be computer-literate, Huggins warns "many of the benefits of the network's services and software will be lost if you are not computer knowledgeable." However, subscribers who purchase their computer through the network receive two days of training.

The Exchange Network is offering Access Matrix Corp.'s Access computer, which connects with an Epson printer. Huggins is trying to standardize the equipment used "because it permits us to offer training and software."

The charter membership fee of $5,960 is not cheap, but Huggins claimed the fees are in line with the commissions that brokers are making on sales today. The charge covers a $4,000 initiation fee and use of the 58-plus city telecommunications network of Compuserve, Inc., electronic mail and an electronic bulletin board. This handles information requests; correspondence; advertising; a Have/Want section, where realtors can advertise cash, paper or property for paper; transactions including filings, contracts and transfer notices; and a variety of meetings.

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Newsletters that keep subscribers up to date on the latest services, changes, computer and software techniques; reviews of seminars, books, audiotapes and software; and subscriptions to newsletters offered by specialists in various fields.

Conferences. Subscribers will be able to "sit-in" on the various seminars and workshops that Huggins hopes to run on-line.

The Exchange Network is offering a Digital Research, Inc. CP/M-compatible computer of their choice. However, subscribers can also pay only the $4,000 initiation fee and use a Digital Research, Inc. CP/M-compatible computer of their choice. For a "small charge," Exchange Network will configure its software to fit a particular computer. Also, subscribers have the option of choosing a lease/purchase plan that requires the first and last month's payments down and $212.49/mo for a total of 36 months. Subscribers are also charged for connect time at 50 cents per minute in addition to any designated surcharge on the menu.
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EDITORIAL

Nip It in the Bud

Fire fighting is not the way to prevent getting burned. Preventing fires is. And the way to prevent fires in a DP shop is for senior management to take a broad view of DP’s role in the corporation and to work with a plan.

A recent study by researchers at the University of Michigan’s Graduate School of Business Administration [CW, July 15] advises against the folly of dealing with major emergencies as they occur without examining their underlying causes.

Continual system outages, reworking of applications, frequent hardware replacement needs, work backlogs, frequent errors, a growing DP budget, high turnover and overreliance on consultants and service bureaus should all be a red flag to senior management that something isn’t right in the DP shop.

To head off such problems before they occur, senior management should communicate its attitude toward computer usage in the firm over time; define the responsibilities of those closest to the computing function; make a concerted effort to assimilate the DP group into the rest of the organization; and guarantee DPers’ career paths.

Without such planning, the DP function will flounder around trying to find its niche in the corporation. DPers themselves will flounder around trying to find their niches in the DP shop, and the company itself may end up floundering on the shores of neglect.

What’s the Encore?

If it is management experience and depth that choreograph success in a high-tech start-up, then Encore Computer Corp. should dance happily into the future. After all, Kenneth Fisher and Henry Burkhardt have pulled together the strongest start-up team in memory, having successfully raided their former employers’ stable for top corporate, marketing and technical talent.

With their bold moves, Fisher and Co. were also highly successful at generating plenty of press fanfare, gaining the kind of exposure that other firms get only by mounting expensive ad campaigns — even though at a recent press conference very little was said about future plans.

But with the fanfare now a barely audible memory, what will Encore do for its encore?

For one thing, the company is going to need a large infusion of money at some point, if it is to realize its ambitious goals. The idea of shepherding 10 or more small companies through the treacherous and competitive maze that characterizes the computer market is both novel and intriguing. It is also quite risky.

Encore is starting out with about $1 million, raised from its initial employees. While this represents a significant vote of confidence from company founders, it is obvious not the stuff with which important acquisitions are made. With all the promising high-tech investments wanting for seed money, Encore will have to do some moving and shaking to get to the front of the line.

From all indications, the companies Encore envelope will not necessarily be of the same product ilk. Thus the question, “How thin can Encore spread its experienced managers when directing diversely aimed companies?”

But entrepreneurs have enjoyed raging successes in the past, starting out with a lot less than what Encore has. Fisher’s and Burkhardt’s plan strives to combine the stronger features of a venture capital firm, a holding company and a diversified corporation into a cohesive unit.

Now that the fanfare has subsided, it will be interesting to see what the curtain calls bring.

LETTERS

Don’t Need a Crystal Ball

Rerun on the front page in four colors Computerworld’s editorial “Diploma Not a Free Ticket” [CW, July 11], regarding the future of programmers. That way, maybe the data processing professional will see it. It has been my experience that many professionals have no idea what the future holds in store for them.

Just skimming the rest of that issue shows evidence of the lack of knowledge. “Study Predicts Growing Usage of Info Centers” [CW, July 11] indicates that over half of the analysts and programmers surveyed are skeptical and pessimistic about end-user programming, while two-thirds to three-quarters of the people who count (our customers) are solidly behind it.

Don’t need a crystal ball to see what’s happening.

Thomas J. Franci
TIP Associates
Arcadia, Calif.

Surveying Surveys

The article “HP Customer Service Ranks High: Study” [CW, July 4], in which findings from an International Data Corp. (IDC) study on “User Satisfaction With Customer Service” are reported, contains some unfavorable statements on Wang Laboratories, Inc.’s service response times. In that the IDC survey includes a sample of only 14 Wang users, one of whom is located in a remote site in Hawaii, the validity of these statements is very questionable.

This user stated that he received a 48-hour response time under emergency conditions and a 96-hour response time under normal conditions. (This same user also reported satisfaction with these response times.) By removing this one customer from consideration, the average response time in both emergency and normal conditions reported by the Wang user drops by approximately one-third.

In a sample of only 14 users, this one lopsided response heavily skewed the results because IDC used an arithmetic mean to compare the results for the various vendors. Wang’s average response time in both emergency and normal conditions for the 14 users is four hours when the median, a much more accurate measure in this case, is used.

Ronald A. Munden
Vice-President
Marketing Services
Wang Laboratories, Inc.
Lowell, Mass.

A Case for Unions

I must respond to Computerworld’s editorial “Not Looking for Union Label” [CW, July 18]. I just turned in my hours for last week’s work, and I had another 50-hour week for my company. The firm for which I previously worked had a similar policy — programmer/analysts worked overtime with no compensation or they were forced to quit.

Computerworld refers to work alternatives like flex time; our time flexes by one minute, we are on report. We never get to leave at our proper quitting time of 4:30 p.m. I would jump at the opportunity to join a union. I wish only that I have the chance.

Why doesn’t Computerworld wake up and see us lowly programmers at the bottom of the ladder. How about writing about our side?

Name Withheld by Request
Chicago, Ill.

* * *
The widespread impact of data processing together with the proliferation of the personal computer has now made it imperative for everyone to become computer educated. Popular TV advertising, employing the influence of well-known personalities, suggests the importance of understanding this new technology. Adults are intimidated to learn to use it, if only because of the spreading interest and involvement of the younger generation, growing up in a world of video games and low-cost computers. Schools at all levels are introducing appropriate courses that teach entry-level computer skills.

Today's society cannot escape the touch of the personal computer in its daily life. As a result, computer literacy has become an identified goal for many. Entrepreneurs are responding with a number of offerings to spread the word about computers, employing such facilities as learning centers, special computer-oriented summer camps and computer-assisted training courseware.

Many educators have suddenly seen the benefit of picking up on the subject of the computer and becoming spokespeople on its behalf. In fact, one would be hard pressed to select a current magazine that does not contain at least one article related to the wonders of automation, whether it be for the office, the factory or the home.

While serious efforts abound in providing educationally sound seminars, classes and publications for the promotion of computer literacy and awareness, nevertheless, a topic so popular is vulnerable to the uninformed. It is too easy to oversimplify and misrepresent. The greater public can, therefore, be easily misled and may thereby suffer the consequences.

In pursuit of this point, I have been reviewing the popular press in order to evaluate how the personal computer is being made available to the general public about computers. A case in point is the article "The Credit Bureau" by Werner L. Frank in the August 1, 1983 issue of The Wall Street Journal. The article seeks to alert the purchaser of a computer to the fact that the computer will be used for credit rating.

"The theme of the article is to make "every bit count.""

**Bit Count**

The article builds a case to support the notion that the bit count is the key element entering into the economic decision making when selecting a computer. It is alleged by the author that this parameter governs size, memory access and speed of the device.

Using this information, the author now asserts a true statement: "An 8-bit computer is billed as having 64K bytes is one that has just over 64,000 bytes of 8 bits each." The reader is then entitled to follow the incorrect observation: "A 16-bit computer is billed as having 128K bytes one that has just over 128,000 bytes of 16 bits each," or twice the capacity that it really has.

The overall conclusion reached by this "expert" on the relevance of bit size for personal computers is that you can easily get by with an 8-bit machine if you are not an engineer requiring "superaccuracy" and you are not "considering tying together four or more personal computers". It is hardly worthwhile for those wishing to exploit software such as Context Management Systems, Inc.'s "Micro Lotus Systems" 1-2-3.

But the writer is not content to leave the technical subject matter behind and the thesis is more important-user-oriented considerations. Rather, he goes on to explain the wonders of memory extended by storage. He states that as the memory is used up, the system can "trick" the computer into storing information on disk or tape systems. This facility is called "virtual" memory by the author, as if we can, therefore, hold in our head a bit of knowledge and jargon can get one into serious trouble.

There you have it — an example of popular reporting. But what is really surprising is that the article was run in the newspaper's special section on computers. Surely, the press would want to be more careful about a subject that is becoming more and more important in the lives of every person today.

The above review is just one instance of poor reporting. Now let us look at another presentation, this time in one of the well-read airline magazines. Again, the topic is the size of the 8-bit vs. the 16-bit computer and the relative benefits to be attained from one as opposed to the other. Here the argument is a bit more sophisticated and subtle. It is asserted that:

1. The largest number that can be represented by 8 bits is 255.
2. The largest number that can be represented by 16 bits is 65,535.

The conclusion reached from these statements is that while the number of bits doubled from 8 to 16, the number that can be represented has squared. Therefore, the reader is led to the conclusion that calculations can achieve enormous benefits from 16-bit-based computers, contrasted with their 8-bit brothers. In other words, the argument is that there is an exponential improvement in going from 8 to 16 bits in terms of what the computers can effectively accomplish as well as perform.

Clearly, this is misleading. More memory is a welcome convenience and potential performance improvement.

HUMAN CONNECTION

Jack Stone

**Concern Mounting Over Data Controls For Credit Reporting Agencies**

Perhaps you saw the back-page news release that told of a low-grade form of War Games — the indictment of a person for allegedly tapping into a consumer data base via a remote terminal, stealing credit card numbers, charging a ton of fancy electronic hardware to the accounts of his bank, a fancy name the bank made available to the general public.

This is hardly the first time such an incident has been recorded; that such thievery is commonplace explains why the event was downplayed by the press.

One must be optimistic that credit reporting agencies spend the time and money necessary both to produce clean files and to protect their secrets. A number of news stories over the years on such operations, concerns about their effectiveness, have largely been the result of particularly wrenching experience with them, I, for one, am very skeptical about credit agency performance. A few years back, I decided to apply for the "executive credit" service with my bank, a fancy name the bank uses for its system that automatically credits funds to a zero-balance account through the device of the overdraft check. Naturally, I submitted a personal financial statement as part of the credit review, which I didn't really mind because I was in good financial shape at the time.

When I phoned for an appointment with my bank, a fancy name the bank made available to the general public, I obtained a letter from the bank. I had paid it off three years before. Two major credit charge accounts that I had opened two years earlier, and for which payments were overdue, were not mentioned at all.

The letter was easily resolved. All I had to do was write a detailed letter of explanation to the bureau formally to take issue with my report; send notes to each of my accounts in-error, requesting them to write the bureau to get the facts straight. I received a letter from the bureau acknowledging that my credit was in order, which I then referred to my bank, after which the credit rating was changed to "acceptable."

These days I deal only on a cash basis. Perhaps you understand why.
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BOSTON — Integrated Planning, Inc., has introduced a reentrant version of its Stratagem decision support system. This feature is designed to improve user response time and the number of concurrent users that can be supported on the IBM 370, 4300, 30 series and compatible systems running under VM/CMS. The standard version of Stratagem continues to be available for IBM MVS/TSO-based systems.

Integrated Planning developed the reentrant version of Stratagem by converting its source code to the C language, which originally was developed by Bell Laboratories.

The reentrant version reportedly allows several users to share the same copy of Stratagem in memory instead of each user having an individual copy. Because 95% of Stratagem's critical subroutines are shared, working set overhead decreases, less virtual memory is required for each user, and response time is improved for both Stratagem users and other DP jobs on the CPU. The reentrant version of Stratagem was designed to provide for more simultaneous users of the system without performance degradation.

The cost of a perpetual license for standard Stratagem is $75,000. The additional cost for the reentrancy option is $5,000. Integrated Planning is located at 338 Newbury St., Boston, Mass. 02115.

NORTH KINGSVILLE, Ohio — Although spreadsheet analysis tools have been successful mainly for business analysis, a manufacturer here has put this type of package to use in the unusual capacity of application prototyping.

In March, 1982, the one-man data processing department at Premix, Inc., a maker of fiberglass reinforced plastics, was immersed in converting the payroll system when the cost estimating department came in with an urgent request. Bernard Werner, manager of data processing, had to look outside for a solution.

He found it in "Paracalc," a spreadsheet package from Para Research, Inc. of Rockport, Mass., for the IBM System/34 computer. The DP manager spent a few hours becoming familiar with the package and then handed control over to Leo Wolker, a product cost engineer.

The initial model was written in steps using the various manufacturing processes as logical units of construction, Wolker said. The parts were rewritten and overhauled and put into production by mid-April.

The model consisted of three separate modules with the first 25 lines and two columns consisting of the input. The second section of the model was strictly for computation with each coordinate of the table labeled as to the calculation being performed. The third segment was the report itself, a segment that looked more like the output that might be expected on a spreadsheet, Wolker said.

There were drawbacks to the finished product, however. Although the model

(Continued on Page 34)

WALTHAM, Mass. — Nixdorf Computer Corp. has released a new operating system for its 8860 Distributed Information Processing System (Dipos). The company also announced two new versions of its Distributed Processing Executive Operating System, Dipex II and Dipex III, for its 600 Series Distributed Data Processing Systems.

Dipos II for the 8860 includes a job control system, full screen editor, printer spooling, enhanced Cobol compiler and runtime system and emulators for IBM 3270 Binary Synchronous Communications, 3770 Systems Network Architecture (SNA) and 3270 SNA/Synchronous Data Link Control terminals. Users can insert, edit and delete lines of text and perform global search and replace functions in full screen format. Dipos costs $1,600 for a perpetual license or $112/mo.

Dipex II and Dipex III feature improved data entry, data management and Editor programming language features of the older version of Dipex.

Other enhancements include file lock/unlock, enhanced management control, password protection for libraries, multiple identifications, library tools, user-defined communication port assignment, batchless edit and output and support for multiple I/O devices.

A conversion program for current customers is offered. A perpetual license for Dipex II costs $3,500 or $70/mo. A perpetual license for Dipex III costs $7,500 or $150/mo. All products are available from Nixdorf at 300 Third Ave., Waltham, Mass. 02154.

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Corporation’s VAX systems running under VMS and PDP-11 systems under the RSX-11M operating system.

Called Sourcetools, the system is designed to aid programmers in managing access to source files and to document the changes in source files over the development life cycle of a product. It provides an automatic standard text file.

The core of Sourcetools is a package called Sourcecon which controls the creation and modification of source files. Another program, Make, automatically keeps programs up to date as components are changed. Two other programs, Textcom and Sedit, function together to ease the task of maintaining parallel source files on different systems.

Priced at $3,600, Sourcetools is available from Oregon Software, 2340 S.W. Canyon Road, Portland, Ore. 97201.

**Software Management Tool Out for VAX Users**

PORTLAND, Ore. — Oregon Software has announced a software management system for programmers designed to aid programmers in working on Digital Equipment Corporation’s VAX systems under the RSX-11M operating system.

Called Sourcetools, the system is designed to aid programmers in managing access to source files and to document the changes in source files over the development life cycle of a product. It provides an automatic standard text file.

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**Cambridge Systems Offers IBM VM Version of ACF2**

LOS ALTOS HILLS, Calif. — Cambridge Systems Group has announced the availability of an IBM VM version of its Access Control Facility (ACF2) security package. ACF2 versions have previously been available for the IBM MVS and VSI operating systems.

ACF2/VM provides the ability to control access to the computer system, to data residing on the system and to other user-defined system resources, continuing the protection-by-default philosophy built into the vendor’s earlier systems.

The VM version uses the interuser communication vehicle interface between the VM control program and the ACF2 service machine; a minimum operating system level of VM SPU is required. Controls include user logon and password verification; user links to mini disks; CMS file controls including create, erase, read, write, rename, copy and open; and controlled access to CMS data sets. ACF2 is licensed on a CPU basis and will be available for $24,000.

Cambridge Systems Group is located at 24275 Elise, Los Altos Hills, Calif. 94022.

**Control System Released For HP 3000**

PALO ALTO, Calif. — Project Resources, Inc. has announced Operations Control System (OCS)/3000, an operations control system for the Hewlett-Packard Co. HP 3000 computer.

The product provides users with automated scheduling, automatic multiqueue job processing with full dependency control, report distribution, management, job performance and resource utilization statistics, tape library management and cost allocation reporting, a spokesman said.

To use OCS/3000, the operations manager defines a 13-month rolling business/accounting calendar indicating holidays, fiscal dates and other events. Specifications are assigned to each job stream to indicate the day or cycle on which it is to be run as well as any dependencies or resource requirements that must be satisfied.

Production can be run automatically with OCS/3000 providing multiple job queues, control of job dependencies and the ability to restart abnormally terminated jobs.

The product is priced at $20,000 for a first site license and $5,000 for each additional CPU from Project Resources at 560 San Antonio Road, Palo Alto, Calif. 94306.

**Wang VS Users Get 'Cobest'**

GLASTONBURY, Conn. — A Contractors Budget and Estimating System (Cobest) for the Wang Laboratories, Inc. VS computer has been developed by Modern Data Management, Inc.

Cobest is an on-line integrated system said to support such construction functions as estimating, job costing, payroll, general ledger, accounts payable and accounts receivable, the vendor said.

Features of the system include quantity and general estimating, detailed job costing, retainage, union reporting, integrated applications and on-line documentation, the vendor said.

The package starts at $20,000 from Modern Data Management located at 70 Oakwood Drive, Glastonbury, Conn. 06033.
Tymshare System Provides Data On Capital Assets

CUPERTINO, Calif. — An asset management system designed to track, control, analyze and report on capital assets is now available from Tymshare, Inc. on either a time-sharing basis or for in-house use on IBM and plug-compatible VM/CMS-based systems.

The Mechanized Inventory Tracking System (Mits), according to the vendor, allows aggregation of all or specific groups of assets either for a single location or multiple locations. It reportedly delivers accurate, up-to-date information about the cost, location, use, life and value of assets; and it assists in inventory control, planning and budgeting.

The system can use most intelligent terminals or microcomputers for offline data entry and editing. Tymshare said, and features include English language commands, custom-formatted screens and built-in error verification. Information can be loaded into Mits automatically through use of a bar code scanner.

In-house versions of Mits are priced starting at $50,000. Further information is available from Tymshare, at 20705 Valley Green Drive, Cupertino, Calif. 95014.

Status Monitor Runs on HP 3000

MOUNTAIN VIEW, Calif. — Computing Capabilities Corp. has announced Radar, a performance and status monitor for the Hewlett-Packard Co. HP 3000 computer that is designed to supervise any application created on HP's Vplus 3000 terminal and forms management software.

Radar does not require recompilation or changes to existing procedures, a spokesman said. Data is available on terminal and transaction usage as well as response-time statistics. Usage and performance statistics can be collected in HP's Image database management system. Standard reports include transaction volume and response times by application, transaction and form. Radar also captures the number of calls as well as elapsed and CPU times of Vplus intrinsic, the company claimed.

Users may create their own reports using HP's Query facility. The data collected by Radar supports the reporting of performance and usage statistics for any combination of application, transaction, form, terminal or user.

Managers or operators can send messages to users of monitored applications. This is displayed without disturbing the Vplus screens in use, the spokesman said. When allowed by system management, a programmer may define any combination of application, transaction, form, terminal or user.

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Firm Uses Spreadsheet Tool for Prototyping

(Continued from Page 31) was substantial, there were several internal table lookups, and the logic was made more complex by the inability to have decision-making through conditional statements, Werner said. Calculations tended to consume too many machine resources, and their complexity required the user to remain at the terminal while performing them.

Drain on Computer
Written in RPG-II, Paracalc was a tremendous drain on the computer, Werner added. Response time ranged from six to 15 minutes. In addition, the amount of available disk space was rapidly being reduced. By July, over 8M bytes of the system were already in use for only 88 models.

However, what seemed a problem turned into an opportunity, Werner said. "Here was a program that had been user-specified and user-written, and it was operational," he said. "It had been decided to treat the spreadsheet cost estimating model as a prototype, and it would be rewritten in a production language."

The model provided detailed specifications for the specialized Cobol program that was written to perform the same task. The documentation within the model was used to translate the calculations. In the process of translation, the underlying structure of the cost estimate model became apparent, and a two-dimensional table was used to drive the program, further simplifying the logic. Cincom Systems, Inc.'s Total data base management system was used to simplify coding. It also provided a means to have a working copy of the model to safeguard the user, he noted.

"Since the program logic remains fairly static, only the reports need to be saved, cutting the storage requirements significantly. Space is preallocated for 1,000 estimates at 5.5M bytes. Using Paracalc, over 90M bytes would have been needed for the same 1,000 models. Response time is now down to 20 seconds," he said.

The spreadsheet system served as a prototype. "Although performance and storage would not have been factors on the personal computer, the rewrite of the cost estimating program would have been inevitable," Werner said. "The Cobol program handles more complex logic that would have been extremely awkward, if not impossible, using Paracalc."

The superior inputting, error checking and formatting capabilities actually make the Cobol program more user friendly than the spreadsheet, he noted. In fact, it requires fewer commands to execute, and the commands are more meaningful since they relate directly to cost estimating. "The user has received a system which he has specified and initially programmed," Werner concluded. "The resulting production system is specialized to the user's needs; the specifications having come from the user's own program.

Werner said that using spreadsheets as prototyping tools can cut the application backlog by as much as one third. "Data processing can only come out ahead by improving on the original design and putting out a product in less time," he said.

The development of new technology is expected of the independent software industry. But four major new software technologies from one independent is a milestone.

Cincom has achieved this milestone through its commitment to the massive R&D efforts needed to create these essential new technologies in several vital areas.

Advanced Technology. Innovative solutions. Across a broad area of need. That's TECHNOVATION!
NEW YORK — Fits Systems, Inc. has introduced its System for IBM System/34 and System/36 computers.

The product offers direct access to data and includes the capability for defining recurring reports, including user-defined calculations, a spokesman said. Access paths can be maintained on-line as activity occurs at the end of a job or queued for batch processing. Support programs included are data base maintenance, universal inquiry, RPG-II interface and report generator.

The package costs $4,300 from Fits Systems, Suite 1100, 32 Broadway, New York, N.Y. 10004.

BLUE BELL, Pa. — Sperry Corp. has announced new versions of its Integrated Civil Engineering Systems (Ices) Basic System and the Strudl civil engineering applications software, using the Asci character code. The programs are designed for Sperry’s 1100/60, 1100/70, 1100/80 and 1100/90 computer families.

Ices consists of the Ices Basic System and standard subsystems, each of which performs tasks associated with a particular class of engineering problems, a spokesman said.

Three other Ices subsystems available in Fielddata code are Roads (for roadway layout analysis), Cogo (coordinate geometry) and Lease/Seopol (slopes and embankments).

The Strudl subsystem, which assists in structural design, also includes Table, a file storage subsystem for structural information. The Ices Basic System is a prerequisite for use of Strudl.

The ices Basic System costs $110/mo. The Strudl system costs $1,100/mo. An extended support charge for running the programs on Sperry 1100/60 and 1100/90 systems is $275 for Strudl.

Sperry’s Computer Systems Division can be reached through Box 500, Blue Bell, Pa. 19424.

Ten Courses On CICS/VS Set for NYC

NEW YORK — Telecommunications Technology Corp. has announced 10 IBM CICS/VS courses to be held from August to October in the metropolitan New York area.

The courses are: CICS/VS Concepts and Facilities (Sept. 6); CICS/VS Command Level Programming (Sept. 12-16); CICS/VS Fundamentals of Command Level Programming (Aug. 29-Sept. 2); CICS/VS Application Design (Aug. 15-18 and Oct. 3-6); CICS/VS Command Level Debugging (Aug. 10-11); CICS/VS Recovery/Restart (Sept. 28-30); CICS/VS System Problem Debugging (Sept. 20-21); CICS/VS Audit and Controls (Oct. 17-19); CICS/VS/DLI Interface Architecture (Aug. 31); and CICS/VS Management Overview (Sept. 19).

Each of the courses costs $150 per student per day. For every three persons registered for a course, a fourth person can attend free. More information is available from Telecommunications Technology at 548 Fifth Ave., New York, N.Y. 10036.

Fusion On IBM/36?

Call for details about FUSION, Electronic Worksheet and Financial Modelling System.
Before Labor Day, we'll be installing our 1,500th UFO applications development system for CICS. That's more installed systems than all of the other independent suppliers combined. And to celebrate, we'd like to give everyone who schedules a UFO trial this summer a free gift worth $3,000. The gift is Oxford's data compression software package called SQUEEZE... that will pay big benefits by reducing on-line terminal response time up to 25%. And it's yours absolutely free, just for scheduling a UFO trial this summer and seeing for yourself why UFO is the #1 CICS application development system.

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No other company knows more about applications development systems than Oxford. And no other company can provide you with as much valuable in-depth support. Make this summer the time you begin to do something about your CICS backlog. Schedule a UFO trial... and get a free SQUEEZE on us!

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Bakco's Accounting Package

INTRODUCED FOR HP 3000

ARLINGTON HEIGHTS, I1. — Bakco Data, Inc. has introduced accounting management software for the Hewlett-Packard Co. HP 3000 computer.

The software is said to utilize the capabilities of HP's data base management system under the MPE IV operating system.

The package costs $9,800, including full documentation and support, from Bakco Data, Suite 190, 85 W. Algonquin Road, Arlington Heights, IL 60005.

TRAPIX Processors Get 'Rtips'

FOR HIGH-SPEED APPLICATIONS

LOS GATOS, Calif. — TAU Corp. has announced a Real-Time Image Processing Software (Rtips) package for high-speed applications, designed for the TRAPIX 5500 series of image processors from Recognition Concepts, Inc. of Incline Village, Nev.

Rtips' functions include real-time digitization and frame freeze, frame-to-frame averaging and subtraction, spatial filtering, point processing and image arithmetic and logic. It also has utilities for image storage on and retrieval from mass storage devices.

Currently available for Digital Equipment Corp.'s RT-11, RSX-11M and VAX/VMS operating systems, the system comprises an image processing library and a utility library of modules.

Rtips costs $6,000 from Suite 101, 10 Jackson St., Los Gatos, Calif. 95030.

MCBA Announces Package

FOR INVENTORY MANAGEMENT

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced an Inventory Management package written in Cobol II with Hewlett-Packard Co.'s Image Data base management system for the HP 3000 running under the MPE-IV operating system.

The package reportedly provides the storing of raw materials, subsets and finished goods as inventory file items, which can be noted as regularly stocked or assembled/purchased on order.

Inventory transfers are provided for, as well as issues and receipts, the vendor said. The software automatically converts purchasing units of measure to stocking/selling units of measure.

A source code license costs $4,500 for the first computer from Mini-Computer Business Applications at 2441 Honolulu Ave., Montrose, Calif. 91020.

Catronix Offers Modeling Program

OPERATIVE ON VAX-11/780

ATLANTA — Catronix Corp. has announced that its Catsof program for three-dimensional solids modeling is fully operative on Digital Equipment Corp.'s VAX-11/780 minicomputer.

The configuration for operation of Catsof includes the 32-bit VAX with DEC's VMS operating system, its VT100 terminal and keyboard and Advanced Electronic Design, Inc.'s 512-color terminal.

Catsof ranges in price from $30,000 to $50,000. More information is available from Catronix, Suite 039, 151 Sixth St. N.W., Atlanta, Ga. 30309.

Microdata's ALL Available

ON REALITY BUSINESS SYSTEM

IRVINE, Calif. — Microdata Corp. has announced the availability of its Recognition Language (ALL) fourth-generation language on the Microdata Reality Small Business Computer System.

All lets users create applications by responding to screen prompts, a spokesman said. A library of common subroutines is contained within the ALL executive and used by the generator to create the applications.

Subroutines cover reading and writing files, data entry, displaying and printing data and processing of information.

All costs $10,500 on the Reality system plus a $25/mo usage and support fee from Microdata at 17481 Red Hill Ave., Irvine, Calif. 92714.

Deltak Offering Two Courses

ON IBM'S PERSONAL COMPUTER

NAPERVILLE, Ill. — Deltak Microsystems, Inc. has introduced two computer-based training courses: "Teach Yourself (VisiCorps') VisiCalc on the IBM [Personal Computer]' and "Teach Yourself VisiCalc on the IBM [Personal Computer] Extended Features."

Basic skills, functions and commands can be learned from the intro-
ductive course. The extended features version includes on-line instruction, tutorial assistance and practice exercises contained through two interactive education diskettes for use on the IBM Personal Computer. A third diskette offers six templates which can be used to produce finished reports.

Both courses are available for an average purchase price of $65 to $100 each from Deltak's East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

Screen Generation Provided

FOR BURROUGHS BY IDS'

JACKSONVILLE, Fla. — Jacksonville Software Services, Inc. has announced its on-line Interactive Development System (IDS) for use with Burroughs Corp.'s Command and Edit software.

IDS reportedly provides screen generation and data base development through the use of Burroughs' TD 830 or MT 985 terminals.

The product costs $4,950 from Suite 234, 7355 Beach Blvd., Jacksonville, Fla. 32216.

Self-Study Intro Course

TARGETS RPG-III USERS

WOODLAND HILLS, Calif. — Automated Training Systems, Inc. has announced a self-study, hands-on introduction to entry-level RPG-III, the primary language of the IBM System/38.

The computer-assisted course covers such subjects as the RPG-III program cycle, tables and arrays, files and data structures and physical and logical files. Course materials consist of audio cassettes, manuals and a dis-

The course costs $695 from the firm at 21250 Calif St., Woodland Hills, Calif. 91367.

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Easy to Install - Just load the ESS program. No additional program products or languages are required.

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Questions? - For more information about ESS, or to arrange a 30-day free trial, call or write TRAX.

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RAX

Random Notes

August 1, 1983

ESS COMPUTERWORLD

Page 37
ANNOUNCING THE
ULTIMATE BUYER’S GUIDE
to PERSONAL COMPUTERS

(From the money-minded magazine with the
computer-minded readers.)

Here's a one-time opportunity for all computer industry advertisers—a comprehensive guide that will accept and run your ad.

MONEY Magazine’s Complete Guide to Personal Computers will be snapped up by over 300,000 eager prospects this September. They’ll spend $2.95 a copy at newsstands or by mail order. And they’ll be actively interested in buying computers and related products and services.

This “user-friendly” guide has been written by the editors of MONEY Magazine to do just one thing—help consumers make those buying decisions. Hardware and software options are explored in detail. We give advice on selecting the right machine languages, operating systems and peripherals. And suggest ways that readers can further enhance their understanding of personal computers.

This MONEY Guide goes on sale September 19th—with a 300,000 rate base. The closing date is Friday, August 5th. Page rates range from $6,280 for black & white to $9,825 for four-color.

Contact your MONEY Magazine sales representative for more information. Or, contact Peter Eldredge, Special Projects Manager at 212 841-2938. This guide will be retained by consumers for many months—they’ll open its pages whenever there is a buying decision to be made.

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DP Managers Get Set for AT&T Divestiture

By Bob Johnson
CW New York Bureau

NEW YORK — With the divestiture of AT&T's operating companies around the corner, data processing and telecommunications managers are scrambling to get their shops ready for the problems they expect to result.

Computerworld conducted a telephone survey of DP and communications professionals in the New York area last week to find out what is being done to head off this anticipated communications confusion. New York is the country's largest user area and a probable trouble spot, and managers here expressed concern over the control, cost and personnel in communications.

Personnel will play an important role in getting through the AT&T changes at the U.S. Trust Co. of New York, according to Michael Casale, the company's DP special projects manager. Casale said that he is currently working on a network control center for his bank's communications and DP operations. A major part of coordinating the center will be the help of savvy computer professionals.

"Our communications area has grown so fast that it's difficult to know just who has control," Casale said. "The AT&T breakup will no doubt just compound the problems, but we are at a stage now where we are attempting to head off these kinds of data communications disasters."

"Part of our communications' network control center will consist of a 'help desk' where a DP assistant will take calls from users with communications problems and direct the problem to a technician, probably the on-line master terminal operator," Casale maintained.

Michael Kanth, assistant vice-president of telecommunications engineering and development for Citibank here.

(Continued on Page 40)

CESI Mux Runs On DEC PDP-8, CESI Omnipac

HOUSTON — Computer Extension Systems, Inc. (Cesi) has introduced an eight-line asynchronous multiplexer for operation to DEC's KL8A, the unit Digital Equipment Corp.'s PDP-8 or Cesi vide users with eight serial line control.

The SLZ8 Serial Interface is said to provide a unique vector address for each channel.

The unit reportedly uses only two device code addressers on one hex-height card. Similar in operation are seven lines. Delivery is immediate at $875 each from Cesi, 17511 El Camino Real, Houston, Texas 77058.

Tymshare Adds to Scanset Line

CUPERTINO, Calif. — Tymshare, Inc. has introduced a 1,200 bit/sec model to its line of Scanset personal information terminals.

The Scanset Model 415/HS reportedly contains its own power supply, making it suitable for rack mounting or bench use in manufacturing and test environments.

The unit's CRT is said to produce realtime graphics with high addressable resolution as needed in waveform analysis, data acquisition and process control and monitoring.

The unit reportedly can scroll through data horizontally in both directions across the screen, according to a vendor spokesman.

Cupertino, Calif. 95014.

Fully Programmable Package HP Unit Offers Vector Graphics

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a display package said to provide high-speed vector graphics in a fully programmable, self-contained unit useful for process control and monitoring as well as measurement and analysis.

The 6-in. directed beam Model 1347A reportedly contains its own power supply, making it suitable for rack mounting or bench use in manufacturing and test environments.

The unit accepts both 8- and 16-bit binary commands as well as ASCII commands from a desktop or mainframe computer.

The price is $5,100 from HP at 3000 Hanover St., Palo Alto, Calif. 94304.

Model 333 Coupler Provides Backup

WALDWICK, N.J. — STC Systems, Inc., a subsidiary of Storage Technology Corp., has introduced its Model 333 concentrator dial backup coupler said to provide users who have leased telephone lines with an alternate or backup to standard telephone line transfer of data via private line data channels.

When a leased telephone line is down, all that is reportedly required are two telephone calls for the system to run again via the new circuit.

Standard features of the unit include a set of transmit and receive test jacks; a LED to indicate when the unit is in the dial backup mode; and a switch to return it to its standby state, according to a vendor spokesman.

Priced at $1,570, the Model 333 coupler is available from STC Systems, Four North St., Waldwick, N.J. 07463.
Redundancy Alone Won't Stop Net Failures, Report Says

DP Shops Ready for

CHERRY HILL, N.J. — High reliability components and redundancy alone will not protect network users from communications path failures, according to "Communications Test Equipment — A Solution to Increased Productivity," by Data Decisions, Inc.

Such measures, the report contends, may dramatically increase costs without providing sufficient improvement in uptime to justify the expense.

Instead, "a combination of proper testing and diagnostic procedures, coupled with selective sparing of equipment and well-executed maintenance agreements, are a better guarantee of network availability than redundancy," the report said.

Users are warned that they could easily spend their entire communications budgets on just a few pieces of test equipment.

The report (9-CK) costs $29 and explores the subject of network failures, offers equipment selection guidelines and poses key questions to ask when evaluating equipment for specific situations, the vendor said from 20 Brace Road, Cherry Hill, N.J. 08034.

DP Shops Ready for

Workstation Unveiled for X-Net

(Continued from Page 39)

SANTA MONICA, Calif. — CR Computer Systems has introduced a multiprocessor-based workstation for use on

its X-Net local- and wide-area data communications networks.

The Network Administration with options for either a 16- or 32-bit format. A data packaging feature allows the converted data to be assembled into 32-bit words consisting of two 15-bit conversions and transferred to the computer at a correspondingly slower rate.

The price is $3,595. Prestone is located at 805 E. Cerrotes Ave., Anaheim, Calif. 92805.

Parallel Interface Offered

ANAHEIM, Calif. — Prestone Scientific, Inc. has announced a high-speed parallel interface to the Gould, Inc. Gould/SEL supermini-computers.

The interface reportedly provides the required logic terminations and compatible driver-receiver circuitry for operating Prestone's analog and digital conversion subsystems from the Gould/SEL HSD controller.

Kanthal pointed out that designing a communications network is much more complex than it was, and it takes professionals who really know the ropes. "It involves a lot more than just laying out a network, the way it is used. Technical people now have to be able to handle multidrop lines using AT&T's Long Lines.

Ease Coordination

"Also, the differences between 'intra' and 'inter' Local Access and Transport Areas [Lata] must be understood," Kanthal continued. "These communications people will have to know how to design a network for optimum cost effectiveness and now with AT&T's split, how to ease the vendor coordination effort."

The AT&T breakup is being closely looked at by the 508 Communications Network Management for X-Net, which can link from 50 to 50,000 noncompatible mainframes, minicomputers, terminals and peripherals.

Special functions performed by the Network Administrator include performance statistics, password protection, electronic mail and code name control of all peripherals and attachments, according to a vendor spokesman.

Priced at $8,000, the Network Administrator is available from CR Computer Systems at 1255 Lincoln Blvd., Santa Monica, Calif. 90401.

Workstation Unveiled for X-Net

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We know that it's tough for consultants to fit a weekday course into their hectic schedules. That's why SysEd offers special CICS training courses for consultants that you can complete in just two weekends. Our intensive weekend workshops in Command Level, Macro Level, Internals, Application Design and VSAM are designed to make even non-CICS programmers immediately productive in a CICS environment. Each SysEd course provides a true-to-life learning experience with "hands-on" use of the computer, up-to-date, practical information, a solid foundation in CICS fundamentals and insights into advanced materials; and individual attention from highly qualified instructors.

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PE Releases Migration

OCEANPORT, N.J. — Perkin-Elmer Corp. has unveiled a 32-bit supermini-computer that enables users to migrate from a 3- to a 21-million instructions per second system.

Christened the 3250XP, the system, like its year-old predecessor, the 3200MPS, can support up to eight auxiliary processing units (APUs) that are linked together to act as a single processor.

But unlike the 3200MPS, the 3250XP allows system builders and application developers, that don't need the minimum two-processor configuration of the 3200MPS, the ability to purchase the single-processor 3250XP and add the auxiliary processors as needed.

Priced at $150,000, the 32-bit system's basic configuration is made up of a CPU that holds 2M bytes of memory in two separate banks, writable control store, universal clock, loader storage unit, two communications lines and a system console. The package also includes direct memory access, an I/O chassis, system cabinet, power supply and battery backup, the spokesman added.

Additional information on the system can be obtained from Perkin-Elmer at 2 Crescent Place, Oceanport, N.J. 07757.

Stand-Alone System Includes Array Processor Architecture

WAKEFIELD, Mass. — Analog Corp. has announced a stand-alone, general-purpose computer system that incorporates an array processing architecture that reportedly enables the system to execute up to 10 million floating point operations per second.

Called the APL Machine, the system is designed as a development tool for high-level decision making, according to the company. A typical configuration consists of a 4M-byte array processor; an IBM Personal Computer, that can be used as a programmer's workstation; a 124M-byte hard disk, and a dual-mode tape drive. The system also supports an I/O processor, supporting up to eight terminals, as well as the Analogic software system.

In addition, the system's array architecture is said to support several levels of overlapped and parallel processing, the vendor said.

The APL interpreter runs in the 12.5 MHz, 16/32-bit control processor and handles all aspects of syntax and conformance checking, the vendor added.

The APL Machine is priced from $40,000 to $80,000, depending on the configuration, from Analog, located at Audubon Road, Wakefield, Mass. 01880.

Standard Bus Disk System Out

TUCSON, Ariz. — Applied Micro Technology, Inc. (AMT) has announced a standard disk subsystem that is said to offer up to 22M bytes of formatted data storage capacity.

The FD840/H series of Modular Disk Subsystem integrates two 8-in. half-height double-sided, double-density floppy drives and one 5¼-in. hard disk drive into a single package, the vendor said.

Housed in a 7-in.-high enclosure, the unit's basic configuration includes the standard bus interface, intelligent controller and AMT's ST9101 Software Support Package, which includes the standard Digital Research, Inc. CP/M operating system and three system utility programs — SET, FORMAT and REMAP, a spokesman said.

A rear-mounted, drive-select switch assembly reportedly permits easy designation of physical unit numbers for systems that utilize more than one subsystem.

The FD840/H package also includes power supply, cooling fan and all cables necessary for installation. Rackmount and tabletop versions are available.

Unit price of the FD840 (floppy system only) is $3,995. Unit prices for the FD840/H range from $5,995 for the 7.4M-byte system to $7,560 for the 22.4M-byte system. AMT can be reached through P.O. Box 3042, Tucson, Ariz. 85702.

SAS* USERS UPDATE!

Another CAI course written by Gary Deward Brown

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SAS® USERS UPDATE!

FROM THE INFORMATION CENTER PEOPLE
Taming the renegade p.c.
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This way, a personal computer user gains direct access to an infinitely broader source of data in a very simple way. The Cullinet Information Database also provides a software connection to link personal computers in a network. Thus, giving the people who use personal computers a way to share their information with others.

Now you can bring a workable and defined strategy to corporate personal computing. And because the Cullinet Information Database integrates with IDMS/R as well as Cullinet's Applications Software and Cullinet Personal Computer Software, you can create a system from one supplier for a free and fluid exchange of information across the whole corporation.

You can, in short, turn personal computers into the useful tools they were always meant to be. Instead of the renegades they've become.

The answer is software.
And software is Cullinet.
Based on Zilog’s Z80A

Visual Technology Unveils Visual 1050 Micro

TEWKSBURY, Mass. — Visual Technology, Inc. has announced the Visual 1050 microcomputer, based on the Zilog, Inc. Z80A microprocessor.

The unit comes with a library of software including Emery First In Micropro International Corp.’s Wordstar (Release 3.3) and Mailmerge (Release 3.3) packages and Digital Research, Inc.’s DR-Graph graphics package, GSX-80 graphics device driver and CBasic programming language. The system also comes with Visual Technology software to allow the system to emulate a Digital Equipment Corp. VT100 terminal. The system comes with Digital Research’s CP/M Plus operating system, the vendor said.

Visual 1050 hardware includes two 400K-byte disk drives, 96K bytes of random-access memory expandable to 160K bytes, a high-resolution 640 by 300 bit-mapped monochrome display, printer port, modem port, Winchester disk expansion port and detached 93-key keyboard. Options include a plug-in dual-port serial card, memory expansion hardware and a Winchester hard disk.

The Visual 1050, including software, costs $2,695, Visual Technology said from 540 Main St., Tewksbury, Mass. 01876.

Add-In Memories Debut
For DEC’s VAX-11/780

SANTA ANA, Calif. — The Standard Memories Division of Trendata Corp. has announced the Pincomm 780SX, a line of add-in memories for Digital Equipment Corp.’s VAX-11/780 processors.

The Pincomm 780SX memory modules provide 1M byte of memory on a single card using full 64K-byte random-access chips. The memory cards are hardware- and software-compatible with VAX-11/780 systems using the DEC MS780E memory system, the vendor said.

The add-in memory boards can be installed directly into the MS780E memory system without modification to DEC hardware or system cabling. Each memory data word stored by the Pincomm 780SX is 39 bits wide, consisting of 32 data bits (four 8-bit data bytes) plus seven error-correction check bits. The check bits allow for single-bit error correction and double- or multiple-bit error correction.

Each Pincomm 780SX board is offered with a four-year warranty and costs $2,800, the Standard Memories Division of Trendata said from 3400 W. Segerstrom Ave., Santa Ana, Calif. 92704.

Line Printers Compatible
With IBMs

FORT LAUDERDALE, Fla. — Southern Systems, Inc. has announced a line of heavy-duty 1,500 and 2,000 line/min line printers that reportedly are compatible with most computer systems, including those made by IBM, Digital Equipment Corp. and Data General Corp.

The 2,000 line/min printer, the BP-2000, was designed as a replacement for the IBM 3211 printer. Both the BP-2000 and the 1,500 line/min unit, the BP-1500, are targeted at heavy-duty data processing environments.

The printers cost from $21,800, depending on quantity, computer type and other special applications needs of end users. Southern Systems is located at 2841 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

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Whether you’re sending letters, packages, or heavy cargo, Emery can deliver with the fastest regularly scheduled door-to-door delivery of any size, any weight—and any value—between most U.S. and major European cities. In many cases, that means door-to-door delivery in as little as 48 hours. And from New York, we can ship letters to major European cities—overnight. In addition, Emery offers you a total range of services—from customs clearance to notifying your customer of the time of delivery—all for one basic price. For just a little more, you can even get proof of delivery and full documentation.

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We use Graham's Epoch 480 exclusively; quality-related problems are virtually zero.

What data processing experts are looking for — at least those we talk to (and we survey them regularly) — is no headaches.

So some, like the one quoted above, use Graham Epoch 480 for everything, not just for important applications like archival storage and data transfer. Their position is, how can you put a price tag on peace of mind?

Epoch 480 delivers, because its binder system is as tough as they come. It minimizes head wear and tape debris and provides sharper signal output. It has earned Graham Magnetics the reputation around the world of being the tape company.

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With Color Graphics
Lexidata Unveils Display Processor

BOSTON — A color display processor that plays video at a rate of 30 frames per second, flicker-free 1,280-by-1,024-pixel, 60Hz high-resolution, monochrome and color graphics was announced recently by Lexidata Corp.

The Model 3700, latest addition to Lexidata’s System 3000 family of compatible color display processors, writes in blocks of up to 80 pixels, according to the company, allowing for writing speeds of up to 42 million pixels per second. The automatic block writing feature results in almost instantaneous nervous fills. Also, a continuously updated video image at 750 usec per pixel allows complex drawings to be displayed quickly, a spokesman noted.

Users can implement high-speed routines using a standard Writable Control Store programmability feature, Lexidata said. An Extended Graphics Operating System firmware package (Egos3) is plug-compatible with earlier 3409 Egos versions. Parallel Direct Memory Interface access interfaces are available for most host computers.

According to the vendor, Model 3700 systems are available from Lexidata: a 640- by 512-pixel, 60Hz version, two 1,280- by 1,024-pixel, 30Hz versions and a 1,280- by 1,024-pixel, 60Hz version. Prices start at $9,995. Further information is available from Lexidata, 735 Middlesex Turnpike, Billerica, Mass. 01865.

Emulator
Announced

EL SEGUNDO, Calif. — Imperial Technology, Inc. has announced a solid-state, nonrotating disk emulator system called the Megaram-7000, said to be a direct replacement for Digital Development Corp., Data Flux and Vaxen Research rotating fixed-head disk drives.

The Megaram-7000 reportedly accommodates a variety of different drive formats and capacities and is both hardware- and software-equivalent to the drives it replaces. The system features 10M bytes in a 7-in. chassis expandable to 16M bytes, battery backup option, full error detection and correction, high reliability and ease of maintenance, the vendor said.

The storage system is contained in three subassemblies. The 2M-byte version of Megaram-7000 costs $16,600, according to a spokesman for the vendor. Additional information is available from Imperial Technology, located at 831 S. Douglas St., El Segundo, Calif. 90245.

Magnetic Tape Controllers
Fi: DEC CSI-11, PDP-11

ORANGE, Calif. — MDB Systems, Inc. has announced a line of console-configurable magnetic tape controllers for Digital Equipment Corp.’s LSI-11 and PDP-11 systems. At the same time, the company also unveiled a smart disk controller for the LSI-11.

Designed to control any combination of modes and speeds on four drives simultaneously, the DEC TM-11- compatible controllers interface nonreturn-to-zero, phase-encoded and combined nonreturn-to-zero inverted phase-encoded drives on a single board. The controllers are transparent to DEC operating system drivers and diagnostics; are 16-, 18- and 22-bit bus-compatible; and have automatic self-test on board, according to the company.

The Q-bus tape controller Model MLSI-TM11 is priced at $2,600, the Model MDB-TM-11 for Unibus is $2,950. The MLSI-RM11 smart disk controller reportedly configures eight storage modules drives to LSI-11 systems without reprogramming. Emulating DEC’s RM01, RM03, RM05 and RK06/RK07 drives, the controller is driver- and diagnostic-transparent to all DEC operating systems and Unix and can be integrated without any modification. It maintains true media compatibility with DEC RM series drives and has a true Control Data Corp. Storage Module Drive Interface, according to the vendor.

The MLSI-RM11 costs $2,800 from MDB Systems, Inc., located at 1995 N. Batavia St., Orange, Calif. 92665.

NCS Offers
EMPLOY-EASE

MINNEAPOLIS — National Computer Systems, Inc. (NCS) has unveiled a turnkey data collection and information processing system for the human resources marketplace.

The Employ-Ease system utilizes the NCS Sentry Plus hard disk system, the NCS Sentry 3000 scanner and an IBM XT hard disk version of the IBM Personal Computer. The system reportedly captures and stores data and generates reports.

In addition to the system’s basic capability to administer and economic personnel surveys on -scalable forms, information processing modules include employment selection, employment maintenance and error correction. The delivery of enrollment and administrative data. Prices of the modular system range from $15,000 to $30,000 from National Computer Systems, 4401 W. 76th St., P.O. Box 3965, Minneapolis, Minn. 55440.
Zilog Offers Upgrade Path for 16-Bit Chip Users

CAMPBELL, Calif. — Zilog, Inc. has carved out an upgrade path for its 16-bit microprocessor users by taking the wraps off a microprocessor that communicates over 32-bit data paths both internally and externally, is capable of memory management and can execute 5 million instructions per second.

Software-compatible with the firm’s 16-bit Z8000 CPU line, Zilog attributes the Z8000 chip’s throughput speed to a 256-byte cache memory that stores copies of the most recently referenced main memory locations. The cache memory significantly cuts down the number of off-chip memory fetches the CPU has to perform, a spokesman explained.

Users upgrading to the new chip can do so without making any software modifications, a spokesman said. Zilog contends the migration path the Z8000 offers Z8000 users is a “natural” one in that the 32-bit chip’s software is a binary-compatible extension of the 16-bit chip’s. The Z8000, like the Z8000, uses the company’s Z-Bus and employs the same interconnect protocol used by all Zilog equipment introduced since 1979, meaning the 32-bit chip is compatible with all Z8000 peripherals.

According to the company, the chip’s memory management facility needs no external support circuitry. The unit maps 32-bit logical addresses generated by the CPU into 32-bit addresses for referencing memory. Users calling on the chip’s memory management capabilities do not experience a degradation in performance because of the chip’s pipelined architecture, a spokesman explained.

Scheduled to be available in next year’s second quarter, the Z8000 starts at $150 each when ordered in 1,000-unit lots, the company said from 1331 Tioga Ave., Campbell, Calif. 95008.

Peripherals

Introduction

For Domain

CHELMSFORD, Mass. — Apollo Computer, Inc. has announced three peripherals reportedly designed to enhance printer economy, ease and network security for Apollo Domain users.

The Domain mouse cursor positioning device has three user-definable buttons said to provide flexibility in creating a personalized user environment. It is fully integrated with the Domain interactive display manager and is software-compatible with Domain’s touch pad and data tablet cursor positioning devices.

The Hardcopy Device Multi-Mode Printer reportedly can print or plot in a variety of software modes. For near-letter-quality performance, the bidirectional, logic-seeking, dot matrix printer runs at 100 char./sec. In line printer mode, it runs at 400 char./sec and for graphics plotting, it offers resolution of 72 dot/in. With a 2K-byte line buffer, pedestal and paper feed, the device costs $3,800.

Finally, the firm introduced a network switch, said to enhance the Domain network system’s reliability, availability and flexibility. The switch allows users to divide large networks along organizational boundaries, simplifying network modifications and isolating network faults.

The Domain network switch is priced at $250 from Apollo Computer, 15 Elizabeth Drive, Chelmsford, Mass. 01824.

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John likes anyone who likes wine and food.

Prolog: \( \text{likes(john, X)} \text{ :- likes(X, wine), likes(X, food).} \)

Is there anything that both Smith and Jones supply, but which Smith supplies at lower cost?

Prolog: \( ?- \text{ supplies(smith, X, Cs), supplies(jones, X, Cj), Cs < Cj.} \)

---

**Introduction to Prolog. A 'Fifth-Generation' Language**

By William F. Clocksin and Jon D. Young

Interest in the Prolog programming language continues to grow, in part because of the much-publicized fifth-generation computer project. The Japanese describe Prolog-derivative languages as fundamental to their supercomputer software effort.

With the appearance in the marketplace of knowledge-based "expert systems," commercial interest is focusing now on practical, reliable and efficient expert systems employing Prolog and other languages.

Alain Colmerauer and associates at the University of Marseilles, France, originally devised Prolog about 1970. Prolog interpreters now exist for a wide range of computers.

With the development of an efficient Prolog compiler by David Warren and Fernando Pereira at the University of Edinburgh, the language emerged as the practical choice for writing sophisticated knowledge-based programs. Many Prolog applications involve large and complex programs that probably could not be written if not for the relative ease of doing so in Prolog.

Current areas of Prolog application include:

- Systems that understand typewritten natural language, both in simple stories and data base queries.
- Expert adviser and interpretation systems.
- Architectural design, site planning and logistics.
- Biochemical analysis and drug design.
- Symbolic equation solving, compiler writing.
- Abstract problem solving and plan formation.
- Knowledge-based systems research.

Prolog programs are being used in commercial applications, notably in Hungary, where the government has encouraged industrial use of the language. Applications include using chemical interactions to design drugs, using knowledge about building codes and architectural practice to design buildings and software engineering.

Prolog has also been applied to English-language query of data bases. For example, the Chat system, written by Warren and Pereira, contains a geographical data base and an English interface that can deal with complicated queries such as, "Which are the continents no country in which contains more than two cities whose population exceeds one million?" Chat first
parses the query, translating it into a logical expression that can be evaluated as a Prolog program. Next, Chat rewrites the expression in an optimized form that can probe the data base more efficiently. Finally, the optimized expression is evaluated as a normal Prolog program that probes the data base and answers the query in English.

Most queries can be answered in less than one second on a mainframe, but as much as two seconds may be required for queries as complicated as the one just discussed. Work on Chat and its derivatives continues at SRI International, Inc. in Menlo Park, Calif., where Warren and Pereira are now based. (In Los Angeles, Silogic, Inc. has begun marketing some of this country’s first Prolog-related products—a line of Prolog interpreters for Zilog, Inc. Z80-based systems and Digital Equipment Corp. Decsystems, PDP-11s and VAX-11s.)

Other Applications
The Mecho system, developed by Alan Bundy and others at the University of Edinburgh, solves mechanics problems stated in English taken from school mathematics texts. An example taken from the area of pulley problems would be: “Two particles of mass B and C are connected by a light string passing over a smooth pulley. Find the acceleration of the particle of mass B.”

Mecho consists of three modules, each written in Prolog. First, a natural-language module translates the English input into a symbolic representation of the meaning of the input. Next, a problem-solver module uses knowledge of mechanics to set up the equations of the problem, and finally, an equation solver uses symbolic algebraic method to solve equations that may be as complicated as simultaneous nonlinear inequalities. A key theme throughout the Mecho system is the use of meta-knowledge, or “knowledge of knowledge,” to control and constrain the search for solutions.

Researchers find Prolog is well-suited to implementing knowledge-based expert systems. An expert system generally consists of three parts: a data base of knowledge (facts and rules) about a particular domain, an “inference engine” for generating and controlling logical deductions and an interface for communicating with the user. Prolog itself provides a powerful data base and one kind of inference engine. Other types of inference engine as well as interfaces to the user and to remote data bases have been implemented completely in Prolog by a number of researchers.

Many of the expert systems written in Prolog have satisfied the criteria for knowledge-based systems:

1. Knowledge in the data base can be easily examined, changed, and extended.
2. The system can explain its deductions.
3. The system is able to reason judgmentally, using confidence factors, as well as exactly.

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structured programming implied by Prolog makes with Pascal, for example.

Facilities for symbolic computation are of course provided in several artificial intelligence languages such as Lisp and POP-2, but Prolog is unique in combining those computations with program control based not purely on the flow of control through adjacent program statements, or evaluation of functions and expressions, but on an automatic procedure for logical inference.

The Prolog system uses a proof procedure to derive relevant logically valid consequences of a goal, using its given stored facts and rules together with the input goal.

Of course, it is the programmer's responsibility that the facts and rules given are adequate to the problem in hand and the solutions wanted. Thus, the idea of logic programming has developed, in which computation is seen as controlled logical deduction.

This method is especially suitable for symbolic operations, since they are very often most clearly, concisely and completely expressed in logic. Prolog provides immediate facilities for executing programs which, without Prolog, might require programming into bulkier and more complex code. The program execution mechanisms used in Prolog vary slightly in detail, but all are based on a "unification" pattern matcher and a mechanical proof procedure discovered by Alan Robinson at Syracuse University.

The denotational semantics of logic programming have been rigorously derived by John Lloyd and others at the University of Melbourne in Australia. Research into these and other logic programming mechanisms continue, and advanced areas in parallelism, nondeterminism and pattern-directed procedure call are being investigated.

A Prolog Primer

Programming in Prolog may be viewed as:

- Specifying, some facts about objects and relationships.
- Specifying rules about objects and relationships.
- Asking questions about objects and their relationships.

The program that is presented to a Prolog system consists of a data base that contains the facts and rules relevant to the problem. The problem is then solved by formulating it as a query presented to the program, which is used to determine an answer. Prolog is a conversational system: a computer terminal is used to enter facts, rules and queries; the answers are printed on the terminal's display.

First, facts. When we say "John owns the book," we are declaring that a relationship (ownership) exists between one individual object "John" and another individual object denoted by "the book." This relationship has a particular order: John owns the book, but the book does not own John.

When we ask the question "Does John own the book?" we are attempting to find out about a relationship. "John owns the book" translates...
PROLOG

IN DEPTH

into a Prolog fact as follows:

own(john,book).

The notation used here is perhaps the most common for Prolog. In this notation, the names of all relationships and objects must begin with a lowercase letter. The relationship is written first, and the objects involved are written separated by commas. The whole group of objects is enclosed in a matching pair of parentheses. A period comes at the end of the fact. The objects listed within the parentheses must appear in a consistent order. The particular order is not important provided that the programmer is consistent. In the example, we have put the owner first and the object owned second. If we introduce a "likes" relationship between a liker and a liked person, we may write likes(john,mary), but it is not the same fact as likes(mary,john). If we wish to represent the fact that John likes Mary, and that Mary likes John, we must say so in two separate facts. The name of the relationship is called a predicate, and the objects inside the parentheses are called the arguments. So, the above example is a fact about the predicate likes, which has two arguments, john and mary.

Next, questions. Once we have collected some facts together in a data base, we can ask questions about them. Let us construct a data base of friends, consisting of a list of "likes" predicates:

likes(john,mary).
likes(john,fred).
likes(mary,fred).
likes(fred,john).

In Prolog, we ask, "Does John like Mary?" by typing:

?- likes(john,mary).

Questions are prefixed by a ?- sign as shown. To answer this question, the Prolog system examines each entry in the data base, looking for facts that match the question. Two facts match if their predicates are spelled the same and if they have the same arguments. In this case, there is indeed a matching fact, so the Prolog system answers yes. Given the above data base, if you ask the question ?- likes(mary,fred), then the Prolog system will answer no. This response actually means "cannot be proved by what is in the data base."

It is also possible to use variables. In Prolog, a variable takes the place of an object that the programmer may be unable or unwilling to name at the time he writes the program. A variable stands for an object whose usage is closer to that of variables in high-school algebra then those in conventional computer languages. In particular, variables may not be assigned to, but we may assert equality relationships among objects that can include variables.

Furthermore, variables can appear as the arguments of terms, in which they can be viewed as partial specifications of data structures that can be fully instantiated at a later time. For example, we could ask the question, "Is there something X that John likes?" by typing:

?- likes(john,X).

In our notation, any name that begins with an uppercase letter is a variable. In the above data base, two facts would match this question. The first is in Mary, so Prolog would print out:

X = mary

and wait for a reply from you. If you type the return key on the keyboard, the system will abandon the search for more matching facts. If you type a semicolon, then the system will continue the search. A more exhaustive interaction might look like this:

?- likes(john,X).
X = mary
X = fred
no

The last reply is no, meaning that there are no more facts that can satisfy the question.

Another way to ask more complicated questions is to use conjunctions. If we want to know whether John and Mary like each other, we can state the question in the form of two goals, separated by a comma. The comma is pronounced "and:"

?- likes(john,mary), likes(mary,john).

Using variables, we can ask if John likes anyone who likes John:
In the first goal of this question, X is initially unknown. We say that X is not instantiated (meaning that it does not have an instance). However, when searching the data base, Prolog finds a fact that matches if X is mary. The variable X is now instantiated to mary. As a result, any occurrence of X in the question is replaced by mary.

Next, the second goal is considered: likes(mary,john). This goal fails, because there is nothing to match it in the data base. But there might be some other fact that matches the first goal (remember we had not exhausted the data base on the first goal). Indeed there is, when X is fred. So now, X is instantiated to fred, and the second goal is tried again: likes(fred,john). This time the goal succeeds, because a matching fact is found in the data base. Both goals thus succeed, and Prolog prints out the first answer as shown above.

It is important to understand the idea that Prolog alternates successively between two neighboring goals in a conjunction to find an answer that satisfies them both. An arbitrary number of goals separated by conjunctions may participate in this way. This is the basis of a very powerful technique known as backtracking, which will be discussed more later.

Next, rules. Many times it is useful to express a fact in the form of a rule. For example, if we wanted to express the fact that John likes everyone who likes wine, it would be tedious to add more facts to the data base to express this. It would be far simpler to store a rule about what John likes, instead of listing all the people John likes. Suppose we wished to represent the rule that John likes some thing X provided that X likes wine. We write this as a rule, made up of a head and a body. The head and body are separated by a :- symbol like this:

likes(john,X) :- likes(X,wine).

Consider a very simple rule that tells us about sisters. Suppose we are given two people called X and Y. Person X is a sister of person Y provided that X is female and X and Y have the same parents. This definition translates directly into a Prolog rule as follows:
sister(X,Y) :- female(X), parents(X,Pa,Ma), parents(Y,Pa, Ma).

This rule is read, "It is a fact that X is a sister of Y provided that: X is female, and the parents of X are the same as the parents of Y." Let us supply some facts that will help the rule to succeed:
female(alice), female(victoria), male(edward), male(albert), parents(edward,victoria,albert), parents(alice,victoria,albert).

We have said, "It is true that Alice is female," "It is true that Edward is male," "It is true that the parents of Alice are Victoria and Albert" and so forth. The single rule above, together with the six facts, permits us to ask questions about certain relationships. For instance, we may ask whether Alice is a sister of Edward: sister(alice,edward).

Yes, it is a fact that Alice is a sister of Edward. Let us try a few more questions, shown with the answer that...
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In Depth

PROLOG

IN DEPTH

Prolog gives. Notice the use of variables in some questions:

?- sister(alice,victoria).
no

?- sister(alice,alice).
yes

?- sister(alice,X).
X = edward

?- sister(X,Y).
X = alice, Y = edward;
X = alice, Y = alice;

?- sister(X,X).
X = alice

Using an underline character where a variable is allowed means the anonymous, or "don’t care" variable.

The last question asked if X is the sister of someone (Y) who is the father of a child (Z). The answer Prolog gives is no. This means that there is nothing in the data base that can satisfy such a question. Notice that the "male" facts in the data base are never used by this rule. In this sense they are redundant, but we listed them here to give a sense of completeness.

Notice that the "sister" rule makes explicit the notion that a female is her own sister. It is possible to modify the rule to add an extra condition that the two candidate objects for sisterhood must be different objects.

Backtracking

How is a Prolog question (or goal) evaluated by the system? Consider again the question:

?- sister(X,Y), parents(Z,_,Y).

Since these two goals are connected by a conjunction, Prolog needs to find some instances in the data base that satisfy both goals. Think of a conjunction of goals connected by "," as a sequence of neighbors. To satisfy a conjunction of goals, an attempt is made to satisfy each goal in the conjunction, from left to right. First, sister(X,Y).

Are there any facts or rules in the data base to satisfy this? The data base is searched (literally) from top to bottom. Immediately it finds our rule for sister shown above. The body of this rule is now interpreted as a new set of goals, and the left-to-right evaluation proceeds for female, parents and parents again. If (and only if) the "sister" goal has been satisfied, Prolog continues from "sister" by trying to satisfy the next goal (parents(Z,_,Y)) in the original question.

Each particular goal in a clause may either succeed or fail when an attempt is made to satisfy it. If it succeeds, then Prolog attempts to satisfy its neighbor on the right. If there are no more neighbors on the right, then the entire conjunction succeeds. If, however, a goal fails, then an attempt is made to resatisfy its neighbor on the left by finding a further possible answer for it, then proceeding rightward as before. If a goal fails, and it does not have a left-hand neighbor to resatisfy, then the entire conjunction fails.

What about variables during backtracking? Any variables in a goal may become instantiated to some data structure when the goal succeeds. As soon as a variable becomes instantiated to some data structure, every occurrence of the variable (having
In Depth/11

the same name) in the goal will be immediately instantiated to the same data structure. If a goal fails, then any variables that may have been instantiated by the goal’s previous success (if any) are forgotten. This is the essence of backtracking. Attempting to satisfy a conjunction of goals essentially involves a depth-first left-to-right search of a proof tree.

Here is a collection of simple one-rule examples together with some explanation of new parts. Each rule uses backtracking to find a set of objects that satisfy each goal in the body of the rule. Remember that these rules are not queries but rather compact ways of expressing a complex relationship among objects.

Example 1: “John likes anyone who likes wine and food.”
likes(john,X) :- likes(X,wine), likes(X,food).

It can be established that john likes X, provided that X likes wine and X also likes food.

Example 2: “X was on the throne during year Y if: X reigned between years A and B, and year Y falls between years A and B.” In this example, we assume that clauses defining years_of_reign exist in the database. (The underline character ‘_’ can be included within a name, as in years_of_reign, to improve legibility. In this context, it cannot be confused with the anonymous variable.)

The infix operators “>=” and “=<” have the usual meanings of “greater than or equal to” and “less than or equal to”:
on_throne(X, Y) :- years_of_reign(X,A,B), Y >= A, Y =< B.

Relevant clauses for the database pertaining to the 15th century House of Avis (Portugal) are:
years_of_reign(duarte,1433,1438).
years_of_reign(alfonso_V,1438,1481).
years_of_reign(john_ll,1481,1495).

Example 3: “The population density of X is Y.” Here we assume that clauses for relating a country with its population, and a country – with its area, are provided in the database. The infix is operator evaluates the arithmetic expression on its right-hand side and matches it with the object on its left-hand side. Remember this, because we shall use later.
density(X,Y) :- population(X,P), area(X,A), Y is P/A.

Relevant clauses for population and area (in millions of people and millions of square miles) for 1976 might look like:
population(usa,203). area(usa,9).
population(india,540). area(india,1).
population(brazil,106). area(brazil,3).

General Data Structures
More interesting examples involve data structures other than numbers and atoms. Arbitrary data structures are represented as terms that can have any number of components. For example, in a parts database, we need to describe a part in more or less detail. If we wish to describe a laser focusing lens, we must record its wavelength (in nanometers), diameter (in millimeters) and focal length (in millimeters). We could define a structure called “lf” with these three components. One particular laser focusing lens can be denoted as:
lfl(325,10,20)
and could take part in questions just as any other individual. Likewise, a spur gear is represented by its diametral pitch, number of teeth and material, for example:
spur(120,85,brass).

Given a parts database relating a supplier to a part and a cost, the portion of the database dealing with laser focusing lenses and spur gears might look like this:
supplies(smith,lfl(325,10,20),143).
supplies(smith,spur(120,85,brass),2).
supplies(smith,spur(120,85,steel),3).

We might make the following queries:
?- supplies(X,lfl(904,__),Y), Y < 200.
?- supplies(smith,X,Cs), supplies(jones,X,Cj), Cs < Cj.

The first query instantiates X to the name of a supplier who can supply laser focusing lenses for 904 nanometers which cost less than

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$200. The second query asks whether there is anything that both Smith and Jones supply, but which Smith supplies at a lower cost.

Given a structure such as `spur(X,Y,Z)`, the atom `spur` is called the functor, and the arguments enclosed in the parentheses are called the components. When used as an individual, as in the above example, the structure can never be mistaken for a goal or clause. However, notice that clauses (facts and rules) are represented as structures. This is no accident. The notion that programs should be written using the same data structures that are manipulated by programs is a feature that Prolog shares with Lisp. The important application of the program-as-data notion is when performing natural language query of data bases. Recall our prior discussion of the Chat system which converts the English query by several stages ultimately into a final Prolog goal, which is executed by the system.

For another use of structures, the Portuguese monarchs discussed earlier can be represented more flexibly as a structure. We choose monarch as the functor and the name, “serial number” and country ruled as components. For example, we could represent `monarch(john,2, portugal)`, `monarch(john,2, sweden)`, because Portugal and Sweden were ruled by different John IIs.

```
? years_of_reign(monarch(john,2,portugal), Monarch, Serial, Year) :-
    years_of_reign(John,2),
    years_of_reign(portugal),
    years_of_reign(John,2),
    monarch(john,2, portugal).```

This example will work even if we leave out the serial number of a monarch by replacing its component in the query by an uninstantiated variable. For example, to ask which John ruled an unknown country in 1588 (the year of the Spanish Armada), we would ask:

```
? on_throne(Country, Monarch, Serial, Year) :-
    years_of_reign(Country, Monarch, Serial, Year).
```

As with other languages used by researchers in artificial intelligence, a data structure known as the list plays an important role in Prolog programming. The list cell, which is represented as a predicate (named `member(X,[Y])`, has two arguments called the head and the tail. Lists are binary trees constructed from list cells. As with the Lisp language, denoting binary trees using the dot notation can be cumbersome. So, there is a simpler notation for lists. Terminal nodes of the tree are written separated by commas and are all enclosed in a pair of square brackets. The empty list is denoted `[]`. Examples of lists are:

```
[john,wants,to,join,the,company]
[[This],list,is, made + of],[Several,types],
of,structure]
```

The notation `[XY]` denotes the list whose head is `X` and tail is `Y`. This is used in pattern matching. For example, suppose we wish to define a predicate that succeeds if its first argument is a member of the list given as its second argument. The first clause about this problem is: “It is a fact that X is a member of a list if X is the head of the list.” The second clause is “X is a member of the list if X is a member of the tail of the list.” Putting these in a procedure yields:

```
member(X,[X],B). member(X,[Y|L],B) :- member(X,L).
```

The first query tests whether Darwin is in a list of influential 19th Century thinkers. The second query instantiates a variable to a member of the set; there are three possible solutions to this query, so the member...
In Depth/13

goal succeeds once for each of the three instantiations shown.

Here is an interesting way to use member to find out if two lists differ— that is, if one list has an element that is not in the other. This is an example of what some people call "nondeterministic programming," and it relies on the above definition of "member" that allows backtracking:

differ(X,Y) :- member(Z,X), not( member(Z,Y) ).

and it relies on the above definition of "member" that allows backtrack-
ing:

ample of what some call "nondeterministic programming," that is not in the other. This is an ex-

The goal not(X) succeeds if its argument fails when considered as a goal. Likewise, it fails if its argument suc-
ceeds.

The rightmost go goal collects the rightmost room number (Z) for its list head and the "list so far" (T) as its tail. The whole thing is passed to the goal:

go(Z,Y, [Z\|T]).

The above procedure might get into loops by re-searching rooms it has searched before. To avoid this problem, we can keep a list of room numbers that we have visited and avoid those rooms.

Pattern Matching

Advantages of pattern matching can be shown by writing a program to convert one arithmetic expression into another. Compilers are an especially attractive example. The Edinburgh Prolog compiler, which generates very efficient code for the Digital Equipment Corp. Decsystem-10, is written in Prolog.

Let us develop an example that converts an expression into its symbolic derivative. This procedure is often presented as a list of rules in mathematics books, and it is nice to find that the rules translate easily into Prolog. We use the functors +, -, * and / to represent nonterminal nodes of expression trees. These functors have a built-in syntax declaration as right-associative infix operators with the usual precedence relationship.

We shall define the predicate d(X,Y,Z), meaning "the derivative of X with respect to Y is Z." Here are a few derivative rules in Prolog. Note the similarity to tables of derivatives as found in mathematics texts:

d(U+V,X,A+B) :- d(U,X,A), d(V,X,B).

d(U-V,X,A-B) :- d(U,X,A), d(V,X,B).


d(U/V,X,A*B) :- atomic(U), not(U=X), d(U,X,A).

d(U/V,X,A*V) :- atomic(U), U \= X, d(U,X,A).

And that is a working program. Here is a question and the answer:

\[ d(x^2+3x,1,2) \]

A = \[ x^1 + \frac{3}{2} \]

The goal atomic(X), whose definition is built into the Prolog system, succeeds if its argument is an atom or an integer and fails otherwise. We use it here to check whether we are finding the derivative of a constant. The infix "not the same as" operator \( \neq \) fails if its two arguments match and succeeds otherwise.

The above answer is not in an algebraically simplified form. However, we can provide a straightforward simplifier, which consists of two clauses plus some facts about algebra.
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sales representative.
The `simp` predicate is defined such that the goal `simp(X,Y)` simplifies the expression X, obtaining the expression Y. The first clause given below simply states that an atom simplifies to itself, and there are then no more solutions.

The second clause unpacks an expression tree into its node and two branches using the `comp` predicate (defined below), then simplifies each branch recursively, then uses `comp` again to re-compose the expression with simplified branches (called S) and then finally checks to see if S is a simplified form using the `s` predicate (defined below). Any simplified form found (F) is instantiated as the second argument to `simp`.

```
simp(E,F) :- atomic(E), F = E.
simp(E,F) :- simp(E,G), simp(F,H), comp(G,H), F = S.
```

Notice that there are pairs of s facts for addition and multiplication, to account for commutativity. This works as follows: To simplify an expression E using the s table, we need to first simplify the left-hand argument, then simplify the right-hand argument and then see if the resulting pieces are in our table. Since we recursively simplify the subcomponents of E, it will be in a simplified state when it is time to see if it is in the table. At the “leaves” of the expression tree, there are either integers or atoms. These are simplified into themselves by the first `simp` clause.

The symbolic differentiator and simplifier can then be used as goals in a procedure:

```
diff(X,Y) :- write('Type the expression: '), read(Exp), d(Exp,s,Derv), simp(Derv,Simplified), write('The derivative w.r.t. x is: '), simp(Deriv,Simplified), write('The derivative w.r.t. y is: '), simp(Deriv,Simplified).
```

Grammar Rules

Because the basic computational mechanism of Prolog is top-down search through a tree of goals, rep-
in the box, the following structure is obtained:

forall(X,implies(salesman(X),exists(Y,and(computer(Y),sells(X, Y))))).

This is a more specific representation of the sentence, "For every salesman, there is a computer that he sells."

Another meaning of the original sentence is, "All salesmen sell the same computer." This other meaning is available from the program by backtracking. In this program, components of structures are used to represent the meanings of phrases. The last component actually specifies the "meaning" representation, but the meaning of a phrase may depend on several other factors given as the other arguments.

For example, the verb "lives" gives rise to a representation of the form lives(X), where X is something standing for the person who lives. In the case of "every," the meaning has to be applied to a variable and two propositions containing that variable.

The result is a representation that denotes, "If substituting an object for the variable in the first proposition yields something true, then substituting the same object for the variable in the second proposition will also yield something true."

Problems, Rules
Finding symbolic derivatives, simplification and grammar rules are only a few examples of problems that are conveniently handled by Prolog. When a problem is cast into the form of rules, at any given point there is a program that works.

The program may not compute answers for all the questions you ask, but it is a matter of adding more rules to cover these cases.

Furthermore, if the program has been made modular — and Prolog makes this easy to do — then there is usually no need to rewrite existing parts of the program when modifications are required.

For many people, including most artificial intelligence programmers, this is an attractive methodology for programming. At any given point, there is something that works. It is easier to build on a working program, no matter how small. Program construction then involves the task of adding more function while maintaining a working structure. This seems to be exactly opposite the methodology promoted by languages such as Pascal. The Pascal programmer is not always able to have a working program until every last detail of the problem specification is known.

About the Authors
William Clocksin is an assistant director of research at the Computing Laboratory, University of Cambridge, England. He works in the areas of implementing high-level declarative languages such as Prolog and applying logic programming to design automation.

Clocksin is coauthor, with C.S. Melish, of the textbook Programming in Prolog, published by Springer Verlag, New York.

Jon Young is ICL Fellow in Logic Programming at St. Cross College, Oxford, England, where he is applying logic programming to communications tasks such as teaching, discourse and dialogue modeling. He acts as a consultant to several commercial and academic research projects in knowledge-based systems.
DPD Announces Price Reduction Of Word-11


The cost has been reduced 25% from $6,000 to $4,500.

Word-11 features list processing, built-in dictionaries for spelling verification, automatic table of contents and footnoting and on-screen highlighting, according to a vendor spokesman.

Word-11 is also available for larger DEC VAX-11 and PDP-11 systems, a spokesman for the vendor said.


Corvus Cuts Cost Of Workstations

SAN JOSE, Calif. — Retail prices of the Corvus Concept personal workstations have been reduced 25% for the model with 256K bytes of main memory and 28% for the $6,000 to $4,500.

The new prices are $3,995 and $4,695, respectively.

More information is available from Corvus Systems, 5029 O’Toole Ave., San Jose, Calif. 95131.

By Russ Hamrick
And Don Fisher
Special to CW

As the office of the future draws closer, something is clearly emerging that should have been anticipated from the outset. There is not just one office of the future; there are many. And new systems continue to appear.

At first glance, this complexity may seem to be an obstacle to the logical development of office automation. But recent software advances strongly suggest that it is, instead, an opportunity. Using the capability of mainframe computers, these software products successfully integrate diverse systems into unified OA networks that are more powerful than any individual component.

Although diversity is welcome, it creates new problems and needs of its own. Diversity of OA equipment can frustrate the promised development of electronic mail and easy exchange of documents. Communications both within and beyond the bonds of a single company is affected.

Such problems do not make individual automated offices impractical, inefficient or inadvisable. Word processing, records processing and even electronic mail can be a boon inside most offices. But without a wider communications capability, the full advantages of the electronic future will not be realized.

Conceptually, the simplest resolution to these problems — at least for a single company — is to abandon diversity and impose one, uniform type of equipment as the company standard. The advantages are obvious: One supplier and one service organization may reduce unit costs; employee training is easier; and overall management is more straightforward.

Another Approach

Another approach to coping with diversity is to provide electronic translation between different devices. If the files of one word processor or personal computer can be transferred electronically to another, the unique advantages of each can be preserved, and each has gained in usefulness. Company capabilities are not compromised by this approach, and the costs of translating do not appear to be excessive.

Because there are substantial differences in the way word processors use sequences of characters to establish the format of documents, successful communications demands careful conversion of every character and of every combination of characters so that the displayed document at the receiving end of the communications link will be as close as possible to the original.

Despite the difficulties, products are emerging in the market that successfully translate between different word processors. All are software based, but most are packaged as hardware devices. Typically, they act as a kind of black-box converter between just two units. Since the software resides in a piece of dedicated hardware, flexibility is limited.

Word processing, records processing and even electronic mail can be a boon inside most offices. But without a wider communications capability, the full advantages of the electronic future will not be realized.

A greater drawback of these hardware devices is that they fail to take advantage of the one most powerful OA tool — the mainframe computer. If a company's central computers can become part of the translation process, the full storage and processing capabilities of the mainframes can draw diverse OA functions together into a true companywide document control system (DCS).

Full DCS networks provide:

- Translation among multiple devices and environments.
- Library services, including key word indexing and retrieval and document archiving.
- Electronic mail for documents through multiple-site store-and-forward routing.

DCS networks can add more than document routing and storage. Properly structured, they can increase the capabilities of network components. With appropriate commands added, a lower function word processor can create documents that will print out at a higher function device just as if it had been created using all the capabilities of the second unit.

In advanced DCS networks, the full capabilities of each word processor are shared throughout the network rather than being restricted to one locality.

DCS promises to provide a framework for integrating currently installed WP units and expanding them into multifunction OA systems.

Hamrick is development manager and Fisher is product manager at Integrated Technologies, Inc., an office software developer based in King of Prussia, Pa.
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Every two months, Computerworld OA gives you a detailed, thoughtful look at all the happenings in Office Automation. Each issue examines a particular area of OA, giving you a complete overview of the state of the art in that area and other aspects of OA. Recent issues have examined overall OA planning Strategies, Workstations, OA Software, Personal Computers, and Management Support Systems.

Our newest publication does for communications what OA does for Office Automation. Computerworld on Communications covers the fast-merging worlds of computers and communications with in-depth articles on important trends and current topics. Subjects which have been or are scheduled to be covered in CW on Communications in its two 1983 issues include: Voice and Data Communications, Local Area Networks, Communicating Personal Computers, Local Loops, Convergent Technologies, and Telecommunications Management.

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Fisher's Plans
For Encore
To Preclude 'Nothing'

By Patricia Keeffe
CW Staff

NEW YORK — In a much ballyhooed press conference, Kenneth Fisher, president and co-founder of the newly unveiled Encore Computer Corp., made one thing perfectly clear — Encore isn't precluding anything.

But that was as clear as Fisher and his colleagues got about the specific plans of Encore. They described it as an operating or holding company that will provide marketing, financial and administrative savvy for small high-technology concerns with strong products and weak marketing.

Fisher's enterprise is also aimed at ventures that have failed to devote energy to their "most critical technical challenge" — the development of new products to sustain a company's initial momentum.

In an age of increasingly compact hardware, this full-blown version of a terminal drew its share of comment in La Palma, Calif. The terminal appeared courtesy of Byte Industries, which recently opened its La Palma computer store, the Byte Shop.

Mainframe Software Vendors
Joining Micro Counterparts

By Bob Johnson
CW New York Bureau

NEW YORK — In an effort to grab their share of the burgeoning microcomputer software market for DP, mainframe software vendors are teaming up with microcomputer software companies.

Recently announced agreements between Applied Data Research, Inc. (ADR) and Visi- corp (CW, July 11) and between Computer Associates International, Inc. (CAI) and Information Unlimited Software, Inc. (IUS), for example, indicate that vendors perceive microcomputer software selection as increasingly important to DP executives in large companies.

Encore Computer
Fisher's Plans

By Bob Johnson
CW New York Bureau

NEW YORK — In an effort to preclude 'nothing,' Encore Computer Corp. (CW, July 11) and between Computer Associates International, Inc. (CAI) and Information Unlimited Software, Inc. (IUS), for example, indicate that vendors perceive microcomputer software selection as increasingly important to DP executives in large companies.

What is in store for the DPer who will be doing the procuring? Will the software vendors be "hand-holding" the systems person through the microcomputer software selection process? Does the DPer like the idea of having a single source supplier as opposed to shopping around for microcomputer software?

Targeting these and other questions, Computerworld conducted a telephone survey of vendors and users to gauge what effect this new market will have on the DPer.

Joseph Farrelly, vice-president of technical coordination and product planning for ADR, predicted that the DP manager will view the selection of microcomputer software the way he would view the selection of any other piece of software.

"Microcomputer software will have to stand on its own two feet to impress the (mainframe) DPer."

Earnings Of $119 Million

TI Rocked by Second-Quarter Loss

By Bill Laberis
CW Staff

DALLAS — Its worst fears realized and exceeded, Texas Instruments, Inc. posted a $119 million loss or $4.71 per share in its second quarter, a reflection of stagnant sales in the home computer market.

The company had predicted a $100 million loss in mid-June, an announcement which sent TI's stock into a tailspin that at one point reduced its per-share value to $107 from $158. The difference between the recent quarter's actual results and TI's own predictions may indicate a weaker home market than seen earlier.

Further, the company said that it would face a loss for the year if its home computer sales deteriorate further.

TI's revenues in the quarter were virtually flat at $1.099 billion, compared to $1.092 billion the same quarter a year earlier.

The huge quarterly loss, compared with a profit of $37 million or $2.73 per share the same quarter last year, included a $183 million pre-tax loss from computer operations, mainly from lackluster sales of its 99/4A home computer and associated peripherals and software.

Improving the picture, the company said, overshadowed improvements in other operations which produced a profit if the losses from the consumer products division are cut. In particular, semiconductor sales rose sharply in the quarter, as they did across the semiconductor industry, paced by demand for metallic oxide semiconductor and bipolar integrated circuits.

Production cutbacks in internal requirements for home computer production have been more than offset by gains in the merchant semiconductor market, the company said.

Demand for the company's microcomputer and data terminal products remained sluggish, with shipments running (Continued on Page 56)
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The UCC-20 OS JCL Generator

Now, you can create OS JCL ... automatically. And, UCC-20 — together with UCC-3 — makes the transition to OS even easier. UCC-20 allows you to quickly produce fully functional OS JCL ... without having extensive OS knowledge or training. Plus, your JCL will match your predefined standards. Best of all, UCC-20 automatically handles syntax, keyword, and punctuation requirements — both simple and complex.

The UCC-3 Disk Management System

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Sales Up, Profits Down
Gould, Prime Reflect Mini Mart

ROLLING MEADOWS, Ill. — Continued softness and some price erosion in the minicomputer market were reflected in the quarterly earnings of Gould, Inc. and Prime Computer, Inc., both of which reported increases in quarterly sales and decreases in profit.

Despite slightly increased revenues, profits for the second quarter at Gould declined by 8% to $19 million or $.42 per share, the company reported. Total sales in the quarter rose to $334 million from $328 million the same quarter last year.

Gould's net income for the second quarter was $10.9 million, compared with the same period a year earlier when the company posted a $10.8 million profit. Revenues in the quarter rose 16% to $121 million, up from $105 million.

Commenting on the results, Joseph Henson, Prime's president and chief executive officer, said, "Our failure to achieve planned sales revenue resulted in lower than expected net income... We expect the second half to show improved earnings." Prime was rocked last month by the resignation of several key marketing and sales people who left to join the start-up Encore Computer Corp., headed by Kenneth Fisher, former Prime president.

MSA's '83 Revenues Climb

ATLANTA — Management Science America, Inc. (MSA) revenues for the first six months of 1983 were $56.8 million, up 46% over the same period last year, the company announced last week. Revenues for the second quarter were $36.9 million, a 63% increase over the same quarter last year.

Net income for the second quarter was $3.2 million, or $.18 per share, compared with $1.2 million or $.09 per share last year. The company earned $924,000, or six cents per share for the six-month period, compared to $219,000, or two cents per share for the first half of 1982.

MSA attributed the performance to growth in the mainframe and micro software markets. Revenues for the company's Peachtree Software, Inc. organization, which makes microcomputer software, were up 150% to approximately $9.2 million for the first half. Mainframe sales were up by 45% for the six-month period. However, revenues from manufacturing systems slipped below expectations, the company said.

During the second quarter, MSA acquired a microcomputer data base management system and a series of accounting micro software oriented toward the German market. The company also acquired Computersistics, Inc.'s order processing and accounts receivable mainframe software business.

Apple Boasts 87% Sales Jump

CUPERTINO, Calif. — Apple Computer, Inc. continued to boom along last quarter, posting an 87% increase in sales to $267 million and a 59% increase in profit to $24 million or $.40 per share.

John Scully, company president and chief executive officer, said that accelerated production of the Apple Ile during the quarter ended shortages at the retail level, fattening Apple's bottom line.

Net income did not keep pace with increases in revenues, he said, because of the cost associated with initial shipments of Apple's Lisa business system and the cost of meeting demand for the Ile. Shipment of Lisa, he added, began on schedule in the quarter.

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Harris Airs Plan to Acquire Lanier Business Products

By Bill Labeis

MELBOURNE, Fla. — Two months after dumping its industrial printing equipment business to concentrate on high technology and information processing, Harris Corp. has announced its intended acquisition of Lanier Business Products, Inc. for approximately $400 million. Following the acquisition, Harris said it will effect the transaction via a stock swap, subject to the approval of the shareholders of both companies. The value of the transaction will be based on Harris' closing stock price when a definitive agreement is signed with Lanier. Harris stock traded for each share of Lanier. The deal should be finalized in about four months, Harris said.

Lanier will continue to use its company name, operating as a wholly owned subsidiary of Harris. Gene W. Milner will remain as company chairman and Wesley Cantrell as president of the office automation equipment vendor.

For Harris, the deal may provide the window of opportunity into the lucrative OA market, a window it has tried unsuccessfully to develop in the past.

"They brought together some [Wang Laboratories, Inc.] OIS-related announcements in recent years, but never really went too far with them," said Aaron Goldberg, industry analyst with International Data Corp. in Framingham, Mass. "The Lanier deal will give them much greater penetration into the office than they've had in the past."

Goldberg said, "I'd guess it would certainly be in Harris' interest to try to link the two product lines where ever possible."

Goldberg noted that the OA area is highly competitive, with major players like Wang and Digital Equipment Corp. certain to make life difficult for second-tier companies like Lanier.

Lanier, however, has a solid market presence and recognition. Goldberg added, "So while it won't be an easy battle, it will be one in which Lanier will not be devastated."

Harris, too, has been trying to turn the earnings corner after six consecutive quarters of profit declines. Joseph Boyd, Harris chairman, told security analysts in April that the second half of 1983 would mark the beginning of a period of sustained growth, based on promises of new product offerings, including a word processing system.

Fisher Says Encore's Plans Will Preclude Nothing

(Charles Casale, Encore's vice-president of corporate affairs, said, "We do have other funding sources available to us, but we are really still in the organizational stage.")

Encore’s Lineup

The senior executives of Encore Computer Corp. include:

- Kenneth G. Fisher — chairman, president, chief executive officer
- Henry Burkhardt III — vice-president, corporate development; former co-founder and vice-president of finance and administration of Data General Corp.
- C. Gordon Bell — vice-president, technology; former vice-president, engineering, at Digital Equipment Corp.
- Charles Casale — vice-president, corporate affairs; former independent financial consultant affiliated with Morgan-Kegan and DQ Securities.

Formerly at Prime Computer, Inc., other Encore execs include Robert G. Claussen, vice-president, marketing; formerly vice-president, domestic sales; George H. Dudley, president, sales and service, formerly vice-president, Eastern operations; John D. Ladden, vice-president, controller, formerly vice-president, marketing services; and Eugene Ringstad, vice-president, formerly vice-president, Central operations.

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MINNEAPOLIS — The economy's shifting into second gear was reflected in second-quarter results posted recently by Honeywell, Inc. and Control Data Corp.

Although Honeywell reported a 31% profit decline to $58.7 million from $85.6 million a year earlier, the 1982 profit figure included a $30 million capital gain earned when the company sold its shares of CII-Honeywell Bull of France. Otherwise, earnings would have been up slightly over 1982, a reversal of the trend of consecutive down quarters that has plagued the company.

Revenues for the quarter were up 5.5% to $1.4 billion compared with $1.3 billion last quarter.

Edson Spencer, company chairman and chief executive, said orders from the Information Systems Division over the first six months of 1983 were up slightly, an indication that company growth is not coming from that division just yet.

Strong performances by its information services and products businesses offset a downturn in computerized financial services to give CDC a 13% gain in second quarter profit.

Earnings totaled $38.8 million or $1.01 per share, up from $34 million or $.91 per share a year earlier. Revenues for the quarter rose nearly 8% to $1.14 billion, up from $1.06 billion.

CDC said shipments of computer systems and orders for peripherals were stronger than anticipated, leading the company to predict higher annual earnings. In 1982, CDC earned $135 million on sales of $4.9 billion.

Mainframe Software Firms Join Micro Counterparts

(Continued from Page 49)

The important advantage a mainframe software vendor can offer is its expertise in the event interaction between large and small systems is desired," Farrelly explained.

ADR, he claimed, has studied the micro-mainframe relationship for over 18 months and has learned that users interested in microcomputers for their shops are looking to the company for direction.

"The use of personal computers and personal computer software is new to DP managers. They appear to appreciate help in selection," Farrelly noted.

He added, "ADR will offer its usual start-up services for the micro software as it has done for mainframe software."

Agreeing with Farrelly's position on how the DPer will select microcomputer software was David Troy, senior vice-president of planning for CAI.

Troy said that the DPer is really still faced with the same type of decisions in selecting microcomputer software as he is with selecting systems software. He noted that the differences in hardware are "almost indistinct," and the only real consideration is finding solutions to DP problems.

"For example, it's not important whether you are dealing with a micro network or a mainframe network. The problem is getting the two to interact.

"A link without the knowledge of the processing function is no more than a data transfer function — there's duplication of data at both ends. What DPers are going to need is software capable of achieving these types of things — providing solutions. Does he want interactive terminals or total central DPer control?" Troy commented.

Favorable Reaction

Users contacted also thought favorably of the marriage of system houses to microcomputer firms. Jack Klein, manager of DP for ABC Liquors of Orlando, Fla., said that although his shop is now only using a few IBM Personal Computers, there will "eventually be a lot of good" coming out of the mergers.

"Anytime there is a chance to pass meaningful data to pertinent parties, whether it be microcomputer to mainframe or whatever, positive results will be realized. The medium isn't important. If DPers can learn how to better merge software through these companies' joint efforts, the better it will be," Klein said.

Another user, Kevin O'Neill, operations manager for the Bank of New York, said he prefers a software company he is "used to" to introduce him to microcomputer software. He said sometimes it is difficult enough dealing with the systems software already in-house.

Vendors that know large systems together with microcomputer vendors are a "hard-to-beat combination," he concluded.
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AT&T Quarterly Profits
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NEW YORK — AT&T posted an 11% gain in quarterly profit, reporting earnings of $1.94 billion or $2.03 per share compared with a profit of $1.75 billion or $2.04 per share in the second quarter last year. The per-share drop reflected an increase in common stock outstanding, which diluted the value of remaining shares.

Revenues in the period rose more than 8% to $17.4 billion from $16 billion a year earlier. AT&T said the figures included a $96.5 million extraordinary charge to account for a consolidation of its Western Electric distribution and repair operations. This was more than offset by the restoration of $217 million in its Pacific Telephone & Telegraph unit's back-tax liability.

As a result of that consolidation, about 830 jobs will be affected, with some eliminated, the company said. Commenting on the quarterly results, Charles L. Broan, company chairman, said AT&T will face some difficult years as a result of the court-mandated divestiture of the company.

IBM Japan Signs Joint Agreement With Two Firms

TOKYO — IBM Japan, an IBM subsidiary, has agreed in principle with two Japanese companies to form a joint venture to develop and market products and services. Mitsubishi Corp. and Cosmo 80 Corp. recently signed an agreement with IBM Japan to develop computer software and services for customers to help them develop applications using Nippon Telephone and Telegraph's futuristic Information Network System (INS).

The joint venture company will also start a school to train information processing professionals, according to an IBM spokesman. The $4.2 million training venture will be 34% owned by IBM and Cosmo each and 32% owned by Mitsubishi, it was reported by Kyodo, the Japanese news service. The marketing venture, to be capitalized at $800,000, will be owned 45% each by IBM and Mitsubishi and 10% by Cosmo, Kyodo reported.

Details regarding the formation of the joint venture are currently under discussion among the three companies, according to the IBM spokesman.

TI Realizes Loss Of $119 Million

(Continued from Page 49)

“slightly ahead” of those a year ago, TI said. Order levels in this segment were flat compared to the first quarter, “reflecting continuing softness in the 16-bit minicomputer market,” the company reported.

As a result of the financial turmoil at TI, William Turner resigned 10 days ago as president of the company’s consumer electronics group. Turner has since taken a job with Automatic Data Processing, Inc. as president of its banking services group.

Turner had pioneered efforts to mass market the 99/4A in large retail outlets. Turner was succeeded by Jerry R. Junkins.
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PENnet networking enables you to connect with packet switched networks which would allow you to distribute your workload worldwide. To learn more about how our PENnet communications software can increase the productivity of your corporate empire, call or write for our brochure. Perkin-Elmer, Oceanport, NJ 07757. Tel. 800-632-2154. In NJ, 201-870-4712.

PERKIN-ELMER
A scholarship valued at up to $5,000 is being offered by International Computer Programs, Inc. (ICP) for students enrolled in a computer science or computer technology program in a four-year college or university. To qualify for the 1984-85 award, a full-time student must be a sophomore or junior who is maintaining a "B" average and is in need of financial assistance. Details can be obtained from Ellen A. Brown, Scholarship Coordinator, ICP, 9000 Keystone Crossing, Indianapolis, Ind. 46240.

Harry J. Gray, chairman and chief executive officer of United Technologies Corp., has been elected chairman of a group of industry, academic and government leaders working to establish the National Science Center for Communications and Electronics.

General Electric Information Services Co. will offer its Mark III service teleprocessing network clients a specialized version of Execuware's Execuclub, a service that allows customers to sample and purchase software packages designed by Execuware for executives with little or no computer experience. Execuware is a division of Aercona, Inc.

Online Computer Library Center (OCLC) and Information Access Co. (IAC) have announced a joint agreement to establish an overnight electronic document delivery system using IAC's full-text data base and the OCLC Interlibrary Loan subsystem and telecommunication structures.

Executive Corner

- Michael J. Long has been appointed president, chief executive officer and director of Advanced Electronics Design, Inc. Company founder and former President Thomas S. Sacco continues as chairman of the board.
- John C.W. Taylor has been elected president and chief operating officer of General Datcomm Industries, Inc.
- Mark S. Levitan has been appointed president and chief operating officer at Shared Medical Systems, Inc.
- C.J. Stoll has been named president and chief executive officer of Intelligent Systems, Inc.
- Jacques G. Maisonneuve, IBM senior vice-president, has been elected to the Board of Directors of IBM, and Donato A. Evangelista, deputy general counsel, has been elected an IBM vice-president.
- James R. Oyler has been promoted to vice-president, marketing, of Harris Corp.'s Information Systems Sector.
- Michael Gallup has been appointed vice-president, product marketing, for Datapoint Corp.
- Marcelo A. Gumucio has been named executive vice-president, marketing, for Cray Research, Inc.
- John Bartell has been promoted to senior vice-president of administration at Information Industries, Inc.
- William Levin has been appointed vice-president, program management, and Jim Rowsey, vice-president, finance, at Pertec Peripherals Corp.
- Frank S. Madren has joined Pyramid Technology as vice-president of marketing.
- Gerard Lacourly has joined Cisinet Corp. as a senior vice-president.
DIRECTOR OF HOSPITAL INFORMATION SERVICES

The Palm Beaches Beckon...

We're JFK MEMORIAL, a rapidly growing hospital with an ideal location in Florida's popular Palm Beaches. Our current need is for a progressive, people-oriented professional capable of assuming total responsibility for all information services-related hardware, software, budget and staffing decisions.

Along with possessing strong data base design skills, DL 1 programming knowledge and CICS programming experience, the individual we seek will be well-versed in short and long-range systems planning. We also require a Bachelor's of Science degree with advanced course work in computer science and a minimum of 3-4 years management or supervisory experience.

The ideal applicant will have a health care background, including knowledge of the special problems and system needs of all functional health care departments.

As a pivotal member of JFK's management staff, you'll enjoy maximum accountability, a generous salary/benefits package and, of course, one of the country's most exciting areas.

For confidential consideration, call collect (305) 433-3678 or send resume to Barry Duke, Assistant Director of Personnel.

John F. Kennedy Memorial Hospital
P.O. Box 1489, Lake Worth, FL 33460

An Equal Opportunity Employer M/F

Software Development Engineer

The Challenge

General Electric's Research and Development Center has openings for experienced software engineers in its Information System Application Services. They will develop standards and guidelines for software engineering and management and software tools for an automated software development environment.

The Environment

The R&D Center—one of the world's leading laboratories linking basic research to applications—provides a challenging work environment in the software development area:

- Distributed VAX 11's running VMS and UNIX
- Embedded systems and engineering work stations
- Real-time microprocessor systems
- Rich language capabilities including C, Lisp, Pascal, Ada

Candidate Profile

Education: MS or PhD in Computer Science/Engineering. Experience in one or more of the following:

- VAX-VMS and UNIX
- IBM-VM
- Software engineering principles
- Software development environments

Other Opportunities

Several attractive openings also exist for:

- Information Systems Engineer
- Computer Graphics Engineer

Contact

Investigate excellent salaries, benefits and growth prospects by sending your confidential resume to Mr. Neff T. Dietrich, University Relations and Recruiting, Ref. 48P, General Electric Research and Development Center, P.O. Box 8, Schenectady, New York 12301. Only U.S. Citizens or holders of U.S. Permanent Resident Visas will be considered.

The future is working at General Electric.

GENERAL Electric

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Look to the FUTURE!

SEI’s role and reputation continue to grow as one of the nation’s leading project-oriented, high technology consulting organizations. SEI consultant teams skills are in demand to specify and construct sophisticated systems and applications across the country.

SEI looks to the future with a variety of new, challenging, large-scale system development efforts. New SEI projects include industrial automation, advanced microprocessor systems, and support for the emerging cellular telephone industry. These projects, now getting under way, offer you an unparalleled opportunity to be involved in major applications and internals efforts from the ground up.

SEI is seeking first-rate professionals — leaders and technical experts — who also look to the future: Eager to learn, ready to work hard, serious about their careers, interested in the variety and challenge of consulting.

Look to YOUR Future!

DEVELOPMENT MANAGERS
$46,000-$79,000
Direct the planning, staffing, construction of major mainframe and microprocessor-based development efforts. Use your data processing skills to apply the technology well. Use your management skills to direct multi-team development projects.

Qualifications:
- Outstanding technical and leadership skills
- Familiarity with System Development and Project Control methods
- Strong background in microprocessor technology or IBM mainframes
- Minimum 8 years relevant experience

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APPLICATION DEVELOPERS
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Get in on the ground floor of development for a major new support system for the communications industry — Worldwide, Networked, Online — One of the genuinely significant development projects of the 1980s. Help define the state of the art!

Qualifications:
- Working knowledge of Structured Analysis and Design
- Familiarity with large scale IBM environments and software: VM/CMS, CICS, IMS, VSAM
- Minimum 6 years solid, real-world development experience
- Experience with FOCUS a plus

Positions in Chicago and Phoenix

TECHNICAL WRITERS
$31,000-$56,000
At SEI, Technical Writers are contributing consultants, not just editors of other people’s drafts. SEI Technical Writers participate in all aspects of major development projects, studies, proposals, document preparation, quality assurance.

Qualifications:
- Outstanding writing and editing credentials
- Minimum 4 years experience in programming, system analysis, and design
- Exceptional good sense and broad perspective on EDP
- College level teaching experience a plus

Positions in Chicago, New York, and Phoenix

BUSINESS ANALYSTS
$38,000-$61,000
Your job? Determine what systems are actually supposed to DO! Perform requirements analyses, cost-benefit studies, preliminary system design. Interact directly with top client personnel. Provide ongoing user advocacy and direction to development projects.

Qualifications:
- Broad technical skills, including a minimum 4 years experience in programming, system design, and analysis
- Working knowledge of Structured Analysis and Design
- Ability to communicate effectively with a wide range of business and technical people
- Writing/teaching experience a plus

Positions in Chicago, Los Angeles, New York, Phoenix, and San Francisco

MICROPROCESSOR SOFTWARE EXPERTS
$38,000-$78,000
SEI micro projects are major systems. Participate in the development of leading edge microprocessor-based products. Help establish development environments. Port and tailor software, contribute to the development of firmware and hardware.

Qualifications:
- Working knowledge of micro-based operating systems, compilers, communications, I/O drivers, Local Area Networks, and software products
- Demonstrated skills in large-scale software development
- Minimum 6 years experience
- Experience with UNIX and 68000 a plus

Positions in Chicago, Los Angeles, Phoenix, and San Francisco

IBM SYSTEM INTERNALS EXPERTS
$46,000-$78,000
Construct and enhance development and production environments. Participate in custom tailoring, installation, troubleshooting, performance evaluation and tuning, capacity/configuration analysis and planning for systems and communications.

Qualifications:
- In-depth knowledge of IBM mainstream products including: CICS, IMS DB/DC, VM/CMS, OS/MVS, SNA/ACF/NCP/VTAM
- Outstanding assembly language programming skills
- Understanding of the interaction between systems and applications
- Minimum 6 years experience

Positions in Chicago and Phoenix

SEI offers top salaries, an imaginative personalized benefits package, unlimited opportunity for growth, and the challenge of working alongside other SEI consultants — the best in the business.

For confidential consideration, send detailed resume:

For Chicago, to: Lonna L. Schroeder SEI Information Technology 450 East Ohio Street Chicago, IL 60611

For Los Angeles, to: Kathleen Radner SEI Information Technology Suite 600 5455 Wilshire Blvd. Los Angeles, CA 90036

For New York, to: Gane H. Gessert SEI Information Technology Suite 1700 122 East 42nd Street New York, NY 10168

For Phoenix, to: Richard E. Shuman SEI Information Technology 313 East Thomas Road Phoenix, AZ 85012

For San Francisco, to: Steven J. Drach SEI Information Technology 1790 Montgomery Street San Francisco, CA 94111

SEI is an Equal Opportunity Employer M/F.
MARKETING SUPPORT REPRESENTATIVES

These key positions, based in Edison, New Jersey, require extensive systems level experience with IBM-based DB/DC software in an on-line environment. A solid grounding in operating systems is essential. Superior communication and people skills are a must. Vendor experience in supporting technical sales is a definite plus.

We are looking for individuals to share in our commitment to quality. Professionals who want to be in the forefront, meeting the increasingly pressing software needs of data management, top management decision support, personal computers, and new horizons.

Additional opportunities for Marketing Support Representatives are available nationwide.

If you're excited by and ready to meet the challenge of advancing technology, then the fast pace of Cullinet may be right for you! Send your resume, in confidence, including salary history and requirements, to:

John Williams, Cullinet Software, Dept. CWEB, Metro Park B, 499 Thoman Street, Edison, NJ 08837.

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The answer is software. And software is Cullinet.
How Can You Get to the Top and Earn More on Your Way Up?

Easy Reading. This easy-to-read, 24-page report covers such important topics as:

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IMS DB/DC
SOFTWARE ENGINEERS
PROJECT LEADERS
SYSTEM PROGRAMMERS
SYSTEM ANALYSTS
PROGRAMMER ANALYSTS

And if New England's not your cup of tea, we offer openings across the country through our affiliation with National Personnel Consultants, Inc. (NPC). National companies pay all fees, interview and relocation expenses.

Send resume or call Mitch Price toll free 1-800-628-3374. In Massachusetts call (collect) 413-781-0982.

DIRECTORY OF COMPUTER SERVICES
Central Washington University, Ellensburg, WA. The Computer Center provides services to instructional, research, and administrative users throughout the campus. The Director is responsible for the management of all resources, services, and personnel of the Computer Center. Candidate should have Bachelor's degree, appropriate technical knowledge, and successful management experience. Salary will depend on qualifications and experience.

Please forward letter of application, resume, and give three professional references by September 16, 1983, closing date to Chair, Director of Computer Services Search Committee, c/o Vice President for Business and Financial Affairs, Mitchell Hall, Central Washington University, Ellensburg, WA 98926. Responsibilities include Development and Assignment of Computer Opportunities/Alumni Advisor.

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Systematics, Inc. was founded in 1980 and serves over 700 clients. We continue to reflect the growth of the software industry as a leader in planning, designing, developing, implementing and supporting software systems for companies of all sizes.

Due to our continuing expansion we are seeking additional software professionals to fill positions in the Florida and Ohio areas. Applicants should be experienced in the following skills:

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- COBOL
- ASSEMBLY PROGRAMMING
- UNIVERSAL LIFE APPLICATIONS
- ATM GET APP
- TANDEM

As a software professional with Systematics you will have the chance to participate in a wide variety of challenging and diversified assignments. You will gain new skills and experience in a dynamic environment. If you are interested in a career which will enhance your professional development, call or write today.

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MIS PROFESSIONALS
The Spirit of Innovation...

...At Harris Semiconductor Sector signifies extraordinary challenge and superior reward.

Harris Semiconductor's MIS Center supports the dynamic business and manufacturing operations of one of the country's 10 largest IC producers. Our MIS team responds to challenges generated by a continually growing product line. As a sector of the Fourth 200 Harris Semiconductor, we acknowledge our team's success with top salaries and benefits that rank among the industry's best.

Our environment utilizes the IBM 3081 and 4341 hardware with MVS, VM, COBOL, CICS, FOCUS, IDMS and TSO software which services a worldwide communications network. These openings reflect long-range career potential and professional fulfillment.

APPLICATION PROGRAMMER ANALYSTS
Responsibilities encompass analysis, design, programming and implementation of business and manufacturing systems. A BS in Computer Science or Math plus 2-4 years programming experience in a large-scale IBM environment and familiarity with data base management systems are required.

MIS APPLICATIONS DEVELOPMENT MANAGER
For major on-line projects, we seek a take-charge professional whose effective interpersonal skills and experience demonstrate success in directing a DP team. Appropriate BS degree. 5 plus years of MIS and proficiency in project tracking techniques as well as familiarity with CICS and IDMS systems and PRDCE are required.

DATA COMMUNICATIONS ENGINEER
Will design, implement and provide the technical support for our campus-wide local area network as well as serve as an internal expert on local area network and microwave service for data and voice telecommunications. Knowledge of IBM 3270 technology, SNA and non SNA protocols and complete familiarity with telecommunications access methods and local area network technology are required. A Technical BS degree and 5 years plus experience required.

Burroughs Corporation, Professional Staffing, Dept. CW-0801, 5600 Avenida Encinas, Carlsbad, California 92008.

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- Graphics
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LINE C, PASCAL, DECO/11, REALTIME,
SIOV, 8086, 8088, VAX, RSX-11, DEC/8490.
For you to assume full responsibility for the development and implementation of our software. Knowledge of computer science is essential. BS degree in Computer Science required. Send resume to Frank Grimone, Executive Vice President.

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SIOV, 8086, 8088, VAX, RSX-11, DEC/8490.
For you to assume full responsibility for the development and implementation of our software. Knowledge of computer science is essential. BS degree in Computer Science required. Send resume to Frank Grimone, Executive Vice President.
New Data Processing Opportunities

Pacific Telecom's aggressive diversification into new markets and strong traditional bases of operation in telecommun.unications have created a wide range of new employment opportunities in in-house and external formation Services. Our new facility in the greater Portland, Oregon, metropolitan area, the company is committed to keeping pace with technological advancement.

If you have experience supporting financial, engineering, or telephone industry specific applications, the following openings exist for Systems Analysts at least 5 years of increasingly responsible exp. in systems development and excellent communications skills are required. Prior project leadership is preferred. College degree in computer science helpful.

Systems Analysts

At least 5 years of increasingly responsible exp. in systems development using structured techniques is required. A large scale IBM or VAX exp. is preferred.

Programmer Analysts

A minimum of 3 years exp. in systems development using structured techniques is required. A large scale IBM or VAX exp. is preferred.

Systems Programmers

Must have experience with DEC VAX. High level language programming, telecommunications networking, computer science degree desired.

Outstanding salaries and benefits include: Incomplete benefits available. Qualified applicants please send resume with salary history to Ellen Bombalski, PACIFIC TELECOM, INC., P.O. Box 9901, Vancouver, WA 98668-9901. We are an equal opportunity employer. Individuals with disabilities are encouraged to apply.

PACIFIC TELECOM

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Going Beyond The Boundaries Of Ordinary Growth.

Sure, a lot of DP professional service companies talk about their growth. And their innovations. And their so-called "unique opportunities". But the fact is, only General Electric Professional Services Company can truly offer what most professional service companies can't.

FACT #1 — LTI Consulting Services Corporation (LTI), and the Systems Development and Consulting Operation (SDC) of General Electric Information Services Company have recently integrated to form General Electric Professional Services Company. Both LTI and SDC have experienced growth that is double the professional services industry average. That's not a coincidence.

FACT #2 — Our consulting innovations and professional resources have helped us amass over 400 major clients around the world. Clients that depend on our definitive solutions to every imaginable EDP problem.

FACT #3 — We offer Programmers and Programmer/Analysts with 2+ years experience in one or more of the environments listed below the opportunity to become absorbed in such a varied selection of applications and environments, that professional enhancement and career growth is the norm. Not the exception.

- COBOL, TSO/SPF, VSAM
- PL/1 IMS
- COBOL IMS DB or DB/DC
- MODEL 204
- FOCUS

If you're a data processing professional who's been waiting for the right opportunity to make a positive career move, and you've got the skills and desire to join the elite professional services firm of the 80's, seriously consider General Electric Professional Services Company.

Our salaries and benefits are competitive, our challenges endless. Opportunities exist in the Metropolitan area and other locations throughout the country.

Please call Cheryl M. New, Personnel Manager collect at (201) 457-0200, or send your resume in complete confidence to her attention: General Electric Professional Services Company, 45 Knightsbridge Road, Piscataway, NJ 08854.

TELECOMMUNICATIONS ANALYST

Provide technical guidance pertaining to functional, technical, and operational aspects of telecommunications systems. Includes responsibility for evaluation and development of major telecommunications software system. Develop specifications for data communications systems plus testing and evaluation of results.

Qualifications are a minimum of two to three years experience with DSU, VTAM and IMS under an IBM MVS operating system. College degree preferred.

Competitive compensation and state-of-the-art benefits program. If interested, please reply by confidential resume, including salary history, to Mr. J.T. Pascarella.

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SALESPERSON

DATA GENERAL EXPERIENCE ONLY

Immediate opening in the Detroit area for a proven salesperson. Skilled at selling to an individual with a minimum of two years Data General experience. Opportunity is a leader in Second Source market and can offer:

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Please send resume for an interview. NO PHONE CALLS PLEASE!

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Baltimore, MD 21205

IBM ASSEMBLER PROGRAMMERS

We have programmer/analyst positions available in Denver. If you have a minimum of two years in-depth work experience as an assembler language programmer on a large IBM mainframe, we have opportunities on our development staff. TSO experience is desired. Salary commensurate with experience.

You may call Sheila Bellantoni collect on (303) 896-7417 to explore your experience with our needs, or forward your resume and salary history to:

Mountain Bell
Management Employment
1125-17th Street, Denver, CO 80201
Attention: Sheila Bellantoni
(No Agencies please)

IBM 
ASSEMBLER
PROGRAMMERS
SOFTWARE ENGINEERS

Experience with UNIX implementation or peripheral driver experience is required. Knowledge of C and assembly languages preferred.

COMMUNICATION ENGINEERS

We have immediate openings for Engineers with communications experience including TCP/IP, 2750, 7750, SNA/IDLC, LAN and X.25. Responsibilities include the definition and implementation of communications systems for a multi-user microprocessor based intelligent terminal.

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We have an immediate opening for an individual to lead the development of software/hardware systems test environments for our intelligent systems product line.

requires a BS/MS/PhD or equivalent plus minimum four years experience in software test and customer support with C language and assembly language development. Experience should have the following:

Location: Tempe, Arizona

QUALIFICATIONS:

Required: Bachelor's Degree in Computer Science or Information Systems.

UNIVERSITY OF COLORADO AT BOULDER

Computer Science and Information Systems.

COMPUTER SCIENCE: The Regis College campus in Colorado Springs is currently seeking qualified candidates to fill a position in Computer Science.

Requirements: Master's degree with a Ph.D. in Computer Science or closely related field.

The successful candidate must have three or more years of experience in teaching systems, data base management, decision support systems, software engineering, computer security, and computer organization.

Salary: Competitive, plus 3-5 years programming/systems experience. The position requires a Ph.D. in Computer Science, Information Systems or related field.

Resumes must be received by August 15. Equal opportunity employer M/F/D/V.

Computerworld August 1, 1983

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CPI (714) 881-UNIX* Openings for professionals: United States, France, Great Britain, Japan; in all categories of the firm. To C.P.I., 501 W. 7th Street, 2nd Floor, Los Angeles, California 90014. (714) 881-UNIX* Openings for professionals: United States, France, Great Britain, Japan; in all categories of the firm. To C.P.I., 501 W. 7th Street, 2nd Floor, Los Angeles, California 90014.
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Computer Sciences Corporation is the world’s largest information services company, growing at a rate of 25% annually. With our Defense Systems Division, you’ll design and develop the most advanced tactical and strategic command and control systems. Computer Professionals who would like to help create the world’s best systems should consider the company that offers the best possible careers - CSC. You’ll find careers to match our challenging projects and sophisticated technology. Excellent compensation. Rapid advancement potential — part of a formal career development program. Depending upon your experience and area of interest, you can choose to participate in a variety of sophisticated projects including:

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- Military Communications
- Wargaming
- Electronic Warfare
- Navy Weapon Systems

For immediate and confidential consideration, please forward your resume with salary history/requirements, indicating geographic preference to:

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CSC
COMPUTER SCIENCES CORPORATION

DATA PROCESSING PROFESSIONALS

Air Products and Chemicals, Inc., is an international Fortune 250 firm located in an attractive suburban area of Eastern Pennsylvania. Our diversified operations are in industrial gases, chemicals, process equipment and engineering services. We are seeking qualified candidates for our Management Information Services staff.

DATA RESOURCES MANAGEMENT

Responsibilities include working with application project teams to design and implement multi-user, shared data bases and to be department expert and data base technologies and theories. Requirements include 6-10 years data processing experience with 2-4 years in data base administration and a BS degree in Computer Science. Math or Business IDMS experience preferred. MIS acceptable.

TECHNICAL SUPPORT

Responsible to install, support and maintain computer system software for company’s mainframe computer and to provide technical consultation to other MIS areas. Requirements include 2-4 years experience with IBM basic ASSEMBLER language, experience in the maintenance of system software packages and a BS degree in Computer Science, Math or Business. Experience in OS/VS/VTAM environment or knowledge of time-sharing concepts a plus. Compensation commensurate with experience. Excellent benefits and superior relocation package. Send resume with salary history to:

Russell D. Trinter
Corporate Staffing & Development
AIR PRODUCTS AND CHEMICALS, INC.
P.O. Box 538, Allentown, PA 18105

An Equal Opportunity Employer M/F

Application Development Consultant

Our client, a major Midwest-based, multi-divisional corporation has a large, sophisticated commercial computing center at corporate headquarters. They seek a consultant to evaluate, implement and train others in the use of software products which will improve programmer and end-user productivity.

If you have:

- In-depth knowledge of both Systems and Applications Software
- Outstanding analytical skills
- 3-5 years’ experience as an Application Development Programmer
- Background as a Systems Programmer
- Excellent oral/written communications skills
- Experience in Database Design and Fourth Generation Technologies

we would like to review your background and career goals. This client offers excellent advancement opportunities, generous compensation, and a remarkable relocation assistance program. For prompt, confidential consideration, please send your detailed resume to:

CW-84217, COMPUTERWORLD
Box 880, Framingham, MA 01701
An Equal Opportunity Employer M/F/H/V
COMPUTER PROFESSIONALS

Sigmacon, a division of the General Mills Restaurant Group, has career opportunities in our Data Center. Our environment includes an IBM 4341 mainframe using MVS, CICS, TSO and Advanced Telecommunications Network. The Center provides MVS for four divisions of the General Mills Restaurant Group. Current openings include

SYSTEMS PROGRAMMER

This individual will be responsible for installation, maintenance and performance tuning of IBM operating system software. Successful candidates will have 2-4 years systems programming experience, 2 years of which have been spent in an MVS JES2 environment.

PROGRAMMER/ANALYST

This individual will work closely with our financial user divisions. Successful applicants will be proficient in COBOL programming with knowledge of IBM JCL, VSAM, CICS and TSO/SPF. He/She will possess a 4 year degree or equivalent experience plus 2-4 years of current data processing experience.

Sigmacon offers an excellent salary and benefits package, as well as outstanding growth opportunities. If you are interested and qualified, please submit resume in confidence to our Personnel Department at:

SIGMACON
8100 Presidents Dr.
Orlando, FL 32803
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CONSULTANT

World leader in offshore engineering and construction has an opening for a technical consultant. Our consultants advise nearly 40 data centers worldwide in hardware planning and systems software acquisition.

This position offers high visibility, extensive travel and the opportunity to remain current with a wide variety of data processing issues. Candidates must be technically oriented, have a minimum of 5 years experience in systems programming with MVS, OS/VS and/or VM. Experience in performance tuning and capacity management are highly desirable. Excellent oral and written communication skills are also necessary.

We offer a comprehensive benefits package and relocation assistance to the Gulf South. Send resume and salary requirements in strict confidence to:

Reply to CW-B4227
Computerworld
One Market Plaza, Spear Tower, Suite #2014C
San Francisco, CA 94105 © (415) 777-3900

DIRECTOR

Administrative Computing Services

Bryn Mawr College invites applications and nominations for the position of Director of Administrative Computing Services. Major responsibilities include administration of data processing systems in cooperation with user offices, budget preparation and control, analysis and selection of computer hardware and software, systems programming and evaluation, and direction of software maintenance and evaluation (PRIME/AIMS), and direction of administrative computing services staff. The Director reports to the College's chief financial officer.

Requirements: College degree; eight years of experience in data processing, including work in a college or university setting and proven managerial ability. Salary commensurate with experience.

Send resume and names of three references by Aug. 22, 1983 to:

Personnel Services
Bryn Mawr College
Bryn Mawr, PA 19010

Bryn Mawr College is an Affirmative Action, Equal Opportunity Employer

SOFTWARE ENGINEER

The PGA TOUR is seeking a golf enthusiast with 2-5 years experience with the following specific hardware and software skills:

- PDP 11/23
- DEC 11M Operating System
- Macro 11 Assembly Language

For program development and maintenance for the electronic scoreboards used at professional golf tournaments.

Send resume with salary history in confidence to:

Art West
PGA Tour
c/o Bagwells
Ponte Vedra Beach, FL 32082

COMPUTER SCIENCE/ DATA PROCESSING

Applications and recommendations are solicited for several full-time faculty positions available on or before August, 1983. Applications will be accepted until the positions are filled. To ensure further consideration, applications must be submitted by August 1, 1983.

Minimum Qualifications Include:
1. A Ph.D. or an equivalent degree in a relevant discipline.
2. Experience teaching courses in at least two college-level computer science courses.
3. Experience in the subject area.

Send resume and qualifications to:

Chair, Computer Science Department
Bryn Mawr College
Bryn Mawr, PA 19010

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KENTUCKY STATE UNIVERSITY
Faculty Positions

COMPUTER SCIENCE/ DATA PROCESSING

Applications and recommendations are solicited for several full-time faculty positions available on or before August, 1983. Applications will be accepted until the positions are filled. To ensure further consideration, applications must be submitted by August 1, 1983.

Minimum Qualifications Include:
1. A Ph.D. or an equivalent degree in a relevant discipline.
2. Experience teaching courses in at least two college-level computer science courses.
3. Experience in the subject area.

Send resume and qualifications to:

Chair, Computer Science Department
Kentucky State University
Frankfort, Kentucky 40601

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IDMS Project Leader
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Memorex offers a competitive compensation package including outstanding benefits and excellent advancement opportunities. If you’re ready to join the New Breed, please send your resume to Joyce Cordi, Memorex Corporation, 14-10, San Tomas at Central Expressway, Santa Clara, CA 95052. An equal opportunity employer, m/f/hv.

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We’re looking for someone who is ready to take responsibility for:
- Large-scale multiprocessor configuration design
- Mainframe/peripheral equipment evaluation
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The ideal candidate will have:
- 3-5 years’ in-depth experience as a Systems Programmer in Commercial Computing
- Strength in MVS internals
- Experience in configuration planning
- BS degree in relevant, technical discipline
- Education/experience in Economic Analysis would be a big plus

A generous all inclusive compensation plan with comprehensive benefits and relocation assistance accompanies this position. For prompt, confidential consideration, please send your detailed resume to:

CW-B4218, COMPUTERWORLD
Rev 88, Framingham, MA 01701

An Equal Opportunity Employee M/F/H/V

NATIONAL UNIVERSITY
OF SINGAPORE

INSTITUTE OF SYSTEMS SCIENCE

Applications are invited for appointments as Teaching Associates and Senior Teaching Associates at the Institute of Systems Science.

THE INSTITUTE:
The Institute of Systems Science provides leadership for public and private sector computerization in the ASEAN region through innovative programmes embracing quality management education, advanced technical training, consulting service and applied research in information systems. Established in 1981 by the Singapore government, it is a key resource to aid in the computerization efforts of the public and private sectors in the region, to help in the development of Singapore as a regional centre for computer software development and services, and to ensure that Singapore has expertise at the upper end of computer technology. The Institute will be moving into a new S$18 million building expressly designed to be the finest computer education facility in the Western Pacific rim.

THE STAFF:
The Institute staff comprises the strongest group of experienced information systems professionals in the region. Rapid growth in our workload creates openings for practitioners with specific skills and a strong interest in teaching.

THE WORK:
You will be developing and teaching in short courses aimed at upgrading the skills of information systems managers, information systems professionals and users, plus a Systems Analysis course at the graduate level. You will also be involved in training, consulting and applied research in such areas as systems analysis and design, data base management, software engineering, data communications, computer networks, office automation and information systems management.

COMPENSATION:
Gross annual salaries range from:
S$54,000 to S$102,000 (US $1.00=S$2.13 approximately)

You will be provided with benefits under the University’s Academic Staff Provident Fund Scheme; under the Scheme you will contribute 23% or your salary subject to a maximum of S$690 p.m. to the Fund, and the University will contribute 22% or your monthly salary. The sum standing to your credit in the Fund, which is tax free, may be withdrawn when you leave Singapore and Malaysia permanently. Other benefits include medical and leave benefits, passage assistance and baggage allowance, a settling-in allowance, an education allowance with respect to your children’s education and heavily subsidized housing.

Application forms and further information on conditions of service may be obtained from:

Mr. Peter Lim, Director
North America Office
NATIONAL UNIVERSITY OF SINGAPORE
61 West 62nd Street...Suite 4-J
New York, New York 10023, U.S.A.
(212) 765-1670

OR: THE DIRECTOR
Personnel Department
NATIONAL UNIVERSITY OF SINGAPORE
Kent Ridge, Singapore 0511
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Placing Systems Analyst and Programmers
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CONTACT
Larry Masters or Stanley Buck
704-375-4000

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Charlotte, N.C. 28281
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OF course... all fees paid by client co.

DIRECTOR
Cooperative Computer Center
Located in Suburban Chicago. The Cooperative Computer Center serves the administrative and academic computing needs of three state universities, Governor State University, Governor of Illinois University, and North Eastern Illinois University. Departments include a staff of 75, an IBM 4341 group II computer supporting several RL 420 Data Base Management Systems, and CICS/VS. A new and large IBM 9606 computer system from Westinghouse Information Services is currently being implemented.

The Director is responsible for all administrative and some academic computing, developing long-range ADP plans, preparing operating budgets, recruiting staff, and insuring that the University receives timely and accurate management information.

Minimum academic qualification is a Bachelor Degree, an advanced degree in Business Administration or a related field is preferred. In addition, candidates should possess significant technical and administrative experience related to the management of an administrative computer center.

Candidates must be able to establish effective working relationships with senior executives and technical personnel, and be capable of the varying information needs and political considerations within a university cooperative. Starting annual salary will be competitive, depending upon experience. Send resume and references by August 15, 1983 to:

Dr. Donald E. Walters
Chairman, CCC Director Search Committee
FOX-MORRIS Personnel Consultants
Board of Governors of State Colleges and Universities
North America Office
2440 Peachtree Road
Springfield, IL 62718

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Texas Instruments has immediate openings for senior and intermediate level software professionals in Dallas. Working with our Information Systems and Services Group, you'll be involved in the support of our IMS systems worldwide.

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- Background must also include assembly language programming

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**NEW START-UP OPPORTUNITIES**
For Assembler specialists in the implementation of programs and systems analysts. Our programs are designed to implement online financial systems. COBOL
- Must have 3 years experience in COBOL plus a Bachelor's Degree or an equivalent. Call listed or submit resume to:
- SUPERIOR RESOURCES
  - Personnel Director - Professional Services
  - 17141 Ventura Blvd, #200
  - Tarzana, CA 91356
  - (818) 988-4500
  - Nember National Computer Assoc.

**ALASKA SYSTEM PROGRAMMERS**
Join a rapidly growing Anchorage EDP group if you have:
- **MVS Operating System**
- **DASD**
- **System Tuning & Monitoring**
- **COBOL/370**
- Contact:
  - JIM MORRIS
  - (206) 453-2700
  - Houser, Martin, Morris & Assoc.
  - Bldg 100, 1740 116th Ave., N.E.
  - Bellevue, WA 98004

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**Attention**
APPLICATION DEVELOPMENT PROFESSIONALS
If you are challenged by your current working environment? If not, there is an abundance of opportunity and challenge in Baltimore, MD; Centrail PA; Washington, DC; and State College, PA. The opportunity is working with a Fortune 1000 account. Comp-u-Staff is a growing, professional services company that offers high salaries, performance bonuses, excellent benefits, expense accounts and training programs. If you would like to relocate and have four or more years development experience using
- IMS (DB/DIC)
- CICS (DLI)

Send a call or resume to:
- Comp-u-Staff
  - Personnel Director
  - 11595 Deforest Ave., Suite 200
  - Bethesda, MD 20817
  - Attn: Ed Dunn
  - Please specify application development environment.

**COMPUTER OPERATOR**
Computer Programmer
Two positions available in a south Arkansas bank that is expanding its data processing center to a multi-bank environment.

**OPERATOR**
- Must have a minimum of 2 years data processing experience or equivalent formal training. NCR, VRX experience a definite plus.

**PROGRAMMER**
- Must have a minimum of 2 years experience. Must have working knowledge of NCR, NEAR 5.

Send resume, in confidence, to:
- Personnel Director
  - NATIONAL BANK OF COMMERCE
  - P.O. Box 8260
  - Pine Bluff, Arkansas 71611
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  - (206) 453-2700
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  - Bldg 100, 1740 116th Ave., N.E.
  - Bellevue, WA 98004

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- IMS (DB/DIC)
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Send a call or resume to:
- Comp-u-Staff
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  - 11595 Deforest Ave., Suite 200
  - Bethesda, MD 20817
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  - Please specify application development environment.
Codex, a leader in the field of Network Products and other key areas of data communications, is now expanding its new product development plans. Our strategy calls for continuing refinement and enhancement of existing products, plus the development of many future products to maintain our position of innovative leadership in the data communications industry.

Internal Consultant—Network Management

You will be Codex' key architect for providing enhanced centralized network management with our network products. The successful candidate will have a strong system design background, knowledge of host-oriented network architecture, Data Base Management, and Network Management systems. You will also be a major contributor to the efficiency and usability of our products by applying your knowledge of Ergonomics.

This position is located at our New Product Development Engineering Facility in Canton, MA. If you are interested in this position, please send your resume to Paul Johnson, CODEX CORPORATION, Dept. 200-801, 20 Cabot Boulevard, Mansfield, MA 02048.

Our on-going record of success allows Codex to offer solid opportunities to a wide variety of computer industry professionals. If you are interested, please submit your resume, in confidence, to the address above.

CODEX
MOTOROLA INC.
Information Systems Group

CAD/CAM Engineer

FMC Corporation's Central Engineering Laboratories is a multidiscipline research center chartered to provide technical services and identify new product opportunities for the construction, defense, food, material handling and petroleum businesses of FMC. We are seeking an Engineer or Programmer to support the development of CAD/CAM usage at FMC divisions by maintaining, enhancing and training in the use of computer aided engineering software and the VAX-11/780. This position installs software and responds to user problems as an educational resource to new users; determines requirements for correction, enhancements and extensions. Also will provide user training and guidance on the application of software.

We offer an excellent salary and benefit package as well as challenging project assignments. For confidential consideration, submit resume or call: Ms. V. Payne, (408) 289-3433, FMC Corporation, Central Engineering Laboratories, 1985 Coleman Avenue, Santa Clara, CA 95052. We are an equal opportunity employer.

FMC Corporation

MANAGER OF DATA PROCESSING

Seeking: an executive who can work very closely with top management and other executives to improve our systems with a view to increasing our productivity. Technical skills must include a strong systems background with an emphasis on applications programming. Management skills must include supervision of a DP department, job and personnel scheduling, hiring and personnel review. We will only consider qualified candidates who have at least 10 years of business experience, of which 5 years must be in the use of computers, and with the status of three-letter Computer Companies, forward your resume to:

SYNDERS
1740 RESEARCH DRIVE
LOUISVILLE, KY 40299

Equal Opportunity Employer

SOFTWARE PROGRAMMERS/SPECIALISTS

Ethna Life & Casualty has immediate openings for Software Programmers/Specialists in its technical support areas. Generally, responsibilities include the generation and installation of system control programs and related software.

We're looking for persons with 3-4 years of experience in at least two of the following: MVS Operating System internals, OS/VS JCL, VM/CMS operations and IBM utilities. A working knowledge of 8100 Hardware, DPPX Base and program products, along with IDMS, IMS, TOTAL and RAMIS would be a plus.

Ethna offers a generous benefits/relocation package and competitive salaries commensurate with your experience. Send resume to Ray Brothers, Recruiting Office, Ethna Life & Casualty, 900 Asylum Ave., Hartford, CT 06156. An equal opportunity/affirmative action employer.
**DATA PROCESSING EXPANSION IN ORLANDO**

Martin Marietta Data Systems, a leader in advanced state-of-the-art data processing technology, and one of the largest full-service data processing organizations in the country, has immediate opportunities for experienced data processing professionals.

The Orlando area offers a lifestyle with the conveniences of a big city and the atmosphere of a small town - all year-round Florida sunshine. Our area's environmental and recreational facilities are among the best in the country.

If you're seeking a technological challenge, a secure and rewarding future and an excellent climate, join the professionals at Martin Marietta Data Systems.

**WE PRESENTLY HAVE OPENINGS FOR:**

**PROGRAMMER/ANALYSTS**
- COBOL, IMS online, manufacturing
- DATA MANAGEMENT
- JCL, TSO, OS/VS & IMS utilities, CLIST, VSAM, disk & tape management

**PROGRAMMER/ANALYSTS**
- Robotics, CAD/CAM, APT, Fornian & scientific applications
- CUSTOMER SERVICE REP.
  - Experience in VMS systems programming & applications

**TECHNICAL SUPPORT**
- Applications & systems experience to work on conversions/proposals. Data base experience necessary

**DATA BASE ANALYSTS**
- IMS, Data Dictionary, Mandarin & procedures

**SYSTEMS PROGRAMMERS**
- NYS, VM, performance & tuning

**COMMUNICATIONS/ANALYSTS**
- CONTEL, S/390, MCF/ADVF

For immediate consideration, please send your resume in strict confidence to:

Pam Evans

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**DATA SYSTEMS**

**WHERE THE FUTURE IS HAPPENING TODAY!**

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**DIRECTOR, DATA PROCESSING**

Cedars Medical Center, a major 525-bed Florida health care facility, is seeking a data processing professional to direct the implementation of advanced health care systems. Cedars Medical Center has recently decided to implement Technicon's medical information and care systems.

The qualified applicant should have significant experience in the implementation of health care systems in a health care facility. This experience should include patient and general accounting, patient registration and order communications. In addition, experience with large IBM mainframes, such as the 4300 series, and related operating software and utilities is essential.

Hands-on experience with the Technicon systems as well as a Bachelor's degree are preferred.

Cedars Medical Center offers excellent salary and comprehensive benefits including free medical, life insurance and relocation assistance. For immediate consideration, forward a resume and salary requirements in strict confidence to: Ely Howard, Associate Director, Human Resources.
MARKETING SPECIALIST
Corporate

Let your sales expertise move you into marketing and management

We're NCR, a $3.5 billion leader in a wide range of in-demand information processing systems for businesses, institutions, and governments — worldwide. Our U.S. Data Processing Group has a Dayton-based headquarters position for a proven sales achiever who wants to move into marketing and beyond.

This key position is highly visible and opens new career potentials with in-depth involvement in a wide range of marketing functions. It also can provide a springboard into the Total NCR operation. Your responsibilities in this role will range from making presentations to regional people, providing marketing support to the end-user and researching market/industry competitive requirements.

Put your 3-5 years of successful sales experience and your extensive data processing systems expertise to work for you along a fast-moving new track.

Find out more about career directions with NCR where you'll be part of our aggressive, successful new product developments. We offer an excellent salary, comprehensive benefits and an unusually supportive environment conducive to personal and professional growth. Send your resume with salary history to: Keith Jenkins, USDPG, NCR Corporation, 960-1, Dept. R66, Dayton, Ohio 45479. We promise a challenge, unlimited growth opportunities and most of all, personal and professional satisfaction.

NCR Complete Computer Systems
An equal opportunity employer

MARRIOTT CORPORATION
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Due to continuous growth, career positions exist for ACP/PARS professionals who have drive, ability, and dedication. We promise a challenge, unlimited growth opportunities and most important of all, CAREER. You'll work in a results-oriented, mature information Systems Department.

• ACP SYSTEMS/COMMUNICATIONS
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These positions offer excellent salaries and comprehensive benefits program. If you're the professional with training and experience and want a CAREER you can build on, in a company as ambitious as you are, send resume or call:

Marriott Drive
Attn: Bill Lesher, Dept. 996.01
Road, Anchorage, Alaska 99502
(301) 897-1022 , an Equal Opportunity Employer m/t

SYSTEMS ENGINEERS M/68000
Systems Engineers h/v s/w systems development on M/68000 or 2-8806 (16 Bit) B5/MS/PHD. High level languages, Northeast location. To $65,000/year plus benefits and stocks.

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DATA PROCESSING PROFESSIONALS

DATACOM SOURCE CORPORATION, Headquarters in Atlanta, is a vertically integrated Company providing systems consulting and software support services for bank and non-bank customers in Atlanta and nationwide. The company's scope includes systems design, implementation, software development, and maintenance.

We are currently seeking individuals with a broad range of diversified program management experience. Stringent management skills, and who demonstrates the desire to work in a team environment. The Data Processing Group is seeking professionals with a minimum of three years experience in program development and management. We offer a competitive salary and comprehensive benefits program, including bonuses and profit sharing and our growth opportunities.

If you're a systems professional with a desire to move into management, please reply to: CW-B4226, Box 880

EDP OPPORTUNITIES

MICROS
IBM, LAN, main, int, cpmbld
$95M+ to $140M in FY 82
5% growth, 2000+ employees
IBM P.C. int. de Int. Sales
$110M
IBM P.C. Data Center, Manager $140M
IBM P.C. 1-2-3, Manager $150M

MANAGEMENT
PROD Mgr Misc, Tel ops, 25 MIV
$90M+ to $140M
PROD Rep, Data center, 160000
$80M + to $100M
PM/1000, 125000 $70M +
ES/3000, build staff
$55M + to $85M
MBVIP, Build Staff, Intsales
$65M + to $85M

SYSTEMS ENGINEERS
2500, 2600, 3000, 3080, 3016
$55M + to $85M

TIERED OF MAINTENANCE?
OS COBOL PROGRAMMERS
2 yrs ex. to $70K
Excellent educational benefits

Please send your resume and salary history to:
Bill Burwell
(713) 262-3513
WM. HARRIS ASSOC.
26 Ave. Rd. agency
WT. NY 11694

SYSTEM SOFTWARE PROGRAMMER
Excellent opportunity for a qualified individual to become associated with a well-established, scheduled airline and participate in the development of new systems. You'll also be involved in selecting an individual to review and analyze system software, determine future and current needs, analyze changes, and install new system software. Desirable experience includes at least 2 years in each of the following areas:
IBM 3431, DOS/VSE, CICS, POWER and Selective Data. We offer a salary commensurate with experience, excellent benefits including full medical coverage.

Please send resume including salary history to:
Wirn Air ALASKA, Data Processing Depart-
ment, 416 W. International Airport Road, Anchorage, Alaska 99502.
ATTN: Tim Scroggins.
EOE/AAP

ST. LOUIS

High-Level Analyst/Architect
DOS/VSE & MVS to 45K

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Rent or buy

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CICS to 49K

System Programmer
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ERP Consultant
5 years exp.

HP/O2 Program Analyst/1 year on $50 to $90K

Robert Half Of St. Louis, Inc.
1000 S. Grand Blvd.
St. Louis, Mo.
(314) 241-1062

New Opportunity for:

Manager, Distributed Computing/Office Automation

Our client is a fast-paced, diversified, multi-division corporation. Information Services and the proven professionals servicing its extensive operations will continue to expand. The Company anticipates significant technological advancements which will continue to prevail in the years ahead…advancements crucial to long- and short-range strategic planning.

Needed now is a "user-oriented" person with a strong technical background, who is knowledgeable in personal computers, minicomputers, word processors and related software.

The position will utilize experience in rapidly changing office automation technologies, distributed computing and consulting. Responsibilities will include: establishment and management of a highly competent staff that will efficiently respond to and support user needs with cost effective solutions to their business computer problems.

The Manager, Distributed Computing/Office Automation will work with all management levels (business, technical, administrative) as well as vendors, to identify the equipment, software and services necessary to provide the desired level of computing support.

Strong communication skills, backed by solid factual knowledge of the industry, will be important in gaining the support and confidence of a widely diversified user community.

The work environment is stimulating and progressive, and a significant total compensation plan and relocation package accompany this position.

For prompt, confidential consideration, send us your resume detailing educational background, career experience and current salary information.

Reply to: CW-B4226, Box 880
Framingham, MA 01701
An Equal Opportunity Employer M/F/H/V
FOR A RARE CHALLENGE...  
LOOK TO MICROTRN

Located in the Pacific Northwest, we've been identified as one of the nation's fastest growing software publishers. Our powerful Relational Data Base Management System is sold to OEM's, VAR's, dealers and distributors. MicroTRN products, developed from the NASA Space Shuttle Program, are compatible with IBM Personal Computers, other microcomputers and Local Area Networks, and are now being marketed world wide.

Currently we are seeking talented, creative individuals for the following positions:

AREA SALES MANAGERS
We are developing an aggressive, dynamic sales management team in the Washington, D.C., Philadelphia/New Jersey, Minneapolis, Chicago, Dallas, Los Angeles & San Francisco based territories. We are seeking entrepreneurial individuals with a proven track record in sales and management to represent our powerful products. You will be backed up with a multi-million dollar sales marketing and top technical support. This position requires 5 years direct sales experience with some management experience. Orientation to computer software preferred. If you are seeking a unique growth opportunity for personal career development, MicroTRN can respond to your needs.

DATA BASE SYSTEMS PROGRAMMERS
The ideal candidate for this Seattle area position will be able to participate in the development of the microcomputer Data Base Management System (DBMS). The Designer/Programmer we seek will have 5-10 years experience in multi-user environment. Experience must include working with systems utilizing concurrent access to files and implementing procedures such as transaction logging, record level locking, back-up and recovery. Programming knowledge of FORTRAN, PASCAL or "C" is required.

MicroTRN offers an excellent compensation and benefits package including stock option. For immediate consideration please contact Alan Friedman, Staffing Manager, MicroTRN Inc., PO Box 285, Bellevue, WA 98008. We are an equal opportunity employer.

CONNECT WITH molex
APPLICATIONS PROGRAMMERS

Molex, Incorporated, a leader in the manufacturing of connectors, switch and terminal products, in the electronics industry has two Applications Programming positions available at its Lisle, Illinois, New York and Framingham, Massachusetts facilities. These positions, created by the expansion of our Molex department, report to the Manager of Manufacturing Programming and have responsibility for manufacturing support and COS support respectively.

Circuitry environment includes:
- DOB/VSE
- COBOL
- VM
- DL/1
- MPS (Command and Macro level)

Successful candidates will have:
- 5+ years of equivalent experience.
- 5 years of data processing experience.
- 2+ years of experience with DOB/VSE, COBOL, ML/CICS and DL/1 are required.
- Good interpersonal skills are a must.
- Conversion experience is helpful.

In return for your programming expertise, Molex offers a superb career advancement opportunity in a state-of-the-art environment, and an excellent compensation/benefits package. For further information (Principals only), call or send resume to:
William M. O'Connor
Manager of Employment
312-869-8450, Ext. 291
( Between 8AM and 6:00 PM, CST, Monday thru Friday)

MOLEX INCORPORATED
2020 Wellington Court
Framingham, MA 01701
Equal Opportunity Employer M/F

SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS
Join desultation, cooperation and fun! We are the leading software house who come to enhance one's career goals. Every new position comes with stock option. Let us help you achieve that of your life career goals. If you are interested, please call or write Team Seattle, GCP 2400 Westlake Ave., Seattle, WA 98109 or call 206-441-4200 Ext. 681.

Dunhill
ORCHARD, INC.
501 North 10th Street
Meriden, Conn. 06450

Computer Scientist
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