RANDELLSTOWN, Md. — Interdata 7/32 minicomputers can now be outfitted with firmware that allows them to emulate IBM 370 mainframes, according to the developers of the firmware, Kardios Systems Corp.

With the enhancement, the Interdata system can run any of the IBM 370's applications programs, according to the Kardios spokesman.

The company is making the firmware available to present 7/32 users or will offer its own version of a configured 7/32, the Duo 70, complete with the firmware enhancement.

When outfitted with the enhancement, the system can run both Interdata applications programs under the Interdata instruction set and IBM application programs under the IBM instruction sets, the spokesman explained. The firmware can include a Basic Assembly Language (BAL) instruction set, commercial instruction set and a scientific instruction set.

Upgrading from the Interdata 7/32 to the Duo 70 takes about a day, the company noted, and Interdata will maintain the system with the enhancement.

In a job stream, the system will switch back and forth from applications written under Interdata to those written under IBM. The firmware runs under Interdata's OS/32 MT multitasking operating system, in two distinct operating modes, the spokesman added.

The Duo 70 costs $15,000 plus the cost of an Interdata 7/32 system configuration for the enhancement including the BAL instruction set. The commercial instruction sets and scientific sets have not yet been priced, a spokesman noted, but delivery can be 60 days after receipt of order. Kardios Systems Corp. is at 3820 Courtleigh Drive, Randallstown, Md. 21133.

New Yorkers' Systems Hit Hard
By Mid-Week Lightning Storm

NEW YORK — Computer systems were hit hard here last week when a lightning bolt knocked out a Consolidated Edison power substation, shutting down the utility's service to 2.7 million customers.

More than 3,300 computer centers were in the affected area, but at press time it was difficult to determine how many had been operating when the power went off at 9:33 p.m. on Wednesday.

But the reliance of business and industry on computer systems and the impact of such systems on the public was evident in the crisis.

With the shutdown last week, for example, all types of reservation systems — from airlines to hotels — were crippled, stranded travelers with and without reservations.

At both the Holiday Inn and the Sheraton Hotels the personnel could not make reservations — or confirm those already made — even at hotels in New Jersey, which was not affected by the outage.

All of those hotels' reservation systems operate through switches in New York and with switches down, reservations were

(continued on page 4)

Carter Pledges Influence
To Develop Privacy Policy

WASHINGTON, D.C. — President Carter pledged last week to use his "influence as President" to help develop a national policy governing the treatment of personal records in public and private data banks.

The pledge was made at a meeting in the White House Cabinet Room last Tuesday morning with David F. Linowes, chairman of the Privacy Protection Study Commission, and members of his staff. At that meeting, the fruits of the commission's two years of work were formally presented.

Carter agreed to discuss the study with his Cabinet members at a meeting today and ask them to read the commission's 638-page report.

And on Capitol Hill reaction to the report was swift. As many as 11 separate bills were offered to help turn the commission's recommendations into reality.

The Privacy Protection Study Commission was established by the Privacy Act of 1974 to study whether the business community should be required to protect the confidentiality of records they maintain on individuals.


This took the form of 10 separate bills that Goldwater said he hoped will "ultimately be incorporated into the Omnibus Privacy Act of 1977."

The bills, designed to provide privacy guidance for the private sector and to clarify the government's role in assuring that privacy, deal with consumer and commercial credit, banking, insurance and medical records, the Social Security num-

(continued on page 4)
IBM Break-Up Seen as Only Solution

By Catherine Arnt

NEW YORK - A 1968 memo indicating IBM was aware it was taking care not to be found guilty of antitrust claims has been shown to the court.

In August 1971, IBM predicted that the potential effect of the FTP and "IBM teams" on the market would be a wash insofar as "the net effect of the FTP and (CPU) leases that were widely accepted and driven by the user, not the manufacturer, was going to the heart of IBM's power — the general-purpose computer systems market," said McAdams.

IBM was able to maintain its monopoly power because it dominated the general systems and the plug-compatible peripherals market with disk drives that were widely accepted and driven by the user, not the manufacturer, said McAdams.

The IBM task force that recommended the FTP forecast it would cause a revenue reduction of more than $75 million in 1971 to 1972. In order to recoup its losses, IBM announced price increases on CPU and other components of the system that were not covered by the FTP in July 1971, McAdams said.

Also, the advantage reverted to IBM, he continued. "The IBM was aware actions it was taking could be regarded as anticompetitive if it introduced here recently in the government antitrust case against the firm."

The memorandum, which IBM considered "privileged communication — to be kept out of the case for nearly two years, concerning the general systems market. A test of whether a market is truly competitive is the ease of entry and exit, McAdams said. GE decided to enter the systems market in the late 1950s, and a feasibility study predicted its first break-even year would be 1976, McAdams said. Before it reached that point, however, the study determined the firm could incur before-tax losses of $250 million.

IBM could also change the interface design of its CPU to undermine competition in the peripheral market — another example McAdams gave of the firm's ability to dominate one market through its dominance of another.

This was a favorable strategy for the 1970s. In the late 1970s, all the components of which IBM originally intended to be fully interchangeable, McAdams testified. This situation is "a great proliferation of interfaces" with accompanying inventory control problems for IBM and an undoing of the benefits interchangeability offered users, he said.

Interlocking Strategies

The FTP and the interface changes are two of the interlocking strategies IBM orchestrated to erect barriers to entry into both the general-purpose and the peripherals markets, McAdams said.

He illustrated the effectiveness of these barriers with a case study of General Electric's (GE) attempt to enter the general systems market. A test of whether a market is truly competitive is the ease of entry and exit, McAdams said.

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Privacy Principles Ignore Global Needs

By G. Russell Pipe

July 18, 1977

AMSTERDAM, The Netherlands — Opponents of strong, comprehensive private-sector privacy legislation may have won a major coup for the US, but frames of European privacy laws are likely to be sorely disappointed. The 600-page privacy study contain-

ing scores of policy recommendations appears oblivious to the labors of some 15 countries working on nearly identi-
cal issues. Indeed the extensive elabora-
tion of legal reforms needed in per-
sonal data practices, tepid as they are, may seem to be a stamp of disapproval of American recordkeeping.

Europeans expected an extension of the Privacy Act of 1974, albeit with modifications, to give blanket coverage over personal records maintained by commercial organizations. Most coun-
tries of Scandinavia, Central Europe and the UK are approaching privacy by framing laws of general application, usually a single statute for public and private records. This has become a sine qua non for transfer of data between countries. Without common basic rules, such as the Swedish and German laws providing the U.S. DP industry will have to rely on congressional action in some 14 states.

Because the commission saw a need for specific recommendations in these areas, European officials are likely to take this as evidence of deficiencies in collection, maintenance, use or dissemina-
tion practices which, they believe, must follow their data where it is located. Thus, until separate medi-
cal, banking, insurance, personnel rec-
cord and other sectoral laws are en-
acted, some foreign governments may contend that the absence of protection should result in restricting personal data sent to the U.S.

The scantily detailed Federal Privacy Board proposal would not meet even minimum objectives of most such bodies being considered by other countries. The likelihood that such an American board would meet basic re-
ciprocity requirements is, at most, wishful. Further, since such a board would be limited to monitoring federal agency activities, leaving the private sector unshepherded, a large gap exists in the jurisdiction it would have with European counterparts.

Carter Pledges Support

(Continued from Page 1)

ber, Internal Revenue Service records, public assistance, social services and gov-
ernment access to personal information.

Not to be outdone, Sen. Birch Bayh (D-Ind.) who chairs the Senate Judiciary Committee's Constitutional Subcommit-
tee, also chose the day the privacy com-
mision report was released to introduce a legislation designed to prevent the in-
discriminate use of graph tests by government and private enterprise em-
ployers. His subcommittee will soon hold hearings to consider this "Polygraph Control in Civil Liberties Protection Act," Bayh said.

Sen. Charles H. Percy (R-Ill.) summed up the mood in the Capitol concerning the commission's report when he ob-
jured the hearing that the "privacy makes strange bedfellows...It is an issue that crosses ideological lines."

Linowes repeatedly expressed his ap-
preciation for the enthusiastic response to the report, entitled "Personal Privacy in an Information Society." He added his hope that that response would be just the beginning of "vigorous and quick action" in part of the President and the US Congress to rectify "some of the syste-
matic problems" identified in the com-
mision's 162 recommendations.

Referring to the Koch-Goldwater bills, Linowes noted that "a single sweeping law on the privacy problems that this nation faces won't do justice to our enormity." Accordingly, the report's rec-
ommendations and their attendant legis-
lation seeks "to keep clearly in mind" the diversity of the institutions, records and rights of individuals involved.

Tailored to Specific Industries

While privacy laws for each area of the economy are only conceptual at this time, the commission principles policy recommenders for the tele-
communications sector, in particular, will be tailored to specific in-

360/370, Honeywell, Burroughs users, at (817) 851-4111, Wang Laboratories Inc., Lowell, MA 01851

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tion companies and doctors and hospitals now conducting medical research.
By Don Lewitt
Of the CW Staff

WASHINGTON, D.C. — An internal investigation at the Department of Health, Education and Welfare (HEW) is probing how a contract was awarded two years ago and if the winning bidder was given unfair advantages.

The investigation is centering on "possible favoritism, gratuities or other irregularities" in the connection with the original contract award, and not particularly with the performance of work done under the pact, according to Robert Wilson, spokesman for the department's Inspector General.

Edwin B. Parker III has been relieved of his duties in connection with the Office of Education project covered by the contract. He has been "detailed to other duties at full salary pending completion of the investigation," Wilson added.

The project involves the automation of the Guaranteed Student Loan Management System under which HEW monitors the status of "millions of students," 8,000 post-secondary schools, 10,000 to 15,000 banks and loans amounting to some $10 billion," according to Parker's replacement, Maurice Tansey.

HEW auditors and investigators are also looking into the close relationship between Parker and Gilmore S. Wheeler, a consultant hired by On-Line Systems, Inc. (OLS) of Pittsburgh, to whom the contract was awarded in 1975, according to a report in the Detroit News.

An article in the Wall Street Journal quotes an unidentified HEW official as saying the probe is focused more on HEW employees than on the contractor. The department is concerned there may have been violations of its code of conduct for employees, he said.

Punishment could range from a reprimand to firing, the Journal added.

The Detroit News quoted OLS president Jack Roseman as saying he was "shocked" that the probe was "even referred to as an investigation."

"As far as I know it's just a review of our program to make sure everything is documented. We welcome that kind of review," he added.

OLS issued a statement earlier this month, acknowledging that HEW is conducting an "audit and investigation" on the procurement of the original contract and "certain OLS expenses primarily related to business meals of [Office of Education] employees incurred during its tenure.

The company also understands HEW is investigating "certain other" contractors for similar reasons, the statement continued.

Wilson clearly disagreed with those assertions. "This certainly is an investigation. It is not a common thing. It is unique," he countered. He would not say, however, how many people are on the investigative team, how it is organized or how long the probe will last.

'Matter of Some Priority'

The investigation began two or three months ago and the department now senses that it is "a matter of some priority to get it done," he said, lending credence to estimates that the probe will wind up within months and "possibly within weeks now," in the words of one observer.

The Inspector General's office at HEW was created by Congress late last year and is organized as three groups, focusing on auditing, investigations and health care system reviews. Detroit News reporter Seth Kantor said both auditing and investigative groups were active in the probe.

The ties between Parker and Wheeler are social as well as professional, according to Kantor, who noted that the consultant served as best man at Parker's wedding in June.

That had no effect on the contract award two years ago, according to Wheeler, who told Kantor that Parker "insisted on withdrawing himself from participating in the contract review at HEW which led to OLS getting the contract.

Wheeler admitted to Kantor, however, that one of the charges HEW is probing is that "information was supposed to have been advanced from inside HEW to On-Line before the bidding began." If true, that could have given OLS an advantage in making its presentation to HEW, Kantor noted.

The loan program started in 1969 and by 1975 there was a pressing need to get the automated management system up and running on equipment outside HEW since in-house facilities were already overworked, according to Tansey.

There was no time to develop custom software and the OLS proposal, involving the use of software capabilities the network already had in place, was the best of all that HEW received, he added.

Contract Terms

The contract, initially for one year but with two one-year extensions at the option of the government, covered adapting OLS software to the project needs and processing the work once the programs were ready. Both extensions have been exercised by HEW and the contract has amounted to a $7.5 million piece of business for OLS.

Especially all of the system is operational now, tied to the On-Line data center in Pittsburgh, Tansey said. Development work continues, however, as the original programming is optimized to particular tasks and modified to meet changes in the law.

In an interview, OLS chairman John Godfrey took exception to news reports which focused on how the contract has grown in value. He said he was bothered, for example, by stories which compared the first year price of $1.6 million to the three-year figure of $7.5 million.

He also noted that OLS was able to implement the system faster than expected says "thanks to our software" — and production work, "which is absolutely essential if the government is to control the loan program," got started earlier than initially expected.

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Is 5x7 Dot-Matrix CRT Terminal Tomorrow’s Endangered Species?

By John P. Hebert

Of the CW Staff

Could a CRT terminal that displays characters in a dot matrix format be on the endangered species list in the near future because it’s hard to read?

Definitely not.

But although terminals with the 5 x 7 dot matrix type of character generation are most widely used because these units are cheaper, other types of terminals are currently available, and at least two manufacturers are experimenting with still other alternatives.

Some commercially available models generate characters composed of a greater density of dots or use line segments or strokes for character generation.

Some terminals use plasma gas, light emitting diodes (LED) and liquid crystal media. However, these are limited to displays ranging from a few characters to a line or two — and rarely more than three dozen characters — according to a report on alphanumeric display terminals published by Datapro Research Corp.

Datagraphix Corp. introduced a relatively inexpensive display, that utilized fully formed characters at the National Computer Conference, and IBM is experimenting with a laser beam technology.

Although the present dot-matrix display is adequate for information reference, it can promote eye fatigue or strain the eyes of those who use CRT’s under the wrong lighting conditions and/or for extended time periods.

Fully formed characters are theoretically less fatiguing to read. But eye fatigue or its absence is also dependent on where the terminal is located and how much it is used at one time, optometrists agree.

If a CRT is used intermittently, the operator can get by with the standard 5 x 7 dot matrix display. But full-time CRT operators using the same display might experience eye discomfort, as might the programmer who spends two hours in front of it in a brightly lit room.

Datapro spokesman F. John Jensen declined to comment on the new product.

Experimental Terminal

At IBM’s San Jose, Calif., research laboratory, scientists who are experimenting with an experimental terminal to demonstrate the laser beam display technology suggested the laser beam terminal as a replacement for certain applications such as engineering graphics or newspaper page formatting.

For most applications, however, they also agreed the CRT terminal presently in use is here to stay.

The major drawback of CRTs, an IBM scientist said, is the cost barrier to displaying more than one million picture elements on a single screen. However, written displays do not have that limitation, the spokesman said.

Further, the laser-generated characters are more sharply defined than in CRT displays and appear black on a white background, giving the look of a typewritten page, according to IBM.

The technology utilized in this IBM experimental device has the potential to display characters in a 20 x 40 spot format, the IBM spokesman pointed out.

“We think we can put more elements on the target screen than a CRT operator can making the screen itself larger than the conventional CRT found in computer terminals, according to the researcher.

There is a drawback, however. This method of scanning takes from 50 to 100 milliseconds to form a character — or about 20 chat/sec.

Although the speed is sufficient for entering information from a keyboard, it is much too slow for displaying information that is already stored in a computer, IBM admitted.

CRT-Bound Workers Strain Eyes

(Continued from Page 1)

Sparks said.

The people most affected by the terminals, he explained, are those who use the device day after day without any breaks.

“They are asking too much of their eyes,” he said.

The muscles of the eye are like any other — “If you run for 10 miles, your legs will hurt.”

“Some people are not suited for this kind of work,” according to Sparks, who sees the problem as symptomatic of our society as a whole.

“This computerized world of ours is creating problems for our eyes. The population is becoming more and more nearsighted because more people are working in closed rooms and confined spaces,” he said.

Recommendation to Doctors

Sparks believes doctors should observe and experience first-hand the conditions related to patient complaints. His travels through computer rooms and CRT terminal clusters have led him to some conclusions concerning those who use and manufacture the devices.

Vendors could come up with a better glaze to prevent glare, he said. Employers should eliminate glare in offices and try to achieve a point of equilibrium between the brightness of the room and the brightness of the CRT screen.

Related to this is the use of the proper lighting on the screens. A CRT terminal should always display illuminated (light) characters on a dark background.

The dot-matrix print displayed on the terminals screen or found on a computer printout is “horrible,” Sparks said. This type of character — generated by a wide variety of CRTs and computer printers — is very difficult on the eyes. The operator or printout reader must constantly try to bring the characters into focus, forcing the eyes to work harder, according to the doctor.

Breaks Suggested

For people who use the terminals, Sparks suggested they often look up from their work, take at least a couple of nonreading breaks during the day and blink their eyes.

Full blinking, he said, is very important because it ensures the eyes get necessary oxygen. Depriving the eyes of oxygen will cause them to swell, as it will any other body tissue, he added.

Apparently, there never has been a formal or informal U.S. study performed on the effects of CRT terminals on their operators.

Dr. Paul Lappin, dean of the New England College of Optometry in Boston, doesn’t think working with a computer terminal is any more stressful for the eyes than reading a book.

“If you do it all day long, it will be fatiguing,” Lappin said, but “there is nothing about the [CRT] per se” that contributes to eye strain any more than other close-work situations.

Old Question

The question of whether eyeglass is adversely affected by such situations is an old one. Lappin said, recalling experiences with radar screen operators’ complaints of fatigue.

“The eye fatigue in the radar operators was difficult to diagnose or even define,” he explained.
Congressional DP Service Seen Enmeshed in Politics

By Edith Holmes

WASHINGTON, D.C. — Politics inevitably becomes an element in the system design of any DP effort which directly impacts members of Congress, according to Dr. Frank Ryan, former director of the House of Representatives Information Systems (HRIS).

Speaking at a conference of DP executives here recently, Ryan, who left HRIS to become executive vice-president of athletics and a member of the mathematics faculty at Yale University, compared his old operation to a service bureau created to develop applications that would better serve Congress.

"Service to Congress, however, is more an art than a science," Ryan said. He found the systems developed to meet particular problems of members of Congress during his tenure as HRIS director are valued by the Representatives for very different reasons.

"The beginnings of HRIS itself are rooted in politics. When the idea of using computers in the House was first discussed in 1971, Wayne L. Hayes (D-OH) had just risen to become chairman of the Committee on House Administration and the number of telephone lines running into each member's office was the primary information issue, Ryan said.

HRIS was initially "a little vendetta" started under the Administration Committee as a result of a debate between Hayes and the Clerk of the House over who should be responsible for House DP, he stated.

"Ryan, who played quarterback for the Cleveland Browns and then for the Washington Redskins, said he was thankful to have been in football before he got to the House. "There are anxious, hungry and tough people in the House as well as on the field," he explained.

When Ryan and his staff designed the House's electronic voting system, they thought that it would help Representatives vote quickly and accurately. It was first used on Jan. 23, 1973 for a quorum call, the system, which runs on dual Control Data Corp. 1700 mainframes, saved approximately 500 hours of legislative time that would have been needed to answer roll calls without it.

"Strategy Devices"

But the Representatives liked the system for reasons other than its reduction of voting time from almost 45 minutes to 15 minutes. For example, the manual voting system had a high instance of errors in recording votes.

It also permitted "phantom voting" by members not even in the Capitol when a vote on an issue was taken.

"Today, members of Congress can look at almost any subset of Representatives whose votes they want to track using CDC terminals on the House floor and in their own offices. The CRTs have become "in-progress strategy devices," Ryan said. He added that the system has given the leadership in the House more control over its followers.

"Members now vote about twice as much as they previously did, but gamesmanship has come into play in the casting of votes, the former HRIS director noted. The House has had an unprecedented set of tie votes, for example.

When the CRTs were first installed on the House floor, Ryan said, members reportedly sat at the terminals, pressing the buttons to change their votes back and forth and watching the changes register on the display panels located around the chamber.

Another system designed to track the status of legislation has been very popular, attracting approximately 1,200 phone calls on particular bills each day with a 2:1 busy signal ratio at the Bill Status Office, Ryan said. The system relies congressional staff people from the tedious chore of following a bill through the legislative process.

Resistence to Comis

Still another system, the Committee Meeting Information System (Comis), intended to alleviate the high instance of schedule conflicts on a given legislative day, also has run into flack.

The problem is that the committees don't want other committees to know which of their rooms are available. The dynamic scheduling system would have all committees report the meetings they plan to a central data base that would help staff workers assigned to arrange meetings avoid conflicts.

HRIS has tried to get the committees to use Comis for two years. In addition to not participating in the system, the committees have also created "ghost meetings," Ryan said.

"HRIS is now trying to bring committee meeting information together without room information," Ryan said.

Explaining HRIS' current effort to develop a communications network with a terminal in every member's office, Ryan said when they have their own devices, they're "generally happy, regardless of what they do."

He cautioned DP professionals to be aware of the perception Congress has of computing.

"Representatives will look at issues in the industry, like those involved in the Consumer Communications Reform Act — better known as the Bell Bill — with the same understanding of DP that they have in their own environment, he said.

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Micro-Controlled Challenger Plays 'Unnerving' Chess Game

By Molly Upton
Of the CW Staff

ROCKVILLE, Md. — Those who have the urge to play chess but who can't find a partner can eliminate their frustrations by playing with Chess Challenger, a microcomputer-controlled game.

The player indicates his moves by inputting the position to which he is moving a piece on a 12-key control pad. There is no need to identify which piece is being moved because the Challenger retains that information from previous moves, according to Harry Krause, marketing manager for Chafitz, Inc., an electronics specialty store here.

The game then responds with its own move, usually within one second, and the new and old positions of the Chess Challenger are displayed in four light-emitting diode characters, Krause said.

The game was developed by a medical electronics engineer and incorporates an Intel Corp. 8080 microcomputer, which is programmed to play an aggressive game, Krause said.

The Challenger assigns a value to each piece and goes for board control. "If you're not very careful, you lose," Krause said.

Improves One's Game

One can also improve one's chess game through repeated encounters with the Challenger, he said. When Krause started, he lost 18 out of 20 games, but he is now splitting on a 50-50 basis, he added.

However, having one's opponent react so quickly can be "a bit unnerving," he warned.

"We've even had parents who play chess buy a Chess Challenger for their children who are just learning the different pieces and moves," a spokesman said. Once beginners learn the basic moves, they can practice games and strategy and become a decent player in a relatively short time.

Chafitz is the exclusive distributor, although the unit can be found in some department stores, Krause said.

Beginning in July, Chafitz expects to offer two other degrees of difficulty for the game by incorporating another micro, he said. First priority will be to retrofit current customers' games, he noted. The upgrade will cost about $75, and the Challenger costs $200.

The existing game has instructions enabling players to make the computer move first or set up special problems, Krause said.

Chafitz is at 1055 First St., Rockville, Md. 20850.

EFT Commission Gets Revealing Feedback From General Public

By Frank Vaughan
Of the CW Staff

HOUSTON — When commissions meet to ponder such weighty issues as electronic funds transfer systems (EFTS), even the best minds can overlook the questions which are of great concern to the public.

Wayne Boucher, who has been serving on the National Commission on EFTS, related one of the unusual aspects of the commission's efforts at the 5th Annual International Conference of the EDP Auditors Association here.

As a result of an erroneous wire service news story, the public was told the commission was seeking public comments on EFTS, and 6,000 letters arrived at the commission's office. Only 11 were in favor of EFT, 10 were "uncertain" and the rest were against it.

Rather than ignoring the letters, the commission compared their contents with its concept of what constraints should be placed on EFT systems.

The commission had been examining such aspects as controls, use, impact on fiscal and economic policies, cost benefits, the management of information and privacy, recordkeeping and telecommunications.

Religious Implications

The concerns of the public matched the areas the commission was examining with one exception: religious implications. A good number of the letters received quoted the Bible's Book of Revelation and voiced a concern that the move to electronic funds was one step further in man's race to the "last days."

People feared they would soon have their Social Security numbers printed on their foreheads by laser beam without their knowledge," he explained.
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By Ann Dooley

The pioneer of small business computers now makes small business computers.

Actually Basic/Four Corporation has been making its own central processing units since August, 1976. We now make our own terminals, too. We wanted tighter rein on manufacturing and testing, choice of the latest components, total control of quality, production and delivery. So we could offer even more reliable, better products.

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The Basic/Four CPUs' new semiconductor memory means 40% faster cycle time, down from 1 microsecond to 600 nanoseconds. New models make expansion even easier, accommodating one to 16 terminals. There are other improvements, too, with more to come. But the Basic/Four systems we make have been running, bug-free. Just like before—only better. The best small business computers available.

Look to the pioneer

Ever since we pioneered the field, our operating system has been acknowledged as the best of any small business computer. It had to be—because our systems were always interactive, even when others were batch. Nowadays, everyone in the field is talking “transaction processing”—following our lead, some six years later!

der to be more effective at their jobs. Sometimes various kinds of employees are included in the training sessions—secretaries as well as DP personnel—and everyone wants help with their particular problems. And when the training period lasts only a few days, it’s impossible to solve all the problems, he said.

One way of alleviating the difficulties is to find out what the key problems are before the training begins, Stone noted. A training proposal should be circulated to the client so employees will start talking and thinking about the program. The proposal should be sent out the day before the line so the operators, who will be most directly affected, will have a chance to contribute their ideas, he said.

Such an effort is worthwhile since the students appreciate being included in designing their own development program, Stone added.

“For the most part, the attitude of the operators and other DP personnel is very negative. "There’s a lot of hostility," he said, because they feel undervalued and ignored.”

Problem of Reversal

When a problem with the computer occurs, the operators don’t know what to do, so the system analyst comes in and takes over and the operator resents it. While there is a growing awareness of the need for training, it is often done in a “slop-dash way.” The usual excuse is that a company’s employees are too busy to take time out for training. But what kind of product are they developing? Stone asked.

Cost-effective training should teach only the skills that the operator uses today’s DP environment, according to Lunetta. “That’s all you can expect—better skills today,” he said.

Providing training time away from the current job is crucial to learning, he said. People must have time to reflect on what they’ve heard or they won’t remember it.

The program should offer only a limited objective as to how much the trainees should learn. They don’t need to know more than the elementary concepts of the system. But right now, they don’t know anything about what’s going on and “yet we entrust them with a thousand-dollar environment,” he added.

A basic problem with which operators must deal is that they have no identity—they have no desks of their own or in individual working areas. They want to become programmers because they feel they will be identified then, Stone said. The problem is that many of them don’t have the communication skills or business backgrounds to be programmers, he said.

Honeywell Program

In contrast to Stone’s training program, Lawrence Lunetta, manager of the Advanced Engineering Program at Honeywell Information Systems, described how Honeywell’s program attracts and places “knowledge workers.” It must be determined who the knowledge worker is, what he’s doing and where he works best, and that can’t be found out in a typical training program, he said.

The Advanced Engineering Program helps the knowledge worker determine alternatives by rotating his work assignments, Lunetta explained. Each student is provided with a wide variety of software and hardware, and given time off from work and most expenses paid, Lunetta said.

In addition, internal training is offered including lectures, seminars and hands-on training, most of which is customized to Honeywell equipment.

Students Recruited

Although program members were originally recruited from within the company, today most students are recruited from universities. It was discovered that employees with well-established lifestyles found it difficult to devote 30 to 80 hours a week the program sometimes demanded, according to Lunetta.

Recruiters look primarily for someone with a B.S. in electrical engineering or computer science who is in the top 5% of his class, he said. Applicants must be highly motivated and regard the program as a reward because they consider themselves “more special than others,” Lunetta said. Currently, there are 26 students in the program, with a yearly turnover rate of 10 to 15 people in the form of incoming and graduating students, he added.

The program offers education plus experience, special opportunities, a company commitment to develop each member’s skills, varied work assignments, internal training and “being exposed to the leading edge of technology,” Lunetta said.

The company benefits by bringing in top talent from around the country, he added, and the retention rate has been over 80%.

The program creates a balanced system providing the student with career flexibility while the company gets critical work accomplished. The students see special opportunities and the company is provided with future leaders.

While Stone admired such a program, he said it was unrealistic to attempt in a production-oriented environment.
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Pushbutton System Gives Teacher Students' Feedback

By Ann Dooley

CLEVELAND — Students at Case Western Reserve University here can tell at least one of their professors what they think of his teaching under an experimental program designed to improve communication.

The Olin Experimental Classroom study utilizes student-activated push-button key sets for remote tape-recorded feedback to students in the Olin classroom for his statistical methods class during part of the spring semester in order to encourage more participation.

"A student may hesitate to slow down the instructor in a traditional classroom because he fears his peers or the instructor may think he is 'dumb.' If the students feel the response is anonymous, they will ask for clarification when they need it," Kumar said.

While the class is in session, the instructor is unaware of who is pushing a button, but the videotape indicates which button on which desk was pushed.

Kumar is currently tabulating results that will indicate whether the system has increased participation by his students. He compared last year's responses with this year's by counting how many times each student pushed a button and the number of times each of the 12 buttons was pushed. The most commonly used button was "repeat," he said.

Most students liked the experimental classroom because they felt it made the professor more responsive to their needs. The teacher response has been mixed. Those who might need it most could also be the ones least willing to try it, Rodgers noted.

Another problem is that an interested professor must get his own funding for the classroom since the university does not provide any money toward the operation of the experiment, Rodgers said. So far, only Kumar's class has used the classroom.

Since the project doesn't have any operating money, student programmers were originally used, but the results proved to be very inconsistent, Rodgers said.

The project was able to hire a part-time programmer and everything has gone more smoothly since then, he said.

The Cleveland Board of Education recently used the classroom as part of a federally funded project to improve the quality of classroom observation and evaluation. Administrators watched videotapes of several classes and used the response buttons to evaluate the teachers. With a printout of the evaluations, their supervisor was then able to discover areas of agreement or inconsistencies within the group.
The new Hewlett-Packard Graphics Terminal uses a microprocessor and raster scan technology to combine high performance with low cost.

The HP 2648A introduces a whole range of bright ideas to graphics. There's so much power built into the terminal itself that you can perform everything from auto-plots to zoom without any additional help at all.

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Raster Scan. No more pulling down the blind to make your plots visible. Our display is clear and easy to read even in bright light. And the raster scan technology permits selective erase, cutting down the time it takes to modify your picture.

Zoom and Pan. This lets you magnify any area of the display up to 16 times. And you can pan in any direction for closeup investigation of complex designs, without having to reinitialize the data.

Area Shading and Pattern Definition. This makes it easy to distinguish areas with similar shapes, such as bar charts, mechanical parts and architectural drawings.

Rubber-band Line. You can draw trial sketches, such as architectural floor plans, with or without CPU connection. Think of the time and money you'll save by cutting down mistakes.

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Contact the nearest Hewlett-Packard sales office listed in the White Pages. We're sure you'll get the picture.
Record Keeping Under Scrutiny

The reprieve is over. With the final report of the Privacy Protection Study Commission last week (see story on Page 1), the record keeping practices of the private sector are now going to be coming under ever greater scrutiny.

The report does not call for blanket federal regulation of private-sector record keeping, but rather points to 14 areas where there is a need for new legislation to help safeguard personal privacy.

However, all people involved in private-sector record keeping — particularly users of computerized systems — should be aware of the report's recommendations and its proposals for legislative action.

The new regulations could affect almost every DP shop in existence in one way or the other over the next few years.

All DP managers should become informed about the potential effects on their operations and should be willing to inform their congressmen about parts of the legislation they feel will either be too restrictive or not restrictive enough.

Only with constructive participation from those familiar with DP will Congress be able to sort out the myriad issues raised by the commission's work. The commission did an excellent job, but its recommendations will now be reviewed by Congress and possibly changed.

Your participation in the process is needed.

It's Time for Ifip

The 1977 Congress of the International Federation for Information Processing (Ifip) in Toronto next month (Aug. 8-12) promises a wide-ranging technical program that should be of interest to many people in the computer community.

But conferences such as Ifip can only really be successful if they draw a large number of well-informed participants — not only on the dais but also in the audience.

So this is a reminder that there is still time to sign up for the conference program, even though it does carry a rather stiff $145 price tag. Out of the 108 sessions and 30 "mini" symposia there is something for everyone.

What is needed is participation by users, vendors and the assorted other folk that make up the U.S. and the assorted other folk that make up the U.S.

Greyhound Computer Corp. vs. IBM case to the jury.

Two days after IBM was granted the directed verdict, Greyhound filed a notice that it would appeal the case.

Your question is: "*For whom?"* In addition, the Dallas Convention Center was designed without any consideration for getting a wheelchair from one level to another. Furthermore, none of the guards or information center people could help us or showed any concern.

**Letters to the Editor**

**Reports of Successful NCC**

**Elicit Response: 'For Whom?'**

As I read your editorial extolling how smooth and well-run the recent National Computer Conference in Dallas was, it reminded me that it was the most frustrating experience I ever had in attending a computer convention during my 20-odd years in the field.

You must have received different treatment from that given the average attendee. I heard many complaints, especially about the parking and lack of space at the various technical sessions.

Personally, because of a lack of space, I was able to get into only one of the six sessions on microcomputers I wanted the attend. The Afips (American Federation of Information Processing Societies) people I talked to were not even sympathetic about the situation.

Their best answer was: "Yes, isn't the convention a big success?"

My question is: "For whom?"

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In addition, the Dallas Convention Center was designed without any consideration for getting a wheelchair from one level to another. Furthermore, none of the guards or information center people could help us or showed any concern.

It was only through the help of some of the center's maintenance personnel and one of the college women passing out literature that we found the freight elevators that allowed us to go from one level to another.

Thanks for your good coverage of the convention, but I have been able to read about several of the sessions I was unable to attend because of the space problem.

W. Thad Lee

League City, Texas

**System/80 Features Here Now**

I don't claim to be an expert on the subject, but if I'm not mistaken, many if not most of the "advanced" features Lecht foresees for the IBM System/80 ("The Waves of Change," CW, July, 4) have been in use for some time on such Burroughs systems as the B1700 and B8700.

This makes all the more frustrating that Burroughs hardware reliability and maintenance are so notoriously inadequate.

Donald S. Schmick

Atlanta, Ga.

**ACM Ombudsman Explains Goals**

In his column [CW, July 4], Alan Taylor attempts to tell the world what the ACM (Association for Computing Machinery) Ombudsman Program "apparently intends to do." What amazes me is that at no time did he ask me.

The ACM Ombudsman Program exists to resolve difficulties that may arise when people interface with computers. Specifically, our goals are to:

1) Educate the public concerning the computer's real capabilities.
2) Identify and help resolve any generic causes of computer-related problems.
3) Act as a third-party fact-finder.
4) Strive to improve interfaces between individuals and computers.
5) Respond to instances of "blaming the computer."

The program is much more extensive than Taylor imagines. In fact, it has been very successful in:

1) Analyzing computerized election systems in Detroit and Los Angeles.
2) Reporting on EDP schools in Nebraska, New Jersey and southern California.
4) Studying the Bay Area Rapid Transit System in San Francisco.

In short, the advancing knowledge of computers is becoming understood both inside and outside the ACM.

Dahl Gerberick

Chairman, Ombudsman Committee Association for Computing Machinery

New York, N.Y.
**People's Computer Center**

**EDP Program Reaches Inner-City Residents**

By Jack Stone

Special to Computerworld

It is commonplace today to read about expanded investments of computer technology in industry, science, commerce and government. And it is normal for one to relate these successes to one's own professional and personal situation. As the marketplace demands well-off economically, socially and culturally, advances in computing are directed toward the personal growth and development aspirations.

But there is another segment of our society which has an entirely different viewpoint toward computers. I refer to the citizens of the inner-city segments of American urban communities.

Because of a long history of economic and social deprivation, most of these people view the computing industry as a source of fame and riches for higher ranking social classes and perceive advances in the technology only as serving to widen the gap between the have and the have-nots who have made a successful transition from poverty to a decently paying DP job, success came only after intensive competition with better educated people.

In summary, it is difficult to identify those areas where computer technology has been of particular benefit to the poor, except for possibly the prompt and accurate distribution of welfare checks.

Recently, there has been a movement toward the establishment of a "people's computer center," in the heart of the inner city, whose goal is to apply computer technology to the solution of some of the social problems in these communities.

In the District of Columbia, Afro-American Datanamics, Inc. provides such a computer center. Carole Reintfeld, president, and Teixeira Nash, executive director, consented to an interview with me.

**Advent of 'Vax'**

The relationship between the manufacturing of computers and their selling prices has traditionally been one of very high markups, at least with the traditional "carriage-trade" price markups of 500% or more (and sometimes even 1500% or more) charged for equipment that did not hold water. Technology appeared to insulate prices and keep them high.

But finally, officially announced computer from the minicomputer market seems destined to break the immunity from market economics that has kept maincomputer prices at such high levels. Called Vax, and scheduled for announcement in October by Digital Equipment Corp., this 32-bit system is priced according to the economics of the mini industry—which maxi marketeers have been accused of robbing to make their products to which maxi marketeers have been accustomed.

Even the initial price for this computer and its successors has to be established recognizing the strength of competition from the mini market. The mini's are producing effective hardware at lower prices. So the markups will not be extremely high to start with, and they will come down as time goes on.

Really, what is happening is the beginning of the merger between minis and maincomputers—a thing that has considerable benefits for the current customers of both types of systems. Through emulation and through language flexibility of the minicomputer, the user can get the ability to use his computer to match his traditional 16-bit mini.

The maxi computer user will get the ability to use a system much like the ones he has grown up with, but at reduced, competitive hardware costs not offered by the traditional maincomputer market.

Powerful peripheral and transmission flexibility in particular will be economically available. In addition, this flexibility can be expected to be enhanced by the ingenuity of the many smaller specialized manufacturers who already have a considerable understanding of DEC's bus architecture and how to use it to its best advantage.

**Maxi Future**

What this development will do to the maxi market is anyone's guess. The key point appears to be that the end to users' automatic confidence in the maxi market first, as a proving ground for their limited purchasing power, seems destined to end the ability of these companies to provide the necessary housing for hardware and software, including the main computer's users' computer.
Dear Mr. Stone:

I read with absolute horror your column of June 20. With all the recent talk of ethics in the computer field, to write an article about training Iranian policemen in computer technology without any consideration of how this technology might be used seems incredible to me.

Perhaps the thought that Iranian policemen are attaching electrodes to the genitals of an uncooperative peasant who was located by use of a computer system your students helped design does not bother you. Personally, I could not live with that on my conscience.

Let me say that I enjoy your articles and appreciate your usual sensitivity to human issues in computing. This article, however, was such a departure from your norm that I felt compelled to call your attention to it.

I would be pleased if you could devote further articles to the ethics of supplying technology to persons who might misuse it. It is certainly an important but often ignored subject.

Saul I. Tannenbaum

Reader 'Horrified' by Stone

Reader Commentary

The project you question was originated in March 1975 by the Iranian Police Department as part of a long-range training program to upgrade its computer center personnel, broadening their skills from those relating to a second-generation batch processing operation to those relevant to a fourth-generation distributed processing environment.

The Iranian Police Department had hopes of using U.S. systems development firms to construct and implement national police systems. In anticipating of this, it wanted selected members of its staff to gain a working knowledge of American computing and police management systems.

I believe the Iranian government approached Language House of Chicago and the Public Management Systems (PMS) Division of Planning Research Corp. (PRC) of McLean, Va., to handle the English language upgrade of the programs, respectively.

I have been an entrepreneur for 10 years and owner/managing director of my own education consultancy firm for nearly five years. I believe I conduct my business at the highest level of ethical standards present in the computing industry.

Further, though the industry has been very good to me, I feel I have given much to it through the courses I have taught, lectures at public forums, papers at professional societies and my column in Computerworld.

With that in mind, it should be easy to see why I took this assignment. First, I was asked to do it by PMS, which sought me after receiving a recommendation from a sister division for whom my colleagues and I had worked over an 18-month period. PMS/PRC is a big company, listed on the New York Stock Exchange; it could have gone anywhere in the world to obtain a training subcontractor, but it came to me.

I had a very strong business obligation because PRC is a major customer of mine and it needed my help in solving a very, very difficult training problem.

Second, all of the training performed by my organization is aimed at building the skills, attitude and motivation of DP managers and technical personnel to do a better job. We do not design or construct systems for customers. As a citizen of the U.S. I strongly deplore the suppression of human rights anywhere in the world, including our own country, and I completely endorse President Carter's policy in this regard. But how do I deal with the allegations or even documentation of such violations of basic human rights anywhere?

Do I become a committee of one and reject my students and turn aside my customer and, in another dimension, discard the policy of friendship with the Iranian government, which is the established policy of the U.S.?

No, I don't believe my actions were a violation of professional ethics. Instead, I would have felt I had violated the trust my customer placed in me and would have ignored the established foreign policy of our country were I to have rejected the project.

Saul I. Tannenbaum is a programmer in Boston, Mass. Stone is president of Computer Education International in Washington, D.C., and a regular contributor to CW.
Software Leads to Simpler Coding of CICS Programs

By Don Leavitt

SAN FRANCISCO — Every once in a while, the flow of sales literature that passes over a DP manager's desk leads to something really worthwhile. That at least is the experience of a manager for an air freight forwarding firm based here.

Novo Air Freight has both domestic and international operations. The data center here, based on a 256K IBM 370/135 and a 512K 370/145 under DOS/VS, handles all accounting and shipment information for the corporation, according to Al Patrizio, director of management information systems.

The 145 supports all the teleprocessing for the firm including 40 local terminals and 110 more “spread from Alaska to Florida to New York to California,” Patrizio said. The network is used for inquiry and data entry applications for a CICS/VS-driven data base residing on multiple spindles of disk storage.

HOUSTON — The Job Documentation System (Jobdoc) from Gulf Computer Sciences, Inc. is described as a series of programs operating under IBM's OS/360 or OS/VS for the centralization and control of computer jobs and documentation.

The system, which gains its on-line capabilities through an interface to IBM's Time-Sharing Option (TSO), keeps operating system and program documentation on-line so users can work with indexed files containing the documentation. The software provides standardization and centralization, with all information available to authorized personnel at any specified location and with on-line instructions for obtaining it.

The instructions provided by Jobdoc include assistance to the job setup and control clerk on the one hand and help to cope with Abend/Restart situations on the other.

The system also includes a backup control for disaster planning including identification of critical jobs and their degree of criticality as defined by the user. Part of the disaster support includes creation of a special portable data base to go work started if required, in a new location.

The package includes Cobol and ALC modules in source form for compilation and input to IBM's JEBUDPE routine; reader-interpreter and analysis modules in object form; and manuals describing the demonstration points for Jobdoc can have the product installed for a one-time cost of $17,000. As of Sept. 1, the cost will go up to $19,500, the Gulf spokesman said.

Winter Park, Fla. — The Blis/Cobol operating system has been enhanced to support Trident disk systems as well as other peripherals attached to Data General Corp. Nova and Eclipse systems, according to Blis vendor, Information Processing, Inc. (IPI).

Among the Trident units supported in this upgrade are the T-25, T-50, T-70, T-700 and T-900. With them in place, Blis/Cobol users can work with indexed files containing up to 16 million records, with 500M bytes each, spanning eight drives, IPI claimed.

The software enables users to retrieve data from the files sequentially, randomly or by alphabetic keys. Working from the ANSI Cobol 74 compiler that makes up the system's backbone, users can access records by four different alphabetic keys, the company said.

While Blis/Cobol provides the software interface between the Trident disks and the DG minicomputers, the hardware linkage is provided by Miniconputer Technology Corp. (MTC).

The multiuser Blis/Cobol operating system includes record-level locks to avoid simultaneous updates. Indexes are maintained dynamically to avoid the need for record-level reorganizations, the company noted.

The stand-alone software system can be used on DG computers with 16K words, but 32K words is a better environment for it, the spokesman said. Blis/Cobol costs $4,000, he added from Suite 320, 1850 Lee Road, Winter Park, Fla. 32789.

Correction

NEW YORK — Copies of the June 1977 issue of the CW were mailed as "ACM Programmer Curriculum Sets Col." in the Jan. 31 issue. The June issue is available for $2 each, according to the Association for Computing Machinery, ACM, 1133 Avenue of the Americas, New York, N.Y. 10036.

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New York (914) 333-0400 Page 19 July 18, 1977 Computerworld
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Survey Flaws Seem Obvious... But Challenges Have Flaws Too

By Sam Levine
Special to Computerworld

In "New Ideas Sought to Bring Order to Professional Surveys" [CW, Apr. 4] Don Lavitt raised pertinent questions concerning the value of the Datapro Honor Roll. He said the statistical sample used in rating the packages is too small and the honor roll only. Some users are also concerned that the vendors "elected" to it. I agree on both counts.

One factor the article didn't address is the value of the questions used to rate the packages. Specifically, Datapro's seven questions deal with overall satisfaction, throughput/efficiency, ease of installation, ease of use, documentation, vendor training and vendor technical support.

The respondee is asked to assign a weighted value to each question based on a 4.0 perfect scale — just like college grades. Unlike college grades, however, the scores are not based on pure objective criteria but rather on the opinion of the person answering the questionnaire.

There is no guarantee that person is the primary user of the package. Consequently, he may not be in a position to accurately grade it. In addition, since the "grades" are purely subjective, I dare say they vary greatly depending on the mental frame of the person when he is answering the questionnaire.

The Datapro questions themselves are also ambiguous. What does "overall satisfaction" mean? Can a user really judge "throughput/efficiency" without accurately measuring it?

"Ease of installation" also puzzles me. Just about every vendor I talked to will insist the package (IBM is a large exception) so why would anyone care about how easy or hard it is to put the package on the computer? If Datapro means "ease of installation" to be a measure of machine time to install the package or program modification effort, it should say so.

The remaining four questions — ease of use, documentation, vendor technical support and vendor training — are equally ambiguous and misleading. Shops might have greatly different opinions concerning how easy a package is to use, how clear the documentation is or how good the vendor training was depending on the quality of the user. But for technical support, well, vendors are only as good as their last performance.

Levine is a consultant in New York.

Card Readers Tied To MDS Series 1200

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has enhanced its System 1200 data entry/communications software to support the use of card readers as well as keyboards for input operations.

The changes have been included in both the stand-alone Key-Display Operating System (KDSOS) for data entry and the "Concurrent" version, which allows communications functions to proceed at the same time according to a spokesman.

The upgrade lets users move data from a card reader directly to the system's disk file, eliminating tape transfer operations, or directly to a communications line to a host computer.

With the enhanced software in place, the user can attach either a Mohawk Model 2453, which has a top speed of 400 cards/min, or the 2455, which can operate at 1,000 cards/min, according to a spokesman.

In fairness to the work Datapro puts into gathering its user ratings of proprietary software, I think Levine deserves a response.

Contrary to his understanding, for example, I have no gripe with the size of the statistical sample the researchers use. They send questionnaires by first class mail to 30,000 individuals drawn from a list indicating they have a substantial interest in DP. Even if half these recipients are not from using organizations, the base itself seems adequate.

I am concerned, however, about the minimal number of raters they accept as a basis for possible inclusion on the Software Honor Roll. With the wide distribution of packages today, it is wrong to let as few as half a dozen raters "make or break" a package.

Happily, most of the 1976 "winners" had many times the minimum number of good ratings to qualify. Yet precisely that fact should encourage Datapro to boost its requirement in this respect.

DP Community Benefits

Incidentally, vendors "elected" to the honor roll are not the only beneficiaries. The whole DP community gains if the vendors compete — through enhancements, not handholding — to make sure their products show up well on such an annual forum.

On the details of the rating scheme, Levine is right — they are subjective. If there were some accurate and objective measures, there'd be no need to check user experience. The basic problem, l think, is that installations and what they try to do with packages vary widely, and standard measures just don't apply.

But by gathering and averaging a good number of individual, admittedly subjective ratings, I think Datapro can come up with reasonably valid ratings on how well a product measures up in a typical (whatever that means) situation.

The real problem, and one that Levine recognizes too, is that Datapro has no control over who actually answers the questionnaire. I'd like to see a good solution to that one.

I agree the questions are ambiguous, but for the same reason the ratings are subjective — we have no fixed metrics applicable to software. Despite possible disagreemen t over detailed meanings of any term, however, most of us can appreciate the basic meaning of the final scores.

Because they are averaged, they probably reflect how well a package does in a typical situation. And it probably does an adequate job comparing ratings of competing packages to see which seem worth evaluating in depth.

Any survey that can help users that much has to be a welcome addition to the community.

XCS Offers Price Break On Distributor Service

EL SEGUNDO, Calif. — Xerox Computer Services (XCS) has reduced prices approximately 10% on the Xerox 1-2-3 System, an on-line service for software distributors. Cost of the service can be as low as $750/mo, according to a spokesman.

The 1-2-3 System provides integrated order processing, inventory control, accounts receivable and sales analysis applications for distributors with annual sales as low as $500,000, he explained.

The $750/mo figure is a minimum charge for use of the system but seems to apply to many of the users on this "start-up" service, he added.

XCS provides remote computing network facilities throughout much of the country and is headquartered here at 701 South Aviation Blvd., El Segundo, Calif. 90245.
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Ontario and Charlottetown in Prince Edward Island on July 1.

The Computer Communications Group of areas have been added to TheCTS Expands Service.

Dataroute, the digital data standard item, according to the firm.

formation at $250, has become a standard item, according to the firm.

The brochure offers a convenient listing of equipment available, but does not offer in-depth product descriptions.

Mercedes, a need, has been located at 822 Airport Blvd., Burlingame, Calif. 94010.

**Lear Cuts ADM-3 Price**

AN AURIFM, Calif. — The Data Products Group of Lear Siegler's Electronic Instrumentation Division has dropped the price of ADM-3 Dumb Terminal $100 and included a one-once optional feature in the package.

The base price is now $895. In addition, a 24-line, 1,920-char. display capability, formerly an option at $250, has become a standard item, according to the firm.

**TCVS Expands Service**

OTTAWA, Ont. — Four serving areas have been added to The Datavote, the digital data network provided by The Computer Communications Group of the TeleCanada Digital Telephone System (TCVS).

The addition of Brantford, Chatham and St. Catharines in Ontario and Charlottetown in P.E.I. makes possible, for the first time, will bring the number of Datavote serving areas to 36.

**Dataroute Inaugurates Usage-Sensitive Net**

By John P. Hebert

Off the CW Staff

MEMPHIS, Tenn.— The Datacom Co. based here is offering a usage-sensitive data communications network alternative for business users which reportedly can interface any terminal protocol.

The nonprofit wholly-owned subsidiary of Data Communications Corp. (DCC) here operates a nonregulated national packet-switched network service which converts users' terminal-to-CPU data communications into a standard speed and code format. The service utilizes microprocessor-based communications controllers developed by Datacom and Universal Data Systems, Inc., according to a Datacom spokesman.

Any users opting for the full-duplex transmission network service can save money compared to the costs of using any other carrier's network service, he claimed.

The network uses leased, unconditioned voice-grade lines from AT&T to transmit users' data at 4,800 bit/sec, he said.

Because the network was originally developed for — and is still shared by — users of the parent company's Broadcast Industry Automation System (BIAS), business users are given a discount on data transmitted between the hours of 8 a.m. and 6 a.m., following the previous evening, according to the spokesman.

Datacom transmits users' data in 12-character packets. Subscribers are charged to transmit kilopackets of data anywhere in the continental U.S. at a rate of $1.70 per kilopacket during the daytime hours (between 6 a.m. and 8 p.m.) and $0.50/kilopacket at night, he said.

Users, however, are not restricted as to when they are able to access and use the network facilities, the spokesman explained.

To access the network, users must either buy or rent a microprocessor "black box" from Datacom for $2,000 or about $100/mo on a one-year lease, he said.

Procruring a line interface between the users' terminal or CPU and the network nodes in 85 U.S. cities is up to the user and is not an extra network cost, according to the spokesman.

The company guarantees users their buffers will arrive at destination; and the network also offers other features, he said.

Datacom may upgrade the network to operate at speeds above 4,800 bit/sec if there is a need, he said, adding the company is looking into the possibility of changing from voice-grade lines to Bell's Digital Data Network service digital line offering.

The Datacom Co. is located at 3000 Direc- tor Drive, Executive Plaza, Memphis, Tenn. 38131.

**ITT Readies Shared User Network**

By John P. Hebert

Off the CW Staff

NEW YORK — ITT Corporate Communications Systems, Inc. (ITT-CCS) late last month received approval from the Federal Communications Commission (FCC) for an interstate common carrier service for primarily voice but also business data communications.

ITT's seven proposed switching centers in the U.S. are designed to provide users with network management controls of line and trunk equipment on a real-time basis, he said.

CCS anticipates filing rates with the FCC for (Continued on Page 25)

**'Calls' Diagnose Phone Faults**

HAMILTON, Ont. — A service operator for Bell Canada here responds to telephone sub- scriber trouble calls by using a Westinghouse Canada Ltd. W1600 CRT terminal to input the subscriber's telephone number into Bell's Centralized Automated Loop Reporting System (Calrs).

Calrs is designed to reduce to minutes the time required to diagnose and take corrective procedures on customer telephone or telephone line problems.

Minicomputer Technology

The system uses minicomputer technology to store and retrieve information and to perform up to 15 measurements plus operating checks to diagnose faults in customer equipment, ac- cording to Westinghouse.

The operator of the computer terminal asks a series of questions and then types the subscriber's answers into the system, which diagnoses the problem. More complicated pro- blems are transferred from the operator's ter- minal to a senior repair technician for analysis and solution, Westinghouse said.
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The interface consists of two adapters which connect to the modem and terminal option which reportedly allows their Pacer Model 103 data line monitor and simulator equipment in conjunction with transmission facilities they own or lease from any other common carrier.

The company also did not research the advantages or disadvantages to users of the 3,440-character display, the spokesman admitted. He said it did, however, alter the necessary electronics in the terminal within two weeks after IBM announced the model 3276 and 3278 additions to the 3270 CRT family (CW, May 23).

Harris also announced a large-capacity 3270-compatible CRT terminal, but did not show its engineering prototype to NCC attendees. IBM's 3276 and 3278, however, have not been shown or demonstrated publicly. The terminals will not be available until well into 1978, according to IBM.

According to the Four-Phase spokesman, his company has no obligation to manufacture or deliver such a terminal to users until IBM does so.

The major reason for producing 3,440-character terminals, an industry source pointed out, is to display the contents of one standard typewritten, single-spaced page on the CRT screen.

The company's second offering, CCSE, will provide the user only with access to the high-volume-capacity switching equipment.

It will require that a large user contract for the use of a minimum number of ports; billing will be based on a monthly per-port charge plus a one-time installation charge for each port used, CCS said.

In July, the minimum number of ports was expected to be 96, the installation fee $60/port and the monthly charge $520/month (CW, May 31, 1976). CCSE will allow large telecommunications users to custom-design their own network using the ITT-CCS switching equipment in conjunction with transmission facilities they own or lease from any other common carrier.

CCS is located at One Whitehall St., New York, N.Y.
LITTLE ROCK, Ark. — "It's ironic, we're actually promoting deflation," according to James T. Randolph, director of Arkansas' department of computer services. Randolph was discussing the state's disk storage equipment.

With the installation of Memorex Corp., 200M-byte disk drives to replace the previous 100M-byte drives supplied by IBM with the state's two 370 CPUs, storage capacity of the disk subsystems has been increased by 75%, while floor space requirements have been reduced by over 50%, Randolph said.

At the same time, the state is able to charge all of its agencies 5% less for central DP services, he said, noting that with the expanded capacity, tasks such as a sales tax application can now be added to the system.

A detailed 30-day study by an evaluation team of computer technicians ultimately led to the decision to award a contract to Memorex for its Model 3675 200M-byte disk drive, according to Randolph. In response to the state's request for proposal to four vendors, three responded as willing to undergo evaluation tests in accordance with the 95% availability requirements then set by the state department of computer services, he said.

Limiting Factors

Managers at the state's DP facility had several constraining factors affecting the decision to upgrade the disk subsystem, including limited floor space and an air conditioning system already at its peak, Hall explained. In addition, the new equipment had to meet the 95% availability criterion, allowing only 5% downtime for all maintenance, including preventive maintenance, over the state's 33-year period.

In more recent months, the state has increased the availability requirement for all of its DP production equipment to 98%, a requirement the disk subsystem has also met successfully, according to a Memorex spokesman.

The state's disk storage subsystem, which is shared between a 370/158 and a 370/145, both of which operate under Release 6 of the operating system, will be capable of supporting 372 storage control units. All of the drives are switchable between both CPUs for maximum system reliability, he said.

The state's disk storage subsystem, which consists of 32 IBM 100M-byte disk drives, had a capacity of 3.2 billion bytes. Air conditioning requirements for the Memorex equipment remain about the same as for the replaced drives, Hall indicated.

The Memorex drives were introduced to the facility gradually, according to Hall. At first, one string of eight spindles were installed, and at two-week intervals the remaining three strings were added. The four 3673 disk controllers are connected to the two 3672 storage control units. All of the drives are switchable between both CPUs for maximum system reliability, he said.

"We can perform string switching between CPU channels and switch control units as well," Hall explained. "That is, if one controller develops problems, the other one is switched to carry more of the load. This capability enables that we never lose an entire portion of the disk subsystem." Each 3672 has the capability to read all units in the subsystem.

The emphasis on reliability and backup has been maintained largely because the system serves the state's Criminal Justice and Highway Safety Information Network. This network operates 49 terminals located at state and local police departments and at the state's Criminal Justice Division, and it connects to the National Crime Information Center.

(Continued on Page 30)

In addition, DPer's have failed to adequately explore alternatives, properly estimate development efforts in the area and properly anticipate the resistance to such projects, Poppel charged. Finally, there has been a failure to gauge the impact of information resources and a failure to control the results of information resource efforts.

Today, users are facing an even "more difficult" environment where DP, communications processing and word processing are all interacting and affecting "human processing" within organizations, Poppel suggested.

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LITTLE ROCK, Ark. — "It's ironic, we're actually promoting deflation," according to James T. Randolph, director of Arkansas' department of computer services. Randolph was discussing the state's disk storage equipment.

With the installation of Memorex Corp., 200M-byte disk drives to replace the previous 100M-byte drives supplied by IBM with the state's two 370 CPUs, storage capacity of the disk subsystems has been increased by 75%, while floor space requirements have been reduced by over 50%, Randolph said.

At the same time, the state is able to charge all of its agencies 5% less for central DP services, he said, noting that with the expanded capacity, tasks such as a sales tax application can now be added to the system.

A detailed 30-day study by an evaluation team of computer technicians ultimately led to the decision to award a contract to Memorex for its Model 3675 200M-byte disk drive, according to Randolph. In response to the state's request for proposal to four vendors, three responded as willing to undergo evaluation tests in accordance with the 95% availability requirements then set by the state department of computer services, he said.

Limiting Factors

Managers at the state's DP facility had several constraining factors affecting the decision to upgrade the disk subsystem, including limited floor space and an air conditioning system already at its peak, Hall explained. In addition, the new equipment had to meet the 95% availability criterion, allowing only 5% downtime for all maintenance, including preventive maintenance, over the state's 33-year period.

In more recent months, the state has increased the availability requirement for all of its DP production equipment to 98%, a requirement the disk subsystem has also met successfully, according to a Memorex spokesman.

The state's disk storage subsystem, which is shared between a 370/158 and a 370/145, both of which operate under Release 6 of the operating system, will be capable of supporting 372 storage control units. All of the drives are switchable between both CPUs for maximum system reliability, he said.

The state's disk storage subsystem, which consists of 32 IBM 100M-byte disk drives, had a capacity of 3.2 billion bytes. Air conditioning requirements for the Memorex equipment remain about the same as for the replaced drives, Hall indicated.

The Memorex drives were introduced to the facility gradually, according to Hall. At first, one string of eight spindles were installed, and at two-week intervals the remaining three strings were added. The four 3673 disk controllers are connected to the two 3672 storage control units. All of the drives are switchable between both CPUs for maximum system reliability, he said.

"We can perform string switching between CPU channels and switch control units as well," Hall explained. "That is, if one controller develops problems, the other one is switched to carry more of the load. This capability enables that we never lose an entire portion of the disk subsystem." Each 3672 has the capability to read all units in the subsystem.

The emphasis on reliability and backup has been maintained largely because the system serves the state's Criminal Justice and Highway Safety Information Network. This network operates 49 terminals located at state and local police departments and at the state's Criminal Justice Division, and it connects to the National Crime Information Center.

(Continued on Page 30)

In addition, DPer's have failed to adequately explore alternatives, properly estimate development efforts in the area and properly anticipate the resistance to such projects, Poppel charged. Finally, there has been a failure to gauge the impact of information resources and a failure to control the results of information resource efforts.

Today, users are facing an even "more difficult" environment where DP, communications processing and word processing are all interacting and affecting "human processing" within organizations, Poppel suggested.

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Inquiry System Helps Firm Style Product Line

MERRIAM, Kan. — A terminal-based inquiry system is helping the H.D. Lee Co., Inc. plan, monitor and react to the ever-changing needs of the apparel industry. The system meets these needs by allowing personnel to access files and ask spontaneous questions regarding all aspects of the company’s clothing business.

With other systems, a program has to be written and stored for each specific question that is to be asked and answered. But with the system Lee uses, IBM’s Interactive Query and Report Processor (IQRP), there is virtually no limit to the type and number of questions: if the facts needed to answer them are on file, the system provides the answer in about 20 seconds. This can lead to another question, another answer, etc., in a conversational “what if” sequence, if desired, according to Peter D. Day, manager of merchandise planning.

To ensure that these facts are there for merchandise planning, for example, Lee has developed a file of sales history for previous seasons. Each lot number has been identified by some 20 variables. The system permits Lee management to look at trends by one or any combination of these variables. Also stored is data on the current season, including sales, forecasts, production quantities and a projection of sales data.

Clearer Picture

With this information available to be shuffled and manipulated as the terminal user wants, the system gives Lee management a view of the overall merchandising structure and complexity that was impossible to achieve before, Day said. It also provides a capability to survey and define, to clarify specific merchandising objectives and to analyze whether these objectives are being achieved.

“In the apparel industry we all recognize that mistakes lead to expensive obsolescence,” Day said. “But since IQRP was implemented in the spring of 1976 it has helped us make the positive decisions that generate profits, not mistakes,” he added.

For example, the terminals are to do the most effective job of planning our product line, making our piece-goods commitments, gearing up our manufacturing plans and sending our salesmen off in the right directions. We must have a good idea of how successfully each specific product classification sold in past years. But we must also look for ways of reducing the product category in terms of what we believe current market conditions will be, not as we would have defined things two years ago,” Day explained.

“For the system to work, IQRP enables someone like me who knows nothing about DP, to sit at an IBM 3270 video display terminal and interpret history so that we can redefine each marketing classification as it should be today. This was impractical to do manually,” he noted.

“Instead,” Day said, “in preseason planning, the system enables us to formulate overall sales goals by product categories and give merchandise assignments, by type and quantity, of product needed to yield the demonstrated goal by line.”

Further, the data enables Lee personnel to develop a detailed merchandise planning report. It is set up by fashion group and within each group, by a breakdown of units, percentage to total for the season, count and yield — by month for the past six seasons, then the forecast for the next two seasons.

Lee managers can look at these figures over time and make a forecast through the next season by fashion group and by total for the division. Fashion groups change, of course, and IQRP enables Lee to change with them easily. Trying to do so with manual data would be difficult, Day noted.

“We can also do price-point analysis, breakdown season fashion group forecasting by fabric type and tell the merchandising what his budget is by each fabric type,” he added.

“Thus, we can start with the company budget for the year, then break it down by division, by season, by fashion group and down to the level of line.”

The system is also of value outside the merchandising area. For example, purchasing personnel needed to make a long-range commitment on corduroy. Therefore, Day just keyed in the words “subtotal corduroy by season” and the terminal displayed the needs companywide by season, plus an 18-month history of corduroy usage. By looking at trends, he could derive a reasonably accurate forecast.

In addition to preseason planning, Lee personnel use IQRP in season, mainly to support the fashion group forecast. Then, the terminal produces a view of the overall merchandising area. For example, purchasing personnel needed to make a long-range commitment on corduroy. Therefore, Day just keyed in the words “subtotal corduroy by season” and the terminal displayed the needs companywide by season, plus an 18-month history of corduroy usage. By looking at trends, he could derive a reasonably accurate forecast.

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Textile Rental Companies Cooperate on Mini Venture

By Esther Surden

IN midsummer, when the economy is sometimes down, a textile company's competition is all getting one, according to Theodore Kline, vice-president of Markman and Associates.

Kline, who has more to lose than the user, said the user's business is at stake. And, for the most part, it is the user who knows the least about which system is right or wrong for the business applications he wishes to automate.

This is the first installment of a three-part series dealing with successfully installing a turnkey minicomputer. Next week's installment, also addressed to small business systems and practical advice on making some postings yourself, the report continued. It suggested a list of questions to vendor's reference lists, the report continued.
Switch From Service Bureau Saves City $2,700/Year

By Esther Surden
Of the CW Staff

CARIBOU, Maine — The city of Caribou is saving an estimated $2,700 yearly in service bureau fees and has cut part-time personnel with the installation of a small business system.

The city, with a population of 11,000, needed a system to perform its tax assessment billing application, a complicated task that had formerly been handled manually, according to Terry St. Peter, city manager.

"We looked at several small machines," he said, including systems from Burroughs, NCR, Olivetti and Digital Equipment Corp. The city also looked at IBM, but less closely than the others, he indicated.

"We looked at hardware and software together. We had no computer programming capability here, so we needed to buy packages that had proved themselves," he added.

"The DEC Datasync 310 seemed to be the right thing for an IBM 3 but for less cost. It offered the necessary flexibility but on a basis that we could afford," he said.

Turnkey Vendor

The city got its system through a turnkey vendor, DATAsystems of Maine. "They were just starting up at the time we started this venture. I believe we responded to some circulars. We have never had any direct dealings with Digital," St. Peter said.

Prior to the installation of the system, the city had hired an extra part-time person assigned to help with the tax assessment chore.

The clerk helped the existing office staff type the evaluation book, then followed that up by typing the bills one at a time — all 5,000 of them.

"Then we had to type a collection book," which records the receipts from the taxpayers.

"Now the system takes care of the entire application from start to finish, according to the vendor," St. Peter said.

The city is also performing a payroll application for the municipal employees and the school district on the small sys-
tem. Previously, although the city was responsible for the school department's payroll, it was con-
tracted out to a bank to be done on its computer.

"We did our own municipal payroll of 90 employees by hand," St. Peter said.

Both payrolls are now handled by the small business system via two payroll packages bought from DataSystems. It covers about 330 people on the city's payroll.

"We would expect to still buy packages, but I'm hoping that this will give us the capability to make some changes and maybe do some small programs here," St. Peter said.

A voter registration package is on the agenda to be placed on the system as soon as it is programmed in-house, he added.

"The sewer district is now purchasing a sewer billing package for use on the system as well," he noted.

Slow and Careful

"We have really gone about this slowly and carefully. We recog-
nized we were on the ground floor with this software house that was just beginning; and we have really had to make some changes in order to develop the system to our satisfaction with their cooperation," St. Peter said.

It took a little longer than antici-
pated, he noted, but presented no real problems to the city.

After Lightning Strikes

User Mixes Memory From Independents

By Frank Vaughan

UPLAND, Ind. — Officials of a university computing center here are operating their minicomputer with add-on memories from two different manufacturers, following a lightning strike that crippled the system last summer.

As a result of that lightning inci-
dent, Taylor University's Digital Equipment Corp. PDP 11/40 is currently operating with 28K words of DEC core, 32K words of Cambridge Memories, Inc. and 32K words of Fabri-tek add-on, according to John Kastelien, director of the computing center.

The university purchased its 11/40 in November 1973. The mini came configured with 28K of core and operated in that configuration until the summer of 1975 when the decision was made to use DEC's RSTS-E operating system, he said.

RSTS-E required 30K of memory, so the university purchased 32K from Cambridge to facilitate the operating system, he noted. No difficulties were en-
countered with the Cambridge add-on until the lighting strike crashed the system in June 1976.

"We had a DEC repairman come in and he worked on the sys-
tem for three or four days and finally fixed the equipment. The Cambridge memory was knocked out, so we shipped the boards off to Cambridge and resigned our-
selves to the fate of not being able to run our RSTS-E until they came in," Kastelien said.

Deadlines Closing In

One week after the boards were sent back, the Cambridge plant closed, because of financial dif-
ficulties, leaving the university with no memory, no commitments and no hope of meeting the re-
quirements for the short term registration deadlines that were drawing near.

"Since we had no idea what was going to happen at Cambridge, we made a contacted purchase of 32K from Fabri-Tek, providing they could loan us a system until they could ship a permanent re-
placement," Kastelien said.

"Fabri-Tek came through with the memory for us and we were on our feet gain," he said.

Meanwhile, Cambridge Mem-
ories reopened and returned the lightning-struck boards to Taylor. The boards didn't work, so this time Kastelien followed boards, cage, power supply and everything, he said.

By December the university had both the Fabri-Tek and the Cam-
bridge memories on-line and operating.

"At this point in time we are considering adding another 32K of Fabri-Tek, especially since the interfacing has gone so well," Kastelien said.

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Support Computers
Micos II for Small Businesses Uses Proven System Software

ELMSFORD, N.Y. — Minicomputer Systems, Inc. has introduced a lower cost version of its Micos business system. The Micos II is "a stripped-down version" of the larger Micos system and is designed to satisfy user requirements for a flexible system with proven systems software as well as applications, the vendor said.

It is said to be comparable to the Microdata Corp. Express and IBM System 34 and can accommodate high-speed data transmission either from terminals or in system-to-system networks.

The basic system includes a 65K Data General Corp. Nova 3/4 CPU, a 10M-byte disk drive, line printer, CRT and the Micos II operating system. The system takes advantage of a recently introduced application software product called Application Programming Tools (APT), the company said.

APT offers the facility of faster program development through the use of program generators for input screens, files and reports. The programming language used with APT is called Extensive Basic, an MCS spokesman added.

The Micos II system can be used in stand-alone mode or in distributed processing applications. The basic system costs $28,750 from the firm at 325 Executive Blvd., Elmsford, N.Y. 10523.

Turnkey Choice Needs

Users' Involvement

(Continued from Page 31)

In summation, the user must:

- Know what he wants to accomplish.
- Take the time to have a feasibility study done or have the system designed correctly, the first time.
- Test the system before it is installed.
- Run his existing parallel system before stepping into the deep unknown.
- Install a system slowly, making certain that it meets or exceeds established benchmarks and criteria.
- Visit other existing user installations and obtain a candid critique of their experiences with the system.
- The hardware should be:
  - Capable of performing present tasks and future, realistic tasks for five to seven years.
  - Manufactured by a reputable hardware manufacturer.
  - Proven/justifiable.
  - Complete without hidden, open-end software programming charges.
  - Proven effective as quickly as possible.
  - Delivered, installed and operational within a few weeks.
  - The vendor's responsibility is to:
    - Know what his system can do.
    - Not sell or undersell hardware.
    - Understand the software job the user wants and either be prepared to do it at a fair price or tell the user to get someone who can do it — before he accepts the order.
    - Avoid agreeing to unrealistic deadlines.
    - Respect the customer.
    - Treat the customer's business as if it were his own.

Deschamps is president of Turnkey Sales & Leasing, Inc., New York, N.Y.

Aris Turnkey Performs Publishing Applications

PLAINVIEW, N.Y. — Aris Associates is offering a minicomputer-based system for publishers with 2,000 to 4,000 titles in inventory.

The system can handle 300 to 600 orders per day, order picking, invoicing and accounts receivable, according to the vendor. In addition, subscription fulfillment for up to 10,000 subscribers per issue can be processed on an on-line basis for monthly and quarterly issues in combination with book orders, according to a spokesman.

Other applications that can be handled on the system include purchase order control, inventory replenishment, accounts payable and general ledger.

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Sykes Floppy Fits IBM 5100

ROCHESTER, N.Y. — The Comm-Store/5100 is a floppy disk system designed for use with the IBM 5100 portable unit, according to its vendor, Sykes Datronics, Inc.

The system is said to fill several needs unanswered by the IBM 5100 it produces floppy disk media readable by larger IBM systems and provides a random-access capability, a spokesman said.

The microprocessor-based unit plugs directly into the IBM 5100's serial I/O port without changes to the 5100 hardware or software, Sykes claimed. The Comm-Store comes supplied with a tape cartridge containing 10 Basic key files and 14 APL functions.

A single drive costs about $1,000 and a dual drive is priced at $4,000 from Sykes at 375 Orchard St., Rochester, N.Y. 14606.

A typical system includes 64K of memory, two 10 million-character disk files, a 600 line min printer and two CRTs and costs $85,000 including software.

A basic system with a low-speed printer and one CRT costs $39,000. The firm is located at 20 Central Park Road, Plainview, N.Y. 11803.

July 18, 1977
Agents Match Clients, Houses With Help From Mini

Special to Computerworld

MELVILLE, N.Y.—A mini-computer has proven to be the key to opening doors for real estate agents here.

The system, located at Multiple Listing Service of Long Island, Inc. (MLS), has been credited with making the job of finding the right house for the right client much more efficient.

MLS is an amalgamation of 659 participating offices in the real estate home market in Queens, Nassau and Suffolk counties.

Of all the minicomputer's functions, the one that seems to trigger the most sales is a residential analysis done on the portable terminals the agents use. One broker reported the analysis has brought him a minimum of one home sale a month—at an average price of $60,000—since the system was installed in April.

The analysis is often the clincher for the prospect who isn't sure he can afford the home, according to Val Mason of Butterfield Realty. The prospect is asked to provide the amount of his monthly rent and his estimated income. Once that's in, the computer terminal prints out the price he can afford without spending more than he does now.

The terminal also prints the income tax benefits which will accrue based on his real estate tax based on amortization and a 5% interest rate. When that data has been entered, the terminal prints out an amortization schedule and a 5% interest rate loan.

For example, a father of one earning $20,000 a year and paying $375 a month for rent finds that the same payment will bring him a $45,000 house in which, based on the formula, he will have a $23,055.90 equity in five years and a $41,402 equity in 10 years.

According to realtors, the terminal's printout of these compilations is generally seized upon by the prospect for further study at home.

Listing Update

The bread-and-butter function of the system, and one which relates directly to MLS's prime function, is the listing update.

With the system, all listings received from the association are entered into the mini and immediately available to the terminal subscribers. Members not on the system receive their information by messenger up to 24 hours later.

Because of the competitive edge it gives them, many of the subscribers request the listing updates three times a day.

Subscribing agents can also enter their prospect's requirements—such as number of rooms, baths and preferred neighborhood—by code so that another agent can search through them. If he has anything which satisfies the requirement, he can then contact the prospect's agent and suggest that a particular home listing with calling agent be shown.

On the selling side, through its ability to compare, what similar houses have sold for and are currently selling for, the system helps agents keep their clients aware of reality. When a homeowner comes in to list a house, he often has an inflated idea of what it will bring. The system can print out a list of comparable homes which are on the market now and against which his home is, in effect, competing.

Since it was introduced in April, the system has grown consistently. So far, approximately 18% of MLS's membership has signed up. According to Margaret Wolf, "that is about the number of agents and clerical employees which can be trained at MLS headquarters in Melville, Long Island."

The only charge for the system is $158 per month for the terminal.

One Complaint

The only complaint about the system is that when the new listings come in—seconds after they have been entered—they lack the photograph that is a standard part of the manually distributed hard copy.

However, as one broker pointed out, "We are beginning to find out what the lack of the photo is an advantage. If we get a match between a listing and what the prospect has asked for we can tell him we've got just what he asked for."

"Sometimes with the photograph we tell the prospect that and he says 'Yes. That's what I asked for, but I don't like it.'"

The system is a Hewlett-Packard 21MX, programmed by Realtronics, Inc. of McLean, Va.

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See our retail advertisement on page 32
**IBM Trial Testimony Reveals CDC's Expectations, Plans**

By Edith Holmes

**Continued on Page 39**

The OEM business is more sensitive to slowdowns in the economy as a whole, Brown told the court. CDC's expectation of two more recessions over the next five years is stronger than its current revenue growth expectations for this area.

On the other hand, in times of economic recession or depression, users are more likely to invest in peripheral equipment in hopes of improving the overall performance of their computer systems, he said.

This is part of the reasoning behind CDC's expectation that its peripheral systems business, which includes IBM plug-compatible peripherals, will increase 22% each year in revenues for the next few years. The corporation's business products area is expected to grow 19% in revenues annually through 1980, according to the draft plan.

Producing forms, a full range of disk products and computer room supplies, the business products business is a "cash cow," a business that generally has a positive cash flow, Brown noted.

Finally, the CDC executive noted that the data systems area of the peripheral business is projected to increase between 9% and 10% per year in revenues.

Much of the OEM business is free of the risks associated with the IBM plug-
OAK BROOK, Ill. — On April 29, Joseph A. Piscopo cut the first slice of a giant birthday cake—a confection celebrating the eighth anniversary of Pansophic Systems, Inc.

Piscopo, president of the firm, founded it in 1969. Before the first year was over, the first software product had been written and by 1970 it was being vigorously marketed. That product, called Panvalet, has become a standard in program management, security and control, he said.

When Pansophic was formed—just prior to IBM's now-famous decision to "unbundle" and separately price its computer software and services from its computer hardware—it was initially engaged in consulting services, systems design and programming for firms in the Midwest. It had three computer software specialists and a small office just west of Chicago.

A great number of new firms appeared starting in 1969, since IBM's decision to unbundle provided the opportunity and the impetus for the emergence of a new subindustry of independent software suppliers. The capital requirements were minimal. There was a vast opportunity available for the development of generalized computer software products which could be readily marketed to over 20,000 IBM computer users around the world.

The software industry has been volatile in the last eight years. Of the more than 700 software companies formed in 1969, only a handful are in business today, and only two are profitable, Piscopo said, noting Pansophic is one of the more profitable ones.

Sales Figures

"Pansophic reported a record $7.2 million in sales for the fiscal year ending April 30, 1977. This represents nearly a 45% increase over the previous fiscal period ended April 30, 1976," Piscopo said.

"Earnings for 1977 were 690% greater than for 1976. The major source of this increase was international sales, which increased approximately 80% over last year's figures.

"For the sixth year in a row, Pansophic paid $50,000 in dividends to shareholders," he added.

"We look for some reduction in overall processing costs resulting from hardware technology advance, coupled with a continued strong increase in user acceptance of packaged software," Piscopo continued.

"The software industry is maturing to the point where an ongoing research and development effort will be sustained. We expect an explosion of innovative technological developments to occur over the next four to 10 years, particularly in systems software," he said.

Piscopo feels users can expect more variety of product offerings, improved reliability and flexibility, high performance and operating efficiency.

"Independent suppliers," he said, "will provide even more effective training, better documentation, and more capable product services and local support personnel to serve their users and support their products. Extended capabilities of improved features will be included in design consideration for future products."

Widely Used

Marketing of Panvalet in the U.S. began early in 1970 and expanded to worldwide markets in 1971. Today Panvalet is one of the most widely used software products ever developed. In fact, at the recent international Computer Programs, Inc. (ICP) Million Dollar Awards in Chicago, Panvalet received awards for having sales over $10 million and having over 3,000 customers.

Pansophic acquired exclusive marketing rights in May 1973 to another product, Easytrieve, an information retrieval and file management system. Easytrieve has also been highly successful and received ICP awards for having sales totaling over $5 million and over 1,000 installations.

Pansophic has also developed Pan*Da, a disk analysis and data set management system providing large computer users with an effective tool for efficient management of magnetic disk storage devices. Total Pan*Da revenues to date exceed $200,000, with 200 installations.

Throughout its history, Pansophic has dedicated itself to market only software products of the greatest benefit to users and with high standards of technical excellence and reliability, Piscopo said. The company has made a total commitment to support the needs of users through a high-caliber customer service staff, he indicated.

Easy-to-use software, built-in printer, large screen, more memory.
With Coming of National Health Insurance

DP's Share of Health Insurance Dollars Seen Growing

By Teri Wiseman
Of the CW Staff
MENLO PARK, Calif. — Health is the third largest industry in the U.S., with 1976 expenditures of $140 billion and an additional $43 billion in federal expenditures, or 11.4% of the entire federal budget.

The data processing share of administrative costs ranges between 15% and 30%, yielding a commercial market for Medicare, Medicaid and Champus (a military payment system) of $292 million. Another $100 million is being spent in-house by the states and an additional $20 million goes for other expenses, according to a recent report by Input, Inc., a market research firm here.

This $412 million for fiscal 1976 does not include amounts spent by the federal government internally for DP, it added.

The report noted that the advent of National Health Insurance (NHI) could raise the federal expenditure forecast for 1980 by as much as 131%.

The Medicare, Medicaid and Champus programs are generally managed by fiscal intermediaries, carriers and contractors, who subcontract DP activities to commercial vendors, Input said, citing California as an example. Maryland, it said, is an example of a contractor which does its own DP.

“Barriers to market entry, which can often be erected through proprietary software, will be less of a factor in the NHI environment for the first couple of years. This is because of the uncertainty, at this time, of the exact characteristics of the final legislation. “HEW is most likely to take a model system approach with NHI. This method is attractive to vendors who wish to obtain processing contracts to use software that conforms closely to the federal standards,” Input said.

“One way for vendors to gain an early entry into the NHI world would be to participate in development of that model software,” the report suggested.

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A high-level business-oriented language that greatly simplifies forms generation and procedures for data entry and local processing. Programs can be developed interactively on the 770 without ever writing lines of code. And, of course, TI offers total service and support, including flexible maintenance plans and a nationwide network of factory-trained customer service engineers. For your distributed processing needs, TI clearly has a better solution. For more information, mail back the coupon. Or call your nearest TI sales office or Terminal Systems Marketing, (713) 494-5115, ext. 3116.

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Plans Product ‘Hierarchy’

CDC Continuing R&D on Mass Storage System

By Edith Holmes

NEW YORK — Between $15 million and $20 million has already been spent by Control Data Corp. on its CDC 38500 mass storage system, and the research and development expenditures are continuing, according to Gordon Brown, CDC’s vice-president for marketing and planning.

CDC expects mass storage systems to become commonplace and so plans to put the 38500 out through a series of product offerings over the next several years, Brown said here recently during his testimony as a U.S. government witness in the trial of the antitrust case against IBM.

The CDC executive described his corporation’s plans in this area broadly — as a “hierarchy of products” with interrelationships and interdependence.

CDC expects its mass storage systems to satisfy three kinds of users: those with IBM systems, those with CDC systems and those who occupy the OEM marketplace.

The $15 million to $20 million to which Brown referred has been expended only to develop products related to the total 38500 configuration.

Brown estimated that the basic technology work done by CDC in the mass storage area cost between $3 million and $4 million.

Research and development on the Vdam — the software required by the system and consisting of staging packages designed to be used with a variety of mainframes — has eaten up approximately $6 million.

Another $2 million has been spent on enhancements to the CDC system, which currently has two users, and on follow-on versions of the mass storage device, he stated.

Much of the R&D cost for the system has been allocated to a CDC subsidiary, Computer Peripherals, Inc., which was formed in April 1972. As of October 1975, when his deposition in U.S. vs. IBM was taken, Brown said about $8 million of these costs had been deducted directly from CDC’s accounts.

Unlike the creation of its disk products, CDC began development of the 38500 three years before IBM announced its product in this area in October 1974.

During the basic R&D period for the 38500 — between the middle of 1972 and late 1974 — CDC spent approximately $10 million on the system. In 1975, another $4 million was spent, and a similar amount was expended in 1976 on this project, Brown said.

CDC had its first 38500 user by September 1976, but the product has caught on slowly.

“Our expectations were that the IBM systems users would accept the mass storage system concept earlier than he did,” Brown said.

In addition, CDC expected to sell more mass storage devices in 1976 than it did, the short months of sales quotas for the 38500 last year.

Other peripheral sales made up for this short fall, causing CDC’s overall market objective in the area for 1976 to be exceeded by 10%, he stated.

CDC’s mass storage system incorporates technology significantly different from that employed by IBM’s 3850 mass storage product, Brown indicated. There was some feeling in CDC that if IBM engineered its storage device one way, CDC should give the resources to IBM to bear on such projects.

Brown said he continues to believe, however, that the CDC line head encoding technique is superior to anything IBM has developed in the mass storage area.

’SPLICE’ THE AFFORDABLE COBOL PRECOMPILER

(Continued from Page 35)

compatible peripherals business, Brown said.

In the plug-compatible area, however, he said CDC’s general plan is “to capitalize on any substitute business opportunities available.”

Smaller Revenue Base

Greater growth can also be projected for plug-compatible systems because they comprise a smaller revenue base — $75 million compared with CDC’s OEM revenue base in excess of $150 million, Brown added.

Continuing his explanation of the principles that are easier to do and more dramatic gains in small revenue base areas, Brown cited the small dollar values presently generated by the IPI, Omega 480-1 and Omega 480-2 systems and by CDC’s 38500 mass storage system.

With small dollar values associated with either of these products, he expects to see compound growth rate of approximately 30%. In other words, he explained, you don’t have to sell many peripherals systems which include the Omega and mass storage devices to reach a 20% growth rate of the $75 million revenue base; you just have to sell 20 of these systems each year, he suggested.

IBM does impact CDC’s short- and long-term planning. Brown told the court it is critical to CDC to evaluate where its products stand in relation to those of IBM, he stated.

The CDC vice-president identified three kinds of risks: marketing risks, or “Can we sell the product we produce?” technology risks, or “our own ability to complete all phases of research, development, manufacturing and start up costs”; and business risks.

Business risks are perhaps “the most critical” to the plug-compatible business, he said. These risks can include unforeseen product announcements, price cuts and the potential for subsystems to be rendered incompatible and/or inimical to IBM actions in microcode encryption techniques.

Survey Directory

FAIRFIELD, N.J. — Over 1,500 multidiscipline reports and syndicated services available from consulting firms are listed in the second edition of the Directory of U.S. and Canadian Marketing Surveys and Services.

The directory includes 125 consulting firms in the industrial and consumer marketing research companies as well as media research firms. The companies range in size from such international firms as IBM, A.D. Little, A.C. Nielsen and Stanford Research Institute to a number of one-man operations.

The directory lists about 50 surveys, including general market studies on computers and DP and such special reviews as computers in insurance, medicine and hospital industries, and minicomputers.

The directory is priced at $100 from C.H. Kline & Co., 130 Passaic Ave., Fairfield, N.J. 07006.

Software Module Marketing

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July 18, 1977

Software Module Marketing

THE SUPERMARKET OF SOFTWARE
LOS ANGELES — As far as the computer industry is concerned, the prognosis for the medical equipment market is excellent, in one executive's opinion.

"The marriage of computer technology and medical science has really revolutionized health care in the United States," according to Ralph Gabai, division vice president and general manager of the Pertec Division of Pertec Computer Corp.

Computerized office systems that allow doctors to have better access to their records, faster turnaround time on patient's bills and generally greater office efficiency is fast becoming commonplace, he noted.

"These are simply routine office functions," Gabai stated. "What is really exciting are the increasing number of applications that would have been impossible to achieve without a computer."

As an example, he cited Dr. Lewis C. Cook, an ophthalmologist from Texarkana, Texas, who is developing a software package that will include data on patients' allegories to all medication related to eye surgery and eye diseases.

Using Text-E-Comp's SBC, the basic system, called a 2050, includes a 16-bit CPU with up to one million bytes of directly accessible core; a 10M-byte Pertec D3000 disk drive; 5M bytes fixed and 5M bytes removable; a 120 char./line, 9x7 matrix impact printer with a capability of 60-150 line/min; and a 24-line, 80 char./line video display terminal.

**Medical Office Applications**

In addition to this unique application the system handles all routine medical office tasks such as processing patient information, on-line posting of individual transactions and turnaround billing receipts, transaction history and daily proof reports. It also handles past due reports, invoicing, monthly billing statements and standard forms for Medicare, hospitals and the American Medical Association.

"Equally exciting in terms of unusual applications is the use of computers in connection with the rapidly growing medical diagnostic techniques called computerized tomography that reconstruct images of the inside of the body," Gabai stated.

"Hospital administrators realize that the help of the computer industry will be essential to cut health care costs, expedite communications, tighten up financial systems and generally improve admissions procedures."

"Anyway you look at it, whether it's routine office functions or more esoteric applications like CT scanning, computer peripheral equipment will continue to have a very healthy marketplace in medicine because of the increased use of CRT's and terminals by hospitals," Gabai concluded.

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The ideal candidate for this position must have demonstrated proficiency in manufacturing-related systems design, programming and implementation. A minimum of two to three years' experience in programming on IBM 360 or 370 computers with manufacturing and/or financial applications is required. A knowledge of COBOL and 370 OS or DOS equipment is also necessary. RJE experience preferred.

If you feel you are qualified for one of these positions, send your resume including salary history to:

**COMPUTER CENTER**
797 Washington Street
Newton, Mass. 02160

**An equal opportunity employer**

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**Opportunities In Central Engineering**

**Compiler Development**

Digital’s Central Engineering organization is a dynamic, challenging environment. We’re currently involved in major Compiler Development projects and are seeking additional professionals who can make significant contributions.

**Supervisor**

Working with extremely intelligent peers as part of our Commercials Software Systems group, our largest and fastest growing organization, you’ll be responsible for the development of BASIC language processors for multiple machine architectures. You must have solid project leadership, experience, compiler design and development experience, and a knowledge of BASIC, PL-1 and FORTRAN languages would be a definite asset. BS/CS in Computer Science or related disciplines preferred.

**Senior Software Engineers**

These positions require mini-computer programming experience preferably on a PDP-11 with BASIC Plus. You should also have a strong interest in compiler development and be motivated to succeed in a fast-paced environment. 2-5 years experience plus a BS/MS in Computer Science or equivalent is preferred.

**Record and File Management Systems Programmers**

We’re seeking innovative programmers to design and implement record and file management systems, working with talented peers in an unstructured, positive atmosphere. A background in record and file design and assembly language programming is required, and a BS/MS in Computer Science or equivalent plus 2-5 years experience would be ideal. Experience with RSTS/E, RXS-11M or related mini-computer systems is a definite plus and a knowledge of BLISS programming is an asset.

To investigate these opportunities with one of the world’s largest and fastest growing computer manufacturers, please send your resume to Joe Hunt, Digital Equipment Corporation, Dept. 8716, 162 Main Street, Maynard, Mass. 01754.

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**PROGRAMMER/ANALYST**

There is a position available in the Blue Cross Blue Shield Central Office. This is a position that requires a BS/MS in Computer Science or equivalent plus 2-5 years experience in programming is required.

**Computer Center Director**

Applications are invited for the position of Computer Center Director to be in charge of the Central Office Computer Center operations. The successful candidate will have a BS or MS degree in Computer Science or related field. He/she should have at least three years of experience in a comparable supervisory position and be able to assist in programming, data processing, computer operations and planning.

**Entry Level Software Engineer**

Opportunity for recent Grad in Sci., Math or E.E. to train in a mini computer environment. Select your own worktime, domestic or international. Send resume to:

**Eexter Associates**
P.O. Box 623
Computer Park
Hampton, N.H. 03842

**Computer Center Director**

An equal opportunity/-affirmative action employer

---

**SYSTEMS MANAGER**

One of the most prestigious competitive programming organizations in the world is looking for a Manager Large IBM 370/158. Strong interpersonal and communications skills and experience working with Burroughs systems is a plus. We offer excellent benefits and a salary commensurate with your experience. Send resume to Mr. Bruce Burton.

**FEDERAL HOME LOAN BANK**

We have an opening for a person with a financial background. Must be compatible with existing staff. Experience with Burroughs medium systems is a plus. We offer excellent benefits and a salary commensurate with your experience. Send resume to Mr. Bruce Burton.

---

**PROGRAMMER ANALYST**

A very Good Year for Us.
A Better One for You?

Most computer professionals are aware that today's most advanced large system technology was developed by a company that, not too long ago, was virtually unknown.

Now that the phenomenon is widely known, Amdahl's #1 performance is as promising as ever. And the company performs as promised: our hardware and software support exceeds the established standards.

Not well known, however, is that this major supplier of large systems is still, in terms of staff size, relatively small. At Amdahl, you're not lost in a sea of people; we began 1976 with less than 400 people and ended it with less than 800. There's still room on the ground floor.

We're looking for above-average talent. You can expect an above-average compensation and benefits package. Please direct your response to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in Sunnyvale on full salary with housing, transportation, and other expenses provided.

**FIELD ENGINEERING SPECIALISTS**

You will have a minimum of 5 years experience in maintaining large-scale systems with in-depth training on competing CPUs. You will have excellent customer support in assisting the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. Openings in several major cities and at Amdahl headquarters in California. Please indicate 567-E on your response.

**FIELD ENGINEERS**

You will carry the Amdahl philosophy of providing expert service as you work to improve the timely and efficient use of computer resources. Your areas of expertise will be computer center operations regardless of the origin of the failure. Largosystem experience essential, preferably on compatible equipment. Experience indicate 567-3E on your response and direct it to the Amdahl regional office nearest you as shown below.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, California 94086

Amdahl Corporation
690 Fifth Avenue
New York, New York 10019

Amdahl Corporation
3921 Spring Road
Oak Brook, Illinois 60521

Amdahl Corporation
22150 Greenfield Road
Oak Park, Michigan 48237

Amdahl Corporation
5454 Wisconsin Avenue, Suite 1355
Chevy Chase, Maryland 20015

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**FIELD ENGINEERS**

We are seeking programmers who are capable of rapid development and who are interested in enhancing their system expertise in COBOL and 360 and 370 OS or DOS equipment. A knowledge of COBOL language and 360 and 370 OS environment is also necessary. RJE experience preferred.

If you feel you are qualified for one of these positions, please send your resume to Joe Hunt, Digital Equipment Corporation, Dept. 8716, 162 Main Street, Maynard, Mass. 01754.

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**PERSONNEL AGENCIES**

**ROBERT HALF**
5454 Wisconsin Avenue, Suite 1535
A Better One for You?

You must be willing to assist the Amdahl customer in his mixed-vendor environment to maintain full operations in his center. Openings in several major cities and at Amdahl headquarters in California. Please indicate 567-E on your response.

**FIELD ENGINEERS**

You will carry the Amdahl philosophy of providing expert service as you work to improve the timely and efficient use of computer resources. Your areas of expertise will be computer center operations regardless of the origin of the failure. Large system experience essential, preferably on compatible equipment. Experience indicate 567-3E on your response and direct it to the Amdahl regional office nearest you as shown below.

Amdahl Corporation
1250 East Arques Avenue
Sunnyvale, California 94086

Amdahl Corporation
690 Fifth Avenue
New York, New York 10019

Amdahl Corporation
3921 Spring Road
Oak Brook, Illinois 60521

Amdahl Corporation
22150 Greenfield Road
Oak Park, Michigan 48237

Amdahl Corporation
5454 Wisconsin Avenue, Suite 1355
Chevy Chase, Maryland 20015

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**PROGRAMMER/ANALYST**

A very Good Year for Us.
A Better One for You?

Most computer professionals are aware that today's most advanced large system technology was developed by a company that, not too long ago, was virtually unknown.

Now that the phenomenon is widely known, Amdahl's #1 performance is as promising as ever. And the company performs as promised: our hardware and software support exceeds the established standards.

Not well known, however, is that this major supplier of large systems is still, in terms of staff size, relatively small. At Amdahl, you're not lost in a sea of people; we began 1976 with less than 400 people and ended it with less than 800. There's still room on the ground floor.

We're looking for above-average talent. You can expect an above-average compensation and benefits package. Please direct your response to Employment Manager, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. We are, of course, an equal opportunity employer.

Immediate openings throughout the U.S. and Canada. Field candidates will undergo a training period in Sunnyvale on full salary with housing, transportation, and other expenses provided.

**FIELD ENGINEERING SPECIALISTS**

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**FIELD ENGINEERS**

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Amdahl Corporation
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Sunnyvale, California 94086

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22150 Greenfield Road
Oak Park, Michigan 48237

Amdahl Corporation
5454 Wisconsin Avenue, Suite 1355
Chevy Chase, Maryland 20015

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**COMPUTER CENTER**

**797 Washington Street**
**Newton, Mass. 02160**

**An equal opportunity employer**

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**SYSTEMS MANAGER**

One of the most prestigious competitive programming organizations in the world is seeking an experienced programmer/analyst to become D.P. Manager. Experience working with large IBM 360 equipment is necessary. RJE experience preferred.

**ROBERT HALF**

**COMPUTERWORLD**

X=) COMPUTERWORLD July 18, 1977
Systems And Programming Supervisor

Challenging opportunity to utilize your professional and management ability with Rockwell International, a leader in manufacturing facility.

Experience a step with demonstrated managerial capabilities in manufacturing, large scale software and financial systems, and a proven record of accomplishment. Degree preferred. Experience with IBM 360/37 and 360/195.

Growth potential, a salary commensurate with experience and a superior fringe benefit program. Interested applicants should forward resumes with current salary to:

Personnel Department
P.O. Box 108, Hebbron Road
Newark, Ohio 43055

Rockwell International
Equal Opportunity Employer M/F

DIRECTOR OF COMPUTER SERVICES

Commercial and industrial experience in all administrative and academic data processing operations required. Experience must include management of programmers and computer operations staff. The position covers a large data processing operation with emphasis on management of a regional center. The University is located in a large city with a metropolitan area of approximately one million.

Minimum of three years experience in a similar position is necessary. The successful candidate must have had responsibility for the overall management of a computer center. The position requires the ability to work with educators, technical personnel, and administration. This position will require supervisory skills, personnel management responsibilities, and ability to work in a fast-paced environment.

Submit complete resume, including salary history and references. 

Salary: Open

Equal Opportunity Employer M/F

TERMINAL SYSTEMS DIVISION
DAYTON, OHIO

Come and join Terminal Systems Division-Dayton. Our Engineering Staff is a leader in the design and implementation of Financial Terminal Systems. We have much to offer you—a career opportunity, a quality environment in which to work and live, and exceptional personal benefits. Dayton, Ohio is a progressive midwestern area, small enough to be friendly but large enough to offer outstanding communities with excellent housing, educational facilities, and cultural activities.

PROGRAMMER/SYSTEMS ANALYST

- Microprocessors
- Minicomputers
- Operating Systems
- Systems Simulation
- System Controllers & Generators
- Assembly & COBOL Languages

Requires a BS/MS in CS, EE, or Math.

PROGRAMMER/ENGINEER

- Microcomputer Devices
- Semiconductor Technology
- Microprocessors, Memories & Logic Families
- Characterization Testing
- Computer Controlled Test Equipment
- Test Program Development
- Data Analysis
- Communications Design

Requires BSEE with interests in hardware/software.

We welcome responses from new graduates as well as experienced personnel.

SYSTEMS ENGINEERS

- Systems Design
- Hardware/Software Development
- Systems Architecture
- Microprocessors

Minimum BS degree in computer science or related technical field with emphasis on data processing. 5 years work experience. Must have good communication skills. Will manage growing department.

Salary: Open and negotiable. Requires travel. Equal Opportunity Employer M/F

DESIGN ENGINEERS

- Circuit Design & Analysis
- Systems Interface
- Circuit Design

Salary: Open

Equal Opportunity Employer M/F

DATA PROCESSING

An Equal Opportunity Employer M/F

manager of data processing

FMC, one of America's top 100 corporations, currently has an opening at its Pocatello, Idaho, elemental phosphorus plant.

Minimum BS degree in computer science or related technical field with up to 5 years data processing experience. 5 years work experience. Must have good communication skills. Will manage growing department of programmer analyst and operators, processing business and technical applications for Pocatello and 6 other plants. Forran experience required. Utilities' CHP 2120 and IBM Systems 7.

Comprehensive fringe benefits include company paid medical, major medical dental and life insurance benefits. Relocation assistance available. Salary commensurate upon work and educational experience.

Reply in confidence to: Steve Hiner, Industrial Relations, FMC Corporation, P.O. Box 4111, Pocatello, Idaho 83201. Phone: (208) 232-6420.

FMC is an equal opportunity employer M/F

DATA PROCESSING

MFG-BANKING-SERVICE

EOP Manager to $25,000; Programmer Analysts BAI & COBOL to $20,000. Forran to $18,000, COBOL to $18,000. RPG to $16,000. All salaries negotiable. Experience (5 years minimum) required. Salary: Open to $27,000. Contact in confidence.

S-H-S INTERNATIONAL

1616 E. Roosevelt Rd.
Chicago, IL 60187

(Private Employment Agency)
MINICOMPUTER SYSTEMS DESIGNERS

Meet with SUCCESS at INTERDATA!

Your goals set at success. You feel you have the ability and the drive to meet these goals, but it seems you are just not offered the right opportunities to be successful. INTERDATA, a fast-paced, forward-looking 200 company and a world leader in the computer industry, offers you opportunities to achieve career success. We seek individuals to be members and associate members of our technical staff, both in software and hardware. Positions open at junior through senior levels. Should have BS, MS, or Ph.D. in engineering/computer science. 1-2 year experience preferred. Meet with success at INTERDATA!

Excellent salaries and outstanding company benefits. Send resume including salary history in strictest confidence to: Veda Drummond.

Plan ahead to move ahead with Norden Division

Located in picturesque New England, Norden—the expanding electronics arm of United Technologies—is now reviewing applications for a wide range of qualified computer-oriented professionals determined to increase the momentum of their career growth.

Numerous design and development engineering positions are open in a diversity of exciting programs including the popular PDP-11 mini-computers, the U.S. Army’s Battery Computer System, the AN/APQ-156 air-to-ground attack radar for the U.S. Navy’s A-6E, and the AN/SYS-1 integrated automatic detection and tracking system for the Navy’s fleet modernization program.

Prime areas of interest include:

- SOFTWARE DEVELOPMENT
- POWER SUPPLY DESIGN
- SYSTEMS INTEGRATION
- LOGIC DESIGN
- COMPUTER ARCHITECTURE
- PROCESSING AND DATA MANAGEMENT
- SOFTWARE DEVELOPMENT
- POWER SUPPLY DESIGN
- SYSTEMS INTEGRATION
- LOGIC DESIGN
- COMPUTER ARCHITECTURE
- PROCESSING AND DATA MANAGEMENT

Please submit your resume, including salary history and requirements: Mr. James E. Fitzgerald, Norden Division, United Technologies Corporation, 304 Helen Street, Norwalk, Connecticut 06856.

EUGENE TECHNOLOGIES

Making it happen in systems technology

An Equal Opportunity Employer, M/F

CINCINNATI TECHNICAL COLLEGE

There are many reasons accepted for the following positions:

INSTRUCTOR/COORDINATOR
DATA MANAGEMENT

- 5 yr experience preferred
- Bachelor’s degree desired
- Knowledge of mainframe computers, data bases, and systems analysis
- Ability to communicate with educational background
- Development experience required: includes B.S. in Business Administration; Knowledge of programming languages; experience in Data Processing; ability to integrate educational and job-related experience

- Duties and responsibilities include: supporting individual and group learning through classroom instruction and laboratory instruction in Data Processing, developing and implementing experience in Data Processing, additional qualifications desirable; preferred: include: significant contact with DEC, as well as familiarity with DEC software, and experience in data processing systems analysis, as well as presentation of subject matter in a structured classroom setting

- EXPRESSIONS OF INTEREST should be submitted by August 15, 1977. No Phone Calls Please.

 rooftop high benefits. Annual performance evaluations will be anticipated contingent on satisfactory performance and are intended to correlate with educational background.

- Experience in Data Processing required: includes B.S. in Business Administration; Knowledge of programming languages; experience in Data Processing; ability to integrate educational and job-related experience

- Duties and responsibilities include: supporting individual and group learning through classroom instruction and laboratory instruction in Data Processing, developing and implementing experience in Data Processing.

- EXPRESSIONS OF INTEREST should be submitted by August 15, 1977. No Phone Calls Please.

- Expressions of interest should be forwarded to:

- Robert Half PERSONNEL AGENTS
5 Liberty St.
Buffalo, NY 14203
(716) 843-8691

- SUPERVISOR SOFTWARE DEV

Large company developing data systems programmer required to manage staff of 6. Will pro-

- Experience in developing data systems, including database management. Will require a degree in Computer Science or related field, and higher education experience in a software development environment.

- Expressions of interest should be submitted by August 15, 1977 to:

- Robert Half

- Equal Opportunity Employer, M/F

- PROJECT MANAGER, DIRECTOR OF ADMINISTRATIVE DATA PROCESSING AND COMPUTER INTEGRATION

- Seeking highly qualified individuals with Computer Science background for the position of Project Manager, Director of Administrative Data Processing and Computer Integration.

- Responsibilities include:

- Overall management of program development and implementation.

- Lead role in project management, resource allocation, scheduling, and budgeting.

- Develop and implement project plans that meet customer requirements and objectives.

- Monitor progress and make adjustments to ensure project goals are met.

- Confer with management, project team members, and key stakeholders.

- Expressions of interest should be submitted by August 15, 1977 to:

- Robert Half

- Equal Opportunity Employer, M/F

- MANAGER Management Advisory Services

(Realtor Chicago Suburb)

It is rare that we are able to list an executive talent position—unusual is the opportunity to fill this position.

We seek a person who has a minimum of 4-6 yrs exp in the design, development, and implementation of computer software systems. We are seeking someone who is highly motivated, dedicated, and dedicated to achieving career advancement in a challenging environment.

- Excellent salaries and outstanding company benefits. Send resume including salary history in strictest confidence to: Veda Drummond.

- MEN WORK OVERSEAS!!

Australia — Europe — Japan

The South Pacific — Far East

South America — Central America

OVER 100 COUNTRIES


Construction — Engineering — Sales — Transportation — Teaching — Oil Refining — Medical

ACCOUNTING — Manufacturing — Secretarial — Aircraft — etc., etc., etc.

- $20,000 to $25,000 per month

- In most jobs overseas you will receive FREE TRANSPORTATION, HIGHER SALARIES AND WAGES, TRAVEL PAY, GENEROUS VACATION AND BONUS, FREE MEDICAL CARE, FREE MEALS AND HOUSING, more ADVANCEMENT OPPORTUNITIES.

- NO U.S. INCOME TAX under the Government Foreign Resident Rule (civil service excluded).

To allow the opportunity to consider foreign employment, we have published a complete set of OVERSEAS EMPLOYMENT GUIDES. Our OVERSEAS EMPLOYMENT GUIDES contain the following information:

- List CURRENT OVERSEAS JOB OPPORTUNITIES with a special section on overseas construction projects, executive positions and teaching opportunities.

- How, Where and When to apply for the job of your choice OVERSEAS!

- Firms and ORGANIZATIONS employing all types of personnel in nearly every part of the Free World.

- Firms and organizations engaged in OVERSEAS CONSTRUCTION PROJECTS, MANUFACTURING, MINING, OIL REFINING, ENGINEERING, SALES, SERVICES, TEACHING, SECRETARIAL, AIRCRAFT, etc.

- Companies and GOVERNMENT AGENCIES employing personnel in nearly every occupation, from the unskilled laborer to the college trained professional.

- How and Where to apply for OVERSEAS GOVERNMENT JOBS!

- Employment on U.S. Government ships "MERCHAND MARINES!"

- Directory of U.S. Businesses operating in AUSTRALIA that employ Americans.

- List of U.S. DEFENSE CONTRACTORS with operations OVERSEAS.

- plus several EMPLOYMENT APPLICATION FORMS with a special section on overseas construction projects.

- OVERSEAS EMPLOYMENT GUIDES, Our OVERSEAS EMPLOYMENT GUIDES contain the following information:

- Expressions of interest should be submitted at August 15, 1977 to:

- Robert Half

- Equal Opportunity Employer, M/F

- ORDER FORM

- MAIL TO: Overseas Employment Guides
1177 Scott Road, Suite C
BURBANK, CA. 91504

- I am enclosing $10.00 cash, check or money order

- Please send me your complete set of OVERSEAS EMPLOYMENT GUIDES immediately.

- NAME

- ADDRESS

- CITY STATE ZIP

- 30 DAY MONEY BACK GUARANTEE

- If you are dissatisfied with our Overseas Employment Guides, for any reason, simply return our Guides within 30 days and your $10.00 will be refunded to you immediately. NO QUESTIONS ASKED.
EDP OPPORTUNITIES

IMS, Inc., a national search firm, has negotiated an exclusive contract with two major conglomerates to considerably increase their Data Processing staffs in 1977. Positions are now open in the following areas:
- DIRECTOR • SENIOR ANALYSTS
- DATA BASE ADMINISTRATOR
- PROJECT MANAGEMENT
- PROGRAMMER/LEADERS
- PROGRAMMER/ANALYSTS
- DATA BASE CONSULTANTS

Experience in any of the following categories under DOS or OS is desired.

Openings exist in Chicago, Cleveland, Detroit, Houston, Philadelphia and Des Moines.

These positions provide excellent salaries, benefits and growth potential. Send resume to B.J. Eiler, Director of Personnel.

We give you more of what you want to be successful: computers, peripherals, technology, reputation, position — over 39,000 Data General computers have been sold and installed in 33 countries around the world. Stay where you are, or move up to Data General — it's your future.

Fourteen of our top twenty-five Sales Engineers never sold computers before they came to Data General.

They were Software Support Engineers, Customer Engineers, Systems Programmers, Hardware Designers — you name it. The point is this: You can stick to your job for the next 18 months, or become a Sales Engineer at Data General, sell computers for a year — and you could make the same money. Or more. You already have the technical credentials and, if you enjoy dealing with people and working in a competitive environment, there's no limit to what you can earn as a Sales Engineer at Data General.

Computer Sales Engineers

We require solid technical background in mainframes, minis or systems — plus the ability to open up new OEM and end user accounts is a must.

New positions are available in the following locations:

EASTERN REGION

New Haven, Conn. — Boston, Mass. — New York City — Long Island — Philadelphia — West Virginia — West Virginia — Memphis

To apply for a position in any of the above locations call (800) 225-7346 or send him your business card with your home phone number on it to Data General Corporation, 15 Turnpike Rd., Westboro, MA 01581.

MIDWEST REGION

Chicago, Ill. — Des Moines, Iowa. — Detroit, Mich. — Minneapolis, Minn. — Kansas City, Mo. — Indianapolis, Ind.

To apply for a position in any of the above cities call Terri Johnson collect at (416) 259-4271 or send her your business card with your phone number on it to Data General Corporation, 1111 Plaza Drive, Schaumburg, IL 60172.

WESTERN REGION


To apply for a position in any of the above locations call Charley Polachi collect at (800) 225-7346 or send him your business card with your home phone number on it to Data General Corporation, 433 N. Mathilda Ave., Sunnyvale, CA 94086.

An equal opportunity employer M/F.
Amdahl interviewing in Boston, Minneapolis, and Washington D.C.

Amdahl Corporation, manufacturer of the well-received 470V/6 computer system, has met the challenge of designing and building a new generation of large computers. Although the past year has seen us grow, there's still room on the ground floor for individuals who seek a challenging and friendly environment. Our benefits package is excellent and you'll be well-compensated for your efforts. Following are some of our more immediate needs. If you're a qualified candidate, perhaps the opportunity you desire is here... at Amdahl.

**DIAGNOSTIC ENGINEERS**
High level languages, logic design. Design and develop advanced diagnostics.

**DESIGN AUTOMATION ENGINEERS**
Language design, data base, design verification, test generation, physical packaging, routing.

**DIAGNOSTICS QA ENGINEERS**
Software QA, high level and assembly language, logic design and computer organization.

**SOFTWARE ENGINEERS**
Mini-computer real time O/S, multiprocessing and large systems. Or configuration management in code control or file control systems.

Amdahl engineers will interview in Boston, Minneapolis and Washington D.C. on Sunday, July 24 and Monday, July 25.

Qualified professionals are invited to schedule an interview. Send your resume to Chacko Neroth, Amdahl Corporation, 1250 East Arques Avenue, P. O. Box 5070, Sunnyvale, California 94086. We are, of course, an equal opportunity employer.

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**SALES**
**Business Computers**

QANTEL . . . . . . . . . . QANTEL . . . . . . . . . . QANTEL.

We're looking for one top salesperson to join our select team of the best business computer salesmen in Los Angeles.

Call (213) 380-4852

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**SYSTEM ANALYST/PROGRAMMERS**

Wausau Homes, Inc., a leader in the home manufacturing industry, has two challenging opportunities in its recently established Data Processing Department. Both positions require experience in a System/3, Model 15, RPG II operating environment.

Manufacturing

*This position requires from four to six years experience, having a minimum of two years in the development of manufacturing systems, with IPICS or equivalent systems experience desirable.*

Retail/Wholesale

*From three to five years experience in distribution and related financial systems for a retail/wholesale environment is required.*

We offer the aggressive, self-starting individual excellent pay and benefits, with a location in Central Wisconsin. Please send your resume and salary requirements to:

**Wausau Homes, Inc.**
Controller
P.O. Box 1204
Wausau, WI 54401

Welcome Home.

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**FLORIDA**

**PROG/ANALYSTS**

BAL-05-C/2 370/370x 3 16k CBL-1G-AP 256k-

BAL-05-C/2 370/370x 5 16k CBL-1G-AP 512k-

CBL-R7 Appy-Apy New 16k CBL-R7 Appy-New 32k-

CBL-R7 Appy-New 64k CBL-R7 Appy-New 128k-

BAL-DOS-CIOG-311 CBL 16k-

BAL-DOS-CIOG-311 CBL 32k-

**DIAGNOSTIC ENGINEERS**

*Must have a minimum of 2 years’ experience in hardware evaluation, design, coding, debugging, documentation and release of diagnostic software.*

**/marketing communications specialist**

*Must have a minimum of 2 years’ experience in the data processing community with emphasis upon public relations, technical EDP communications (both written and verbal, planning, researching and preparing press oriented programs. Additional responsibilities will include preparation of application briefs and bulletins plus technical articles for presentation.*

---

**EDP PROFESSIONALS**

**MG Director**

To 25k

**Sr. Programmer/Analyst**

To 25k

**Data System Manager**

To 25k

**Programmer Analyst**

To 20k

**Operations Support**

To 22k

**HVC C/C knowledge**

To 25k

Dennis A. Morant, Hamilton Consultants

W. 30th St, P.O. Box 33503

WA 98104, (206) 355-2155

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**EDP POSITIONS**

**THE COMPUTER SYSTEMS DIVISION OF HARRIS CORPORATION HAS SEVERAL OPENINGS IN THE AREA OF**

**PRODUCT MARKETING MANAGER**

**$100-$200 SYSTEMS**

A senior marketing position to direct market penetration and product development of primary Harris Computer Systems Division product lines and related systems. Previous hardware sales experience and planning relative to marketing systems are required.

**SOFTWARE INSTRUCTORS**

Will develop and present software training courses. Two years’ minimum programming experience and communications skills are necessary. Desirable applicants should have operating system, language processors and data base background. Will be responsible for documentation and will teach course offerings. 25% travel required.

**MARKETING COMMUNICATIONS SPECIALIST**

Must have a minimum of 2 years’ experience in the data processing community with emphasis upon public relations, technical EDP communications (both written and verbal, planning, researching and preparing press oriented programs. Additional responsibilities will include preparation of application briefs and bulletins plus technical articles for presentation.*

**DESIGN AUTOMATION PROGRAMMER**

*Must have a bachelor’s degree. In addition, we prefer a candidate with 3-5 years’ experience in the electronic manufacturing field. Experience should also include the analysis and programming of placement, routing and evaluation of inter-connection design problems.*

**DIAGNOSTIC ENGINEERS**

*A minimum of 2 years’ experience required in hardware evaluation, design, coding, debugging, documentation and release of diagnostic software.*

**TEST ENGINEER**

*Will develop test programs at printed circuit assembly test level and test procedures for subsystems and peripheral equipment.*

**TECH WRITERS**

*Positions available for both hardware and software development technical writers. Technical degree or English preferred.**
EDP Professionals
(jarvis walk group)
(Specialists in D.P. Recruiting)
- All Areas of Industry
- Various Technical Levels
- Salaries $16-30,000
If you feel that your present position does not afford you the necessary career growth, please call or send letter/resume to the appropriate office. We assure you that our associates will be happy to discuss specific client situations with you.

the jarvis walk group
N.Y. 320-5th Avenue, NYC 10017
(212) 887-5250
N.J. 349 E. Northfield Rd, Livingston 07039
(201) 996-3773
CALIF. 11223 La Cienega Blvd, Inglewood 90204
(213) 670-7253

DATA PROCESSING POSITIONS
SAUDI ARABIA

A rapidly growing Systems Management Company has immediate openings in Riyadh, Saudi Arabia.

SYSTEMS AND PROGRAMMING MANAGER
Challenging position involves development of on-line microfilm and perforated card systems. Must have at least six years solid Data Processing experience and at least two years in significant management positions. Experience with large scale IBM Teleprocessing systems required.

OPERATIONS MANAGER
Challenging position involves operation of large-scale IBM Teleprocessing system, multi-shift data conversion efforts, and micrographics production. Must have at least six years solid Data Processing experience. Interested applicants should have experience in management positions, mainly with large-scale IBM Teleprocessing systems.

SYSTEMS PROGRAMMER
Position involves maintenance of an innovative IBM 370 Teleprocessing system with microfilm terminals. At least three years in-depth experience maintaining both IBM DAS and OS Teleprocessing systems required, preferably CICS with 3270 terminals. Must be able to maintain system single handedly.

Salaries commensurate with experience. Excellent benefits. Six weeks paid vacation annually with round trip air fare to place of residence. Free furnished housing and free education for children – two or more years contracts. Send resume and salary history to:

SYSDOREX INTERNATIONAL, INC.
3172 Porter Drive
Palo Alto, CA 94304
Attn: Joe Papa, Director

UNIVERSITY OF PETROLEUM AND MINERALS
DHAHRAN, KINGDOM OF SAUDI ARABIA

Applications are invited for professorial positions (all ranks) open for the Academic Year 1978-79, starting 1 September 1978, at the University of Petroleum and Minerals in Dhaerahm, Saudi Arabia, in Business Administration, Geology, Chemistry, Earth Science, Petroleum Engineering, Mining Engineering, Chemical Engineering, Petroleum Economics, Operations Research, Organizational Behavior, Information Management, and Data Processing. Full-time employment through the central administration with salaries commensurate with experience and advanced degree is desirable. Applicants should have a Ph.D. and records of research and academic achievement. Applications including resume, statement of research and salary history should be sent to:

Attn: Joe Papa, Director
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DREXEL BURNHAM LAMBERT INCORPORATED

Drexel Burnham Lambert Incorporated, a major New York City financial services organization is seeking several exceptional people to fill a number of career positions that have opened to support our expanding range of computer services.

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Requirements:
- Experience in implementing a brokerage communication and order-match system.
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- Ability to interface with users.

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Requirements:
- Bachelor's degree.
- 4 years ANS COBOL, OS JCL.
- Supervisor experience.
- Extensive user contact, design organization and implementation.
- Ability to coordinate in a multi-project environment.

Systems Programmers
Requirements:
- Bachelor's degree.
- At least 1 year of COBOL programming in a business environment on an IBM 360/370.
- Solid working knowledge of OS JCL and IBM UTILITIES.

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- Continuous in-house training program including CICS.
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M.S. or PhD in Math, Physics, Computer Science, or Engineering and experience in analysis of engineering systems.

Send your resume in confidence to:
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Our continued success depends on the quality of our people, which is why OSI is looking for innovative, ambitious individuals to work in a large scale IBM OS/VS 360/370 environment.

We have become a nationally recognized leader because we are dedicated to providing our business community with the highest quality professional computing services available. In order to continue this high level of quality, our rapid growth has created many challenging opportunities for customer oriented quality people.

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All of our P/A positions require at least 3 years experience in O/S COBOL, JCL, and utilities. Will be involved in developing and implementing new approaches to Health Management Systems, including development of new processes and management of systems. Will have daily contact with clients in the Health insurance industry. Statutory experience desired.

Health Management Systems

Requires heavy experience in O/S COBOL, JCL, and utilities. Will be involved in developing and implementing new approaches to Health Management Systems, including development of new processes and management of systems. Will have daily contact with clients in the Health insurance industry. Statutory experience desired.

Manufacturing Information Control Systems

Development and support of MICS software. Will be involved in developing new systems and supporting existing installations. Will have daily contact with clients in the Manufacturing industry. Manufacturing experience desired.

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We offer services to Municipal Governments and have several opportunities for professionals with accounting systems experience. Will have daily contact with clients in the Governmental industry. Accounting experience desired.

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All replies held in strictest confidence.

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Minimum 2 years IBM BAL experience required. PARS experience preferred, particularly ACP and Support specialists.

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Minimum 2 years 360/370 OS required. COBOL, ALC, and/or FORTRAN, PARS experience beneficial.

Position and levels commensurate with experience. Salary history must be submitted. No training need apply. Send resume to:

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Our requirements include 10 or more years experience in data processing with 4 or more years experience managing a data center. Experience with complex terminal systems and technical knowledge of MVS and VTAM a strong plus. A degree is preferred.

This is a key management position with decision making authority and excellent promotional opportunity. For prompt consideration, submit a letter or resume including salary history to: B. Gray, Dept. 1122

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We presently have openings in insurance, banking, manufacturing, services, retail, construction, and others.

For additions to our clients' staff requirements, we'll consider candidates with experience in any of these areas: COBOL, BAL, DOS, OS GECOS, MVS, IMS, TSO, CICS, and other on-line applications. There is also a need for people with 11/24 or 70 under RTES-E and/or Data Files 5500 experience.

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You should have good MVS internals experience and the ability to debug, plus expertise in one of the following areas:
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- VSAM
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Current openings are in Sunnyvale, California.

**Like customer contact? Amdahl needs:**

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At customer locations, you should have MVS diagnostic expertise and the ability to be a jack-of-all-trades.

Currently there are several openings throughout the United States.

**Like to do both of above with travel? Amdahl needs:**

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To work with Field Engineers at customer locations to solve more difficult bugs.

You should have very good diagnostic techniques preferably with some MVS experience.

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**NO MVS EXPERTISE? Drop us a note anyway. We also have systems engineering openings that do not require MVS experience.**

Please direct your response to Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086 and indicate 310-D on your resume or letter. We are, of course, an equal opportunity employer.
Qualified candidates will require 3 years of experience in the design and implementation of large computer systems and are employed by a variety of large computer companies. The New Zealand Government has computing installations nationwide with extensive telecommunications networks. A variety of large computer systems and mini-computers are employed in these applications including:

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- Senior Systems Analyst
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- Data Base Administrators
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These positions require previous senior level data processing experience with large systems, data base and telecommunications. The salaries for these positions range from $10,000 to $12,000. Each salary is competitive with DP salaries in New Zealand and is consistent with the standard of living.

Confidential interviews for the above positions are being held in the United States. Please send full resume to:

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Salary commensurate with experience. Excellent employee benefits and company paid. Please send resume with salary history to:

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We are a subsidiary of Buckeye Federal serving the financial community through z/OS-envelope processing as well as batch processing. Appropriate individuals are needed to continue our growth in this area.

Salary commensurate with experience. Excellent employee benefits and company paid. Please send resume with salary history to:

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We are seeking an experienced personnel to analyze, design and document the administrative systems of the United States Postal Service. The individual will have experience in processing transactions with PONTIFIED, Basic and 370 JCL. The programmer/analyst is responsible for the design, development, and maintenance of our administrative information systems.

You will be involved in the programming and analysis of an on-line, decentralized student record system for the University of California at Berkeley. Experience in COBOL and Systems/370 data base processing techniques using larger scale computers. Required will be a master's degree in Computer Science and preferably 1 to 2 years field experience in computer technology.

We are a leading private university offering a high potential for career growth in a state-of-the-art environment. Our current and long range plans offer high potential for career growth in a state-of-the-art environment. If you have a minimum of 2 years experience with strong COBOL, ALC or Systems Analysis skills and are interested in our challenging opportunity, please send resume to:

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These are but a few of the elements of a newly created position at Hillenbrand Industries. Hillenbrand is actively seeking a Senior Level Assistant MIS Director for the Corporate MIS Department. Newly installed IBM 370/148 and 370/158 have provided a rapidly expanding environment for new development activity corporate-wide. Qualified candidates should have a minimum of 7 years in an operations capacity and 2-3 years as a Data Center Manager. Each candidate will start September 1, 1977 or as soon thereafter. Typical responsibilities will include systems design, implementation, and daily management. Interested candidates should include resume with salary requirements to:

R.M. Hornbuckle
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Highway 46
Batesville, Indiana 47006

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Regional educational institution is seeking Assistant Director of Computer Services to implement, manage and coordinate educational computing activities. Essential qualifications include a master’s degree in educational technology or related field, five or more years’ experience in administration of computer services within an educational institution and the ability to work effectively with faculty and administration. Send resume to: Dr. John M. Tyler, Director, Computer Services Cooperative, 334 16th St. S.E., Rochester, Minn. 55901

DIRECTOR OF
COMPUTER CENTER

Louisiana State University is seeking an experienced systems programmer. The position is to administer the use of the computer facility; and to provide leadership for computer system development. The College has an IBM 370/145, consisting of MVS and OS-VS/1. The person reporting to the Director must have a working knowledge of these systems. Send applications to: Dr. M. Tyler, Director, System Network Computer Center, Baton Rouge, La. 70803

OFFICES: Seattle, Wash., D.C., New Orleans, La., Columbus, Ohio, Fort Worth, Texas, Seattle, WA 98111

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If a call is not answered, we invite you to forward, in confidence, a resume outlining your qualifications and career interests to:

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Furts State College, enrollment 9800 students, is seeking a Director of Computer Services. The Director will be responsible for the overall operation of the computer center and to assist in developing the overall computer strategy and environment. The primary responsibilities of the Director are to administer the use of the computer center; to assist the president in development of new systems within the College. The Computer Center is committed to the support of academic and administrative computing needs of the Campus. The position will require a person with knowledge of a large scale computer, i.e., IBM 370. The candidate should be versed in system analysis and design. Experience with 

REQUIREMENTS:

G.L.S. B.S. M.S. Ph.D. appropriate computer science coursework

QUALIFICATIONS:

Demonstrated management and technical competence in computer systems. Experience in academic institutions is desirable. Skill in communication, both oral and written, is essential. Salary is competitive with related requirements. Applications should be received no later than July 30, 1977. Please send resume and references to: Mr. Earl Frasher, Assistant Vice President for Budgets and Planning, Furts State College, Chickasaw, Oklahoma, 73901. Send your resume in confidence to:

FOR ADDITIONAL INFORMATION:

For Details on PARKER GARRETT ASSOCIATES
P.O. Box 1296
Scottsdale, WA 98111
Offices: Seattle, WA, S.C., Mich, Atlanta

DIRECTOR
OF SYSTEMS DEVELOPMENT

Oberlin College, a private liberal arts college with a faculty of 350 and an enrollment of 2700 students, is seeking a Director of Systems Development. The position is to coordinate the overall planning of new systems within the College. The College has an IBM 370/165-11 under MVS. Candidates should have a highly developed sense of responsibility and a working knowledge of contemporary computer systems. Salary is competitive and dependent upon educational and administrative experience. Interested persons should send resume in confidence to: Dr. Michael R. Fearn, Neptune, N.J. 07753/(201) 922-1100

Clemson University is seeking a Director for the Corporate MIS Department. Newly installed mainframe computer systems operate on an IBM 370/158 and two 2311's. Candidates with a minimum of 7 years in an operating environment will be given preference. Salary 20K to 25K. Send applications to: Dr. John F. Powers, Dr. S.C. 29631.

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Computer Consoles has immediate openings for Senior and Intermediate-level Applications Programmers with mini-computer experience.

You'll be an important member of a development team, analyzing functional application specifications and designing, coding, debugging and testing software in accordance with these requirements. You will formulate subsystem implementa-

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Successful candidates will have a BS in Computer Science or equivalent degree. 1-3 years' experience in Assembly language programming on mini-computers is a must. Experience with data base systems preferred.

Paid interview and relocation expenses. Send resume and salary requirements to:

Mr. Raymond W. Anderson
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Choice to become heavily involved in new VM 370 development in an interesting and challenging environment with 1 year's experience. Must have MVS experience. Previous experience in 1BM 370 or UNIVAC environments a plus. Position will be filled by October 14, 1977 with the person reporting to the Director of Systems Development. Must have a minimum of 3 years experience in scheduling and operating of mainframe computers, with emphasis on performance analysis. Salary is dependent upon experience and qualifications. Interested persons should send their resume in confidence to: Mr. W. Shue, Computer Services Cooperative, 334 16th St., S.E., Rochester, Minn. 55901

For Details on DENBY ASSOCIATES
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Scottsdale, WA 98111
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To qualify, you should possess a minimum of 1 year's experience in EDP/MVS SYSGEN and maintenance. Background in IMMGEN TSO LIBRARIAN experience, and CICS is mandatory, but is not mandatory. In addition, you should be knowledgeable with applica-
tions of the following: AS/400, AS/400, and IMS and highly desirable, but is not mandatory.

You'll be playing an integral role in a conversion to MVS and systems tuning as well as providing a stable data processing environment.

We offer an excellent salary and benefits package, outstanding growth potential, and a congenial, professional working environment.

To apply, send your confidential resume with salary history and requirements in confidence to: N.P. FISCHLER, Manager of Employment.

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Write and test System/370 business systems software. Responsibilities include high level program development and testing, working closely with a team of analysts and programmers. A Bachelor's degree in mathematics, sciences, or computer science is required with 1-2 years of experience or an equivalent combination of education and experience. Requires a valid driver's license and a clean DMV record. Applicants should be able to sit in front of a console for extended periods of time. Salary: $17,000-$20,000, depending on experience. Excellent fringe benefits, including a 401(k) plan with matching contributions, group life and health insurance, and comprehensive travel and vacation benefits. Please send resume with salary requirements to: Jeffrey L. Kublin, Director of Computer Services, Technical College, Cobleskill, New York 12043. FAX: 1-315-896-3000.

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<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>CYCLE SPEED</th>
<th>THRUPUT</th>
<th>MARKET VALU</th>
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<td>165,000</td>
<td>$275,000</td>
<td>$45,000</td>
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- 12, 15 Channel TV Monitors
- 12 Special TV Monitors
- 12 Channel TV Monitors
- 12 Colour TV Monitors
- 12 Channel TV Monitors
- 12 Colour TV Monitors
- 12 Colour TV Monitors
- 12 Channel TV Monitors
- 12 Colour TV Monitors
- 12 Channel TV Monitors
- 12 Colour TV Monitors
- 12 Colour TV Monitors
- 12 Channel TV Monitors

Mentioned above cash, checks or bid bonds shall be given as a guaranty that the bidder will pay the balance of the amount of his bid if he refuses to accept delivery of the personal property for which he has bid.

This is not an official publication. Refer to official notice to bidders published in Pittsburg, California. published on July 8, 1977 and July 15, 1977 in the Post Dispatch; ree phd waive any irregularity or informality in the bids or in the away, or other charges, and the oy shall be made to the successful guaranty that the bidder will pay the balance of the amount of his bid if he refuses to accept delivery of the personal property for which he has bid.

MEDANOS COMMUNITY HOSPITAL DISTRICT.

Directors of the LOS MEDANOS COMMUNITY HOSPITAL DISTRICT until 5:00 o'clock p.m. on the 27 day of JULY, 1977, in the Conference Room of the DISTRICT, 550 School Street, city of Pittsburg, Contra DISTRICT.

Each bid shall be for the complete computer system or as to specific items of said personal property, preference and priority being given to MEDANOS COMMUNITY HOSPITAL DISTRICT located at 550 School Street, city of Pittsburg, California, and so as not to interfere with the services, treatment and/or operations each of the items hereinabove set forth during regular business hours.

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<table>
<thead>
<tr>
<th>Company</th>
<th>Closing Price</th>
<th>Weekly Change</th>
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</thead>
<tbody>
<tr>
<td>IBM</td>
<td>$142.25</td>
<td>+1/2</td>
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<tr>
<td>Xerox</td>
<td>$87.75</td>
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<td>Honeywell</td>
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**Peripherals & Subsystems**

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<tr>
<td>Texas Instruments</td>
<td>$27.25</td>
<td>+3/8</td>
</tr>
<tr>
<td>General Electric</td>
<td>$21.25</td>
<td>+1/4</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>$97.75</td>
<td>+3/8</td>
</tr>
<tr>
<td>Sony</td>
<td>$57.25</td>
<td>+1/4</td>
</tr>
<tr>
<td>Canon</td>
<td>$39.75</td>
<td>+1/4</td>
</tr>
<tr>
<td>Panasonic</td>
<td>$23.25</td>
<td>+1/8</td>
</tr>
</tbody>
</table>

### Computerworld Stock Trading Summary

**Peripherals & Subsystems**

<table>
<thead>
<tr>
<th>Company</th>
<th>Closing Price</th>
<th>Weekly Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xerox</td>
<td>$87.75</td>
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<tr>
<td>Honeywell</td>
<td>$47.75</td>
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<tr>
<td>Texas Instruments</td>
<td>$27.25</td>
<td>+3/8</td>
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<td>Panasonic</td>
<td>$23.25</td>
<td>+1/8</td>
</tr>
</tbody>
</table>
No matter what size, or how your organization is structured, or how many payrolls you have to pay, MSA's Payroll Accounting System can handle it. Any type of employee can be paid through any one of a variety of pay periods and you can process different department payrolls at different times. To keep track, you can produce specialized reports designed to your specifications without any extra programming. You have complete flexibility in deductions, tax withholdings and automatic deposits. The system also has standard provisions for handling Federal Unemployment, State Unemployment and Disability Insurance. And this system can be combined with MSA's Personnel Management and Reporting System to provide improved employer-employee relationships.