IBM Drops Memory Prices, Doubles Capacity of 3033

By Howard A. Karten
CW Staff
WHITE PLAINS, N.Y. — IBM slashed memory prices by 30% last week in a move that industry analysts said may presage the introduction of a long-awaited E and H series of computers.

The firm also announced the doubling of the maximum main memory on its 3033 system. Coupled with the overall memory price cuts, this action was seen by the analysts as an "aggressive" move against IBM's plug-compatible competition.

Purchase prices on Mosfet memory for the 370 and 30 series computers were cut by approximately 30% from the firm's previous $110,000 per 1MB to $75,000. Rental prices on the same units, however, were reduced by only 20%.

In U.S. at Last

Russian computer programmer Boris Katz has arrived in the U.S. after a three-year struggle to leave the Soviet Union, and he and his 13-month-old daughter Jessica shared an issue of Computerworld last week. See story on Page 4.

Carter Readying Privacy Initiative

By E. Drake Lundell Jr.
CW Staff
WASHINGTON, D.C. — The Carter Administration will launch a major "initiative" in the privacy arena early next year, according to informed sources here.

The initiative, which may receive a "high priority" from all the recommendations of the Privacy Protection Study Commission, from the legislative report "simultaneously" and that the legislative initiatives next year will be limited.

Next year's initiatives will most likely deal with credit, insurance and medical records, giving priority to sources without a warrant or subpoena.

The "options" list is being drawn up from all the recommendations of the Privacy Protection Study Commission, submitted in July of last year. Neustadt said last week. The President has not yet decided on the priority items, he added.

The commission was mandated to recommend privacy action in the private sector. Neustadt said it is unlikely that action will be taken in all areas of the Privacy Commission report "simultaneously" and that the legislative initiatives next year will be limited.

Next year's initiatives will most likely deal with credit, insurance and medical records, giving priority to sources without a warrant or subpoena.

By Jeffry Beeler
CW Staff
BOSTON — Despite a penchant for leading technical jargons, people in the U.S. computer industry are no more guilty of misusing English than any other segment of the population, according to noted NBC-TV news commentator and author Edwin Newman.

On the other hand, computer people have probably contributed as much as most groups to the lamentable decline in the American public's ability to speak and write effectively, said Newman, the featured speaker at last week's joint symposium at Wang Laboratories, Inc. computer and word processing systems users.

London 'Times' Shuts Down

By Rex Malik
Special to CW
LONDON — The venerable *Times* was shut down here last week in a dispute that involves the introduction of computer-based typesetting equipment, and no one knows when — or if — the 197-year-old institution will publish again.

*Times* newspapers also closed The Sunday Times, the Times Higher Education Supplement and the Times Literary Supplement, joining the reading habits of the British establishment, which has regarded the *Times* as its quintessential mouthpiece through the years.

The major stumbling block in the *Times* negotiations with its unions involved the use by journalists of computer-based systems to enter stories directly into the paper's computerized typesetting systems. Thelocal in-house union — or chapel — of the National Graphical Association (NGA) contended that such a move would eliminate many of its members' jobs.

The NGA said while it welcomes computer-based systems to enter stories directly into the paper's computerized typesetting systems, the local in-house union — or chapel — of the National Graphical Association (NGA) contended that such a move would eliminate many of its members' jobs.

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"No Surprise"

Most industry analysts last week said the price cuts were "expected" and "no surprise." The announcements show a growing competitiveness on the part of IBM and indicate the firm is about to bring out a new range of computers, they maintained.

IBM's previous price of $110,000 per 1MB of memory "stood out like a sore thumb" among its competitors, which offer 1MB of memory for 

(Continued on Page 7)
Says Industry Not Helping U.S. Defends World on Data Policy

By E. Drake Lundell Jr. 
CW Staff

NEW YORK— Exemplifying the ad
group of concerned industry mem-
that "we have been trying to get more
bers represented at the "Data Policy
U.S. policy was in fact, that" a,
and public transit systems. The
by attending meetings of com-
puter users concerned with the
issue and through articles in the
trade press."

In addition, Richard Neustadt, as-
tistant director of the White House Do-

cumentary.Visit Computerworld Cir-

At a session on "Data Regulation:
and Third World Realities,"
Anson Fishman, a 

The NTIA is drafting guidelines for
U.S. delegations on negotia-
tion of data flow issues, which are
ex-
pected to be ready by July 1979,
Fishman noted.

The government has been looking for
examples where European countries
allow privacy and transborder data
flow regulations have had an economic
impact on business. And that it may not
be too severe, it may call for U.S. ac-
tion, and meeting the regulations just
may be the cost of doing business in those countries, he
said, adding that so far "I don't think
the response from industry has been
good."

Fishman added that the NTIA "has
Electronic Mail Meet Today

WASHINGTON, D.C.— Vendors,
large-scale mainframe users and users
were interested in electronic mail and
classifieds technology in cooperation
with the Computer and Business Equipment Manu-
facturers Association (Cbema).
The three groups—X4, X4812, and X4812/4—will deal with
office machines, word processing and
the formation of specific working
groups, respectively. They will
attempt to define as completely as possi-
ble standard requirements to enable
manufacturers' equipment to ever-
tually communicate with each other,
said group coordinator Roger Myers.

A series of task groups organized by the
National Standard Development Forums (Ansi) in co-

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erved.

On the Inside This Week

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American National Standard Development Forums
are interested in the machinery
and signal types.

The meetings will discuss communi-
cation standards for protocols, end-
line tailoring, line speeds, transmission
modes, communications control codes
and signal types.

Interested individuals and societies
can call Myers directly at (202)
347-4337.
A message from John R. Bennett
President of Applied Data Research
Princeton, New Jersey

"ADR is now into DB/DC"

After a long and careful study, ADR has concluded that the critical future needs of computer users can most effectively be answered by online data base and data communications systems; by systems that are fully compatible under all of IBM's DOS, OS and VS operating systems; and by systems that can be extended to distributive processing and new IBM hardware.

Accordingly, ADR has made the largest single commitment to any product line in our history. We bought the INSYTE DATACOM line of products because it has all of these qualities plus those which we have traditionally offered in our products—productivity benefits, economic leverage, ease of use, efficiency, dependability and broad user applications.

Effective September 29, 1978, all of DATACOM's products, facilities and more than 60 professional staff members became part of ADR.

ADR will develop and enhance this new product line and provide technical support to its customers, just as we have serviced the 5000 customers who have purchased over 9000 of our system software products during the past 15 years.

Sincerely,
John R. Bennett, President
Applied Data Research, Inc.
Two Programmers Make It to the U.S. at Last

By Marguerite Zientara

CAMBRIDGE, Mass. — Two Russian computer programmers arrived here with their families in November after a three-year struggle with the Soviet government to emigrate to the U.S.

Boris and Natalia Katz’s desire to leave the Soviet Union became an urgent need when their first child, Jessica, was born in September 1977 with a rare ailment meant that Jessica could not absorb vitamin C. The family waited six weeks and then arrived here Nov. 30.

When asked the reason for his original application in 1973 to leave the Soviet Union, Boris Katz explained, “My understanding of truth and lies is very different from Soviet authorities. This is how I learned of these things by the Soviet government.”

“Secondly,” he said, “I wanted to be with my family.” Since 1975 Katz’s mother and two brothers have lived here in Cambridge, where one brother is a student at Harvard University and the other is a professor of mathematics at MIT.

The soft-spoken scientist and his wife, Natalia, both 31 and both computer programmers, were refused permission to leave by Soviet officials on national security grounds. The Soviet officials claimed that Natalia, a research assistant for the government’s Institute of Meteorology from 1970 to 1974, had access to confidential information, although Boris Katz denied that was true.

“She worked only in mathematics, but some sections of the Institute of Meteorology dealt with secret work and some people there may know state secrets,” he explained. “That is why I was asked to leave according to any confidential information.”

When the Katzes decided in 1974 to apply for visas to come to the U.S., Natalia changed jobs and went to work for the Institute of Geophysics in Moscow.

In Russia, when one wants to emigrate, one must give one’s employer papers indicating the desire to emigrate. The employer then submits papers to the KGB, the visa office. When Natalia told her employer in 1973 that she wanted to emigrate, she was fired from her job at the Institute of Geophysics.

“We applied for jobs [for her] after that, but after applying for emigration form Russia, it’s very difficult to find work,” Katz said.

Boris Katz himself worked for eight years as a programmer for the Scientific Institute of the Research Tractors, Katz also carried to Russia in cans by American tourists. With it began the emigration of other Russian computer scientists, Katz commented, “They try, but it cannot be compared with the applications here.”

He added, however, that the Soviet government “now Houston, Texas, although he would be “very happy to see [my] friends and homeland.”

Many of Katz’s friends, a large number of whom are computer scientists, also hope to emigrate to the U.S. within the next few years. Katz noted that many computer scientists want to emigrate and a large number of refuseniks are computer people. “Refusenik” refers to a Russian who has been denied an exit visa.

“People who want to leave the Soviet Union, as well as Jews leave the Soviet Union, and are presently looking for work, hopefully in these fields,” Katz said. The most powerful — computer programmers, are not very powerful

While working at the Scientific Institute to Research Tractors, Katz also followed other interests in the computer field. From 1972 to 1975, he was a post-graduate student at the Institute of Geophysics, where he studied earthquake prediction techniques. Although there are a relatively large number of earthquakes in Russia, Katz said, his area of interest was California.

In 1976, Katz took a one-year course of study in operating systems given by Siemens Corp.

During these years, Katz had two articles published in the monthly Russian technical journal, Automatics and Remote Control. In 1972, he wrote an article describing a computer system he developed that could “grab” secondary school level mathematical problems about movement.

This year, Katz published an article concerning a complex poetry-writing program, along with examples of computer-generated poems, one which is reproduced below with its English translation.

When asked if he is a poet, Katz replied with a smile, “No, my computer is a poet.” While his poetry is actually generated by the computer using algorithms, “All the examples I’ve seen of computer poetry were written not by the computer, but by people claiming it was written by the computer.”

Katz hopes to follow his interest in either computer analysis of linguistics or computer-generated poetry in this country and is presently looking for work, hopefully in these fields.

Boris Katz and Natalia Katz with 12-month-old Jessica relax at the home of Katz’s mother after their long-awaited journey to the U.S.

lies who wanted to leave Russia to Soviet President Leonid Brezhnev. While emigration to the U.S. from Russia usually involves a three- to six-month wait in a Rome emigration camp, the Katz family spent one night in Vienna, went to Zurich the next day and, after a half-hour wait, got on the plane for Boston. Katz credited Kennedy with making his trip so expedient.

Katz’s DP Activities

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NSF Head Slams U.S. for Poor R&D Support

By Jake Kirchner

WASHINGTON, D.C. — Federal support of research and development in this country is "a sorry state of affairs," the director of the National Science Foundation (NSF) contended at the Association for Computing Machinery's (ACM) annual meeting here last week.

Delivering the keynote address at ACM '78, Daniel C. Atkinson said the U.S. has "slipped dramatically" in the last decade in its support of basic R&D. That slip has occurred at the same time other industrialized countries substantially increased their R&D funding, he pointed out.

In a speech entitled "Federally Supported Research: Boon or Boondoggle?", Atkinson cited NSF figures indicating that in the 10 years from 1966 to 1976, the percentage of the U.S. gross national product (GNP) spent on R&D declined from 3.1% to 2.2%.

During that same period, R&D funding as a percentage of GNP increased in the Soviet Union from 2.4% to 3.2%, in West Germany from 1.6% to 2.1% and in Japan from 1.4% to 2.1%.

While American industry continued to show a "strong commitment to R&D" in that 10-year period, the emphasis has shifted from long-term research to research programs that will produce a payoff in the short-term, Atkinson said.

President Concerned

That industry trend and the fact that federal funding of R&D dropped from 13% of the federal budget in 1966 to 6% in 1976 have aroused White House worry, according to Atkinson, who characterized President Carter as "very concerned" about R&D and technological innovation in the U.S.

Carter's commitment to increasing R&D in the U.S. is "much more dramatic than some might realize," he said. The President has called for a review of technological innovation in the U.S. which, when completed in the spring, will provide "policy options" for Congress.

In addition, Carter has specifically exempted R&D expenditures from his call for budgetary cutbacks to fight inflation. "There has to be some tax incentive," he said, "so that industry makes more of a commitment to longer term research."

Atkinson said Carter has taken the time to "scrutinize" NSF's R&D budget "line by line" to familiarize himself with what the organization is doing in this area, he reported.

"NSF has put up $13.9 million this year to support computer science R&D, a figure which Atkinson said represents 40% of all federal funds spent for that purpose. It is a "sorry state of affairs" when his country "commits such a small amount of money to such an important area," he declared.

Myth Destruction Urged

Beyond increasing federal funding of R&D and supporting a strengthened R&D effort in the private sector, Atkinson said it is necessary to assure the health of university R&D programs, especially in computer science, and to attract the best students to the sciences. "The myth" that the sciences are overpopulated and offer little future for bright students must be destroyed.

"We have to build better bridges between our university research groups and our industry groups," he said. The cooperation that formerly existed between the two sectors must be restored, and the federal government should foster that initiative, he believes.

"One area in which this country is lagging and lagging very badly," he said, is in the production of scientists from universities who are familiar with the latest developments in industry. Businesses are not as concerned with basic university research as they are with the caliber of students coming from that environment, he noted.

"A Sorry State of Affairs"

"Commits such a small amount of space for that purpose. It is a "sorry state of affairs" when his country "commits such a small amount of money to such an important area," he declared.

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Typesetting Automation Dispute Shuts Paper

NGA, causing management to suspend publication when the deadline passed. The NGA has indicated it will not discuss the proposals while the papers are suspended.

The suspension of The Times, — with a circulation of about 215,000 copies, is the flagship of Times newspapers, and the Sunday Times — circulation 1.3 million — resulted not only from concern with computerization and job reassignment, but with other issues as well.

Furthermore, the present troubles are not confined to the Times group. There have been running battles between management and unions in all the major Fleet Street national papers during the 1970s. Most of these battles have concerned management's contention that featherbedding, or over-hiring, was occurring even before the computerization move.

Another major problem concerned unofficial job actions by local unions that either caused the papers to halt printing altogether or to print a reduced number of copies through strike actions. The Sunday Times did not appear twice and lost over eight million copies through such job actions, and supplements lost 600,000 copies through such tactics. Revenue losses totaled almost £1.3 million — resulted not only from concerns with computerization and job reassignment, but with other issues as well.

As far as management is concerned, those issues are more critical than the computerization argument. According to The Times management, the expense problems were in-creasing. This year The Times did not appear altogether on nine days, and it lost four million additional copies through such actions. The Sunday Times did not appear twice and lost over eight million copies through such job actions, and supplements lost 600,000 copies through such tactics. Revenue losses totaled almost £1.3 million — resulted not only from concerns with computerization and job reassignment, but with other issues as well.

That is the front-end phase and would go on-line. That phase was scheduled for 1980 completion. Phase Four, slated for completion in 1981, would put reporters on-line. That phase was scheduled for completion by the end of 1981.

The central composing room would continue to exist to handle outside copy, but it was hoped that eventually advertising agency copy would be handled tape-to-tape. However, this has not been finalized.

SDC is known to have had many problems in trying to configure the system to Times standards. The group's papers have been consistent winners of design awards, and The Sunday Times is particularly fancy. There have been problems over visions for accents, makeup flexibility as much as three-fourths of what the group expected, according to internal sources. The Friday running behind schedule.

However, parts are up and running — not operationally but for training. Some union members have reportedly asked if they could use the period of suspension, for which they are receiving full pay for at least the first few weeks, to train on the new equipment. Meanwhile, The Times is like the favorite of its tough and notorious competition. A word of seven letters with no clue at all.

The solution? "Missing."
Newman: Misuse of English Not Totally Fault of DPers

(Continued from Page 1)

putere, Newman finds DP jargon less objectionable when it comes from industry professionals than when it's practiced by outsiders. "I'm disturbed by the avidity with which some laymen adopt computer language when it's not necessary," he complained. "So, in one case [a layman using computer jargon] I resented the term "word processing" because, he explained, "I've always believed words should be spoken and written, not processed."

Otherwise, he said, he sees nothing "farfetched" in speaking to a group of computer users about the frightful state of American English. "There are no inappropriate forums" from which to attack the "dull, mushy, boneless, gassy" language that pollutes much of contemporary speech and writing, he insisted.

Important to Everyone

Contrary to popular belief, clear and concise communication is important to everyone, regardless of one's occupation. Despite the rapid growth of television and other electronic media, language remains the principal means of formulating and expressing ideas, and failure to communicate effectively usually signifies an inability to think clearly, Newman said.

Moreover, he added, hazy communica-
tion wastes time and labor, creates confusion and results in surplus paper-
work, the bane of business.

Unfortunately, many Americans seem irresistibly drawn to pompous, unnecessarily convoluted language either because they think it makes ordi-

Sample Misusages

In last week's address, as in Strictly Speaking — probably his best known plea for linguistic common sense — Newman supported his observations with sample misusages drawn from nearly every major walk of professional life including government, edu-
cation, business and the news media.

Newman reserved some of his sternest criticisms for the nation's educators, whom he said almost never use simple, straightforward language when they can find a more recondite substitute. In the gobbledygook of contemporary education, students no longer attend school; they become "involved in the educational process," he said.

Once enrolled in classes, students prepare for "performance evaluations" (tests) by consulting "bibliographies of books" where they no doubt find a few texts of "easy difficulty" and perhaps even some suggestions for "recursive reading."

In business, executives stress the im-

the virtues of a "high personal auton-
omy quotient" (self-reliance). No busi-
ness seems immune from the impulse
to inflate or distort language, not even the companies that sell "ice cream transfer spades" (ice cream scoops), "Sealy sleep systems" (beds) or furni-
ture made of "man-made vinyl."

Business, like government, has turned "izing" — the coinage of for-
dable nonsense words ending in "ize"
into a new national pastime, Newman reported. Executives now "cognitize"

Easier Program Development.

OPTIMIZER III takes some of the mystery out of programming. It monitors program execution and provides verb-level execution counts showing exactly what the program does, what has been tested, and where problems exist. It even shows where CPU time is con-

Faster Debugging.

By providing direct feedback about program operation, OPTI-
MIZER III helps spot otherwise hidden logic or performance prob-

Williams Found Guilty

LOS ANGELES — Barbara Jean Williams has been found guilty in Los Angeles Superior Court on charges of welfare fraud and per-

jury for what was termed the big-
gest welfare fraud uncovered in the U.S. to date.

Williams bilked Los Angeles County out of $24,000 by using eight fictitious names and collecting welfare payments for more than 70 children — only four of whom were actually hers. She managed to cheat the system for seven years by fabri-
cating drivers' licenses and birth certificates that looked legitimate to welfare case workers.

Williams succeeded with the scheme until a routine computer match hit on a duplicate address on OPTIMIZER III.

Because programmers need all the help they can get.

Already expanding COBOL productivity at 300+ sites.

OPTIMIZER III is a new program product from Capex that provides COBOL programmers the infor-
mation they need to develop and maintain programs with less effort. Although it was just introduced in mid-
March, OPTIMIZER III is already in use at over 300 sites. If you use any of the IBM OS, VS1, SVS or MVS
systems, OPTIMIZER III can help you improve pro-

Williams was found guilty of 10 counts of welfare fraud and 12 counts of perjury. She faces up to eight years in prison. Currently free on $50,000 bail, she is scheduled to be sentenced on Dec. 28.

OPTIMIZER III helps them do more of what they do best.

Easier Program Development.

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Faster Debugging.

By providing direct feedback about program operation, OPTI-

Easier Program Development.

OPTIMIZER III takes some of the mystery out of programming. It monitors program execution and provides verb-level execution counts showing exactly what the program does, what has been tested, and where problems exist. It even shows where CPU time is concentrated, to help focus tuning efforts. As a result, programs can be developed or modified faster, with less effort.

With its powerful program analysis, debugging aids, and automatic program optimization, OPTI-
MIZER III helps programmers to concentrate on pro-

Consumer Electronics

With the wave of new consumer electronics, however, it's easy to see what happened to the old model:

Newer models:

- Portability
- Multimedia capabilities
- Improved battery life
- Enhanced design

Older models:

- Larger form factor
- Limited multimedia capabilities
- Shorter battery life
- Basic design

In the world of consumer electronics, as in many others, evolution often leads to a new model that is a hybrid of multiple old models. This is true even in the world of consumer electronics. A newer model may incorporate features from several older models, such as portability, multimedia capabilities, improved battery life, and enhanced design.

On the other hand, the old models may also evolve, adapting new technologies and design elements to maintain relevance in the market. This coexistence of new and old models is a testament to the dynamic and ever-changing nature of consumer electronics.

In summary, consumer electronics have undergone a fascinating transformation. The evolution of models has not only introduced new features and designs but has also preserved elements from older models, leading to a symbiotic relationship between the old and the new. This interplay between innovation and preservation is a crucial aspect of the consumer electronics industry, ensuring that the market remains vibrant and adaptable to the changing needs and preferences of consumers.
IBM Price Cuts Seen Presaging System Debuts

(Continued from Page 1) Amdahl Corp., which markets memory for $85,000 per 1M byte, said it
probably will not reduce its memory pricing on the 30 series of processors,.
and therefore won’t have to replace some users in the under-138 class to
larger systems expected at the end of
1979 or early 1980. Furthermore, the incentive to pur-
chase may also keep the purchase price high
in the 30 series of processors, closing the H series of
larger systems expected at the end of
1979 or early 1980. While many analysts see the price
cuts as "competitive" against IBM’s plug-compatible competitors, those
competitors were apparently not
caught by surprise. Amdahl Corp., which markets mem-
ory for $85,000 per 1M byte, said it
probably will not reduce its memory price because the reduction would “not
be that significant in terms of the cost of
the whole system.”
On the other hand, Irel Corp., which has followed IBM’s price of $110,000
per 1M byte rather consistently,
reacted immediately by dropping its
prices to $75,000 per 1M byte.
The price reduction by IBM was not
as aggressive as we had expected,” a spokesman said, adding that
“we have announced and are now shipping
16K-bit chip for memory, so IBM is now
catching up to us [in technol-
gy].”
Reactions to the move by other mem-
yory vendors and leasing companies
were varied. Kent Mueller, product marketing
manager with the Commercial Systems
Division of Intel Corp., said the an-
nouncement was not a total surprise to
that company.
“We had anticipated a price reduc-
tion, but thought it would come
during the first quarter of 1979. Some
of the price cuts were probably
on large systems, and large systems are
IBM’s original product line, he added.
“IBM will hold the line on its prices “at this
time.” He noted, however, that Am-
pecx’s prices are below IBM’s.
Richard Egan, executive vice-
president of Cambridge, Mass., echoed the
Ampex spokesman, stating that the
company is looking at the possibility of
price reductions, but has not yet
made any decisions.
“It will really be a matter of what the
competition does,” he said. “If history
repeats itself, there probably will be a price reduction.” He predicted the net
effect of IBM price cuts on the in-
dustry will probably be to “quicken the
pace of business, because [users] will be
biting and waiting for IBM to do something.”
From the time of the 3033’s introduc-
tion to a maximum of 8M bytes of
IBM-supplied memory. Several IBM
watchers have commented that the
reason for this was IBM’s surprise at
the volume of orders for the system, which
strains the company’s production
facilities.
With the doubling of the chips’ den-
sity, IBM has effectively doubled its production capacity, according to Paul
Raynault, vice-president of Computer
Finders, Inc. of Hackensack, N.J.
The new price for the 12M-byte ver-
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for the 16K-byte version, while
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were $95,650 or $107,810, respectively.

Privacy Initiative Readied
(Continued from Page 1)

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to credit information about him and
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Carbs on Insurers
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Blown Fuse Halts Input of Data At Logan Airport

By Marcy Rosenberg

BOSTON — A sudden power loss kicked out Logan Airport’s radar system here recently, cutting off the input of air traffic data to the airport’s mainframe for about one hour.

Radar scanners supply the computer—a modified Univac 1230 used to store and retrieve air traffic information—with such data as flight names and numbers, altitudes and speeds for incoming and outgoing planes, according to Ray Zazzetti, deputy chief at Logan’s control tower.

Although the Univac system “functioned normally” during the power outage, “there was nothing to feed data to the computer” because the radar was down, Zazzetti explained.

A blown fuse in the radar system caused the loss of power in the tower cab and in the radar room where the air traffic controllers work, according to a spokesman for Massport, the state agency that governs the airport. The radar went down between 4:45 p.m. and 5:45 p.m., the spokesman said, noting peak air traffic hours are from 4 p.m. to 7 p.m.

During that hour, the airport subbed in a “hand-carried, hand-manipulated slotting system” to compile and retrieve information—such as data as flight names and numbers, altitudes and speeds for incoming and outgoing planes, according to Ray Zazzetti, deputy chief at Logan’s control tower.

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Cheeky Answer Systems Seen Vital

By Brad Schultz
CW Staff

WASHINGTON, D.C. — Computerized question-answering systems (QAS) should be "impertinent." In the sense used by Prof. Laurent Siklossy at a technical session of the 1978 Association for Computing Machinery (ACM) convention here last week, a QAS is impertinent if it tells a user something he did not ask.

A sophisticated QAS must be impertinent, providing the user with unsolicited information as well as answering questions. The extra information should be relevant and help the user achieve his goals, the University of Texas computer scientist explained.

Impertinent QAS can minimize the "all too oft-repeated reaction to present-day QAS: "Why didn't you tell me?" To which the QAS answers, "Well, you didn't ask.""

Customer Duped

Siklossy recently collaborated on the design and implementation of an airline tariff QAS developed to field airline customer queries about travel through Europe, North Africa and the Middle East. Drawing from this experience, he illustrated the need for impertinent QAS with a sample dialogue between a hypothetical customer and the system.

The dialogue began with the user declaring his desire to travel by air from Chicago to London and then back to Chicago. The QAS responded by asking when the user wished to depart and when he wished to return home.

The user specified these dates and was then asked, "Will you fly first class?" He replied, "No, economy" and was next informed of a suitable itinerary, including flight numbers, arrival and departure times and the name of the carrier.

Next the user asked the price of the ticket, the system noted the amount. The dialogue ended with the user acknowledging acceptance of the terms.

CW
At ACM

But the user was "had" by this interaction, Siklossy told the session. Because the user never inquired about certain available discounts, he learned of them too late, from fellow travelers. On his return, the user asked the QAS why it had not informed him of these opportunities. "You didn't ask," the system responded.

Siklossy noted that in this example the QAS answered all questions put to it, yet proved inadequate in helping the user attain his objective (to make a journey within certain constraints of time and money). The problem arose from the user's limited knowledge.

Subject Focusing

To avert such a problem, the next QAS interaction must feature a "subject-focusing phase," Siklossy continued. Basically, subject focusing is a procedure by which the user's interests within the "topic space" are made explicit to the system.

Gradually, the user's declared concerns are sharpened through dialogue with the QAS. Wherever possible, values are assigned to the "dimensions of the topic space."

For example, the dimensions of a trip might include the departure and return times, the coordinates of points visited, the ticket prices, the identity of carriers and the weather and political conditions of the places to be visited.

At some point in the subject-focusing phase, both user and system agree on a "question space," Siklossy said. Beyond this point, true questions can be asked by the user, with answers supplied by the system.

Two Examples

For instance, the user could ask the system how many employees of a given firm earn more than $30,000 per year and be told "36" without being informed that all 36 employees earned far more than $30,000.

In another situation, the user might ask which companies supply all parts used by a given department and be told, "companies ABC and DEF." He would not be told that DEF supplied only one part and that all other parts come from ABC.

Data base management research should not be limited to the external organization of data, such as categorial hierarchies, Siklossy told the session.

The useful QAS must do more than understand what has been asked, he concluded; it must understand what has not been asked.

Cheeky Answer Systems Seen Vital

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Out of 'No Man's Land'

Panel Agrees Congress Has Entered the DP Age

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — In the course of a few short years the U.S. Congress has emerged from a DP "no man's land" to become a full-fledged member of the information age.

But all that progress has not come easily. Members of a panel at the Association for Computing Machinery's (ACM) annual meeting last week described the process of congressional automation as "a series of ups and downs" and "a steeplechase course."

However, "in spite of all the frustration and occasional disappointments, we have been able to move ahead," according to Robert L. Chartrand of the Library of Congress Congressional Research Service (CRS).

"A dozen years ago there was precious little activity on Capitol Hill regarding computers," Chartrand said. Most members of Congress took a "wait-and-see" attitude about DP at that time, he added.

The breakthrough came in 1970 — during what he called the "dim years" — when CRS contacted more than 100 senators and representatives and more than 150 staff members to determine possible uses of automation.

In 1970 slightly less than $5 million was spent by Congress on computer-related services. Today the figure is eight times as much. During the intervening years, Chartrand said, Congress has made a commitment to use information technology in order to improve its decision-making process.

Another panel member, John K. Swearingen, director of information systems of the Senate Committee on Rules and Administration Technology Services, noted that while five years ago there were no computer terminals and only "one small computer" in use in the Senate, there are now terminals in every senator's office and the Senate is supported by two IBM 370s.

Example of Progress

CRS, which provides most Congress' DP support, is an example of how far automation has come on Capitol Hill. CRS maintains several large data bases with on-line connections to hundreds of terminals, runs a DP operation that includes two Amdahl Corp. 12M-byte 470/5Vs and has a library of more than 5,000 computer tapes and 12G bytes of disk storage.

Congress now employs several hundred DP support staff, the panelists noted, and is moving rapidly into advanced technology. Chartrand cited expanded use of video and cassette technology and experimentation with teleconferencing via satellite as indications of the directions in which Congress is moving.

Boyd L. Alexander, director of information systems in the U.S. House of Representatives, told the panel audience that micrographics will be used in the Legislature's daily operation. The Senate receives about one million letters every month addressed to individual senators, a figure that can easily double or triple in any given month.

That volume of correspondence, Swearingen said, supports the move toward word processing, where "we've really only scratched the surface."

A similar trend is noticeable on the House side, according to Alexander. "The IBM system is particularly popular on the Hill," he added.

Basically, we see distributed DP as the way we're moving," Soon, he predicted, congressional committees will have their own minicomputers and microcomputers, and they will only tie into the House mainframes to access the congressional data bases and for special projects.

Alexander also predicted an increased use of computer graphics, especially by the committees, and more use of advanced communications. Congressmen have a real need for better contact with their district offices, and direct voice and digital communications links will be established for that purpose, he explained.

Congress now has the staff, facilities and services to provide timely information that is as accurate and complete as possible, according to CRS' Chartrand.

One sign of that progress, he added, is that Congress, now more familiar with information technology, is showing more concern for the issues that technology raises and is embodying that concern in legislation.
Carter Administration Favoring Deregulation

By Jake Kirchner

WASHINGTON, D.C. — The Carter Administration is favoring deregulation, according to one Administration official.

Rather than regulating that industry, the Administration wants to clarify the principles needed to develop information policy, according to Paul I. Bortz, deputy assistant secretary for the National Telecommunications and Information Administration (NTIA).

Bortz said that in the years ahead "we can expect development of many policies which affect information applications and industries," but the industries are too diverse to ever lend themselves to one "single, comprehensive information policy."

"Where there is overlap between regulated industries such as the computer and information services sector," NTIA espouses "fair and consistent policy" that is based on some deregulation of the regulated industries rather than the regulation of currently unregulated sectors.

In accordance with this view, Bortz said, NTIA will seek "full deregulation of the terminal equipment market."

Explaining NTIA thoughts in this area, Bortz maintained, "The patches being added to the regulatory framework — such as those added to the Communications Act of 1934 by the first Federal Communications Commission Computer Inquiry in 1971 — do not last very long in the face of rapid innovation."

Bortz said, NTIA is currently analyzing the "issues pertinent to the current Computer Inquiry," and the agency's position on one facet of that inquiry is that the terminal equipment industry should be deregulated, Bortz remarked.

Deregulation of that market "will further stimulate the already rapid development of equipment options" that have occurred since the "landmark Carterfone decision," he said. NTIA also believes AT&T must be able to participate in that market and that AT&T's participation should be allowed in a way "to ensure competition that is fair to all parties."

NTIA has yet to propose specific recommendations for such deregulation. Bortz said, but believes a deregulated terminal market "can flourish" consistent with "both the spirit and the letter of the 1956 Consent Decree."

Some of the other "key issues" being studied, he said, are:

- The market structure and regulatory policy.
- The steps to be taken to "open access to and encourage maximum dissemination of information."
- How to encourage "the production of information goods and services."
- How to arrange for the "equitable distribution" of communications and information goods and services.
- The market structure of information industries.
- The problem of information and foreign relations.

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HP's motion to dismiss the ICS suit argued that the first count of ICS complaint—fraud and misrepresentation—is nullified by Virginia's statute of limitations on personal litigation. Where applicable, the statute invalidates the suit of an injured party if it was filed more than one year after the alleged injury.

The motion also charged ICS with violating the Federal Rules of Civil Procedure by insufficiently detailing its allegations on all three counts, preventing HP from framing a proper response.

In a brief filed with the U.S. court, Christo countered that the statute of limitations does not apply to the suit against HP and indicated that ICS could not have violated the statute even if it did apply.

According to the brief, ICS did not attempt 'full utilization' of the system until January 1977 — although it was delivered in September 1976 — and was unable to properly evaluate the system's performance during the period between January and August 1977. Under constraint of the statute of limitations, if ICS had concluded during this period that misrepresentation had occurred, then the statute would have lapsed by the time the complaint was filed.

The system's hardware and software components were allegedly not 'up and working' together during this period, preventing a comparison of benchmarks with contract specifications, the brief explained.

At least until the time ICS launched its federal court action, "problems continued to occur, and HP continued to make attempts at repair, including sending at least one unqualified expert to examine and evaluate the computer system and to recommend corrective measures," the ICS brief claimed.

Hence, Christo argued, the statute of limitations could not have lapsed in this matter — if applicable, which he disputes.

Christo called 'patently absurd' HP's contention that the complaint was insufficiently detailed. The vendor protested in its motion for dismissal that the second count — breach of contract — was phrased in a fashion "so vague and ambiguous that it does not state a cause of action."

The document failed to define the hardware, software or services alleged to be faulty. HP contested. In an attached "Motion for a More Definitive Statement," the vendor asked that these items be specified.

However, the complaint did characterize HP's MPE time-sharing system, data entry library and Image software...
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To Dismiss Suit

The complaint said that an HP representative verbally assured ICS its products would meet the firm's needs; that the hardware proposed was "fully tested and reliable"; that ICS could easily convert its existing software to the new equipment; and that "HP would furnish to ICS everything that was needed for an efficient, reliable on-line system."

ICS has claimed $328,000 in damages on the first count, $2,908,000 on the second and about $421,600 on the third for a total of just less than $3,450,000 "plus interest and costs."

A number of efforts, Westermeier said, to provide general malpractice coverage to DPers and specific coverage for software vendors.

Dealing With Reliance

About improper reliance on computer systems, he said the subcommittee will look at recent court cases to "educate the DP community" when management should intervene in an otherwise automated decision-making process "to assure that decisions are not made in an arbitrary computerized mode."

Westermeier said, "has an educational function to try to help individuals to better understand the law and their liabilities and rights and to try to alert management to potential legal problems."

HP Asks Court

(Continued from Page 13) as inefficient and improper for use. According to the complaint, HP failed to disclose certain flaws in these and other products and misrepresented their performance capabilities. This allegedly caused ICS to purchase goods ill-suited to its needs and forms the basis of the first count.

The second count refers to HP's alleged failure to deliver what was promised and the third count — negligence and malpractice — to the vendor's alleged failure "to provide certain services and advice . . . which equalled or exceeded then-prevailing standards . . . within the data processing industry."

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banks experienced nearly equal losses through ATMs, while 78.6% noted that losses with ATM-based systems were smaller than those they had experienced when using more traditional means of accessing demand-deposit and time-deposit accounts.

Approximately 7% of the responding banks experienced nearly equal losses under both systems while the smallest percentage – 5.4% – reported that losses through ATMs were greater than those under the more traditional transaction methods.

One reason for the reduced losses could be the security methods implemented by the banks with the ATMs, according to the survey. Forty-three percent indicated about their systems' security, 47% reported either no security problems, or extremely few security problems, while only 40% reported minor problems with ATM security.

**Systems Cost-Justified**

In addition, 38% believed their systems were cost-justified, while approximately 30% noted their security systems were currently under review. No respondent indicated any major problems with the security aspects of its system.

A respondent to the survey claimed that a large percentage of the dollar loss resulted from improper handling of identity cards, either from loss or theft. The survey showed stolen cards accounted for almost two-thirds of dollar losses through ATMs reported.

Approximately 64% of the losses resulted from interception in the mail of the card and/or personal identification number (PIN), loss or theft of the card or other kinds of unauthorized use. Another 22.3% of the dollar losses were attributed to customer fraud, such as use of an ATM after an account was closed or unrecovered overdrafts. Approximately 13% of the losses resulted from internal bank problems such as hardware or software errors or internal fraud, according to the survey.

**Liability Limits**

Although the loss from the customer's end was high, 63% of the responding banks reported no set liability limit for losses occurring through ATM systems. In most cases, the banks, the customer absorbed an average of $25 per loss, but in two-thirds of the instances where losses occurred through ATM transactions, the customer suffered no loss, the survey reported.

The remaining 38% had established customer liability limits. Half set $50 as their limit, while the other half "reported their customers had a zero loss exposure."

In those banks with set liability limits, the average customer loss was $13, and in three-quarters of the cases, the bank absorbed the entire loss, the survey results said.

More than half the responding banks indicated that customer liability was lost on a case-by-case basis or determined by customer negligence. Almost one-quarter of the surveyed banks reported the bank absorbed all losses while nearly 10% indicated either a set dollar limit was used or the customer was responsible for all losses until the card's loss was reported.

**Security Devices**

To protect customers' funds, the banks employ a variety of security measures. Approximately one-quarter of the respondents indicated that the telephone is provided at the ATM site to report lost or stolen cards, and almost one-fifth of the banks said they use a security camera at the ATM site.

A number of banks use added security measures such as data encryption and separate mailing of the electronic funds transfer (EFT) card and PIN. They also set daily and weekly limits on withdrawal amounts from ATM systems.

One-fourth of the respondents said they allow customers to select their own PINs, but this appeared to be a source of disagreement within the banking community. Some banks contained that customer-selected numbers provide the greatest security, while others believed bank-selected numbers give the best protection.

Those that advocate the bank-selected PIN fear a customer-selected PIN may be easily discovered by a thief from information in the account holder's wallet such as a birthdate or house number.

Many banks gave users more credit for handling cards than they should have, an ABA spokesman said. Banks often found customers writing the PIN on the card itself, loaning the card to a friend or even leaving the card in the machine, he said.

However, banks that prefer to have customers select their own PINs reported that customer education on preventative measures eliminates most problems. The responding banks pointed out that customers who choose their own numbers are less likely to write them on their EFT cards.

The ABA concluded it was impossible to determine from the survey results whether any kind of relationship exists between additional security measures and dollar losses. The ABA noted that the cause-and-effect relationship could not be determined since the results were unclear as to whether banks had fewer losses because of ATM security or whether they installed the additional measures because of unacceptably high losses.

**Rebuttal of 'War Stories'**

The ABA mailed the questionnaires in May and June to approximately 225 banks using ATM systems. Sixty percent were returned. The respondents operate about 20% of all ATMs in the U.S., according to the ABA.

The average bank responding to the survey had a system of 14 ATMs with one in 10 off-premise. The average system age was four years, and the mean transaction volume per ATM was 3,760/mo. Two-thirds of the systems had on-line terminals.

Almost half the respondents had deposits exceeding $1 billion and less than 6% had deposits of less than $100 million.

The ABA said it undertook the survey to help rebut the large number of "war stories" reported by the media and discussed in Congress about the security problems inherent in electronic banking systems. The ABA believes these claims are unfounded.
You’d probably like to switch over from your IBM 3270’s to more versatile equipment, but you’re not ready to bite the bullet. Well, there’s a complete terminal system that will make the change painless because it’s 100% IBM plug compatible. A terminal system with features you won’t get from IBM for years, if ever. A terminal system that can easily provide special functions. A terminal system that’s software modifiable to future changes in network line protocol requirements. The terminal system is the Trivex Plus 70. And in addition to having all the functional capability announced by IBM, Trivex 3270 compatible units offer you those valuable extras that can make your job a whole lot easier. Maybe you’re thinking: “That’s fine, but what makes you think my company would be interested? Can it meet the unique requirements of my 3270 application?”

Well, that’s precisely where our Trivex Target Test comes in. Check it out. In about 60 seconds you’ll know whether or not you should give Trivex a call.

### The Target Test

<table>
<thead>
<tr>
<th>CHECK ONE</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Does a single device failure take your complete cluster off line?</td>
<td>❑</td>
<td>❑</td>
</tr>
<tr>
<td>2. Does a single device failure take your complete channel down?</td>
<td>❑</td>
<td>❑</td>
</tr>
<tr>
<td>3. Will remote communication speeds, switch selectable, up to 19.2KBS improve your network efficiency?</td>
<td>❑</td>
<td>❑</td>
</tr>
<tr>
<td>4. Do your programmers need more information displayed to efficiently develop and debug software?</td>
<td>❑</td>
<td>❑</td>
</tr>
<tr>
<td>5. Are there one or more special functions you need to make your job a lot easier?</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

Results:
Score 20 points for every “yes” answer. If you scored 20 points or below, you’ve got nothing to complain about. Don’t change a thing.
If you scored 40 points, you may not make the switch yet, but an inquiry is in order.
If you scored 60 points, call us and ask for application information.
If you scored 80 points or over, BULLSEYE! Call us right now. We’ll send a salesman out to see you.

He can tell you about our high resolution, non-glare CRT, OCR wand, and local display-to-print capability. Or you may be interested in our statistical package or 10-key numeric pad or cursor position indicator. Whatever target you’re aiming for Trivex can help you hit the mark.

Don’t Replace Your 3270s Without Taking The Trivex Target Test.
Notes Net Gain of 13%

Diebold Survey: MIS Spending on the Rise

By Marcy Rosenberg

NEW YORK — Corporate spending for information systems showed a 13% net gain from 1976 to 1977 and is expected to rise an average of 11% yearly during the three-year period from 1977 to 1979.

These were among the findings recently released by the Diebold Group, Inc., a management consulting firm that surveyed some 200 clients for 1977 MIS budget figures and projected spending for fiscal 1978.

Based on 1977 figures, the survey found MIS expenditures exceeded 1.07% of sales, up .95% in 1971.

Diebold noted, "but that much more capability is needed today for the applications made possible by advances in computer technology.

"Hardware budget dollar increases usually mean acquisition of new hardware, according to Joe Ferreira, director of Diebold's research program. However, while that is taking place, labor costs are also going up as a result of infilation over normal salary increases and new hires.

"With hardware prices coming down, you can buy more capability for fewer dollars," Ferreira noted, "but that much more capability is needed today for the applications made possible by advances in computer technology.

"Companies, therefore, end up spending more for increasingly sophisticated equipment and also for more people to make the systems work. The industry has not yet seen significant improvements in personnel productivity to keep up with increasing hardware performance."

DP Out of DP Area

Employees working within MIS departments comprised 1.58% of the total corporate work force in 1977 compared with 1.41% in 1971, Ferreira said.

However, because distributed processing has made it possible to move some DP functions out of the MIS department and into user departments, "more and more people will perform DP activities in user areas and will be paid from user budgets," he noted.

In 1977, an additional 22% of all employees in the companies surveyed performed DP-related activities outside the MIS department.

Today, DP employees devote more time to applications work than to redesign and maintenance efforts, according to the survey. Companies are cutting operations personnel budgets an average of 1% per year, from 32% of the total 1971 MIS budget to a current 22%, Diebold found.

New Emphasis

Applications efforts appear to be moving toward distribution — such as inventory shipments and away from manufacturing. For example, more time of materials processing, the survey found.

Patterns in hardware spending indicated personnel and memories remained stable at 43% of the total hardware budget and terminals comprised about 12% while conventional peripherals dropped to 29% and will continue to decline.

In the communications area, Diebold noted a "reverse trend" to greater convergence of telecommunications and DP systems. About 38% of all firms in the study separated telecommunication from the DP function, but this percentage decreased sharply as corporate size increased.

"DP expenditures in many companies are fairly well centralized with a single group in overall charge of budgets and spending," according to Ferreira. On the other hand, he noted, "telecommunications is far more apt to be distributed widely throughout the corporation with a variety of authorities in charge of different pieces."

Reverse Trend

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Reverse Trend

A reverse trend appears to be taking shape, however, with telecommunications becoming more centralized and traditional MIS areas more decentralized because of distributed processing, Ferreira added. "Spending for telecommunications averaged 32% of corporate revenues while the average telecommunications budget comprised 52% of the MIS budget. Communications budgets rose an average of 10.1% from 1977 to 1978, and Diebold predicted they will increase 9.1% annually over the next five years.

DP opportunities are increasing for independent communications carriers and equipment manufacturers who are increasing their current 42% share of the data equipment business, according to the survey.

Corporate Plans

The number of companies which have developed an overall corporate communications plan rose by 7% in two years to 47%, and about 60% of the survey respondents indicated plans to obtain more equipment and transmission services from outside the Bell System.

Concerning specific communications trends, Diebold found 51% of the participating companies have combined voice and data networks and 49% are using special devices to monitor communications routing and costs. The most popular of those monitors is from a company other than Bell.

In-house electronic mail "is still embryonic," the survey noted, but while only 21% of the companies have implemented these systems, 40% of those firms not using them plan to experiment with the technology in the future.
At last, there is one distributed processing network which lets all of its users, whether they are in New York, San Francisco, London, Zurich or East Mule's Tooth, Missouri look at the entire data base exactly as if it were located in its entirety in New York, or San Francisco, or London, or Zurich, or East Mule's Tooth.
GUARDIAN/EXPAND
The Tandem NonStop Network
Operating System

The differences are enormous.
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First of its kind. The one multiple processor
system in the world capable of continuous opera-
tion—even during the failure of a processor I/O
channel, disc controller or disc. Without loss or
duplication of any transaction, even those in
process. And with maximum protection for the
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try. Plus phenomenal flexibility: expandable in
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ability to support thousands of terminals per
system. File capacity of up to four billion bytes
per file, and no limit on the number of files. Extra-
ordinary it is, all by itself, and now as many as
255 Tandem NonStop Systems can be economi-
cally interconnected in a powerful, complete and
amazingly simplified network. Read on.

Announcing the
4000 processor network.

Here's how to tie together 4000 processors:
Easy. Interconnected in the most beautifully
simple way. Per the diagram. Point-to-point con-
nections can be made between all centers of over-
lapping activities, but are not required. We can
in fact tie the network together with a single
continuous line. And there is no user involvemen-
for pass-through. To get from "A" to "F" no user
housekeeping penalties from "B", "C", "D", & "E.

It looks exactly as if all messages were being
transmitted only next door. And X25 protocol is
available as well.

Introducing the distributed/
centralized data base.

Totally transparent. With a split of geography
completely invisible to the user. Not the separate
interconnected data bases found in other net-
works but a unified data base completely and
transparently accessible throughout the network.
No user, and no application program, has or re-
quires any awareness whatsoever as to the actual
location of any segment of the data base in the
Tandem network. With a Tandem NonStop Com-
puter System, your data may be in Ypsilanti, but
it looks for all the world like it's residing right
in your own local system.

To get rid of a host of problems,
get rid of the host.

Having a host system in a network is tradi-
tional. Unfortunately, it is also the traditional
point of concentrated difficulties. For when the
host goes down, so does the whole network. And
even if the host is only suffering an intermittent
difficulty, the integrity of the data base is up
for grabs, not only in the host, but throughout
the remote data bases as well. With Tandem's
GUARDIAN/EXPAND Network, a local failure
has no impact whatsoever on the rest of the

Conventional fixed network is difficult and expensive to expand
and modify as needs grow. And they always do. Communication
and utilization of data base records from twice removed nodes is
prohibitively expensive in applications programming, so more
lines are the only viable solution. And that is expensive, too.

Tandem pass-through packet switching enables "A" to communicate
with "E" at no penalty in system overhead. And you can add direct
lines, per "B" to "E" or "L" to "G" whenever traffic warrants with-
out disrupting system performance or efficiency. Note that nodes
can be of variable sizes, all using Tandem NonStop Systems as the
common element. Efficient, powerful and extremely low cost.
system, and best-route switching automatically circumvents the trouble spot. If there is a failure in the communication link, the system will automatically go around it. The system and the network stay up and running, and best of all—the data is intact, its integrity assured.

**A unique and unified operating system—free of geographic limits.**

Whereas most network operating systems are created "on top" of prior operating systems, at significant penalty, Tandem's Guardian Operating System was created from day one for the multiple processor environment. It treats all resources within the system as files, both hardware and software, and accordingly achieves complete geographic independence, both for the user and for the user's programs. This is beautiful at any time, and it is a lifesaver when increased work loads call for an expanded system, more processors and peripherals, and perhaps a new configuration of resources. This is unique: no reprogramming is required, not even recompilation.

**The long and the short of it—keeping costs down and performance up.**

No one can do that like Tandem. For the differing needs at each node can be met by the expandable Tandem NonStop System in varying configurations. Single system programming works over the entire network and will continue to work regardless of growth and complexity of the system. And because this is after all a mini-based system, the costs are low to begin with and add-ons come in low-cost increments. Without one cent of penalty on the original investment.

**Comprehensive software—transparent and segmented.**

Under the overall supervision of GUARDIAN/EXPAND, the Network Operating System, each individual system maintains its own Guardian Operating System plus all of the multiple processor and control communications systems and a host of applications languages including industry standard ANSI '78 FORTRAN and ANSI '74 COBOL. With T/TAL, EDITOR, SORT/MERGE, DEBUG, TGAL, ENFORM Query/Report Writer, and complete remote diagnostic capabilities, the software package of the Tandem NonStop Operating Network is truly impressive. Best of all, it never requires one iota of modification as systems, nodes and the entire network expand and are modified to suit changing requirements. And any Tandem GUARDIAN/EXPAND node can communicate with IBM or any other mainframe using industry standard protocols. We've made it possible and practical to go from any industry standard system to a low cost, comprehensive and flexible network without sacrificing your original installation.

**If you're from Missouri, too.**

Call or write for complete information about the Tandem NonStop Operating Network. We'll be happy to demonstrate both how and why this system will cost you less to begin with, less to expand, and less to operate than any other network on the market today. And most likely for years to come.

Tandem Computers, Inc.
19333 Vallco Parkway, Cupertino, CA 95014.
Toll Free 800-538-9360 or (408) 996-6000 in California.
Under Bank’s Volunteer Program

Homebound Handicapped Learning to Program

By Jay Woodruff

PORTLAND, Ore. — The U.S. National Bank of Portland has devoted four years to teaching computer programming to handicapped persons at home.

Homebound Opportunities in Program

Education (Project Hope) is staffed entirely by volunteers from the bank. The project provides the handicapped trainable with a portable terminal and an expert programmer to teach him.

Since programming is "primarily a mental job, handicapped persons adapt to it very well," according to Linda Godson, data base officer at the bank and volunteer head of the program.

Programming instruction is tailor-made for each trainee, and although Cobol is emphasized because of its use in business, other languages are taught depending on the trainee’s needs.

Training takes about one year, and students start writing programs as soon as possible because that is the most motivating and fastest way for them to learn, Godson said.

Students begin the course by reading an introductory textbook on computers. A terminal and a book on Cobol are then delivered to the student’s home. The book contains practice programs that can be run after the student learns the time-sharing option system the bank uses to enter data.

At-Home Visits

Instructors usually visit the trainee at home twice a week for about three hours each time to answer questions about programs and to show the trainee ways to increase efficiency. "There are usually a lot of questions," volunteer programmer Linda White said. Trainees work at their own pace.

Some trainees also attend school, and they use the computer for school-related projects.

Students enter a program, run it and get immediate reports on the terminal. White said quick feedback keeps students interested in their work.

After three or four programs are successfully completed, the students usually are somewhat self-sufficient, although instructors continue to help them understand new procedures that appear in the text, teach them some that do not and clear up difficulties.

Cost to Bank

The total cost to the bank for Project Hope has been between $10,000 and $11,000, but bank officials said it can be done for less if some of the equipment is rented, as U.S. National did before it committed itself fully to the program. Portable terminals can be rented for $50 to $75 a month per terminal, Godson said.

The bank paid $7,000 for hardware and from $3,000 to $4,000 to set up the system. The biggest cash investment was for three Texas Instruments, Inc., terminals that cost $1,500 each. Two other terminals are on loan from Pacific Northwest Bell, which has maintained a high interest in the project. For mainframes, U.S. National uses an IBM 370/155 and a 370/158 and plans to install a Model 168.

Volunteer Commitment

An important reason for the program’s low cost is the commitment of its volunteers. Bank personnel are allowed to contribute two of their weekly work hours to the facet of Project Hope in which they have an interest.

Most persons who get involved in the project contribute more than two hours a week and derive a great deal of enjoyment from it, according to Godson.

"It’s exciting to work with the handicapped," she said, “because many of them have not had a chance to get out of their homes and meet other people. When you plug them into the world of computers, they often blossom unexpectedly.”

Graduates at Work

Two of the five project graduates work at the bank on a contract basis. When the bank needs a programmer, it contacts one of the two at home, and he estimates how long it will take to complete the job. The programmer is paid a fee, but if the job exceeds the estimated time, he is paid for that time as well.

Ronald Ryan, the first to take the Project Hope course, works for the bank. Hope gave him self-confidence and made a difference in his life. "Now I feel like I am contributing something that someone can use," he said.

Five more students will graduate soon. The number of students trained by the bank is limited by the number of portable terminals available, and Godson said the bank is at a turning point on whether it will expand the program.

One thing is certain, Godson said: There doesn’t seem to be any danger that the program will be stopped. I doubt we could stop it now. With our enthusiastic volunteers, nobody needs to be told what to do, and no administrative necessity is needed to keep the program going.

How successful is the Oregon bank’s Project Hope? "Successful, but small," was Godson’s assessment. She added that Affirmative Action goals can be met through the program, though the bank did not have this specifically in mind when it started the program.

More Talk Than Action

Although the program itself may be termed a success, one difficulty remains that the bank has not been able to solve — employment of trainees. The corporations contacted by the bank have expressed an interest in hiring Hope graduates, but few have done so.

"They talk about hiring, but they are very timid about hiring someone who will work at home," Godson said. The reason most often cited is the prohibitive cost of medical insurance for the homebound handicapped worker.

Although bank graduates are highly qualified, Federal jobs are almost impossible to get because of the red tape an applicant must go through when pursuing the job, according to Godson.

The bank has tried to promote support for the project and has worked to interest other banks by putting together a slide show. The show has resulted in inquiries, but no commitments yet.

"It just takes time," Godson concluded. "We hope we can get more positive responses in the future, and we realize this is just the beginning.'"
Latest DP Executive Guide Lists 6,000 Entries

PHOENIX — The Fall 1978 edition of the Directory of Top Computer Executives with more than 6,000 executives listed is available from Applied Computer Research.

The directory is arranged geographically by city and state and has a cross-reference index by company name within industry classification. Three government classifications — (federal, state and local) — as well as health services have been added to this edition.

The directory contains 1,500 more entries than the 1977 editions. Guidelines for listing are gross annual sales in excess of $50 million or annual DP budgets of more than $250,000, a spokesman said.

Each entry includes the organization’s name and address, subsidiary and/or division names, phone numbers, major systems installed and the names and titles of the top DP executives — vice-presidents, directors and DP or information systems managers.

In addition to the directory itself, the data base is available on mailing labels, magnetic tape, computer printouts or 3-by-5-inch cards, the spokesman said.

Many Uses
The directory is designed to be used for direct mail marketing, recruiting, arranging meetings or contacting other organizations.

Single copies of the directory cost $75, with additional copies priced at $45. An annual subscription, including two semianual issues, costs $120, with additional subscriptions priced at $72.

Applied Computer Research is at P.O. Box 9280, Phoenix, Ariz. 85068.

Calendar

Jan. 13-14, 1979, Cleveland, Ohio — CDP Review Course, sponsored by the Cleveland and Erieview chapters of the Data Processing Management Association, Cleveland chapter of the Association for Computing Machinery and Cleveland State University’s Computer and Information Sciences Department. Contact: CDP Review, P.O. Box 6772, Cleveland, Ohio 44101.


Housely to Lead ICN Seminar

WINTER PARK, Fla. — International Computer Negotiations, Inc. (ICN) is sponsoring a four-day seminar conducted by Trevor Housely, data communications expert and author.

The seminar will be held in Denver Feb. 19-22; in Cherry Hill, N.J., Feb. 26-March 1; and in Orlando, Fla., March 5-8.

Designed to keep systems engineers and communications managers abreast of what is new in data communications, the seminar will present an orientation and review of key factors, including a highlight of developments and their applications potential.

The seminar costs $795, ICN said from 1331 Palmetto Ave., Winter Park, Fla. 32789.

Minis and Micros Topic of Conference

COLUMBUS, Ohio — Battelle Columbus Laboratories will hold a conference Feb. 7-8 to discuss how industrial, plant and process managers can better use minicomputer and microprocessor technology.

A special session will be devoted to demonstrations of minicomputers, software development and debugging systems, as well as graphics and interactive control.

Conference participants will be made aware of the general field of small computer systems, basic terminology and aspects of system procurement and development.

Registration information is available from Susan R. Armstrong at Battelle, 505 King Ave., Columbus, Ohio 43201.
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Part of Analysis System

CPU Helping Fillings Stay Put

By Marguerite Zientara

SAN FRANCISCO — Dental fillings may someday stay in mouths longer and wear better, thanks to a computerized analysis system here that measures such factors, according to Dr. Joseph Moffa, dental research coordinator for S Public Health Service’s Division of Hospitals and Clinics.

Because of the rapid development of dental restorative materials, Moffa said, a need arose for more efficient methods to assess their safety and clinical efficacy. Conventional long-term studies have been complicated by the time-consuming effort required for the development, maintenance and analysis of accurate dental treatment records, he added.

Dental Data on File

The two-year-old computerized system, funded by a National Institute of Dental Research grant, was designed to eliminate all data forms and manual operations associated with the collection of clinical data.

When a patient comes into the Public Health Service Hospital here for treatment, demographic and pathological information associated with the patient is entered into the hospital’s data base through CRTs. “As treatment is rendered, the pathology file is debited, so it is always kept current,” Moffa noted.

After materials for dental fillings are placed in patients’ mouths, pertinent data is coded for the computer. This data includes the manufacturer of material, the date of the filling’s placement and the person responsible for placement.

Each material is identified by a 5-digit code number. The 3-digit prefix defines the product name, and the 2-digit suffix identifies the individual batch or variable associated with placement.

For example, one 5-digit code number could identify the material, Dispersalloy, and indicate that it is unpolished. The system is capable of storing variations of 999 different materials, according to Moffa.

Annual Evaluation

These materials are evaluated on an annual basis. Since the data about the materials is coded, at evaluation time dentists at the hospital can get a list of the names and addresses of all people with a certain material in their mouths by inputting a particular code. This same code prompts a printout of the patient’s name, the name of the dentist performing the procedures and all the procedures performed that day.

At the end of the day, all that vital information is printed on self-adhesive labels that can be affixed to the patient’s medical record. In the event the medical record is subpoenaed or needed by another facility of the hospital, the record is always as up-to-date as the computer’s data base, Moffa explained.

In addition, in each of the hospital’s two operatories — patient treatment centers — a 21-in. video monitor screen is suspended over the patient’s chair so the patient can monitor the accuracy of his demographic information.

This process is used both for new patients and for updating the records of previous patients. After verification for accuracy, this information is transferred to the disk storage unit by a single-key operation and becomes part of the hospital’s data base of clinical information.

“At any point in time, we can query this data base via the administrative terminal to give a printout of the names, addresses and telephone numbers of all patients with specific dental treatment needs,” he added.

The hospital uses a Wang Laborato ries, Inc. Model 2200 computer with 20k bytes of main memory. Three CRT terminals are multiplexed to the CPU. Two are inpatient operatories and one is in the hospital’s administrative unit, where it is used for word processing and other statistical backup functions.

With 10M bytes of disk storage, the system makes use of three Wang printers. Two of the printers are 240 line/min printers and one is a 40 char./sec daisy-wheel printer. The daisy-wheel carries out word processing functions.

While private offices now use computers for tasks like billing, Moffa noted, high costs prohibit them from using the technology for patient treatment and material analysis, as does the lack of a computer at Public Health Service Hospital. The future may bring such widespread use, if the prices come down on storage.

If photographic evidence is required, the CRT display will list the tooth number and surface to be photographed. Lastly, in the event a patient or a specific restoration is not evaluated, the reason is entered.

Reasons for nonevaluation are divided into three categories: those related to material, those unrelated to material and those associated with patient complications. “We feel the reasons for nonevaluation, especially in the related category, are very important and have been neglected in previous clinical studies,” Moffa noted.

The appraisals are made annually for all materials. “At any point in time, we can compare substance A with substance B at three years, for example, and the computer will print out a descriptive statistical analysis of the areas of interest,” Moffa said.

Knowledgeable Computer

The system has additional functions, Moffa noted. For example, when a patient is treated, the computer “knows” the patient’s name, the name of the dentist performing the procedures and all the procedures performed that day.

“By Marguerite Zientara

If you’re using a Datspeed 40, Beehive, Diablo, Saroc, HP, Quine, LSI, Execuport, NEC, Teletype, TL, Tektronix, Hazeline, Agile, Perkin-Elmer... you’ll find the DataMaster II compatible with your terminal and your budget.

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Trendata’s Model 500 is a communications data recording and storage unit utilizing IBM compatible flexible diskettes. With features like English language commands, alphabetical and sequential sort, and full record edit capability, the Model 500 adds flexibility to your system plus ease of operation.

The 500 also provides communications capability to and from a remote computer or another Model 500 Disk System. For more information write or call:

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Editorial

Keep Your Options Open

The key to successful implementation of distributed networks lies in the flexibility of these nets to accommodate the addition of services and equipment.

From the user's standpoint, it is a forlorn hope that all applications will continue to expand and network services will be close behind. So the goal becomes one of finding the maximum capability for today's needs while still leaving room for tomorrow's demands.

It is an understatement to say that the number of contenders in the race to capture the user's distributed network dollars is growing almost daily. Basically these vendors have taken on characteristics that place them into one of four categories:

- The mainframe supplier which provides an architecture that creates an environment dependent on large hosts for efficient operation of time-sharing based remote subsystems. An example is IBM with its Systems Network Architecture (SNA).
- The turnkey service vendor which typically evolves from an initial time-sharing network service supplier and provides local processors at remote user sites that are usually limited to operating on the host in some way. This group includes General Electric Co., which recently introduced this kind of product.
- The "traditional" vendor of distributed DP hardware which has specialized in providing equipment at multiple sites. While most of these vendors provide some compatibility with large central mainframes, the emphasis is obviously on utilizing a maximum amount of distributed systems. Datapoint Corp. and Four-Phase Systems, Inc. are in this category.
- The carrier which provides the basic transport mechanism with added intelligence that allows the user access to any hosts operating on the public network. This group includes Teleset Communications Corp. as well as AT&T with its Advanced Communications Service.

Charting a cost-effective and flexible course through this sea of alternatives is not easy. Each of these approaches in its own way offers the user a solution to current network patterns.

Typically the existing user nets were initially configured to support specific applications with specific solutions. As it becomes more cost-effective for a company to move to a remote site, it also becomes clear that multi-application nets are the wave of the future.

Further complicating the emergence of multifunction nets is the trend toward combining operations that have been separate within a company. This trend is moving beyond DP into voice, facsimile, word processing and other areas.

All this makes the job of the network manager an extremely complex one if there is to be flexibility to take advantage of tomorrow's corporate requirements.

The integrated multifunction, multitechnology network of tomorrow will be a key profit center in successful companies. Until these nets arrive, users must be careful to keep their options open.

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Letters to the Editor

Bigger and Fatter

I have been reading several comments concerning the proposed 9-digit Zip Code and must agree that from a strictly economic viewpoint such a change would be expensive.

There is, however, one thing that has not been remarked upon in any of the comments which will make the 9-digit Zip Code even more cumbersome. I'm speaking of the big, fat Zip Code directory now used to look up Zip Codes.

How fat will the 9-digit directory be? How many volumes will have to be printed to contain the billions of entries? Someone will have to look up all the new codes in this directory and assign them to the customer records.

R. Buckley
Orange City, Iowa

Two Bytes' Worth

I had hoped to stay out of the Zip Code controversy, but now I feel I must put in my two bytes' worth.

The gentleman who suggested a couple of issues back, that the code be made five alpha rather than five numeric positions so no changes to the file would have to be made must have had a very poor systems analyst.

Most installations with which I have been acquainted use either a packed decimal (three bytes) or a full-word binary (four bytes) field to store the code. The savings in storage media for a multimega entry file is considerable.

Those who choose the route of the packed data will have to change their record definitions (regardless of language) and make a one-time pass of the files to expand the field. On the other hand, those who store in binary can support the additional digits with only a change in the Cobol definition. (Of course, in both cases there must be an alteration to the print format.)

I'm afraid, however, that my real fear is in the area of data storage and manipulation. Early in my career (late '60s), I was already running into situations where "near-sighted" programmers had saved only one position for the year, never bothering to consider what would happen to them hence.

Don't forget that Jan. 1, 2000 is just around the corner.

For, one thing, consider the Zip Code problem to be one of minor but tolerable inconvenience: the dawn of the 21st century is another matter all together.

Joel Kurash
Stokie, Ill.

No Pressure From NCR

During the last three years our institution, the First National Bank of Lake Forest, has purchased used NCR Corp. Century system components—196K bytes of memory and two Model 657 disk drives—on the open market.

Not once during negotiations to purchase these units did NCR, the account representative or field engineering attempt to apply pressure tactics regarding maintenance of the equipment if purchased through a broker or from another user. Prior to purchasing the equipment, NCR was fully aware of our intentions, and maintenance was provided upon installation without hassles or legal problems.

Our relationship with NCR has been long-standing and mutually beneficial. It is my contention that if a user wants to sit down with NCR's corporate or local representatives to discuss a problem, they are understanding and responsive.

They have proven to be ethical and honorable in our dealings. So if you want to nitpick and dot all the i's and cross all the t's in contract, go ahead. However, I think it is a waste of time.

William Henderson
Assistant Vice-President
First National Bank
Lake Forest, Ill.

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Data Past

Five Years Ago

Dec. 12, 1973

WASHINGTON, D.C. — The U.S. Court of Claims ruled that many copyright notices forbidding computer storage and/or copying of published material might be ineffective and unenforceable. The court found that government users, libraries and other not-for-profit organizations enjoy "fair use" exceptions to copyright liability. The ruling was seen broadening this exception to other data processors who build data bases from published literature.

The computerization of accounting systems uncovered alleged embezzlements totaling hundreds of thousands of dollars in two separate cases.

The larger fraud concerned a Wall Street brokerage house, Cowen & Co. From this victim's personnel, a trader, allegedly swindled $376,000 over a period of six years through a girl-friens acquaintance.

In the second case, Marguerite Pells pleaded guilty to the embezzlement of approximately $15,000 to $21,000 over a period of two years from Burke Sale Co. of Seattle, Wash.

Eight Years Ago

Dec. 16, 1970

RALEIGH, N.C. — IBM made available to customer engineers a remote, real-time data bank of maintenance information to assist them in diagnosing malfunctions and supply corrective action data at customer sites. Part of the Remote Technical Assistance and Information Network/370 (Retain/370) support system for 370 users, the data bank was designed to minimize interruptions to customer operations caused by problems with any IBM equipment or programming.

NEW YORK — Armed with a computer study that traced the union's hiring practices, U.S. Attorney John M. Sweeney filed a civil contempt action against Local 46 of the Wood, Wire and Metal Lathers Processing Union. With the information from the computer, Sweeney sued the union for allegedly refusing to hire more blacks.

Joel Kurash
Stokie, Ill.

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William Henderson
Assistant Vice-President
First National Bank
Lake Forest, Ill.
Reader Commentary

TV Makers Should Sell Personal Computers

By Peter R. Newsted
Special to CW

As a computer user and instructor who frequently covets his own personal computer but wonders when the prices will come down and how to supply applications for it, I stumbled upon the following possibility. Perhaps Zenith, Sony, RCA, Panasonic and others are already at work on it. Because of their size and marketing base, TV manufacturers must be the ones to market personal computers and make money at it. This is logical because the primary appeal of personal computers is playing games, and CRT televisions are required to do this (especially in color).

It is also desirable to have major firms behind software development rather than the cottage industry of "Ma and Pa" computer stores. Having TV firms market and manufacture personal computing gear not only would allow economies of scale, but would also present an image of a general public product behind an exotic product. People would feel confident that they could get their personal computers fixed if they broke.

Having the TV industry as the center of the personal computing market has several other ramifications. TV would seem to be the focal point — rather than the telephone — because of interactions with other media. For example, RCA's camera that records pictures on a chip for viewing on a screen would be a logical application extension.

Get Networks Involved

Computer-generated displays — like the ones on some TV stations in the UK — would seem more natural and acceptable when generated by networks. In fact, networks themselves might generate programs with which home computers could interact.

This would probably be in only one direction: one would store recipes from the TV network, receive the source code for a new game or play games with a computer-generated situation.

The strategy should be to stress the personal computer's applicability over its programmable aspect. Obviously, only a very small percentage of TV viewers have any interest in programming, but almost all of them would like the arcade and calculations aspects of personal computers, particularly in response to mass media advertising and a national service reputation.

Creative Cassettes

Having larger firms behind personal computing would ensure a wider range and higher quality of applications, probably at a very cheap price. Applications will not sell if they cost more than a board game, calculator, musical record or tape.

Programming itself should be treated as an application. Compilers should come on cartridges or cassettes like other applications.

In addition to eliminating the programming stigma from personal computing — people will always be afraid of things they do not fully understand — this should improve the quality, variety and availability of computer languages for those of us who do wish to do personal computing.

Computerized games such as chess must also come on cartridges. Imagine the advertising gimmicks: "Our cartridge beats 40% more masters." or "Whizoo backgammon is 10 times more challenging." The marketing potential exists for all ages, especially game-oriented children.

Computer-assisted instruction (CAI) cassettes would be possible. Courses for credit could be put on cassettes, and responses could be recorded. The grades written on the cassette — and then turned in for credit.

Modified Keyboards

With all due respect to data entry, full keyboards are not the best. Many people do not like to type; many games can use simplified keyboards and joysticks.

Perhaps keyboards that light up with different symbols would be appropriate. The required symbols would be generated by the application or game being run. Different machines from different manufacturers would be rampart until some won out and standardization set in.

Video cassette development and marketing seem to be a logical path to follow. People will recognize personal computing capabilities. If people are willing to pay $1,000 for a video recorder and a book system, they would probably do the same for a sophisticated home computer — particularly if it cost less and was not called a computer.

Standardizing formats would be essential — probably standard or micro cassettes would be used as well as full video cartridges for longer applications, compilers or libraries of games.

Both the video unit and the standard cassette recorder should serve as forms of off-line storage for program code.

One Exception

I see only one exception to the TV industry's move into personal computing. This is the traditional area of business DP. As business computing is moving peripherals-oriented, especially with respect to disks and printers, there is still a need for personal computers which will be better served by lower end machines from existing mainframe manufacturers which already understand business needs — such as payables, receivables and general ledger functions. Recognize the need for hard copy and quick access to records.

Newsted is an associate professor of management information systems at the University of Calgary in Canada.

The Taylor Report

NCR's Universal Contract Sparks Continued Debate

By Alan Taylor
Special to CW

My suggestion that NCR Corp. write into its Universal Agreement the guarantee to customers [CW, Nov. 28] cited in the letter from Ben E. White, associate general counsel for NCR's legal department [CW, Oct. 30] met with swift response from readers and NCR users. So far I have not heard from NCR.

An article in The Cooperative Health Care Users' Group Monitor in March 1977 reported that many user law departments did not like the Universal Agreement. Its headline, "Universal Disagreement," may have been somewhat overdone.

In addition, I discovered many authorized versions of the Universal Agreement exist, so its claim to be "universal" is also somewhat overdone. However, in the different versions with which I am familiar are cosmetic rather than substantial.

I have yet to hear from NCR users who have not had to change mainframes since the Universal Agreement came out about 1973 or 1974 are operating without the Universal Agreement and do not intend to sign it at all.

Still, the most interesting thing I found out was what a colleague of Olive's, Robert Conway, thought about the Universal Agreement and its implications. Readers might like to know what other members of NCR's legal department think so they can compare those thoughts with Olive's present and future comments.

In one case, a user argued that NCR had sold him his computer knowing he intended to increase the memory capacity to 256K bytes without future purchases from NCR. Then the user found out he had to buy NCR memory if he wanted to increase his capacity.

Denying the user's allegation, Conway wrote to the NCR user's attorney. He put it this way: "I believe that you will find the Universal Agreement in this matter is very detailed and complete in every respect. If your client felt otherwise (Continued on Page 30)
Longer Zip Code Only Means Higher Costs

As a long time supplier of computer services to the much maligned health care industry, our company views with great concern the consequences of arbitrary decisions made by government agencies, even when they are made with the best of intentions. This concern includes the U.S. Postal Service’s Zip Code expansion, a seemingly minor request.

Almost every new law and its subsequent regulations, it seems to me, inevitably leads to an increase in the cost of doing business. Some laws affect our business directly by the imposition of new or increased taxes; others increase costs indirectly since compliance requires added use of our business resources, be they manpower or equipment.

New rulings made in connection with existing laws and regulations — further compound this situation. Of course, each new health care ruling brings with it the assurance that compliance will either reduce taxes or prevent abuses within the system. Sometimes the regulators claim it will do both. Regulations are issued, dates for compliance are set, data requirements are determined and forms are designed. Sometimes, although rarely, forms flexibility is such that computerized reporting is really welcome opportunity.

But always, however, instruction manuals detailing reporting requirements and procedures are “soon to be issued and released.” Even in the absence of detailed examples, most will agree that complying with new or changing federal regulations is a major problem and a greater concern. We do comply, but voluntarily? Hardly. Every regulation which increases workloads bears with it burdens of higher costs which must be passed along to the final consumers of our products or services. Therefore, anything — anything — which might raise our costs we try to avoid.

Since the original implementation of Zip Codes did not hold the line on escalating postal rates, we have little faith that its expansion will do anything except raise costs.

The Postal Service Zip Code request is one we will not adopt voluntarily simply because we are hard-pressed to meet the demands of changing regulations which directly affect our clients. And, they say, more changes are coming. Now, if only we had some specific instructions we could …

Kuroski is president of CBA Data Services, Inc. in Chicago.

Letters to The Editor

Data Set Management

In “CPE Effort Eases Manufacturer’s DP Functions” [CW, Nov. 27], Ron Gallager, of Bendix Corp., did a nice job explaining the need for computer performance evaluation.

What Gallager failed to explain is that a performance measurement system can only identify the areas that must be addressed to realize optimum performance for both CPU and DASD.

The Bendix Corp. recently purchased two copies of CMS/OS, our disk management system, which is now providing it with tools to take advantage of data sets in order to reconfigure DASD packs.

Donald A. Murphy
Director of Marketing
Software Module Marketing
Sacramento, Calif.

Not Far Off at All

I found “Capacity Planning Seen Vexing DP Managers” in the Oct. 30 issue a good article that summarized the existing capacity planning problem.

However, I do take issue with the statement that “computer models to do capacity planning are still far off.”

Apparently the speaker was not aware of our Scert Performance Prediction System. DP Managers of more than 1,000 companies have used it for capacity planning.

H. Fred Silver
Vice-President
Performance Systems, Inc.
Rockville, Md.
To Ease Communication

'Systems Planning Ombudsman' Needed

By Herbert Reichlin
Special to CW

This summer, while attending the 25th alumni meeting of my college graduating class, I encountered an experience I thought was restricted to doctors, lawyers, architects and plumbers — my advice was asked. Although the questions asked, by three old friends were different, they all boiled down to pretty much the same thing: "How do we know the DP system they are working on in my company will do what we want it to do and not turn out to be a very expensive mistake?"

I've worked in most areas of the computer industry — as a user, a salesperson, a systems developer in both hardware and software — and I am therefore very sympathetic to those on both sides of the question, the systems developer and the user. The single biggest problem I have discovered is the communication block.

Most end users have never participated in the kind of sequential analysis that systems development requires. They are not aware of the various logic levels involved, the overall goal, the internal and the external requirements, the various lead times, the need for all the separate parts to mesh in a neatly structured whole.

Like Toy Directions

Most systems developers will easily talk of the software and hardware requirements, but they have had little or no experience in product planning, marketing, manufacturing, delivery and scheduling.

Their questions are asked in language that may have different meanings, one meaning for themselves and another for the end user. They do not know how to put their questions in the language and context the end user understands.

In many ways this reminds me of the directions that came with the unassembled toys we bought for our children. At times it seemed as if the writer presumed we were master cryptographers. Obviously the manufacturer never did a field test of the instructions to find out if its customers would be able to use them.

Essential Questions

To each of my three friends I put the same set of questions: "Was the overall purpose of the project described in written form and signed off by both you and the systems developer? What documentation method is being used by the system developer to make sure the system stays on track? In what manner do you get progress reports? What systems tests have been agreed on? How will the transfer to the system be done?"

From all three I got the same startled response — surprise at my questions and little understanding of what the questions meant.

New Job

It was at this point that I thought of the phrase "systems planning ombudsman." Two of the participants in the project, the system developer and the end user, want to communicate with each other so the project goals can be achieved. Yet each is uncertain whether they are working on the same problem and trying to achieve the same goals, and each dreads the thought that when the system goes on-line, it will be a failure.

If I am right, considering my experience and the articles that have appeared from time to time in Computerworld on this topic, then our industry does need to create this job classification of systems planning ombudsmen.

The consultant fee for this individual could be listed in the corporate accounting "records on the same schedule devoted to insurance premiums, because that would be the single essential purpose — ensuring that the end user got the system for which he had contracted. That insurance (or assurance) would be worth a substantial premium.

Reichlin is manager of operations and control for the Governor's Council on Drug & Alcohol Abuse, Commonwealth of Pennsylvania, based in Harrisburg, Pa.
NCR Universal Contract Debate Continues

(Continued from Page 27)

this aspect of his purchase was so important, it would have been very easy to add a statement to this effect to the contract.

"However, since that was not done, I feel confident that your client is precluded from relying upon such unsubstantiated oral agreements at this time.

I direct your attention to Section 1 of the Universal Agreement which addresses this very situation. For your convenience, the applicable sentence reads as follows:

'The contract, comprised of this Agreement and the order, shall constitute the entire agreement of the parties and shall supersed any prior agreements or understandings, whether oral or written, and all negotiations, letters, other papers and proposals except as attached to the order or specifically incorporated by reference."

In short, it doesn't matter if your NCR representative tells you something verbally or in writing. You will still have to rely on NCR's goodwill rather than any legal right unless it is written on that original order.

Vague Identities

While Conway correctly interpreted the legal terms of the contract under NCR's Universal Agreement, he failed to mention some important technical points. Unlike Conway, I find the contract lacks some essential details which make it far from simple. Perhaps impossible, for a user to get some vital items put into contract. One problem is that the NCR products are given vague identities.

The actual products have engineering names, which may or may not really identify them, names like "606-102/301 disk drives" rather than "Criterion" or "Century." As the case with other manufacturing firms, what is underneath the label may change without anyone outside being aware of it.

In fact, two different users receiving what they believe is the same gear at the same time may be getting different items. And there is no way for users to know about this and protect themselves.

Consider the memory situation. You buy a computer with a small basic memory, and you want to grow. So you find out about the additional memory, and you think you will be able to keep your old memory, too. You use it and you are sure you have your old memory, since you still have the same addresses. Right?

Wrong. At least, not necessarily right. The vendor may have taken out the old memory and replaced it with a larger one. You have really traded your memory, not added one. And trading in computer gear may be financially dangerous.

The problem, which has been around for about 20 years, is that the easiest way to sell computers is to emphasize their growth capacity, while the easiest way to build and deliver them is to overload the sizes of memory logically involved (32K, 64K, 128K bytes and so on). Marketing facts like technical facts, and the result is the description of the items in the catalogs and brochures is often too vague to properly identify what is being sold.

A detailed computer contract should identify the addressing circuitry, memory interfaces and I/O trunk interfaces that will be physically installed, whether or not they are used. Certification and acceptance tests can't tell the user about this.

Such information is important when considering future values. But if the contract cites, for instance, "NCR Model 615-101 with 32K bytes of memory installed," that doesn't tell you much about what you bought.

On the other hand, if the contract read, "Must be sold back to manufacturer if more than 64K bytes needed," then the customer might ask questions the salesman would rather not answer.

Because vital characteristics about the system are left out in favor of a vague marketing identity, I cannot agree with Conway that the NCR contract is "complete."

If NCR customers are going to benefit from those guarantees Oliver mentioned, he should write them into the agreement. I'm waiting to hear that this has been done or else be shown by a hard-nosed lawyer that despite Section 1 of the Universal Agreement, such changes are not necessary.

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DP Should Be Equal to All Corporate Areas

By James T. Walsh
Special to CW

With the advent of computer applications to business controls in the early 1960s, the functional administration of these machines and their output was almost universally placed in the hands of financial personnel. The most obvious connection was their ability to process huge quantities of numerical data and to manipulate this data to produce various reports which made possible easier, quicker and more detailed financial analysis of the business being controlled.

Numbers being the province of the financial people, control of these machines and their operators, in most instances, automatically fell under the jurisdiction of the chief financial officer of the business.

Of course, it wasn't always finance which controlled data processing; sometimes, because of strong functional heads or bias on the part of the top decision maker, other areas controlled it. Almost without exception, however, DP was subservient to some other functional area and did not report to the chief executive.

You will note I say "DP," not "information management," "systems management," "information systems," "information processing" or any of the other current terms. It was, back then, simply data processing.

For some time there has been a trend toward recognizing information systems management as an entity in itself and not an element to be subordinate to another function. The recognition of the real nature of this function has, in many cases, given DP equal status with the other major elements of a business. There has, however, been a lack of publicity regarding this evolution, particularly in medium-sized companies, and I feel more emphasis should be placed on this transition.

Control of DP

Through successive generations of computers, even though on-line applications for operational control in each function of a business became not only a reality but a necessity, control of the DP operations has remained a part of the financial function. Only recently has the real purpose of the function been recognized as being of equal importance to top management as any function of a business, be it manufacturing, engineering, marketing or finance.

Interplay of information between and among the other functional areas justifies transfer of the information management operation from control by one of its clients to status as a partner equal in importance with all its served functions. In this way the function can be allowed its greatest latitude in developing true business systems, serving the special needs of each area and still providing a common data base for generation of the reports needed by corporate management for overall control.

Moving information processing from a subordinate position to an equal partner with other functional areas can accomplish several important things:

- The stigma of other functions working through the financial department or another discipline to obtain data needed only by the involved unit is removed.
- Consideration can be given by information management to the merits of individual requests for aid.
- The information management operation can more easily acquire professionals from the other disciplines.
- Filtering of requests for assurance to assure fitting into a financial or other biased view of the operation can be eliminated, and requests can be more easily evaluated on the basis of aiding overall operations.

Reader Commentary

Efforts.

- The managers of the information management operation will be given the opportunity to truly become information specialists in all areas of the business.
- Most importantly, top management will have direct access to the information specialists when deciding the types and degree of data needed for day-to-day control and for special analysis of alternative courses of action or aberrations which arise.

Lower inventories, shorter manufacturing cycle times, more timely production to customer requirements, better control of cost elements, smoother introduction of engineering changes and products, quicker processing of orders, better market analysis and identification of variances, margins and profits are the products of the DP cost center.

(Continued on Page 32)
MIS, Communications Merger Seen Gainful

(Continued from Page 27)

But people untrained in DP remained in place, growing more powerful within the company, as they grew into the roles of key decision makers.

"For example, phone service at major retail locations may typically rent for $5,000 per month. Figuring a 60-month payout, we're talking $300,000 being made by, with all due respect, a clerk."

"He was unenlightened with the negative attitudes of the MISers with regard to his newest baby, data communications, which they characterized as 'merely an overhead item to carry information around.' Jealous of the MIS group's advanced technical knowledge, he saw little opportunity to expand his own knowledge of the technology.

"He saw the handwriting on the wall for an ultimate merger of the two organizations, based on two advances in technology: terminal stations and switching devices which were essentially user-programmable and lower cost communications devices and transmission facilities. The programmable devices, as for any DP novice, were baffling to the communications manager. And he felt ignored by top management, which was impressed with the lower cost communications and placed increasing demands on the MIS department — not the communications department — for new online systems."

Battle for Survival

"So the communications manager went into battle for survival. But for the retailers, the battle was short-lived. In most of the big traditional, the MIS director won hands-down and took over all voice and data communications responsibilities."

"The major exceptions are several of the biggest retail organizations. In these cases, the identities of the warring factions are intact and a truce exists, but nobody is saying for how long."

"I, for one, believe the merger of the information systems and communications functions is the right way to go. It forces DPers to take the business of telecommunications seriously and apply their planning and systems analysis techniques to cost-effective designs of complex data and voice communications systems."

"The merger is also good for the vendors. It forces us to think in terms of total DP/data communications systems as we deal with the MIS buyer, which in turn, makes us provide better service to our customers," he concluded.

Readers with comments about DP-related management or other people-oriented problems are invited to write to Jack Stone, Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

DP Should Hold Equal Position

(Continued from Page 31)

Many of the above factors are only peripherally involved in the financial area. Each, of course, has an impact on the detail utilized by finance, but the present generation of computing equipment, using online terminals, move the need for utilization of specific data away from finance and more directly into the other functional areas of business.

Each has its own need for information in a format unique to that function and each, therefore, becomes as important in its own needs as finance.

Proper Place

By removing information processing from a subordinate position to its rightful position as an information receiving, processing, storing and generation function, standing equal in stature with the other elements of the business, the real potential of this 30-year-old "revolution" will begin to achieve its proper attention and its proper place in the business organization.

I strongly recommend the transfer of information management to an organizational level equal to finance, manufacturing, marketing and engineering. This step will steeply position information management to provide needed information to all the business functions while maintaining a data base from which management can extract necessary controls.

It will also provide direct control of this vital function by the chief operating officer with the authority that now exists. Only in this way can DP truly become a business information processing function."

Walsh is director of manufacturing services for Philips Industries, Inc. in Dayton, Ohio.

Introducing the BTI 5000 Interactive Computer System. An all-new system offering high storage capacity, fast response, superior operating flexibility and high reliability.

It's a multi-access system. The BTI 5000 supports up to 32 users at the same time. Because the operating system software is a true timesharing executive, users can perform any mix of independent or related tasks.

It's secure. Multiple levels of control prevent unauthorized access to the system. Security screens protect each user's library and his current activities.

Communication is simple. User terminals may be connected by direct cable, or over the telephone via dial-up or leased lines. Any ASCII, asynchronous, RS-232C compatible terminal can be used with the BTI 5000.

It's easy to program. BASIC-X is the BTI 5000's programming language, an extended version of BASIC continually augmented by BTI over the past 10 years. It retains BASIC's simplicity for the novice programmer, but has the features the experienced programmer needs.

Application software is available. The BTI 5000 comes with a library of contributed and factory-supported programs. Proven application packages are also available for accounting, inventory control, order processing, text editing, mailing list management, and more, plus general-purpose data base managers.

It's easy to expand. User capacity can be increased from 8 to 32 ports. On-line storage can be expanded from 29 to over 500 megabytes. You can add multiple magnetic tape cartridge drives, industry-compatible 9-track magnetic tape, line printers from 300 to 900 lines/minute.

But it's not expensive. With 8 user ports, $29 megabytes of hard disk storage and a magnetic tape cartridge drive, the BTI 5000 costs just $38,950. A 58 megabyte system costs only $2,000 more. And if you want more than one system, the quantity discount is attractive.

The BTI 5000. Get all the information before you decide on your next computer. You owe it to yourself.

Call us.
NBS Scientist Warns: Four Obstacles Styxie Queuing Models

By Don Leavitt

WHITE PLAINS, N.Y. — The Print Load Analyzer (PLA), a Field Developed Program (FDP) from IBM, was developed to enable users in OS environments to develop a picture of their over-all printing environments. This should ease printer selection, aid in load balancing and simplify forms usage accounting, a spokesman said.

Although some tools have been developed to help the user rate the productivity and performance of a DP system, printing equipment has normally taken second place in performance measurement concerns, she commented, adding that until now the amount of printing accomplished was measured by forms and paper inventory controls.

PLA is linked to System Management Facility (SMF) data, and that means the study of the printer load can be more detailed than before. SMF data can indicate how much printing is being accomplished by forms usage and paper inventory control.

Printed reports through PLA show the daily print load at an installation, with a summary of the measurement period, providing tallies of specific forms used. Definition of what activity is to be measured and for what period is under user control, the spokeswoman indicated.

PLA is cataloged by IBM as 3794-CNX. Monthly license fees ($90) are waived after the billing of 12 consecutive monthly charges. As an FDP, the package has limited support.

‘Microbol’ Backs PDT-100 Users

ALTAMONTE SPRINGS, Fla. — Called the first high-level language developed to complement Digital Equipment Corp.'s PTD-100 "intelligent" CRT-based processor, Microbol — from Microbol, Inc. — includes an operating system, language processor and disk management facility.

The package is intended to support business-oriented DP functions, especially by taking advantage of the VT-100 CRT's attributes. These include split-screen scrolling, dynamic cursor addressing and full software control of all screen options, a spokesman reported.

Complete program compilation is not required. Microbol statements are incrementally compiled and interpretedly executed. It provides open substitution for effective use of subroutines and allows nested subroutines and subroutine return stack control, the spokesman added.

Microbol also permits individual and vector transfer of program control based on function keys, input control keys and program-generated conditions, he said, noting data fields may be defined and redefined without restriction.

The system supports indexing — "not just subscripting" — and provides decimal point control and numeric field editing, as well as a "simplified uniform indexed disk file facility" for direct access of records by key, he continued.

Microbol operates within 10K words of memory supporting application programs that can be shared by multiple users. The system permits overlapped input and output operations under program control.

The first application of Microbol is an on-line medical system for physicians' offices. Marketed by Microbol Medical Systems, Inc. for $12,500, it includes the software, a DEC PDT-151 dual floppy disk processor, a VT-100 CRT and an LA180 printer.

More information is available from Microbol, Inc., Suite 118, 711 E. Semoran Blvd., Altamonte Springs, Fla. 32701.

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Personnel Work Supported-

CHICAGO - An enhanced version of the Payroll/Personnel System from Cyborg Systems Inc. now being delivered to users includes significantly better support for personnel work, and the payroll operation was also improved, according to the vendor.

Until the current release, the Cyborg package left the user in 'sort of a 'do-it-yourself' personnel capability,' a spokesman volunteered. The expandable data base provided for payroll work allowed users to add personnel-type entries and there was one standard Equal Employment Opportunity (EEO) report. The built-in report writer facility lets users generate whatever output they thought appropriate, but 'it really was up to them to do the work,' he admitted.

Now, in the spokesman's words, the vendor 'did what any of the users could have done.' We designed a number of transactions and created about 25 reports,' all focused on supporting the user's Equal Employment Opportunity (EEO), Occupational Safety and Health Administration (OSHA) and Employee Retirement Income Security Act (Erisa) reports.

Written in ANS Cobol and operational on IBM, Honeywell Inc., Univac and Digital Equipment Corp. full-scale systems, the package costs $35,000. Cyborg said from Suite 2225, 2 N. Riverside Plaza, Chicago, Ill. 60606.

Package Lets Users Develop Forms on VT100 Screen

MAYNARD, Mass. – Digital Equipment Corp. has a series of utility programs for users of its PDP-11 mini-computers or PDP-11 intelligent terminals that are said to permit development of CRT screen equivalents of standard paper forms.

The Forms Management System 11 (FMS-11) allows the construction of customized forms and specialized applications on systems using the company's VT100 terminal. Screen manipulation operations are performed on a field or form basis by form driver subroutines.

Each form can be user-altered without changing the entire forms structure, a spokesman noted.

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Three Languages

FMS-11 incorporates all of the VT100 terminal's key features into its forms development routine including reverse video, blink, underline, scrolling and a 132-column display.

FMS programs under DEC's RT-11 operating system can be developed in Basic, Fortran or Macro languages; the amount of memory used by the package varies according to the user's application.

FMS-11's development system license costs $1,350; the system is scheduled for delivery in early 1979 from the company at 146 Main St., Maynard, Mass. 01754.

Obstacles Face Queuing Models

(Continued from Page 33)

 ply today.

Automated instrumentation is an obvious answer but, 'it is likely to be quite some time before such tools become widely available.'

' Rough Going'

Even if good models are available, the challenge of using them effectively can be a major obstacle, the author continued. 'The sad fact is, unless you happen to have a recent computer science graduate on your staff who has taken a course or two in queuing theory and computer performance evaluation, you are likely to find your first adventure in queuing models rather rough going.'

Queuing theory is quite as difficult as any other topic in advanced mathematics and "unless you feel at home with Markov processes, Laplace transforms and equilibrium state distribution solutions, you may be well advised" to work with one of the packages that have been developed for the nonmathematician, Dunlavey observed.

Having started his article with detailed discussions of some of the queuing models, he ended with comments about some of the packages that are around to help the neophyte.

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**High Performance Compiler Checks Out Algol**

EDMONTON, Alta. — Described as a high-performance compiler that runs on any machine which supports the IBM 370 problem state instruction set and can provide a 1K region of memory, the Full Language Algol 68 Checkout Compiler (Flacc) is now available from Chion Corp. Flacc was developed in consultation with Dr. Barry Mailoux, one of the authors of the revised Algol 68 report, the language's defining document. The Chion system implements the complete revised language without exception, according to a Chion spokesman. It includes “all of formatted, unformatted and binary transpose, all of the merging preclude, parallel processing, united modes, long and short modes and heap allocations,” he explained, adding that these features are omitted from most implementations.

The checkout features include a symbolic dump, a trace function, profile gathering and a traceback of active locales at termination, the spokesman said. Checks include use of uninitialized or undeclared values, arithmetic overflow, subscripts out of bounds, scope errors and deadlock of parallel processing, he continued.

Operating system independence for Flacc is achieved by gathering all system-related routines into a single module that provides a rigidly defined interface with the user's environment, the Chion source said. The prerelease version of Flacc has been extensively field-tested in a number of different environments, he claimed. Flacc operating system interfaces are currently available for OS/VS, MVS and MTS.

The basic checkout compiler system can be leased for 287 Canadian dollars per month; more information is available through F.O. Box 4942, South Edmonton, Edmonton, Alta., Canada T6E 5G8.

Three Programs Converted For Use on Prime Minis

WELLESLEY HILLS, Mass. — Three engineering and scientific programs — described as widely used on mainframes — have been converted to run on Prime Computer, Inc. systems. This is the first time these programs have ever run on a minicomputer, according to Prime.

The Access program, first of the converted programs, was authored by the Edison Electric Institute. Used by electric utilities and consultants to perform complex energy audit analyses of building designs to help minimize energy waste, it includes 17,000 lines of Fortran and was converted in three weeks, a spokesman claimed.

HEC2, a 10,000-line Fortran program written by the U.S. Army Corps of Engineers' Hydrologic Engineering Center, is used by civil engineering firms that design and analyze water resource projects throughout the U.S. and Canada. It determines water surface profiles of water systems and is used to estimate flood profiles for rivers or river dam-reservoir systems.

The Storm Water Management Model (SWMM) was created and certified by the U.S. Environmental Protection Agency and used in planning systems to handle overflows of storm water or snow melt in urban areas. It allows engineers to design storm water systems and is in use throughout most of the world, the spokesman said.

This 24,000-line Fortran program was converted to run on Prime equipment in “a matter of days,” he claimed. Users interested in the programs should contact their developers, the spokesman said from Prime headquarters at 40 Walnut St., Wellesley Hills, Mass. 02181.

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<tr>
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Longer Zip: Wrong Answer to Right Question

By Stephen L. Robinson
Special to CW

Poor Van H. Seagraves. In the Nov. 20 issue, he lamented Computerworld's editorial opposition to the expanded Zip Code. He said he "cannot imagine that a publication covering one of America's most creative and fastest growing industries should focus on programming problems instead of how the computer industry can meet this challenge and help the mailing industries reduce cost."

Yes, Mr. Seagraves, we are creative; that is why we are appalled by what is apparently an absurd approach to a legitimate problem. No, we are not focusing only on programming problems; we understand the scope of the complete conversion effort.

Yes, we are interested in meeting challenges, and that is why we speak up with proposals that appear more viable than the solution put forth by the U.S. Postal Service. Several letters have already appeared in CW and elsewhere offering approaches to achieve the necessary fine division, to the route level, cited by Seagraves. A first obvious approach is the substitution of alphanumericics for pure numerics. Optical scanners do quite a nice job on alpha, and the increase from 10 to 36 combinations would certainly be substantial. If that is not enough, why not consider a 7-character code formed by concentrating the now-standard 2-character state codes to a revised 5-character alphanumerical code? As it is, we have an unnecessary redundancy between the city and state fields and the geographic indicators of the Zip Code.

Such a change would yield 50 times 36 combinations, which should keep the post office happy for a while. Also, the total cost to effect this change (most likely only a formatting change in output lines) would be substantially less than the cost of a 9-character code.

Speaking of costs, has the post office computed the total cost of this boondoggle? A quick guess tells me that my name and address appears in at least 50 files. I imagine the total number is quite a bit larger.

A hundred or more would not surprise me (if you don't believe this number, add up all your subscriptions, credit cards, bank accounts and mortgage statements and junk mail which arrive in a month).

But let's be charitable. Suppose the national average is only 25. There are some 200 million people in this country, which projects to five billion address changes.

To estimate the cost of such changes, we should include analyst, consultant and programmer time; computer time: the cost of acquiring new forms, and the cost of misprocessed mail as a result of "learning" errors of the new codes.

If the cost averages out to less than $1 per change, I would be surprised. (This does not, of course, include the "annoyance" cost to the public of dealing with the new code.)

What Benefits?

So we are talking about a potential cost of perhaps $5 billion (staggering, isn't it?). To be fair, we should look at the other side of the coin, the "benefits" side.

Will our mail be delivered faster? Will the cost of a letter go down? Will the cost of a letter remain the same? Will the cost of the letter rise more slowly than in the previous 10 years, which has seen the meteoric rise to 15 cents? I believe that most of the data processing community agrees the answer to all the questions above is "no." That is why we do not approve of the nine-digit proposal. Not because we are not interested — we are; not because we don't understand — but because we don't understand what would happen to us if we tried, which projects to five billion additional changes.

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Robinson is an independent consultant operating as S.L. Robinson & Associates, Morrisville, Pa.

Wang Users Offered Accounting Packages

HOLLYWOOD, Fla. — Four accounting packages designed to run on Wang Laboratories, Inc.'s WCS 20 or WCS 30 systems are now available from National Software Marketing, Inc. The current selections include payroll, accounts receivable, accounts payable and general ledger accounting.

Each system is supplied on three floppy disks. One floppy is already initialized for the files "so you can just drop in the disks and the systems are ready to run," a spokesman said.

Described as tested systems that required hundreds of hours of development, each package costs $200 plus $10 for handling and media. They can be ordered from the vendor at 4701 McKINLEY ST., Hollywood, Fla. 33021.

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Development Aided

WELLESLEY, Mass. — An interactive system for on-line program development and word processing, Interact is now available from Cullinane Corp. for IBM-oriented installations.

Described as a renamed Release 6.0 of Mentext, which Cullinane took over when it acquired California-based Mentel, Inc. recently, Interact is said to provide powerful, easy-to-use word processing features that include text editing and automatic formatting.

Interact is compatible with IBM 360s and 370s and supports IBM 3270, 2741 and teletypewriter-compatible terminals. It is currently available for OS or OS/VS users.

- The current version costs $25,000, Cullinane said from 20 William St., Wellesley, Mass. 02181.

Runtime Library Included

Series/1 Gets Cobol Compiler

NEW YORK — Users of IBM's Series/1 minicomputer can now acquire a Cobol compiler and runtime library support system, developed by California-based Royal International Systems, from DDP Products, Inc.

The Series/1 Cobol System is said to be a complete package that allows the user to compile and execute Cobol programs conforming to Level 2 of the ANSI Cobol 74 specifications. Validation of the system's conformance with Federal Information Processing Standards can also be provided, a spokesman added.

Written in an interpretive instruction set and utilizing the stack capabilities of the Series/1, the compiler is capable of processing a Cobol source program in a minimum Real-Time Programming System.

Output Listings

Output includes listings of both source and object code, error diagnostics, data and procedure maps and a cross-reference list.

The reentrant modules of the runtime library perform the I/O, data manipulation, arithmetic, table-handling and debugging functions required by the executing program. The routines utilize the task workstack for linkage and local variable storage, the spokesman noted.

The complete Series/1 Cobol system requires a 64K-byte 4953 or 4955 processor with disk or diskette units, a printer and an operator station. Software prerequisites include RPS V1.1, the Program Preparation Subsystem and support for the Indexed Access Method, if indexed files are needed.

The complete package, including the compiler, costs $9,500 or $750/mo. An "executive" version, excluding compiler, costs $3,900 or $375/mo, the spokesman said from DDP Products at 31 E. 28th St., New York, N.Y. 10016.

DMC Unveils Pascal Compiler For Commfile 130

SANTA CLARA, Calif. — A Pascal compiler, now available for use on DMC's Commfile microcomputer floppy disk system, is said to be a "simple and straightforward ... standardized" implementation of the language as defined by Wirth's "Pascal User Manual and Report."

This compiler runs under DMC's disk operating system. Pascal source code is loaded onto the Commfile's floppy disk using the standard Editor, after which the compiler produces object code which is executable on 8080 or Z80 microprocessors, a spokesman explained.

The compiler is available to Commfile users for a license fee of $500, he said from the offices of DMC, a division of Cetec Corp., at 2300 Owen St., Santa Clara, Calif. 95051.

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Crane Developer Scoops Up Manpower, Dollar Savings With Data Control System

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SHADY GROVE, Pa. — When a rapid growth company attracts increasing competition, it cannot maintain a position of leadership without effectively reducing waste in manpower usage and high-cost inventories. These objectives were attacked at Grove Manufacturing Co. here with the implementation of a computerized data control system.

Ten years ago Grove had some $32 million in sales. Today annual sales are approaching $300 million.

As a specialist in its field, Grove has been the innovator in designing and developing self-propelled cranes with hydraulically telescoping booms. It has managed to capture a substantial corner of the world mobile crane market by fending off aggressive competitors.

To combat increasing manufacturing and marketing costs, five years ago Grove's management approved the installation and implementation of the Manufacturing Control System (MCS), designed to automate eight major facets of the total operation — sales forecasting, engineering data control, inventory control, requirements planning, purchasing, capacity planning, operation scheduling and shop floor control.

For 10 years prior to 1978, just to keep pace with burgeoning growth, Grove's management services department had gone through five separate upgrades in computer systems resulting in its present back-to-back IBM 370 systems, a Model 135 and a Model 138.

Terminal Network

Management services proceeded to implement the present MCS by installing Cincom Systems, Inc.'s Total data base management system (DBMS). Cincom's Environ 1 was added to support a network of teleprocessing terminals for DBMS inquiry and a real-time customer service system consisting of order entry, inventory control, warehouse control and inventory management.

Currently the system supports remote job entry (RJE) from Conway, S.C., with the DBMS and RJE from the engineering department for design calculations utilizing IBM's Conversational Monitor System (CMS). To cope with future requirements, Grove is preparing to implement a tie-in to its subsidiary company in the UK can access the CBMS here via satellite.

After five years' experience with the system, J. Martin Benchoff, president and chief executive officer, said the benefits accruing from the DBMS have been gratifying.

"While the new materials requirements planning (MRP) through DBMS has been very successful, the real motivation in making the change was to improve the bottom line," he noted, adding savings have been realized in every major segment of the DBMS setup.

For example, data-controlled sales forecasting and pursuit of marketing objectives have supported whole goods sales increases of 110% between 1973 and 1978.

Joe Palkovitz, director of material control, said, "Because of a steady introduction of crane models to cope with market requirements, which contributed to a 65% increase in the number of inventory items just within the past three years, MRP and DBMS have allowed an inventory reduction of 17% in actual dollars.

That cost savings is remarkable, considering the 21% inflation rate Grove inventory experienced during 1975 to 1978. If that factor is backed out, overall inventory dollar reduction reaches 34%."

(Continued on Page 44)

Booklet Describes Software That Analyzes CMS

SPRINGFIELD, Va. — A booklet describing software for analyzing interactive Conversational Monitor System (CMS) performance may deserve attention despite its limited, 24-page size because both its authors are from IBM's Research Lab at Yorktown Heights, N.Y.

The software, called Stream Analysis of Responses by Category (Starcat), is said to analyze sequences of user command strings that have been captured in a special time-stamping CMS console file.

System response times are associated with each string; strings are assigned by command name, environment or experimenter-chosen groupings — into categories; and category statistics are reported for one-, two- and three-string sub-sequences.

Starcat is said to provide a new tool for the quantitative analysis of interactive terminal performance.

Written by Roger C. Evans and Lance A. Miller, "Starcat, a System to Analyze Interactive CMS Performance" is cataloged by the National Technical Information Service (NTIS) as item AD-A036 835/3WC. It costs $4 in paper format or $3 on microfiche from NTIS at 5285 Port Royal Road, Springfield, Va. 22161.

COMMUNICATIONS MICRO CONTROLLER

The CMC offers the following features:

- POLLINIC—SDA II polling in the CMC off loads the host
- OPERATOR CONSOLE—Provides powerful system monitoring and diagnostic tool
- AUDODIAL/AUTO ANSWER—Currently supported
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DPF Incorporated, a Fortune 500 company, is one of the largest independent computer leasing organizations in the United States. Through its computer leasing operation, DPF services a broad range of leading corporations, institutions and governmental agencies. It owns and leases computer portfolio with an original manufacturers price approaching one-half billion dollars.
Firm Scoops Up Savings With Data Control

Environ 1 software packages, the two major users of the system, materials control and customer service, would have required a combined staff increase of approximately 160 people representing a monumental outlay in additional payroll and fringe benefit costs.

John Jacobus, director of customer service, noted that, "to achieve the current 92% delivery factor in off-the-shelf crane service parts plus the 283% increase in line items delivered to the field today, Grove's customer service department would have had to hire 73 additional people if it had not had use of the system."

Other Benefits
Parts and service benefits have emerged as well. Since implementation of the computerized parts control system, delinquent parts orders have been cut from 3% to 15% in five years.

Grove greatly improved customer relations relative to parts shipments. To a construction contractor, equipment availability means profit, and if a manufacturer can help him cut downtime to a minimum and get his equipment back to work, he's happy. Another point of interest is that five years ago, capacity planning at Grove was almost nonexistent. But then a rapid rate of sales growth and an almost continuous expansion of production facilities to meet demand took place.

Capacity requirements planning was developed and interfaced with MRP. This was necessary to determine load vs. capacity conditions at each work center, to keep work loads at reasonable levels and to spot potential overloads that might require either subcontracting or installation of production equipment and facilities.

More Savings
Prior to the system's implementation manually calculated figures could be delayed up to eight days. Now the situation throughout the production operation is analyzed by computer, and a condition report is usable the same day it's generated.

While the DBMS was delivering all these cost savings and vastly improving its efficiency, management services' DP costs went up only .1% over the five-year period. Total costs today are reportedly well below national averages for similar installations.

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SyncSort OS and DOS - the best-performing sorts for IBM computers are marketed only on a performance-evaluation basis. The Systems Engineers who conduct these technical presentations and benchmarks in the nation's major computer centers have to be every bit as sharp and technically competent as the people they're talking to. A "smile and a shoe shine" simply aren't enough.

So the only kind of people we hire for these key positions are men and women with excellent computer background. When we first spoke to some of them, their response was the same as yours might be: "Me? Go into marketing? Never!"

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If you'd like to find out how far your talent and effort can take you, call us collect. We'll look for:

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The number is (201) 568-9700. Ask for Ted Yarnell or Bill Prinzivalli (or send them a confidential resume). They're our marketing managers - who started out as computer pros' turned systems engineers. Naturally.

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Does Preprocessing In-House

User Trades Service for Net, Saves 70%

Special to CW
CUPERTINO, Calif. — Since switching from an outside service firm that handled sales orders and prepared proposal quotes to a combination of a packet network service and an in-house preprocessor about 10 months ago, Fairchild Camera and Instrument Corp. has slashed its communications and preprocessing costs for these applications by 70%.

Instead of getting a monthly bill from the outside service firm for $40,000 to $45,000, Fairchild now spends only about $12,500 a month for the same service — $6,500 to have Tymnet, Inc. handle the heavy communications involved in processing sales orders and price quotes and $6,000 to perform the necessary data editing and validation in-house on a Computer Automation, Inc. Syfa processor.

"We're getting everything we had before plus the added benefit of being able to implement a standardized approach for both the domestic and international sales order entry process," according to William Brasuell, Fairchild's worldwide telecommunications manager.

Dan Perry, systems manager for Fairchild's marketing distributed processing, said that from an operational standpoint, Tymnet saved his life. "I no longer have to worry about proper network functioning or reliability," he explained.

Objective Set

In mid-1977, Fairchild set cost reduction in communications as a primary objective. Perry suggested going in-house to perform the preprocessing for order entry and finished quotes as a first step toward reducing costs.

Brasuell then began researching the communications requirements of this approach and undertook an in-depth study of possible alternatives to the costly outside packaged service. He brought in Dr. Dixon Doll, president of DMW Telecommunications Corp., an independent telecommunications and management information research firm, to perform a comparative analysis of the options.

Doll recommended that Fairchild switch to a pure communications service for the heavy transmission volume related to order entry and customer quotes provision, and DMW's analysis showed that public data communications networks offered the greatest econom

Railsroad Unloads Paper Burden

By Taking on Trio of Terminals

MIAMI — A trio of remote terminals has taken over the job of preparing invoices and other time-consuming documents prior to same-day delivery to customers after a shipment is completed; prepare master lists of each train departing from Jacksonville and due for arrival in Miami; and handle customer inquiries regarding shipment progress.

Before the terminals were tied into the line's Jacksonville mainframe, these tasks... (Continued on Page 46)

Former FCC Chief to Keynote Communications Networks '79

WASHINGTON, D.C. — The Communications Networks '79 conference will be held Jan. 30-Feb. 1 at the Sheraton Park Hotel here and will feature a keynote address by Richard E. Wiley, former chairman of the Federal Communications Commission (FCC).

Sharing the keynote platform with Wiley will be Prof. Anthony Oettinger of Harvard University, Dr. Dixon R. Doll, president of DMW Telecommunications Corp., and Jack Epstein of Booz, Allen & Hamilton.

A session dealing with proposed revisions to the Communications Act of 1934 will feature Walter Hinchman, former chief of the FCC's Common Carrier Bureau.
Railway Takes on CRTs, Unloads Paperwork

(Continued from Page 45)

were handled manually by clerks at the Miami stations. A number of separate steps were involved, as Zeller explained:

"When a train arrived in Miami, clerks would sit down at a typewriter and prepare a bill for freight charges for a particular customer’s shipment, based on its weight, classification and so on, then add a drayage charge for delivery of an off-loaded trailer from our terminal ramp to the customer's plant. The data needed to prepare bills came from files at the Miami stations, so clerks spent much of their time looking up paper files. We knew this was inefficient but, what was worse, extensive manual handling was clogging data entry up at the Jacksonville plant.

"Clerks had to mail copies of completed bills to Jacksonville for key-punching into the mainframe. Because of mail delays, consignees sometimes mailed payment for bills before the billing transaction was entered into the computer's accounts receivable program, which created obvious problems with recordkeeping.

"Furthermore, manual errors originating at Miami railroad stations and key-punching errors, such as transposed digits, led to errors in the computation of the waybill, the transportation document that travels with the shipment."

Communications Snarl

Other documents and data besides consignee charges were snarled by poor communications from Miami to Jacksonville.

For example, the "train consist" - a master list describing each car on a single train, including the car number, weight and trailer load - was previously available only in Jacksonville. With the terminals, however, the "train consist" can be transmitted within a few seconds to Miami.

"Our Miami terminal now knows exactly what trains will be arriving, exactly what trailers they're carrying and when they are expected. This kind of advance information can be passed along to consignees, obviously providing better service, but also eliminating tedious phone calls that were once required to keep track of train movement into local stations," Zeller said.

User Saves 70% by Moving From Service to Packet Net

(Continued from Page 45)

Fairchild chose Tymnet because of its low cost and its ability to meet requirements that went beyond the cost factor, Brasuell said.

Tymnet's projected $7,000 to $8,000 monthly cost was less than half the $20,000 estimate for leased lines and even less than the $11,000 to $12,000 per month for Walts service, which convinced Fairchild of the economy of public packet service.

Fairchild also was attracted by Tymnet's expanding 1,200 bit/sec service, geographic coverage, access to Canadian cities through its interconnection to the Datapac network and its links to international locations via the international record carriers' Tymnet connections.

Strict Requirements

Fairchild's requirements included total terminal flexibility, complete vendor management of network facilities and the error checking, retransmission and rerouting features of a value-added network, Brasuell noted.

In other network vendors, all of Fairchild's wide-ranging requirements, he said. We also became convinced that Tymnet personnel could best meet our strict requirements for responsive and reliable support.

Once the decision to use Tymnet was made, installation was rapid. "Our interface to Tymnet was an eight-port asynchronous Tymcom CPAA - took about half a day to install, which was unbelievable," Brasuell said.

After the in-house development was complete, the entire switchover of the sales order entry system took about one month and was transparent to the users. "We simply substituted a different phone number to call and advised users of a new log-on procedure," he recalled.

Since converting to the network in November 1977, Fairchild has doubled its Tymnet ports, upgrading from the Tymcom CPAA interface to a 16-port interface last February. In addition, Fairchild has a pending upgrade from the Tymnet to a 30-port interface communicating with two hosts.

Order Entry System

Fairchild's sales orders are received at Mountain View, Calif., for processing from nearly 85 sales offices, independent distributors and dealers in the U.S. and Canada. Orders are filled and shipped worldwide from Fairchild's Far East factories and warehouses.

The company processes international sales orders by different methods from that used for domestic order entry, employing separate computers in Milwaukee, London and Paris.

In Fairchild's order entry system, a sales office interactively creates an order using Tymnet to access the stock processor. The CPU validates the order by ensuring that all information about the customer and the product is correct.

Sequenced, edited orders are shipped into the sales backlog on Fairchild's IBM 370/138 for verification daily. The 370 updates the Syfa's customer master and backlog files daily and updates the product master file weekly.

Quote System

In the finished quotes system, a sales person with a potential order calls in a request for price and delivery quotes.

For any given product, the pricing and production control offices are often geographically separate. They enter the price and delivery quotes, respectively, into the system, and the Syfa CPU assigns a quote number.

When the order is entered, the sales representatives receive this quote number. Then the order is scheduled and the price is automatically validated.

Fairchild is about to add Tymnet access to VM on its IBM 370/138 for engineering applications. To interface this application, the company is considering adding another eight-port asynchronous Tymcom interface with up to 1,200 bit/sec capability, a Tymcom CPAA/2200.

Fairchild also is considering interfacing Tymnet to IBM's Time Sharing Option on its 370/138 for business programming and may either upgrade the second Tymnet to 16 ports or replace it with an asynchronous Tymnet interface.

"The Tymnet service is super. We are very pleased, and our cost projections are right on target," Brasuell said.

Our service has been 99%-plus reliable, and I've had extremely good response from the Tymnet support staff," Perry concluded.
Datamedia Reduces Prices, Extends Elite's Warranty

PENNSAUKEN, N.J. — Datamedia Corp. has announced price reductions of 4½% to 12% on models of its Elite CRT terminal line.

At the same time, the factory warranty was extended to one year from 90 days and an optional second year of warranty was made available for $100 at time of purchase.

The Elite 3000A microprocessor-based CRT series offers several buffer terminal models with editing, multiple-level, protected formats; APL character set; Distinct Equipment Corp. VT-52 compatibility; and advanced printer control features. Its costs range from $1,495 to $1,795 for a single unit.

The Elite 1321A is a full-featured character-interactive CRT with a dedicated keyboard, cursor addressing and printer control; it now costs $1,250.
Graphics. Without
You just lost your last excuse for sticking with alphanumerics. Because with HP's new 2647A Intelligent Graphics Terminal, you get graphics without digging into your CPU's software.

A picture's worth a thousand numbers.

On an alphanumerical terminal, your data's just a screen full of numbers. But with the 2647A you can plot tabular data as a bar graph, or a pie chart, or a linear or logarithmic line graph. Quickly, with just a few keystrokes.

Now you can really see your data, not just look at it.

What's more, with the 2647A you can zoom in and out. Pan right, left, up, down. Selectively erase. Shade important areas to make them stand out. Use a rubber-band line to make a quick sketch.

Without any help from your programming department.

It's more than smart.

The 2647A's the smart way to get graphics from tabular data without software. But what if your CPU's output isn't tabular? Or if you'd like to plot derived data, say a three-month moving average from monthly sales figures? Or if you need more than a bar graph, pie chart or line graph?

The 2647A's not just smart, it's intelligent.

You can program it to reformat data from your CPU, or to compute more data, in easy-to-write BASIC. And you can program it in AGL, our high-level graphics language extension of BASIC. Its powerful commands, such as FRAME, AXES, LABEL, LOCATE and PLOT, put sophisticated graphics at your fingertips.

Either way, your program runs on the 2647A without any help from your CPU.

Hard copy's easy.

How do you get graphics into your briefcase?

The 2647A makes graphics as portable as alphanumerics. It interfaces easily with our 9872A Four-Color Plotter (which can even make overhead transparencies), and with our 7245A Thermal Plotter-Printer. All you need is an interface card, a cable and the peripheral itself.

And to keep costs down, more than one 2647A can share the same hard copy peripheral.

You still get alphanumerics.

You don't have to give up alphanumerics to get graphics. Because the 2647A's also a programmable alphanumerical terminal for interactive use on-line or by itself.

With independent alphanumerical and graphics memories. Eight soft keys you can define to do several steps with a single keystroke. A bright, easy-to-use, high resolution display. And built-in dual cartridge tape drives for 220K bytes of mass storage.

Best of all, the 2647A with full memory and data communications interface costs only $8300*

Which makes it easy to get the picture.

HEWLETT PACKARD

42805HPT9

*U.S. domestic list price
Asynchronous Units Linked With 3780-Based CPUs

CAMBRIDGE, Mass. — A standardized interface unit for use between asynchronous devices and host computers supporting the IBM 3780 protocol is available from Industrial Computer Controls, Inc.

The CA12-SIU/3780 is a Z-80 microprocessor-based unit that lets a user interface a wide range of asynchronous devices to a processor supporting the IBM 3780 communications protocol, according to a spokesman.

Available with up to 32K bytes of buffer memory, the standardized unit operates on 2A, 117 Vac, 60Hz and requires no user expertise.

When not performing its data communications function, the CA12-SIU/3780 can conduct a self-test. It can also be remotely tested over phone lines by means of a modem.

Options for the unit include rack mounting, additional memory and changes in communications capabilities (transparent or nontransparent, Ascii or Ebcdic).

The CA12-SIU/3780 is priced at $3,080 from Industrial Computer Controls, 400 Memorial Drive, Cambridge, Mass. 02139.

Bridging Switch Monitors Data Between Sites

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has introduced the Model 570, designed for online monitoring of data between remote sites.

The Model 570 is installed online between two modem repeaters at their digital interface. The unit allows for online monitoring of data and timing in both directions.

The unit is capable of operating with modems which have any one of three signal interfaces — CCITT V.24 (EIA RS-232C), Bell 303 and CCITT V.35, according to a spokesman. LEDs monitor the TC, SCR, RD and SCTE signals at these interfaces.

The interface signals of the Model 570 to the data test set are CCITT V.24, he added.

Operational Modes

The Model 570's modes of operation include Bridge and Terminate as selected by a key-lock switch or remote control and an automatic bypass mode which will not affect throughput during any M570 failure condition.

Modems may be internally timed or use timing supplied by the Model 570 at 50 KHz or 56 KHz.

The Model 570 is priced at $2,800. IDS is at 7 Wellington Road, Lincoln, R.I. 02865.

DG Users Gain 3270 Support

MEMPHIS, Tenn. — Data Communication Corp.'s Unique TPS-3270 Combo software package reportedly allows IBM 3270 emulation and transaction processing to run concurrently on any mapped Data General Corp. processor. It will support up to 32 CRTs and a variety of other peripherals with total device independence, the vendor said.

The package gives CRT users the ability to switch from transaction processing to 3270 emulation by a single keystroke, a spokesman noted.

The Unique 3270 is a full implementation of all 3270 features which can be supported on an IBM mainframe plus concurrent local printing at speeds up to 1,100 line/min. The Unique Transaction Processing System is a stand-alone, real-time system. It includes foreground/background control structure for multiple program execution.

The Unique TPS-3270 is available now for "under $20,000" for the complete software package and "under $10,00" if purchased with hardware. The 3270 software alone is $4,000 or $2,000 if purchased with hardware, the spokesman said from 3000 Directors Row, Memphis, Tenn. 38131.
IBM Adds Programmable 3653 POS Terminal

WHITE PLAINS, N.Y. — IBM has introduced a programmable version of the Model 3653 point-of-sale (POS) terminal for the retail store environment that can provide managers with the capability to add functions and increase control of sales and non-sales applications.

The 3653 programmable terminal, operating with IBM's Model 3651 programmable store controller, can be programmed to perform a variety of POS functions. For example, retailers can change the sequence of functions, check prices in the terminal, collect new information and customize sales slips.

The system also can be programmed for special functions such as layaway, CO2 transactions, special discounts, currency conversions and service desk operations — including check cashing, check credit approval and payments, IBM said.

Three IBM program products for retail customers have been announced for use with the programmable 3653. They are:

• Point-Of-Sale Application/Retail Environment, which provides the basic functions needed to control both sales and non-sales applications in a retail store.

• Point-Of-Sale Application/Store Data Management, which can be used to build and maintain files in a retail store and for direct store-to-store communications between controllers in a chain store operation.

• Subsystem Program Preparation Support III, which gives store programmers the capability of writing programs to run in the store controller or in the POS terminals to provide terminal functions, report generation and conversational applications.

Presently installed IBM 3653 POS terminals at store locations can be upgraded to the programmable terminals for $425. Installed terminals and programmable terminals can be operated by the same 3651 programmable controller, IBM said.

The 3653 Model 1P terminal, which is scheduled for delivery in the second quarter of 1979, can be purchased for $4,090 or leased on a five-year contract for $106/mo.

The Point-Of-Sale Application/Retail Environment program product can be licensed for $60/mo for each 3651 controller, and the Store Data Management program can be licensed for $15/mo per controller.

The Subsystem Program Preparation Support III program product can be licensed for $262/mo for each host 370 mainframe.

Interface Links

Three Printers

FAIRFAX, Va. — Air Land Systems Corp. has unveiled a microprocessor interface called the MFC-15 designed to provide serial data interface for the DataProducts Corp. 2230, 2260 and 2290 printers over communication lines that have complex protocols.

To accommodate the data rate of these high-speed printers, the MFC-15 uses a 128-character memory which can be accessed by the printer at its own rate, up to 500 KHz.

The system costs approximately $1,000 in quantities of 100 or more from Air Land Systems Corp., 2240 Dorr Ave., Fairfax, Va. 22031.

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Even though the processors are functionally independent, the system is a single, unified computing facility, with its strengths in its specialization of components. One or more processor in each system is dedicated to file processing and management. The others are applications processors. Internal communications are achieved by an Interprocessor Bus, using dedicated Resource Interface Modules (RIMs).

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The adaptability of an Attached Resource Computer system is another example of how Datapoint out-thinks its competition to help you out-think yours.

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In much the same way, a Datapoint ARC™ system adapts itself to fit the needs of a business.
**Telenet Service Expands**

VIENNA, Va. — Telenet Communications Corp. has initiated international packet-switched data communications services to Israel, Singapore and the Philippines. The service enables terminal users overseas to connect on a demand basis to computers using the Telenet packet network in the U.S.

International packet-switched service is now available in 22 countries in Europe, North America, Asia and the Middle East. The overseas telecommunications administrations and the U.S. international record carriers jointly provide the interconnection facilities between each participating country and Telenet in the U.S.

In Israel, the Ministry of Communications provides public dial-up access to Telenet-based computer systems. Charges for the service average $20/hour, including connection time and traffic charges. Similar services from the Philippines are available at an average cost of $26/hour, according to Eastern Telecommunications of the Philippines, Inc., the agency responsible for international telecommunications there.

In Singapore, access to Telenet is available with both dial-up and leased-line arrangements from the Telecommunications Authority of Singapore. Rates average $22/hour. Telenet is based at 8330 Old Courthouse Road, Vienna, Va. 22180.

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**ADI Programmable Unit Emulates Most CRTs**

ANN ARBOR, Mich. — The Series 60 Basic Universal Terminal has been introduced by Applied Dynamics International (ADI). With a programmable read-only memory (Prom) that can be programmed to meet most protocol requirements, the Series 60 can simulate the functions and operation of CRT terminals from other manufacturers, the firm claimed.

The Series 60 incorporates two microprocessors: a Z80 which handles the communications I/O and a dedicated special-purpose micro for displaying refresh.

Direct memory access (DMA) transfer is available from the bus by locking out the Z80. The modular Prom software is both linking and relocatable, according to a spokesman.

The Series 60 is available in read-only, keyboard send/receive, automatic send/receive, multiplex and intelligent configurations, in all screen formats from 8 by 16 to 40 by 80. Three circuit boards are used (program microprocessor, video and timing control, and power supply), with provisions for three additional boards (for internal memory expansion to 8K bytes and a floppy controller, for example).

Establishing the characteristics of each customer's Series 60 configuration is as simple as defining the program requirements on ADI's configurator and burning a corresponding Prom, the spokesman asserted.

Asci, Bandot, Ebcdic, Hollerith or other desired standard or nonstandard code conversion is accomplished in the process. The user's program, including control characters, can be redefined at any time by ordering redefined Proms from the factory.

The Series 60 is available as a complete terminal, including keyboard and monitor, as a controller only; or a board set only. Both standard and custom keyboards are available.

Controller-only prices start at $720. ADI said from 3800 Stone School Road, Ann Arbor, Mich. 48104.

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**Modem Comes In Assembly Kit**

SAN FRANCISCO — Dynamic Devices has introduced an acoustically coupled modem assembly set.

The unit reportedly can be assembled in less than 15 minutes with nothing but a screwdriver and a pair of pliers. No soldering is required.

Since all components are tested, calibrated and burned in, expensive test equipment is completely unnecessary, the firm said.

The coupler will operate in both originate and answer modes, with full- and half-duplex capability. An RS-232C/20ma interface is standard.

No special telephone lines are required, and the device is fully compatible with telephone company 300 bit/sec equipment, a spokesman noted.

The AC3C is available with a 20-day money-back guarantee. An additional 120-day warranty on parts and labor is provided.

The AC3C will be sold at a introductory price of $149.95. Dynamic Devices is at 1087 Mississippi St., San Francisco, Calif. 94107.
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departmentally, to complete consoli-
dation of the financial management
of the company. Originally created
for Boeing’s needs, EIS has been
enhanced for use by all financial
executives. Many companies are
now using it, and BCS can make EIS
available for your operation.
It’s a service that can be tailored to
your business yet is flexible enough
to grow with business expansion.
To respond to the day-to-day
business problems — planning,
analysis, reporting, forecasting and
control — take a look at a responsive
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175 — makes engineering time
more productive while cutting com-
puter costs. Other engineering
software packages — a complete
library from energy systems
through project management —
provide the opportunity for greater
personal engineering creativity
and productivity. Use them to take
over routine calculations, absorb
overloads, and carry out complex
analyses. Some of the engineering
packages are exclusive,
while others have
been significantly
enhanced

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computerized engineering features.
Whether your company is large or
small, whether you use computer
time interactively or in batch
modes, BCS could have the package
that fits your engineering program.

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BCS currently serves 1900 clients
and provides more service, more
support, and more efficiency
than you’ll find from most computer
service firms.

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the technical representatives, the
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BOEING COMPUTER SERVICES COMPANY
A Division of The Boeing Company
Auto-Answer Modem Runs at 1,200 Bit/Sec

PALO ALTO, Calif. — Prentice Corp. has introduced a two-wire, simplex/half-duplex, Bell-compatible modem for the automatic answering of computer calls.

The P-2025 1,200 bit/sec modem is a direct-connect unit that interfaces with the two-wire, dial-up switched telephone network through a 97A or 97B jack. Prentice said a data access arrangement is not required. Users can connect the P-2025 to the switched network in any of three standard modes: programmable, fixed loss or permissive.

Specifications of the P-2025 include a serial binary asynchronous data format, -3 to -12 dBm transmit level (standard modes: programmable, fixed loss, switched network in any of three standard modes) and a mechanical design matching that of all Prentice half-duplex, Bell-compatible modems.

The card version of the P-202S is priced at $340 in single quantities, the vendor noted. The rack-mountable card version — with front panel, but without a power supply — fits all standard Prentice enclosures, the vendor explained.

Portable Data Line Monitor Debuts

PALO ALTO, Calif. — A portable data line monitor (DLM) with capabilities for basic line monitoring, transmitting data patterns and messages, terminal rolling and addressing and electronic strip chart recording is available from Arbor Communications Corp.

Billed as a "powerful tool for diagnosing problems on communications lines," the DLM contains an integral 3-in. CRT that displays such standard codes as hex, Ascii and EBCDIC. Send/receive data is inverted and character underscoring can be used for event marking, an Arbor spokesman stated.

Monitor starting and stopping can be controlled from the EIA control panel or by data comparison, the spokesman noted, adding that an optional electronic strip chart recording display allows the user to review time-oriented events captured on the parallel TTL data or EIA data set leads or from autocall 801 signals.

The Arbor Model 101 DLM costs $6,100, the vendor said from 3784 Farnsworth Way, Palo Alto, Calif. 94303.

GDC Unveils Multiplexer

DANBURY, Conn. — A four-channel microprocessor-based statistical multiplexer has been introduced by General Datacomm Industries, Inc. (GDC). The TDM 1240 assembles and transmits variable-length data blocks composed of only the actual data characters from the individual channels so that it can achieve a typical multiplexing efficiency of 200%, the firm said.

The unit was designed to provide data transparency to all information bits, including parity, in each transmitted data character, according to the firm. Because of this, the TDM 1240 is not restricted to use with only alphanumeric printing devices and the capability to flag errors encountered in local distribution is not sacrificed.

The GDC TDM 1240 costs $2,480 from General Datacomm Industries, Inc., One Kennedy Ave., Danbury, Conn. 06810.

Remote-Batch Unit Prints 80 Columns

SEATTLE — Datacorder II, a programmable key-to-cassette remote-batch data entry terminal, will be shipped with an 80-column instead of 48-column, electrosensitive printer beginning Jan. 1. International Entry Systems, Inc. (IESI) has announced.

Integrated in a 26-lb case are an 8080 microprocessor, 16-Kbyte random-access memory, keyboard, 48-character alphanumeric display, the printer, a cassette recorder and RS-322 communications interface. IESI said. Programming is done on the unit with Quick, a high-level data entry formatting language. Extended Basic and asynchronous and synchronous communications configuration programs.

Datacorder II costs $3,495, the vendor stated from 408 N.E. 72nd St., Seattle, Wash. 98115.
Perkin-Elmer proudly presents the end of high-cost FORTRAN number-crunching.
Perkin-Elmer proudly presents the FORTTRAN VII System. $89,900.*

<table>
<thead>
<tr>
<th>Feature</th>
<th>INTERDATA FORTRAN VII 8/32 System</th>
<th>DEC FORTRAN IV-Plus VAX 11/780</th>
<th>IBM FORTRAN H 370/158</th>
</tr>
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<tbody>
<tr>
<td>Table Handling</td>
<td>26 secs</td>
<td>119 secs</td>
<td>126 secs</td>
</tr>
<tr>
<td>Binary Search</td>
<td></td>
<td></td>
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<tr>
<td>(40KB Array)</td>
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<tr>
<td>Matrix Manipulation</td>
<td>45 secs</td>
<td>42.5 secs</td>
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<tr>
<td>(Gauss-Jordan Reduction)</td>
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<td>376 secs</td>
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<td>100 x 100</td>
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<td>200 x 200</td>
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<tr>
<td>400 x 400f</td>
<td>2555 secs</td>
<td>3774 secs</td>
<td>1840 secs</td>
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<tr>
<td>Sharable Development Software</td>
<td>editor</td>
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<td>No</td>
</tr>
<tr>
<td>(40KB Array)</td>
<td>linker</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>(40KB Array)</td>
<td>assembler</td>
<td>No</td>
<td>No</td>
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<tr>
<td>(40KB Array)</td>
<td>compiler</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>(40KB Array)</td>
<td>editor</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Small (under 40KB) Development Modules</td>
<td>linker</td>
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<tr>
<td>Modules</td>
<td>assembler</td>
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<td>No</td>
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<td></td>
<td>compiler</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Fast Compiler</td>
<td>editor</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Compiler</td>
<td>(over 1500 LPM)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Optimizing Computer Technology</td>
<td></td>
<td>Global</td>
<td>Block</td>
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<tr>
<td>Custom Microcoding Development Software</td>
<td></td>
<td>Yes</td>
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</tr>
<tr>
<td>Price</td>
<td>$95,000</td>
<td>$185,000</td>
<td>$1,370,000</td>
</tr>
</tbody>
</table>

*U.S. price includes Interdata Model 8/32 system with 512KB of memory, 10MB disk, 800 BPI tape, Carousel console, Operating System, utilities and FORTRAN VII.

†Requires larger memory.
The new Interdata FORTRAN Systems—starting at $89,900—outperform the industry. Check the comparison chart. See just how our new FORTRAN Systems chop away big chunks of run time and program development time. How they eliminate compiler overhead that wastes run time with other machines. And for all of their sophistication our new systems couldn’t be easier to use.

These benchmark results might be hard to swallow until you learn more about the system behind them.
The GO is Global Optimization.
We developed our new FORTRAN VII software to whip through large FORTRAN problems like matrix manipulations and binary searches with ease. And we’re doing it with the finest globally optimizing compiler ever developed. It slashes FORTRAN programs to the bone, achieving the fastest execution speeds possible.

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Call this an offer. Or call it a challenge. Run one of your most demanding programs on our new FORTRAN System today. Free. Then you’ll understand our enthusiasm, and draw your own comparisons. We’ll bet yours will make the ones shown in this ad seem conservative.

To learn more and perhaps reserve some system time, just send us this coupon. Or, if you’d like, call toll-free at (800) 631-2154; in New Jersey at (201) 229-6800.

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\square \text{I have some number-crunching problems that should test your new FORTRAN System.} \\
\text{For example:} \\
\hline
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\text{Title/Department:} \\
\text{Company:} \\
\text{Street:} \\
\text{City:} \quad \text{State:} \quad \text{Zip:} \\
\text{Telephone:} \\
\hline
\end{array} \]

Send this coupon to: Perkin-Elmer/Interdata Division, 2 Crescent Place, Orangeport, NJ 07757.

\[ \text{PERKIN-ELMER} \]
\[ \text{Data Systems} \]
Independent Memory Held
Best Buy for IBM Users

By Anthony J. Coppola
Special to CW

Burgeoning deliveries of IBM 30 series sys-
tems will force a revaluation of recent eco-
nomic history in the prices of memory. The
prices of IBM memory for outmoded 370
systems will plummet. Despite this, however, other factors will
continue to make the economics of indepen-
dent memory ownership a better invest-
ment.

The pricing history of IBM 360s and out-
of-production 370s — assuming it is re-
peted — provides a good clue to why this is
ture. Although newer systems are typically
leased from IBM, the balance swings more
and more toward ownership as time goes by.

Statistics compiled by International Data
Corp. (IDC), a market research firm, indi-
cate that nearly 97% of the 360s extant in
1977 were purchased: this compares with
industry estimates of approximately 20% ownership when the 360 line was intro-
duced. More than half of these systems were
user-owned, while the remainder were
owned by third parties such as leasing com-
panies and brokers.

Stable, Not Static

Although the 360 market is stable, it is not
necessarily static. IDC figures show that be-
tween 1973 and 1977, the amount of mem-
ory per average system increased nearly
50%.

Since IBM no longer builds memory for
this market, the increase must have come
from independent memory makers. Rather
than fading away, then, the 360 base is in-
creasing, at least in terms of capacity.

Three factors have contributed to this
growth. IBM's own marketing philosophy,
the nature of companies owning 360s and
the inherent advantages of using indepen-
dent memory.

IBM's policies encourage independent
memory suppliers. The introduction of sys-
tems typically offering greater capacity and
better price/performance ratios encourages
the users who lease older systems to migrate
to the newer ones.

The systems abandoned by these migrating
lessees typically move into the used market-
place where they can be sold at a substantial price reduc-
For example, a 370/145 costs about $1
million new but about $220,000 used. And
IBM does not sell systems to its leased base,
nor does it lease to its purchased base.

With newer IBM systems offering greater
capacities and improved performance, why
will anyone want to use an old system? The
answer has to do with the type of com-
pany that uses 360s and 370s. Basically,
there are three general categories of users:
each of which has its own operating require-
ments.

In the first category is the Fortune 500 type
of company. It may have multiple 370 or 30
series systems, particularly to handle on-line
DP. At the same time, however, it may have

(Continued on Page 60)

With CPU, Service
Tracks Each Vehicle
In Corporate Fleets

EDEN PRAIRIE, Minn. — The use of com-
puters by auto manufacturers is an old
story, and the use of microcomputers in cars
is a very new story. Somewhere in between
lies the use of computers to track service and
financial data on autos, particularly the
fleets of cars maintained by many com-
panies for their personnel.

"If corporations with fleets of company
cars or trucks maintained and disposed of
their vehicles the way consumers do, pro-
ductivity would drop and expenses and fi-
nancial terms would become unmanage-
able," according to John A. Lever, vice-
president for information services at Gelco
Corp., a service transportation company
here.

"Today, while most typical fleet purchas-
ing arrangements have simplified the selec-
tion, financing and the selling off of the ve-
ciles, few operations take care of all the de-
teils that occur in between," Lever added.

"Gelco uses a computer for almost every
facet of its truck, trailer and auto fleet leas-
ing and management operations.

"Our system backs up Gelco's customers
with newer IBM systems offering greater
capacities and improved performance, why
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(Continued on Page 66)
Indepedent Memory Seen Best Bet for Users

(Continued from Page 59)

Tape Records
To 6,250 Bit/In.

GRAHAM, Texas — Graham Magnetics, Inc. has introduced a magnetic tape that is said to offer significant advantages in the tape coating and in the dispersion of the magnetic particles on the tape.

The Epoch 480 is certified by the manufacturer for all bit densities through 6,250 bit/in. It is guaranteed to hold its value. It is also easier to disperse of memory made by an independent supplier.

In a typical situation with a new IBM system, the price for independent memory starts at approximately 70% to 80% of the IBM price. As more independent manufacturers enter a specific market, price competition widens the gap to 40% to 50%.

As soon as IBM stops actively building a system, its price for memory in the now "used" market fluctuates. If IBM enters a specific market, any memory in service is still supported by IBM.

Independent memory has inherent competitive advantages over IBM memory, and the cost of ownership of independent memory is substantially lower than IBM memory. Also, third parties (dealers) prefer to sell. And many users have found the cost of IBM attachments sometimes cost more than the memory — a situation not true with the independents.

When an IBM system is introduced, the independent memory supplier not only has a price advantage over IBM, but also offers features and enhancements not available from IBM. These features and enhancements take on added significance in the used memory market since they improve performance and extend the life of the system.

Among the typical features and enhancements offered by an independent memory supplier are:

- Memory capacity that exceeds the stated capacity of the system. It is not the technical limitations of the CPU that determine the maximum capacity of memory, but rather IBM's marketing strategy. Therefore, by using independent memory, a user can increase the throughput of an existing system at a lower cost than upgrading to a faster version provisions in their lease agreement.

- Field upgrading. When a user adds independent memory, he can usually add it in smaller increments than IBM offers. This means he can better control the amount of memory on his system. This eliminates the situation of excess memory capacity on a system.

Cabinet for Printouts

Features Locking Top

WEBBABYLON, N.Y. — Vue-Fax, Inc. is offering a printout security cabinet for housing output binders with built-in locking top. Incorporating a top that locks, the unit is said to provide 31.5 in. of filing area large enough to house letter-size output. Ball-bearing casters allow the unit to be moved from place to place.

The security cabinet sells for $190 from Vue-Fax at 101 Alder St., W. Babylon, N.Y. 11704.

Lower Ownership Cost

Besides these features and enhancements offered by independent memory suppliers, it costs less in terms of energy and floor space to use independent memory. Even though the initial price of IBM memory may be lower in the used market, the long-term operating costs will be higher.

For example, a 370/155 is 50% more powerful than a 370/148, yet a Model 155 used memory costs only 50% that of a new 148.

At Electronic Memories & Magnetics Corp. (EMM), we recently completed a comparison of the cost of operating our memory and IBM's on a 360/65. This comparison is shown in the box above. A glance at the table shows the operating costs of the independent memory are significantly lower than those of IBM memory.

By extending the life and performance of older 360 and 370 systems, users are realizing direct benefits. They are amortizing the cost of the systems over a greater period of time. At the same time, they are increasing their machines' capacity so they come closer to the newer systems. This means users can avoid the high capital investment required for a new system.

Whether the 370 used market will parallel the evolution of the 360 used market remains to be seen. However, the operating costs of the independent memory supplier are still building and supporting the used market, a user who orders memory is actually getting new or refurbished memory. This includes new components and the manufacturer's warranty, which is the same as a new memory.

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The software has been developed and personnel trained. The company wants to extend as long as possible the life of the system to amortize its associated costs.

At another level is the medium-sized company that may have leased a 360 at one time from a third-party leasing company but has decided to convert the lease to a purchase. Its primary concern is to get maximum performance out of the system. It wants to use the system to its full capacity and foresees the necessity of moving up to a larger, more costly system.

At the third level is the small firm that buys a 360 in the used market place. This is usually the company's first large mainframe and represents an upgrade from a smaller system or a move from a time-sharing service. The mainframe represents a major capital outlay and, because this type of used product is cost-conscious, it wants to maximize the use of the system at the lowest possible operating cost.

Of course, there is still another major user of used systems - the third-party leasing company. With its capital tied up in 'obsolescent' systems, it needs to maximize the return on its investment dollar. This means enhancing the performance and capacity of the system so it comes close to the newer systems, which allows the lessor to offer the system at a substantial cost savings over the newer systems.

Inverse Price Relationship

The challenge to the purchaser of used systems, therefore, is to maximize its investment. Whether an end user or a third-party leasing company, the goal is to extend life and improve the performance of the existing system. Adding memory with performance enhancements is the most effective way to accomplish this.

The traditional price relationships between independent memory suppliers and IBM is turned around in the used computer market. IBM memory - which has several years old and uses older, slower, often less reliable technology - typically drops in price as a function of time.

However, it is not uncommon for memory supplied by an independent to hold its value. It is also easier to extend the capability of the system at a substantially lower cost. Whether an end user or a third-party leasing company, the investment is still supported by IBM.

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However, it is not uncommon for memory supplied by an independent to hold its value. It is also easier to...
Typesetting System Gives L.A. the Latest News

LOS ANGELES — Reporters on the Los Angeles Times can now incorporate late-breaking developments into their stories and still meet publication deadlines, thanks to a computerized typesetting system that significantly cuts production time.

"Our typesetting procedures have changed drastically during the past four years," according to Joe Malcor, superintendent of the electronics department at the Los Angeles Times. "For many years, an operator would typeset manually on a Linotype machine. The Linotype produced characters in hot lead form, and the operator was responsible for designating column width, hyphenation and line justification. Display ads had to be cut and laid out by hand."

Others Inadequate

"We had tried two other systems that produced text copy on photographic paper, but one required loading a paper tape with typesetting instructions into the machine, then printed only one character at a time. The second system could only print one or two columns per sheet because the paper wasn’t newspaper-wide," Malcor recalled.

In 1974, the Times began using computerized photocomposition for typesetting to replace those long and tedious procedures. The typesetting system relies on an IBM 370/158 mainframe. Peripheral equipment includes three Autologic, Inc. APS-4-100 typesetters, two APS-18 communications controllers and two Evans & Sutherland Computer Corp. digitizing systems, as well as seven T8000 tape transports and six D3000 disk drives manufactured by Pertec Computer Corp.

"We have approximately 100 CRTs for text input throughout the paper’s different departments,” Malcor said. "The operator enters the text into the CRT with coded directions for typesetting, such as column width and typeface. The IBM 370/158 then takes care of line justification and hyphenation, which frees the operator from making those decisions."

"A line printer produces copy that is returned to the editor for proofreading. After editorial approval, the text is sent via a direct line from the mainframe to the APS-18 communications controller, where it is received by the disk drive."

"Finally, the APS-18 deposits the text into the typesetter, and the typesetting process continues. The photographic copy is then sent through the remainder of the printing procedure," he explained.

The typesetting process for display ads varies slightly from the process for articles. It is based on a digitizing system that was designed especially for the Times.

"The digitizing system allows us to put the ad text on a video display board, where an operator can manipulate the typeface and line lengths and can make any changes or additions desired," Malcor said. "When he is satisfied, the ad is entered into the typesetting cycle in the same manner as an article. Ad layouts are no longer done by hand."

"All articles and display ads pass through the disk drives that maintain the operating program for the typesetting system," Malcor said. "But with a paper as large as the Times, we have found that a backup system is a necessity."

"For this reason, we use a magnetic tape-based system where the operator can input the story onto magnetic tape that is then transferred to the tape transport on the APS-4-100 to typeset."

"The computerized typesetting system has saved the employees a significant amount of time. We have been able to push back editors’ deadlines and still get the paper printed and distributed on time," he pointed out.

"It now takes an average of four minutes to run one page of the Times classified section through the entire typesetting procedure. The stock page takes two and a half minutes. Typesetting itself takes only seconds."

Many of the decisions that were made by the Times personnel, such as hyphenation and line justification, are now made and carried out by the computer system, Malcor noted. Because of this, the paper has been able to redirect employees to other tasks.

Future plans? "We don’t have any plans to expand this system to other applications. But the Times is a progressive newspaper and plans could change," Malcor concluded.

WHAT DOES AUBERBACH THINK ABOUT INTERCOMM?

THE CLAIM: In a 360/370 OS or OS/VS environment with a dozen or even thousands of terminals, our INTERCOMM will run circles around CICS or any other teleprocessing monitor. It’s the state of the art in large scale TP monitors.

"Why are we so high on INTERCOMM? Mainly because it has been in the forefront of technology for so long.

"Users also share our sentiments... all were quite satisfied with the system’s performance... and the support has been outstanding.

"CICS is not all that bad. It is not, however, in INTERCOMM’s class." (Emphasis added.) We couldn’t have said it better. Because INTERCOMM does more things and does them better than any other TP monitor.

Now take a second to find out why over 200 users have already opted for the world’s most sophisticated teleprocessing software.

Call or write today... (calling is faster!) Brochures on products filling your precise requirements will be in the mail the same day.

BETACOMM: Designed for the medium to large size 360/370 DOS/VS user using on-line programming facilities. Increases programmer productivity 50 to 200%.

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Chicago (312) 296-9500
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CPU Peripheral Replacements Let Cycle Maker Rev Up Throughput

Several vendors have announced the availability of free literature that might be of interest to DPers.

• Tally Corp., 6301 S. 180th St., Kent, Wash., is offering a booklet called "How to Select the Printer You Need." The booklet is said to cover available types of medium-speed printers and features to look for when purchasing a unit. Intangibles influencing cost-effectiveness and best value are also discussed, the firm noted.

• A booklet from CompuLink International, at 1818 Market St., Philadelphia, Pa., 19103, discusses interactive computer graphics. The brochure outlines the concept of interactive computer graphics in a variety of drafting applications, and details some historical aspects of this relatively new technology.

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Andres Contreras

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Mexico

Eureka (U.S. inquiries)

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Joe Gold (Geneva)

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sheluo

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Non-IBM:

John Halmack (Dallas)

(214) 234-1818

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Consider the operating cost of the Kodak laser printer versus the operating cost of a paper-impact printer.

Consider, for example, the cost of generating a 1000-page, 3-copy report.

Three-part stock paper costs about $22.30* per 1000 pages. But you can put the same report on microfiche for around $1.50.

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Time and labor costs are important factors, too. Especially in a DP department.

Which is why you should know that it would take almost 50 minutes to decollate, burst, bind and package a 1000-page report. It would take only 9 minutes to print, duplicate and package the same report on just 4 microfiche.

A Kodak laser printer can save you money in other ways, too. With a paper printer, you'd have to load at least 12 boxes of paper to print the equivalent of one cartridge of 16-mm film. Compared with fiche, the margin of difference is even wider. You'd need 34 boxes of paper to print the equivalent of one fiche cartridge.

In fact, when you add up the savings in materials and labor, you'll find that printing with a Kodak Komstar laser printer is about 87% cheaper overall than printing with a paper-impact printer.

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In Portland, Oregon, Sperry Univac minis help the Police Bureau come to the rescue hundreds of times a day.

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This futuristic system coordinates dispatchers and officers and keeps them constantly updated. Much of the paperwork required of field officers is eliminated. And the data base it generates is used for uniform crime reporting and resource allocation.

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If you have a system application, we undoubtedly have a mini that's just right for it. Whether it be business data process-
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ing, scientific, instrument control, or data communications.

For more information, write to us at
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92713. Or call (714) 833-2400, Ext. 536.

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We'd like to hear from you. Even if your
system application isn't as arresting as the
one in Portland.
The Army's 18th Airborne Corps is a tactical command force ready to support U.S. action anywhere in the world. One of its major subordinate commands, the 1st Corps Support Command (Coscom), uses an IBM 360/40 mainframe to provide all administrative and logistical information handling for a corps force that can exceed 100,000 personnel as well as for its helicopters, weapons systems, tanks and other equipment. Prepared for providing tactical combat support for a military operation of any size, Coscom can assemble its four IBM 360/40 mainframes, each equipped 45-ft tractor trailers for movement within two to three hours. At a site, once in the field, handles various processing tasks as it was designed to do.

Data comes in from the combat divisions, for example, on the availability of troops for tactical decision-making or on inventory control to speed delivery of supplies to combat units.

Punched Card Problems

In the past, support units used keypunch equipment, which they also brought into the field for input to the mainframe. Under “combat” conditions, however, punched cards created their own particular problems. With the humid environment, the punched cards swell and cause jams in the reader, according to Lt. Col. Gerald Hicks, assistant chief of staff of management information systems for Coscom. “We also had trouble losing cards. In one case, we would use from three to five trays — or 9,000 to 15,000 cards — for input.”

“Often, by the time the cards got from the keypunch truck to the base, we would be missing a tray. Not only did this slow the cycle, but we were left with missing information.”

In January of this year, Coscom’s Material Management Center (MMC) replaced its four IBM 029 keypunches with Inforex 1303 typewriter keypunch units to handle its transaction process. The typewriter keypunch consists of clothing, repair parts and other commodities to the corps.

“We wanted to have state-of-the-art equipment and increase our productivity,” Hicks remarked. “We checked out Inforex with people using its equipment, and they were pleased with it. The Army also has a requirements contract with Inforex, and we knew that would speed approval since we are the first tactical unit to use such a system.”

According to Hicks, the transition from keypunch equipment to the key-to-disk system — with five workstations, processor, tape drive and card reader — went smoothly. “It’s very easy to train the operators. We received the system in January, and we are operating it within two to three days. We’ve experienced a 20% increase in our productivity rate; the error rate has decreased to almost zero.”

A report of the processed data coming into the MMC on keypunch workstations is generated by Coscom’s commodities unit, which receives and maintains an authorized stock list of items for supply to the various divisions. The information is used to identify stock, keep track of inventory on hand — its condition and status of obsolete age — and list inventory on order.

Prepunched cards in the form of requisitions, status requests, delivery notices and so on make up the other 40% of the input. These come in from support units which deal directly with senior staff and agencies of the Department of Defense for analysis and policy planning.

System on Maneuvers

While watching the delivery of the Inforex equipment, Hicks and his maintenance technician got the idea to test the system on maneuvers, as they had the keypunch equipment. “When we saw that the minicomputer was actually shipped via commercial carrier on casters and wrapped in a plastic bag, we wondered why we couldn’t deploy and operate the system from a van as well as from the garrison.”

“Chief Warrant Officer Ed Gidley, our computer technician who maintains the 360/40 and other equipment, sat down and looked over the van and the system. Using whatever was on hand, including styrofoam, rubber matting, heavy nylon strap and metal rings obtained from an airborne unit, Gidley worked out the details.”

The system was strapped into the back of a standard M313 expandable van — a 2.5-ton truck whose body can expand by 4 ft on either side — and driven over 35 miles (approximately eight of which were unpaved) to the Camp McCaffery field location. Usually, equipment like the key-to-disk system must be studied and tested by a battery of Army experts before it can be “authorized” for general Army use. However, since this process can take several months to several years, the Army has authorized use of off-the-shelf equipment to save time and take advantage of advances in computer technology.

“We stayed prepared to support any worldwide contingency,” Hicks commented. “My feeling is that if we have the equipment that does the job — and does it well — then that’s what we want to take.”

Readiness Training Test

The eight-day field exercise for the corps included an operations readiness training test for the MMC and the 14th DP Unit. The units are given the setting and logistics of an operation in a particular world location, then expected to perform their required tasks from that location on as they would on a contingency mission.

We tried to go out with a problem operated in Hicks noted, “but we did have a fear of failure. We were making an operation in a particular world location, then expected to perform their required tasks from that location on as they would on a contingency mission.”

The key-to-disk system provided benefits in the field as well as at the garrison. “With the Inforex system we only handled one magnetic tape rather than trays of cards; it’s faster and much easier to read into the computer,” Hicks remarked.

“Operating conditions in the field were very poor,” he commented. “We cavorted a system in the 70s during the day into the 40s at night. We used heaters and they put out some smoke — when they worked. When they didn’t work, the equipment proceeded in freezing temperatures.”

“Any of these conditions could have caused a system failure, yet the equipment continued to operate without problems once we started the test. The system on the test was a resounding success.”

Coscom has ordered another Inforex 1303 for its personnel service center and eventually plans to install the key-to-disk system at a key location for even greater availability of management information.

The Inforex system offers more than cost savings; it offers combat readiness. “With the sophisticated weapons systems in use, as well as helicopters, tanks and tanks, any failure or even a delay in getting supplies to a unit could result in what tremendous loss of combat effectiveness in a short moment of time,” Hicks concluded.
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Service Tracks Each Vehicle in Corporate Fleets

(Continued from Page 59)

200,000 vehicles. Data on each vehicle is current to within 24 hours.

Typically, an operator keeps a car in a fleet for about 28 months before selling it; trucks are usually kept longer. In order to meet tax and other reporting requirements, Gelco retains information about the vehicle on-line for a year after it leaves the road or is sold. After that, while not required to update the data about the vehicle, it keeps the information on microfiche for several more years.

"Once the basic decisions on quantity, manufacturer, models, destination and financing terms have been determined, computerized transaction processing takes over," Lever explained. Gelco's staff enters the customer order using a CRT; some details relating to options are entered later, according to parameters predetermined by the customer.

Once the vehicle order for an entire fleet is recorded in the system, Gelco's system completes the order by adding preference information such as color, then relays the order directly to the manufacturer in Detroit.

"It's all computer-to-computer from this point," Lever said. "The system has been programmed to emulate a data entry device within the automobile manufacturing firm. Thus, when we ordered 4,300 automobiles from a single manufacturer over three evenings and fixed the delivery schedules with each factory closest to the final destination, our system communicated with the manufacturer's computer with no problems."

Gelco also tracks each vehicle through the production cycle, monitoring its status until it is finally delivered to the dealer nearest the customer's home who will operate the vehicle. Once a serial number has been established, Gelco starts the registration process with the state in which the car will be based, he said.

Data Base Integrity

Data security provisions have been established between Gelco and the auto companies. Gelco customers who have terminals of their own and who have appropriate data identifiers can dial into the Gelco computer to check the status of individual vehicles on order. "This capability, however, is on a 'read-only' basis," Lever noted.

"To change the specifications on an individual vehicle, the customer must notify Gelco," he added. "Thus the integrity of the data base is protected, assuring a minimal amount of interruption to the entire operation and preventing unauthorized tampering with sensitive information."

The entire operation from vehicle selection through order and delivery schedule determination is called the Direct Order Entry System (DoES). The DoES software was developed by Lever's 25-person programming department to take advantage of Honeywell Well Level 6 communications (Network Processing Supervisor), data base (Integrated Data Store/II) and program development (Management Data Query System) executive software systems.

The Network Processing Supervisor coordinates network communications over 25 lines among Honeywell CRTs, teletypewriter units and a Honeywell Level 6 Model 43 located in Toronto. That minicomputer is used for document entry and fleet maintenance of vehicles in the Canadian market.

The company's 38K-word system includes eight tape units, 24 disk units containing 200M bytes of mass storage each and printers, readers and punches.

DoES was implemented first in 1975, when Gelco installed its first Honeywell Level 6 system. In 1977, the order status retrieval system was introduced to give domestic customers up-to-date information on their vehicles.

Maintenance Management

Another service program, called Maintenance Management, encompasses regular service and emergency repairs. Using CRTs, mechanics make maintenance and repair decisions that take into consideration prices, quality, repair location, possible downtime and warranty coverage.

A combination of 14 Watts lines and nine local lines connect the maintenance administrator to fleet users throughout the U.S. on a 12-hour basis. Incoming call notices are directed to the administrator responsible for the appropriate geographic region, who then uses a CRT to retrieve the appropriate data before accepting the call.

"Using his mechanical background, information available from the calling driver and the vehicle's maintenance history, the administrator provides a preliminary diagnosis," Level explained. "A 50,000-firm vendor file is consulted for the reputable service facility nearest the driver, and an estimate is made of the cost of repair.

"Once the problem is diagnosed and the vehicle is in the proper repair facility, the administrator performs all negotiations necessary to issue a purchase order."

The maintenance administrator then generates a purchase order authorizing the work. The order contains an estimate and the name of the service facility.

"Without the computer, we'd never be able to provide these services for our corporate customers. Our capabilities and growth have been paced by the upgrades and improvements in computer services," Level said. "Otherwise, we'd be just another fleet leasing and management firm."
IBM took a giant stride in computer technology to create the new System/38.

The result can be a giant stride in efficiency for your organization.

IBM System/38 is a new breed of small computer:
- It's compact in size. Affordable in price. And as a general business computer, it's exceptionally well suited to a wide range of organizations. They include firms from about $5 million to $100 million in sales, as well as units of larger companies.
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- Because in creating System/38,

Turn the page
IBM thought on a very big scale.
And System/38 can have a large impact in stepping up the efficiency and profitability of the organizations which use it.

**Big computer functions in a small system**

System/38 is designed to let any organization enjoy the productivity advantages of online applications typical of large-scale computers.

Specifically, IBM sought to incorporate in a simple-to-operate smaller system advanced functions that make work station applications easy to design, install and maintain.

Functions like an integrated online data base with data base management. Single level storage. Simplified computer-aided programming. Total system management through a central control facility. Real-time inquiry and update. Online training capability. Data integrity and security.

A tall order, you'll agree.
Especially for a system leasing for as little as $2,800 a month.

Yet IBM System/38 has all the features listed above—and more. Not just some of them. Every one of them.

Together, they provide what may be the most attractive package of computing benefits ever offered to business.

What can System/38's functions mean to your organization?
Let's review them briefly.

**Distributed online work stations**

One of the biggest advantages of System/38 is that users don't have to come to the computer to get the vital information needed in their jobs. Instead, the computer comes to them where they work, by means of online display stations and printers called work stations. As many as 40 local work stations—as well as additional remote work stations—can communicate with System/38 interactively. They can bring the power of the computer to people doing totally different jobs. At executive desks, in departments, plants and warehouses.

Across the hall or across the country. And the same up-to-date information will be available concurrently to all authorized users for real-time inquiry, change or update.

The value of System/38 in keeping everyone up to date can scarcely be overestimated. It can mean hundreds of thousands of dollars saved in operating efficiencies.

**A self-managed system**

There are two aspects to computing: processing the data itself and managing the system that processes the data. System management can consume a great deal of expensive time and talent.

System/38, however, has a remarkable internal facility that eliminates much of the complexity of system management. Called the Control Program Facility, it monitors and manages system activity—including the flow and processing of data. As a result, users and programmers are free to concentrate on their own jobs, rather than worrying about how the computer performs its tasks.

**Central online data base**

Instead of having separate data files for each application—one for or-
der entry, for example, and another for inventory—System/38 lets you combine data for related applications into a single online data base. The integral Data Base Data Management facility presents data in whatever format and sequence is required by the user.

Every user can be in touch with the same central source of information. When data is updated for one application—say order entry—it’s available for all others using that information, such as production, shipping, accounts receivable and inventory. Duplicated and conflicting data can be eliminated. Information is easier to retrieve, revise and use.

**Streamlined programming**

Both new and experienced programmers will find their work simplified and speeded with System/38. Thanks to advanced technology, many functions that ordinarily require programming have been absorbed by the system.

For example, System/38 offers a powerful “query” function which can break out data in the data base as required by the user and present it in the desired sequence and report format—without conventional programming. Executives can use a work station at their desks to obtain special management reports in minutes, rather than days or weeks.

And with RPG III, an advanced version of the familiar RPG language, programmers are given new freedom to tailor processing of data and flow of logic to the needs of an application. Moreover, new application programs can be compiled, tested and “debugged” from any work station—in real time and using real data samples—while regular processing continues without being

**More on System/38, turn the page**
affected. This means that a programmer is no longer burdened with manual coding, card punching and waiting for test time and results.

In short, System/38 can mean greater programmer productivity. Streamlined programming like this benefits both the programmer and the user who want results fast.

**Single level storage**

Another feature that makes for operating efficiency is an extension and simplification of the virtual storage used in larger computers. In System/38, IBM has taken this technique a big step further with the concept known as Single Level Storage Management.

It treats all storage—both main and auxiliary—as a single unit or level and automatically keeps track of everything stored in it. Users, particularly programmers, no longer need be concerned about program size or location or any other aspect of storage management.

**Online training**

As more employees become involved with the computer, training them in its operation becomes an important task. With System/38, your people can get “hands on” experience at live work stations, using actual data files—without fear of record destruction and without interfering with the use of the system by others.

And the prompting and guiding messages flashed on the screen can aid both trainees and regular users alike. There is even a “HELP” key for use whenever further assistance is needed.

**Data integrity and security**

System/38 provides an extensive range of security levels. They vary from simple basic precautions to an advanced plan which assigns a personal identification code to every user.

Under this plan, the information any individual can access, change or process is carefully designated and restricted according to a user “profile” stored in the data base. In a multiple work station environment, with large numbers of users, this kind of positive individual control can be particularly helpful in assuring the integrity and security of computer data.

**Conversion from System/3**

Conversion to System/38 from an IBM System/3 can be aided with conversion utility programs. They allow the user to do as much as possible of the conversion process on his System/3 prior to installation of System/38. These programs are designed to make conversion easier, faster and less expensive and protect the user’s investment in software.

**Growth with IBM support**

Once installed, System/38 is designed to grow with your business. New capacity and components—such as added work stations or additional storage—can be attached quickly and easily, without recompiling existing programming to accommodate the new configuration. And most maintenance can be performed while the system continues to operate.

Moreover, wherever you’re located—in midtown Manhattan or mid-Nevada—you know that IBM support is responsive. The IBM commitment to customer service goes far beyond simply supplying hardware. IBM stays with you.

**Behind System/38: a technological breakthrough**

At the heart of the major price/performance improvements of IBM System/38 are two pace-setting technological advances.

The system’s memory uses a new silicon chip technology with up to 64,000 “bits” or elements of information per chip. A speck of silicon less than one-tenth of a square inch in size, the 64K chip is the most densely packed chip yet employed as a standard computer component.

And in the processing section itself, System/38 uses a logic chip with up to 704 circuits—more than 25 times the capacity of the processor logic chips employed in IBM System/3.

But that’s only part of the story. A totally new architecture, incorporating advanced features new in themselves, was developed for System/38. Through it, it became possible to shift some of the customary software of the computer operating system to internal handling by System/38 itself. In turn, the operating system took on functions that ordinarily call for programmers to write special instructions.

System/38 thereby relieves programmers of much tiresome and repetitive work. And the convenience of compiling, testing and “debugging” programs at work stations—interactively and in real time—can mean greater programmer productivity and faster computing results.

**A small computer can make a big difference.**
Controller Links to Dual-Head Disks

Ave., Sunnyvale, Calif. 94086. and can be ordered from AED at 440 Potrero controller costs $2,000 in OEM quantities

Department, Kansas State University, Manhattan advances.

do not provide processing with small systems and minicomputer and microcomputer software

Topics to be covered at the symposium will submit their completed texts by April 1, 1979, according to conference officials.

LSI-11 processors, according to an AED spokesman. In its 7-in. high cabinet, a standard 6200LD provides a programmable

format, MFM recording, eight interfaces, and a maximum of 512K bytes.

With all eight memory slots occupied by the 64K-byte DR-717 modules, the interface system stores a total of 16,384

The interface system costs $4,800, compared with $3,040 for the 64K-byte DR-717 and $1,985 for the 32K-byte version. Da-

taram Corp. Among its other features, the 64K-byte, single-board Interdata memory bank interface system from Dat-

Interdata's 7/32 minicomputer can report-

memory bank interface system for

shape to the IBM Series/1 in 370-based distributed processing networks.

PAPERS SOUGHT FOR MINI SYMPOSIUM

DALLAS - The Association for Computing Machinery has issued a call for papers to be presented at its Second Annual Symposium on Small Systems, which will take place Oct. 1-3, 1979, at the Hilton Inn here. Authors who wish to present papers at the symposium, nicknamed Sigsmall '79, should submit their completed texts by April 1, 1979, according to conference officials. Topics to be covered at the symposium will include business and industrial applications for minicomputers, small system applications in entertainment and education, distributed processing with small systems and microcomputer and microcomputer software advances.

Prospective speakers should send abstracts to Dr. Fred Maryanski, Computer Science Department, Kansas State University, Manhattan, Kan. 66506.

Controller Links to Dual-Head Disks

SUNNYVALE, Calif. - Users of dual-head, double-density disk units can reportedly connect their equipment to Data General Corp., Digital Equipment Corp., HDS Corp., Interdata, Varian and other vendors' minicomputer systems with a disk controller from Advanced Electronics Design (AED) Inc.

Besides supporting 1.2M bytes per diskette, the e200LD provides a programmable format, MFM recording, eight interfaces, cycle redundancy check, initial program load and drivers for DEC PDP-11 and LSI-11 processors, according to an AED spokesman. In its 7-in. high cabinet, a standard e200LD incorporates two disk drives to which users can add two additional drives. Available with drives or in kit form, the controller costs $2,000 in OEM quantities and can be ordered from AED at 440 Potrero Ave., Sunnyvale, Calif. 94086.

Systems Outdo Series/1, Sell for Half the Price

By Jeffry Beeler

CINCINNATI - Computer Systems Development, Inc. (CSD) has coupled 16-bit microprocessor technology with an integrated software system to produce a Series/1-like small business system family that reportedly delivers an average of 25% more processing power than its IBM equivalent for roughly half the price.

The introduction of the Sentinel series marks the first use of Intel Corp.'s 16-bit 8086 microprocessor chip in a commercial system, a CSD official claimed. He cited the 600-nsec device as one reason for the line's reported price and performance advantages over the Series/1.

CSD, formed earlier this year after

Cincinnati Milacron, Inc. shed its Electronics Systems Division, also credits the Sentinel family's competitive edge to its software system, which was developed for the Champion International, Inc. paper company by Cincinnati-based Tominy, Inc. Named Champion Distributed Processing System (CDPS) by its developer, the software integrates an operating system, a Cobol-like programming language tenta-

tively known as Champsport and utilities plus a "full-function," multitasking data base management system, according to the spokesman.

With CDPS, users can reportedly compile application programs on a Series/1 processor and then run them on a Sentinel series

(Continued on Page 82)

Mini Bits

Interface, 64K Memory Replace Interdata Units

CRANBURY, N.J. - Users of the local memory bank interface system for Interdata's 7/32 minicomputer can reportedly replace that unit with a minor memory bank interface system from Dataram Corp. Among its other features, the interface system operates with Dataram's recent 64K-byte core memory module that replaces its 64K-byte, single-board Interdata counterpart, according to a spokesman. The interface system consists of a 14-in. rack-mountable chassis and an interface board that drives the chassis's memory mod-

ules. Like its Interdata counterpart, the sys-

tem provides 16 slots for memory boards and associated peripheral controllers.

Eight of these slots hold any of Interdata's current core memory modules or Dataram's 64K-byte DR-717 core memory boards. With all eight memory slots occupied by the DR-717 modules, the interface system stores a total of 16,384

2/2
Cassette Recorder Debuts

NEWTON UPPER FALLS, Mass. — Using its read-after-write capability, a cassette recorder from Memodyne Corp. allows users to monitor data as it is written and thus ensure integrity, a spokesman said.

The Model 764-8EU also reportedly accommodates variable block lengths and provides an automatic reversal feature that permits users to record on both of the unit’s recording tracks without reversing.

Compatible with American National Standards Institute and European Computer Manufacturers Association tapes, the recorder re-winds and searches at 100 in./sec, and stores a maximum of 2.2M bits, equivalent to 1,600 data blocks/track, the spokesman said. In OEM quantities, the recorder costs $865 and is available from Memodyne at 385 Elliot St., Newton Upper Falls, Mass. 02164.

Memory System's Capacity Three Times That of MJ11

IRVINE, Calif. — Although it occupies half the space of the Digital Equipment Corp. MJ11 core module, an MOS memory system from Plessey Peripherals Systems, Inc. reportedly provides three times the capacity of that DEC counterpart.

Intended for the DEC PDP-11/70 system, the PM-SJ11 comes in two standard versions: a 256K-byte model expandable to 1.5M bytes and a 128K-byte model expandable to 768K bytes, according to a Plessey source.

Other features include error correction code, which spots and rectifies memory errors before they go to the CPU, and an error logging register (ELR), which records errors that arise during memory access.

With the ELR feature, the PM-SJ11 provides the address and bit locations for single-bit errors and address information for double- and multiple-bit errors, the spokesman continued. The system then displays these errors on its control panel, which uses colored indicator lamps to distinguish between single- and multiple-bit errors.

The memory system’s main modules include one to six memory boards and two controller boards, which provide parity checking, memory timing and error logging circuitry, plus an electrical interface for the PM-SJ11’s CPU, according to a Plessey source.

A fully equipped 256K-byte version of the PM-SJ11 system costs $10,055 from Plessey at 17466 Daimler Ave., Irvine, Calif. 92714.

Exec Advises Regular Checks

(Continued from Page 73)

during memory access. With the ELR feature, the PM-SJ11 provides the address and bit locations for single-bit errors and address information for double- and multiple-bit errors, the spokesman continued. The system then displays these errors on its control panel, which uses colored indicator lamps to distinguish between single- and multiple-bit errors.

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A fully equipped 256K-byte version of the PM-SJ11 system costs $10,055 from Plessey at 17466 Daimler Ave., Irvine, Calif. 92714.

The syndrome that brings insufficiently examined professionals onto the scene is easy to describe, Lawrence said. A candidate approaches a prospective employer highly recommended by a friend or acquaintance of a manager.

References are checked cursorily, and if one or two cannot be located, they are not pursued. As a result the employer gains authorized access to critical information without undergoing adequate screening, he explained.

To rectify this potential problem, users need not institute special "star chamber" procedures, but instead, establish a firm management policy for all job candidates at management, professional and security levels, he recommended. This program should be spelled out in printed form proclaimed to every job applicant.

It should state that all references will be thoroughly checked and any discrepancy, however seemingly trivial, will need to be satisfactorily explained. All candidates in these categories should be subject to professionally structured lie detector tests, and failure to comply with this requisite should effectively bar the candidate from further consideration, Lawrence asserted.

These precautions become onerous only when they are selectively applied and thus appear directed at particular individuals. When they are universally applied, no one can justifiably charge discrimination, and security is certainly enhanced, he said.

Although Lawrence conceded his suggestions might sound drastic, he justified them as necessary for national security and corporate survival.
First of all, there's the **price**. Our OMEGA 480-1 has greater **throughput** than a 370/138—yet it costs about the same. And our 480-11 exceeds 370/148 performance but costs substantially less!
And an OMEGA 480 system requires about one quarter the **power** and one half the floor **space** of the comparable 370.
Of course we designed it to be **field-upgradable**. That means you can start with the smaller OMEGA 480-1 now, and upgrade to the larger processor when your needs require the higher performance.
And there's software. OMEGA 480 supports, without modification, most IBM operating systems, program products and user programs.
Financing can be important, too. Several attractive options are available through our **Installment Sales Plan** or from a selection of 3- to 7-year **leases**.
But most importantly is the service, **experience** and **support** you want. You get it from Control Data. Our support organizations have more than 8,000 dedicated hardware and software specialists—including many with years of IBM system experience.
That experience comes from servicing more than 1,400 current IBM users, and maintaining such Control Data plug-compatible peripherals as Disk, Tape, Memory, Printer and Mass Storage Systems.
Why not decide for yourself whether the OMEGA 480 is the better business decision for you. Call 612/853-7600. Or contact your local Control Data representative. Tell him Don Roepke sent you.
Eight Canadian Cities Linked
Dispersed Net Cuts System Costs $16,000/Mo

REGINA, Sask. — The cost of maintaining a telephone service order system at Saskatchewan Telecommunications, Inc. has shrunk by more than $16,000/mo since the firm implemented a distributed system that links corporate headquarters to key departments in eight of this Canadian province’s cities.

Designed to provide overnight processing of changing customer data, the telephone service order network incorporates a central 192K-byte Digital Equipment Corp. PDP-11/70 minicomputer linked in a star configuration to eight 124K- or 96K-byte PDP-11/34s, one here and one in each of seven district offices.

In addition to linking the remote computing sites with Sask Tel’s marketing and customer billing divisions here, the Information Gathering, Retrieval, Editing and Distribution (Ingred) system transmits data between 92 terminals in the district offices’ commercial, plant assignment, plant dispatch, warehouse, traffic and directory services departments.

Before it installed the Ingred system early this year, the company wrote service orders for this city and Saskatoon by hand, punched the order data onto paper tape and then verified and transmitted the orders to headquarters through a 300 bit/sec teletypewriter network, Sask Tel’s systems and programming supervisor Bob Hockings recalled.

The company forwarded service orders from smaller districts by mail. At the main office, clerks punched paper tapes, which they then converted to magnetic tape for batch processing on an IBM 360/50.

Turnaround Too Long

Under this earlier system, however, the phone company had to endure unacceptable turnaround times and experienced significant encoding or transmission errors, Hockings explained. Printing orders and mailing them to the appropriate departments typically took three to four days.

Even longer delays occurred during the winter months when storms hindered mail delivery.

Realizing that their previous system no longer suited a firm where service orders totaled 240,000 a year and volume grew 10% annually, Sask Tel officials decided to search for an alternative.

In traditional service order systems, phone companies either link remote terminals to a central mainframe or rely on service bureaus. After considering both alternatives, Hockings concluded that “implementing such systems was beyond the rational economic resources of the company. It was apparent that all companies with these systems had a larger subscriber base than Sask Tel, in a much more densely populated geographical area.”

As a result, the company opted instead for a distributed minicomputer network with remote processors and terminals linked to a headquarters minicomputer. Such an alternative would cut operating costs and provide remote computing capabilities, Sask Tel officials reasoned.

Moreover, if any part of the distributed network malfunctioned, the rest would remain unaffected.

After investigating several prospective minicomputer-based networks, the phone company finally chose a Digital Network (Decnet) system from DEC. That hardware was chosen over rival systems primarily because DEC’s “broad minicomputer line offered a selection of equipment to suit both large and small districts,” Hockings explained.

Moreover, “the Decnet software provides the communications capability to support our internally developed applications programs.”

At corporate headquarters, the central PDP-11/70 supports two 8M-byte DEC RP04 disk units, two DEC LA180 printers, two 800 bit/sec TE16 tape units, one LA36 Decwriter II and one Vucom 3 CRT terminal.

At the Saskatoon office, a 124K-byte PDP-11/34 supports three 5M-byte RL1 disk units and 13 CRT terminals plus 12 printers and printing terminals.

Each of the remaining PDP-11/34s at the smaller Yorktown, Prince Albert, Swift Current, North Battleford, Moose Jaw and Weyburn district offices incorporates a 96K-byte main memory and supports two 2.5M-byte RK05 disk units, three LA36 printer terminals and four Vucom 3 CRTs.

Each remote system uses a Decnet protocol to communicate at 4,800 bit/sec with the central minicomputer.
BOSTON — Besides improving its financial and merchandise control, a large local department store has eliminated misfiled and lost purchase orders, receipts and sales checks by switching from manual recordkeeping to an on-line minicomputer system. Allied Stores Corp. earns $1.9 billion per year by supplying merchandise to 175 department stores in 27 states. Each of those stores offers products ranging from apparel and cosmetics to furniture and major appliances. This area requires broad support in purchase order management, customer service, inventory control and timely management information.

Big Ticket System

The equipment that provides this support is known as the big ticket system. The real challenge with any big ticket system lies in satisfying the often conflicting requirements of salespeople, customers and warehouse and delivery personnel. To provide Jordan Marsh with such comprehensive support, Allied looked to computerization to replace its manual DP system. Before June 1977, Jordan Marsh maintained a customer history file by retaining all its sales checks, according toSteve Nezer, Allied’s project manager for DP systems. "When a customer telephoned with an inquiry, someone would have to search through the files for a copy of the sales check," Nezer recalled. "It was a long process that did not allow us to respond immediately to a query. With 60 to 70 daily calls that ranged from reserving a piece of merchandise to complaining about a product defect, the manual system proved untenable. "With so many transactions, misfiling was not uncommon and records could be lost forever," Nezer said. In addition, the volume of paperwork and filing continually increased. Nezer explained, because of Jordan’s policy of maintaining active and inactive sales checks for up to six months after a sale, he noted. Beyond that time, the sales check was the only record.

Wanted It All

"We wanted a cost-effective system that could satisfy all our complex needs, yet be simple to program and operate," Bill Stapleton, Allied’s DP director, explained. By closely watching developments in the minicomputer market, Allied became aware of Wang Laboratories, Inc.’s intention to introduce its VS system last year. The VS system seemed to satisfy all of Allied’s "wish list" requirements, and a prototype was installed at Jordan’s North Quincy warehouse in June 1977.

"It became operational within a week," Stapleton said. In addition to a 2200 VS processor, the system includes two 600 line/min Model 2263 matrix printers, one 120 char./sec Model 2231 printer and 21 interactive workstation terminals. Approximately 50 purchase orders per day are generated by Jordan’s big ticket buyers. An original goes to the vendor, and a copy goes to the Central Control Unit (CCU) in the distribution center.

Purchase order information at the CCU is then keyed into the system at one of the VS workstations and stored for future use. As new merchandise is received at the warehouse dock, the receiver sends a packing slip by pneumatic tube to the CCU. The VS prints a copy of the purchase order form for checking to ensure that all quantities and styles in the original purchase order match the merchandise received," Nezer explained. The information is then automatically updated in the system’s data base.

After merchandise has been checked in, data about problems and damages is input into the system for a permanent record. The Model 2263 then prints four-section tear-apart merchandise tags listing ID number, description and warehouse or store destination for future use. As new merchandise is received at the warehouse dock, the receiver sends a packing slip by pneumatic tube to the CCU. The VS prints a copy of the purchase order form for checking to ensure that all quantities and styles in the original purchase order match the merchandise received," Nezer explained. The information is then automatically updated in the system’s data base.

After merchandise has been checked in, data about problems and damages is input into the system for a permanent record. The Model 2263 then prints four-section tear-apart merchandise tags listing ID number, description and warehouse or store destination for each item. All merchandise status information, which indicates whether an item is on hand or on order, is immediately accessible to any of Jordan’s home furnishings salespeople at any of its stores.

To provide Jordan Marsh with such comprehensive support, Allied looked to computerization to replace its manual DP system. Before June 1977, Jordan Marsh maintained a customer history file by retaining all its sales checks, according to Steve Nezer, Allied’s project manager for DP systems. "When a customer telephoned with an inquiry, someone would have to search through the files for a copy of the sales check," Nezer recalled. "It was a long process that did not allow us to respond immediately to a query. With 60 to 70 daily calls that ranged from reserving a piece of merchandise to complaining about a product defect, the manual system proved untenable. "With so many transactions, misfiling was not uncommon and records could be lost forever," Nezer said. In addition, the volume of paperwork and filing continually increased. Nezer explained, because of Jordan’s policy of maintaining active and inactive sales checks for up to six months after a sale, he noted. Beyond that time, the sales check was the only record.
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The DECSYSTEM-20 family's incredible software compatibility also makes distributed processing easy. With DECnet communications software, you can set up a network of machines offering a variety of capabilities, all using the same operating system, applications software, and vendor, with central software maintenance. And through 2780 and 3780 interfaces available within the family, you can even communicate with other makes of computer.

In addition, DECSYSTEM-20 family software is fully proven, with over 15 years of development behind it. The TOPS-20 virtual memory operating system supports a full complement of industry-standard high level languages, including the lowest cost full-mainframe APL on the market. And with their comprehensive system utilities and specially designed interactive architecture, all DECSYSTEM-20's are surprisingly easy to use for both skilled and unskilled operators.

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Micros Tighten Car Dealer's Business Control

AUGUSTA, Ga. — Rather than hav- ing to endure processing delays as long as one day, a user here can obtain key information about its business activities almost immediately and correct errors just as quickly, thanks to two in-house microcomputer systems the company installed recently.

Spokesmen for Bob Richards Chevrolet, one of this state's largest automobile dealerships, praised the dual micro systems with tightening management's control over its business operations. Unlike most mainframes and some minis, which are physically separated from their users, Richards' systems literally operate alongside the clerks, mechanics and accountants who rely on them.

Built around two 64K-byte Pertec Computer Corp. Mits microcomputers, the systems perform general accounting functions, maintain sales records and control and the spare parts inventory for the auto dealership's service department.

Looking for Control

Before Richards acquired the current systems, its only involvement with computers was through accounting service bureaus that managed the company's billing.

"But with sales exceeding 2,000 cars and trucks a year and a parts inventory in excess of 10,000 part types, some sort of system to bring things under tighter control was needed," dealership owner Bob Richards recalled. "The problem was that almost every system we looked at — mostly minicomputer-based or time-shared mainframes — seemed to remove more and more control from the dealership."

For a year and a half, Richards searched for his firm's first in-house DP system, only to discover to his frustration that the more expensive the hardware, the less control he felt he would have over it, particularly its costs.

To increase Richards' frustration, most of the minicomputer systems he considered threatened to swell his costs rather than reduce them. For the jobs he wanted done, a minicomputer would have cost at least $20,000 and the software another $20,000 to $30,000 with additional hardware and software maintenance costs of about $400 to $500 a month. "Once we committed ourselves to a system like that, we would have been wedded for life," Richards observed.

Two Different Micros

But with the help of the Computer Systemcenter of Atlanta and consultant Dale Wingo of Aiken, S.C. - based Sandlapper Systems, Inc., he finally searched for his firm's first in-house microcomputer systems, one of which is dedicated to bookkeeping and accounting and the other to parts inventory control.

"I expected to spend $40,000 for a single system," Richards explained. "Instead, I got two systems for a little more than half that cost."

The dealer spent $80,000, with additional hardware and software for the two systems costing $30,000 to $40,000. "In addition to the two processors, the system incorporates three Hazeline Cor. 1500 CRT terminals, two 10M-byte hard disk units and a 120 char./sec Decwriter III printer that is shared between the two applications. The system also uses a Basic language system called Disk Extended Basic."

Richards and his consultant opted to do all the programming themselves rather than buy ready-made programs. "Compared with some of the standard software packages offered by some minicomputer firms, the Mits software was incredibly inexpensive," Richards recalled. "We felt the applications were unique enough that it would be to our advantage to write programs tailored to our specific needs."

Accounting Subsystem

Accounting, in addition to the standard functions such as general ledger, accounts payable, accounts receivable and payroll, performs jobs unique to the auto-sales business. Some of these jobs include maintaining vehicle inventories, producing repair orders and keeping daily, weekly, monthly and yearly sales records broken down by salesman and auto number.

The system is programmed "to keep track of each customer after he has bought a car, and it notifies the dealer- ship on the birthday of the customer, the anniversary of the sale and when servicing is necessary," the consultant explained. "It even prints out the cards that can be sent to the customer."

In operation, the subsystem's disk storage unit is initially loaded with the data about member accounts. At the end of each day, all transaction data is entered to update the disk file.

To provide the dealership's management with a day-to-day reading of business activities, the system automatica- tively prints a daily operation con- trol report. The accounting subsystem hardware consists of a CPU, memory, disk unit and shared printer, whereas the parts inventory subsystem incor- porates two CRT terminals in addition to the other units.

"One CRT is located on the customer counter for the clerk and one in the re- pair area for the mechanics," Wingo said. "Each time a mechanic uses a part in an auto being serviced or a clerk sells a part, each is required to fill out a simple form that appears on the CRT terminal. The system then updates the inventory list, checks inventory and lets management know when it is time to order new parts.
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Memory Subsystem Bosses

READING, Mass. — Two processors can independently access up to 1M byte of common virtual memory with a multiprocessing memory subsystem from Datacube SMK Inc., the vendor said.

Compatible with its National Semiconductor Corp. counterpart, the random-access RM-117 subsystem provides a 20-bit-wide internal memory address that is generated either through virtual memory or through its dual Intel Corp. Multibus interfaces.

The dual-port memory subsystem reportedly contains on-board control logic, and it provides control and memory mapping functions through I/O output commands to eight contiguous addresses. With access contention transparent to the user, the subsystem cycles in 350 nsec for one port and in 750 nsec if users simultaneously access both ports.

The RM-117 costs $1,200 each and $995 in quantities of 10. Datacube is at 670 Main St., Reading, Mass. 01867.

Series of ac Power Conditioners

Protect Gear From Line Surges

PLAINVIEW, N.J. — Users can reportedly protect their minicomputers, microcomputers, point-of-sale terminals, word processing equipment and other sensitive electronic units from more than 99% of a power line's surges, spikes and line noise with a series of ac power conditioners from Pilgrim Electric Co.

The three Voltec Series 5 conditioners include the Model 872, at $120 and 120 Vac; the Model 873, rated at 2A and 240 Vac; and the Model 874, rated at 3A and 360 Vac, according to a Pilgrim Electric source.

By limiting 2,500V spikes to safe levels, the three units allow users to run their computer hardware with primary power lines and to eliminate the trouble and expense of installing dedicated lines.

All three models accommodate 60 joules of transient energy and are said to be provided with a CRT terminal model protection against pulsed, continuous and intermittent power line noise.

With an insertion loss of 70 dB above 15 Hz, the internally fused conditioners are packaged for office use and come with an on/off switch and pilot light.

The models 872, 873 and 874 cost $142, $147 and $156, respectively, and are available with a five-year warranty from Pilgrim Electric at 29 Cain Drive, Plainview, N.J. 11803.

Systems Outperform Series/1

(Continued from Page 73)

system or vice versa. The integrated software system, which IBM is expected to introduce this month as a Series/1 in installed user program, also allows users to mix and compile programs on any 370 series model and then download them to a user's own mainframe.

Thus, the software permits the CSD family to replace Series/1 systems as remote processors in 370-based distributed computing or distributed data base management networks, the official explained.

But despite its networking capabilities, the Sentinel systems line will primarily serve as a stand-alone DP product, he stated.

The Sentinel family systems come in four versions: the Models 10, 20, 30 and 40, which differ primarily in the peripherals and peripheral controllers they incorporate.

All four models incorporate the same CPU and, because of their microcomputer technology, accommodate up to 1M byte of main memory. In addition to a 14.5M-byte Winchester disk unit, the Sentinel's CPU incorporates an IBM 8085-based controller that permits the CSD small business systems line to interface up to eight of Shugart Associates' latest disk units, including four of the company's 800K-chr. floppy disk systems and an equal number of its 1.4M- or 2M-byte Winchester hard disk units.

A standard Sentinel desk enclosure provides enough space to accommodate up to four 800K-chr. floppy disk units and up to two 29M-byte Winchester disk units for a total capacity of more than 60M bytes. With additional capacity, the business systems family can support more than 120M bytes of mass storage per controller. Moreover, the CSD systems can accommodate several of these controllers simultaneously, the spokesmen said.

In a basic configuration, each of the four Sentinel models incorporates a CRT terminal controller that accommodates up to four CRT displays. With multiple interface boards, the systems typically include 16 terminals, he added.

A standard Model 10 system serves primarily as an intelligent data entry station and incorporates a minimum of 32K bytes of main memory with a 1,920-chr. CRT terminal and two dual-density 800K-byte floppy disk units or optional 1.0M-byte floppy systems. The standard Model 20, by contrast, merely suits standard-alone DP and provides at least 64K bytes of addressable memory plus a choice of 150- to 180 char/sec printers. Otherwise, the Model 20 includes the same hardware and software modules as the bottom-of-the-line system.

Like the Model 20, the Model 30 requires at least a 64K-byte central memory. But unlike its floppy disk-based sister system, the Model 30 incorporates a 14.5M-byte Winchester hard disk unit as standard equipment as well as a 300 line/min printer. A standard Model 40 incorporates 29M-byte Winchester disk systems plus a 300 line/min printer and a 64K-byte minimum memory. Users can upgrade their systems within the Sentinel line by merely plugging the appropriate memory and controller boards into their CPU chassis, the official explained.

The four CSD models will typically perform standard financial accounting functions for businesses whose annual revenues total $100 million or less, he noted.

Among its communications features, the Sentinel family offers two controllers that permit asynchronous and isochronous transfers at speeds up to 9,600 bit/sec. The isochronous control board incorporates a microprocessor that reportedly accommodates IBM 2770, 2780 and Hasp remote job entry workstation communications. Application programs now available with the CSD small systems line include four horizontal software packages for accounts receivable, accounts payable, general ledger and payroll. In addition, the vendor is said to be currently developing two packages for the construction industry and certified public accountants.

The CSD 10, 20, 30 and 40 configurations cost $9,950, $19,900, $24,900 and $34,900, respectively; with leasing arrangements available. First shipments of all four Sentinel models begin in January as a Series/1 in 3914 Crossgate Drive, Cincinnati, Ohio 45236.

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- IBM Model 30 incorporates 29M-byte Winchester disk systems plus a 300 line/min printer and a 64K-byte minimum memory.
- Users can upgrade their systems within the Sentinel line by merely plugging the appropriate memory and controller boards into their CPU chassis, the official explained.
- The four CSD models will typically perform standard financial accounting functions for businesses whose annual revenues total $100 million or less, he noted.
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Cuts Station’s Overhead

Micro System Handles Radio Scheduling

By Ann Dooley

ANAHEIM, Calif. — Listeners of radio station KEZY here have a new reason to thank the smooth scheduling of that station’s music, commercials and disk jockey chatter. The station, AM/ FM rock station on the air 24 hours a day, KEZY has used a mini-based automated system for the last seven years to cut down on overhead. It also eases the deejays’ workload, leaving them free for promotion and production tasks, according to Mark Moseri, operations manager.

The station moved to a microprocessor-based system two months ago to get more flexibility in switching as well as more reliability, he explained. The new Basic A system is made up of three Intel Corp. 8085 microprocessors and was put together by IGM, a division of Northwestern Technology, Inc.

KEZY uses the system to handle all its switching, music selection and switching decision-making. The system can schedule the sound recordings played over the air for up to 4,000 audio events including songs, commercials and announcements. It also controls up to 16 audio devices such as time and temperature announcers, open-reel tape decks and cartridge tape players.

Little ‘Live’ Programming

The KEZY audience of 24,000 to 35,000 can listen to musical selections from cartridge tapes, station IDs, time announcements and disk jockeys without actually hearing a live voice for most of the programming period. The system can run for hours without human intervention, Moseri said, adding that the station does go live two or three times each 24-hour day.

The Basic A is programmed sequentially and keys the disk jockey, commercials and music over the air according to a schedule, he said.

The system can display the events coming up next to broadcast on a color or black and white CRT. From a keyboard, the operator can add or change scheduled events or display any event or group of events that is needed. The scheduling is updated daily on a weekly basis but programming changes occur almost daily.

The Basic A uses broadcaster’s English instead of numbers, which makes things easier, according to Moseri. In order to notify the operator of an available time slot, for example, the system displays “Available” on the CRT. The CRT can be color-coded for further ease of use, he said.

The Basic A’s three 8085s communicate with each other via RS-232 interface. One micro acts as a system controller and the broadcast schedule is stored in this processor’s random-access memory (RAM). The processor keeps track of clock time, sends commands to the other two processors and communicates with the operator.

The second microprocessor, called a monitor controller, lets the operator preview recordings before they are selected or listen to what is currently being played. The third 8085 acts as a device controller for the audio playback equipment. KEZY originally chose an IGM system because the company was one of the first in the field and was known for its reliability, Moseri said. The Basic A is especially reliable because the system functions are shared among the three processors, an important feature in a real-time controller, he noted. The monitor controller was also designed to act as a back-up system controller if the regular one fails.

Although mishaps still occur from time to time on the air, most of the problems result from disk jockey error or programming error, he said.

The microprocessors run Assembler language programs under RMS-80. Intel’s real-time software support system. Since the RMS-80 is a modular, IEL supplied only the functions that were needed, so the system is customized, Moseri said. For the Basic A, the RMS-80 modules were used for task switching, real-time clock, serial I/O control and system resource allocation.

Eight tasks run under the RMS-80 on the main processor and other tasks run independently on the monitor controller and audio controller.

At this point, the station could not operate under anything but an automated system of this kind, he said. In addition to the cost savings, it makes things easier for the disk jockeys.

A Microchip

AJA Software Offering Library

Of Applications for TRS-80s

ORANGE, Calif. — AJA Software, developers of “ready-to-run” software programs for microcomputer applications, is now offering a library of applications programs written specifically for the Radio Shack TRS-80 microcomputer.

Each program comes on diskette, is ready to run and has complete documentation, the firm said. Minimum system configuration includes TRS-80 Basic, one or more floppy disk drives and 8K of memory with an optional printer.

Selectric Conversion System Gains Interface

PLEASANT HILL, Calif. — Escon Products, Inc. has introduced a new interface unit for its IBM Selectric typewriter conversion system that can interface to any microcomputer with an S-100 bus. Unused motherboard capacity, the company said.

“A microprocessor is included on the circuit board for data flow control, formatting and character set selection. Installation on the Selectric is simple and does not affect normal typewriter operation, the firm said. The S-100 bus interface costs $490 complete. The parallel port is $325, the RS-232 $549 and the IEEE interface $560 from Escon Products, Inc., Suite 204, 171 Mayhew Way, Pleasant Hill, Calif. 94596.

Artec Adds 10-Slot Version of Motherboard

SAN CARLOS, Calif. — Artec Electronics, Inc. has introduced a 10-slot version of its 16-slot, single, totally shielded motherboard. Intended for use in compact systems with large memories, the 10-slot board allows the processor and peripherals to be condensed into a smaller package, without large amounts of spurious noise in the bus lines, the firm said.

The board features a special Artec technique that terminates microchips and disk jockey chatter. An AM/FM rock station on the air 24 hours a day, KEZY has used a mini-based automated system for the last seven years to cut down on overhead. It also eases the deejays’ workload, leaving them free for promotion and production tasks, according to Mark Moseri, operations manager.

The station moved to a microprocessor-based system two months ago to get more flexibility in switching as well as more reliability, he explained. The new Basic A system is made up of three Intel Corp. 8085 microprocessors and was put together by IGM, a division of Northwestern Technology, Inc.

KEZY uses the system to handle all its switching, music selection and switching decision-making. The system can schedule the sound recordings played over the air for up to 4,000 audio events including songs, commercials and announcements. It also controls up to 16 audio devices such as time and temperature announcers, open-reel tape decks and cartridge tape players.

Little ‘Live’ Programming

The KEZY audience of 24,000 to 35,000 can listen to musical selections from cartridge tapes, station IDs, time announcements and disk jockeys without actually hearing a live voice for most of the programming period. The system can run for hours without human intervention, Moseri said, adding that the station does go live two or three times each 24-hour day.

The Basic A is programmed sequentially and keys the disk jockey, commercials and music over the air according to a schedule, he said.

The system can display the events coming up next to broadcast on a color or black-and-white CRT. From a keyboard, the operator can add or change scheduled events or display any event or group of events that is needed. The scheduling is updated daily on a weekly basis but programming changes occur almost daily.

The Basic A uses broadcaster’s English instead of numbers, which makes things easier, according to Moseri. In order to notify the operator of an available time slot, for example, the system displays “Available” on the CRT. The CRT can be color-coded for further ease of use, he said.

The Basic A’s three 8085s communicate with each other via RS-232 interface. One micro acts as a system controller and the broadcast schedule is stored in this processor’s random-access memory (RAM). The processor keeps track of clock time, sends commands to the other two processors and communicates with the operator.

The second microprocessor, called a monitor controller, lets the operator preview recordings before they are selected or listen to what is currently being played. The third 8085 acts as a device controller for the audio playback equipment. KEZY originally chose an IGM system because the company was one of the first in the field and was known for its reliability, Moseri said. The Basic A is especially reliable because the system functions are shared among the three processors, an important feature in a real-time controller, he noted. The monitor controller was also designed to act as a back-up system controller if the regular one fails.

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NEC Unit Uses 8080A

SANTA CLARA, Calif. — Intel Corp. has introduced the latest Multibus-compatible member of its single-board computer line, the ISBC 86/12.

Based on the 16-bit 8086 microprocessor, the board supports a 1M-byte address space. It enables, for the first time, both 8- and 16-bit single-board computers to be interfaced over the same bus in multiprocessing configurations as well as with other peripherals, the firm claimed.

In this way, a designer can create a low-cost design using an 8-bit single-board computer and enhance it over time, a spokesman noted.

The ISBC 86/12 is supported by the Intellec Series II development system and software that supports high-level language development, he added.

Interfacing Software

In addition to the 86/12, Intel has introduced the ISBC 957 interface and execution package that reportedly permits software modules developed on an Intel development system to be downloadable into the 86/12 for full-speed execution and debug.

This enables the designer to begin system development immediately with the 86/12 using the same software as for the ISBC 80 products, the firm said.

To facilitate program development, the interface and execution package provides all the hardware, software cables and documentation required to interface the Intellec system to the 86/12 board.

The ISBC 86/12 includes the 16-bit NMOS 8086 microprocessor and 1K bytes of dual-port dynamic read/write memory with on-board refresh and sockets for up to 16K of read-only memory (ROM); interfaces for both serial and parallel I/O; and a full RS-232C interface. It provides nine levels of vectored priority interrupts expandable to 65 levels over the Multibus system.

The ISBC 86/12 costs $2,140 and the ISBC 957 package costs $2,145 from Intel Corp., 3065 Bowers Ave., Santa Clara, Calif. 95051.

'Taxpro' Works

On IRS Forms

ROWLAND HEIGHTS, Calif. — Dicomp Business Programming is offering software for the professional tax preparer who has an 8080 microcomputer, North Star Computers, Inc. disk drive and printer.

The Taxpro package processes Internal Revenue Service (IRS) 1040 forms and 13 related schedules with the "least tax" approach, according to the firm. It prints in format on 1040 forms and prints other forms on plain paper.

A similar package for the home user is Taxpac, which processes IRS 1040 and up to five related schedules and forms. The display is on a CRT screen with dollar amounts listed in order by form number.

Taxpro costs $1,115 and Taxpac costs $399.95 from Dicomp Business Programming, P.O. Box 8372, Rowland Heights, Calif. 91748.

A Beautiful Way To Interface

SOROC's first and foremost concern in designing outstanding remote video displays, has resulted in the development of the IQ 140. This unit reflects exquisite appearance and performance capabilities unequaled by others on the market.

With the IQ 140: the operator is given fast command over data being processed by means of a wide variety of edit, video, and mode control keys, etc.

The detachable keyboard, with its compartment of 117 keys, is logically arranged into 6 sections plus main keyboard to aid in the overall convenience of operation. For example: a group of 8 keys for cursor control / 14 keys accommodate numeric entry; 16 special function keys allow access to 82 pre-programmed commands / 8 keys make up the extended edit and edit section; 8 keys for video set up and mode control / and 8 keys control message and print.

Two Polling options available: 1) Polling compatible with Lear Siegler's ADIM-2. 2) Polling discipline compatible with Burroughs.
With Stock Market Jumpy
Some Firms Postpone Stock Offerings

By Marcia Blumenthal
CW Staff

A jittery stock market and the uncertain economic outlook for the next year have resulted in some postponements of public equity offerings by companies whose offerings would have been effective by the end of the year.

While some firms have squelched their plans for public issues, others are forging ahead with the sale of their stock and still others are undecided, waiting for a bright sign in the market by year's end.

Struggle With Debt Level Spurs
Calcomp to Adopt Sales Accent

By Marcia Blumenthal
ANAHEIM, Calif. — An "overwhelming need" to ease an unmangeable debt level has caused management at California Computer Products, Inc. to shift the company's emphasis from manufacturing to sales and distribution.

To reduce its debt and minimize spending on manufacturing and research and development, Calcomp recently sold off its Memory Products Division to Xerox Corp. and established a separate minicomputer peripherals marketing department.

In addition, a revenue-sharing arrangement recently negotiated with Insac Data Systems Ltd. of London is under way. The two companies will share investment costs as well as the revenue gained from developing 15 application packages for Calcomp's IGS-500 interactive graphics system.

"Stalled" was the word Canova used to describe the financial picture at Calcomp for the past four or five years. "We were profitable in 1976 and 1977, but for the three years previous to 1977 we incurred losses," Canova said.

He attributed those losses to R&D expenses and high debt costs. The journey into debt began in the early 1970s, when Calcomp began to diversify its profitable plotter and interactive graphics line, branching out into manufacturing IBM plug.

Display Data Corp. decided two weeks ago to postpone its public offering, which would have been its debut in the stock market. "We could go public tomorrow and sell out, but the issue is what price you get for that stock," Robert F. Barron, vice-president of finance, remarked.

The company's underwriters and management will determine when the time is right for the sale of the stock, Barron said.

According to the company's prospectus, the offering of one million shares had a tentative price of $14 per share. The five-year-old firm, which specializes in turnkey systems, had sales of $12.3 million for fiscal 1978 ended August 31. Earnings were $1.6 million.

Ramtek Going Ahead

In contrast, Ramtek Corp., which does not yet have a public market for its stock, is planning to go ahead with its first offering. In recent weeks, however, the company's management has been holding meetings with its underwriters to assess the exact timing for the issue.

The situation boils down to how much of a penalty Ramtek is going to have to swallow in a skittish market. "If we are going to be penalized 15% because the market is down, then that's probably tolerable. If we are going to get a bigger penalty in pricing our stock, then we will withhold," Ramtek's president and chairman of the board, Charles E. McEwan, noted.

Ramtek's prospectus anticipated the price of the stock would be between $10 and $12, but "we won't establish a final price until the night of the offering," McEwan said.

As far as McEwan was concerned when interviewed, his company is going ahead with the sale of the issue. "Our financial figures are based on a year-end audit in June; if we go beyond a six-month period for a full audit, our underwriters will probably require a

For Third Quarter

DP Trade Balance Favorable

WASHINGTON, D.C. — Imports of computer and business equipment totaled $568 million in the third quarter of 1978, a 43% increase over the third quarter of 1977, according to statistics compiled by the Computer and Business Equipment Manufacturers Association (Cbema). Exports were $1.3 billion, up 29.1% over the year-ago quarter.

Those figures provide a favorable balance of trade for the industry of $749 million, a 20.2% increase over the 1977 quarter. The first nine months of 1978 showed a positive balance of trade of $1.99 billion for the industry, an increase of 16% over the $1.71 billion reported for the first nine months of 1977.

Exports rose 26% during the three-quarter period, from $2.78 billion in 1977 to $3.62 billion in 1978. Imports, however, experienced an increase of 40% from the $1.16 billion reported in 1977 to $1.68 billion in this year's nine months.

Computers and related equipment account for more than 80% of the industry's current year-to-date export total, according to Cbema. Exports of that equipment for the first nine months had $1.9 billion value compared with $1.7 billion a year ago.

The level of exports for parts for computers and peripherals in the 1977 period was $68 million and rose to $1.1 billion in the first three quarters of this year. Imports rose 41% from $184.2 million during the first nine months of 1977 to $261 million for the same period in 1978.

New terminal gives you five extra features at no extra cost.


With these five big extras as standard, the new DASI 744 is not only the most well-equipped terminal of its kind, it's also the most economical, selling for the remarkably low price of $1595.

Based on the rugged Texas Instruments' model 743, and modified by Data Access Systems, the country's largest independent supplier of data terminals, the 744 combines these standard extra features with quiet, solid state printing at operator selectable speeds of 10 and 30 cps.

Like all DASI terminals, the 744 is backed by a full 90-day on-site warranty with nationwide service provided by our own experts. Maintenance contracts are available after 90 days. The new DASI 744 is just one example of how Data Access Systems is pioneering new and better ways to make your terminal operations more efficient and economical.

Call your local district office, or toll free: (800) 631-9604 or 9605.

$1595.
Fourfold Leap Predicted in CRT Graphics Market

WELLESLEY, Mass. — Growing use of raster scan technology and emerging applications areas will set the pace for a four-fold leap to more than $1 billion in the CRT graphics market by 1983.

The $275 million interactive graphics market will skyrocket in the next five years as it gains a strong foothold in business applications, according to a Venture Development Corp. (VDC) market study.

Management information will be the single largest application for graphics in the early 1980s, when the business graphics market will hit $243 million — equivalent to the shipping of 111,000 terminals, the study predicted.

By that time, computer graphics will be available not only in virtually every engineering laboratory, but will also be used routinely for generating management reports, VDC said.

Raster Scan Market

Spurring the growth in CRT graphics is raster scan — or digital television — display technology, which will experience a surge of its own during the five-year period, according to VDC.

The raster scan display market will grow 60% per year, the study forecast, outpacing both random scanners (vector or strobe) and storage tubes as the most popular graphics display technology.

Currently holding 31% of the graphics market, raster scanners will capture the lion’s share — 74% — by 1983. Random scan technology will climb 18% yearly, but its share of the market will decline from 30% to 16% by 1983, the study said.

Storage tube technology, originally developed by Tektronix, Inc., for storage oscilloscopes, will bite the dust as the leading graphics display technology, increasing a meager 1% annually in dollars into the 1980s, VDC indicated.

While its market share will drop from 39% to 10%, direct view storage tubes will continue to be the most widely used technology in computer-aided design/computer-aided manufacturing (CAD/CAM) turnkey systems because of superior resolution.

Tektronix, however, is not counting on the storage tube alone to secure its hold as leading graphics terminal supplier. VDC noted. The vendor recently came out with both monochromatic and color raster scan-type graphics displays.

Raster Scan Benefits

Sales of raster scan terminals are taking off because they are cheaper than storage and vector technology in the ability to process photographic images such as those obtained from radar, satellites and X-ray scans, VDC said.

In addition, the raster scanner can selectively erase parts of a picture and display a wide range of color shades and intensities.

While competing display technologies provide better picture resolution, VDC noted raster scanners cost less at lower resolutions.

In fact, the prices of CRT graphics terminals will steadily decline as the cost of memories and semiconductor packages continues to plummet, the study predicted. Because interactive graphics terminals are cheaper to use, VDC said they already are displacing alphanumeric terminals in many applications.

Another advantage of CRT graphics terminals is that they do not require skilled labor to operate, VDC pointed out.

One indication of increased expectations for CRT graphics is the rapid growth of many companies in the industry. For example, VDC said, Computervision — the industry leader in turnkey CAD/CAM graphics systems — has been able to triple its stock price in the last nine months.

Although interactive computer graphics promises to be a hot business in the next few years, it will become harder to compete because of rapid technology changes and volatile prices.

A number of CRT graphics equipment manufacturers that were active in the early '70s — including Photon, Data General, and Xitan, Inc. have consolidated all East Coast manufacturing, microcomputer hardware and software engineering and service operations into a 40,000 sq-ft facility in Hanson, Mass., to provide more production space for handling a backlog of more than $18 million.

Tracer, Inc. has increased its regular semianual cash dividend by 20% to 4 cents a share.

National Systems Analysts, Inc., a DP consulting firm, has acquired Quad Data Associates, Inc. Quad Data will operate as a subsidiary of National System Analysts and will provide programming services, turnkey systems and a municipal accounting package.
Expands Corporate Headquarters

CINCINNATI—Computer Systems Development, Inc. (CSD) is expanding its corporate headquarters here and gearing up its manufacturing capability to produce its new small business system. CSD was formed earlier this year in anticipation of buying Cincinnati Milacron, Inc.'s (CM) George line of small business systems. In July, CSD refused to extend the time limit for the consummation of the sale to CSD [CW, July 17]. That refusal left a wake of disappointments.

Micro Growth

Hinges on Chips:

Pactel Report

LONDON—Despite advances in chip technology, the growth of microcomputers in Western Europe will ultimately hinge on how, when and if industrial designers use this technology. Technological improvements and offerings from Intel, Z80- and 68000-bit random-access memories (RAM) will not be enough to set the micro market off on its potential 31.9% growth cycle through 1986, according to a market report by PA Computers and Telecommunications Ltd. (Pactel).

Whether this $105 million market reaches a projected $832 million in eight years will depend largely on how successfully the micro can wedge its way into new application areas, the report noted.

Currently, computers and terminals account for 61.8% of the European micro market, but Pactel predicted this percentage would drop nearly 50% by 1986, when telecommunications and the automotive industry become more committed to the technology.

Competitive Picture for Micros

The competitive picture in the microcomputer business appears to mirror that of other computer markets, Pactel noted. What IBM is to mainframes and Digital Equipment Corp. is to minis, the European market and little erosion of the automotive industry become more committed to the technology.

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Jilted by George, CSD Rallies With Own System

Cincinnati Milacron's (CM) George line of small business systems is looking into the possibility of forming limited partnerships with some companies signed on as distributors.

Sennett doubts that CSD will be able to pick up CM's distributor base because many of CM's distributors have taken on other small business lines. Initially CSD will offer the standard business applications software for its systems. Sennett noted, but will introduce a construction package in January and one for certified public accountants in February.

Right now, CSD is gearing up to produce the small business system. According to Sennett, the beefing up of the manufacturing capability is being spurred by 'interest in an intelligent interface control for rotating Winchester-type storage devices that are now in limited production.'
EXECUTIVE CORNER

- Dennis M. Mannion has been named vice-president of operations at Donner Consulting Group as a senior consultant.
- Alex Bernstein has joined the Brandon Consulting Group as a senior consultant.
- David C. Pixley has been named by the board of directors of Genesse Computers & Software, Inc. as president and chief executive officer.
- Kurt Ensell has been named senior vice-president and chief scientist.
- Robert B. Hawkins has been named executive vice-president of Control Data Corp.'s Computer Group. He will be in charge of managing the company's activities in international ventures and cooperative programs involving technology exchange.
- Paul J. Mozola has been named vice-president of the Midwest region of Data Processing Security, Inc.
- Byrne O'Brien has been named director of administration and finance and Michael Nugent has been named staff attorney at the Association of Data Processing Service Organizations.
- Jack Robinson has been appointed regional marketing director for the Midwest and West Coast operations of Data Access Systems, Inc.
- Thomas Frentier has joined Dearborn Computer Co. as controller. Jack Hughes has joined as its manager for the Western region and Robert Meyer has joined as manager for the Northeast region. Another new employee, Robert Neumeyer, has been appointed product manager, and William Eck is the firm's new regional manager of software sales.
- Leland C. Fay Jr. has been named president of Evidex Corp., a Chicago-headquartered litigation support service company.
- John J. McElroy has been appointed president of Interactive Data Corp.
- R.E. (Bob) McKeon has joined theITT Courier Terminal Systems, Inc. as vice-president of field engineering.
- Daniel Foy has been named vice-president for communications industry marketing for the Infonet Division of Computer Sciences Corp.
- A.C. Rice has been elected to the board of directors of Tandem Computers, Inc.
- Juan A. Rodriguez has been appointed vice-president and general manager of Storage Technology Corp.'s Disk Division.
- Joseph J. Kroger has been named president of Univac's Marketing and Services Division and Paul J. Spillane has been named president of the firm's Products Division.

TERRY CLAIMED, ADDING THAT THE TREND THERE IS TOWARD TURNKEY SYSTEMS DEVELOPMENT.

FUTURE PLANS

Terry envisions a range of software exporting firms establishing bases in the Philippines by the end of the decade and a core of American manufacturers producing hardware there by the early 1980s.

The Philippine government is currently researching the capability to develop computer systems among the islands that comprise the nation.

Lear Siegler set up a distributorship in the Philippines last August and is exploring other business arrangements there, Terry said. The company exhibited its products at the recent Regional Computer Conference sponsored by the Association of Southeast Asia Nations.

"However, the kind of sales sophistication that we have in the U.S. doesn't exist in the Philippines or anywhere in Southeast Asia. For that matter," Terry observed. One solution to that problem, he suggested, would be bringing Philippine computer graduates to the U.S. for six months of specialized training.
What do you call a minicomputer that can expand up to 2 megabytes of main memory at $32k per megabyte, that can handle up to 960 megabytes of disc storage, that's available with manufacturing software, and does on-line processing at 4000 transactions an hour?
Powerful. The HP

The latest addition to our very successful HP 3000 family combines a new high in performance with a new low in memory price.

With more powerful hardware and software, the Series III offers twice the throughput of the Series II. We made the most of the latest LSI technology by using 16K RAMs to offer error-correcting main memory up to 2 megabytes. At the same time, we dropped its price 46 percent to just $32K per MB. Our new optional 120 MB disc also cuts disc memory cost/MB by 46 percent and increases storage to 960 megabytes.

**On-line transaction processing made easier.**

So more people can get more out of the system at the same time, we speeded up our operating system. With the help of our latest Multiprogramming Executive, MPE III, people at dozens of terminals can simultaneously enter and update the data base, develop programs or solve problems. And they can use any of six languages, too.

In addition, you can either handle a wide variety of different jobs or dedicate the system to single high-volume tasks—without changing operating software!

MPE III also gives you some features previously found only on expensive mainframes. Multipoint terminal support is one. You can cut your communications costs substantially by hooking up a string of terminals on a single cable, with a 9600 baud line speed.

Private volume disc files is another asset. A set of commands allows you to interchange disc volumes without powering down and reconfiguring the system.

**A faster, more flexible data base manager.**

We've improved our award-winning Data Base Management scheme, IMAGE/3000, to make it operate about 20 percent faster. And our new associative locking scheme lets several users update the data base at the same time.
New tools for manufacturers.

We're also introducing an applications software package, MFG/3000, that will help shape up inventory control and material requirements planning.

Designed for manufacturing companies of all sizes, it's already proved to be a real time and money saver, easy to install and operate. (In developing the program here at Hewlett-Packard, we reduced our own inventories, too!)

Consulting help to get you started.

While we're making it easier to use the HP 3000, we still want to give you all the personal help we can. So we've added a number of consultants in on-line transaction processing and manufacturing to our field force. They'll help you through the critical first phase of planning and installation.

With all these advantages, and system prices starting at $115,000, don't you owe yourself a closer look? Call your nearest HP office listed in the White Pages and ask about a hands-on demonstration of the powerful Series III, the new head of HP's business systems family. Or write to Hewlett-Packard, Attn: Bill Krause, Dept. 329, 11000 Wolfe Road, Cupertino CA 95014.

A new feature of DS/3000, our networking software, gives you easy access to remote data bases. For a large company, this can obviously lead to a much more efficient distribution of data, as well as making management information even more speedily available than before.
(Continued from Page 87)

reduced," he pointed out. Besides the problem of a readjust, McGowan said, "we've been growing at about 35% to 40% per year. Retained earnings cannot sustain that growth rate. Our choice if we don't get public is to slow our growth curve. We was not particularly happy about the prospect of growing without capital.

Modular Computer Systems, Inc., an established firm on the stock market, has withdrawn its stock offering, thereby limiting its opportunity for growth. The stock was trading at $15 a share earlier this year and is now priced at about $9.

Modcomp withdrew its offering for two reasons, according to Kenneth G. Harple, its president. "The main reason we withdrew was that the market was down and, since it was so close to the end of the year, our underwriters would have insisted upon readjusted finances," he said.

"Also, we had a large loss in 1976, but when we filed, the Securities and Exchange Commission questioned whether the loss was really incurred in that year. We are now doing an analysis, which is complicated because the records are in a different location.

The company's bank line will be adequate financing for the next one or two years, Harple added. However, bank financing will require running the company much more conservatively, he indicated.

With equity funding, Harple said, Modcomp could have looked for growth through acquisition, an option which the company will not now consider.

"We don't anticipate any serious cutbacks in our operation, but if we had the opportunity to double now, we wouldn't double, we would control our growth," Harple maintained.

Two Firms Undecided

Still looking for a clearing of the stock market clouds are Computervision Corp. and Data Dimensions, Inc. Data Dimensions' filing will be effective the week of Dec. 18. "If the market is good and the stock is at a reasonable price, we will go ahead," Lester Gottlieb, president, said. On the day he was interviewed, Gottlieb said, "today I wouldn't do the deal."

Data Dimensions has not raised equity capital since its initial offering in 1969. The company's stock was recently trading at $5.50 per share, down from $8.75 when the firm filed.

The Securities and Exchange Commission in August. Data Dimensions' underwriting statement states the firm does not have to go forward with the offering if the stock price is less than $7 per share. Should the company decide to withdraw its offering, it will not proceed with another offering until late spring, Gottlieb said.

The firm would use equity capital to reduce debt and for lease financing, he added.

Martin Allen, president of Computervision, isn't particularly concerned about whether there will be a market for his company's stock. "The price is what bothers him. The stock is considerably underpriced based on any reasonable measure," he said. In August Computervision was trading at $22 a share. It later slipped to $18 and has since recovered to about $22.

While not proceeding with the public issue would require more careful asset management, the company is going forward with its expansion plans regardless of whether the stock offering is made, Allen said. Part of that growth plan includes the addition of about 350,000 square feet of space to various divisions.

MCI Going Forward

MCI Communications Corp. intends to go forward with its sale of stock. "The market is stabilizing from its rundown in October and November," V. Orville Wright, MCI president, said. The company's stock was trading at $5.75 in late September and was recently priced at $4.

The capital raised from the offering will be used for development and for working capital for "market opportunities provided by two recent court decisions on Execunet," Wright said.

Regardless of the mixed bag of responses from companies planning public offerings, Roy Rogers of Hemrecht & Quist said the prices on the market have adjusted downward by about 20% to 30%.

As a whole, the market now is priced at an average of nine to 10 times projected earnings; earlier in the year, prices were based on 12 to 13 times projected earnings. Rogers noted

Register now for an event that will shape your perspective for the next decade:

FORUM by participating in several intensive workshops, interactive sessions and a keynote address — user, vendor, consultant — on the urgent computer/ communications/service systems decisions facing all...
Energy Efficiency Up

WASHINGTON, D.C. — The computer and business equipment industry attained a 33.4% improvement in energy efficiency since 1972. This figure and other statistics were part of a required report recently made to the U.S. Department of Energy by the Computer and Business Equipment Manufacturers Association (Cema).

Since the 1972 base reporting year, space devoted to manufacturing has increased 17.5%, Cema noted. However, total energy consumption in British Thermal Units (BTU) has decreased across the industry by 19.2%.

If energy conservation measures had not been taken by companies in the industry, total BTU consumption would have reached 22.4 trillion BTUs for the six-month reporting period. Instead, a decrease to 14.95 trillion BTUs occurred in the first half of 1978, the report indicated. Production space for 1978 was 107.4 million sq ft.

During 1972, BTU consumption was 18.5 trillion per half-year for 88.6 million sq ft of space. A distribution analysis of the various energy sources indicated that although there was a light increase in the use of gasoline, the major energy source for the industry continues to be electricity. Electricity accounted for 48.8% of all energy consumption, natural gas for 32.54% and fuel oil for 17.47%.

Future Systems Forum Registration Form

Please reserve space(s) at $600 per attendee at the three-day EVENTS FORUM, which is considered to be one of the best equipped conference rooms in New York City. A block of rooms has been set aside at attractive rates for FORUM attendees. Please check-mark on the registration form whether or not you want to receive a post-age-paid reservation card...or you can call the Barbizon Hotel directly — at 212-247-7000 — and mention the FORUM.

Return the Registration Form below, or call this special number: 673-9452.

So that we can provide a more personalized service to attendees, a limited number of spaces are available. Make your reservation today.

Please fill in above, detach this form and mail it with your payment to ITI Program Management Corporation, 106 Central Park South, New York City, January 24, 25 and 26, 1979.

The Barbizon Plaza Hotel

FUTURE SYSTEMS FORUM

The sponsoring Interface Group conferences during 1979 are the largest data communications conference in the world and second largest computer-related show in the U.S., Adelson claimed.

Interface '79 will be the only major computer conference in the Midwest next year, Adelson said. Other Interface Group conferences during 1979 will be the Federal DP Expo, March 9-21 in Washington, D.C., and Interface West, Oct. 30-Nov. 1 in Anaheim, Calif.

Electronic Arrays to Merge With NEC's U.S. Subsidiary

MOUNTAIN VIEW, Calif. — The shareholders of Electronic Arrays, Inc. have approved the merger of the company with the U.S. subsidiary of Nippon Electric Co. Ltd. (NEC).

The shareholders will receive $3 in cash, per share in exchange for their Electronic Arrays common stock. Electronic Arrays manufactures and markets MC40, a solid state integrated semiconductor circuits.
Struggling With Debt, Calcomp Stresses Sales

(Continued from Page 87) compatible tape and disk memories. "The rapid price changes and the kinds of competitive actions for which we surmised IBM have affected our ability to compete in the plug-compatible marketplace," Canova lamented. Although Calcomp has now completely ceased manufacturing IBM plug-compatible equipment, it will continue to purchase that equipment from other vendors and sell it to both its existing customers and new sales prospects. However, Calcomp will continue to manufacture its "bread and butter" plotter and interactive graphics products. Canova said. The markets Calcomp is exploring, such as minicomputer peripherals and software packages, are being chosen dependent on the amount of capital needed to exploit those markets and our company's strengths," he continued. Canova described the minicomputer peripherals venture as essentially a distributorship. "We already are end user-oriented and have a large sales and field service organization throughout the country."

The difference is that now Calcomp will purchase a wide range of peripheral products from other manufacturers, put the Calcomp label on the equipment and offer local service. The new sales group is separate from the existing sales force and will not sell IBM plug-compatible peripherals. Currently the minicomputer peripherals marketing department is touting a line of printing systems for use with Digital Equipment Corp.‘s PDP-11 and Data General Corp.‘s Nova and Eclipse computers as well as three disk storage subsystems for use with DEC’s PDP-11. The first in a group of products called the "Supermini Series," Calcomp is already selling these products in three major metropolitan areas. Prices for the printing systems range from $10,200 to $29,900. The disk subsystems are priced between $20,800 and $33,900. In both cases installation is included in the purchase price. By 1979, Calcomp said it will introduce a magnetic tape system, add-in and add-on memory and terminals. While these products do not offer appreciable savings over DEC or DG products, Canova noted that, in many cases, they offer higher performance and give users the "security blanket" of local service backing.

Excited About Venture Canova is excited about the revenue-sharing venture with Insac. "We just shipped an interactive system to Insac so it can develop application programs," he said.

Supplying the equipment is Calcomp’s investment in the software development project, he explained. The venture calls for Insac to develop 15 application programs for Calcomp’s ICS-500 system. The contract is likely to involve a team of about 20 people working in the UK for several years, an Insac spokesman said. The first products, an isometric engineering drawing system and a utility mapping system, are scheduled for introduction in early 1979.

As Calcomp sells its graphics systems and the Insac software, the two companies will begin to share the revenues from those sales. "The revenues will not necessarily be split 50-50," Canova added.

With the realignment of its product line, Canova predicted Calcomp’s revenues and earnings will grow "at least as fast as the computer industry — about 15% to 20% a year."
By Western Standards

Soviet DP Industry Still Lagging After 25 Years

By Irwin Ross

Special to CW

Although the Soviet DP in-
dustry is 25 years old this
year, by Western Standards it
is still an upset without much to show for.

Soviet DP was stymied when American computer manu-
facturers, a handful of which
had operations in the U.S.S.R.,
failed to make headway in
Russia. But to date the Soviets have
been bearish buyers, purchasing
only a limited number of ex-
tremely complex systems and
showing little interest in
workaday machines that han-
dle such pedestrian chores as
payroll or DP. As one Western
computer salesman said of the
Soviets, "They buy either for very
big projects where they can't pos-
sibly get by without the latest
models or for projects like the
Olympics, where they have their
prestige on the line and can't afford to look bad.

They always buy a total package,
with training and maintenance
contracts included."

Kama River Plant

The foundry at the Kama River truck plant — the largest
such facility in the world — is controlled by a $10 million
IBM 370/145 system. IBM has also sold systems to the In-
ternational tourist organization, which is finally going to automate
tselling procedures. Some sales
and installation procedures are automated to the Soviet Olympic
committee for use at the 1980 Moscow games.

Honeywell, Inc. systems have been purchased by the state bank in Leningrad, the
Zil truck plant in Moscow and the
Izhievsk motorcycle factory in the Ural's. Aeroflot's
international operations are now being handled by a
$5 million Univac system.

For the most part, the slow-going, often slipped
calendarization of Soviet in-
dustry is being accomplished
with locally produced ma-

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calendarization of Soviet in-
dustry is being accomplished
with locally produced ma-
chine.
Sweda Gets Housewares Chain's POS Order

PINE BROOK, N.J. — Sweda International has received a $2.35 million order for 50 point-of-sale (POS) cash registers from Handy City, a retail housewares and hardware division of W.R. Grace & Co.

After a one-year study of all manufacturers’ POS equipment, Handy City selected Sweda Model 800 cash registers for its new retail acquisition, Handy City. Sweda will deliver POS systems to Handy City’s 23 existing chain stores and to 27 new stores by the end of next year.

Other Orders

American Medical International, Inc., which owns and operates more than 50 acute care hospitals around the world, has ordered 161 8430 systems from the NCR Corp. as part of a distributed processing network. The systems are valued at more than $1.3 million.

People's Drug Stores of Maynard, Mass., has placed a $1.1 million order with Data Terminal Systems, Inc. (DTS) for 500 Model 440 stand-alone electronic cash register systems. The Jack Eckerd Corp. has ordered DTS Model 220 systems valued at $1.25 million. Eckerd is headquartered in Clearwater, Fla.

The General Services Administration has purchased 17 Model 1200 printing systems valued at $2,040,000 from Xerox Corp. They will be used in general business applications, such as accounting, inventory control and payroll processing.

Accounting Systems Corp. has ordered 21 Model 404 distributed data entry and processing systems from Sycon, Inc. The systems, with a value of approximately $185,000, will be used as property management firms as part of an automated property management service.

K Mart Corp., a discount store chain, will use an additional electronic register systems valued at more than $10 million from NCR Corp.

Wal-Mart Stores, Inc., a discount department store chain, has ordered 1,000 Model 440 electronic cash registers from Data Terminal Systems, Inc. for $2.75 million.

Tandy Corp. has ordered 250 System 70 small business systems from Applied Digital Data Systems, Inc. The order is valued at approximately $1 million.

Wieners Corp., a New Orleans-based retail shoe and apparel chain, has purchased 100 Model 2200 point-of-sale terminals and 100 Model 2300 OCR-A readers, with supporting polling and conversion and editing software, from Chase Computer Corp.

William M. Wilson's Sons, Inc., a manufacturer of gasoline pumps and fuel distribution systems headquartered in Lansdale, Pa., has ordered a 90/40 system from Univac for on-line purchasing, order entry and control and control engineering.

Display Data Corp. of Hunt Valley, Md. has ordered 5000 Regent CRTs from Applied Digital Data Systems, Inc. The value of the agreement is estimated at more than $3 million.

Cole County, Mo., has ordered its first system, a Univac 90/30, which will be used for local government applications.

The Fermi National Accelerator Laboratory has ordered three Cyber 175 systems from Control Data Corp. The contract is valued at approximately $10.6 million.

CPU, Inc., a DP service bureau that serves credit unions, has ordered 100 Model 200 on-line CRT systems from Sycon, Inc. The total purchase value is estimated at approximately $1.6 million.

Ford Motor Co.'s Car Engineering Division in Dearborn, Mich., has ordered a computer-aided design and computer-aided manufacturing systems from Computervision Corp. The orders are valued at $1.4 million.

NLT Computer Services Corp., a Nashville, Tenn., direct mail firm, has installed an IBM Model 3800 printer. A second 3800 is scheduled for installation within the year.

The Amplex Division of Chrysler Corp. has ordered two Model 445 distributed data processing systems from Sycon, Inc. The systems have a value of approximately $150,000 and will be used in the division's Detroit and Van Wert, Ohio, facilities.

Arby's, Inc. has ordered Model 2160 fast-food systems consisting of point-of-service terminals, a receipt printer, a slip printer and a microcomputer-based processor from NCR Corp.

**EDP professionals have a word for the new Wang VS computer.**

Richard Berger, Vice President and Data Processing Manager, Bug- has of Innsi- nger service center network headquartered in Hartford, Conn.

"We are absolutely amazed at the throughput rate we've achieved with our Wang VS. On our very first job for one of the country's largest student insurance agencies, the VS arrived in Pittsburgh on December 23 and was completely installed and operational on-site on February 18, with 61 programs, debugged and tested all by only two people—and not a single line of code had been written until the machine came in the door. "The VS really fulfills all of our requirements, particularly in areas where other systems are weak: cost/performance, language-availability, user-utility software. "I think the real key for the DP manager is the utilities available with the VS. Its speed and its interactive COBOL compiler. These three things combined make this a very powerful tool."—J.P. Scott, Data Processing Manager, Aptech Computer Systems, Inc., Pittsburgh, Pa.

Kenneth W. Cakebread, Manager of Data Processing, Trans-Air Forwarders and Brokers, Inc., Inglewood, Calif., has converted 220 programs from our old batch-oriented Honeywell 62 system to our new Wang VS system. Not only did I do it. Thanks to the programming power of the VS, I actually came up with more. "Before we converted to the VS, the biggest problem we had in the accounts receivable area was misstaping cash. No more, now, by capturing current information and feeding it into the computer from a workstation, we're able to sort out potential problems long before they get to the accounts receivable stage. And with Wang's on-line editing capabilities, I'd say we cut our average editing time on a per-item basis from 30 seconds to a single second. "And believe it or not, while the VS gives us faster access and maybe triple the programing capacity of our old system, it was only half the cost."—Kenneth W. Cakebread, Manager of Data Processing, Trans-Air Forwarders and Brokers, Inc., Inglewood, Calif.

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We are seeking individuals with a background in any of the following areas:

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In addition, the individuals should have a minimum of three years experience in at least one of the following areas:

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THINK BIG aptly describes the way we develop and implement new concepts at this pace-setting NCR facility. We design and build large-scale computer systems — with a difference. Our bold thinking pushes the state of the art to anticipate the EDP needs of business in the 1980s. That boldness leads to the kind of major developments that have twice warranted setting up company divisions for new products.

Where we’re headed . . . We have several major projects in work. One is our new virtual resource executive — a powerful system that combines COBOL, with virtual operation. Another is a system which will provide interactive transaction processing capability for our virtual mainframes. And in the design process, we’re looking for new approaches to software, firmware and testware development. On top of that, we’re moving rapidly into VLSI technology with the support of NCR’s own micro-electronics facilities.

We’re big on resources . . . You need lots of high calibre equipment and technical support to take on projects of the magnitude we handle. You’ll be working with our most powerful, new generation Criterion mainframes, the latest advances from our data communications divisions, a highly interactive battery of technical support specialists. And you’ll have it all at hand in a plant-complex big enough to house your grandest ideas.

. . . but small in modus operandi! We keep our project teams small. You work intimately with a few heavyweight professionals. That means you come to grips with more of the problem, share more of the responsibility. It also means that everyone carries his or her full weight and stands out with high visibility.

Outside — the good California life . . . Our pioneering development groups are at home in Rancho Bernardo; 22 miles up the coast from San Diego. Our 114-acre hillytop location has been called “one of the 10 best-designed facilities in the nation.” You’ll be in the midst of California’s finest recreational facilities, including 70 miles of beaches from San Juan Capistrano to the Mexican border. You’ll work where others come to vacation.

Immediate openings in many areas: If you have an engineering or computer science degree or equivalent and a year or more of experience in one or more of the areas listed, contact us at once.

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- Distributed Network Architecture
- Transaction Processing
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- Diagnostic Programming
- Test Systems Development
- Micro Proof Of Design Software
- Systems Architecture

- Tools Support
- Time-sharing — compiler
- Design/Development (high level block structured languages) — SW tools design
- Distributed Intelligence
- Architecture/Interactive Systems Software Architecture
- Fifth Generation OS Architecture
- Fifth Generation OS Architecture
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NCR is on the move. We’re mounting a major, coordinated effort backed by ample R&D resources, to emerge up front in 1980 EDP. For example: VLSI technology in which we have requirements in the following areas: MANIFOLD IN LOGIC DESIGN CENTRAL PROCESSOR LOGIC DESIGN, MOS CIRCUIT DESIGN, LAYOUT DESIGN.

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- Local network prototypes
- Network protocols

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- PWB/UNIX
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- Software development tools
- Specification languages
  (*UNIX is a trademark of Bell Laboratories)

**Reliable Systems Technology**
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- Secure computer systems
- Test and validation

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You will use modern systems programming languages running in PWB/UNIX environment to develop operating systems, software tools, DBM's, and network implementations. These positions provide excellent opportunities for technical growth.

**Operating System Designer**
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**Software Test Specialist**
You will break new ground in design of test methods for provably secure systems. Using your familiarity with modern software testing methodologies, you will interact with the systems design team. As a result, you will become familiar with formal mathematical specification techniques for software.

**Software Methodology Specialist**
You will work in a PWB/UNIX environment to create tools to make the software development process more exact and less error-prone. Your major contribution will be the direction of research and development that leads to the next generation of software tools.

**Programming Language Specialist**
Your knowledge of modern compiler-building technology and formal languages will be used in the evaluation and development of systems programming languages for use in support of our reliable systems technology efforts.

**Modula Expert**
You will provide theoretic and practical leadership in the design and implementation of visibility, efficiency, and maintainability extensions to a UNIX-based Modula compiler. You will also consult and instruct on the use of modula and BCPL.

**Software QA Specialists**
You will use your knowledge of MIL-S-52779 and modern software QA systems to develop and apply WDL-wide software QA methodologies. Knowledge of modern systems development practices and high level systems programming languages is also required.

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Please send your resume and salary requirements to: Professional Employment, Dept. PF-118, 3939 Fabian Way, Palo Alto, CA 94303. Or call (415) 494-7400, ext. 6601 for immediate consideration. We are an equal opportunity employer, M/F. U.S. Citizenship Required for most positions.

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**Product Managers (Phoenix)**

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**Project Manager (Phoenix)**

CAPEX needs experienced, aggressive, people-oriented project managers who know how to lead and manage a project of up to ten high capability programmers to produce quality software products for worldwide use. Responsible for staffing, organization, product design, implementation, design, scheduling, technical leadership and draft user documentation. If you know how to do it right in a top-down design, structured programming, 360/370 environment then CAPEX needs you.

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Demonstrated experience in design and implementation of large business systems combined with management or financial applications design experience with the understanding of the JCL environment (CICS/DL-1, etc.) are required for this position.

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Your background should include either 2 or more years experience in data base applications (DBMS, TOTAL, DL 1, IMS, etc.) with the desire to become a data base administrator or actual experience with data base design, gens, file security, error recovery and backup.

**PROGRAMMER ANALYSTS**

1 or more years experience in DBMS programming is required and knowledge of JCL, large scale IBM communication to on-line (CICS) applications is desired.

**PROGRAMMERS**

1 or more experience utilizing CICS/VS, OS/VS and ANS COBOL is required. Experience in a manufacturing environment with systems 5 or 32 is especially desirable.

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If you — are determined to be successful
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— have an eye towards a management position
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then — come and extend a successful sales career with us.

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— enjoy traveling and working with clients in a sales environment
— are interested in mini/micro computers and distributed
— processing
— are interested in an excellent salary, bonus, mileage and expenses
then — come and be a part of our successful sales team.
General Automation offers excellent employment benefit plan including medical/dental/optical and life insurance. Other benefits include outstanding vacation, holiday and sick leave, education reimbursement and stock purchase/savings plan.

As a result of our continued growth and expansion programs, openings now exist in all regional areas of the United States. If you would like to be considered as a new member of our team, call one of our regional managers in the region that interests you to arrange for an interview. Yes, we do have a relocation policy. Selected candidates should provide a detailed resume of their work history and accomplishments.

Central Region:
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24320 Indoplex Circle
Farmington Hills, Michigan 48024
(313) 478-2640

Western Region:
Ken Felderstein
1055 S. East Street
P.O. Box 4883
Anaheim, CA 92803
(714) 717-4800

Eastern Region:
Date Greene, Sales Manager
377 Route 17
Hasbrouck Heights, New Jersey 07604
(201) 288-6580

Southern Region:
Harry Bonds, Sales Manager
8554 Katy Freeway, Ste. 100
Houston, Texas 77024
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COMMUNICATIONS GROUP
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Ft. Lauderdale, Fla. 33322
equal employment opportunity/affirmative action employer.
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THE FACTS: Harris Corporation designs, produces, and markets high-technology communication and information processing equipment and systems. Its products are used throughout the world in voice and video communications, data processing, data communications, and graphic communications.

Fiscal 1978 was another record year in sales and earnings for Harris. Sales increased 35% to $872 million. This trend reflects the growing importance of the communication and information processing industry in the world economy, and the emergence of Harris as a broad-based producer of equipment for that industry. For the first time new orders received in fiscal 1978 exceeded the billion-dollar milestone.

To meet current demand and support projected growth, Harris invested a record $72 million in new plant and equipment in fiscal 1978. The company continues its heavy commitment to research and engineering. During fiscal 1978, expenditures for this purpose totaled $89 million.

THE FANTASY: Where better to live and work than Florida, America's year-round vacationland and fast emerging technical community. Melbourne, Florida, home base for Harris, provides easy access to a wealth of educational, recreational, and cultural facilities and a cost of living profile the envy of almost any U.S. city. The scenic beachfront community of Melbourne is only an hour's drive from Disneyworld, a short hop from the Florida Keys or even a 20 minute flight to the excitement of the Bahamas.

Take a look and consider the outstanding professional and personal lifestyles with Harris in Florida.

Harris In Florida

TEMPERATURE

<table>
<thead>
<tr>
<th>National Average</th>
<th>Brevard County Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>73°F</td>
<td>87°F</td>
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</tbody>
</table>

EDUCATION (S.A.T. SCORES)

<table>
<thead>
<tr>
<th>National Average Math</th>
<th>Brevard County Average Math</th>
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<tbody>
<tr>
<td>468</td>
<td>479</td>
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</tbody>
</table>

STATE AND LOCAL TAXES

<table>
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<tr>
<th>Annual Income</th>
<th>Ranking Nationally</th>
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<tbody>
<tr>
<td>10,000-19,999</td>
<td>47th Lowest</td>
</tr>
<tr>
<td>20,000-29,999</td>
<td>47th Lowest</td>
</tr>
<tr>
<td>30,000-39,999</td>
<td>47th Lowest</td>
</tr>
<tr>
<td>40,000-49,999</td>
<td>47th Lowest</td>
</tr>
</tbody>
</table>

CRIME (VIOLENT) (Per 100,000 population)

<table>
<thead>
<tr>
<th>National Average</th>
<th>Brevard County</th>
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<tbody>
<tr>
<td>8.283</td>
<td>11.51</td>
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</table>

HOUSING

<table>
<thead>
<tr>
<th>National Average</th>
<th>Brevard County</th>
</tr>
</thead>
<tbody>
<tr>
<td>$56,600</td>
<td>$43,749</td>
</tr>
</tbody>
</table>

MIDCON Interviews in Dallas

Call 214-748-2340 collect to arrange convenient interviews.

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BUSINESS SYSTEMS PROGRAMMERS
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Two IBM 3033's interacting with over 250 remote terminals plus 40 mini computers serving specialized applications all help to keep Pratt & Whitney Aircraft in the jet engine field.

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- Time Transaction Processing (MVS/JS2/TEO)

A requirement is a B.S. degree in Computer Science, Mathematics, Engineering or related fields.

For immediate consideration, call 1-800-243-3342 or send your resume (including salary history) to Professional Recruitment, Office 124, Pratt & Whitney Aircraft Group, East Hartford, Conn. 06108.

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The Hong Kong Polytechnic is an expanding institution which is now putting into effect a forward looking development plan incorporating a developments approach combined with a needs assessment approach to the design and development of the three Divisions - Engineering, Applied Science and Commerce & Design, and Business and Management. Applications are invited for the following posts which are tenable from 1st September 1979:

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**PRINCIPAL LECTURERS/SENIOR LECTURERS**

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Application forms and further information are obtainable from the General Secretary, Hong Kong Polytechnic, Hung Hom, Kowloon, Hong Kong, or through Personal Recruitment or from Data Technology Industries, Inc., 11201 Gateway Blvd., Suite 413, Riverdale, Md. 20840 or from Personnel Consultancies, Ltd., 370 South Main, Orange, CA 92668.

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**IBM 3033's PLUS**

**Head of Computer Center**

Mississippi State University is seeking candidates for the position of Head of the Computer Center. Position responsibilities include management of a large scale central computer, operation of the facility, software planning, development, and applications programming, with emphasis on mathematical and scientific computing. The individual should also have a BS degree in Mathematics or Computer Science, with experience in software planning, supervision of approximately 5 employees, and the ability to assist in other time sharing positions. Position also includes the possibility of academic appointment.

A large-scale Unix 1100 system provides computer support to all areas of campus research and instructional activities. Applicants must meet the following requirements: a doctorate in computer science or a related field, management, systems programming, and/or project management experience in large-scale computing, demonstrated state-of-the-art knowledge of computing, and skill in problem solving and analysis.

Send resume by February 1, 1979 to:

Dr. Fred Dach, Director

Mississippi State University
P.O. Box 9742
Mississippi State, MS 39762

Ms. Karen Trzeciesky,
Employment Office
Bethlehem Steel Corp.
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Chesterfield, IN 46304

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**IRAN**

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We are looking for experienced educators, preferably having the faculty of a rapidly growing program in Mathematics or Computer Science. You should enjoy teaching and be able to use computer resources and systems technology to develop a very successful program for this expanding university.

We intend to extend this program in Computer Science to include specializations in computer science education and mathematics. Applications and letters of reference should be addressed to Mr. Dave Stine, Data Technology Industries, Inc., 6611 Kenilworth Ave., Suite 413, Riverdale, Md. 20840, or to Office 124, Pratt & Whitney Aircraft Group, East Hartford, Conn. 06108.

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Employment Office
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NYC, N.Y., to 40
To $45K
To $45K
Florida Storart IBM
By Mar, M/F.
To $45K
To $37K

Fees assumed by client co's.

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Memphis & Austin

We are adding software development and programming services to our firm in the larger geographic area. We have a new opportunity in the implementation phase of a new line of computer hardware. This position is located in the South and Southwest for Systems Analyst/Programmers. We are a leading manufacturer of magnetic recording media and computer peripherals. You will program DEC PDP-11 in assembly language and Fortran in all phases of planning and design activities. You will qualify you should have an MS in computer science or engineering or the equivalent in experience. 2-5 years as a systems programmer with strong background in peripherals, preferably disc drives. PDP-11 assembly language programming experience and Fortran programming required. Some 360 or 370 systems and assembler programming experience desirable. Memorex offers excellent salaries, a complete company paid benefit package and outstanding growth opportunities.

For immediate consideration, please send a resume to Memorex Corporation, Attn: R.K. 1390, 3255 Scott Blvd., Santa Clara, CA 95052. Or call Ed Kennedy at 987-1203. An Equal Opportunity Employer M/F.

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Personnel Consultants
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(817) 222-9191

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To qualify you should have an MS in computer science or engineering or the equivalent in experience. 2-5 years as a systems programmer with strong background in peripherals, preferably disc drives. PDP-11 assembly language programming experience and Fortran programming required. Some 360 or 370 systems and assembler programming experience desirable. Memorex offers excellent salaries, a complete company paid benefit package and outstanding growth opportunities.

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Two openings for people who can cover different aspects of the computer business. You will need to be able to spot trends, interact with industry executives and managers of the nation's largest data processing departments, produce good, well-researched news and feature stories and supervise staff writers — all under the pressure of our weekly deadlines.

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We offer a good location just outside Boston, excellent benefits, including profit sharing, and the chance to join a small but successful and fast-growing publishing organization.

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operating systems software
development manager

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You will be responsible for directing the activities of software personnel in the design and development of operating systems for a large, complex software system. Requirements would include a working knowledge of large scale IBM or compatible computer systems, proficiency in assembly and higher level programming languages and management experience with software systems personnel. A BS or MSEE, math or computer science is desired. Equivalent experience will be considered.

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Responsibilities will include the design, development and implementation of operating systems for use on complex software systems. Experience requirements include knowledge of assembly level and higher level languages, first level interrupt handlers, and queueing/delaying related to IBM 370 system architecture. Education preferred is a BS/MSEE, CS or equivalent experience.

STC offers a liberal salary plus benefits including health insurance, stock purchase plan and a retirement package.

If interested please call Dick Shinn TOLL FREE 1-800-525-2940 Ext. 7403, or send your resume in complete confidence to:

Professional Placement
Dept. CW/1203

STORAGE TECHNOLOGY CORPORATION
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We are an equal opportunity employer M/F

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TWA - Senior Analyst/Programmer - ACP Systems Support

TWA - Senior Analyst/Programmer - ACP Systems Support

We are looking for a professional with a BS/MSEE, CS or equivalent experience in the area of operating systems for a large, complex software system. Familiarity with IBM 370 systems architecture will be helpful. Education preferred is a BS/MSEE, CS or equivalent experience.

STC offers a liberal salary plus benefits including health insurance, stock purchase plan and a retirement package.

If interested please call Dick Shinn TOLL FREE 1-800-525-2940 Ext. 7403, or send your resume in complete confidence to:

Professional Placement
Dept. CW/1203

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DIRECTOR OF COMPUTER CENTER
AND INFORMATION SYSTEMS

Bentley College, an independent institution specializing in business, with 5,000 undergraduate and 600 graduate students, located on a new campus outside of Boston, is seeking an individual to direct its Computer Center and Information Systems Department. The position reports directly to the President. The mission of the department is to satisfy the rapidly expanding instructional/research needs of the faculty and the administrative information needs of the college. The position is to supervise the following areas: microcomputer systems, data processing, and computer management systems, and supervision of hardware/software support personnel.

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Mr. Robert L. Lenington
Manager-Personnel
Bentley College
11500 Ambassador Dr., Kansas City, MO 64155

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data processing

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Obertin College, a private liberal arts college with a PTE of 2750 students, located southwest of Cleveland, is seeking a Manager of Operations Computing Center. The person will be responsible for the supervision of personnel whose mission is the operation of computer hardware and data control production. This position reports to the Director of Computing. Present equipment is a Honeywell Sigma 3 operating under CP-V.

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Sr. Systems Prog. to 25K
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1201
Data Analyst to 22K
1201
System Programmer to 25K
1201

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B.S./M.S in Computer Science, Math, Physics or Engineering for Programming and Analysis of problems in signal processing, time series, data analysis and Electro-magnetic problems. FORTRAN experience on computer systems comparable to the Cyber series, or CDC 6000 desirable.

SRI INTERNATIONAL is a problem solving organization performing basic and applied research under contract for clients and business, industry and government on a worldwide basis. We offer a stimulating environment, excellent Company benefits including a liberal vacation schedule, dental plan and Company Paid Retirement Plan.

Please send your resume, including salary history, to Ken Z. Zener, Personnel Representative, SRI INTERNATIONAL, 23201 Madison Ave., Mentor Park, OH 44052.

An equal opportunity employer

COMPUTER PROGRAMMER
We need an experienced programmer for a cardless System 3, Model 15D, with CPP, RPO II and online (CCP) experience mandatory. Manufacturing experience desirable. Excellent salary and benefits. Send detailed resume including salary requirement to:

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P.O. Box 9070
Little Rock, ARK 72219

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STATE OF FLORIDA
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Please send your resume, including salary history, to Personnel Dep't., 5825 Bowers Avenue, Monroeville, PA 15146.

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PROGRAMMER/ ANALYST

Program your future with VERSTATEC!

Initially, you will assume responsibility for developing graphic plotters software on mini-computer systems while gaining a broad knowledge of several popular mini-computer systems. 1-2 years of FORTRAN assembler language programming on Hewlett Packard 2100 computer system helpful.

We'd like to tell you more about VERSTATEC - our excellent compensation package which includes FREE Dental & Retirement Plans, as well as our forecast for continued dynamic growth. Send resume, including salary history, to Personnel Dept., VERSATEC, A XEROX COMPANY, 2805 Bowers Avenue, Santa Clara, CA 95051 (408) 988-2880.

An equal opportunity employer M/F
**IBM CUSTOMER ENGINEERS**

**THE POSITION:** We will be opening our new computer refurbishing center soon in a desirable Minneapolis suburb, and need a person to configure, test, and stage IBM GSD computer equipment (primarily System/3) prior to deliver. Some installation in the field is required. Excellent salary, complete benefits including moving expenses.

**QUALIFICATIONS:** The ideal candidate will be technically knowledgeable of the IBM GSD products, primarily System/3. Experience from either IBM or a 3rd party maintenance firm is acceptable. We need a career minded, self starting individual in a position solving attitude.

**THE COMPANY:** Data 3 Computer Corporation is a leader in the purchase, sale and leasing of IBM GSD products. The new computer refurbishing center will enable us to maintain rapid growth in this dynamic industry. For appointment, call Bob Johnson Collect. ALL INQUIRIES WILL BE HELD IN STRICT CONFIDENCE.

**DATA 3 COMPUTER CORPORATION**

P.O. Box 398
(612) 682-4844

IBM CUSTOMER ENGINEERS

**THE POSITION:** We will be opening our new computer refurbishing center soon in a desirable Minneapolis suburb, and need a person to configure, test, and stage IBM GSD computer equipment (primarily System/3) prior to deliver. Some installation in the field is required. Excellent salary, complete benefits including moving expenses.

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**DATA 3 COMPUTER CORPORATION**

P.O. Box 398
(612) 682-4844

**SANTA’S JOB BAG**

Let me give you a job for Santa. For years, I’ve been looking for a Christmas gift that’s different. I’ve got a few ideas:

- A new challenge for the young people (ages 10-16) who work in your office. How about setting up a new program for them to solve problems?
- A gift for the new employee who just started working for you:
- A gift for the person who’s been with your company for ten years:
- A gift for the person who’s been with your company for thirty years:
- A gift for the person who’s been with your company for fifty years:
- A gift for the person who’s been with your company for one hundred years:

**DATA 3 COMPUTER CORPORATION**

P.O. Box 398
(612) 682-4844

**IBM CUSTOMER ENGINEERS**

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SYSTEMS ANALYST

Armour Dial has immediate opportunity for an individual with approximately 2-4 years programming experience in a real-time, multi-programming environment. This new position is an integral part of a state-of-the-art data acquisition, control, and management information systems department. It is involved in real-time, interactive operations. A computer degree is desirable but proven experience is the key.

Responsibilities will include real-time operating systems enhancement and maintenance, systems analysis, and computer systems consulting to members of the computer systems department. Some applications programming and software development work will also be required. This position is located in the pleasant river community of Ft. Madison, Iowa. Offers challenge, visibility, and the opportunity to work with a team of aggressive professionals. You are invited to submit a resume and salary requirements specifying hardware and software experience and assurance confidence to:

Employe Relations Supervisor

ARMOUR DIAL COMPANY
P.O. Box 1427
Ft. Madison, IA 52627

An Equal Opportunity Employer M/F

DATA BASE ADMINISTRATION

Honeywell 6600

Commitments to comprehensive computer systems development utilizing Honeywell’s DMIV software have created a need for additional data base administrators within the Corporate Data Base Administration department of a leading Management Service Organization.

DATA BASE ADMINISTRATOR - Requires previous experience as either a DDA or DBMS software support specialist, including at least 3 years of IDS and TDS responsibility. Some travel required. Responsibilities for physical design, implementation, and support of totally integrated corporate-wide data base utilizing DMIV.

APPLICATION SUPPORT ANALYST - A strong application programming background with a minimum of 3 years experience utilizing IDS and TDS required. Will act as technical consultant to the Systems and Programming department.

Initial assignments (long term) will be with our Wilton, Connecticut based Relocation Management subsidiary. Full DMIV training will be available. Candidates with competitive salaries, liberal benefits, a comprehensive relocation package and a professional working environment with excellent future career opportunities. Qualified applicants are invited to send resume, in confidence, to:

Patricia H. Adelhardt

PETERSON, HOWELL & HEATHER, INC.
P.O. Box 2174
Baltimore, Maryland 21203

An Equal Opportunity Employer M/F

DATA BASE MANAGEMENT

Expansion of the Washington, D.C. management consulting practice utilizing Honeywell’s DBA software has created several opportunities for bright, aggressive individuals with 1-5 years experience in data management. We are seeking to expand our core of professionals skilled in one or more of the following areas:

- DATA BASE ADMINISTRATION
- DATA STANDARDIZATION
- DBMS EVALUATION & SELECTION
- DISTRIBUTED DATA MANAGEMENT
- DATA BASE DESIGN (especially S-2000)

Arthur Young & Company is an international Big-8 professional services company. Our Washington office consulting clients include federal, state, and local governments as well as commercial organizations with applications in financial and accounting systems, decision support systems, and data resource management, among others.

These positions are career openings with excellent opportunities for rapid advancement and professional development. Starting salaries are commensurate with education and experience. An advanced technical degree or management degree with an information systems specialization is required. Please submit resume and current salary in confidence to:

Dr. Craig M. Cook
ARTHUR YOUNG & COMPANY
301 Indiana Ave. N.W.
Washington, D.C. 20036

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

Colorado Springs, Colorado

Grow with the largest commercial data processor in the Rockies and enjoy the natural beauty of the Pikes Peak area. Our firm is a diverse team of professionals working on both commercial and scientific applications on Control Data Cyber 70 computers as well as PDP 11, HP, His, and Datapoint minis. Openings exist in all of the following fields:

- Real Time Data Acquisition
- Telecommunications
- Operating Systems
- (NOS/BE, RSX, & RSTS preferred)
- Bank Data Processing
- General Ledger, Payroll, and Accounting Systems

We offer competitive salaries, excellent benefits, and diversified, challenging positions with recognition and reward for potential and performance.

For confidential consideration, send resume (including salary history) to: KAMAN SCIENCES CORPORATION, Attn: RS, P.O. Box 7463, Colorado Springs, CO 80933

KAMAN SCIENCES CORPORATION
ATTN: FL
P.O. Box 7463
Colorado Springs, CO 80933

KAMAN SCIENCES CORPORATION
An Equal Opportunity Employer Male/Female

PROFESSIONAL OPPORTUNITIES

Put Your Experience To Work For You In Building A Better Career Opportunity

Sperry Univac has a variety of challenging opportunities waiting for you at one of our Minnesota locations. These openings exist within our Arkansas Industry Development Center which designs and supports software applications such as reservations, ticketing, cargo, diamonds, control, message switching, check-in, hotel and fare quote. We are searching for candidates with 3 or more years experience in any of the following disciplines:

- Design, implementation and support of real time applications
- Acceptance testing of production applications
- Technical support to the customer environment
- Specific support of OS/1100/TDFMS

In addition to requiring experience within the area mentioned above, it is desirable that you have a background in FORTRAN, and/or generally UNIVAC 1100 series exposure.

We offer highly competitive starting salary, a comprehensive benefits program and outstanding professional and personal growth opportunities.

FOR IMMEDIATE ATTENTION, PLEASE CALL COLLECT OR DIRECT YOUR RESUME TO:

A.D. Rosenwald

UNIVAC

P.O. Box 3925, M.S. UI28
St. Paul, Minnesota 55165

(612) 456-2309

An Equal Opportunity Employer M/F

PROGRAMMER/ANALYST

We are a large, rapidly expanding food processing company located in Seattle, Washington with an opening for an experienced Programmer/Analyst. We are looking for an individual with accounting experience. Order entry and inventory control background. A knowledge of computer languages, salary $10,000-$15,000. Openings exist on the Data Center’s Accounting and Enhancing current systems on a Datapoint 5500. The ability to document systems is a plus.

Our company offers good job security, competitive salary and company-paid benefits. Company relocation expenses. If interested, please send your confidential resume with salary history and requirements to Programmers/ Analysts, 1400 - 14th Ave. B.E., Seattle, WA 98101.

An Equal Opportunity Employer
MASSACHUSETTS

CONNETICUT

OPPORTUNITIES FOR COMPUTER
PROFESSIONALS IN BUSINESS
COMPUTER APPLICATIONS:
ANALYST PROGRAMMERS

We have openings for experienced individuals who have a proven track record in large applications systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time, within budget, within specifications, you may like the challenges.

Please apply in writing with educational, employment and salary requirements to:
Mrs. Linda M. Heidenis
NORTHEAST UTILITIES
The Conn. Light & Power Co.
The Hartford Electric Co.
The Hartford Electric Co.
Western Mass. Electric Co.
Holyoke Water Power Co.
Northeast Utilities Service Co.
Northeast Nuclear Energy Co.
P.O. Box 270, Hartford, CT 06101

Be in the vanguard of communications software development at NCR.

Join a highly strategic NCR division that among other things — is at the heart of NCR's whole future in Distributed Network Architecture. As a software development professional at NCR Communication Systems Division in Columbia, S.C., you'll be working on the very latest in multiprocessor software for microprocessor-based systems.

The communications projects you'll work on and the products you'll design will lead to direct involvement with 1980's concepts, and with state-of-the-art development in:
- Intermodal Routing Algorithms
- Packet Switching
- End-to-end Protocols

The key professionals we're seeking for our expanding, and strongly software-oriented communications group will have had solid backgrounds in communications and/or systems software. More specifically, we require 3 or more years of experience in one of the following: Assembly Level Programming; Operating System Design; Communications Link Drivers (asynch, synch, SDLC); Front End Processor Software; Terminal Controller Software; Data Network Design.

For a high-level review of your qualifications, and a prompt briefing on the exceptional career opportunities and lifestyle you can enjoy at NCR/Columbia, call Mr. Kenneth Uhlig, toll free: 1-800-845-0586. Or send your resume and salary history to him at: NCR Corporation, Engineering & Manufacturing, Department S50, 3325 Platt Spring Road, West Columbia, South Carolina 29169.
INFORMATION SYSTEMS PLANNER
A Fortune 200 manufacturing corporation which has already selected a number of subsidiaries to contribute to a senior staff to the improvement of corporate-wide information systems plans and methodologies for computer application development, implementation of EDP hardware/software and related telecommunication use. The person selected should have previous experience in the use of structured analysis/programming techniques, and be capable and interested in guiding their introduction and use. First-hand knowledge of EDP technical training, standards development, and hardware evaluation is a definite asset.

The position is headquartered in southern California and offers competitive salaries and excellent benefits. As required by law, identification cards will be issued to all qualified applicants.

Informal history to:
Mr. J. C. Rainey, M/S 567, Reynolds Memorial Hospital, 210 Campbell Ave., S.W., Roanoke, Va. 24011.

TELEPROCESSING ANALYST

Programmer/Analyst
Minimum 3 years EDP systems and programming experience in the manufacturing industry. Must be proficient with COBOL and thoroughly familiar with IBM 370 systems using OS/SVS S/370 and HASP. Requires a minimum of 2 years systems design and analysis experience. An excellent opportunity with a rapidly growing company with the EDP staff located at corporate headquarters.

Salary range: 16k to 22k, plus excellent benefits package which includes 100% company paid medical, dental, life and accident insurance for you and your eligible dependents.

Apply, in confidence, to Employment Supervisor.

Teleprocessing Analyst
Requires 2 years college and 4 years' responsibility using COBOL including 2 years as a Systems Software Specialist responsible for teleprocessing software and systems.

Programmer Analyst
1327-1650
Requires High School graduation and 1 year experience in design and development and implementation of business computer Systems using COBOL.

Programmer Analyst II
1594-1971
Requires High School graduation and 2 years experience as above.

Programmer/Analyst
Applications are being accepted by the Fairfield-Susan Unified School District for Programmer/ Analyst. Applicants must have experience in COBOL and/or PL/1 and a strong background in the following areas:

- Development and implementation of business computer programs using COBOL.
- Knowledge of Fortran, RPG II and some program support using COBOL, FORTRAN and/or PL/1 languages.

The position is located in Fairfield, Calif. and offers a starting salary of $15,631.00 plus $1,734.00 and relocation expenses. Send resume to: C. N. Patterson, Jr., Dept. of Personnel Management, Room 207-A Courthouse, 210 Campbell Ave., S.W., Roanoke, Va. 24011.

EDP MANAGEMENT OPPORTUNITIES

Our clients, a leading service company in the Los Angeles area, has 2 openings in data processing management. Candidates must be highly motivated and have a proven track record of accomplishments.

Manager Software Support

The individual will have both technical and managerial skills to support an IBM 370 computer. The person will have responsibilities for the computer support group, data base administration and data processing administration network, as well as hardware and software evaluation. College degree preferred.

Manager of Computer Operations

This position requires prior management experience with a large computer in an on-line and batch environment. Responsibilities will include computer operations, data entry and production control/scheduling. The position requires familiarity with computer systems both up and down and computer management systems and the skills to communicate with management at all levels.

These are outstanding growth potential opportunities offering top level compensation and an excellent benefits package. Both positions report to Director of Management Information Systems.

Send resume and salary history to:

CW Box 1784
709 Washington Street
Newtonville, MA 02160
Equal Opportunity Employer M/F

SYSTEMS APPLICATIONS PROGRAMMERS

IBM/370 installation with DMS/VS, CICS, SPAM and S/370 TRIVIE. Several years on line financial and manufacturing applications and growing. Several openings for programmers for entry level as well as senior positions. Send resume or call:

Norma Patz
Director, Management Systems
AIS Industries
Kingston, Tenn. 37762
1-800-261-0441

EXECUTIVE DIRECTOR

COMPUTING NETWORK FOR HIGHER EDUCATION AND RESEARCH

EDUNET is a new national networking organization designed to facilitate sharing of computer facilities among higher education institutions. As part of a major five-year development project in which E3 Funding will be available over the next several years, the network is being established as a non-profit membership organization serving higher education since 1972.

The position requires a knowledgeable person with a strong commitment to education and coordinating a national effort supported by a $2 million grant. The candidate will have had considerable experience in administration, and be skilled in coordinating a multi-institutional effort.

Applications are due January 15, 1979. Further information is available from:

Raymond B. Williams, President
EDUNET
19024 N. 126th St.
Bainbridge Island, WA 98110

SYSTEMS PLANNER

Requires High School graduation and 2 years experience as above.

The position is headquartered in southern California in a firm which offers competitive salaries and excellent benefits. As required by law, identification cards will be issued to all qualified applicants.

Informal history to:
Mr. C. J. Rainey, M/S 567, Reynolds Memorial Hospital, 210 Campbell Ave., S.W., Roanoke, Va. 24011.

Managing Director

Our client, a mid-sized expanding Mid-Atlantic technical services firm, seeks an experienced manager to direct its computer center. The candidate must have a strong ability to manage a microcomputer installation, to convert user requests into operational systems, and to provide technical guidance. Background should include a degree with S-10 years in a technical area. Knowledge of Fortran, RPG II and COBOL would be an asset. All employment costs, including training, are paid by the client. Please respond in strictest confidence by resume or phone to Bob Mansfield at (201) 922-6311.

MGR DATA PROCESSING

$35,000 + BENEFITS

Our client is a well-respected, expanding Mid-Atlantic technical services firm, seeks an experienced manager to direct its computer center. The candidate must have a strong ability to manage a microcomputer installation, to convert user requests into operational systems, and to provide technical guidance. Background should include a degree with S-10 years in a technical area. Knowledge of Fortran, RPG II and COBOL would be an asset. All employment costs, including training, are paid by the client. Please respond in strictest confidence by resume or phone to Bob Mansfield at (201) 922-6311.

FOOD PROCESSING SYSTEMS ANALYSIS

One position is available for a systems analyst and programmer to assist in the development of the systems and programming of the following areas:

- System generation, testing and support.
- System generation, support and maintenance.
- System generation, support and maintenance.

The position is based in downtown Los Angeles and requires high school graduation and 2 years experience in systems analysis and design.

Apply by December 11, 1978.
Technical Support Analyst

We’re searching for a hands-on professional who has 2-6 years experience with Unix, Steiner 90, utilizing SCA and AC490 software (Univas V/9 experience desirable). The ideal candidate will have an in-depth knowledge of data communications, with experience in hardware/software evaluation and selection. Excellent oral and written communication skills are essential.

Individuals with IBM — DOS — OS and assembly language experience will be considered. Degree required.

We are an industry leader located west of Boston, and we offer excellent benefits and career growth opportunities. Please send your confidential resume (including salary history) to CW Box 1786, 797 Washington St., Newton, MA 02160.

Boeing Computer Services, a dynamic and growth-oriented Division of The Boeing Company, is seeking dedicated, customer-oriented individuals to join its APL staff.

Challenging assignments are available at our new Virginia facility in suburban Washington, D.C. for programmers experienced in using APL and having skills of:

- Systems Applications Design & Coding
- Customer & Sales Support
- Applications Support — e.g., E-Plan, report writing

We offer excellent starting salaries and generous benefits. For immediate consideration, send resume with salary history to Sandra Stevenson

FLORIDA SYSTEMS & PROG.
STATE OF THE ART, DIVERSIFIED, GROWTH ORIENTED
Client base in the SUNSHINE STATE need in-house
SYSTEMS ANALYSTS and PROGRAMMER ANALYSTS.
EXPERIENCE of TWO or more YEARS using COROL
and/or professional experience desired. Send comprehensive re-
sume (including Salary History) or CALL

Chuck O’Connor, Chairman, Search Committee, Barbra Moun-
tana College, Billings, MT 59101.
An Equal Opportunity/Affirmative
Action Employer.

Amecom Division
LITTON SYSTEMS, INC.
515 Calvert Rd., College Park, Md. 20740
An Equal Opportunity Employer M/F/H

PROGRAMMERS AND ANALYSTS
Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications in software development and technical support. We offer exciting opportunities in computer systems. 

- Computer engineering
- Computer maintenance and support

Call or send resume to Frank Leonard Personnel, 1211 S. Westshore Blvd., Tampa, FL 33607. An Equal Opportunity Employer M/F/H

Amecom Division
LITTON SYSTEMS, INC.
515 Calvert Rd., College Park, Md. 20740
An Equal Opportunity Employer M/F/H

OPERATIONS ENGINEERS

Major NEW Avionics ESM programs with production follow-on to provide systems operating capability through the year 2000 requiring state-of-the-art development of multifunction distributed microprocessors, now provide innovative engineers with an ideal new career opportunity.

AMECOM has an immediate need for:

Six (6) MICROPROCESSOR DESIGN/DEVELOPMENT ENGINEERS
Ten (10) REAL-TIME ELECTRONIC WARFARE SOFTWARE ENGINEERS

These positions range from Member of the Technical Staff to Senior Scientist with salaries to $35,000.

If this sounds like the opportunity you have been waiting for, we urge you to call COLLECT or send your resume including salary history to:

PHILIP T. FOSTER
(301) 864-5600

Amecom is located in a pleasant Maryland suburb with your choice of city, country, mountain or water living, close to the Nation’s Capital and five major universities.

LAW OFFICE MANAGEMENT SOFTWARE
Australian software company wants to acquire rights to an operational comprehensive law office management and accounting package for DEC WD7i and PDP11.

AUSTRALIA. QUAL OPPORTUNITY EMPLOYER M/F.

EQUIPMENT MANUFACTURER

Operations Manager

Major Chicago based food service distributor is currently seeking a skilled professional to coordinate the operations of our in-house Data Processing System. Responsibilities will include the planning, controlling and organizing of all data entry, I/O, and other operational and control functions. This position will involve a managerial span of control affecting 30 supervisory, technical, and clerical employees while reporting directly to the VP of Data Processing.

Candidates should have at least 6 years experience which combine programming, operating, and managerial responsibilities.

Our sophisticated equipment features an IBM 370/145 system with DOS/VS full power. Previous IBM Systems experience is essential.

We offer a highly competitive compensation and benefits program in an environment which offers creativity and professional growth. Please direct resume and salary history to:

EDWARD DON & CO.
2500 S. Harlem Ave.
N. Riverside, Ill. 60546

An Equal Opportunity Employer M/F/H
SOFTWARE DEVELOPMENT

Career opportunity in Texas. Top national corporation searching for creative and innovative professional to work on computer systems and on-line interactive systems.

- Lead Software Prog. $30K
- Prog/Manager/Analyst $25K
- Programmer/Analyst $24K
- Systems Analyst $22K

Above positions require a degree in Computer Science or related area, and minimum of 3 years experience at comparable level with proficiency in COBOL, PL/1, C, and/or Basic. Knowledge of microprocessor (Z80, T19900 preferred) software and systems development. Excellent communication skills are necessary.

Systems & Procedure Analyst

Immediate Openings

Hillsborough County

Tampa, Florida

$1435.00 Monthly with pay raise opportunity. After a 6 month probation period. Employer offers a stimulating working environment and substantial opportunities for advancement.

Medina Information Systems offers a stimulating working environment and substantial opportunities for advancement.

TO $25,000

SYSTEMS ACCOUNTANT/SYSTEMS ANALYST

Computer science experience in accounting or related area desired. Strong communication skills. Computer experience in COBOL and PL/1 preferred. Must have a B.S. Degree in Accounting or related field.
OIL INDUSTRY

COMPUTER MARKETING CONSULTANTS

These are key management positions with Sperry Univac's newly formed Energy Marketing Center at our worldwide headquarters in suburban Philadelphia.

We are looking for recognized expertise in the oil industry. You must have a background with a major oil company, or as a senior representative of a supplier to the industry. You will be responsible for evaluating data processing system requirements in your professional area leading to the development of marketing plans for a worldwide penetration of the industry.

You will report directly to our Director of Energy, and have major responsibility for product definition, implementation and support in a worldwide market.

Positions require the following professional backgrounds:

MANAGER GEO PHYSICAL TECHNOLOGY
You must have a minimum of 3 years experience in seismic data processing applications with medium and large-scale computer systems. Array processor implementation experience with seismic applications is desirable. BS or advanced degree required.

MANAGER PETROCHEMICAL TECHNOLOGY
You must have a minimum of 3 years experience in petro-chemical engineering data processing applications on medium and large-scale computer systems. Your background should include refining and pipeline disciplines related to the oil industry. BS or advanced degree required.

MANAGER COMMERCIAL SYSTEMS
You must have a minimum of 3 years experience in commercial and retail data processing applications for the oil industry on small to large-scale data processing systems. BA or advanced degree required.

The positions require the ability to communicate with all levels of management, and excellent interpersonal skills. A reasonable amount of travel, including Europe, will be required.

These are positions that offer unparalleled opportunity for high visibility career growth.

Please send your resume, including salary history, to:
A.T. Barbato
Director Personnel
Worldwide Headquarters
Sperry Univac
P.O. Box 500
Blue Bell, PA 19424

An Equal Opportunity Employer M/F

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PROGRAMMER/ANALYSTS

Be Seen By the Best ...

M.I.S. International has grown as a successful, highly regarded software service company because of the efforts and expertise of creative and ambitious professionals looking for a true challenge. This challenge can be found in our ever expanding client base which includes many Fortune 50 Corporations, spanning the automotive, insurance, farm equipment and consumer retailing industries. In the long run, we believe the only question is...

If You Are The Best, Why Not Work For The Best?

We have current openings for:

- Business system analyst/programmers experienced in COBOL, PL/1, IMS, DMS, IDS
- Real Time analyst/programmers experienced in micro/mini computers
- Engineering analyst/programmers with time sharing experience

We have an excellent starting salary for those with demonstrated expertise; regular increases are based on individual merit. Our benefit package is second to none, and relocation costs are provided. If you think that individual effort is important, and want to work for a company that agrees with you, call or send your resume to Mr. Ed Lyons.

M.I.S. International, Inc.
31350 Smith Road - Room C
Romulus, Michigan 48174
(313) 356-7010

An Equal Opportunity Employer M/F
SOFTWARE ENGINEERS

OUTSTANDING OPPORTUNITIES

Call Collect Today
For a Direct Conversation
with the Director of Software Development!

305-587-2900, ext. 363

SYSTEMS ENGINEERING LABORATORIES, a growing leader in the design and supply of computers and systems for measurement and control, computation, and communications applications. We currently have many openings at our Ft. Lauderdale, Florida, headquarters for individuals with experience in ASSEMBLER languages and one or more higher-level languages, plus 1 to 5 years experience in operating systems development. A degree in Computer Science is preferred. We offer SOFTWARE ENGINEERS excellent opportunities to contribute either individually or in small teams, working on compilers, run-time systems, file systems, product quality assurance, and major operating systems development. You will be interacting with experienced software engineers, advanced systems, logistics, and documentation groups. We offer competitive salaries commensurate with our background and experience, plus generous salary and benefits programs, we offer pleasant professional surroundings. For further details, contact Personnel Department.

FOR IMMEDIATE ATTENTION, CALL COLLECT TODAY 305-587-2900, ext. 363
If unable to call send your resume to Fred Brillante, Dept. CW 1211

SOFTWARE ENGINEERS

ENGINEERING LABORATORIES

6801 W. Sunrise Blvd., Ft. Lauderdale, FL 33313

We Are An Equal Opportunity Employer M/F/H

Sr. Design Engineer/MTS

Creativity, innovation, performance: these are apt to characterize Datum's reputation within the marketplace. Become an integral part of our success story as you use your own creativity and technical expertise.

Background should include microprocessor, operating system, systems design, circuit design, software packages and special development. 5-7 years related experience and a BSEE or equivalent is required. Will interface with all levels of management.

We offer a fine starting salary and comprehensive benefits.

Please send resume to: Industrial Relations, Datum, 10636 S. State College Blvd., Anaheim, CA 92806.

Equal opportunity employer M/F

DATA BASE CONSULTANT

UNUSUAL OPPORTUNITY

Leading international Data Base consulting firm has immediate openings for qualified professionals in New York, Washington D.C., and Philadelphia. We are seeking candidates who have experience in Data Base Management Systems (IMS, IDS, TOTAL, ADBASE) and/or Data Dictionary Systems. Experience with database management and a BS in Computer Science is essential. Ability to communicate effectively verbally and in writing is desirable.

Compensation commensurate with experience. Exceptional benefits.

Send resume to:

DBD SYSTEMS, INC.

77 North Centre Avenue
Suite 304
Rockville Centre, NY 11570

Equal opportunity employer M/F

OPERATIONS ANALYSIS/ HARDWARE PLANNING

Large Houston based financial organization has a requirement for an individual to assist in data center operations improvement analysis in a multiple CPU, online environment. Additional responsibilities will include assisting in long range hardware planning, equipment evaluation and computer performance measurement.

In addition to excellent oral and written communications skills, the successful candidate will have:

• An in depth understanding of technical and operational issues of a large data processing organization
• 2-3 years of Data Center operations analysis, or project management experience in evaluating and recommending operational improvements for a large IBM installation
• Other more years of planning equipment acquisitions, and improving operations effectiveness through automated techniques.

Qualified candidates should send a resume in complete confidence, detailing background experience and salary history to:

Manager, Professional Recruiting

P.O. Box 2557
Houston, Texas 77001

EQUAL OPPORTUNITY EMPLOYER M/F
We are a leading manufacturer of broadcasting and related equipment and a steadily growing division of Harris Corporation. Harris is a diversified and highly successful electronics and communications corporation with volume above the three quarter billion level.

We offer exceptional opportunities for long-term professional career development for qualified candidates with demonstrated ability to obtain results.

**SYSTEMS ANALYST**

The qualified candidate must possess good organization, communication and project management skills. Requires experience in Order Processing Applications. Position includes Project Management responsibilities for the development of an on-line order processing system. Mini-computer experience desired.

**PROGRAMMER/ANALYSTS**

Positions are for Programmers/Analysts with Manufacturing and/or Financial Systems experience. Desire ANS COBOL, OS/360 and on-line experience. Total compensation plan and benefits attractive. Relocation will be well assisted. Send resume in confidence to:

**PROFESSIONAL EMPLOYMENT MANAGER**

HARRIS CORPORATION
BROADCAST PRODUCTS DIVISION
P.O. Box 4290
Quincy, Illinois 62301

An Equal Opportunity Employer—Male and Female

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**SYSTEMS ANALYST**

The candidate should have 2-5 years of systems analysis experience with demonstrated abilities in the design and implementation of major production, accounting, and financial systems for the company.

We seek a creative systems analyst with excellent technical and communications skills. The candidate should have 2-5 years of systems analysis experience with demonstrated abilities in the design and implementation of major production, accounting, and financial systems for the company.

**System Analyst at Corporate Headquarters in Portland, Oregon**

A young, aggressive and growing energy firm can offer you significant challenges and opportunities in systems development with career growth. A recently created data processing department has been charged with development and implementation of major production, accounting, and financial systems for the company.

We seek a creative systems analyst with excellent technical and communications skills. The candidate should have 2-5 years of systems analysis experience with demonstrated abilities in the design and implementation of major production, accounting, and financial systems for the company.

**EDP AUDITOR**

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Qualifications: Ph.D. in Computer Science, Information Systems, Business Administration, or related field. Must have background in computer programming. Must be interested in teaching, 3-5 years experience in either systems design, data base management, small business computers, or EDP audit. Send letter of application to: Dr. Robert A. Scholes, faculty opening (contingent upon funding), California State University, Pomona, Pomona, CA 91768.

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January 11, 1978

ComputerWorld
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<table>
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<tr>
<th>Model</th>
<th>RAM</th>
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</tbody>
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</tr>
<tr>
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<td>32K WORD CORE MEMORY</td>
<td>DEC LIST $7,100</td>
<td>50%</td>
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<tr>
<td>M11-4C</td>
<td>EXPANSION BOX &amp; 32K WORDS CORE MEMORY</td>
<td>DEC LIST $5,220</td>
<td>50%</td>
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**11/34-11/04 MEMORY — SAVE 50% AND MORE**

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<td>16K WORDS</td>
<td>DEC LIST $5,220</td>
<td>50%</td>
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<td>16K WORDS</td>
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<td>DEC LIST $5,220</td>
<td>50%</td>
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<th>Type</th>
<th>Description</th>
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<th>Discount</th>
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<td>32K WORD CORE MEMORY</td>
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<td>DEC LIST $5,220</td>
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**11/34-11/04 MEMORY — SAVE 50% AND MORE**

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**WANT TO BUY**

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<table>
<thead>
<tr>
<th>Model</th>
<th>Memory</th>
<th>Channels</th>
<th>Attached Drive</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>360/45</td>
<td>32K</td>
<td>1</td>
<td>12</td>
<td>200</td>
</tr>
<tr>
<td>360/65</td>
<td>64K</td>
<td>1</td>
<td>12</td>
<td>200</td>
</tr>
<tr>
<td>360/75</td>
<td>128K</td>
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<td>360/95</td>
<td>256K</td>
<td>1</td>
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</tr>
<tr>
<td>360/125</td>
<td>512K</td>
<td>1</td>
<td>12</td>
<td>200</td>
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Str. End 3.3 3.3
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Earnings 1,297,871 3,003,000

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Revenue 7,989,000 8,770,000
Tax Credit 60,000 60,000
Low 689,000 139,000
High 11,680,000 7,667,000
Revenue 15,130,000 14,178,000
Earnings 804,000 (500,000)

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1978 1977
Str. End 3.6 3.6
Revenue 2,088,000 2,366,000
Tax Credit 13,000 13,000
Low 43,000 70
High 11,600,000 7,667,000
Revenue 110,000 134,000
Tax Credit 259,000 259,000
Earnings 830,000 500,000

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Three Months Ended Sept. 30
1978 1977
Str. End 1.5 1.6
Revenue 3,908,000 3,634,000
Tax Credit 32,000 32,000
Low 830,000 830,000
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