Software Patent Threatens Many Users

By Don Leavitt
ON THE CW STAFF

OTTAWA, Canada — Computer installa-
tions doing accounting work here and in the U.S. may be in for legal battles and
royalty payments if David M. Homa has his way.

Canadian Patent

The Canadian government late last

month issued a patent on a software
system to the inventor as a "revo-
lutionary" approach to management
reporting, analysis, financial and accounting
operations that are so "fundamental" to
business, the patent "will affect prac-
tically the entire accounting and com-
puter industry."

The patent was issued to Homa, presi-
dent of Xoma Ltd., a Montreal-based
consulting firm. An application has al-
ready been filed for a U.S. patent, and
Homa expects that added protection to
be granted in 1974.

Meanwhile, Homa warned, "the com-
puter industry proceeds to improve/imply
to have the value of its invention recognized
by the computer industry and to require
that reasonable royalties be paid to the
company for its use."

What It Does

The system, newly patented under
Canadian Patent No. 915,922, allows
"business large and small, to make use of
today's computers without intricate pro-
gramming and at a reasonable cost," Homa
claimed. The software covers means of separating data coming into a
computer into individual transactions,
classifying [editing] and then storing ac-
ceptable items or rejecting those that
(Continued on Page 2)

Software/Services: 6683

Systems/Peripherals: 1

Professional Practices: 1

Software/Services: 12

Systems/Peripherals: 18

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Energy Crisis No Worry to Some Users

Open Bids Linked to Master Plan

IBM Charges Calcomp Monopoly
Poor Planning Hurt Model Crime Program, Critics Say

By Margarette Zientara

ST. LOUIS, Mo. — Four-and-a-half years after the St. Louis Circuit Court's computerization program was praised as the "pilot program for the whole nation," critics have blamed too little planning and too little federal supervision for certain unfulfilled goals of the program. In the program's defense, Circuit Judge Carl R. Gaertner claimed "the major part of the program is completed and is definitely operating." He stated that the one completed project has 27 components to it, whereas of the six uncompleted projects each has one component.

The computerization program began in 1969 as the branchchild of Circuit Judge Thomas T. McGuire, who served as its first project director. McGuire also served on Region Five of the Law Enforcement Assistance Council, the agency which has disbursed most of the program's funds.

Conflict of Interest Possible

In November 1970, McGuire resigned as director when it was informed federal officials that his dual role might present a conflict of interests. At that time, John S. Wilson took over as project director.

In McGuire's original application for $8,900 in federal money, he set up two projects that were to be completed within six months of receipt of the money:

- A complete history of every criminal case.
- An attorney listing to expedite the assignments of lawyers to indigents.

The first project, the only one in the four-year program to be completed, was plagued with problems from the start and in the end took almost two years.

More Money Needed

Soon after the start of that project it became apparent that more federal money would be needed, so grants of $18,000 each were approved, making a total of $44,900 of federal money available during the first year. As an inkling match to the federal money, the City of St. Louis contributed $2,140 worth of personnel and computer time.

Then the problems really started mounting. The first programmer quit to take a better job within two months of being hired.

In December 1969, three months before the project was to be completed, Wilson turned to write the programs. Wilson said records show IBM received at least $17,000 for its work, almost all of which was later redone.

In the spring of 1970 a new computer expert was hired who, over the next 12 to 15 months, wrote and rewrote more than 20 programs aimed at accomplishing the first goal of an "automated system of inventorying and accounting for all criminal cases." Of the more than 20 programs written, only about five or six were ever used regularly, according to the programmer, and only seven of them were distributed at all.

Six other projects slated for the same plan are still being worked on or were dropped completely:

1. Computerization of the fines, fees and bond accounting procedures in the office of the circuit clerk for criminal causes. This project, according to Judge Gaertner, was "not completed."

2. Computerization of the jury commission's records. This project was not completed, and is now "in process," according to Gaertner.

3. Automation of the state probation and parole office. According to Gaertner, that office was already hooked into a national organization which furnished the information to them. The planners didn't realize that at planning time.

4. Establishment of an on-line capacity for the entire court computer system, with CRTs on the judges' benches. Gaertner said there was "no need for that."

5. Establishment of an attorney listing service to expedite the assignment of lawyers to indigents. This project was completed in about four months by the programmer but a few weeks later the Missouri Supreme Court ruled that lawyers could not be forced to defend indigents, thus making the program useless.

6. Development of a jail census. This project is now in progress, according to Gaertner.

4½ Years Later It's Operating...Partly

Confidence is dealing with the world's largest independent peripheral manufacturer.

Clear Up the Airway, Improve Reception

VICTORIA, Australia -- Are you suffering from ionospheric irregularities? A computer at Latrobe University is analyzing ground- and satellite-based measurements of irregularities in an effort to improve the prediction of short-wave broadcasting reception and distribution of standard frequency broadcasts. The studies are being conducted by the university's physics department.

The university's configuration consists of an Interdata Model 70 with 16K bytes of core, high-speed paper tape reader, punch, digital flatbed plotter, analog-digital conversion equipment and 7-track magnetic tape.

In one application on this system, Doppler information from standard frequency broadcasts is first received on slow-speed analog tape at the Neerlong Field Station just north of Melbourne. It is then played back at high speed and digitized on magnetic tape or fed directly to the IBM's Fort Fourier Transform analysis is performed on the data of the

Ampex solved the "disk delay" puzzle with fifteen-second start/stop

Passage of time is a relative thing. A minute doesn't mean much on your lunch hour, but sixty seconds can be an eternity when you're waiting to change packs on a disk drive. That's why Ampex developed the DM-330 Disk Drive with 15-second start/stop. To cut down the time you stand in one spot, eyes glued to a rotating pack, waiting for it to coast to a stop.

Part of the complete DS-330 Disk System, the DM-330 is plug-compatible with IBM's 3330 hardware, costs less and works harder. Just high loading means your DP people can give up weight-lifting. And because the air shield lifts away with the flip-up top, disk pack changing is a simple matter of slide-and-twist.

Our DS-330 System Controller can handle as many as 16 DM-330 drives for an all-up capacity of 1.6 billion bytes. All with an average access time of 28 milliseconds, all with user convenience, all with Ampex accuracy, reliability and quality.

When it comes to Disk Drives and complete Disk Systems, Ampex has all the pieces. Call toll-free 800-421-6554 to find out how they fit in your data processing installation.
Privacy Panel Agrees: Time Ripe

(Continued from Page 1)

secretary of commerce, said the rapid growth of computerization at all levels of government and industry had put the issue of privacy on a "collision course" in the development of technology, but added the present time is ripe for focusing on the problem and acting.

Rep. Jack Brooks (D-Tex.) indicated computers were "here to stay" and the challenge was to control the side effects of computerization and not just to rail against them.

Brooks added there was a need for a broad national policy in the field of privacy in computerized systems, indicating the nation has hardly taken its first steps in this direction.

But at the same time, he said, the broad policy recommendations adopted by Congress and others would be unworkable unless computer users and technicians could develop ways to make their files and centers secure.

At the same time, Brooks declared that "this is a great time for a breakthrough in the area of personal privacy since the nation is concerned over abuses to personal privacy causes by the large investigative investigations and Congress is receptive to ideas on how to better protect personal information in record-keeping systems.

Dr. Ruth Davis, director of the NBS Institute for Computer Science and Technology, said we are now past the time of stating that privacy is a big problem and are at a stage where we can break the problem down into its component parts and assign responsibility for solving those parts.

At the same time, Davis cited a crying need for "national coherence" in the area of privacy considerations since the more than 70 privacy bills pending in state legislatures and the dozen or so in Congress could lead to a "conflicting morass" of regulations even if just a few were actually passed.

The three major efforts that should begin today, she noted, are:

- The development of uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations which would be necessary to keep uniform operating procedures for all installations 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Computerized Traffic Signs Make 'Sense'

By Marvin Smallheiser

Los Angeles, Denver and the New Jersey Turnpike Authority have all come up with the same idea of computerizing traffic signs on major highways to improve traffic flow and make travel safer.

Los Angeles is in the forefront with a system in operation for two years. Forty-two miles of freeway are under electronic surveillance by means of sensors in the pavement and a communication system linking helicopters with tow trucks and police, according to Albert Perdomo, assistant highway engineer for the freeway department.

The 400 sensors are polled 15 times per second by a Xerox Sigma 5, which then analyzes the rate at which cars are moving. In a central control room, information is flashed every 20 seconds onto a display map illuminated by lights representing measurement points, showing whether each point has a smooth flow of traffic, congestion or a tie-up.

Helicopters

The Los Angeles system is unique in its use of helicopters, which other the two systems will not use. They send pictures of any incident area via closed-circuit television to the control station to help direct assistance vehicles. Tapes of those pictures are also used for training.

Besides the Sigma 5 with 28K memory, the system's hardware includes a Data General Nova 1220 with 16K that controls the signs on the Santa Monica Freeway advising motorists of free-flowing traffic conditions. A line printer, card printer, card reader, key-punch, two teletype writers and two CRT's complete the system.

The Denver system, now being installed on sections covering 28 miles of Interstate 25, 70 and the Denver-Boulder Turnpike, is expected to be operational by April 1974. Detectors in the pavement at half-mile intervals will sense traffic flow and send electronic messages through underground telephone cables to a Honeywell H-316 computer, according to J.R. Boyle of Honeywell Traffic Control Operations.

The computer will be monitored by traffic engineers from the highway department in a master control room, also with a display map. Data from the detectors will be interpreted by the computer, which will then activate the message signs to advise motorists of traffic conditions. A similar system is in operation in greater Chicago.

The New Jersey Turnpike Authority expects to have its system working by the end of 1975, having just awarded the contract to Revenue Systems, Inc. of Plainview, Long Island, N.Y.

Sperry Systems Management Division designed the system, which is based on a PDP-11/40, and will install it. The New Jersey system will cover 35 miles stretching from Interchange 9 at New Brunswick to the northern terminus.

This system also will use electronic sensors located at half-mile intervals and a control center at East Brunswick will be manned 24 hours a day. The sensors will detect traffic build-up and automatically, via computer preprogramming, activate signs to post a reduced speed and to identify the problem to the motorist.

The New Jersey system will use lighted signs already in operation under a different system. At the present time patrolling state police report any trouble on the highway and the sign operators are then directed to change the wording on the affected signs. The New Jersey control room will be manned by a traffic engineering dispatcher from the New Jersey Turnpike Authority and, like the other systems, will have a wall panel map and CRT. The CRT will furnish further pertinent data such as the average number of vehicles passing each point in the system, the average speed of the vehicles and will serve as an early warning indication of any traffic problem.

Best Route

When a problem is detected, the CRT will also furnish police with routing information to enable them to get to the trouble spot by the shortest possible route.

The Los Angeles project is the most expensive, at $8 million; New Jersey follows with $5 million system, "from design to implementation," and the Denver system is being installed under a $380,000 contract.

Cramped for space in your production of computer-generated graphics? Stretch out on the king-size 22-inch bed of the new Gould 5100. In fact, the Gould 5100 gives you the widest plotting capability at the fastest speed of any electrostatic unit. With a price/performance ratio superior to every other printer/plotter on the market.

The Gould 5100 has been specifically designed for scientific and engineering work where speed is essential, and where the ability to print out such materials as seismographic charts and A to D size drawings is required.

And it's absolutely loaded with features. 22-inch wide roll paper. Up to 3 inches per second in graphics mode. Resolution of 100 dots per inch horizontally and vertically. Superior density of plotter output.

What's more, the optional 96 ASCII character set allows the Gould 5100 to print 264 characters across the page at 1200 lines per minute. Direct on-line interfaces are available for IBM System/360 and IBM System/370 computers as well as for most mini-computers.

And Gould software is the most efficient and flexible available anywhere. In addition to the basic software package that emulates the widely accepted Calcomp graphics package, special engineering, drafting, scientific and business graphic software enables your computer to efficiently handle the most sophisticated computer graphics.

Built with traditional Gould quality, and backed by Gould's own reliable service, the Gould 5100 will greatly expand the efficiency and throughput of your production of computer-generated graphics. Let our Pete Hightberg or Bill Koepf prove to your satisfaction. Get in touch with them now at Gould Inc., Dept. CW11, Data Systems Division, 20 Osphee Road, Newton, Massachusetts 02164.

The new Gould 5100 printer/plotter. It lets you work out on the biggest bed in the business.
the port has a major, if quieter, role.

On the waterfront

In an urban sprawl often thought of as dominated by the Boeing Co., the port has a major, if quieter, impact. And data processing, in a role usually thought to be dominated by the Boeing Co., the port has a major, if quieter, impact. And data processing, in a role usually thought of as dominated by the Boeing Co., the port has a major, if quieter, impact.

A systems analysis organization, unique in this field, paces that impact. And data processing, in a role usually thought of as dominated by the Boeing Co., the port has a major, if quieter, impact.

The systems and data processing organization accounts for 42 of those! About 55,000 jobs are dependent on the Port of Seattle.

DP Proves Answer to Complex Seattle Port Problem

SEATTLE — An estimated 55,000 jobs are dependent on the Port of Seattle.

What sails into Seattle's Elliot Bay now ranges from barges and tugs to the latest and largest Japanese tankers. And the task of managing the port's complexity has increased dramatically, with computing leading the way.

In fact, Port of Seattle activities are not limited to seaborne transportation. Sea-Tac Airport, 747-big and highly automated, is also a part of the port.

Inside the port's ancient building one discovers a modern and spotless office complex. To the right, through the double-glass doors labeled "Systems and Data Processing, Clifford Muller, manager," is the analytical and electronic pulse of the port.

Glass-windowed and carpeted offices, housing two or three systems analysts each, are furnished with desk-and-storage units designed by one of the organization's own people with a flair for the niceties of architecture. Through the glass one sees remote terminals, both CRT and hardcopy, scattered through the offices. Clearly, this is no quill pen and tall stool operation.

But where is the computer?

That omission is purely intentional. The Burroughs B4700 resides in a small side room, surrounded by its electronic umbilicals and peripherals, communicating quietly with its batch workload and its 38 remote terminals.

No one gets in the computer room without a specially printed magnetic key card, and the key "combination" is changed every three months. Still another key card controls access to the separate mass storage room where the disk storage units house the port's centralized data base.

There are three reasons for the security, says Cliff Muller — to increase operator productivity, to keep technical employees from congregating there for conversation and to "keep risks down." Risks, of course, are primarily those of maliciousness or theft.

But there is another, quite important risk. The port's capability is "number one in the U.S. in terms of transportation systems," according to Muller. And in the highly competitive port business, where Seattle ranks among the nation's top 10 ports, that unique advantage is worth protecting. Visiting managers from other ports are definitely not invited to tour the port's DP facilities.

What Happens?

What kind of problems are solved in a port's DP operation? Primarily, transportation problems are the concern.

What's arriving on the T.S. Queensville from Bangkok? What parts is Arco oil bringing in by Burlington Northern for the North Slope oil fields? When does the Hotaka Maru arrive, and what's in those 40-foot containerized cartons?

Twenty-one different DP systems are in operation, processing one-and-a-half million transactions in 1972 (by 1978 that should increase to 28 systems). Accounting, which once made up 98% of the port's data processing, is now down to 17% as more sophisticated applications continue to evolve. The remainder of the port's workload is scientific, primarily warehousing structural design.

At the coding level, also, Muller mini-mizes risks. Assembly language is banned, except as a last resort. Cobol and Fortran are the required languages. A thick software standards document spells out the rules, and supervisors audit programmer conformance, including browsing through listings to make sure those rules are followed.

Review Board

At a higher level, the three top port executives and Muller make up a data processing review board, monitoring planning and direction and keeping DP in tune with the port's highly business-oriented goals.

It's a problem-oriented shop. "Hardware? Muller said, "should be transparent to the user." When the changeover from a B3500 to the B4700 (necessary by the increasing size of that one-and-a-half million transaction load) occurred last December, the transition and parallel run time was accomplished in two weeks.

The remote terminal support was checked out on the new system on weekends by analysts working overtime, to insure that those 30 remote sites wouldn't have to realize a new computer was on the scene.

What remote terminals? "Time equals money" to the port's customers. Batch processing was simply not fast enough for shippers who want cargo to move, not settle into warehouses. Paperwork movement pays cargo movement.

To speed that paperwork, terminals are being supplied by U.S. firms, this is a fantastic opportunity. Especially in view of the fact that the overseas market is expected to grow at an annual rate of 25% to 30% in the next 5 years.

Let us show you where your best customers are located. Clip the coupon now and start selling where the money is.

If you make computers or computer equipment, this coupon will introduce you to a 19 billion dollar market.

That's the amount overseas customers are projected to spend between now and 1977. On mainframes, peripherals, data transmission equipment and minicomputers.

That's the amount the U.S. Commerce Department came up with after a careful Global Market Survey in 23 selected countries.

Countries where the rate of growth for computers and related equipment usually exceeds that of the United States.

The point is, we know where those customers are. And what they're looking for. And we're ready to provide you with the survey free of charge.

Considering that about 90% of the free world computer market is supplied by U.S. firms, this is a fantastic opportunity. Especially in view of the fact that the overseas market is expected to grow at an average rate of 25% to 30% in the next 5 years.

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By Robert L. Glass

Special to Computerworld

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Let us show you where your best customers are located. Clip the coupon now and start selling where the money is.
Thinking Security? Consider Water Protection

TOLEDO, Ont. — Is your computer installation secure? A simple way to determine the security of your system is to check it against the following security musts concerning water protection and computer center access control:

- Include water detectors and alarm systems in the building design to protect against water damage if the building’s waste or water pipes burst and there is a fire on the floor above.
- Locate shut-off valves for the sprinkler and air-conditioning systems and the building’s water supply in accessible and clearly marked positions.
- Inspect walls for holes drilled to install telephones or electrical outlets to see that they have been sealed to protect against water leakage. Ensure these outlets are above the floor. Ensure junction boxes are above recessed floors.
- Keep plastic covers for computer equipment available and clearly labeled to cover each piece of equipment to protect it from dust during construction and from water produced by sprinklers used in firefighting.
- Designate the computer center as a "restricted area" where access is limited to authorized personnel.
- Monitor access to the computer center during normal working hours by a receptionist at the entrance, and after working hours by a security guard service, a closed-circuit TV system or an alarm system.
- Have visitors sign a log book when they enter or leave the computer center, and do not allow visitors into the center after working hours.
- Have employees and visitors wear badges to designate access limitations.
- Periodically inspect the schedule of persons, including cleaning staff, who have access to the operations area in order to ensure there is no time when no one, or only one person, is in the computer center.

This checklist was compiled by DCF Systems Ltd., 74 Victoria St., Toronto, Ont. MSC 2A5.

And it would cost you less, too.

Because, while our new Sycor 250 does everything IBM’s 3270 does and more, its monthly lease cost is lower.

And thanks to its intelligence, that’s only the beginning of your savings. Take data entry. Our 250’s high I.O. insures every piece of data your operator enters is absolutely clean. So less time is spent on rework.

Which means you can install more terminals per line and probably end up needing fewer lines and ports.

Give your Sycor representative a call. He’ll be happy to point out other money-saving ways the 250’s intelligence can be directed to your operation.

While you’re at it, ask him about the 250’s impressive optional equipment. Like the badge reader, the light pen and the whole family of versatile printers in speeds of 40, 80 or 160 cps.

He knows it takes a smart DP manager to pick an intelligent terminal.

The Energy Crisis

So the energy crisis is upon us. Whether the fuel “shortages” are politically inspired whether they stem from a runaway conspiracy to control prices, or whether the problem is truly out of hand, is to speculate. The truth is, at least for the short term, we have an energy problem.

And many computer users appear to be ignoring the facts. Preliminary results of a Computerworld survey indicate that users have “happened upon” attitudes. While some users admit it can happen, they are doing little to protect their centers.

It is time to prepare contingency plans: What happens if a reduced work week is mandated by state or federal governments? What reports can be eliminated if buildings (and therefore data centers) are to be closed down after the “first shift”? What happens if power companies are forced to cut voltage by more than 5%? What happens to files if disks and tapes are in short supply?

Many people fear big business has caused an artificial shortage [see Herb Grosch’s column], but regardless of the cause, a short-term crisis needs to be dealt with. Even if a longer-term crisis is avoided, users should begin emergency plans for the winter.

Forbes ‘Misunderstood’ EFTS—Privacy Not the Issue

By Dale L. Reisard

The result — no consumer concern.

Forbes: “The trend toward computerization disturbs bank customers. Utter nonsense — surveys are quite consistent in showing that most bank customers are positive in their reaction toward the use of computers. As a matter of fact, the consumer tends to be more trustful of unattended equipment (cash dispensers, for example) than human tellers. Computerized records are more credible in the eyes of the typical bank customer than manually prepared records are.”

In EFTS the merchant credit program is actually enhanced, the credit constraints not weakened, and the typical merchant reaction is favorable to the new system. As for the consumer, EFTS adds a new dimension to the function of the consumer’s credit. Enormous money is involved, which when properly used, is a powerful new companion to credit.

Whatever Forbes is talking about, it isn’t EFTS. In EFTS

Viewpoint

The vast majority of consumer transactions are debits — not credits. They are electronic replacements for transferring funds already on deposit — not purchases made with credit cards. Forbes is confusing credit cards with EFTS, the mistake of an outsider engaged to give a speech about a subject he is not familiar with.

In EFTS the merchant credit program is actually enhanced, the credit constraints not weakened, and the typical merchant reaction is favorable to the new system. As for the consumer, EFTS adds a new dimension to the function of the consumer’s credit.

Forbes: “Computer records of financial transactions under EFTS would indeed be valuable, centralized, comprehensive and readily available. The individual’s right to privacy versus the right of banks to know at least in this (EFTS) system.”

The plot thickens. Having confused EFTS and debit card business, Forbes now tackles the “invasion of privacy” issue. The premise is natural enough — if one believes that EFTS records are centralized into a single dossier.

The whole thing is clearly a greedy conspiracy, designed to get the Alaska pipeline gravy train de-surfaced, automobile emission controls dismantled, utilities deregulated, huge dump cars modeled again, and move all, to generate enormously higher prices and profits for the oil and automobile companies and the utilities.

Not only is the regressive nature of this distributorship, it is that the public will keep the poor people cold, dark and off the road — but if the public did accept pricing as a method, the surplus profit ought to be taxed away and used to build mass transportation and clean up strip mining and oil spills.

For the sake of our future, for the sake of our kids, don’t let these horrible people get away with it!
Recently I have been attacked for "unprofessional conduct," and for harboring "nonsensical" fears that IBM and other vendors may be having inside information about their competitors. The answer is IBM's performance in the case. This would have been the ideal case to take before the Supreme Court and the nation as an assault on the antitrust laws. For a more thorough, in-depth analysis, I recommend Capitalism: The Pro-Bono-Ideal, also by Alan Taylor.

Robert Arning

Framingham, Mass.

Joe Wright

New York, N.Y.

When I became editor-director of CW last summer, I promised to allow letters from our readers to speak for themselves, since I had ample opportunity elsewhere in the paper to lay out my views. The large number of such contributions on subjects like this, plus some scribbles on my "Santiago, Moscow and Forest Hills" column [CW, Oct. 10] from one Mel Jones of Collinville, Ill. -- "The how can you be so stupid?" sort of thing -- represents a political viewpoint. Call it right wing, call it Ayn Rand, call it Bierce (Jones enclosed three John Birch Society reprints), it is an anti-intellectual prejudice that writes off the laws of the land as foolish and immoral, not worthy of defense, when they are perhaps the best policy the writer's economic/political prejudices can suggest.

I have, at the other end, those who argue that fear is contagious; I'm trusted, not guaranteed, at Jones' FBI informants and Ayn's con- tempt for the antitrust decrees. But I have a forum; I can brandish my opinions in these CW's editorial columns.

Should I henceforth suppress right-wing comment (note that I haven't's, so far) It would be an easier problem if we had a balancing flow of left-wing suggestions: nationalise IBM, socialize software! But we don't. I would appreciate reader comments before I decide. HG

Telex Support

This letter is not an official comment by the Telex Corp., but is a second copy of correspondence sent by an employee who is offended by the contemptuous letters expressing the "immoral Ac- tion" and "More Outrageous" published in the Oct. 31 issue of Computerworld.

I don't know who Cheryl Johnson is nor what her background might be, nor do I understand why her letters deserve so much space. It would seem in light of the newfound shortage that CW's supply should be put to better use than to carry the apparently ignorant and naive ravings of one who judges the success or worth of a corporation, for the basis for what has made America great, and what is and is not free competition from her reading of the New York Times.

If Johnson has the time, aside from her letters, I suggest she read Judge A. Sherman Christensen's decision to become informed on what free competition is, and that she take the time to find out what Telex Computer Prod- ucts, Inc., does and significantly. However, to dis- count the laws of the land as foolish and immoral, not worthy of defense, when they are perhaps the best policy the writer's economic/political prejudices can suggest, is regarded as an assault on the antitrust laws. To call these facts "outrageous" seems inappropriate reward for attempting to rectify oppressive and unprofitable conditions of which have caused giants such as GE and RCA to leave the scene, and makes it impossible to exist, lose their identity or be forced to link arms with their former competi- tors in an attempt to survive. Then there is Memory, but that's a whole letter's story.

Philip E. Deck

Telex Computer Products, Inc.

Tulsa, Okla.

Provide Accurate Information

The DP Can Render Pro-Bono-Publico Services to Society and Government

Recently I have been attacked for "unprofessional conduct," and for harboring "nonsensical" fears that IBM and other vendors may be having inside information about their competitors. The answer is IBM's performance in the case. This would have been the ideal case to take before the Supreme Court and the nation as an assault on the antitrust laws. For a more thorough, in-depth analysis, I recommend Capitalism: The Pro-Bono-Ideal, also by Alan Taylor.

Daily News of Computerworld

New York, N.Y.

We can, however, define such matters as the professional usefulness of computers, it is necessary to reduce the costs. Doctors, fore- more they could insist on smallpox vac- cinations, but to show the cost was real- ital, and that medical volunteer labor would, if necessary, be provided free.

Data processing can meet this require- ment by using the unique characteristics of these programs -- i.e., they have practically no product- cost.

In the case of the rainfall simulation, for instance, there is a program available from the Corps of Engineers which can almost certainly be used to determine whether a much more detailed simulation analysis is required.

If this program were in a library avail- able to all professional computer scientists and branches, at little or no charge, and if this library were available to planning boards, in many areas of technology. It does not, however, have a situation where it was developed.

The life of CW depends on it.

No Great Expense Involved

Such a professional library could be set up in a professional library might include, for instance, public programs that would help the cities and towns start reporting their crime figures for comparison with those of similar units -- even including cities the size of Hartford, Conn. -- do not offer this kind of service so now. One of the reasons for this surprising failure (which imperils the health of the national system) is the complexity of initiating an effective re- porting system.

Yet this is an area where professionally checked DP programs can considerably help both by providing economy and proper performance and speeding up the time scale. Other programs could deal with items such as the proper measure- ment of the effectiveness of crime preven- tion programs, recidivism of released pris- oners, etc.

No Great Expense Involved

Such a professional library could be set up in a major expense. It could pro- vide better and cheaper services than those available from, for instance, the Nasa's Cosmic. It might indeed be able to be sus- taining.

Our own recommendation is that such a library be set up by a group of DP professionals not affiliated with either the computer manufacturing nor the educa- tion industry. Such a group of interested parties is needed. Such programs are invited as well as suggestions for appropriate programs or offers of sup- port.
COMPUTERWORLD

Why sell only software when you could be selling a complete turnkey system?

The Lockheed System III

If you ask, "Why the Lockheed System III?" the answer to this question is because it offers you a unique opportunity to supply the total needs of your customers by combining your own application software with an inexpensive, flexible, minicomputer system. A computer built by Lockheed Electronics and backed by dependable, nationwide service.

How unique? Let System III speak for itself:

**The basic configuration includes 10K bytes of memory, CRT/keyboard, 100 CPS printer and 5 million byte disk. Furthermore, System III is easily expandable without a lot of hidden cost.**

And what's probably most important to you and your customers: the cost of a typical System III can be substantially less than the cost of competing systems.

Limited Appeal

It is entirely optional to the customer, and has limited appeal to date.

Privacy Issue

Misunderstood

(Continued from Page 8)
Professional Practices

Turnkey Contract Guide Outlined

The practice of acquiring computerized systems by turnkey contract contains a built-in disparity between the technical skills available to the contracting parties. On one hand, there is the equipment vendor with a wealth of skills at his disposal and on the other, there's the buyer with a need for new skills.

The following 12-point agreement framework could be a guide to a professional standard of negotiations:

- **Definition of “turnkey responsibility”** to be provided by the vendor, together with lists of what is and what is not the vendor’s responsibility.
- **Definitions**, with examples, of key technical terms.
- **The incorporation of proposals and other documents in the agreement.**
- **Provision of a system design specification**, including system specifications (input, output, logic process); hardware and software specifications; performance specifications development and installation schedules; and customer facility, personnel and support requirements.
- **Approval and/or acceptance procedure** – to include formal approval of the system design specification; acceptance test or demonstration using realistic business data and operating volumes; an operational test showing daily performance criteria and system; acceptable scheduling control for testing later phases of the installation plan; acceptance of supplier responsibility for operating system and application programming defects detected after acceptance tests.
- **Supplier statement regarding ownership of equipment, programming and documentation with safeguards relating to ownership changes, business failure, etc.**
- **Specification of equipment performance**, including statement of conditions which can cause 15% degradation, covering areas of uncertainty in supplier's estimates and maximum investment needed to meet proposal contingencies.
- **Specification of software performance** – a statement regarding capabilities of operating system performance, specifications and limitations, and identifying those specific operating system components which can contribute to system degradation.
- **Specification of upgrading capabilities defining maximum equipment and software capabilities and costs involved.**
- **Statement of financial obligations** including safeguards, payment schedules and limitations of liabilities of both parties at point of initial contract, at approval of system design specification and at passing of acceptance tests.
- **Provision of systems development and installation schedule supported by a bar chart indicating major tasks of both parties, including leadtimes, dates and parallel activities.**
- **Description of support services, including recommendations, costs for site planning, auxiliary equipment, power failure protection, file conversions and personnel training.**

This framework was excerpted from data provided by J. Richard Cleming, a certified management consultant and president of System Planning Associates. Comments on alternative ways to handle turnkey contracts are invited and should be sent to Alan Taylor, Professional Practices Page, Computerworld, 797 Washington St., Newton, Mass. 02160.

The Computer Caravan welcomes:

As an exhibitor in The Spring 1974 Caravan.

Interdata will be displaying its newly announced 7/32 and 7/16 mini-computers. The Model 7/32 is a 32 bit minicomputer priced under $10,000. This powerful new machine has a main memory expandable up to a million bytes of 75 ns core and direct addressing up to 16 million bytes. Other 7/32 features include sixteen 32 bit hardware general registers, sixteen 32 bit hardware I/O registers.

If this doesn't sound like a "waste" to you, stop at their booth. While you're there, take a look at the Model 716, too. It's a 16-bit OAM mini featuring performance, reliability, fast start-up, support and a low price of $3200.

What may we say about your company?

The Computer Caravan/74 sponsored by

 paradyne

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Would you believe you can actually eliminate much of the time, expense and trouble in computer-to-computer data communications? This is Straight Talk about PIX — Paradyne’s revolutionary remote I/O device.PIX is performance-proven by users nationwide. For more Straight Talk on what PIX can do for your configuration, call or write us — Today!

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Corporate Headquarters: Paradyne Corporation, 8550 Ulmerton Road; Largo, Florida 33770; (813) 536-4773
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More than 80 of the country's leading corporations have bought the MMS General Ledger. They all had the resources to develop a corporate finance reporting system themselves. They installed a software package, instead.

Why? Because buying the World's No. 1 seller—the MMS GENERAL LEDGER—makes more sense than "re-inventing the wheel." After all, it's proven, reliable, self-contained, and offers tremendous flexibility because of its unique data base design.

Best of all, the MMS General Ledger can be used in DOS, OS/5, SMS and/or MVS. So when you consider the cost of developing a system, consider MMS General Ledger. You'll see that the "make-or-buy" decision is as easy as jumping off a fence.
The day the new habits arrived at St. Theresa's.

It could have been the program and it could have been a faulty tape. Heaven only knows. But you'll find no peace on earth when an error is raising the devil with your orders.

What you need to find is a way of narrowing your possibility of error. And the easiest place to start is in your selection of computer tape. How? By specifying BASF.

At BASF, we produce tapes that are a lot better than they have to be. For example, our special coating technique provides a more even dispersion of oxide particles in the binder, so no matter what your packing density, you get improved bit-to-bit uniformity and fewer sins of omission.

One more point. Our tapes don't cost any more than the competition's. You're already paying for BASF quality... you might as well have it. Write today for the complete story of how BASF computer tapes stack up against the competition. Remember, nobody makes better tape than the people who invented it.

BASF Systems, Crosby Drive, Bedford, Mass. 01730.

When it's BASF...you know it's not the tape that goofed.
Model 1511/1512 Tape Drives.
Convert and edit mini-cartridges into half-inch computer-compatible magnetic tape for communications or direct processing. The 1511 records 556 bits per inch on 7-track tape; the 1512 records 800 bits per inch on 9-track tape. Both have 7" reels. Also available: Model 1513/1514 Tape Drives. The 1513 records 800 bits per inch; the 1514 records 1600 bits per inch. Both are 9-track with 10½" reels.

Model 1533 Dual Mini-Cartridge Tape Drive.
Allows you to update multiple files, store information off-line, and sort and merge records right in the department where they originate. Up to three cartridge drives, each with two mechanically independent tape transports, can be serially interfaced with the 1501 Video Display Workstation at a distance of up to 1500 feet.

Model 1501 Video Display Workstation.
For data entry, verification and validation, it combines an input keyboard, 256-character video display screen; automatic threading magnetic tape drive for a mini-cartridge that holds 122,400 characters; a solid state of 8K memory; and a 300 Nanosecond processor.

Synchronous Communications Adapter.
Enables the 1500 system to communicate with computers using IBM binary synchronous communications standards.

Now there's the Singer 1500 intelligent terminal system.

Model 1525 Serial Printer.
A quiet, highly reliable serial impact printer. Extremely versatile within its price range, it prints up to 30 characters per second on either single or multi-part continuous forms. Accepts continuous journal roll paper from 7" to 15" widths. And continuous pin feed paper of up to six-part copies from 8½" to 15½" widths. Features automatic paper alarms.
Now there's no better way to disperse computer power throughout your company.

Dispersed computer power. In theory, it sounds great.

In practice though, it's a different story. It seems like the only way to make all that new hardware and software interface with the equipment you've already got is to use a shoehorn. Or a magic wand.

That's why the new Singer* 1500 intelligent terminal system is such a hot piece of news. Because it's designed to fit right into the operation you're running now. With an absolute minimum of fuss. And expense.

And look what you've got once it's in:

Besides the basic job of recording data, the 1500 gives you capabilities for verification, production statistics, self-check numbers, field totals, contents searching, table look-ups, range checking and copying.

Since the 1500 has BSC communication, along with unattended terminal operations, HASP capabilities, polling and selection, automatic error checking and recovery, expanded features and growth operations, you've got the most flexible means of getting your data processed you could ask for.

At transmission rates from 600 to 9600 BAUD. The system is completely compatible with System Ten* computer by Singer, as well as the IBM 360/370.

Add to that the peripherals for printing and the extra tape drives for sort/merge capabilities and there you have it: one of the most complete systems available to meet today's needs. All backed by a world-wide service organization, with 145 service centers in the U.S. alone.

And that's only the beginning. From here, you can really spread out. And put the full power of your computer wherever you need it. Because you've got a system of completely programmable, go-anywhere desktop terminals. With a pre-processor in each unit.

And that brings the practice of dispersed computer power up to par with the theory. At last.

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Information Systems by
SINGER
If you're now involved in data communications (or will be soon), vote "yes" below. We'll give you a seminar that teaches you the ins and outs of the teleprocessing field.

This is the seminar that wraps it all up. Tailored specifically for the teleprocessing user, Data Communications And Teleprocessing includes both fundamental and applications-oriented subjects ranging from transmission theory to terminal selection techniques—everything you need to know to plan effective data communications systems in 2-1/2 busy days. And that's saying quite a bit. Because data communications is a complicated area with many problems for the user. Proper planning is a must. And that's saying quite a lot.

In addition to the technical capabilities of the systems, the index also lists some 60 factors considered useful in developing extended selection criteria. Simple screening techniques to assess user requirements and the feasibility and range of available choices are also included, as noted.

Citing these and other important areas, he said:

"There is quite a range of choices now available."

"This puts a big burden on the interactive user to decide if he should even try to write his own program."

"I'm not convinced that if people help develop or write a program they actually have a better understanding of its limitations and function."

"At what level are systems different?"

"You should attend this seminar, if..."

As a participant in this seminar you'll receive a valuable set of reference materials to help you in the future—

including a comprehensive 2-volume looseleaf outline of all course materials that gives you an invaluable continuing reference source long after you complete the seminar. You're not getting just a course, but a service reference as well. Plus you will receive a copy of "Data Modem Selection and Evaluation Guide" by Vess V. Vileps, a "Data Communication and Teleprocessing Dictionary" and a line cost calculator. Course outline and materials will be prepared by the ICC Institute.

Dr. Dixon Doll, a highly respected teleprocessing consultant

Dr. Dixon Doll leads the expert faculty at this seminar. He has his Ph.D. in Systems Engineering from the University of Michigan and many years of experience in this field as a consultant and educator. He has performed work-study with communications techniques at M.I.T., taught graduate-level computer systems design, and has served as professional consultant to such firms as IBM, Raytheon, ICC and MCI. Dr. Doll is in charge of our faculty of experts, and takes an active part in the entire seminar.

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"There's got to be a better way to do it yourself."

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To: Walter Boyd, Executive Vice-President

Computerworld, 797 Washington Street, Newton, Mass. 02160

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City                  Zip □

(continued)

At your total application, and that includes personnel constraints and the funds available for implementation. That being the case, he concluded systems acquired from outside and adapted to specific needs are usually more cost-effective than systems built in-house.

Rensselaer Adds to Degrees Linked to Data Processing

TROY, N.Y. — Rensselaer Polytechnic Institute (RPI) is establishing two new DP-related degree programs in computer science and systems engineering. The computer science curriculum, leading to a B.S. degree, will be offered by the mathematics department of RPI's School of Science, which already offers a graduate degree in the field.

B.S. and M.S. Offered

The systems engineering program, with both B.S. and M.S. curricula, is sponsored by the School of Engineering, an RPI spokesman said.

"At what level are systems different?"

As a participant in this seminar you'll receive a valuable set of reference materials to help you in the future—

including a comprehensive 2-volume looseleaf outline of all course materials that gives you an invaluable continuing reference source long after you complete the seminar. You're not getting just a course, but a service reference as well. Plus you will receive a copy of "Data Modem Selection and Evaluation Guide" by Vess V. Vileps, a "Data Communication and Teleprocessing Dictionary" and a line cost calculator. Course outline and materials will be prepared by the ICC Institute.

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When and Where

Computerworld is considering the sponsorship of this Data Communications And Teleprocessing seminar in three cities during the first part of 1974. Whether or not we hold them will depend on your vote. If you are interested, fill out the coupon below and send it in right away. You are under no obligation, but you will get first preference for our limited enrollment. If we decide to go ahead, you'll receive your complete details and a registration form.

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a Computerworld special report
November 28, 1973

Growth of Minicomputers versus Small Business Computers and Other General-Purpose Computers:
Expressed in terms of physical number of computers installed.

<table>
<thead>
<tr>
<th>Year</th>
<th>Minicomputers</th>
<th>Small Business Computers</th>
<th>Other General-Purpose Computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968 (actual)</td>
<td>5,800</td>
<td>41,000</td>
<td></td>
</tr>
<tr>
<td>1971 (actual)</td>
<td>6,600</td>
<td>44,000</td>
<td></td>
</tr>
<tr>
<td>1974 (estimate)</td>
<td>27,000</td>
<td>46,800</td>
<td>99,000</td>
</tr>
<tr>
<td>1977 (estimate)</td>
<td>49,000</td>
<td>54,000</td>
<td>276,000</td>
</tr>
</tbody>
</table>

Expressed in terms of dollar value of computers installed.

<table>
<thead>
<tr>
<th>Year</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1968 (actual)</td>
<td>$174,000</td>
</tr>
<tr>
<td>1971 (actual)</td>
<td>$675,000</td>
</tr>
<tr>
<td>1974 (estimate)</td>
<td>$1,860,000</td>
</tr>
<tr>
<td>1977 (estimate)</td>
<td>$4,420,000</td>
</tr>
</tbody>
</table>

Data provided by International Data Corporation, 60 Austin Street, Newtonville, Mass. 02160 • Tel: (617) 969-4020

Mini Buying—Pitfalls
User Must Link Probable Price To Specific Need

MAIDENHEAD, England—"I find it staggering that, for some reason, management seems prepared to spend large amounts of time on something called 'optimal choice,'" said J.M. McNeil, manager of turnkey systems group, Logica Ltd.

"The most important starting point in choosing a minicomputer is for management to decide what the price is likely to be and then allot a related amount of skilled management time to its selection, stopping at the designated point. If that were done, the result of not having made quite the 'optimal' choice of machine would be negligible," McNeil said.

"Perhaps an element of pride is involved," he noted. "People like machines and they like to show them off. They would hate to put in a Vax machine and have someone come around and say they should have bought a PDP-11," he added.

Problems, Not Machines

The problem is users look at individual minicomputers as opposed to looking at individual problems. Their reality is

<table>
<thead>
<tr>
<th>Micro</th>
<th>Mini</th>
<th>Midi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Length (bytes)</td>
<td>8 to 12</td>
<td>12 to 16</td>
</tr>
<tr>
<td>Price x $2,500</td>
<td>&lt;3</td>
<td>3 to 10</td>
</tr>
<tr>
<td>Example</td>
<td>SPC-12</td>
<td>PDP-8</td>
</tr>
</tbody>
</table>

Figure 1. Classes of Small Processors

Forced on them by salesmen who each offer a different minicomputer. Users would do better to isolate their problems and then determine what class of machines can solve these problems at what costs instead of choosing by cost of machine and then seeing what problems they can solve, McNeil indicated.

Instead of a generic term minicomputer, McNeil divides small systems into three classes: micro, mini and midi.

While this is a rough categorization and it is ludicrous to speak of formal boundaries, this breakdown allows users to more readily see into what price range and capabilities area their needs fall (Figure 1), he said.

"To put into perspective...the comparative performance of the three classes of machine, we may consider a number of roles that arise in data communications (Figure 2)," he stated.

For example, when a user is considering front-end processing, in general he is concerned with the larger classes of machine. "However, if the user were only interested in simple concentration tasks, no more than the most basic machine is (Continued on Page 8/2)

On the Inside

Room to Grow

A small user "loved it and liked it" with an in-house minicomputer, and found he still has plenty of room to grow. Page 5/6

Towns Band Together

A minicomputer is providing a common ground for four communities, helping to solve their educational, administrative and inmate rehabilitation problems. Page 5/14

Mini Users, Unite!

"A national organization dedicated to minicomputers" is needed to serve as forum, swap shop and information service, according to Jon David of Systems R&D Corp. Page 9/2/3
Mini Buying—the Proper Way

The First Step—How Do I Evaluate the Data?

MAIDENHEAD, England — The first step in buying a minicomputer system is to develop a means of converting and evaluating the abundance of information supplied by the salesmen, according to J.M. McNeil, manager of turnkey systems group, Logica Ltd.

One way to get the starting evaluation information is to set up a chart as in the example shown in Figure 3—showing several possible minicomputers.

For a particular application, the user can look at his diagram and see immediately that if those were the only machines available, the application may preclude the computer.

“For example, if 32K bytes of memory are needed, not every machine will provide it. If the requirement is for a large number of interrupt levels, that will preclude all the machines except one, although it is extremely slow,” McNeil stated.

A basic proposition, according to McNeil, is that if users are realistic about the available products and their requirements, the actual number of minicomputers worth examining is small.

Once the user has chosen those machines that meet his needs he still has the hardest part of his selection ahead of him. The chart cuts out most of the machines but to bring it down to one final choice requires a more rigid analysis.

Factors regarding the supply and support for the system are listed at the top of Figure 4. These are the first factors to be considered when choosing a system.

The middle section consists of those items that generally constitute the technical specifications of the minicomputers. Some brochures give the impression that the minicomputer is basically only evaluated on its specifications and in particular items four and five (memory and processor characteristics).

Putting price as the last item does not mean to imply that it is the least important, McNeil warned.

But he also warned against being overly impressed with price and falling for equipment that is solely designed down to a price range instead of up to a performance level.

Suppliers

The three main factors in judging the manufacturers are place in the market, financial stability and applications experience, according to McNeil.

For this reason, the smart user will add a little in the favor of any supplier with a longer experience in the user's application need.

Likely Price Decided

(Continued from Page S/1)

required,” he stated.

While this is the type of selection process that should be taking place, in actuality, McNeil feels users start at the other end and characterized the normal selection process:

“First, with small computers, comparatively few people know what they want.

“The client says he wishes to buy something that looks like, say, an IBM 1070. He wants the kind of support he would get with an IBM 1080 but can only afford a PDP-8.

“He is told this is impossible and is asked for a specification; if one is lucky, one will be handed a sheet of paper which is usually a list of the attributes of a machine sold by the salesman who has made the best impression to date.

“The next stage is to make it clear that piece of paper is not a specification and some months later, perhaps if there is not too much sales pressure of the wrong sort: something approaching a view of what the user wants will materialize,” McNeil said.

“I would stress that this situation crops up in all environments, including those that are often claimed to be the most knowledgeable about the small machine, such as scientific establishments,” he said.

$995*

MINI-TSEC™, a new general purpose DATA-SCREEN™ Terminal that includes, as standard equipment the important communications functions and display features of models costing two and three times more.

The low price is complete — no extra cost options! MINI-TSEC™, with a 960 character (30 x 12) display capacity operates at switchable speeds to 9600 baud with RS-232, TTY and 20-60ms current loop interfaces. Buffered (off-line message composition) and conversational (on-line) modes plus keyboard or computer control, blink, protect and field tab are a few of the many features of MINI-TSEC™. To learn much more request brochure 975.

* Complete with keyboard in OEM quantities. 1 to 5 price, $1,000 complete.

Figure 2. Role of Small Processors in Data Communications

Figure 3. Characteristics of three typical 8-bit machines
Mini Buying — Technical Considerations

Now Check Operating Specifications

MAIDENHEAD, England — Evaluating technical specifications of proposed minicomputers is both easy and hard — information is quantifiable and comparable but it also involves the most variables, according to J.M. McNeil, manager of turnkey systems group, Logica Ltd.

After compiling a list of mini-computers that could work in the user's applications and evaluating the supplier, the user is left with a small list that should be compared on the basis of operating specifications.

Store Factors

Figure 5. Memory Characteristics

5 lists a number of items of primary importance.

During the last decade core memory has held its own against a number of new memory technologies, but we are now entering a new phase with commercially available semiconductor memory. Its advantage lies in high speed and low cost. The trade-off is a volatility problem: the contents are lost when the power goes down, McNeil noted. A second grading factor for memory is the initial cost of the memory needed and the cost for memory additions.

Thus, "the danger is to buy a cheap machine with a minimum memory and find yourself paying later in memory," he added.

Read-only memory can be of importance, especially in minicomputers. "One of the fundamental problems with small machines is they are built to be cheap. Since logic costs money, small computers have a rather basic instruction set which is not too elegant," he said.

The larger instruction set is generally worth more than memory speed to the user even though users traditionally have been enamored with speed. Even in a real-time environment the importance of computer speed is exaggerated, McNeil asserted, as there are not many real-time tasks where the user would find himself directly up against the speed of any prevalent minicomputer.

Word Lengths

The fewer the bits in memory, logic, registers, etc., the cheaper the computer. However, the smaller the word, the less room for both instruction and address and the more tedious it will be to address, McNeil said.

Figure 6 shows the advantages and disadvantages of an 8-bit machine.

ADVANTAGES

- Handles information bytes efficiently; no byte-packing or unpacking
- Cheap register hardware
- Cheap store driver circuits
- Very cheap basic configurations

DISADVANTAGES

- Relatively high cost for core increments over 4K words
- Memory address problems: either double length instructions (time penalty) or single instruction fetch but very restricted instruction repertoire
- Low accuracy for scientific computation
- 8-bit input unattractive for some process control and telemetry applications
- 8-bit I/O slow for peripheral transfers

Figure 6. Advantages, Disadvantages of an 8-Bit Machine

Here's an exciting new operating system with RPG that dramatically simplifies and speeds data processing applications

CIMOS-22 is a disk-based operating system for the CRP/2000 minicomputer which consists of language processors, programming and debugging aids and services that simplify data processing applications. The capabilities of CIMOS-22 are packaged in a flexible system design so that each user can tailor the operating system to his individual needs. From either RPG or assembly language programs, the user can take advantage of the data management facilities of CIMOS-22. The facilities include the ability to organize, catalog, store, retrieve and update data files. From a system console or assembler language program the user can create and delete disk-based files. On-line editing capability permits the user to build and maintain data files as well as source and object program libraries. There is much more to CIMOS-22 that you should know about, it's all detailed in our new brochure shown here . . . and it's yours free. Cincinnati Milacron, Process Controls Division, Lebanon, Ohio 45036.

(Continued on Page 5/6)
The pictures indicate a typical growth pattern of 1100-2200-5500 usage as a field office’s work load increases. In the left-hand column, normal progression begins with the Datapoint 1100 for Remote Batch Terminal applications. In this mode, card readers, tape units, communication equipment, and printers are utilized as peripheral devices for efficient transmission of data between the remote location and host computer. In the second phase, the Remote Batch Terminal operation is upgraded to a 2200 to provide stand alone processing power to expedite Remote Job Entry applications. In addition to the expanded processing power of the 2200, disk capability and RPG II substantially enhance the effectiveness of the 2200 used in this way. In the third phase, a stand alone Datapoint 5500 is utilized as an independent Local Processor to meet all the dispersed processing requirements at the remote site without relying on a central host facility.

In the right-hand column, the first picture shows the Datapoint 1100 used as a powerful Intelligent Terminal for data entry and limited processing tasks. In the next phase, field office needs have grown to an intelligent multi-station requirement and are satisfied by the Datapoint 2200 used as a Terminal Processor. In this mode, a single Datapoint 2200 can provide “intelligence” for up to eight keyboard/display stations with subsequent transmission of data between the host and remote sites. The final progression is to the Datapoint 5500 Remote Processor, used in field offices as local “computer utilities,” still linked to the host processor system, but now providing substantial independent compute power of their own to an array of peripherals and terminals located in the field offices.
Dispersed data processing the Datapoint way is the productive, economic approach to providing your field offices with the on-site computer power needed to compete in today's business world, while yet being linked to a central computing operation. Datapoint's trio of upward-compatible dispersed processors—the 1100, 2200 and 5500—offer you a capability that can be readily and painlessly augmented as office work load increases, as your company's communications network becomes more sophisticated and your field office personnel more knowledgeable.

Let's look at these processors: the Datapoint 1100, available with 4K or 8K central memory, is the new Intelligent Terminal system from Datapoint Corporation that can bring your field offices into the on-line computer age immediately. Competitively priced, and with extensive capability for business processing tasks such as on-line (or off-line) data conversion and entry, it is a basic building block for creation of a multi-use dispersed data processing and data handling capability in your field offices. Once installed, the 1100 can do double duty for progressively more sophisticated data processing and data communications assignments including remote batch applications through utilization of card reader, magnetic tape, and printer peripherals. In software, Datapoint provides a CTOS operating system, Assembly Language, and the new DATAFORM language for sophisticated data entry and editing. Initial deliveries of the 1100, with a monthly lease price of $138, will begin in January.

When your field office work load grows beyond the capability of the 1100, it is an easy, painless transition to a more powerful Datapoint processor, without the need for jarring systems redesign and expensive software revision. The secret is in the upward compatibility of the 1100 with the well-established Datapoint 2200 Terminal Processor and the new Datapoint 5500 Remote Processor. It is as simple as pulling the plug on the 1100, plugging in the 2200. No complex systems changeover, no costly software rewriting is entailed; the user obtains the needed increment in dispersed data processing power in his field offices without disruption. The 2200, a widely used and well-established system with up to 16K central memory and dual ECMA standard cassette drives, will do everything the 1100 will do, and also provide an expanded on-site computer power. In a multi-station mode, it can service up to eight low-cost terminals for data entry and related tasks.

The 2200 is a natural step towards the 64K Datapoint 5500 Processor (deliveries in third quarter, 1974), which will do everything the 2200 does and also constitutes an on-site "computer utility" in your field offices. This system will provide computer power for a large number of associated peripherals and for a variety of low-cost, non-programmable terminals while simultaneously furnishing a high speed link to a central computer facility. These three Datapoint communications-oriented dispersed processors, progressively larger, faster and more powerful, open a new world of capability to the network-oriented user who sees the need for a growing satellite computing capability in his field offices, while still accessing a central computer facility for heavy duty processing and primary file storage.

Chalk up another innovative approach from Datapoint Corporation to the solution of business data processing problems. With the versatile Datapoint 1100, the proven Datapoint 2200 and the powerful Datapoint 5500: with their associated peripherals including line and serial printers, 7- and 9-channel magnetic tape units, a cartridge disk system, and synchronous and asynchronous communications adaptors; with full operating systems and extensive programming language capability including RPG II, BASIC, DATABUS and others under development, no other source can serve your dispersed data processing and field data handling needs so effectively, so economically. For further information on the growing Datapoint family of dispersed data processing systems, peripherals and software, contact the sales office nearest you or write or call Datapoint Corporation, San Antonio, Texas 78284, (512) 696-4520.

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Small User Switches to In-House, Has Room to Grow

By Don Leavitt
Of the CW Staff

INDIANAPOLIS, Ind.—"A company our size shouldn't be spending more than $800/mo for data processing. There was nothing available, until this kind of configuration, that would allow us to do our work for that kind of money," systems analyst Benton Chudnov said recently, explaining why Melvin Simon and Associates, Inc. chose a mini-based, commercially ori-

ted system a year ago.

Before it acquired its DEC Datasytem 330 last November, the company—which develops and manages shopping centers—had been renting time "outside" on an IBM 1130, to run a cus-
tomized accounting system, and more time on an IBM System/3 for other applications. It had no DP equipment in-house.
The system installed, in the middle of the DEC Datasytem 300 line, included a single disk, two DEC tape units, a Cen-
tronics-built printer and DEC's Commercial Operating System software. This configuration gave Chudnov the speed of the disk, which he particularly wanted for on-line data entry, and the backup support of tape, so crucial to any commercial ap-

lication.

Continue 'Outside' Work

With the changeover to the in-house gear, the company was able to continue doing all it had done "outside" and add "sub-

(Continued on Page S/7)
We've got an idea that ought to interest any OEM who's trying to bring down the price of his product.

Go buy yourself 5° Nova 2's with the new 16K memory boards. (Yes, we know you can probably get away with less memory. Bear with us.)

Now take a look at what you get: a high speed multiaccumulator 16 bit CPU, an I/O system with programmed data transfer, 16 levels of programmed priority interrupt, high speed Direct Memory Access, programmer's console, 4-slot mainframe, power supply and 16,384 words of 1 microsecond memory, expandable to 32K. With 4K and 8K memory modules also available.

That, you'll have to admit, is an awful lot of computer for the money. With twice the memory of other computers in that price range.

Hold on. It gets even better.

With that 16K memory, you won't have to talk down to the computer in machine language. You're going to be able to program in higher level languages.

So your programmers will be able to spend more time on what they want it to do and less on how to say it.

Which means they'll get the job done faster. And you'll get your product out on the market faster.

Both of you are going to save yourselves a lot of time and money.

Think about that for a minute.

Consider how your system costs go down when your programming time goes down.

The $5,600 price tag looks even better now, doesn't it?

And that's before the quantity discounts get figured in.

The 16K Nova 2 Data General
Southboro, Massachusetts 01772 (617) 485-9100.

User Goes In-House With Room to Grow

(Continued from Page 5/6)" to the workload it handled. The computing power that the system provided, at its price, "so far surpassed everything else on the market that it really was the only choice," the analyst went on.

The Unix language processor provided with the Commercial Operating System is close enough to Cobol to be used comfortably by Chudnov, who has had 12 years' experience in DP, and by two people who have joined him since the system was installed but who had no previous programming background.

"There's little they can't do.

They're writing programs for our on-line systems comparable to logic it would take a 360 programmer well over a year to attempt."

Accounting Needs

Melvin Simon attacked its accounting information needs first. A general ledger system is already up and running and Chudnov's accountants are now completing a full financial statement and reporting system. An on-line data entry system will be expanded next year into what would loosely be identified as "receivables" in other installations, the analyst said. Work on a payroll system is to start shortly, he added.

The on-line data entry operations have been configured as a key to the entire system and it has already overworked the system, defeating every man of time many times over," in Chudnov's view.

"Online" may be a somewhat misleading description of the system; it does not involve any communications from remote sites, but it does support direct data entry from terminals, on an interactive basis.

The system is designed so that there's little point to checking it can do" and the results have been very satisfying thus far. The system is processing some 2,500 transactions each month, and is coming up with only four or five errors that somehow slip through the editing procedures.

The system is built around the concept that the operator should not be able to go on to the next field until the data for the current field has been positively checked. Debits and credits must balance and any out-of-balance situation forces a complete re-entry of the item.

Room to Grow

While he has system development well under way, Chudnov feels his system also provides plenty of room for growth. The system includes background/foreground support so that on-line functions can be added concurrently with batch work, and multi-terminal support, due partly, according to Chudnov, will allow several terminals to access files directly.

The printer can be improved in speed if that seems necessary, and up to eight disks can be put on the system if storage needs grow, he noted. Though the company went through a "typical hardware shakedown" for the first couple of months, conversion to the DEC system was "very smooth." "Relative to all the problems I've seen" in other situations, Chudnov said, "we've had none." The biggest problem he's had has been managing supplies as the company has grown.

Support from DEC has been "great," even though according to Chudnov, the local DEC service force had to learn about the Datasystem from the Melvin Simon configuration since it was one of the first in this state. At first, the DEC people didn't really recognize the needs of a commercial installation, since they were used to time-sharing users and several newspapers in the area.

Chudnov knew there was no lack of application programs for the system and he says now he had to convince DEC that his proposed installation could be self-sufficient. In fact, however, there is a "hot line" back to DEC's Maynard, Mass., headquarters, and, now at least, various software experts here.

With the Datasystem, Chudnov concluded, DEC has provided a great opportunity for a system without many preconceived restrictions, but something that would be willing to put some effort into it.
Big computer systems love Honeywell minicomputers.
You have a big computer. We don't care who made it. When you bless that big computer with Honeywell's System 700 minicomputers, good things happen.

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In your sales offices, they'll do things like processing orders. In your warehouses, they'll do things like keeping track of inventory. In your factories, they'll do things like scheduling jobs. In addition, they can communicate the pre-processed data directly to your headquarters, either off-line or on-line.

Use them as message concentrators. They can reduce your data communications line costs.

Use them for high-volume centralized data entry. They'll speed input and reduce the load on your main computer.

What your company's management gets from all this is more current information for decision-making, better control over operations, better service to your customers, and lower costs. What you get is a grateful management.

Now, not every minicomputer can do all this for you. It takes special hardware for the application interfaces, peripheral devices matched to the local operations, and operational software. In other words, it takes Honeywell's System 700 approach.

System 700 minicomputers are designed—from start to finish—to meet their basic reason for being: the business application. They're a modular family of products representing a broad range of capabilities. And they're strong in the capabilities that matter the most in a successful minicomputer installation. For example:

**Communications**
The System 700 uses a high-speed, 16-bit, real-time central processor. It will work with any system having binary synchronous communications capability. That means almost any central computer, regardless of who made it.

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A very powerful and sophisticated operating system, OS/700 includes a powerful real-time executive that functions in a core-only or core-disk environment. It can handle communications, data base management, and real-time processing with equal efficiency.

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Honeywell offers an exceptionally large choice of proven peripheral devices, including printers, teleprinters, disks, tape drives, card readers, card reader/punches, paper tape readers, paper tape punches, and communications controllers. In fact, we believe we offer the largest choice available from a minicomputer manufacturer.

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A System 700 with the Honeywell Real-Time Interface (RTI) permits interfacing to a diversity of sensors, field contacts, logic signals, control elements and other devices. Such a system can communicate directly with your central computer, thus providing current information on production operations.

That's probably reason enough for choosing the System 700 for your minicomputer needs. But we have a couple more.

Honeywell is a major minicomputer supplier. So you have our assurance of support, and our commitment that they'll work the way we say they will.

Honeywell is also a complete-service computer company. We manufacture a full line of computers, so we have the experience and know-how to help you get the right kind of performance from your total system.

For more information, call our local sales office, or write System 700 Marketing Manager, Honeywell Information Systems (MS 061), 200 Smith Street, Waltham, Massachusetts 02154.

The Other Computer Company:  
Honeywell
Firms With Regional Offices
Fare Best With Remote Minis

TOKYO, Ont. - Remote minicomputers can give firms with regional offices substantial cost savings and greater efficiency compared with a centrally located large computer, according to J. B. Burke, vice-president, finance, Bristol-Myers Products Canada Ltd.

Applications such as the one at Bristol-Myers illustrate the minicomputer's ability to serve users on a dedicated portion of a larger system.

"Even though we could have realized processing savings through a central computer, processing of data at regional offices more than paid for itself through the elimination of the costs and delays inherent in moving data to and from the central processing point," Burke stated.

Burke said his nine plants located across Canada with central headquarters located here in Toronto. Prior to using the minis, "we were operating a management information services department here using an IBM 360/367 with 64K bytes of core memory. This system has traditionally operated in a batch mode."

In addition to the company headquarters' batch operations, the Toronto computer handled all invoicing functions from postoffice records.

Shipping documents were received from regional plants and product codes were entered onto the documents. Reference was made to a master product book which lists the shipping weight and a total shipping weight for the order was entered.

"Prior to the use of mini systems in these outlying areas we had been facing problems with data processing, including delays in receipt of information. These delays averaged three days per plant and sometimes went as high as ten days," Burke noted.

"For a year ago, he stated, his firm began to look at this problem with the view of speeding up the receipt of information in Toronto."

"As a first step, we looked at the traditional RJE [remote job entry]. However, this presented some serious problems - mostly economical - in that operating with dumb terminals would have required them to be on-line with the main computer at any time of day."

In conclusion, he said, "we would have had to increase our core to provide the necessary CPU power."

"Rejecting RJE, the firm set out to find some sort of device allowing data entry at a regional center. Instead of going on-line as required with RJE, the idea was to find a system on which information could be accumulated locally for transmission to the central computer once or twice a day."

"For this plan, we needed some local equipment to facilitate affirmation of the central processing point," Burke stated. "At this stage, the firm had solved most of the delay problems: information shipment was cut to one day resulting in cutting the credit control and cash flow problems to one day.

Getting More
The next step was to update sales and inventory data in Toronto and, by selecting from main disk files, transmit up-to-the-minute information back to the remote centers.

"It was during this stage of development that we realized the disk capability of the local office would permit us to maintain all this information locally with no need to go to the central computer."

"Even though we could have realized processing savings through a central computer, processing of data at regional offices more than paid for itself through the elimination of the costs and delays inherent in moving data to and from the central processing point."

Burke said.

The new concept was to use the local minis as totally autonomous systems with the computer having full information on local stocks, customers and prices. Orders would be entered directly via a video terminal which would do all processing to produce the required documents.

As the document is being prepared, a picture image is placed on the disk subsystem attached to the mini. At night the mini is polled from the central office 360/30 and the polled sales data is entered into the main CPU for production of consolidated records.

An example of the cooperation between the minis and 360/30 is in the area of credit control.

"We establish an algorithm to define each customer's credit control availability. Obviously if a customer has a limit of $50,000, the fact that he bought $40,000 yesterday should not impede a shipment today. On the other hand, if he has had $40,000 worth of goods six months ago and has not paid, then shipment should not take place. If the customer is in an overdue position when we poll the local minicomputer at night, a mark is placed next to that customer's record," Burke said.

This mark later prohibits the creation of shipping documents for that customer.
Mini Has Ability to Move Away From Remote Batch

TOKYO, Ont. — One of the greatest promises of the minicomputer is its ability to move computing away from large, remote-batch computers and back into the hands of the people the computer is supposed to assist, according to M.J. Lucas of L & W Data Systems here.

Lucas outlined a tragic history of the computer trying to solve an initial problem with a solution that created more problems than the old system.

"In its precomputer life, a well-run business could generally maintain an effective on-line information system using clerical staff. Essentially these people posted transactions by hand in ledgers and responded to management's information needs on an "as required" basis. "These processes were known to be slow, inaccurate and inefficient and became more so as companies expanded in volume, functions and locations," Lucas said.

At this point, he noted, the computer industry entered the scene with batch processing systems which were so powerful (according to their advertising) they would answer everybody's prayer for salvation from the information bind.

"In many cases these systems not only failed to solve the problem but, in fact, increased overhead and introduced such things as sorts, file dumps, punched cards, little squares on forms which must be filled in by the uninitiated for the convenience of the key punching operator, sequential processing and more paper than the user could read, leave alone understand," he asserted.

"The difficulty, according to Lucas, is the fact that the computer industry offered a data processing solution instead of an information solution. "Management is asking for information pertinent to its day-to-day problems but it is presented with a paper factory."

To solve the central mind-boggling concentration of data, users must find some means to make selected data available at the office or plant where the data is pertinent. Not only is this logical, it is technically possible and even cheap using minicomputers. Yet despite this fact, users have traditionally moved toward more powerful data processing systems instead of toward multi-access information systems, Lucas said.

"Right now the present development of minicomputers and associated peripherals makes on-line multi-access information systems economical and viable. "The mini can support a large number of terminals; it can support disk storage of the size needed to handle required throughput volume; it is physically rugged so it requires little site preparation; it is reliable; and last but not least it is inexpensive," he added.

He said the existence of a large assortment of peripheral devices means the user can specify mini system configuration from remote site to remote site. Yet despite system variance, the central processor and disk makeup can remain constant so data entered at one site can be readily read and edited at another.

A secondary advantage of the mini approach is it gets users away from the programmer syndrome, Lucas feels. "We have found it is easier to predict a user's throughput than a programmer's throughout volume during system development. Because the mini is smaller and is generally bought to perform a defined function - as opposed to the nebulous function called data processing - it is set up and judged on the performance of that function," he asserted.

The interface between the user at a remote site and the minicomputer is direct, while the interface between the large computer and the user is through programmers, analysts, operators, key-punchers, etc., he noted.

But this immediacy of contact also creates a problem. "Traditionally mini systems are not supplied with on-line business-oriented software systems. This part of the industry has not been around long enough to develop the required systems," Lucas said.

The remote office user is not a "computer heavy"; he requires a simple direct operation and the system must be transparent.

However, this problem is evaporating through a realization by both the mini-computer builders and outside software houses that this need is there and a strong move is going to be made in the next few years away from one large central frame to small remote functioning systems.

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The Plan offers a whole new maintenance procedure, too. Built-in integrity checks can isolate a fault to a circuit board and maintenance is as simple as replacing the board.

There's even a program called Air Spare. It's fast delivery of a backup board and low-cost repair of the defective one.

The Plan offers a whole new maintenance procedure, too. Built-in integrity checks can isolate a fault to a circuit board and maintenance is as simple as replacing the board.

There's even a program called Air Spare. It's fast delivery of a backup board and low-cost repair of the defective one.

Everything we offer at Prime, hardware, software and support, works together as a logical system, be it large or small. You can put together a powerful, reliable, easy-to-use computer system at a better total system price than ever before possible.

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Read on.

Plan on a guaranteed trade-in

You can start your system with any Prime Computer. If, for any reason, it isn't the best one to handle expanding applications, trade it in. Trade all of it or parts of it. Trade whatever is standing between you and better performance.

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You can also elect to keep the original processor as a spare. The cost is only $1000. Keep your original power supply, memory and chassis, too. Or selectively upgrade any of them under similar trade-in arrangements.

Of course, all the software written on the original system*

Standard features include: virtual memory, restricted execution mode, memory protection, byte parity, extended direct addressing, integer multiply/divide, direct memory access system, automatic program loaders and microverification.

*Standard features include: virtual memory, restricted execution mode, memory protection, byte parity, extended direct addressing, integer multiply/divide, direct memory access system, automatic program loaders and microverification.
will run on the new one without modification. Only Prime makes this possible. Only the Prime Plan guarantees it.

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You can write real-time and time-independent programs on any Prime processor, in any language, under Disk Operating System control, or as stand alone programs, using a common set of support packages. You can then execute the developed programs on the same or any other Prime processor under Disk or Real Time Operating System control, or as stand-alone programs—without modification. Furthermore, the Prime 300 supports a multiuser, virtual memory version of the Disk Operating System (DOS VM) and a foreground/background version of the Real Time Operating System (RTOS VM).

Plan it right, right off
The right combination of computer resources are all here and they’re yours to select. Pick a processor. Enhance it with options if you wish. Select memory size and speed. Add peripherals and controller. Then package the electronics in the right size chassis and you’re done. We’ll provide the right power supply to handle whatever you put together.

There are no arbitrary restrictions. No surprises, either. With the chart above you could start planning now.

Plan on running full time
Prime service is every bit as sound as its technology. It’s just as inventive, too. For instance, you can pick a full service contract or choose to use our services only when required. In either case we maintain a nationwide network of service and customer service representatives. They’re ready to help.

We even have a way to hold maintenance costs to an absolute minimum. We call our idea Air Spare. For $200 we’ll loan you a spare (processor, memory or controller). We’ll then repair the faulty unit while you keep on running. And better than running, the whole replacement is handled by air express.

Read more about it in the Plan.

One more thing to plan on
The Prime Computer User Plan is a unique and remarkably logical document. You’ve just been treated to a sampling here. For the first time you’ll know everything to expect in a computer system. Read the Plan. Send for it today.

To: Prime Computer Inc.
23 Strathmore Rd.
Natick, MA 01760
\[ Send the Plan
\[ Send Planner
(He’ll call for an appointment.)

Name
Title
Company
Address
City State Zip
WESTFORD, Mass.—Educators, school and town administrators, and state correctional institutions are banding together around a minicomputer here to solve common and unique needs.

For the educators, the mini means better education directed to the individual student; for the administrators, access to immediate processing of records and forms; and for the inmates, a better chance at jobs and rehabilitation.

All of these benefits have come from a small system originally intended only as a teaching aid, according to Joseph Danahy, DP manager of Nashoba Valley Technical High School (Nashoba Tech) here, which houses the shared data processing facilities.

Prior to obtaining the minicomputer, schools in the Nashoba Valley were faced with several educational problems. The schools wanted to introduce computers as a tool for teaching basic problems. Remedial CIA for Students

For the educators, the mini means you can operate Microdata's new computer system. That's Reality.

Finally, there's an information management system so easy to operate anyone can use it. We call it REALITY®.

REALITY is a powerful, low-cost system designed for a wide variety of applications such as inventory control, production control and general accounting.

REALITY is easy to use because the user communicates with it in a remarkable computer language called ENGLISH®. You're reading it right now. It's a Microdata exclusive.

REALITY is simple on the outside, powerful on the inside. It operates on-line in RPG II. So if you're currently using a System/3, REALITY is compatible with your present programming.

Because REALITY combines the hardware and software (we call it firmware), it can handle multiple users and terminals while still providing substantially faster response than large scale data processing machines. Another REALITY exclusive—a single corrective entry will automatically update all related records in a single chain reaction sequence.

REALITY is everything a computer system should be, but never was before.

Face REALITY. If you're interested in multiple systems, call Microdata at 714/540-6730 for a demonstration in your office. Or write for descriptive literature. Microdata Corporation, 17481 Red Road, Irvine, California 92705.

Microdata. Bring us your problems.

If you can read this you can operate Microdata's new computer system. That's Reality.

These terminals inmates ran many of the same programs as the Nashoba Valley Tech students. Included are CAI exercises to improve basic skills and specialized programs to learn vocational skills. In this manner, many inmates are gaining skills needed for high school diplomas and preparing themselves for gainful employment, Danahy noted.

At present, much of the town's administrative work is being done in a batch mode on the IBM mainframe, but with the success of the more accessible HP 2000 system, plans are underway to put common data needed by all four towns onto the minicomputer. The data would then be accessed from remote terminals cutting duplication of storage and processing costs.

Improve Basic Skills

CAI remains the largest and most valuable application on the HP 2000. Students who are weak in basic skills receive individual instruction in special remedial classes.

A special Instructional Dialog Facility (IDF) allows teachers to develop CAI-type programs depending on individual needs. Using IDF, teachers in several vocational areas are dividing subjects into Individual Learning Application Packages (LAPs) for specific tasks. These learning packages are then run by students who can progress at their own pace.

Several terminals are located in the data processing department of Nashoba Tech. Here the students learn how to run the computer and other data processing equipment. This training is meant to lead to careers starting as keypunch operators, coding specialists, junior programmers, computer operators and data processing librarians.

The system is particularly useful to the students "because it is so easy to learn," according to Ronald Bland, data processing instructor.

The Basic language — native to the HP 2000 — can be learned in a few hours yet is useful for both simple and sophisticated programs, he added.

In addition to a day school program, the computer finds work during a full night-time schedule. Adults use the data processing equipment to either add to their general knowledge of computers or direct their efforts toward a specific computer position.

Not only is the computer used to train students for data processing positions, but a guidance program also helps them plan for higher education or find jobs.

One program can show at a glance tuition costs, degrees offered, departments and college scores needed for entrance to universities.

A second set of programs shows the same type of information for vocational schools and two-year colleges together with scholarship information.

For those seeking immediate jobs, a program is available to show specific career information describing job opportunities, education required, typical pay and other information.

Future Plans

In addition to the expansion of the administrative and LAP programs, the school plans on expanding the impact of its computer services through Project Model (Mobile Occupational Development Educational Laboratories).

This project will bring educational laboratory services to the educational and culturally disadvantaged, as well as physically and mentally handicapped children and adults throughout the area. The mobile labs will each contain a terminal so remote resident populations can benefit from the same programs offered schools and administrators in the Nashoba network, Danahy said.
Me! the HP 2100S computer.
Specifically designed for solving system problems.

Here's the top-of-the-line HP computer. Specially designed for systems use, the basic package meets most system needs as it is. Yet, its well-thought-out options and peripherals let you customize your HP 2100S for efficiency. Proven software includes Assembly Language, FORTRAN, BASIC, and ALGOL compilers, plus a complete microprogramming software package. Operating systems are available for batch processing, real-time and time-sharing. Send for our new brochure that tells it all.
Minicomputer's Hardware Cost Decreases

So Software and Capabilities Increase

The minicomputer is irreversibly moving toward the end user. This move has nothing to do with any marketing plan or change in minicomputer philosophy, according to Gordon Bell, vice-president, engineering, Digital Equipment Corp. "The move to the end user is a logical and natural evolution that becomes clear once users see where the mini has been." A key factor in this move is the downward cost of minicomputer systems. As the systems get cheaper they reach a point where one group of users with a specific problem is willing to pay the current price for a solution (the minicomputer), Bell said.

For example, he stated, in 1963 a fairly comprehensive minicomputer system cost around $27,000. In 1973, this cost dropped to around $2,000 for an equivalent system. This drop in hardware costs turns out to be a fairly constant 35% per year, which seems to be a good estimate for the next few years at least, he predicted. Following this downward slope, at some point the price of a mini system is going to be attractive enough to a given group of users.

Yet the cost of hardware is dropping faster than software and other support is rising, so the end result is a drop in system costs. The Constant Price System

When a minicomputer system reaches the point of acceptability in a given end-user situation, a strange thing happens, according to Bell. "Despite future reductions in system building costs, that particular application system's price remains constant over time." Using the "hot dog stand" user as a continuing example, Bell hypothesized a system for this user would become attractive at $1,000. "Let us say we are able to build and support this system by 1975 complete with software and support. At this point the need and the solution will come together and the system will be built. A new class of business users will become computer end users.

"Let us also look into the future to 1978 when we are able to incorporate into our system capable of supporting the hot dog application for $500; the hot dog stand user will still be paying $1,000 for a new system.

Instead of giving the user cheaper systems as time goes by, he is given systems with more software and other capabilities.

In one past this is purely psychological, Bell said, as once the user is used to paying a given amount for a system, he expects to pay that figure. More pressure is put on the system supplier to offer more capabilities as opposed to dropping price.

"It suppose it has to do with the nature of budgets; once a system is budgeted this cost has a tendency to remain constant. If a user feels $1,000 is justified to solve a given problem this year, then $1,000 is enough a few years down the road, especially if the latter system has many more features," Bell said.

Danger in the Evolution

There is one major danger to the user in this dropping price picture that is directly tied to overly ambitious expectations, Bell said.

The pressures of competition both among users and builders prevents the temptation to build a system for a specific need in advance of the right technology/cost ratio.

"To jump immediately in with a new system (to become a first experimental user) runs the risk of getting a system before its time. The future for such a user may involve getting a system that will have to be redesigned at a later date or getting a system that incorporates compromises made in the name of getting the system there first," he warned.

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Our new DEC DATASYSTEM Series 500 business computers do. You pick the one with just the right power for now. And as you grow, your DEC DATASYSTEM grows with you.

All DEC DATASYSTEM Series 500's use a special computer system that's built to be expanded. Internal memory can grow from 32K to 224K bytes, file capacity from 4.8 million to 343 million bytes, and terminal configuration from one to 32 interactive devices.

You also get a variety of peripherals to choose from. Mass storage media. Data entry/inquiry consoles. Batch data input stations. On-line multiform printers. All sizes. All speeds.

And you get a Resource Sharing Time Sharing system that gives you the computational, file, and remote data entry capability needed by business today.

The nice thing is that you can get it all for some 20-50% less than other computer companies charge for computers they know you'll outgrow.

Which isn't as shocking as you may think. Once you get to know Digital, you'll come to expect us to offer more computer for less. Call one of our business specialists in Boston, Mass. (617) 890-0330; New York, N.Y. (212) 582-1300; Chicago, Ill. (312) 498-2500; Santa Ana, Calif. (714) 979-2460; Oakland, Calif. (415) 635-5453; or Atlanta, Ga. (404) 451-7411.


WE MEAN BUSINESS
INTERDATA ANNOUNCES THE INDUSTRY'S FIRST 32-BIT MINICOMPUTER FOR UNDER $10,000.

WITH UP TO A MILLION BYTES OF DIRECTLY ADDRESSABLE MEMORY.

Minicomputer myths you can live without:
1. There's no such thing as a 32-bit minicomputer.
2. Minicomputers have an absolute 64K addressing limit.
3. The only way to even access more is to resort to some sort of hardware kluge with a hairy software scheme that'll cost you an arm and a leg.

All wrong.

Because now there's the Interdata 7/32 — a powerful new 32-bit minicomputer with main memory expandable up to a million bytes and direct addressing up to 16 million bytes.

<table>
<thead>
<tr>
<th>Performance</th>
<th>7/32</th>
<th>Nova 840</th>
<th>PDP-11/40</th>
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<tbody>
<tr>
<td>Word length</td>
<td>32</td>
<td>16</td>
<td>16</td>
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<tr>
<td>Memory speed (cycles/word)</td>
<td>750</td>
<td>600</td>
<td>900</td>
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<tr>
<td>Maximum memory capacity (bytes)</td>
<td>1,048,576</td>
<td>262,144</td>
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<tr>
<td>Addressing range (bytes)</td>
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<tr>
<td>Direct</td>
<td>1,048,576</td>
<td>65,536</td>
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<tr>
<td>Relative</td>
<td>1,048,576</td>
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<tr>
<td>Double indirect</td>
<td>No</td>
<td>No</td>
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<td>General-purpose registers</td>
<td>32,32-bit</td>
<td>8 16-bit</td>
<td>8 16-bit</td>
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<td>Index registers</td>
<td>16</td>
<td>8 16-bit</td>
<td>8 16-bit</td>
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<tr>
<td>Vectored interrupt levels</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Minimum interrupt overhead time (usec)</td>
<td>6.5</td>
<td>47.5</td>
<td>46.5</td>
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<tr>
<td>512K processor</td>
<td>71,450</td>
<td>Not available</td>
<td>Not available</td>
</tr>
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Big it is. But hairy it isn't.

Because it's simple, straightforward and efficient. And it's the industry's first uncomplicated extended-memory software environment.

Backed up by a lot of hardware muscle like thirty two, 32-bit registers. 1024 I/O interrupts with automatic vectoring. 239 instructions.

And a lot more. All of which would lead you to expect to pay a lot more money, right? Well, that's also a myth.

The software muscle is all there, too. A new FORTRAN V compiler. An optimizing assembler called CAL. And the first extended operating system that's both powerful and simple — OS/32. Plus all the other field-proven Interdata software — it's all compatible.

The new Interdata 7/32.

We put our muscle where their myth is.

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We put our muscle where their myth is.
By Fred Coury

Special to Computerworld

Writable Control Store (WCS) represents a significant step forward in minicomputer technology. However, many users do not fully understand what it is, what it does and what is most important, what it means to them.

To understand WCS and its implications, it’s necessary to understand microprogramming, another concept that is often misunderstood and therefore not used to its full potential.

The block diagram of a digital computer is shown in Figure 1. Generally speaking, the lower three blocks (program and data store, arithmetic/logic unit and input/output section) are rather straightforward, regular in structure and similar in most computers.

The sequence of operations to be performed by the minicomputer is determined by the user’s program, which resides in the program and data store. The control section reads the user’s program, which resides in the program store, and directs the appropriate hardware to execute each instruction.

The logic of the conventional control section, unlike other blocks in the figure, is usually random in nature, with specific hardware dedicated to each function. This usually means a unique design for each different computer.

In the microprogrammed minicomputer, the structure of the control unit is made regular by separating the functions to be performed by the control unit from the sequence in which functions are to be performed. The functions are specified by control lines which go to various points in the memory control, arithmetic/logic unit and I/O section.

However, the sequencing of control functions is defined by a sequence of bit patterns, or microinstructions, from the control store which is part of the control section (Figure 2). The sequence of microinstructions is called a microprogram and is often referred to as firmware because it lies somewhere between hardware and software in organization and permanence.

Implications for the User

This is all fine if you are a microcomputer designer. But what does microprogramming mean to the user?

First, it means higher performance at a lower cost. For example, extended arithmetic instructions can be standard features as they require no additional hardware, just some additional microinstructions in the same control store area as the standard instruction set.

Second, it means higher speed. This is a function of two things: one, the ratio of the speed of the control store to the program store, and two, the relative power of the microprograms versus the user instructions.

It used to be that the instruction width and faster control section of the minicomputer, and as an extension of the control store to the program run perfectly the first time is extremely slim, how does the user debug his microprogram? That’s where the WCS comes in. Although Figure 2 shows the control store as a read-only memory (ROM), the program would be written into it somehow. To more classical implementations this is done by hand or by machine.

However, there is nothing to prevent data from being written into the control store automatically by the minicomputer which it controls.

This concept is illustrated in Figure 4 where the WCS looks like an output device - the computer sends data to it. To the control unit, however, WCS is indistinguishable from the basic instruction set contained in the factory-implemented ROM.

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Texas Instruments announces
for the 980A minicomputer
interactive terminal processing

DX980 is a general purpose operat-
ing system that supports the 980A
computer in various applications in-
cluding batch processing, interactive
terminal processing, and real-time
processing. It can support all of these
applications simultaneously or each
one individually.

The Memory Protect/Privileged
Instruction feature of the 980A pro-
vides a "hardware protected" environ-
ment so that an executing program
cannot destroy the operating system
or another job.

DX980 features a modular organi-
zation. Executive functions common to
several application environments are
included in the nucleus, while executive
functions unique to specific environ-
ments are embodied in subsystems.

The nucleus is partially memory
resident and partially disc resident
with the disc resident portions called
into memory as required using a
dynamic allocation technique. The
nucleus provides for such functions as:
Job Management — to provide the
facilities for job submission, resource
allocation, job initiation, execution
management, and job termination.
The number of jobs active is limited
only by available resources.

Task Management — for task cre-
tation, scheduling, synchronization, and
termination. Multi/tasking is sup-
ported both across several programs
and within a single program.

Memory Management — for dynamic
memory allocation and release.

I/O Management — to provide I/O
functions from programs to periph-
erals on a device independent basis.

File Management — to provide a
device independent interface from a
program to data stored on disc. Three
file types are supported:
Linked Sequential File — has an
access interface identical to that used
for the various sequential devices
(magnetic tape, line printer, card
reader, etc.). Consistency between
sequential device and disc is achieved
with the Linked Sequential File.

Relative Record File — provides a
low overhead direct disc access to a
contiguous section where I/O
transfers may be either blocked or
unblocked.

Indexed File — provides a directory-
supported random access method
based on a record identifier whose
size is user specified. File operations in-
clude record addition, insertion, modi-
fication, deletion, and retrieval using
either a random or sequential access
method. A multiway balanced tree
directory provides random access with
extremely low disc access for search.

Operator Communications — pro-
vides an extensive command language
that may be used from the system
operator's console. Subsystems are
individually activated and deactivated
by the systems operator as needed.
When active, a subsystem operates in
privileged mode and is essentially part
of the operating system. Main memory
is allocated to the subsystem only
when it is active so a user who is not
interested in a particular operating
environment does not pay a penalty
for the ability of DX980 to support
the environment.

Batch Processing
A batch processing environment is
supported by three separate modules,
referred to collectively as the Batch
Processing Subsystem:

Batch Input Reader — is used to
effect direct assignment of a sequen-
tial input device to a sequence of
serially executed programs.

Batch Input Spooler — is used to
effect spooled input from a sequential
input device to a sequence of programs.
DX980—an operating system that supports batch processing, and real-time...simultaneously.

which may execute in parallel.

Batch Output Spooler— is used to effect a sequential output device.

**Interactive Terminal Processing**

DX980 provides for interactive communication between the system and local or remote terminals through the Interactive Terminal Subsystem. The features provided include:
- An interface to support multi-user interactive applications programs
- Interactive file editing
- Remote job entry
- Job status retrieval

**Real-Time Processing**

DX980 provides for multi-tasking on a priority scheduling basis. The processor may be switched from task to task by an I/O request, a supervisor call, a device interrupt or at the end of a task. It provides a roll-out/roll-in feature to insure real-time response to high priority requests.

**Other Software**

DX980 supports a variety of software including FORTRAN IV, symbolic assemblers, the TI language translator and the linkage editor. It will operate on any 980A system with at least 16K memory, an interval timer, an operator’s console and a disc. The modular structure allows expansion to include:
- Multiple 3330 type disc drives
- Multiple disc cartridge drives
- Magnetic tape drives
- *Silent 700* ASR or KSR data terminals
- Card readers
- Line printers
- Alphanumeric CRT terminals
- Paper tape readers and/or punches

DX980 allows users with big jobs to do their processing in an economical manner. However, Texas Instruments also offers software to support the many users who do not need a large disc-based system to solve their problems. For this class of user TI offers the Program Development System shown above. This system may be as simple as a $9725 package of an 8K 980A with a twin cassette *Silent 700* ASR terminal. It enables fast and easy development of new software. Speed, simplicity, and reduced noise level are the major advantages over a system equipped with a 33 ASR.

Standard software includes:
- Communications interfaces
- Hardware vectored interrupts
- Up to 64K words main memory

**Hardware**

This software has been designed to take advantage of the powerful features of the 980A, which include:
- Hardware multiply/divide
- Memory parity
- Memory protect
- Privileged instructions
- Power fail interrupt
- ROM bootstrap loader
- Removable control panel with keylock
- Hardware breakpoint and program sense switches
- DMA interface port, expandable to 8 ports
- Four I/O bus ports, up to 256
- Auxiliary processor port

The 980A is the price/performance leader in the computer world. Want more information? Get answers by writing or calling Texas Instruments Incorporated, P.O. Box 2909, Austin, Texas 78767; phone (512) 238-5121.
Read all about it in Computerworld's special year-end review and forecast.

This special December 26th and January 2nd combined issue Closes December 7th. Don't miss it.

**DPer Calls For Mini Association**

"There should be a national organization dedicated to minicomputers, an association where users can exchange experiences and put forth ideas, where new developments can be examined, where information can be made available to those requiring it."

According to Jon R. David, president of Systems RDI Corp. in Lodi, N.J., since the number of minicomputer installations is nearly twice that of large, medium and small combined, the minicomputer needs and deserves adequate special treatment in the form of a national minicomputer organization.

David sees the general aims of the organization as follows:

- To provide a forum where new ideas, concepts, equipment and techniques and other appropriate items and matters can be set forth, examined and discussed by knowledgeable and interested parties, and where these parties can establish criteria for communication within their fields.
- To provide a central source where actual and potential minicomputer users and other interested parties can turn for information and assistance on appropriate matters.
- To act in whatever other ways and in whatever other areas may seem to be of interest and/or benefit to the membership.

**Some Questions**

In order to answer such questions as, What are mini computers? Can they be programmed? How are they maintained? Why are they used in some applications rather than in others? How do you get into mini systems? What are mini systems used for? How can you use a minicomputer? Should you? David has suggested the following initial projects:

- The production of a monthly publication of sufficient length to service adequately at least the first two general aims; if practical, treatment may also be given to other things, such as the establishment of an international "pen-pal" network, a "situation wanted" section or a "topic of the month" for discussions and/or education.
- The encouragement of members to form local chapters to work on their own and in conjunction with the parent organization.
- The development of special interest groups to treat specific areas of application such as telecommunications, business systems, process control and specific equipment and systems such as mainframes, individual classes of peripherals, interfacing and software systems.
- The formation of a committee to coordinate activities of local and special interest groups, and to coordinate with appropriate groups within other organizations.
- The planning of a national symposium and exposition where interesting equipment and systems can be on display, seminars and workshops can be held on specific topics and education/orientation sessions can be offered.
- The formation of a committee to coordinate with the trade media.
- By way of guidelines, David offers the following:
  - A question immediately coming to mind is: What equipment will be treated? Some would argue, for example, that intelligent terminals are not minicomputers; others would certainly say that micros do not belong. The group (whose name is Mini), however, should treat these devices and systems first because they are often part of minicomputer projects, second because equipment and techniques applicable thereunto are frequently also applicable to minis and third because sufficient members will probably want them treated.
  - The group should not endeavor to exclude areas which might not fit a (nonexistent) definition, but rather to encourage participation by everyone and in every area that might prove of interest to the membership.
  - The monthly publication should stress timeliness rather than polish. Consideration should be given to utilizing a totally photocopied approach.
  - Local and special interest groups will be the backbone of much of the group's operations and accomplishments. To avoid a situation in which local groups become nothing more than social clubs, and special interest groups become snob groups, it is suggested that these groups prepare their newsletters by simply typing them, then send them in to the parent organization where they will be reproduced and distributed to the group's members.
  - The National Conference and Exposition will be the main event of each year for the organization. Although paying exhibitors of all sorts will be solicited, efforts should be made to achieve creativity of exhibits so we can show things interesting in and of themselves, and also suggesting new areas to those viewing them. Tutorials and workshops should definitely be available.
  - Since the trade press offers an ideal vehicle for box conforming and educing the general computer-oriented public, all efforts should be made to promptly inform representatives of the trade organs of interesting developments.
The Computer Caravan brings exhibitors and users together in a user-oriented, professional forum and exposition. The forums, workshops, panel discussions and seminars focus on an exchange of timely, practical information among users and independent experts. And the exposition gives users a chance to review a wide variety of the latest equipment and services, with their current needs in mind. This unique combination of forum and exposition gives computer users the first practical method of learning about and selecting equipment from a variety of manufacturers. And the results in sales are very impressive.

Unlike other computer shows, which make you travel to them, the Caravan comes to you — with a 3-day show in each of 10 cities across the U.S. in the Spring of 1974. Watch Computerworld for the details.

If you're a marketer, now is the time to act. The Caravan can accommodate 100 booths, and more than half of those have already been spoken for. We have all the facts you need to examine the new EDP marketplace closely, and we'd be glad to go over them with you. Just call Neal Wilder or Dottie Travis at (617) 965-5800. Or write to us at Computerworld, 797 Washington Street, Newton, Mass. 02160.

If you're a computer user, you'll find The Computer Caravan to be a unique new method of gathering the information you need to gain greater efficiency for your installation. And you'll also find that we're convenient.

The Computer Caravan regional computer users' forum and exposition.

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When you use "Scotch" computer tapes and disk packs, you get the combined skill and dedication of more than 1000 special people. The 3M Clan. People who have led the industry with innovations in computer media technology, starting with the development of the first computer tape in 1953. A clan which stands behind its products with one of the largest and most extensive groups of technical sales representatives in computer media. People who thrive on assisting. People who will go to any length to solve a customer's problem. The Data Recording Products Division of 3M. A proud clan.

"Scotch" is a registered trademark of 3M Company.
Data Briefs

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CRF Terminals Contain Building Block Cards

ANN ARBOR, Mich. — Ann Arbor Termi- nals Inc. has introduced a line of complete plug-compatible CRF terminals containing building-block circuit cards directly interchangeable with its Series 200 modular display controllers and key- boards.

Design III is available with serial or parallel data interface in 16 standard RS-232 and RS-422 models. Operating speeds to 9,600 bit/sec are asynchronous stan- dard.

The display set consists of 64 upper-case or 16 upper-case/character sets, with display formats up to 40 lines by 80 characters. A built-in M OS dynamic shift register stores a full screen of data.

Prices begin at $990. Delivery is 15 days from 42 Enterprise Drive, 48103.

On-Line Terminal System Expanded

WINTER PARK, Fla. — Financial Data Sciences, Inc. has introduced a typewriter printer, CRT printer and punched card reader to expand its on-line transaction processing system.

The administrative typewriter printer 120 supports typewriter entry and 30 char/sec/cr printing.

The CRT impact printer models 801 and 802 for general use are commercially available to produce reports or provide a complete audit trail. The 801 is used with the CRT terminal processor and the CPU. The Model 801 has 80 print positions, the 802 has 120. Both print at 120 char/sec/cr.

The punched card reader 620 reads up to 150 card/min and can be used in any position and in any combination with a CRT, CRT printer and the typewriter printer.

The administrative typewriter printer costs $4,350. The price of the CRT im- pact printer model 801 is $4,290, and the Model 802 is $4,875. Price of the punched card reader is $3,995. Initial deliveries are scheduled for early 1974. Further information can be reached at P.O. Box 1306, 32798.

Terminal Comes With Selectric

FAIRFIELD, N.J. — A send/receive 1500 Selectric terminal with capability of half-duplex operations and available with any model IBM Selectric typewriter has been introduced by Tycom Systems.

The Tycom 38-M is a complete package including the S/310 and the 300 modules. It contains a built-in 120-line terminal, a 120 character line printer, a terminal controller and keyboard, and a 23 capacitive terminals.

The Tycom 38-M with acoustic coupler and modem provides a terminal controller's maintenance by means of a keypunch.

The 38-M is manufactured at 8075 Capital Court in Fairfax, Va. An initial delivery of 15 units is scheduled for mid-January. Additional shipments are expected by mid-March.

With the AJ 630 you get MORE than a Quiet, Reliable, Wide Carriage Terminal.

The AJ 630 Keyboard Printer Terminal gives you quiet, non-impact printing— a minimum of moving parts, remote setting of tabs by the user, and speeds of 15, 15 and 30 characters per second, just to name a few.

There's a lot more you can do with this terminal. The Engineering manufacturing know-how that assures AJ quality, our own sales and service staff to assist you in 30 principal cities, and the option to buy or rent the equipment directly from us.

It doesn't end here. You can get Selectronic and Teletype Terminals, too— and a variety of other equipment, including 120-line printers and cassette recorders. Check with AJ for the complete line of products and services.

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CI Notes

Eniac Patent Issue Dies

MINNEAPOLIS — Honeywell, Inc. and Sperry Rand Corp. have declared settled the litigation between them involving Sperry's patent on the Eniac computer system, invented in 1946.

The firms have indicated they will not appeal a judgment handed down last April by Federal District Court Judge Earl R. Larson declaring the patent invalid (CW, April 25).

Both firms said they agreed not to assert claims for infringement of present EDV patents and applications and Sperry Rand will pay Honeywell $3 million.

The litigation between the two firms lasted six years, with Honeywell charging antitrust violations against Sperry Rand and Sperry Rand countersuing for patent infringement.

NCR Sets On-Line Group

DAYTON, Ohio — NCR has established a special systems group for the development, manufacture and support of customized on-line computer systems.

The group, according to NCR President William S. Anderson, will have program management responsibility for projects, including overall systems design, development of special hardware and software and installation and support both in this country and abroad.

Honeywell to Buy GE-PAC

MINNEAPOLIS — Honeywell, Inc. has agreed in principle to acquire GE's Processor Control Systems division, which makes the GE-PAC line of minicomputers.

In addition, Honeywell will obtain non-exclusive rights to manufacture and sell the GE-TAC data transmission system. Boeing Co. has acquired manufacturing rights for the latest models of the GE-TAC remote terminal, the GE-TAC 7020 Model 4, which will hit individual and as part of its utility Supervisory Control and Data Acquisition system.

Supershorts

Pertec Corp. has signed a three-year $11 million contract to supply CRT terminals to Singer Co.'s Business Machines Control and Data Acquisition system.

Looking for the best answer to your minicomputer needs?

By Molly Upson

CF 8/4/73

Table: Mini Shipment Report and Price Forecast

<table>
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<th>Manufacturer</th>
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<th>Sales Estimate</th>
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<td>IBM</td>
<td>1972</td>
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<tr>
<td>Digital</td>
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<tr>
<td>NCR</td>
<td>1972</td>
<td>200,000</td>
<td>$0.8 billion</td>
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- Powerful processing capability of 100 to 250 lines/minute
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Looking for the best answer to your minicomputer needs?

E. Drake Lundell Jr.
D/F 8/4/73

TULSA, Okla. — The marketing strategy in its antitrust suit with Telex will be crucial in IBM-Telex Appeal.

By Molly Upson
CF 8/4/73

TULSA, Okla. — The marketing strategy in its antitrust suit with Telex will be crucial in IBM-Telex Appeal.

Likely revolve around the issue of predatory pricing, legal sources said last week, seeing the amended complaint as a move to change the legal bases and conclusions of law issued by Judge A. Sherman Christensen in the case (CW, Nov. 21).

Much of Christensen’s ruling centers on the fact that IBM made "predatory" pricing moves designed to destroy its competitor in the plug-compatible peripheral business. If IBM can weaken that ruling, the whole decision may fall with it.

Most precedents in predatory pricing are considered as setting prices for products below their actual cost in order to drive competition from the market.

But in Christensen’s amended ruling it is clearly spelled out — at the insistence of IBM lawyers — that IBM never priced products below cost.

Revised finding 11A reads: “There was no evidence that IBM reduced below cost and a reasonable profit. Indeed, when announced, the profitability (of the units in question) was anticipated to be in the range of 20% to 30%.”

“Likewise, at the announcement of FIP (fixed term plan) it was anticipated that the profitability of the products to which it applied would be at least 20%.”

“Those profit margins in part, of course, had been achieved by obtaining a share of the market which would have otherwise been made by Telex and other ACMs [plug-compatible manufacturers].”

“Reductions are found to be predatory.”

Most antitrust lawyers contacted could not find another case in which a firm was found guilty of predatory pricing without cutting prices to a level below the cost of producing the product or at least below reasonable profit expectations.

So the ruling here, if upheld, would be precedent-setting in this area as well as others — particularly the market definition question.

In that area, most lawyers consider Christensen’s ruling that IBM monopolized a market for plug-compatible equipment to be equally precedent-setting.
Rotating memories due for overhaul?

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Save down-time and money by letting the experts, with all the right equipment and know-how, do the job effectively and efficiently—on time, every time! Computer service includes the ability to diagnose any malfunctions and repair them, plus many other services: D.O.S./V.S., OS, OS/MFT, OS/MVT, V.S. and more. Please call for a quick quote on all your specific memory overhaul requirements. (213) 391-0535

Our computer service is the core of 612 vacuum tubes, the machine has an adding capacity of 1/30,000 that will possibly get into international electronics by following trends in other countries and trading off lower technology parts and taking on higher technology tasks, he said.

The number of professionals, including consultants and analysts totaled 5,104 compared with 4,630 in the 1972 period.

Honeywell expects to include CRTs or other components made either by Amalgamated Wireless Australia Ltd. (AWA) or Information Electronics, instead of similar Honeywell gear, as part of bids for large-scale government contracts.

W.R. Willmert, vice-president, manufacturing planning of Honeywell, noted that Australia does not now manufacture cores and multiplexer circuit boards, among other key components.

Software Acceptable

The Australian government currently requires a certain percentage of equipment bid for government purchase to be manufactured in Australia, but is rapidly modifying its position by accepting software as an alternative to hardware for government requirements, he noted.

In addition, Willmert said, Australia could possibly get into international electronics by following trends in other countries and trading off lower technology jobs and taking on higher technology tasks, he said.

More than two-thirds of revenue from a Honeywell CPU currently stays in Australia. Willmert said.

Honeywell, he said, would need a $25 million market annually to warrant building a plant for microcomputers.

Honeywell is estimated to hold 17% of the total Australian market, and to have installed over 200 systems there.

Aussie POS Seen Growing

SYDNEY. Australia—The Australian point-of-sale market is estimated to be worth in excess of $36 million over the next five years, according to Lawrence J. Abtyn, Singer's marketing director for retail systems, Asia and the Pacific.

About 15,000 point-of-sale retail terminals will be installed in Australia within the next five years, he said.

Univac 120 Goes to Museum

JAPAN—A Univac 120, the first business computer used here, was presented to the National Science Museum of Japan. Until 1961, about 70 units of the Univac 120 were in active use. With a core of 612 vacuum tubes, the machine has an adding capacity of 1/30,000 that of a Univac 1100.

UK Service Bureaus Start Right in '73

LONDON—The British service bureau and software business is off to a strong start this year with first quarter revenues at a record high of $56.6 million, according to a survey by the Department of Trade and Industry.

In 1972, the same sector's revenues totaled $42.7 million.

More than half of the 1973 revenues, or $31.8 million, was derived from processing of custom-designed programs, package programs, time-for-sale and remote-access services, according to the survey.

The processing of custom-designed programs has shown a steady increase, but use of package programs has declined compared with the last quarter of 1972, although up slightly from the first quarter of 1972.

The time-for-sale market has been declining, but remote-access services have jumped from $2.5 million in the first quarter of 1972 to $5.5 million, the survey indicated.

Revenues from professional services, including programs and consultations, accounted for $17.1 million of the total $56.6 million, the report said.

In the same 1972 period, the figure was $10.4 million.

Staffing is seen slowly returning to the levels of before the recession of 1972. The 165 service bureaus and software houses responding to the survey indicated a total employ-
Worldwide Trade Agency Proposed To Regulate Broadening DP Industry

By Molly Upton

NEW YORK — "If the regulatory approach is to be applied to the data processing industry, it will have to be done on a world scale," observed Frederic G. Withington, head of the data processing service program at Arthur D. Little. Noting that the recent IBM-Telex judgment gives legal substance to the idea that computer manufacturers’ control over their customers and competitors must be regulated, Withington suggested the establishment of a Federal Data Processing Commission.

The agency would be patterned after the Federal Communications Commission, which, although its record may be "imperfect, most would agree it has managed fairly well to protect the public interest, foster reasonable competition and still permit new technologies (and whole new industries based on them) to be introduced," he said here recently.

But, since within the DP industry there is a strong trend toward multinational firms, Withington suggested a supranational regulatory body.

Firms Spreading Out

"If present trends continue unchecked by national government actions, continued mergers of computer companies could culminate in four or five multinational suppliers of general-purpose computers, each having facilities and customers in all parts of the world," he said.

"The familiar pattern of an entrepreneurial nationally oriented industry will disappear and it will become essential to create a regulatory agency having worldwide authority," he predicted.

IBM, he noted, is already a world company, and he cited several moves by other DP firms to acquire a broader base for international operations.

Honeywell acquired GE’s computer division and Bull, while Sperry Rand bought RCA and several smaller companies. NCR and Control Data Corp. are moving by degrees toward full amalgamation.

CII, Siemens and Philips have formed Unidata, and through Siemens and CII, Unidata has a cooperative arrangement with Hitachi-Fujitsu.

The Japanese government has prompted the combination of DP firms into three groups: Hitachi-Fujitsu, Nippon Electric-Carrier, Toshiba, and Oki-Mitsubishi.

And Nixdorf Computer has entered the U.S. through the acquisition of Victor’s computer division, and is negotiating with ICL.

Although there is no precedent for such regulation, the United Nations is exploring ways of regulating world companies.

"It seems that if the regulation Judge A. Sherman Christensen has found necessary to be made workable, the UN effort or something like it is going to have to succeed," Withington said.

At the UN, a group of eminent persons appointed by Secretary General Kurt Waldheim has conducted a round of public hearings to see if "some form of accountability to the international community" can be applied to companies that operate internationally, according to a UN secretariat report.

Although business leaders are not ready to accept anything resembling a worldwide version of the Federal Trade Commission, many have little objection to the UN establishing a center for the exchange of information about multinationals and possibly a system for registering those firms that would subscribe to a voluntary code of conduct.

Prince Resigns Ampex

CW West Coast Bureau

LOS ANGELES — Eugene E. Prince, vice-president and general manager of Ampex Computer Products Division, has resigned following differences over policy matters, a company spokesman confirmed.

Charles V. Anderson, a veteran Ampex executive, has been named new vice-president and general manager on an interim basis.

Anderson joined Ampex as a vice-president and general manager of Ampex Computer Products Division, has resigned following differences over policy matters, a company spokesman confirmed.

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Charles V. Anderson, a veteran Ampex executive, has been named new vice-president and general manager on an interim basis.

He bought his tape transports from company A. He bought his disk drives from company B. He bought his printers from company C.

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He could have saved time, energy, money and frustration dealing with one reliable international peripheral manufacturer—Per-tec.

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His disk drives would be top and front loading, plug-compatible models—identical in size and interface. He’d have a choice of mechanical or electronic actuating, 35 msec access time, margin testing, an optional fixed platter. And a built-in power supply—all within the drive and identical in both configurations.

His printers would be quiet, easy-to-operate two speed (300 and 160 lpm) models. He’d have a selection of pre-engineered, plug-in options to meet his specific system requirements. And features like electronic top-of-form, skip-over perforation, and full fault protection.

He’d have personal and professional assistance in the design, development and maintenance of his system. Factory training for his service people. Back-up by a service and support network in 30 U.S. cities and 20 foreign countries.

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We'd like you to meet the ENTREX family of outstanding key-to-disk systems. To get acquainted, just call or send in the coupon today. Once you get to know us, you'll agree...ENTREX has the answers in data entry!

Microprogramming

OCEANPORT, N.Y. - Microprogramming has enabled Interdata, Inc. to keep one user-level architecture since its first model, thus offering compatibility throughout the product range, according to Ronald A. Paterson, vice-president of marketing of Interdata.

"The hardware keeps improving - more performance at lower cost - but because of microprogramming we can make the user-level processor appear to be the same," he said.

The user-level architecture is the cornerstone of Interdata's marketing approach, both to the end user and OEM segments of the industry.

CPUs to OEMs

Currently, about 60% of Interdata's revenues stem from OEM sales, and 40% from end users. In two or three years, he commented, the figures will shift to perhaps a 50-50 split. But even then, the majority of CPUs, perhaps as high as 80%, will be going to the OEM market.

The OEM market is where Interdata finds the high unit volume of CPUs which enables a firm to grow, to keep costs down and thus be competitive in the end-user market, he said.

"High unit volumes also enable us to continue investments in vertical integration programs - such as our own PC board facility and manufacture of our own paper supplies," Paterson said.

"The typical OEM starts off with one medium-price product. But he must be able to expand his product line in both directions, toward the low price end and the high price end. He faces the problem of maintaining his product line; he'd like a high degree of parts commonality," he observed.

"And, a couple of years down the road, he must redo his product line - but he would like to hold that new investment to a minimum. OEMs have been known to get 'the shakes' when they're told they have to redo their software and peripheral interfaces.

"Interdata keeps pushing costs down, and at the same time keeps pushing performance up.

"We want to do both, but we insist on doing them in a way which preserves compatibility with our previous products. "We are just now coming into multi-processor hierarchical systems, in which a powerful minicomputer manages several medium mini 'foremen,' which in turn supervise many black box controllers."

Software, beyond a doubt, is the principal challenge in the mini industry, Paterson found. "In 1974, for the first time, we will spend more money on software development than on hardware development. And that, I think, is a very significant fact," Paterson concluded.

I wish to attend a SCORE seminar

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8 INFORMATION SYSTEMS

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Orders & Installations

The Federal Intermediate Credit Bank of St. Paul has ordered 152 Datasette 2200 dispersed data processing systems as part of a Regional Management Information System designed to permit on-line updating and on-line access of master files.

American Express Co. has ordered four minicomputer-based 3200 Data Management Systems from Lockheed Electronic, Inc., for use at its New York center for processing Travelers Cheques.

Sisters of St. Mary has ordered a Univac 1105 to form the core of a health care information system serving five Midwest hospitals administered by the congregation.

The University of Minnesota has ordered a Record 1000 system from Dynamic Information Systems, Inc., to provide multioperator access to the university's central addressing file.

Kaiser Foundation Research Institute has placed an order with Analytical Development Associates Corp. for hook-up to the Kaiser center communication system and for installation of a new performing kidney function tests.

Intermediate School District 109, Seattle, Wash., has purchased a Sigma 6 from Xerox Corp. for administrative data processing.

Publix Super Markets, Inc., has ordered 30 NCR 255 point-of-sale systems valued at $52 million.

Western Ohio National Bank has installed an NCR Century 101 to provide unified statement banking capabilities.

Northwest Orient Airlines has ordered 20 computer-operated automatic ticket printers from Control Data Corp.

NEW YORK - The Association of Data Processing Service Organizations, Inc. (Adapso) has called for a disciplinary investigation into the conduct of attorneys in the IBM-Control Data Corp. antitrust suit which led to the destruction of the index on IBM's documents.

Citing the refusal by the New York and American Bar Associations to proceed, Adapso Executive Vice-President Jerome L. Drayer said the association had decided to make public its correspondence with these groups.

"We are publishing this information in the hope that the press and the public will insist that the bar investigate these issues. We are not concerned with past conduct," he said.

"We are terribly concerned, however, that there may be a repetition, with the most serious adverse consequences to the administration of justice," he continued.

As part of the correspondence between Adapso and the two groups, John C. Bonomi, chief counsel of the Adapso committee on Grievances of the Association of the Bar, replied to Adapso President T. O'Rourke indicating, "This office would not wish to take any action which might be interpreted as an attempt to interfere with the conduct or the outcome of pending litigation [U.S. vs IBM]."

In a letter to Powell Purpurne, chairman of the Committee on Grievances, O'Rourke countered that the American Bar Association's decision in September that lawyers who conduct such investigations function as 'judges'... have a fiduciary responsibility in the administration of justice.

"It would be most unfortunate if the alleged misconduct [in the IBM-CDC case] in fact is unchallenged, uninvestigated and unpunished for several years, simply because of the vagueries of the pending litigation," O'Rourke concluded.

For Possible Lawyer Misconduct
Adapso Wants Probe of IBM-CDC Case

By Shukan Computer Special to Computerworld
TOKYO - The State of DP here is undergoing changes, with emphasis on increased utilization of minicomputers, on-line equipment and terminals, according to a survey report by the Japan Information Development Association.

There is currently an average of 3.6 computers per company with about 32 peripherals, the report indicated, adding that it expects systems to be upgraded 2.7 times in the next five years.

Terminals have increased 2.5 times, and increased equipment diversification is expected, the report said.

The survey indicated 84% of respondents expect to enlarge the scale of their computer system in the next five years.

Sixty-two percent of businesses have upgraded their systems at least once since installation, and roughly half of all industries plan to upgrade during 1973 or 1974.

For the average for all industries, 3.6 systems, far surpasses the 1.9 systems of the previous year.

This growth is attributed chiefly to the expansion in the scope of minicomputer application and the volume of business

Emphasis in Japan Now
On Minis and Terminals

PANVALET...Because Security is more than External!

Cheers for 1-Man Show...When It Comes to Software Contracting

By Kenneth P. Seidel

Elliott Raphaelson of Chase Manhattan Bank set forth his ideas in seeking outside software custom programming services [CW, Aug. 22]. Many of the recommendations are worth consideration when it comes to setting up a contract with an outside supplier.

Overlooked in his analysis and advice, however, is the possibility of dealing with free-lance consultants rather than fully-fledged incorporated software houses.

Raphaelson advised the user to "examine closely the latest financial information available on any proposed vendors" because the "mortality rate is high in the custom software business."

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Ken Seidel is a consultant in Fallsbrook, Calif.

—自然语言的文本结束—
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**COMPUTERWORLD**

November 28, 1973

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SAN FRANCISCO — Irel Corp., revenues and earnings showed spectacular progress during the three- and nine-month periods ending Sept. 30.

President Peter S. Redfield noted the results represent contributions from each operating division and particularly the company's rapidly growing business and financial service activities.

"These have become very important factors in Irel's strengthened performance and outlook and augur well for the prospects of the other financial and business service activities we have recently begun," he said. All Irel figures have been restated to exclude the operating results of Information Storage Systems, Inc., which was sold to Unisys in August. Any gains from that sale will be reported at the end of the year.

In the three months, revenues rose to $38.4 million from $18.9 million, while earnings jumped to $2.8 million or 36 cents a share from $2.3 million or 3 cents a share.

On the basis of income from continuing operations, the figures were $2.3 million compared with $747,000.

In the nine months, revenues reached $95.3 million from $53.7 million and earnings totaled $3.3 million or 71 cents a share compared with a loss of $2.6 million or 35 cents a share in the same year-ago period.

Income from continuing operations was $4.1 million compared with $1 million in the 1972 period.

**1st Quarter Brightens for Graham, New Product Expenditures Cited**

GRAHAM, Texas — Graham Magnetics, Inc. improved in the first quarter, despite "rapidly increasing expenditures on new products."

In the period ended Sept. 30, the tape maker earned $252,448 or 27 cents a share compared with $220,403 or 24 cents a share in the 1972 period.

The minicomputer maker earned $623,448 or 41 cents a share, including a $280,000 tax credit compared with $676,643 or 51 cents a share, including a $318,000 tax credit in 1972. Revenues rose to $8.7 million from $6.2 million in the year-ago period.

"The company is now favorably positioned in its chosen markets and anticipates increased sales and earnings for the coming year," Fuller added.
November 28, 1973

Earnings Reports

GRAHAM MAGNETICS
Three Months Ended Sept. 30 1973
Shr Earnings 612,000 269,000

TELEX
Three Months Ended Sept. 30
Shr Earnings 417,500 185,000

VARIAN ASSOCIATES
Year Ended Sept. 30
Shr Earnings 568,000 23,000

INFORMATICS
Six Months Ended Sept. 29 1973
Shr Earnings 8,300 3,880

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