

SEPTEMBER 1974

Behind the privacy bill

Computers don't argue

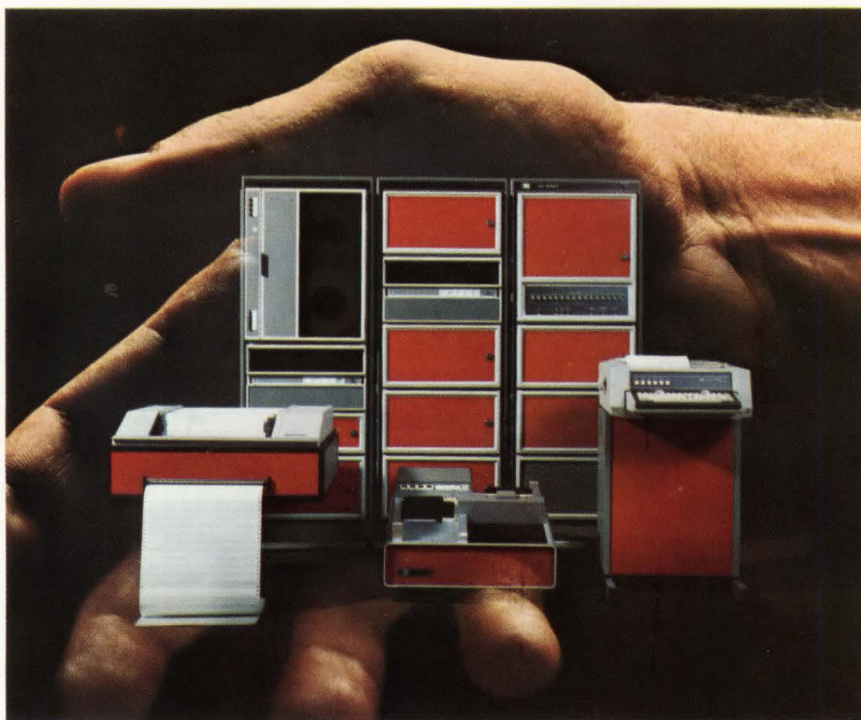
Ruth Davis: The conscience of computing

Computer Decisions

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INFORMATION RETRIEVAL NUMBER 91

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Computer Decisions

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INFORMATION SYSTEMS AUTOMATED PROCESSING PROBLEM SOLVING VOLUME 6 NUMBER 9 SEPTEMBER 1974

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UNDERCURRENTS

HP begins manufacture of smart tubes

With the planned introduction of two intelligent terminals, Hewlett-Packard will be making just about all of the gear it sells in the mini management systems business. The firm will produce two units, the smaller slated to equal roughly Teletype's Dataspeed 40 in power, the larger to be essentially a mini with a screen. Both models will offer lots of storage inside the cabinet, a spinoff of HP's high-density storage experience (HP uses 4k RAM chips on their current mini lines). The tubes will displace those now bought outside, and will be integrated into the M260 and M230 business systems. At this writing, prices for the units were not available, but the hint is "competitive," which may mean a battle with whatever DEC brings out its new Components Group.

European single-element printer on the way

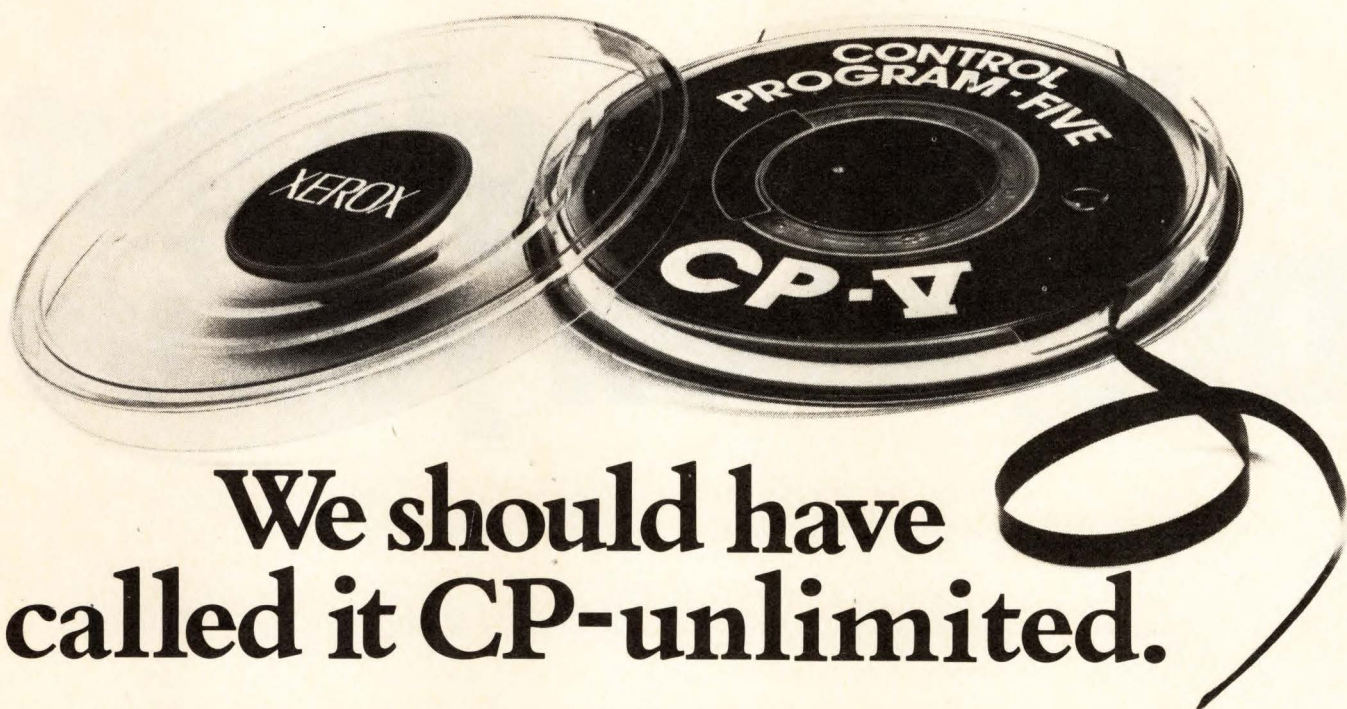
Facit-Addo, a unit of the Swedish Electrolux conglomerate, is in the final development of a single-element printer. Initially aimed at the oem marketplace the unit will be used in word processing and general purpose terminals. Prices on the printer will most probably be lower than those for the popular Selectric mechanism. Still up in the air is the question of interchangeability—will the printer take a Selectric ball? We should know very shortly . . . California's Qume is said to be doing well with its "petal" printer. At least one business mini firm is near announcement of a Qume-based system, and other firms nervous about the Xerox ownership of Diablo are reconsidering their character-printer plans.

Amdahl ready to unveil virtual machine

Late this fall Amdahl Corp. will be running its monster 470 system. The firm, which had originally planned to bring out a real memory computer first, is expected to show a virtual memory machine instead. Amdahl will offer potential customers benchmark testing as soon as the system is on the air. While he's been quiet about performance, hints are that it will be astonishing compared to 370 thruput.

Disks and film the whole family can enjoy

In the recent past, a little record by "Randy Z and Bongo Jack" which satirized the computer business became a favorite of industry trivia collectors. Some of you may know that Randy Z is really Renn Zaphiropoulos, the president of Versatec. Anyway, the record, *Push the Magic Button*, is going to be joined by another, still untitled, release aimed, we are told, at the securities industry. Judging from past records, it should be a smash—or will it be called a crash? . . . Computer Automation is winning awards with their brilliant *Frankenstein* takeoff. The seven-minute production touts their Capable tester, and is the funniest industrial film we've ever seen.



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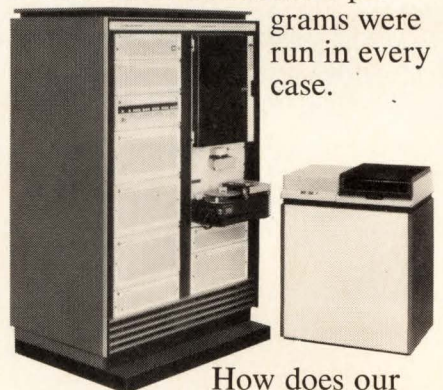
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A=B	4	14	35	7	13
Do Loop	4	22	10	11	17
A(I,J)=B	22	63	39	28	46
A=Sin(B)	100	251	266	197	1583

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NEWSDATA

CalComp makes gains in antitrust position

California Computer Products, Inc., one of five computer companies involved in antitrust suits against IBM, recently won a favorable ruling in a second pretrial hearing in San Francisco. Federal Judge Ray McNichols ruled that a patent infringement counterclaim brought by IBM against CalComp was unrelated to the main suit. He granted a motion by CalComp to stay discovery on the counterclaim.

CalComp, along with Memorex, Transamerica Computer Corp., Marshall Industries and Hudson General Corp., has charged IBM with monopolistic practices.

On another IBM counterclaim, that CalComp had monopolized the digital plotter market, the judge stated that he believed the issue should be tried as part of the antitrust suit.

A CalComp spokesman expressed disappointment that the judge did not also stay discovery on the second counterclaim. "We are confident we can demonstrate this claim is ludicrous in view of the fact that IBM's assets are approximately 150 times greater than the assets of CalComp."

Computer exhibit teaches power thinking

People visiting the Trojan Visitors Information Center in Ranier, Oregon, are receiving a painless course in nuclear and other forms of energy. The Trojan Center, near the Trojan Nuclear Plant (which will be put into operation in 1975), has displays depicting the uses and development of energy sources and the increasing need for more power.

After perusing the eight displays, visitors are offered a chance to go to "Computer College" where they are asked 15 questions about energy at any of 10 crt terminals. The questions have either multiple choice or true-false answers, the "student" specifies his answer by pointing at it with a

light pen. An IBM System/7 is behind the scene, giving the quizzes and summarizing the responses of visitors. Those successfully completing the quiz receive "diplomas" from the Computer College.

According to George Carter, center manager, "The computer area is one of the highlights of the center. It takes only a couple of minutes or so for the quiz, and people often have returned to the exhibits after getting stumped on a question. The quiz gets them thinking about the displays."

The Trojan Plant will be the first commercial nuclear power plant in the Northwest; the center's purpose is to educate the public about nuclear energy as well as total energy needs.

The computer-generated report of incorrect answers will help the center evaluate the effectiveness of the displays. "For instance, one question refers to the amount of electricity generated throughout the country by dams. It actually is a small percentage nationally, but since people out here are used to dams, many think it's greater and miss the question," said Carter. "Because of this response, we're going to change one of our exhibits."

In the future, the center may use the computer to present different sets of questions to different audiences. This way a college class could be given questions that are much more difficult than those given an elementary school group.

Regulating water a dam site better

The computer is again combatting floods and power shortages. Three dams on the Snake River in Washington are being monitored by an IBM 1800 to control river flow and generate hydroelectric power.

The three dams—Ice Harbor, Lower Monumental and Little Goose—communicate with the computer over microwave links; the computer itself is located at McNary Dam on the Columbia River in Oregon. Each of the three Snake River dams has thirty

sensors that are continually transmitting data, such as water height and rate of flow, to McNary. As local conditions change, the computer regulates the dams.

While each dam is controlled individually, the computer takes into account conditions at the other two dams. This way all three dams are kept operating smoothly. Disconnected systems might allow one dam to spill water while the others are holding less than their capacities. "We want to avoid spilling water unless the river flow is high and exceeds the hydraulic capacity of our turbines," said Gordon Richardson, project engineer at McNary. "Water represents electricity to us, and the more water we spill the less energy we can generate. By regulating river flow and power generation more efficiently than manual operations could, the computer directly reduces our overhead. In turn we can keep down power costs to our consumers."

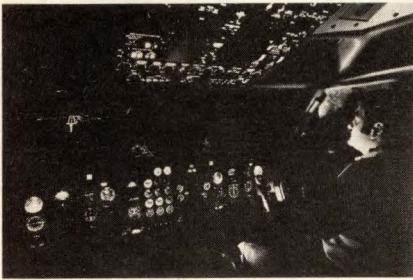
At night, when power demands are normally lower, the dams store water. The next day, as demand increases, this water is directed through the turbines to generate electricity. McNary and the three Snake River dams feed into the Bonneville Power Administration Grid, which serves the Northwest. Bonneville signals the computer for more or less power as needs fluctuate.

Ice Harbor, the smallest of the three dams, can generate enough electricity to supply about 60,000 homes. The other two dams can each supply electricity to about 90,000 homes. A fourth dam on the Snake, Lower Granite, will be tied into the system when it is completed in 1975.

IBM coughs up \$13-meg in Ampex settlement

Ampex Corp. of Redwood City, CA, has dropped legal proceedings against IBM that stemmed from a dispute over patent rights following IBM's agreement to pay Ampex \$13-million. Also at issue was an antitrust dispute which threatened both firms

with lengthy and expensive court actions. Ampex and IBM will share patents on computer devices under the truce.



Cockpit simulators serve commercial aviation

The first computer-controlled display system approved by the Federal Aviation Agency for training pilots in nighttime take-offs and landings is being used by Pacific Southwest Airlines at their headquarters in San Diego, CA. The system, known as *VITAL II—Virtual Image Take-off and Landing*—was developed by McDonnell Douglas Electronics Company, of St. Charles, MO, working in conjunction with PSA.

The system uses two computers. The primary computer is a Honeywell DDP-124, which is used to govern the physical movements of the simulator cockpit, as well as to keep track of the aircraft's position, speed and course. A Varian 620 minicomputer is used to control the visual displays presented through the cockpit's two forward facing windows.

The visual displays are generated on crt's and then reflected through the cockpit's windows through a system of spherical mirrors. The crt images are generated by the minicomputer, which takes data, such as position and altitude, from the primary computer. This information is then used in conjunction with stored data in the mini about the layout of the lights around the airport. The system can depict airports as they would appear from any given altitude and angle. The virtual image projected by the mirror system is focused at infinity so the image remains in perspective regardless of the angle at which it is viewed.

PSA operates entirely within California, narrowing the range of conditions to be simulated. The minicomputer can generate the image of eight actual airports, such as Los Angeles and San Francisco, as well as a ninth generalized hypothetical airport. The data used to generate these airports were gathered during actual training flights.

The simulator is used to train pilots to handle such aircraft as Boeing 727's. Many maneuvers that previously had to be taught in actual flight are now thoroughly taught on the system reducing the costs and hazards of pilot training. The system can simulate instrument take-offs and landings, mechanical failures and other difficult or anomalous situations. It also can take into account terrain effects and cross winds.

Since the simulator has been installed, McDonnell Douglas has received orders from twelve other airlines, as well as the US Navy. The new installations use faster Varian V70 minicomputers as display generators, which should allow increasingly complex scenes to be depicted.

Interbank to provide electronic interchange

In a major step towards nationwide EFTS, Interbank Card Association will offer electronic interchange of descriptive billing to Master Charge member banks during the third quarter of this year, it was announced by John J. Reynolds, President and Chief Executive Officer of the Association.

A new facility, Interbank Network for Electronic Transfers (INET), will provide electronic interchange of sales slips in two stages, beginning with an offline, tape-to-tape network and by mid-1975, switching to direct online computer-to-computer interchange.

"Continued growth in interchange volume and increasing costs of processing these transactions have prompted a majority of our members to request electronic interchange of descriptive billing. INET will provide an effective near term and long range response to their needs," Reynolds said.

"INET will curtail the need to send sales slips from one region to another, reduce the float for participating banks, permit sales tickets to be posted to the cardholder's file five or six days earlier and provide an early indication of fraud," Reynolds said.

Noting that approximately half of the Association's 6,400 Master Charge banks currently use descriptive billing, Reynolds said that participation in INET would be on a voluntary basis.

Beginning in August, 1973, two Interbank regional associations, Credit Systems, Inc. and Mid-American Bankcard Association, conducted successful trials of tape-to-tape and computer-to-computer interchange. Similar trials were also carried out between Atlantic States Bankcard

Association and First Union National Bank of North Carolina. Results of these tests and in-depth experience gained in conducting them demonstrated to a majority of Interbank members that electronic interchange is both cost effective and operationally viable.

Reynolds noted that INAS, Interbank's first online computer-to-computer service, has been functioning effectively during the past 15 months and "will continue to provide fast national sales authorization for our members' merchant accounts."

During the initial tape-to-tape transmission phase of INET, participating members will transmit outgoing interchange to Interbank's computer center in St. Louis where it will be sorted and a settlement draft produced. Incoming interchange transactions will then be distributed to each participating member.

National electronic interchange will occur in a time frame synchronized to banking operations. Most Interbank members are not ready to transmit data before 11 p.m. and prefer to receive it before 3 p.m. Therefore, the entire cycle is scheduled to take place in 16 hours—that is, from 2300 to 1500 hours. The computer center in St. Louis will receive data during a six hour period, take four hours for sorting and transmit out again in a six hour period. The entire cycle will be completed by 3 p.m. each day, permitting members to input the data into their main update and posting runs, Reynolds said.

Referring to the use of tape-to-tape interchange for the initial phase of INET, Reynolds said that "it requires minimal capital investment, is relatively easy to implement and permits immediate participation of indirect INAS users. Secondly, nothing is wasted. The tape transmission of units and the software for settlements and sorting will be needed in the final system design."

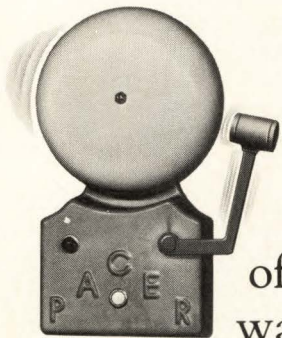
In its final phase, INET will provide computer-to-computer transmission through the network for all participating Interbank members.

"This will permit full utilization of communications facilities that are currently in reserve. It will also greatly reduce manual handling required by the interim tape-to-tape system," Reynolds said. He emphasized that cost per transmission is expected to decrease with volume.

continues on page sixty-six . . .

The Bully.

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Every contest has one winner. Sometimes it's a technical decision. Sometimes it's a knock-out. And sometimes it's both.

Consul 980.

ADDS

Applied Digital Data Systems Inc.

INFORMATION RETRIEVAL NUMBER 9



WASHINGTON DATALINK

by Linda Flato

SPLIT UP AT&T, BIDDLE URGES

Accusing AT&T of pulling political, economic and market-power wires to cut off development of legitimate competition, A.G.W. (Jack) Biddle, executive director of the Computer Industry Association, urged that the corporation be split into smaller operating units, in hearings before the Senate Antitrust and Monopoly subcommittee. He extended CIA's divide and conquer strategy to include chopping the Federal Communications Commission in half: One agency to regulate broadcasting, the other to oversee telecommunications.

Biddle's proposals echoed his past complaints that the independent computer and DP industry "is subject to not just one, but two monopolies: IBM and AT&T," and has been forced into "an unwilling acceptance of the barriers that exist in the telecommunications marketplace." He suggests that AT&T be divided into separate local telephone companies, a long lines company and one or more terminal equipment, switchgear, wire and cable and supply companies.

Clay T. Whitehead, director of the Office of Telecommunications Policy, echoed some of Biddle's trust-busting proposals. Whitehead called for a shakeup of the entire communications industry and revamping of the "outmoded regulatory mechanisms that protect monopoly rather than constrain it."

Despite Bell's denial, "liberal, nondiscriminatory interconnection with access to the switched network is feasible and essential," he concluded.

IBM general counsel Nicholas deB. Katzenbach opened the subcommittee's four days of hearings on the computer industry with a sharp denunciation. The former Johnson Administration Attorney General condemned the hearings as "unfortunate, somewhat unfair and clearly unnecessary." He argued that the trial of the government's antitrust suit against IBM, set to open in New York next month, "will provide incomparably more accurate, less biased, more comprehensive and better informed facts than this hearing."

Katzenbach also took a few judicious jabs at some of the hearing's witnesses. Adamantly protesting the bias of some of the witnesses, Katzenbach complained that they "will promote views prejudiced to IBM in every way they can." He singled out the "so-called" Computer Industry Association for special criticism. Denouncing the CIA's public attacks upon IBM, Katzenbach maintained that the association with its anti-IBM membership was not representative of the computer industry.

PRIVACY GROUP MAKES 13 PROPOSALS

A proposal calling for public inspection of "privacy impact statements" containing information on newly designed federal data processing or communications systems was one of 13 recommendations made recently by the President's Domestic Council Committee on the Right of Privacy.

The long-awaited recommendations of the committee, established last February under the chairmanship of now-President Gerald Ford, all deal superficially with the privacy problems posed by computers. Among the proposals are those dealing with the privacy implications of

mailing lists, tax information reported to the IRS, electronic funds transfer systems, and confidential records maintained by financial institutions.

In addition, the committee urged the Office of Consumer Affairs to develop a "Declaration of Individual Rights of Privacy in Consumer Transactions." It also proposed that the National Bureau of Standards step up its development of security standards for personal information systems.

Other proposals involve the right of an individual to know why certain information is being collected on him, and his right to inspect and correct it.

JUSTICE SUES LTV FOR DOUBLEDEALING

A walloping \$17.6-million suit, accusing LTV and its subsidiary LTV Aerospace Corp. doubledealing in the sale of computer programs they developed under government contracts, has been brought against the firms by the Justice Department. LTV and its offspring had been developing the programs on their in-house computer facilities since 1968. That year they formed Computer Technology Inc., and cleverly transferred the title to the government-owned programs. University Computing Co. was bamboozled into buying CTI, along with proprietary programs that belonged to Uncle Sam, in 1970.

LEAA GRANTS CROOK-WATCH FUNDS

The Law Enforcement Assistance Administration continues to pile money on the controversial criminal justice information systems. The most recent recipient of LEAA funds is the Montana Board of Crime Control, which will use its \$112,586 grant to create a statewide crook-watching system, including a data center chock-full of hardware, software and peripheral gear.

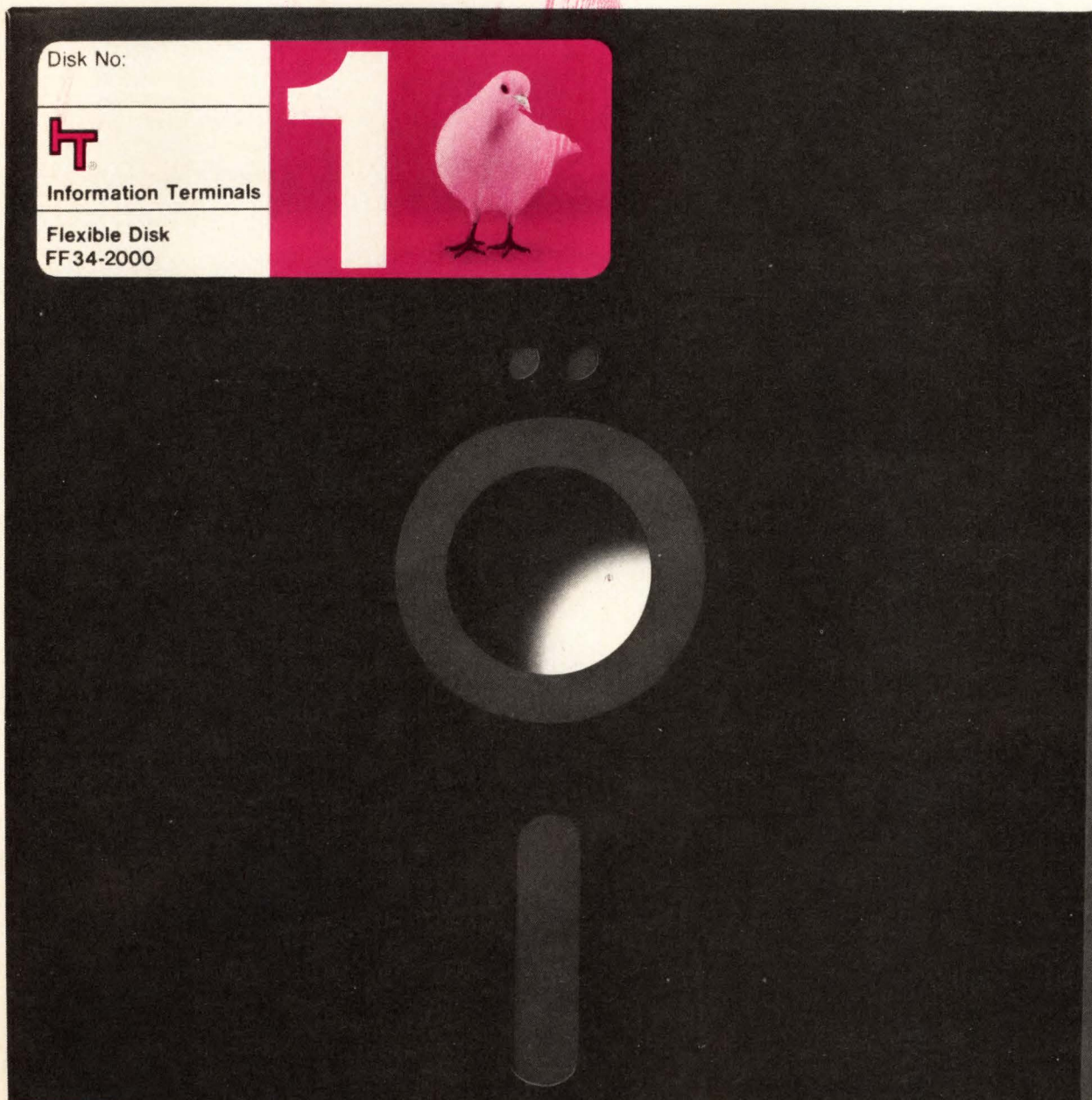
AEC HAS \$11-MILLION SHOPPING LIST

Atomic Energy Commission is in the market for \$11-million worth of computer equipment for its new National Controlled Thermonuclear Research Center, to be located in Livermore, CA. The center, which will serve the AEC's national laboratories as well as universities and industries working on fusion research, will need one large and five small computers and a packet-switched communications network to link them. The net will initially operate over wideband, full duplex lines at 50 Kbps. The computer facilities and communications network are scheduled to be operational by next spring.

FHLBB GIVES BANKS MORE PLAYTIME

The Federal Home Loan Bank Board's rocky love affair with electronic funds transfer systems seems to be flourishing. The FHLBB has extended the time that federal savings and loan associations can play around with experimental online terminals and off-line cash dispersing and receiving machines. The new deadline is July 31, 1975.

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INSIDE STORY

Direct brain-to-computer interface on the way

Imagine, if you can, a computer installation with none of the input devices you're used to. No card readers, tape readers, crt terminals or teletypewriters. Instead of all this cumbersome and inefficient hardware, you've got a special helmet. You will enter data directly from your brain into the computer.

Sound too far out to be true? Well it's not. Work on such a system is now in its preliminary stages at the Stanford Research Institute, Menlo Park, CA. Called a biocybernetic—or automatic biologically controlled—communications system, it is the ultimate man-machine interface. According to Rebecca Mahoney, a researcher at SRI, preliminary work alone has yielded a system that can recognize the thought patterns of seven words!

In describing the system explicitly, Mahoney notes that it monitors and identifies patterns in the human electroencephalographic signal (EEG) that are associated with language. Once these signals are identified (and the same word will produce different patterns for different people) they are used to control the operation of laboratory equipment, she says.

The system was originally designed to have a subject control the operation of a television camera by simply having him think of the operation that he wanted the camera to perform. For example, if the subject wanted to move the camera to the right he would think "right," the signal would be detected and the appropriate control switches would operate a motor to make the camera turn right. With this aim in mind, SRI researchers chose the seven most appropriate words: Right, left, up, down, near, far and stop.

The SRI biocybernetic interface works like this: The subject is shown the seven words and is told to say each word to himself. As he says each word, the subject's EEG pattern is recorded and stored in the memory of a Digital Equipment LINC-8 computer. These patterns, called *templates*, provide the basis for comparison with signals to be entered later on.

After all of the templates are stored in memory, the subject is again shown the seven words. This time he says each word to himself, the EEG pattern produced is compared with the original templates, and the best match is made. The new signal is then averaged with the original template, thus refining the pat-

tern recognition capability of the system. At the same time a control signal is applied to the appropriate circuitry to perform the desired action.

The recognition accuracy of the system ranges between 60% and 100%, depending on the word. The words "up" and "stop" are most easily recognized by the computer, while the words "near" and "far" are the most difficult.

Funds for the project are being provided by the Defense Department's Advanced Research Projects Agency (ARPA), which is sponsoring a large biocybernetics program designed to make man and machine work more closely.

The long-range goal of the Stanford project is to link man's creativity with the speed and memory capacity of a digital computer, making it possible to eliminate currently used data input devices. This is not really feasible with the SRI system as it now exists; it would need a very large vocabulary. But this problem could be overcome by developing a technique that would permit the recognition of phonemes, the basic units of speech. There are less than 50 phonemes and these can be used to construct any word.

SRI researcher Mahoney thinks that within a few years a biocybernetic communications system will be feasible for aircraft pilots. In this application, most of the meters in the cockpit would be replaced by a crt display that is connected to an onboard computer. When the pilot wants specific information—like altitude—he just thinks about it and the information appears on the screen.

So far, SRI researchers have given little or no thought to taking the biocybernetic idea one step further and making it a two-way communication system. This would eliminate the need for computer output devices as well.

Although biofeedback is still in its early stages of development, it has been shown that it is possible for a person to willfully change his EEG pattern. Presumably then, it would be possible to take data from a computer, condition it and feed it back to the human brain so that direct two-way communication between computer and human is realized. While current work is crude, the potential for mindreading computers has been proven.

—JHG

RUNS FOR YOUR MONEY

by Jan Snyders

One into one equals a system

I'm sure there are many "old timers" out there who remember when we installed a system, one application was initiated at a time. The usual procedure was to start with the payroll system, and then go on to accounts receivables, payables, etc.

Imagine how much simpler it would have been if the complete system could have been installed at one time. Several years ago, a few software houses attempted the development of a complete integrated accounting system. At the time IBM unbundled, these companies felt they could take over the industry. Unfortunately, the package did not mesh.

However, today International Management Systems Corp. of Marina Del Ray, CA, has a system that could be classified as a manager's dream. The *IMS Integrated Accounting System* is written in *ANS Cobol* for IBM System/360/370 equipment. It requires 54k of core, two tape drives, two disk drives, a card reader and printer.

All general accounting functions are performed by the integrated business account system. At the heart of the system is the *Master Control System* which maintains a common data base for use by all subsystems. The *MCS System's* primary function is to provide the mechanisms for system integration, customization, editing and validation. Each subsystem can be installed on a stand-alone basis or in conjunction with other *IMS* subsystems. A facility is also provided to integrate user-written subsystems with the common data base.

The system encompasses business functions such as Purchase Order Processing, Accounts Payable, General Ledger, Budgeting, Forecasting, Accounts Receivable, Sales Analysis, Asset Control Payroll, Personnel, Job Cost, Manufacturing Accounting, Project Control and Check Reconciliation. A special Report Writer is used to produce reports which are not produced by the system but are needed in the user's environment. All systems may be installed with a minimum of change to the user's existing input documents.

The *Master Control System* serves as a slave to all interfaced systems. The system builds, updates and maintains various tables of data in such a way as to make the data available to other systems and programs and to insure that the data is available to other systems and programs and to insure that the data is available in a user-defined and user-organized format. A primary task of the *MCS System*, in addition

to the routine maintenance of the tables themselves, is to use the same tables to validate all input data transactions, including those to the Master Control File. This is designed to prevent any erroneous data from entering the production systems.

When used in conjunction with *IMS* application software a standard set of parameters is supplied. In addition to a facility for changing the supplied parameters to correspond to his current input documents, the user has the option of adding new transactions and/or tables to the system. The user may also specify that numerous transactions are to be created from a single input document. The *MCS* table entries are created containing rules, formats, validations and edits. Transactions may create input to other systems, *MCS* tables or both depending upon the user's needs.

If a user desires to integrate any of his current application software through the use of *MCS*, he follows a simple procedure to define all of the transaction and required edits of the system.

Input into the system can be in the form of diskette, tape or cards. Dynamic batch balancing is an integral part of the input system. There is no limit to the number of transactions or tables to be handled by the system. The system is multicompany and/or multidivisional in nature. For each of the *IMS* application packages, *MCS* maintains a company profile for each entity using the particular application.

The Report Writer System provides the mechanism to produce special reports upon short notice and without the necessity of involving the programming staff. A second function of the system is to provide management with reports which were not part of an original system design, but are now necessary. The English-type command structure allows management to design and generate its own reports.

The system has many features and options available to reduce the time required to generate reports from existing data bases. Any sequentially organized file may be read by the system. A user "hook" is present in the read routine which allows the user to insert his own code to read specially organized files or to perform matching routines before passing the records to the Report Writer itself.

When used in conjunction with the *IMS Integrated Accounting System* modules, the Report Writer system provides the means to "customize" reporting.

The *IMS General Ledger System* is one part of the

accounting system. It accepts input from other *IMS* subsystems, the *Master Control System* and other interfaced user subsystems. There are six distinct modules within the system consisting of basic General Ledger, Budgeting, Forecasting, Job Cost Control, Asset Accounting and Manufacturing Accounting. When used in conjunction with other *IMS* subsystems, the user need concern himself only with decoding the entry to the appropriate subsystem, since such entries automatically appear in the General Ledger.

In the Accounts Payable System, the three modules are Accounts Payable, Purchase Order processing and Check Reconciliation. Any number of companies may be processed simultaneously, with intercompany entries being generated when required. Any or all companies may be selected for reporting purposes during a cycle.

A complete interface is maintained with the General Ledger, including the entries posted to accounts payable, discounts, cash and intercompany charges. When used in conjunction with the Purchase Order Processing Module, a three-way match is made between purchase order, invoice and receiver.

There are 42 standard reports output from the system, with "user hooks" in place for an additional 18 reports. The Report Writer Module is available to produce additional reports which are not part of the system, but are required in the user's environment. In addition to the normal reporting necessary to Accounts Payable processing, Purchase Order processing and Check Reconciliation, the system produces mailing labels, Relodex cards and 1099's.

The Accounts Receivable module of the *IMS* system

may be used on a stand-alone basis as well as in conjunction with other *IMS* accounting systems. In addition to maintaining the outstanding invoices or items for each customer, the system maintains a two-year history of both purchases and payments month by month. Statistical data such as the average number of days to pay an invoice, highest outstanding balance, number of times past 90 days, etc. is computed each time the cycle is run. A series of accounts receivable reports is available including statements, an aging report, delinquency alert, dunning notices, cash receipts, invoice worksheets and customer status reports.

A sales analysis module is available with the Accounts Receivable System. This module maintains complete detail for all transactions entering the system.

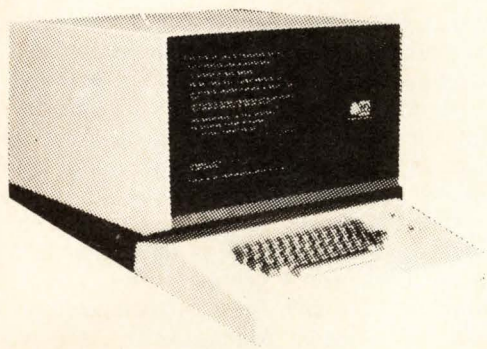
The last module in the system, Payroll/Personnel System, features three submodules classified as basic payroll, personnel and labor distribution. The payroll module provides for piecework payroll, commissioning, automatic wage increases, union deductions, minimum gross pay, vacation and sick leave accruals and automatic pay without time card input.

The Personnel module provides a series of personnel reports plus a skills inventory. The Labor Distribution module produces a file containing all time card input distribution as well as default distribution for the portion of the employee's pay which was automatic or was an additional earning.

Just imagine how far ahead a data processing department could have been if we had all of our work done for us "way back then" the way it is possible to have it done today.

KEYVIEW the 32 LINE CRT

DISPLAY and DATA ENTRY TERMINAL



the TELETYPE® SUBSTITUTE with HARD COPY CAPABILITY

- Characters per line, choice of 64, 72, 80, 96
- Data Rates, dialable to 9900 baud
- Keyboard, Standard ASR33, solid state and contactless
- Code, standard 7-level ASCII alphanumeric
- Interface to any computer, standard, EIA-RS232C

INFORMATION DESIGN INC.
CIVIL AIR TERMINAL
BEDFORD, MASSACHUSETTS 01730
PHONE: (617) 274-0190

Characters are very bright, absolutely flicker-free and are displayed on a 12" screen.





Governing the computer industry

As a new government settles slowly into the White House, and the cries of investigators fade behind the din of Capitol normalcy, we find our industry faced with some mighty tough challenges. The question most asked, paraphrased to fit the needs of political rhetoric and legislative pomp is this: What are we doing to ourselves with computers?

Instant online fact retrieval systems mean reflexes to a credit card company, but in the minds of some government and industry spokesmen, they mean tyranny also. Facts safely smothered in mountains of paper or microfilm become jigsaw puzzle pieces on a data base system. When the puzzle is assembled by a computer, unforeseen and undesirable consequences may result.

Senators and Congressmen, lately sensitive to the momentum of data when it is accelerated by electronic circuitry, are writing bills and riders to regulate information systems. President Ford's privacy commission, now in limbo with the ascent of its leader, has made its position known. And the inner workings of government, typified by action at the National Bureau of Standards, find new audiences among users of computer systems who must keep their organizations working while meeting the demands of law.

For business, the key measure in Congress is the Koch-Goldwater bill. While it may not be law until the next House session, it promises to bring this nation abreast of Sweden in its concern for personal privacy.

Linda Flato, an outstanding Washington journalist who has followed events on the Hill for several years, went to the sponsors of the measure to get their feelings about it. While it's impossible for anyone to predict the final wording of a major act, the people behind this measure have at least stated their intent. From here on in it's politics.

Dr. Ruth Davis may be the most powerful computer

scientist in the government. Director of the Institute for Computer Sciences of the National Bureau of Standards, she is often the source of technical backing for law and policy. Industry, labor and government will be depending on her very much during the next few years. We hope the time she spent with our editors will serve to fill you in.

One meeting Dr. Davis organized, devoted to automation's impact, has sent out many shock waves. There is only one way to understand the happening and that is to examine what the speakers themselves said. We found the session fascinating.

Our lead piece is not an article at all. It's a story by Gordon Dickson, a well-known author whose specialty is science fiction. When we first read it, we felt that it was a bit extreme. Since then we've had several run-ins with what Ted Nelson calls "cybercrud." If a machine can take the blame, we often let it do so. The story reflects a fear we share with industry professionals and the general public. Perhaps it will prompt you to take a greater interest in the way your computer system affects its human context.

With this issue we begin a regular column by Jan Snyders, who we think is the sharpest software critic in the business. A prolific writer, Jan is active in the National Women's Press Association and the Association for Systems Management. Her work has won awards from the Illinois Women's Press Association. We hope it will win accolades from you.

We've been trying to make *Computer Decisions* more readable with each issue. The job, not always easy with the range of technical and business material we must print, requires lots of editing. Florence Lazar, whose career includes years at *Time* after a rise through Midwest newspapers and the *Washington News*, has joined us as copy editor. Now we'll have pro grammar. □

Computers Don't Argue

by
Gordon Dickson

Treasure Book Club
PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

Mr: Walter A. Child Balance: \$4.98

Dear Customer:

Enclosed is your latest book selection.
"Kidnapped," by Robert Louis Stevenson.
Woodlawn Drive
Panduk, Michigan
Nov. 16, 1975

Treasure Book Club
1823 Mandy Street
Chicago, Illinois

Dear Sirs:

I wrote you recently about the computer punch card you sent, billing me for "Kim," by Rudyard Kipling. I did not open the package containing it until I had already mailed you my check for the amount on the card. On opening the package, I found the book missing half its pages. I sent it back to you, requesting either another copy or my money back. Instead, you have sent me a copy of "Kidnapped," by Robert Louis Stevenson. Will you please straighten this out?

I hereby return the copy of "Kidnapped."
Sincerely yours,
Walter A. Child

Treasure Book Club
SECOND NOTICE

PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD

Mr: Walter A. Child Balance: \$4.98
For "Kidnapped," by Robert Louis Stevenson
(If remittance has been made for above,
please disregard this notice)

437 Woodlawn Drive
Panduk, Michigan
Jan. 21, 1976

Treasure Book Club
1823 Mandy Street
Chicago, Illinois
Dear Sirs:

May I direct your attention to my letter of November 16, 1975? You are still continuing to dun me with computer punch cards for a book I did not order. Whereas, actually, it is your company that owes me money.

Sincerely yours,
Walter A. Child

Treasure Book Club
1823 Mandy Street
Chicago, Illinois
Feb. 1, 1976

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan
Dear Mr. Child:

We have sent you a number of reminders concerning an amount owing to us as a result of book purchases you made from us. This amount, which is \$4.98 is now long overdue.

This situation is disappointing to us, particularly since there was no hesitation on our part in extending you credit at the time original arrangements for these purchases were made by you. If we do not receive payment in full by return

— 2 —

mail, we will be forced to turn the matter over to a collection agency.
Very truly yours,
Samuel P. Grimes
Collection Manager

437 Woodlawn Drive
Panduk, Michigan
Feb. 5, 1976

Dear Mr. Grimes:

Will you stop sending me punch cards and form letters and make me some kind of a direct answer from a human being?

I don't owe you money. You owe me money. Maybe I should turn your company over to a collection agency.

Walter A. Child

FEDERAL COLLECTION
OUTFIT

88 Prince Street
Chicago, Illinois
Feb. 28, 1976

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan
Dear Mr. Child:

Your account with the Treasure Book Club, of \$4.98 plus interest and charges has been turned over to our agency for collection. The amount due is now \$6.83 Please send your check for this amount or we shall be forced to take immediate action.

Jacob N. Harshe
Vice President

FEDERAL COLLECTION
OUTFIT

88 Prince Street
Chicago, Illinois
April 8, 1976

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan
Dear Mr. Child:

You have seen fit to ignore our courteous requests to settle your long overdue account with Treasure Book Club, which is now, with accumulated interest and charges, in the amount of \$7.51.

If payment in full is not forthcoming by April 11, 1976 we will be forced to turn the matter over to our attorneys for immediate court action.

Ezekiel B. Harshe
President

MALONEY, MAHONEY,
MACNAMERA and PRUITT

Attorneys
89 Prince Street
Chicago, Illinois
April 29, 1976

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan
Dear Mr. Child:

Your indebtedness to the Treasure Book Club has been referred to us for legal action to collect.

This indebtedness is now in the amount of \$10.01. If you will send us this amount so that we may receive it before May 5, 1976, the matter may be satisfied. However, if we do not receive satisfaction in full by that date, we will take steps to collect through the courts.

— 2 —

I am sure you will see the advantage of avoiding a judgment against you, which as a matter of record would do lasting harm to your credit rating.

Very truly yours,
Hagthorpe M. Pruitt Jr.
Attorney at law

437 Woodlawn Drive
Panduk, Michigan
May 4, 1976

Mr. Hagthorpe M. Pruitt, Jr.
Maloney, Mahoney, MacNamara and
Pruitt

89 Prince Street
Chicago, Illinois

Dear Mr. Pruitt:

You don't know what a pleasure it is to me in this matter to get a letter from a live human being to whom I can explain the situation.

This whole matter is silly. I explained it fully in my letters to the Treasure Book Company. But I might as well have been trying to explain to the computer that puts out their punch cards, for all the good it seemed to do. Briefly,

— 2 —

what happened was I ordered a copy of "Kim," by Rudyard Kipling, for \$4.98. When I opened the package they sent me, I found the book had only half its pages, but I'd previously mailed a check to pay them for the book.

I sent the book back to them, asking either for a whole copy or my money back. Instead, they sent me a copy of "Kidnapped," by Robert Louis Stevenson which I had not ordered; and for which they have been trying to collect from me.

Meanwhile, I am still waiting for the money back that they owe me for the copy of "Kim" that I didn't get. That's the whole story. Maybe you can help me straighten them out.

— 3 —

Relievedly yours,
Walter A. Childs

P.S. I also sent back their copy of "Kidnapped," as soon as I got it, but it hasn't seemed to help. They have never even acknowledged getting it back.

MALONEY, MAHONEY,
MACNAMARA and PRUITT
Attorneys

89 Print Street
Chicago, Illinois
May 9, 1976

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Dead Mr. Child:

I am in possession of no information indicating that any item purchased by you from Treasure Book Club has been returned.

I would hardly think that, if the case had been as you stated, the Treasure Book Club would have retained us to collect the amount owing from you.

If I do not receive your payment in

— 2 —

full within three days, by May 12, 1976, we will be forced to take legal action.

Very truly yours,
Hagthorpe M. Pruitt Jr.

COURT OF MINOR CLAIMS
Chicago, Illinois

Mr. Walter A. Child
437 Woodlawn Drive
Panduk, Michigan

Be informed that a judgment was taken and entered against you in this court this day of May 26, 1976 in the amount of \$15.66 including court costs.

Payment in satisfaction of this judgment may be made to this court or to the adjudged creditor. In the case of payment being made to the creditor, a release should be obtained from the creditor and filed with this court in order to free you of legal obligation in connection with this judgment.

Under the recent Reciprocal Claims Act, if you are a citizen of a different

— 2 —

state, a duplicate claim may be automatically entered and judged against you in your own state so that collection may be made there as well as in the state of Illinois.

COURT OF MINOR CLAIMS
Chicago, Illinois
PLEASE DO NOT FOLD, SPINDLE
OR MULTILATE THIS CARD

Judgment was passed this day of
May 27, 1976, under Statute \$15.66

Against: Child, Walter A. of 347
Woodlawn Drive, Panduk, Michigan.
Pray to enter a duplicate claim for
judgment.

In: Picayune Court—Panduk, Michigan

For Amount: Statute 941

437 Woodlawn Drive
Panduk, Michigan
May 31, 1976

Samuel P. Grimes
Vice President, Treasure Book Club
1823 Mandy Street
Chicago, Illinois
Grimes:

This business has gone far enough. I've got to come down to Chicago on business of my own tomorrow. I'll see you then and we'll get this straightened out once and for all, about who owes what to whom, and how much!

Yours,
Walter A. Child

From the desk of the Clerk
Picayune Court
June 1, 1976

Harry: The attached computer card from Chicago's Minor Claims Court against A. Walter has a 1500-series Statute number on it. That puts it over in Criminal with you, rather than Civil, with me. So I herewith submit it for your computer instead of mine. How's business?

Joe

CRIMINAL RECORDS
Panduk, Michigan

PLEASE DO NOT FOLD, SPINDLE
OR MULTILATE THIS CARD

Convicted: (Child) A. Walter

On: May 26, 1976

Address: 437 Woodlawn Drive, Panduk, Mich.

Crim. Statute: 1566 (Corrected) 1567

Crime: Kidnap

Date: Nov. 16, 1975

Notes: At large. To be picked up at once.

POLICE DEPARTMENT, PANDUK, MICHIGAN, TO POLICE DEPARTMENT CHICAGO ILLINOIS, CONVICTED SUBJECT A. (COMPLETE FIRST NAME UNKNOWN) WALTER, SOUGHT HERE IN CONNECTION REF. YOUR NOTIFICATION OF JUDGMENT FOR KIDNAP OF CHILD NAMED ROBERT LOUIS STEVENSON, ON NOV. 16, 1975. INFORMATION HERE INDICATES SUBJECT FLED HIS RESIDENCE AT 437 WOODLAWN DRIVE, PANDUK, AND MAY BE AGAIN IN YOUR AREA.

POSSIBLE CONTACT IN YOUR AREA: THE TREASURE BOOK CLUB, 1823 MANDY STREET, CHICAGO, ILLINOIS. SUBJECT NOT KNOWN TO BE ARMED, BUT PRE-

— 2 —
SUMED DANGEROUS. PICK UP
AND HOLD. ADVISING US OF
CAPTURE. . .

TO POLICE DEPARTMENT, PAN-
DUK, MICHIGAN, REFERENCE
YOUR REQUEST TO PICK UP AND
HOLD A. (COMPLETE FIRST NAME
UNKNOWN) WALTER, WANTED IN
PANDUK ON STATUTE 1567, CRIME
OF KIDNAPPING.

SUBJECT ARRESTED AT OFFICES
OF TREASURE BOOK CLUB, OP-
ERATING THERE UNDER ALIAS
WALTER ANTHONY CHILD AND
ATTEMPTING TO COLLECT \$4.98
FROM ONE SAMUEL P. GRIMES,
EMPLOYEE OF THAT COMPANY.

DISPOSAL: HOLDING FOR YOUR
ADVICE.

POLICE DEPARTMENT PANDUK,
MICHIGAN TO POLICE DEPART-
MENT CHICAGO, ILLINOIS.

REF: A. WALTER (ALIAS WALTER
ANTHONY CHILD) SUBJECT WANTED
FOR CRIME OF KIDNAP, YOUR
AREA, REF: YOUR COMPUTER
PUNCH CARD NOTIFICATION OF
JUDGMENT, DATED MAY 27, 1976.
COPY OUR CRIMINAL RECORDS
PUNCH CARD HERewith FOR-
WARDED TO YOUR COMPUTER
SECTION.

CRIMINAL RECORDS
Chicago, Illinois
PLEASE DO NOT FOLD, SPINDLE
OR MUTILATE THIS CARD
SUBJECT (CORRECTION—OMIT-
TED RECORD SUPPLIED)
APPLICABLE STATUTE NO. 1567
JUDGMENT NO. 456789
TRIAL RECORD: APPARENTLY
MISFILED AND UNAVAILABLE
DIRECTION: TO APPEAR FOR
SENTENCING BEFORE JUDGE
JOHN ALEXANDER MCDIVOT,
COURTROOM
JUNE 9, 1976

From the Desk of
Judge Alexander J. McDivot
June 2, 1976

Dear Tony:

I've got an adjudged criminal coming
up before me for sentencing Thursday
morning—but the trial transcript is ap-
parently misfiled.

I need some kind of information (Ref:
A. Walter—Judgment No. 456789, Crimi-
nal). For example, what about the victim
of the kidnapping. Was victim harmed?
Jack McDivot

June 3, 1976
Records Search Unit
Re: Ref: Judgment No. 456789
—was victim harmed?
Tonio Malagasi
Records Division

June 3, 1976
To: United States Statistics Office
Attn: Information Section
Subject: Robert Louis Stevenson
Query: Information concerning
Records Search Unit
Criminal Records Division
Police Department
Chicago, Ill.

June 5, 1976
To: Records Search Unit
Criminal Records Division
Police Department
Chicago, Illinois
Subject: Your query re Robert Louis
Stevenson
(File no. 189623)
Action: Subject deceased. Age at death,
44 yrs.
Further information requested?

A.K.
Information Section
U.S. Statistics Office

June 6, 1976
To: United States Statistics Office
Attn: Information Division
Subject: Re: File no. 189623
No further information required.
Thank you.
Records Search Unit
Criminals Records Division
Police Department
Chicago, Illinois

June 7, 1976
To: Tonio Malagasi
Records Division
Re: Ref: Judgment No. 456789—
victim is dead.
Records Search Unit

June 7, 1976
To: Judge Alexander J. McDivot's
Chambers
Dear Jack:
Ref: Judgment No. 456789. The victim
in this kidnap case was apparently slain.
From the strange lack of background
information on the killer and his victim,
as well as the victim's age, this smells
to me like a gangland killing. This for
your information. Don't quote me. It
seems to me, though, that Stevenson—the
victim—has a name that rings a faint
bell with me. Possible, one of the East
Coast Mob, since the association comes
back to me as something about pirates
—possibly New York dockage hijackers
—and something about buried loot.
As I say, above is only speculation for
your private guidance.

— 2 —
Any time I can help . . .
Best,
Tony Malagasi
Records Division

MICHAEL R. REYNOLDS
Attorney-at-law
49 Water Street
Chicago, Illinois
June 8, 1976

Dear Tim:

Regrets: I can't make the fishing trip.
I've been court-appointed here to repre-
sent a man about to be sentenced to-
morrow on a kidnapping charge.

Ordinarily, I might have tried to beg
off, and McDivot, who is doing the
sentencing, would probably have turned
me loose. But this is the damndest thing
you ever heard of.

The man being sentenced has apparent-
ly been not only charged, but adjudged
guilty as a result of a comedy of errors
too long to go into here. He not only
isn't guilty—he's got the best case I ever

— 2 —
heard of for damages against one of the
larger Book Clubs headquartered here in
Chicago. And that's a case I wouldn't
mind taking on.

It's inconceivable—but damnably pos-
sible, once you stop to think of it in
this day and age of machine-made re-
cords—that a completely innocent man
could be put in this position.

There shouldn't be much to it. I've
asked to see McDivot tomorrow before
the time for sentencing, and it'll just be
a matter of explaining to him. Then I
can discuss the damage suit with my
freed client at his leisure.

Fishing next weekend?

Yours,
Mike

MICHAEL R. REYNOLDS

Attorney-at-law
49 Water Street
Chicago, Illinois
June 10, 1976

Dear Tim:

In haste—

No fishing this coming week either.
Sorry.

You won't believe it. My innocent-as-a-lamb-and-I'm-not-kidding client has just been sentenced to death for first-degree murder in connection with the death of his kidnap victim.

Yes, I explained the whole thing to McDivot. And when he explained his situation to me, I nearly fell out of my chair.

It wasn't a matter of my not convincing him. It took less than three minutes

— 2 —

to show him that my client should never have been within the walls of the County Jail for a second. But—get this—McDivot couldn't do a thing about it.

The point is, my man had already been judged guilty according to the computerized records. In the absence of a trial record—of course their never was one (but that's something I'm not free to explain to you now)—the judge has to go by what records are available. And in the case of an adjudged prisoner, McDivot's only legal choice was whether to sentence to life imprisonment, or execution.

The death of the kidnap victim, according to the statute, made the death penalty mandatory. Under the new laws governing length of time for appeal,

— 3 —

which has been shortened because of the new system of computerizing records, to force an elimination of unfair delay and mental anguish to those condemned, I have five days in which to file an appeal, and ten to have it acted on.

Needless to say, I am not going to monkey with an appeal. I'm going directly to the Governor for a pardon—after which we will get this farce reversed. McDivot has already written the Governor, also, explaining that his sentence was ridiculous, but that he had no choice. Between the two of us, we ought to have a pardon in short order.

Then, I'll make the fur fly . . .

And we'll get in some fishing.

Best,
Mike

OFFICE OF THE
GOVERNOR OF ILLINOIS

June 17, 1976

Mr. Michael R. Reynolds
49 Water Street
Chicago, Illinois
Dear Mr. Reynolds

In reply to your query about the request for pardon for Walter A. Child (A. Walter), may I inform you that the Governor is still on his trip with the Midwest Governors Committee, examining the Wall in Berlin. He should be back next Friday.

I will bring your request and letters to his attention the minute he returns.

Very truly yours,
Clara B. Jilks
Secretary to the Governor

June 27, 1976

Michael R. Reynolds
49 Water Street
Chicago, Illinois
Dear Mike:

Where is that pardon?

My execution date is only five days from now!

Walt

June 29, 1976

Walter A. Child (A. Walter)
Cell Block E
Illinois State Penitentiary
Joliet, Illinois
Dear Walt:

The Governor returned, but was called away immediately to the White House in Washington to give his views on interstate sewage.

I am camping on his doorstep and will be on him the moment he arrives here.

Meanwhile, I agree with you about the seriousness of the situation. The warden at the prison there, Mr. Allen Magruder will bring this letter to you and have a private talk with you. I urge you to listen to what he has to say; and I enclose letters from your

— 2 —

family also urging you to listen to Warden Magruder.

Yours,
Mike

June 30, 1976

Michael R. Reynolds
49 Water Street
Chicago, Illinois

Dear Mike: (This letter being smuggled out by Warden Magruder)

As I was talking to Warden Magruder in my cell, here, news was brought to him that the Governor has at last returned for a while to Illinois, and will be in his office early tomorrow morning, Friday. So you will have time to get the pardon signed by him and delivered to the prison in time to stop my execution on Saturday.

Accordingly, I have turned down the Warden's kind offer of a chance to escape; since he told me he could by no means guarantee to have all the guards out of my way when I tried it; and

— 2 —

there was a chance of my being killed escaping.

But now everything will straighten itself out. Actually, an experience as fantastic as this had to break down sometime under its own weight.

Best,
Walt

FOR THE SOVEREIGN
STATE OF ILLINOIS

I, Hubert Daniel Willikens, Governor of the State of Illinois, and invested with the authority and powers appertaining thereto, including the power to pardon those in my judgment wrongfully convicted or otherwise deserving of executive mercy, do this day of July 1, 1976 do announce and proclaim that Walter A. Child (A. Walter) now in custody as a consequence of erroneous conviction upon a crime of which he is entirely innocent, is fully and freely pardoned of said crime. And I do direct the necessary authorities having custody of the said Walter A. Child (A. Walter) in whatever place or places he may be held, to immediately free, release, and allow unhindered departure to him . . .

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Failure to route Document properly.
To: Governor Hubert Daniel Willikens
Re: Pardon issued to Walter A. Child,
July 1, 1976

Dear State Employee:

You have failed to attach your Routing Number.

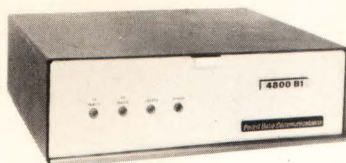
PLEASE: Resubmit document with this card and form 876, explaining your authority for placing a TOP RUSH category on this document. Form 876 must be signed by your Departmental Superior.

RESUBMIT ON: Earliest possible date
ROUTING SERVICE office is open. In this case, Tuesday, July 5, 1976.

— 2 —

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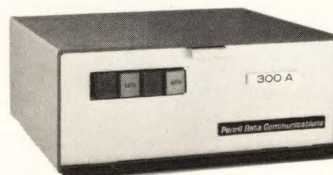
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Behind the privacy bill

Legislation to protect us against the zeal of data collectors is in the works. The personalities behind the measure have a great deal to do with the law.

by Linda Flato

If you ask Rep. Edward Koch (D-NY) why he is so happy these days, he will rattle off several non sequiturs on impeachment, his re-election prospects, or a new hair he discovered growing on his thinning thatch. But the real reason he "can't be anything but ecstatic" is that his privacy bill is headed for passage during this session of Congress.

The liberal, 50-year-old Congressman introduced his first privacy bill in the House in February 1969. Each year since then, he has diligently re-introduced similar legislation, hoping that it would gain broad-based support. Partisan in-fighting cut down this support, and it wasn't until this year that his measure pulled the backing necessary for passage.

Much of this bipartisan endorsement can be attributed to Rep. Barry Goldwater Jr. (R-CA) and his enthusiastic interest in privacy. The political odd couple met earlier this year at a National Bureau of Standards privacy conference. They subsequently joined forces to come up with several solid pieces of privacy legislation.

Koch recently described Goldwater as "a good boy" and said that the partnership had given their legislation an extra dimension. "It shows that it is not legislation that liberals are concerned with alone or conservatives are concerned with alone; it is legislation that transcends partisanship."

"Good sex appeal"

Goldwater said he "respects Ed Koch" and that he is not involved in privacy because of the "PR mileage." He admitted that the issue had "good sex appeal," but that he felt there was a "serious and legitimate need for this type of legislation."

The Koch-Goldwater privacy proposals are contained in two basic bills—the Omnibus Right to Privacy Act and the Comprehensive Right to Privacy Act. The omnibus bill, introduced in April, would control the collection of personal information by federal, state and local government agencies.

The act would exclude certain criminal law enforcement, national security, press files and administrative information systems. It would also establish a five-member Federal Privacy Board to collect and publish information on personal information systems, issue regulations, conduct research on improving standards, and inspect systems for noncompliance.

The measure contains additional personal privacy safeguards which would restrict the use of the social security number as a universal identifier. The bill is

currently in the House Judiciary Committee awaiting hearings.

The Comprehensive Right to Privacy Act, introduced in June, contains virtually the same provisions as the omnibus bill, but it pertains only to federal information-gathering practices. A series of hearings on the measure were held earlier this summer by the House Government Operations Committee. The bill is now in the mark-up session and is expected to be passed by the House before the end of the year.

Predicts passage of bill

Koch said he was delighted with the progress the Koch-Goldwater privacy bills have achieved. He predicted that some version of the comprehensive measure would pass this year. The immediate impact of the legislation on federal agencies, he pointed out, would be tremendous. "Federal agencies have collected an estimated 190 million computer files, so if we were to open those this year, that would be pretty good," he said.

The comprehensive privacy measure, based on the bill Koch introduced on Feb. 19, 1969, has gone through a number of changes and improvements. Koch commented that there were provisions in the current draft that would have to be changed because some committee members would find them too controversial. "This bill is not the Ten Commandments," he said. "We welcome constructive suggestions and additions."

Commenting on Watergate's effect on his legislation, Koch noted that the abuses have had an obvious impact on privacy. "The scandals in which President Nixon apparently used the agencies of government to harass and persecute those American citizens whom he and his supporters deemed to be 'public enemies,' have made it clear that we have to do something about privacy."

Computer not a bad word

Koch readily admitted that he was "technically incompetent as far as computers go." He said he had attended several IBM seminars and that he found "nothing wrong with computers—only with the people who use them. The word computer is not a bad word, and the use of computers should be encouraged."

Problems with computers, he put in, result from their improper use, such as "collecting information on citizens that shouldn't be collected because it's irrelevant, erroneous and immaterial." Koch expressed particular concern that there was currently no way a

person could see his file or have it audited to remove erroneous information.

Koch said that the blame should be placed "where it belongs—not on the computer, but on what the computer is collecting at the request of the program that's placed in it by a human being. Our legislation does not attack computers in any way, but says that they should be used for the right purposes."

He urged the computer industry to "get involved in the privacy issue" by developing checks and balances and software to protect the material being collected by the computer. "Men and women make decisions on what information will be collected about private citizens, how much information will be used and to whom it will be disseminated. Computers will not take us to 1984; men and women will."

Created a monster

Goldwater supports many of Koch's views on privacy, but also feels that there hasn't been enough attention paid to the government's attitude on information collection. "We've gotten to the point where we think that government is the only problem solver. As a result, we've passed more legislation creating more programs and more bureaucracies and more civil servants to come in and 'do good for the people'." He objected to "this guise of doing good" and said it has "created a monster in our information-gathering practices."

The government's data collection, Goldwater maintained, "has put everybody in little cubes—you're poor or you're a student or you're elderly or you're handi-

Rep. Edward Koch



capped. You're all in these little categories and you're in there by a social security number."

The use of the social security number is Goldwater's biggest complaint. The privacy legislation he has been introducing for the past two years has focused on limiting the use of the SSN as a universal identifier. He called it the "evil number," said it was dehumanizing, and charged that it was "similar to the type of identifier that enabled the Nazis to hunt down Dutch Jews during World War II."

Outlaw or protect

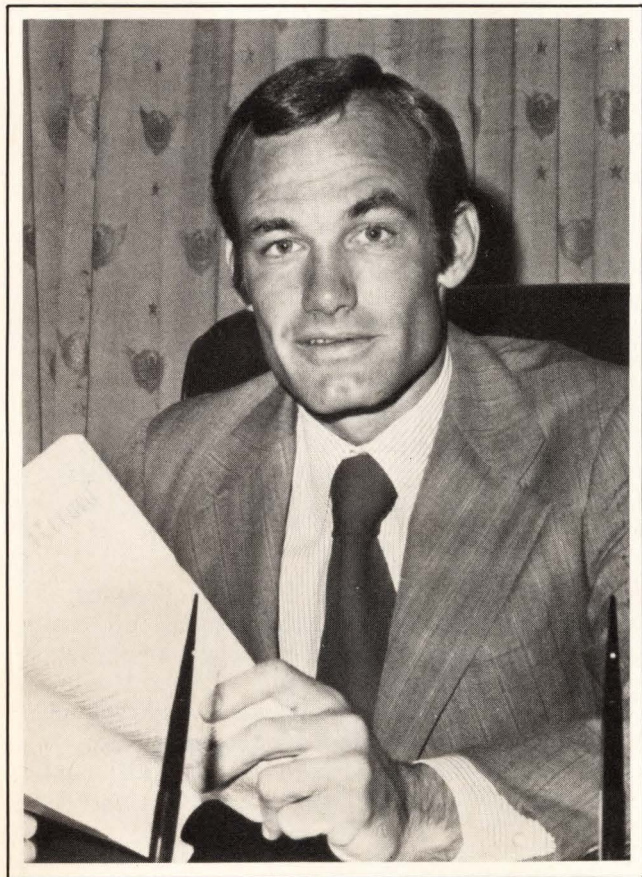
He suggested that the SSN "should either be outlawed completely or protected through technical means." Citing the National Bureau of Standards' work in this area, Goldwater recommended that algorithms be used to scramble or hide the number. "The NBS would like to approach the problem that way, and they seem to think it's pretty easy," he noted.

In discussing the Koch-Goldwater privacy measures, Goldwater was quick to point out that he did not share his "worthy partner's" optimism on passage. "We are pushing for it and the gears are in motion. The Senate is moving pretty well but the House . . . has slowed down." He commented that passage of the bill may possibly be delayed until next year.

Watergate turned the tide

Goldwater noted that his staff had received very favorable reactions to the bill from the public as well as Congress and the White House. "Originally we weren't getting too much cooperation or help, but then

Rep. Barry Goldwater



Privacy bill. . .

(continued)

all of a sudden a group of events such as Watergate, the sharing of IRS files with the USDA, and the fight over FEDNET turned the tide." A staunch supporter of President Nixon, Goldwater reluctantly admitted that the Watergate abuses "certainly helped the privacy issue by making people more aware, alert and sensitive to information-gathering practices."

Feedback on the privacy measures, Goldwater said, has revealed opposition from "people who collect information," such as social planners and behavioral scientists. "We are also getting some opposition from business because they are afraid of the costs involved in complying with the law."

He stressed that the legislation would not destroy information collection or hinder business. "All we are asking," he explained, "is that a little more consideration be taken for the individual. For too long the government has gone full steam ahead to collect information willy-nilly, without giving a thought to the private citizen."

The legislation, according to Goldwater, "would try to harness the computer and establish some principles to guide those manipulators of technology. The computer and technology are only tools that allow us to enjoy a higher standard of living." The computer as a means to an end "has allowed government to be so-called more efficient in servicing and controlling the lives of the American people." The problem, he emphasized, "lies in man, how he thinks, his attitude, and how he uses his tools." □

Bills and coups

Legislation on the problems and potential associated with computers is headlining bill rosters in both the Senate and the House. The following is a compilation of the most significant measures being considered during this session of Congress.

- **S. 3418**, a bill establishing a Federal Privacy Board to control both public and private personal information systems, was introduced in May by Sen. Sam J. Ervin (D-NC). It applies to information systems maintained by business organizations, credit reporting firms and other private businesses, as well as federal, state and local government agencies.

- **The Government Data Bank Right to Privacy Act**, introduced by Sen. Ervin in June, is a refinement of S. 3418. The measure limits the scope of control to federal systems and to state and local systems which are federally funded.

- **S. 3065**, a measure that would limit the use of the social security number as a standard universal identifier, was introduced by Sen. Barry Goldwater (R-AZ) in February.

- **S. 2542**, offered by Sen. Birch Bayh (D-IN), is designed to protect the privacy rights of individuals on whom certain records are maintained. It was introduced in October 1973.

- **H.R. 13863**, sponsored by Rep. Donald G. Brozman (R-CO) in April, would curb the power of automated data banks which compile credit ratings and other financial information. A companion measure, H.R. 13864, also introduced by Brozman, would bar the use of the social security number as a universal identifier.

- **The Criminal Justice Information Control and Protection of Privacy Act of 1974**, introduced by Sen. Ervin in February, would restrict and regulate the

kinds of information on citizens that police can collect and distribute. It would apply to arrest records, conviction records, fingerprint identification, intelligence data and other kinds of criminal records that local police and the FBI collect and exchange.

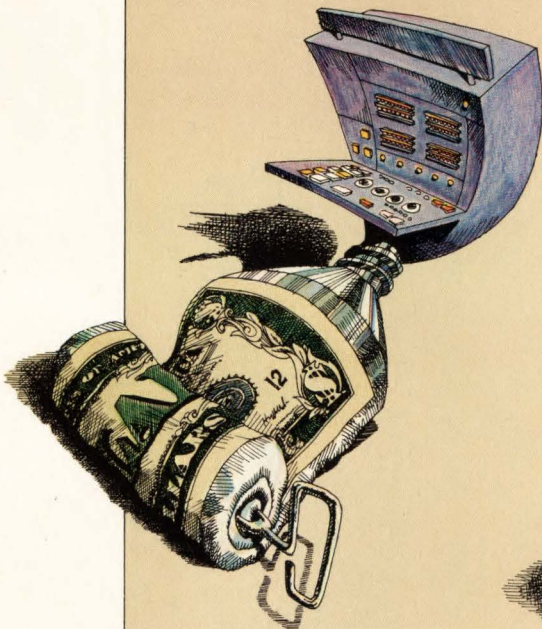
- **H.R. 12574 (The Criminal Justice Information Systems Act of 1974)**, sponsored by Rep. Peter Rodino (D-NJ), is the House version of Sen. Ervin's bill. It would control the exchange of criminal justice information between federal and state criminal justice agencies, or between criminal justice agencies in different states.

- **The Industrial Reorganization Act (S. 1167)**, re-introduced by Sen. Philip Hart (D-MI), would break up the monopoly power in eight industrial fields including the computer and communications industry. Under the measure, monopoly power would be presumed to exist if any corporation in that industry consistently earned profits of over 15 percent after taxes; if there had been no substantial price competition among two or more companies in that field over a period of years; or if any four firms accounted for over 50 percent of the sales in that field.

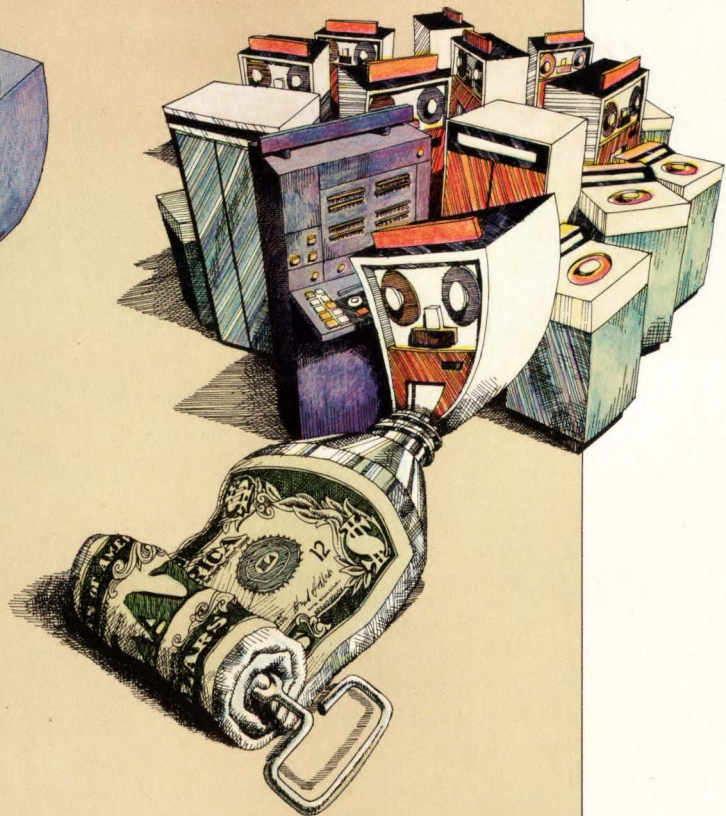
- **S. 2785**, offered by Sen. Charles Percy (R-IL), authorizes the General Services Administration to enter into multiyear leases using its ADP fund without obligating the total payments at the time the lease is signed.

- **An amendment to H.R. 11221** is designed to consolidate various federal agency studies on electronic funds transfer systems into a single commission. It was introduced in March by Sen. Thomas McIntire (D-NH). The 16-member commission would include representatives from the Federal Reserve Board, the Treasury Department, the Federal Home Loan Bank Board, retail EFT users and EFT equipment or service suppliers.

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Ruth Davis:

The conscience of computing

If there is a computer tsar in the government,
it's really a tsarina.

Ruth Davis is shaping the user's world

by Hesh Wiener

"It's possible that we will end up with more than we bargained for," says Dr. Ruth Davis, director of the Institute for Computer Sciences and Technology at the National Bureau of Standards. The mission of her office, greatly expanded during the past several years, is multifold: Setting computer-related standards, anticipating the social and economic impact of computers, prompting a sometimes recalcitrant and still-learning government into more serious studies of computing. She does her job so well that more and more issues end up on her desk for study and arbitration. And while the responsibility is well deserved, it can become overwhelming.

"There's no question that we are trying to become a center of influence. It would be unfortunate if we were the only one. My real concern is to be the opposite of what most bureaucratic institutions are. I don't want to become a technological ingrown toenail."

This sentiment, from a person who spends long days in her office and makes frequent appearances before professional and lay audiences throughout the world, illuminates one aspect of a complex personality and deep intellect. Davis' ease with scientists and government officials—she is as adept in front of a Senate committee as she is with her HP-65—belies the volume of work that goes through her office.

Taking the broad view

Ruth Davis, unlike many people in government organizations, thinks of her work conceptually. The particulars of her efforts to inform, to influence, and to encourage follow from a philosophical outlook.

"Officially our role is to be a conscience—a counterpart to the managerial or policy control that the government exercises in the world of computing. We are limited only by our ability to have our judgment accepted. We represent the interests of both industry and user from the technical and scientific point of view."

This broad view of the role of responsible officials has always been a part of Davis' outlook. It hasn't always been a part of government's outlook, but it is becoming more widespread as the Institute's activities are recognized. Developing computer policies with a humanistic touch, in the context of a bureaucratic government, is a recent phenomenon.

Finally getting heard

"We had been operating from a position of weakness in the past," observed Davis. "There are several clear reasons.

"The world of computers and automation has been

naive in dealing with policymakers. It's not one-sided, however. It's a sad fact that scientific and technical spokesmen in this country do not understand the newer technologies of computing. They inadequately represent this community to Congress, the President, and to senior officials.

"Further, computer technologists are not being readily admitted into the group of senior scientists epitomized by the National Academy of Sciences. These groups consist principally of people who grew up in the World War II scientific world. They don't understand the interactive and personal nature of computer technology."

As recent events reveal, the relationship between computing people and government people is improving. Davis, who tries to follow the machinations of government with an eye to improving understanding, sees progress.

"I do believe that congressional ears are open to us now," she states emphatically. "So far they are not aimed at science and technology in general, and for that I'm very sorry. But we're getting rather close to those who face problems where any solution is dependent on computers—people who deal with the individual privacy issue, people involved in credit regulation, and people involved with automation as a means to bring industries that we've lost and to ease the unemployment problem."

Casting off the mold

Davis is somewhat critical of computer scientists—she notes that professionals are reluctant to even use the term. Traditional sciences are based on natural phenomena. Computer science, if it is a science, is the study of a machine. Davis thinks the distinction is untenable. "I see no reason for any science or technology to be cast in a mold 500 to 1000 years old," she argues.

Computer scientists, like other scientists, must live two lives, Davis feels. On one hand, they must immerse themselves in their work. On the other, they must try to think out the consequences of their discoveries or inventions. Davis cites Einstein as an example. But there are few like Einstein. Through her office, she hopes to encourage more scientists to think about the impact of automation.

One particular problem she faces is the common denial by computer scientists that computers are an enigma. "Most people don't speak properly about computers," claims Davis. "They say that the computer won't do anything it isn't told to do."

It is more accurate, according to Davis, to say that

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Ruth Davis . . .

(continued)

there is no theoretical limit to what the machines can do. And computer scientists seem to mistrust the lay public's ability to accept this strange truth.

"I see the computer as the first extension people have ever had to their intellectual capabilities," she adds. "Every other invention has added muscle power or sensory power, not intellectual power." Because of this, computers can have great effects on the way we live. Davis extends herself with efforts to get government officials to "recognize that computers are one of the principal instruments of social transformation that we have."

The bearing of standards

The best-understood job that Davis has done is in the development of standards. The use of a standard language such as *Cobol* is recognized as a strong impetus to hardware-independent programming.

As language standards have enabled the user to develop software without being tied to one specific computer system, hardware standards will provide an additional degree of freedom. Hardware standards—at the moment that really means interface standards—will let users plug systems together with greater ease than is now possible, and ultimately at lower cost. The impact of plug-compatible storage systems on the IBM market is well-documented. In the world of mini-computers, the Babel of interfaces has made it nearly impossible for users to select multivendor systems, or for users to modify in-place minis for new uses.

The hardest standards to set up will be those that deal with individual privacy and computer system security. Investigation and legislation to date have not been well-connected. Official recognition of our need for some stringent rules about personal data files has suddenly burst upon the consciousness of Washington, and in an effort to do something—maybe anything—legislation is being drafted that may be impossible either to implement or enforce.

Between law and technology

While the Congress moves to provide some first cuts at the monumental problems of computer databank privacy, Davis' office has had meetings, published papers, and generally brought professional and governmental attention to bear. Alternately mediating among computer jocks who belabor details and teaching the fundamentals of data processing to decidedly unscientific legislators, the Institute for Computer Sciences and technology has become the only official connection between the worlds of law and technology.

Government insight may be applied first to those problems faced by government itself. Efforts to safeguard an individual's personal records must work in official settings before we can expect similar responsibility in industry. Many new computer installations are under way to unsnarl bureaucratic backlogs everywhere, and these sites will be the testing grounds for better controls over system integrity. The Institute for Computer Sciences and Technology is watching these developments carefully.

Davis sees a jump in computer usage in government at all levels. "State and local governments are evolving as bigger users of information technologies than the Federal government," she says. "Most functions that are difficult to perform in terms of record keeping reside at state and local levels. Demands of the public for accountability can only be met by better use of information and communications technology."

Federally-developed rules regarding privacy and security, and federally-developed guidelines for the ways and means to use computers will shape these local systems. And the National Bureau of Standards will influence policy at these levels.

Come home, industry

A hot item in the Davis repertoire these days is her attempt to forecast and ameliorate the potentially shocking effects of automation. She favors an increased rate of automation in many industries. Is there a contradiction here particularly with its impact on labor? Not according to Davis, who sees automation as a vital ingredient in the continued strength of our present industries and a way to get back some that we have lost to nations where wages are far lower than those in the U.S.

"There's no question that it's presently easier for business to avoid labor problems and the large capital investments needed to automate by going overseas. There's also no question that this is going to bring about a considerable number of problems. We've lost entire industries because the cost of labor makes them unproductive here.

"Take the electronics industry: We haven't built an electron microscope here in 20 years. The shoe industry is another one, and there are several others.

"We cannot increase productivity and still keep people employed if we don't make use of technology. And the only technologies we have today that can make the difference are automation technology and information technology.

"This situation does not upset labor because you are bringing back industries that you have already lost."

A computer tsarina?

When a single person in a single office has so much to say about an industry, doubts arise. Do we really want a computer tsar—or in this case, a computer tsarina? Ruth Davis, for one, is not jealous of her influence. While she feels that her office is doing a very good job, she hopes that others will lend their opinions.

Her office has gained strength from Davis' charisma, intellect, and drive. It has become central to many governmental processes. The difficulties of this situation are a constant part of Davis' thoughts.

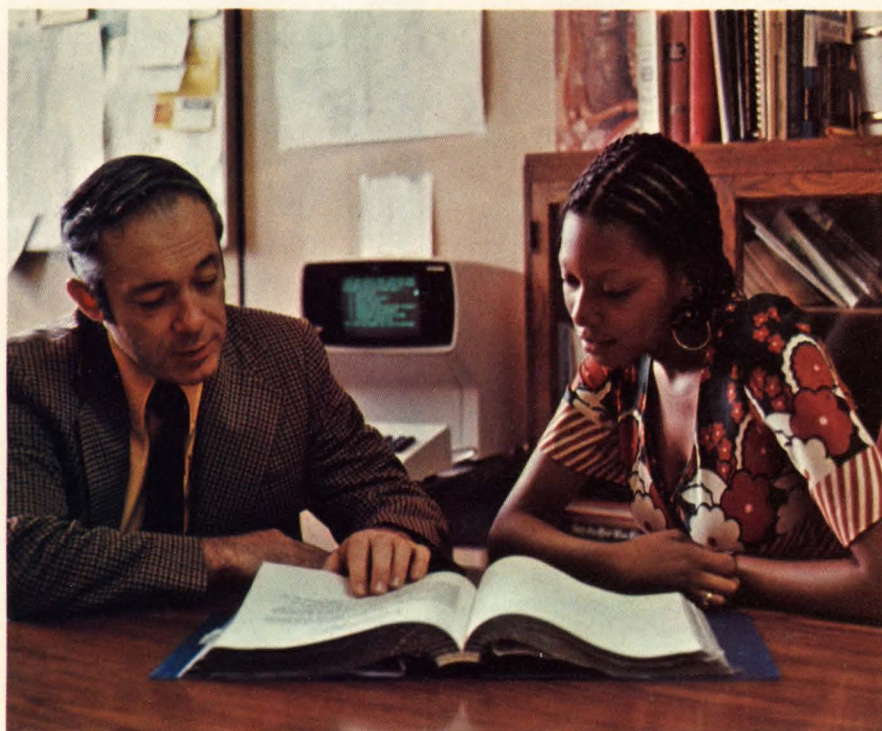
"I think that influence is the most transcendent phenomenon we have in government," she concludes. "There are exceptions, of course. But one must uncouple institutional influence from individual influence. It is my firm belief that we have two responsibilities: To build an organization that makes the most of the capabilities of all its members, and for every individual in the organization to try to be a good influence at all times."

Right now it's difficult to tell how permanent Dr. Ruth Davis' power really is. But it seems to be in the right hands. □

DP DIALOG

Notes and observations from IBM which may prove of interest to data processing professionals.

DP DIALOG appears regularly in these pages. As its name suggests, we hope DP DIALOG will be a two-way medium for DP professionals. We'd like to hear from you. Just write: Editor, DP DIALOG, IBM Data Processing Division, White Plains, N.Y. 10604.



Dan Heintz discusses career objectives with LaVatryce Jones after she has run through a computer-based career program.

mation on some 500 different occupations.

Using the Willowbrook system as base, Proviso Township High Schools, just outside of Chicago, further developed CVIS to make it function as a total data base. On the East campus, 3,800 students are using CVIS. An additional 4,400 students are served on the West campus.

At visual display stations, students answer preprogrammed questions and indicate their interest in various career opportunities. The school's System/370 Model 135 checks constantly to see if they are on the right track.

Dan Heintz, Vocational Counselor at Proviso East, says, "The system has already helped our counseling effort immeasurably. Instead of spending time hunting for information, our counselors can now concentrate on counseling. They also have access to up-to-date information on a wide variety of careers."

Besides keeping track of career opportunities, CVIS also provides information on some 1,600 colleges, as well as specialized and technical schools. "By the end of the year," says Howard Schumacher, Director of Management Information Services for Proviso Township High Schools, "the system will also include information on financial aid and local jobs."

"CVIS gives our students a chance to see the number of careers available to them and helps them focus on their own potential and interest," says Dan Heintz. "We hope that information provided by this system, together with our own counseling efforts, will help steer these students in the right direction."

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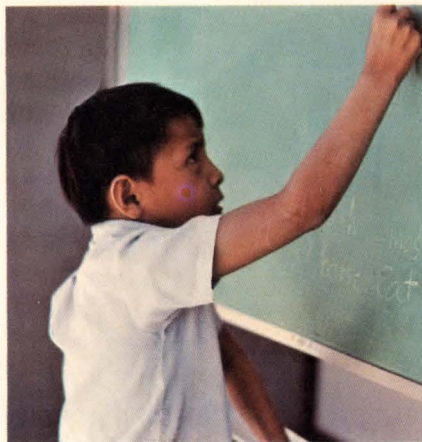
The Search for the Right Career

Choosing a career is a difficult decision most students confront sometime during their education. For many the decision is often based on inadequate information on the number and variety of career opportunities and generally insufficient knowledge of the educational training needed for each.

Students at 75 schools across the

country are getting help from an innovative program called the Computerized Vocational Information System (CVIS). It was started in 1967 at Willowbrook High School in Villa Park, Illinois under the direction of Dr. JoAnne Harris. An interactive system, CVIS enables students to compare their own abilities, interest and grades with infor-

Reading the Navajo Way



Learning to read can be difficult for any child. But learning in an unfamiliar language is an even greater struggle—one which 53,000 Navajo children must face every day.

These children are part of the largest Indian tribe in the United States—over 130,000 people living on a reservation which spans parts of Arizona, New Mexico and Utah. They attend school mainly staffed with teachers who don't understand Navajo and who are teaching Navajo children who don't understand English.

To help solve this educational dilemma, Dr. Bernard Spolsky, director of the Navajo Reading Study at the University of New Mexico, has undertaken a project which will set out first to train Navajos themselves as teachers. Secondly, it will develop Navajo reading materials with the help of a computer so the children, when they first enter school, can learn in their own language.

"Then," says Dr. Spolsky, "once they have learned to read in their own language, a language they understand, they can begin to learn English in, say, the second or third grade."

"The computer enters the picture with the development of the Navajo reading materials," says Dr. Spolsky who is also a professor of elementary education, linguistics and anthropology. "To develop effective first grade readers, it is not enough to know the child speaks Navajo. You must know in detail how he uses the language—what words he doesn't use, what words he uses and precisely how he uses them."

"To uncover this information we interviewed over 200 Navajo children on the reservation—in their homes and at school. There were no restrictions on subject matter: home life, coyote tales, space ships, whatever came up."

The material was then keypunched for processing on an IBM system at the university. "At this point we had a body of speech of over 11,000 sentences, 53,000 different words and 8,775 different word types. Computer processing made it possible to do our analyses on as large a data base as we could gather in the time available."

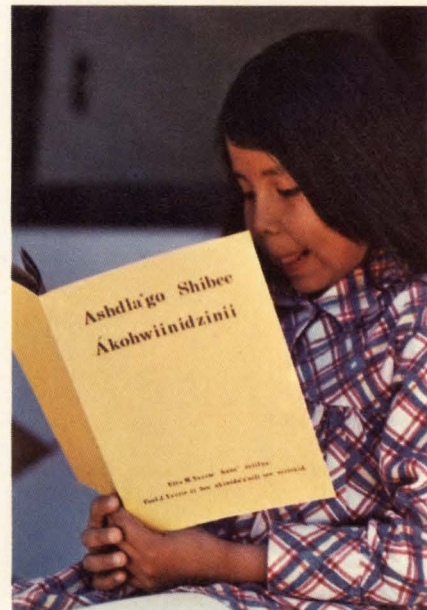
The computer was able to run several analyses on this amount of data. It prepared a concordance, or an alphabetical index of all the words used in the interviews in context of the sentences in which they occurred. Then it ran frequency studies by word and word type, studies of individual letters and letter units and analyses of vowels and consonants. "All of these reports were extremely useful in providing the basis of language intelligence for planning reading materials geared to the language the child is speaking."

The results of the complex computer analyses are 13 new books, mainly for the first grade reading level but some also for the intermediate and advanced levels. Dr. Spolsky recalls a typical story in one of the primers. "It has to do with the children and the

school bus. The children board the bus, a rabbit gets on, a coyote gets on, then a skunk gets on, sits down and emits his characteristic odor. Very quickly the driver stops and everyone gets off. It has an element of humor for the six-year-old, and also a kind of introduction to fantasy, all in terms familiar to the child."

In addition to the reading primers, the Navajo Reading Center has brought out ten publications that are reprints of older selections from Navajo history, long out of print.

"Could we have done without the computer? Concordances done manually are monumental projects. We just couldn't have taken it on. In addition to our bilingual education work, the file in the computer provides the basis



for another thrust—the study of the Navajo language development process.

"In 1940 the Navajos used virtually no English words and only a handful of Spanish words. Of the 53,000 words we have now classified, 500 are loan words from English. So the language situation on the reservation has changed somewhat in the past 30 years."

"Even so, the Navajo language has remained remarkably pure. In 300 years of contact with the Spanish, the Navajos borrowed only 30 to 40 words. There's something about the spirit of the language. They traditionally have not borrowed words, preferring to compound their own to deal with new entities."

In any event Dr. Spolsky feels there is a special satisfaction in helping maintain a vibrant, living language and in combining basic research with actual teaching activities, using the most advanced technology.

IBM



Computer Aids Children of Migrant Workers



Billy is in the fifth grade classroom for the second day in Thomasville, Georgia. His teacher knows he has a way with numbers, difficulty reading either English or Spanish, and has a 20% hearing loss in his left ear—probably because of a case of measles he had when he was six.

Two years ago, it's likely that the school wouldn't have known a fraction of this, and by the time it pieced together his background and took the first definitive steps in helping him, Billy would have been on his way to a new

town, another school, and possibly the gloomy prospect of facing still another set of academic obstacles.

Today, Billy, the son of migrant farm workers and one of an estimated 900,000 such children in the United States, not only stands a better chance of completing his education, but can learn there are ways of earning a living other than working in the fields.

Because of a computer-based communications network called the Migrant Student Record Transfer System (MSRTS), Billy's education and medi-

cal records can now keep up with him.

The system is the result of a joint project between the federal government and the State of Arkansas, which started in 1968 on an experimental basis. It now enables 8,000 school districts throughout the United States to obtain current scholastic and medical histories of more than 400,000 registered migrant children. These records are stored in an IBM System/370 computer in Little Rock, Arkansas.

Using teleprinters linked to the central computer by telephone lines, authorized school districts can get needed information in a matter of hours. The records of each student are updated by means of the same equipment.

"The problem of educating migrant children is quite complex," says Winford Miller, the system's administrator. "Schools along the country's three main migrant streams often have no way of knowing what subjects have been studied and what grade levels were achieved. Moreover, health records are often incomplete or non-existent.

"With the availability of MSRTS, at least a promising start has been made," says Miller. "It's only a small advance but it has large implications. Certainly it means the nation's migrant children have a better shot at schooling than they had before."

IBM

It's Never too Hot or too Cold at East Fishkill

Well, almost never. For nearly two years, a System/7 has been helping to keep IBM's System Products Division facility at East Fishkill, N.Y. comfortable while conserving fuel and energy.

With floor space equal to 1,000 single-family homes, and a population of 7,000 people, the East Fishkill site is much like a small city. Even before stringent energy conservation measures were adopted, the sensor-based system's ability to optimize the efficiency of heating and air conditioning equipment had made possible a 6 percent reduction in fuel oil use and a 10 percent drop in electrical consumption.

Mechanical Facilities Manager Gordon Harrison explains that facilities technicians formerly walked a beat, taking electrical consumption readings at 26 points in the 2.3 million-square foot facility, and relaying the information to a central point, where calculations were performed by hand.

"Not only were we subject to human error," Harrison recalls, "but there was a time lag of up to 15 minutes in

the readings. We never knew on a real-time basis if we were exceeding peak electrical usage targets, which can mean paying a substantial premium. Now, we are literally up to the minute."

In the Computer-Assisted Facility Operation, or CAFO as it's called, sensors continuously monitor 200 temperature, flow, pressure and electrical variables. This data is logged by the System/7 and then analyzed at an IBM 1130 host computer, which compares readings with weather data and historical consumption patterns to predict heating and air conditioning requirements. Technicians are supplied with a continuous flow of data on the loads, capacities and operating efficiencies of five boilers and ten chillers, and the information they need to balance the system and keep total consumption



This weather station is a key part of a sensor-based heating and cooling system at IBM's East Fishkill facility.

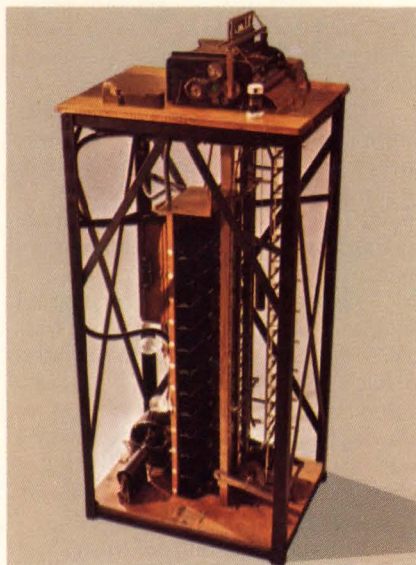
within pre-determined limits.

"We've replaced intuition with information," Harrison says, adding: "At the height of a 12-day heat wave, we were able to cooperate with the local power company's request to avert possible brownouts. Because of our monitoring and forecasting capability, we were able to reduce over-all power demand by 10 percent without affecting operations."

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Computing Pioneers: Part II

In an earlier issue, *DP DIALOG* traced the evolution of calculating devices from the abacus to the late 19th century. A number of readers asked that the story be continued. So, here are a few more of the events that led to the modern computer.



Automatic punch card sorter (c. 1910).

By 1890, a growing nation and its expanding industrial economy were producing numbers, figures and statistics in profusion. No longer was the census merely a matter of counting heads, for example. By 1890, it had been expanded to include statistics on immigration, race, health, literacy and employment. It was clear the government needed an efficient way to tally this wealth of information.

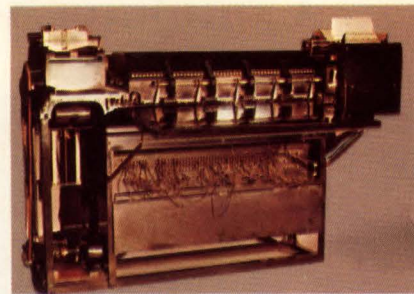
Herman Hollerith, a Census Bureau statistician, solved the problem with the first electrical tabulation machine. Fast and accurate, it used cards in which holes were punched to represent vital statistics. Systems like it earned growing acceptance throughout the next thirty years, although they were modified and speeded up to handle the

ever-increasing needs of the government, business and scientific communities. To accommodate more information for business use Hollerith increased the size of the punched card itself. As his design model, he chose the dollar bill of the time.

Between 1900 and 1910, railroads began using "Hollerith machines" to tabulate waybills. Insurance companies, with actuarial statistics to correlate and mortality predictions to make, were quick to see the advantages of mechanical tabulation. And public utilities, with countless customer records to maintain, also turned in growing numbers to machine accounting. More sophisticated methods—such as cost accounting and sales analysis followed.

With the United States' entrance into World War I, the Wilson administration set up a plethora of public agencies to control transportation, communication, manufacturing and distribution. Under Bernard Baruch, the War Production Board established committees on commodities as diverse (and unlikely) as baby buggies, biscuits and crackers, and pocket-knives. To operate effectively, these agencies needed rapid access to vast quantities of information, and thus installed large numbers of tabulating machines.

By the thirties, many large firms had established a "tab" department, but it remained for the government to undertake the largest bookkeeping job ever. The Social Security Act of 1935 made it necessary to maintain employment records on 26 million people. To handle this task, a production line punched, sorted, checked and filed 500,000 cards a day.



This high-speed card-sorting machine (c. 1920), handled 400 cards a minute.

By the mid-thirties technology had advanced to the point that mechanical reading, writing and arithmetic were available—but separately, as individual functions of distinct machines.

From the 1937 master's thesis of MIT student Claude Shannon came a way of using symbolic logic to improve electrical switching circuits. In one example, he showed how to automatically add two numbers using only relays and

PHOTO: COURTESY OF THE NEW YORK NEWS

SUNDAY NEWS, JANUARY 10, 1937

BIGGEST BOOKKEEPING JOB BEGINS

Social Security Board Has Gigantic Task

By LIT RICHARDS

Baltimore, Jan. 9.—The world's biggest bookkeeping job is under way here.

Thanks to the Social Security Board, this city is now famous for one thing more than fried chicken and terrapin is Maryland. For here's where all those security blanks came last month, after the deadline closed. In piles as big as haystacks, they're being counted, sorted and stuffed on sheets that will pay pensions a good many years away.

When you finished your report of 1936, you knew the end of the road was in sight. You had to fill in the card and punch the holes in the card. You had to fill in the card and punch the holes in the card. You had to fill in the card and punch the holes in the card.

At the time of the 1936 census, the age group of 1936 was 1936. The age group of 1936 was 1936. The age group of 1936 was 1936.

The next step is to fill in the card. The next step is to fill in the card. The next step is to fill in the card.

These three steps are the first steps in the process. These three steps are the first steps in the process. These three steps are the first steps in the process.

John C. Stibitz

He's the boss of the work.

This article said of the IBM collators, "They're incredible. They do everything but take off their hats and bow."

switches. Although any numbering base could be used, Shannon said, the circuit would be greatly simplified by adopting the base two.

That same year, working independently, George Stibitz of Bell Labs built such an adder in his home. He called it the "Model K", after the kitchen table on which it was constructed.

At about the same time, Wallace Eckert of Columbia University used a mechanical programmer to link together different kinds of punched card and accounting machines to allow complex astronomical calculations.

Such developments foreshadowed many of the advances of the next decade. As early as 1937, Harvard graduate student Howard Aiken had proposed that a new kind of calculating machine be built. It was later to become known as the Mark I, the first automatic, general purpose digital calculator.

IBM

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During World War I, the Army used punched-card sorters in the first large-scale application of psychological testing.

The impact of automation

A distinguished panel has opened up many serious aspects of automation to government and public scrutiny.

The points raised deserve the attention of businessmen and computer professionals as well.

A Computer Decisions Staff Report

The changes that automation has made in human lives and the problems it has created came under the scrutiny of a group of experts in fields ranging from science fiction to technology assessment at the National Bureau of Standards last May. Chairing the panel discussion on "Automation's Impact on the Public" was Will Lepkowski, science and technology editor of McGraw-Hill's Washington news bureau. Exerpts from the discussion follow.

Lepkowski: The most important thing to realize in matters of public policy is that there is no such thing as the "public." There are such things as persons, however . . . And so this panel's focus will be on the public as persons.

Automation means many things to persons out there in the public. Machines that cough Cokes to thirsty youngsters . . . computer-run systems that navigate supertankers . . . programmed assembly lines that spill cars off the conveyor one a minute, and, of course, data banks.

Automation technology speeds processes. It raises productivity. It accelerates the flow of information. It makes everything in the economic stream move faster. And it has a way of nourishing itself toward fuller capacities, toward tighter control.

In the process it has created worry. Technologists may like their new technology, but social thinkers and the artists and the humanists don't. Workers don't. Young people especially don't.

Automation used for promoting economic growth has a bad name. The critics say it has produced boredom and frustration on the job, when it hasn't utterly taken jobs away . . . They fear the decline in personal freedom as the automation technologies, which operate through control, are applied to the greater and greater control of human beings.

How can automation technology achieve a good name in a period of rising economic and social insecurity?

The purpose of this panel will be to lay out the human challenge to automation technology, but neither to probe the design of new technologies nor to begin an ambitious expedition into the human condition . . . The point will be the personal focus—to help persons live their lives as free of unneeded control as possible . . . The first speaker is Ben Bova, editor of *Analog* magazine, who will take us into the world of the future to see what the science fiction writers are saying.

Bova: Science fiction teaches you to look at things in the very long term . . . We tend to take the panoramic view of things, including the panoramic view of human history.

Now, this entire automation problem is a particular part of the technology that human beings have created for themselves. Before there was man there was technology. Very early ancestors of ours a million years ago and more were using pebble tools and animal bones, and basically, technology is a matter of making and using tools . . . We have built a technology that in turn forces us to adapt socially, culturally and psychologically. Without technology the human race long ago would have come to a dead end. But with technology, we have organized ourselves to a point where we are threatening our own existence in any of several ways.

The price we have paid for depending so heavily on technology, I think, is obvious. One part of that price is a loss of human individuality . . . The more we depend on technology to air-condition this room and to provide the fabrics that we wear, carry us from various parts of the compass to this conference, the more we have to give up some part of our individuality to accomplish these things.

So the basic question, I think, for this panel and the conference is quite clear: Does automation technology lead to an increase in human freedom or a decrease? I don't think this question has yet been answered, but there are some trends that are easily discernible.

Without steam, slavery

Without the invention of steam machinery, we would still have slavery . . . It became cheaper to use steam than people. Without the development of the early 20th century, without, say, the internal combustion machine, we would all be on the farm right now, working from dawn to dusk to produce enough food to feed ourselves. And without the kind of technology we have today . . . I think most of the people on this planet would die . . .

We are going through essentially . . . the second industrial revolution, and like the first it's a time of great upheaval . . . We are beginning to use automated machinery to free people from the drudgery of repetitive tasks. In this morning's *New York Times* there is a story about young workers in industry who find their jobs utterly boring . . . Now these are the kinds

of jobs that should be done right now by automated machinery. If a task can be done the same way twice, why risk—why use—a creative human being? Use a machine. Now eventually, the machines will become creative, too, and that will bring up another problem.

There are people who are working toward what they call a self-aware computer. A computer that is "intelligent" is a staple of many science fiction stories. In a strange way, Carl Jung hit on it also. I don't think he would recognize the computer as the answer to his prayer, but he did say once that psychologists will never be able to understand how the human mind really works until they have another kind of intelligence to compare our own way of thinking against.

Lepkowski: Next is Dr. John McCarthy, who heads the Artificial Intelligence Laboratory at Stanford University and is professor of computer sciences there. He'll be talking about some of the advances and work on home information systems.

McCarthy: I am not going to talk about artificial intelligence.

I want to talk about some things that might be done with home information terminals . . . as an example of something that can improve a problem. I'd like to discuss the use of home terminals . . . to break the current information monopolies. Nowadays, we don't have total monopoly, but a newspaper or a TV station is a substantial commercial undertaking. If you want to get material before the public, you don't merely have to produce it, you actually have to get somebody with control of a substantial resource to publish it for you.

Now let me tell you what is now possible technically, and I believe that it is very close to being possible economically: To have a national information system built of many interconnected sub-information systems in which everything that is published or has been published can be stored in an immediately accessible form . . . To publish something is simply to put it in the system and declare it to be publicly available.

Of course people will still have to decide what to read, and they will presumably read it by some trail from what they normally read . . . by word of mouth, or something like that. Nevertheless, there will be an enormous break in the information monopoly. A popular author doesn't need a publisher; he just puts his book in the system, his fans find it, and they decide it's worth what he charges for it.

Lepkowski: Next is Dr. James Albus, who is a project manager in the Office of Developmental Automation Control Technology, and whose particular bag is robot control.

Albus: It seems to me, from the sessions here and the general knowledge I have of the technical field in robot control, that the technology is essentially here to do almost anything that we want . . . We have the technical ability to build robots which would revolutionize the manufacturing industry in this country and the resource development and many other aspects of our very crucial wealth-producing industries . . . The questions which are impending the introduction of this technology for the benefit of our economic system . . . are economic, social, and political. There are really two basic questions . . . One is that if the robots can do the work, how do people

get the income? The other question is, if the robots can operate industries by themselves, that represents an enormous concentration of economic power, and who owns that power and who controls it?

Whose robots?

Interestingly enough, although during this conference I've heard the question of income raised by several union people, I don't think I've heard the word ownership issue from the podium. To me that is curious . . . We are hung up on the issue of private ownership of property. Yet something as powerful as robots, which can completely control industry and can completely do anything that we really want to do technically . . . we haven't even mentioned the word ownership. Who owns these machines and who controls them?

Lepkowski: The next speaker is Dr. Daniel De Simone, who is the deputy director of the Office of Technology Assessment, which serves Congress as kind of a forecasting tool to the dangers and opportunities of things like automation technology.

De Simone: Up until a generation or so ago, technological advance was generally regarded as beneficial to mankind . . . The view was simplistic, but it was seldom questioned . . . Then the pendulum began to swing. Some people warned us to stop and think whether all progress was an undiluted blessing . . . The benefits of technology cannot be ignored . . . but most people agree that we need to control technology and channel it to useful purposes. With this realization was born the technology assessment movement.

What is technology assessment? Objective inquiry is essential, but it is many other things, too. In a way, it is a social movement, like consumerism. It is a technical art, like forecasting. It is a method of managing change, like systems analysis. It is an integrated way of scrutinizing technology and evaluating its possible effects before opportunities are lost or before irreversible troubles arise.

The role of technology assessment has been both understated and oversold in different instances. Those who have studied the process thoroughly are confident that in some cases a good technology assessment may turn out to be the only way to bring 535 members of Congress together on a common ground, in order to discuss the complexities of a difficult technical subject and arrive at a considered decision.

But technology assessment is by no means a magical tool for resolving all problems, not even those that primarily concern engineering and the sciences. That brings us to the Office of Technology Assessment.

OTA . . . opened for business just a few months ago . . . It is charged with assessing not only the current state and rate of progress of technologies, but also their consequences from many viewpoints: physical, biological, economic, social, and political. OTA thus gives Congress a new window with a fresh outlook on technological issues that are increasingly important in national decision making.

Lepkowski: Lou O'Leary is director of personnel research and assistant vice president of AT&T.

O'Leary: In the minds of some, we're the ultimate automated industry. As Ben Bova probably remembers, a few years ago there was a movie called *The President's Analyst*, in which it was revealed that the

total society was being taken over by the automated phone company and being run by a whole bunch of Brook Brothers, and vice presidents. This movie would have been really a tremendous backhanded compliment to the Bell Labs, but I thought it was a rotten picture.

We operate with due and deliberate speed an incredible data processing machine which works on demand for as many as 110 million input-output terminals, any one of which can at any moment select one of the 7 million billion possible connections to reach any other.

The ubiquitous phone

Needless to say, the ubiquitous phone service of today is absolutely dependent on this big computer. We started building it in earnest back in 1920 when we began to convert our manual central offices to dial operation.

Back in 1920, it took 142,000 operators to say "Number, please," and those 142,000 young ladies served some 8,800,000 phones. Today we have 150,000 young ladies and gentlemen as operators serving some 109 million phones. And, of course, you are dialing or key pulsing most of your own calls. If you didn't, and we were still on manual service, you'd be paying probably something like hundreds of dollars every month for local phone service, and we would be employing the total U.S. work force.

One final number towards an eventual point. Back in 1920, before these big dial conversions, we had many more operators per thousand phones than we have now. We had 229,000 employees back then; now we have far fewer operators per thousand phones, but we have one million employees.

No full-time leisure

Now, automation may be working quietly and insidiously away to put us all into the full-time leisure market, but at this stage of evolution in my own business, there are very few signs of it . . .

Back in 1953 . . . my boss gave me something of a young Dr. Kildare talk. I don't recall many of his words, but the gist of it was if the Bell system hadn't managed these 30 years of dial conversion properly, we would have had a militant and highly virulent labor union by about 1928, and probably federal ownership of the phone company by 1932 . . .

A lesson learned

He said that neither one of us would like the outfit now, because it would have become something that would have been hurting people . . . He was kind of an engineer/management type, but he did know pragmatically that technical change had to be managed with people in mind. And this was a lesson that the system had somehow learned over those decades of dial cutovers.

And that, finally, is my central point. Automation must be managed. Technology must be introduced ready-cut to the human measure . . . And a final thing—don't ever, ever talk or think about a human employee as a sub-system of a computer design.

Lepkowski: As you can see, we are moving more and more into the actual problems of day-to-day work.

Next I want to introduce Dr. Michael MacCoby, who is a psychologist in private practice, but is connected with the Institute for Policy Analysis, and is the director of the Harvard project on Technology Work and Character.

MacCoby: When there are discussions of technology and the future, there is a great danger of getting into a very abstract point of view . . . The question that one should start with is, who creates the new technology and why? And in looking at this over the past decade, I think that one can generalize that the major thrust of large-scale technological development has obeyed two kinds of principles. One is technology developed by the state, where the underlying principle has been both an increase of security—that's both internal and external security—and of glory and prestige, which has had a lot to do with the space program.

Now those principles, from a psychological point of view, very easily lead to deep irrationalities, because if you are a little bit paranoid and you have reason to be so, since you're being threatened, there is never any limit to the amount of security that is secure. And, equally, if you are grandiose, there is no limit to the amount of prestige or glory that you can have . . .

Profit principle

The second principle is that of corporate growth and profit. This principle is less irrational than that of the government because it must obey some kind of principles of market and of production processes. You can have any kind of production technology, but if people are neither educated nor willing to do it it can't be done.

Often there is a symbiosis between the government principle and the principle of the corporations. Sometimes there is a conflict: When the government's irrationality threatens good business practices, management, planning, and the development of markets.

But let me go from this to make two points. The first is to stress that the motives for developing new technology, from the assembly line to the computer, have not been to further humane development of individuals who work with it. While some technological development may have humane consequences, such as doing away with bad jobs or increasing communication, most managers who create new technology never even think of the human consequences of what they are creating. They are neither inclined by character nor educated to consider how technology affects emotional health and ethical development.

Managers do generally believe they are benefiting humanity by creating jobs, making life easier for people, increasing communication, and generally raising the standard of living. But social goals do not determine priorities of what is built. The priority is what can be sold the most easily or what is demanded by the state . . .

Speaking as a social, psychoanalytic commentator, one must say sadly that the possibility . . . is very great that in the future we will move towards a society of two classes. One is the technocrats, who are psychologically people who are detached, highly competitive game players, who are all head and little heart, who live in highly protected and privileged enclaves, protected from the second class. They are the people who

have not been able to make it, the losers, full of resentment, who are expected at best to be consumers, who are empty and passive and look for drugs, excitement and increasingly violence to turn them on.

Lepkowski: I would like to introduce Gus Tyler, assistant president of the International Ladies Garment Workers Union.

Tyler: Automation has had a profound impact on American society. Prior to World War II, there had been technological advances, but the second World War speeded it all up. The nation was given an almost impossible challenge: How do you remove 12 to 14 million people from the civilian labor force and then meet the demands of both peacetime and wartime production? That was the spark to step up productivity, and we came out of the war with a thing called automation, which was old stuff with a new name on it.

It was assumed that with these smart machines displacing men, you would have growing unemployment, and with 12 or 14 million people returning from the war, you would have still more unemployment. But from the end of World War II right down to the present, the size of the labor force has grown, the participation rate (the percentage rate of people over 14 in labor) has grown and unemployment has shrunk.

More buying power

Why did it not happen? For several reasons: The workers who had been working 44 and 48 hours a week during the war and were getting overtime went on strike and said they wanted the same pay for 40 hours, and they got it. That expanded buying power. Secondly, people had been on a program of forced savings; they now began to spend their money. Thirdly, unions had been negotiating all kinds of pension and welfare funds and now were spending the accumulated money.

Government programs, such as Social Security, were maturing, moving onto the market. New families were being formed, and they bought on the installment plan. The federal government instituted the GI Bill, and spent billions of dollars on education, on financing new business and buying homes. The United States took its money and sent it to other countries so they could buy from us.

The result was that when we were all done, 12 million came back—they got jobs, they used the automated equipment, they expanded our production, and we had no unemployment . . .

Automation had its first impact in the manufacture of commodities. A smaller percentage of the work force was able to produce the necessary commodities for the entire society. But automation was not able to distribute those commodities. Therefore, there was a tremendous expansion of people . . . in the service economy.

Tastes change

Secondly, with the rise in affluence, the tastes of people changed. They didn't abandon their desire for commodities, but they expanded their desire for services, so we had a tremendous expansion in that service sector.

Thirdly, after World War II, the rapid expansion of the welfare state was no longer only at the federal level, but in state, county and municipal employment and in the educational system, so we had that change in the labor force.

By about 1950, we had a fundamental change . . . Prior, most had worn blue collars; now, most wore white collars. Prior, most manufactured commodities; afterwards, most were engaged in dispensing services. Prior, the great creator of new jobs was the private sector; afterwards, the great creator of new jobs was the nonprofit public sector. And finally, the skilled and the professional employee began to grow more rapidly than any other occupational category in the United States.

This was a new kind of a labor force . . . Since the mid-1960s the unions that grew most rapidly were the new unions—The American Federation of State, County and Municipal Employees; government employees, educators, people in the service sector. These people are more political than the people who preceded, and that's what changed the character of the American labor movement.

Demand for women

The new kind of economy created a demand for women . . . At the present time, about 40 percent of the labor force is female. The tremendously expanded service sector can use part-time employment, so a woman can take care of her home part of the day and work part of the day.

Also, the work is scattered in the neighborhoods—small units—you work in a nursery school, you work in a doctor's office, a dentist's office, as a school aide.

In manufacture, work has been simplified and made lighter, and women go to work in factories . . .

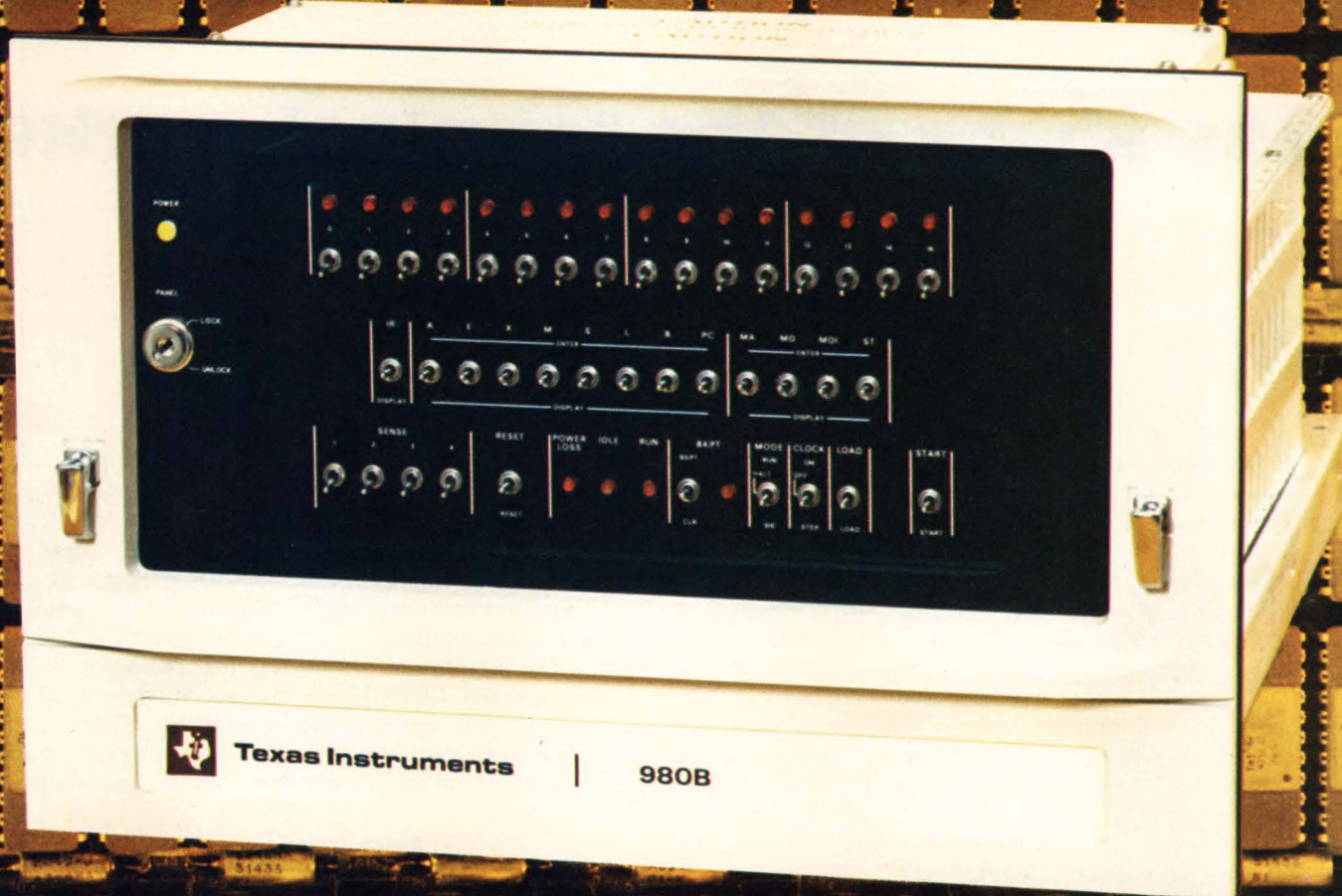
The home has been changed, which has a tremendous impact on the new generation, many of whom grow up parentless because both parents work. This is bound to have an impact, and it's going to bring tremendous pressure to bear on the society in terms of providing some means of raising these children—comprehensive child care and the rest—and the political implications are endless . . .

May I say in passing that if women were to withdraw from the labor force at the present time, the number of families with father and mother who live in poverty, now 4 percent, would rise to 13 percent . . .

Impact on rural U.S.

Final point—automation has had a tremendous impact on American farming . . . About one million people a year have found themselves obsolete and excess in rural America. Most of them came off the farms, others were dependent upon their income . . . We got a resultant wave of migration out of rural America into urban America . . . over 22 years about 22 million people, totally unprepared for urban life.

The educational system in the cities was not able to accommodate them. Housing was not there for them, and so there arose in the American cities several million people that could only be described as "urban nomads." Hence, crime, disorders, riot and chaos in urban America—one of the byproducts of automation in the United States. □



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INFORMATION RETRIEVAL NUMBER 41

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The shape of the terminal market

Excerpted from a Creative Strategies, Inc., report

The computer terminal industry is one of the fastest growing segments of the overall computer industry. The number of terminals in use increased from 50,000 in 1965 to 586,000 by the end of 1972. We project a further increase to 2.3 million terminals by the end of 1977. During the same period, if-sold revenues from annual net installations will increase from \$932-million to \$2.6-billion.

The largest segment of the terminal industry is interactive data terminals, which are used for data base access, timesharing, and data entry, usually in an on-line mode. These interactive terminals are either crt- or printer-based and are either directly online to a central computer or connected to the host processor by common carrier networks.

By the end of 1972, 475,000 interactive terminals were installed in the United States and CSI forecasts an increase to more than 1.8 million units by 1977. The installation of new interactive terminals on an annual basis generated an if-sold revenue of \$522-million in 1972, which will increase to \$1.5-billion by 1977.

The market for terminal equipment and systems is divided into two broad categories. The first category is general purpose equipment that can be used for a variety of applications simply by calling up different programs stored in the host processor. Such systems are usually used for online data entry and timesharing applications. The second category of interactive terminals is dedicated applications systems that are configured for a single function, *e.g.*, airline reservation systems.

At the close of 1972, 336,000 general purpose data terminals were installed in the United States. During that year the net total of new installations was 91,000, with an if-sold market value of \$430-million. By 1977, the annual net increase in the installed base is forecast to be 216,000 units with a sales value of \$930-million.

Of the general purpose terminals in use at the end of 1972, 103,000 were crt terminals and 213,000 were teleprinters. An additional 12,000 intelligent terminals and 8,000 portable crt and printer terminals were also in use. By 1977 the interactive terminal installed base will total 1.19 million units, including 543,000 crt, 466,000 teleprinter, 154,000 intelligent, and 30,000 portable terminals.

Dedicated application terminals, although representing a smaller 1972 installed base of 139,000 terminals, will grow faster than general purpose applications and units installed should total 588,000 by 1977.

The 1972 installed base of 475,000 interactive data terminals comprised 173,000 crt, 257,000 teleprinter,

and 45,000 portable and limited function units. It should be noted that crt terminals as a percentage of total installed units will grow from 36 percent in 1972 to 47 percent by 1977. During 1977, crt terminals will account for slightly more than 50 percent and printer based terminals will account for 22 percent of net terminal installations.

The present and future terminal market is based on three major technologies that are fundamental to crt, printer, and smart terminal products. These technologies are video displays, hard copy printers, and low cost programmable controllers, processors, and memory devices.

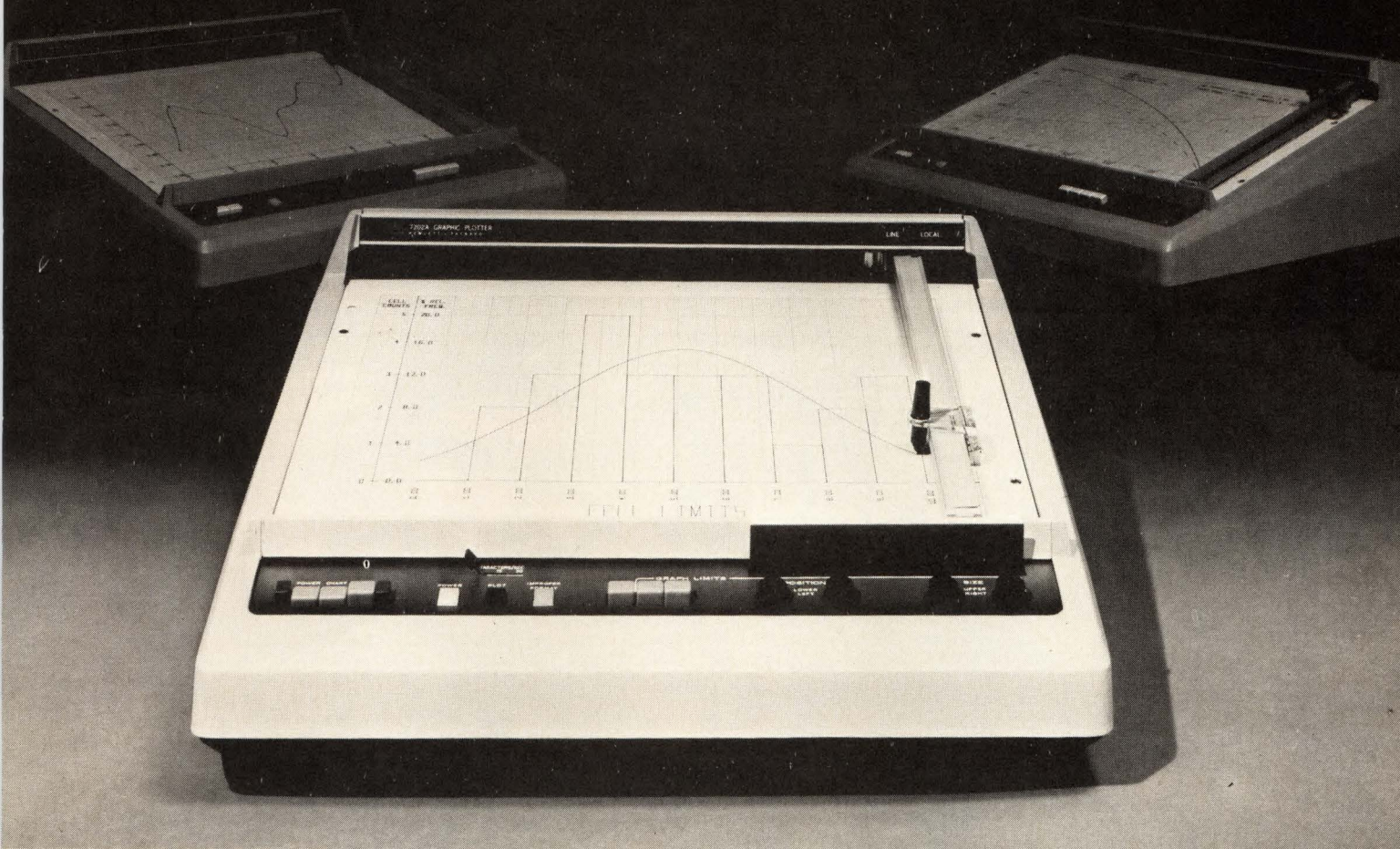
The video display technology, basically a derivative of the TV set, has evolved into a compact, reliable, versatile, and low cost display for data terminal use. It is now possible to build a low-cost crt and interface electronics that sells for under \$1,000 oem. At this price level, large volume crt terminal applications become economically feasible.

Perhaps the most dramatic improvement in terminal performance in recent years has been the introduction of intelligent terminals. These units utilize new large-scale semiconductor processor and memory devices to add microprogrammable control and processor capability to both teleprinter and crt terminals. At the limit of its current capability, the new microprocessor chips may be used to build a terminal processor with the memory and computing power of the IBM 360 model 30. The availability of computing power at the terminal will alter the distribution of intelligence in terminal-oriented data processing systems, thus permitting great improvements in the performance and efficiency of future systems.

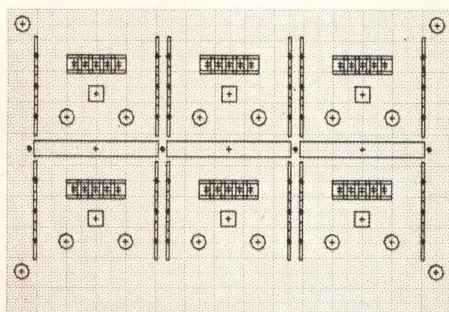
The competitive factors influencing the relative market positions of participants in the terminal industry can be defined in terms of distribution channels, level of product integration, influence of dominant firms, marketing and support, maintenance and service, technological competence, financial strength, corporate structure, product positioning, and pricing strategy.

The independent portion of the end-user oriented computer peripherals market will be dominated by terminal suppliers who are vertically integrated from terminal hardware through terminal systems and who have established nationwide sales and service organizations.

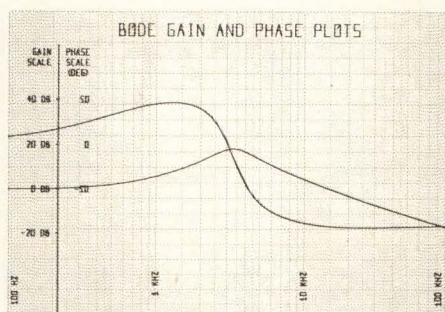
Mainframe suppliers such as IBM, Univac, and Burroughs have set the trend toward greater utilization of terminals for computer input/output. □



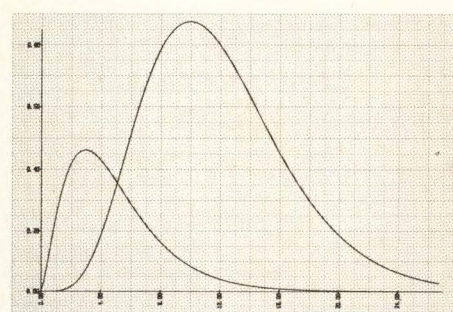
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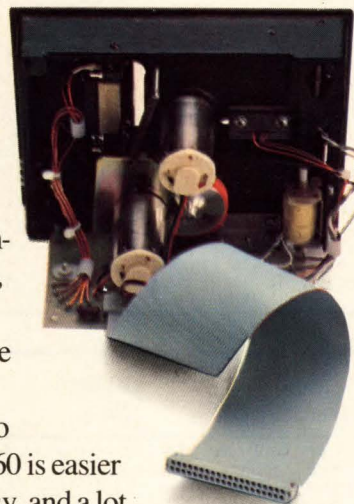
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Manufacturer and model	Ann Arbor Design III KSR	Ann Arbor 200 KSR	ADDS Consul 580	ADDS MRO-380	ADDS MRD-780	ADDS Envoy 680
No. displays per controller	SA	SA	20	20	20	SA
Programmable	No	No	No	No	No	No
TTY compatible	Yes	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	No	No	No	No
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	256-3200	256-3200	1920	1920	1920	1920
Displayable symbols	64/96	64/96	64	64	64	64
Function keys	3	3	None	None	None	None
Separate numeric keygroup	Yes	Yes	Yes	Yes	Yes	Yes
Tabulation	No	No	No	No	Yes	Yes
Line/char insert/delete	No/No	No/No	No/No	No/No	Yes/Yes	No/Yes
Roll/split screen	Up/Opt.	Up/Opt.	Yes/No	Yes/No	Yes/Yes	Yes/Yes
Purchase price	\$1,640-2,480	\$915-1,195	\$1,795	\$1,195	\$2,265	\$3,895

Manufacturer and model	ADDS Consul 980	ADDS Consul 880A	ADDS MRD-780A	ADDS Consul 880	AES 85	AES 90
No. displays per controller	20	20	20	20	16	SA
Programmable	No	No	No	No	Yes	Yes
TTY compatible	Yes	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	No	No	Yes	No
IBM 3270 compatible	No	No	No	No	Yes	No
Char per display/memory	1920	1920	1920	1920	1920	1920
Displayable symbols	96	64	64	64	128	116
Function keys	None	None	None	None	Yes	Yes
Separate numeric keygroup	Yes	Yes	Yes	Yes	Opt.	No
Tabulation	Yes	Yes	Yes	Yes	Yes/Yes	Yes
Line/char insert/delete	Yes/Yes	No/Yes	No/Yes	No/No	Yes/Yes	Yes/Yes
Roll/split screen	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Opt.	Yes/No
Purchase price	\$2,800	\$3,265	\$2,825	\$2,600	NA	\$14,900

Manufacturer and model	Beehive MB-1	Beehive SB-2	Beehive MB-2	Bendix Logiport/2	Bunker Ramo 2204/15	Bunker Ramo 2206/17
No. displays per controller	SA	SA	SA	SA	36	36
Programmable	No	No	No	No	No	No
TTY compatible	Yes	Yes	Yes	Yes	No	No
IBM 2260/2265 compatible	No	No	No	No	Yes	Yes
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	960	2000	2000	2000	1920	1920
Displayable symbols	63	224	224	63	96	96
Function keys	None	8	None	None	16	16
Separate numeric keygroup	Opt.	Yes	Opt.	Opt.	Yes	Yes
Tabulation	No	Yes	No	No	Yes	Yes
Line/char insert/delete	No/No	Yes/Yes	No/No	No/No	No/Yes	No/Yes
Roll/split screen	No/No	Yes/Yes	Yes/No	Yes/No	No/No	No/No
Purchase price	\$1,710	\$3,295	\$1,795	\$2,450	\$1,440	\$1,390

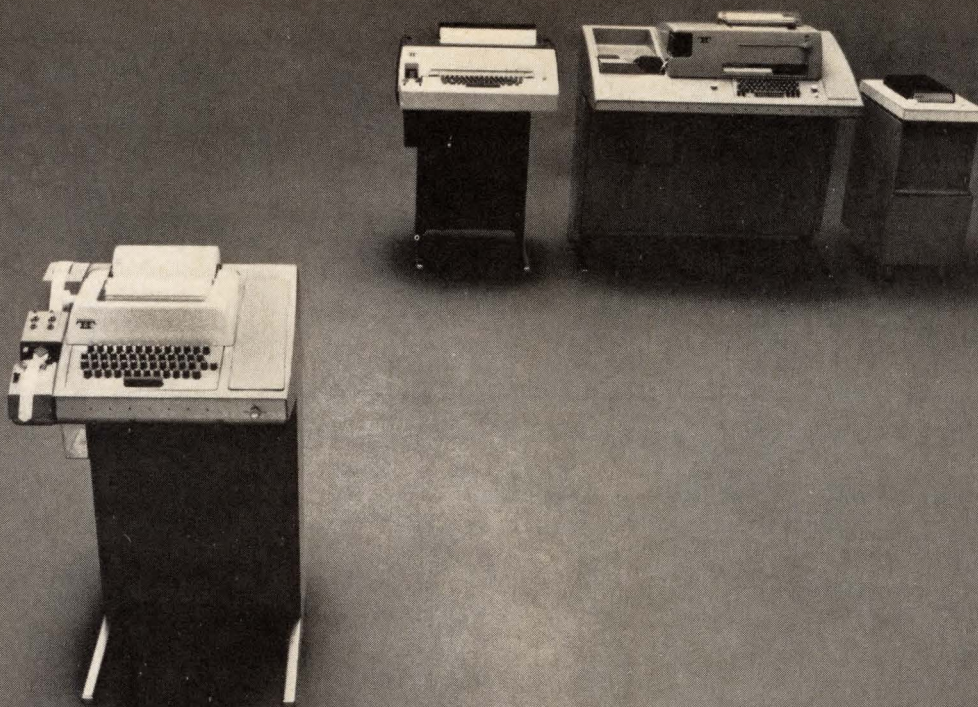
Manufacturer and model	Bunker Ramo 2212	Bunker Ramo 2210	Burroughs TD-700	Burroughs TD-800	Car-Mel I&R 211	Car-Mel D301/302
No. displays per controller	36	36	SA	SA	SA	SA/128
Programmable	No	No	No	No	No	No
TTY compatible	No	No	No	No	Yes	No
IBM 2260/2265 compatible	Yes	Yes	Opt.	Yes	No	No
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	1920	200	256	960-1920	512	512
Displayable symbols	96	96	64	64	64	64
Function keys	12	6	None	None	None	None
Separate numeric keygroup	Yes	Yes	Yes	Yes	No	No
Tabulation	Yes	Yes	Opt.	Yes	No	Yes
Line/char insert/delete	No/Yes	No/No	No/Opt.	No/Opt.	No/No	No/No
Roll/split screen	No/No	No/No	No/Opt.	No/No	Yes/Yes	Yes/Yes
Purchase price	\$1,345	\$760	\$3,398	\$4,750	\$1,850/1,900	\$1,950/2,050

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Manufacturer and model	Car-Mel M-501	Computek 200	Computek 300	Computer Com CC-40	Comp Optics CO:75	Comp Optics CO:77
No. displays per controller	SA	32	SA	2-3	32	32
Programmable	No	Yes	No	Yes	No	No
TTY compatible	Yes	Yes	Yes	No	No	No
IBM 2260/2265 compatible	No	Yes	No	No	Yes	No
IBM 3270 compatible	No	Yes	No	No	No	Yes
Char per display/memory	512	2000	1000	960-1920	1920-3000	480-1920
Displayable symbols	128	128	64	96	86	64/96
Function keys	None	25	4	None	3	12
Separate numeric keygroup	No	Yes	No	No	No	Opt.
Tabulation	No	Yes	Yes	No	Yes	Yes
Line/char insert/delete	No/No	Yes/Yes	No/Yes	No/Yes	Opt./Yes	Opt./Yes
Roll/split screen	Yes/Yes	Yes/Yes	Yes/No	No/No	No/No	No/Yes
Purchase price	\$1,600	\$3,000	\$4,000	\$3,850	\$2,498	\$1,449

Manufacturer and model	Conrac 401 B	Conrac 480 TTY plus	Conrac 401-3	CDC 711	CDC 713	CDC 714
No. displays per controller	8	SA	8	1	1	15
Programmable	No	No	No	No	No	No
TTY compatible	No	Yes	No	No	Yes	No
IBM 2260/2265 compatible	No	No	No	No	No	No
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	2000	480-960	2000	640, 1280	640, 1280	640, 1280
Displayable symbols	128	64	101	64, 96	64, 96	64, 96
Function keys	5-25	Opt.	Yes	None	None	None
Separate numeric keygroup	Opt.	Opt.	Opt.	Yes	Yes	Yes
Tabulation	Yes	No	Yes	Yes	No	Yes
Line/char insert/delete	Yes/Yes	No/Opt.	Yes/Yes	Opt./Opt.	No/No	Opt./Opt.
Roll/split screen	Yes/Yes	Yes/No	Yes/Yes	Yes/Opt.	Yes/No	Yes/Opt.
Purchase price	\$3,000	\$1,400	\$3,000	\$3,675	\$2,095	\$8,900

Manufacturer and model	Courier C 270	Courier C 275	Courier C 275M	Courier Executerm 60/260	Courier Executerm 65/265	Courier Executerm 250
No. displays per controller	32	SA	5	12	SA	32
Programmable	No	No	No	No	No	No
TTY compatible	No	No	No	No	No	No
IBM 2260/2265 compatible	No	No	No	Yes	Yes	Yes
IBM 3270 compatible	Yes	Yes	Yes	No	No	No
Char per display/memory	480-1920	480-1920	480-1920	480-1920	480-1920	480-1920
Displayable symbols	64, 96	64, 96	64, 96	64	64	64
Function keys	Opt.	Opt.	Opt.	None	None	None
Separate numeric keygroup	Opt.	Opt.	Opt.	Yes	Yes	Yes
Tabulation	Yes	Yes	Yes	Yes	Yes	Yes
Line/char insert/delete	Yes/Yes	Yes/Yes	Yes/Yes	No/Yes	No/Yes	No/Yes
Roll/split screen	Yes/Yes	Yes/Yes	Yes/Yes	Yes/No	Yes/No	Yes/No
Purchase price	\$3,750	\$4,700	\$7,500	\$3,050	\$3,400	\$3,650

Manufacturer and model	Courier Executerm 267	Datamedia Elite 1500	Datamedia Elite 2000	Datamedia Elite 2500	Data 100 73	Datapoint 3000/3300
No. displays per controller	5	SA	SA	SA	SA	SA
Programmable	No	No	No	No	No	No
TTY compatible	No	No	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	Yes	No	No	No	No	No
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	960-1920	1920	1920	1920	960, 1920	1800
Displayable symbols	64	64	64	127	64	64
Function keys	None	None	None	11	None	None
Separate numeric keygroup	Yes	Opt.	Opt.	Yes	Yes	Yes
Tabulation	Yes	No	No	Yes	Yes	Yes
Line/char insert/delete	No/Yes	No/No	No/No	Yes/Yes	No/No	No/No
Roll/split screen	Yes/No	Yes/No	Yes/No	Yes/Yes	Yes/No	Yes/No
Purchase price	\$6,500	\$1,555	\$1,895	\$2,280	\$3,360	\$2,400

Manufacturer and model	Datapoint 3360	Datapoint 1100	Datapoint 6000	Delta Data 5000	Digi-Log 3300	Digi-Log 33
No. displays per controller	64	SA	32	95	SA	10
Programmable	No	Yes	Yes	Yes	Yes	No
TTY compatible	No	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	Yes	Yes	Yes	Yes	Yes	No
IBM 3270 compatible	No	Yes	Yes	No	Yes	No
Char per display/memory	2048	960	1920	2160	1920	1280
Displayable symbols	64	94	224	96	128	64
Function keys	None	None	35	12	Yes	None
Separate numeric keygroup	Yes	Yes	Yes	Yes	Yes	No
Tabulation	Opt.	Yes	Yes	Yes	Yes	No
Line/char insert/delete	No/No	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	No/No
Roll/split screen	Yes/No	Yes/No	Yes/Yes	Yes/Yes	Yes/Yes	Yes/No
Purchase price	\$2,900	\$4,670	\$4,500	\$2,800	\$2,200	\$1,295

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Manufacturer and model	Digi-Log 209	Digi-Log 305/306	DEC VT05	DEC GT40	DEC VT50	Four-Phase IV/40
No. displays per controller	10	10	SA	SA	SA	16
Programmable	No	No	No	Yes	No	Yes
TTY compatible	Yes	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	No	No	No	Yes
IBM 3270 compatible	No	No	No	No	No	Yes
Char per display/memory	640	640, 1280	1440	2432	960	1152, 1920
Displayable symbols	64	64	64	127	127	125
Function keys	None	None	None	None	None	12
Separate numeric keygroup	No	No	No	No	No	Yes
Tabulation	No	No	Yes	Yes	Yes	Yes
Line/char insert/delete	No/No	No/No	No/No	No/No	No/No	Yes/Yes
Roll/split screen	Yes/No	Yes/No	Yes/No	Up/No	Yes/No	Yes/Yes
Purchase price	\$1,195	\$790/875	\$2,800	\$13,500	\$950	\$1,900

Manufacturer and model	Four-Phase IV/70	GTE/IS IS/7801, 2	GTE/IS IS/7805	GTE/IS IS/7700, 1	GTE/IS IS/7100	GTE/IS IS/7000
No. displays per controller	32	28	SA	24	SA	SA
Programmable	Yes	Yes	Yes	No	No	No
TTY compatible	Yes	No	No	No	No	No
IBM 2260/2265 compatible	Yes	No	No	Yes	Yes	Yes
IBM 3270 compatible	Yes	Yes	Yes	No	No	No
Char per display/memory	1152, 1920	240-1920	240-1920	240-1920	240-1920	960
Displayable symbols	125	128	128	64	64	64
Function keys	12	12	12	None	None	None
Separate numeric keygroup	Yes	Yes	Yes	No	No	No
Tabulation	Yes	Yes	Yes	Yes	Yes	Yes
Line/char insert/delete	Yes/Yes	Yes/Yes	Yes/Yes	No/Yes	No/No	No/No
Roll/split screen	Yes/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/No
Purchase price	\$1,845	\$1,850	\$5,100	\$12,235	\$4,680	\$4,880

Manufacturer and model	Hazeltine 2000	Hazeltine 1000	Hazeltine 1200	Hazeltine 3000	Hendrix EDS5200, B	Hendrix EDS 5700
No. displays per controller	SA	SA	SA	16	SA	8, 16
Programmable	No	No	No	No	No	Yes
TTY compatible	Yes	Yes	Yes	Yes	No	Yes
IBM 2260/2265 compatible	No	No	No	Yes	No	No
IBM 3270 compatible	No	No	No	Yes	No	No
Char per display/memory	1998	960	1920	1998	3072	1296
Displayable symbols	64, 96	64, 96	64, 96	64, 96	128, 226	192
Function keys	None	None	None	None	None	None
Separate numeric keygroup	Yes	No	No	Yes	No	No
Tabulation	Yes	No	No	Yes	Yes	Yes
Line/char insert/delete	Yes/Yes	No/No	No/No	Yes/Yes	Yes/Yes	Yes/Yes
Roll/split screen	Yes/Yes	No/No	No/No	Yes/Yes	Yes/No	Yes/Yes
Purchase price	\$2,995	\$1,750	TBA	\$3,900	\$12,000	\$6,500

Manufacturer and model	Hendrix CDS 4000	HP 2615A	HP 2616A	Honeywell VIP 7500	Honeywell VIP 7700	Hughes Conographic 12
No. displays per controller	SA	SA	SA	SA	10	4
Programmable	Yes	No	No	Yes	No	No
TTY compatible	Yes	Yes	Yes	Yes	No	Yes
IBM 2260/2265 compatible	Yes	No	No	Yes	No	No
IBM 3270 compatible	Yes	No	No	Yes	No	No
Char per display/memory	960	2000	2000	960	960, 1920	3230
Displayable symbols	94	64	96	94	63, 96	94
Function keys	2	None	8	None	12	32
Separate numeric keygroup	No	None	Yes	Yes	Yes	Yes
Tabulation	Yes	No	Yes	Yes	Yes	Yes
Line/char insert/delete	Yes/Yes	No/No	Yes/Yes	Yes/Yes	Yes/Yes	Delete
Roll/split screen	Yes/No	Yes/No	Yes/No	Yes/No	Yes/Yes	No/Yes
Purchase price	\$13,000	\$2,750	\$4,500	\$9,800	\$4,860	\$13,300

Manufacturer and model	Hughes Conographic 10	IBM 3277	Imlac PDS-1G	Imlac PDS-4	Incoterm SPD-320	Incoterm SPD-10/20
No. displays per controller	SA	32	4	4	32	2
Programmable	No	No	Yes	Yes	No	Yes
TTY compatible	Yes	No	Yes	Yes	No	Yes
IBM 2260/2265 compatible	No	No	Opt.	Opt.	No	Yes
IBM 3270 compatible	No	Yes	Opt.	Opt.	Yes	No
Char per display/memory	3230	480, 1920	140, 1900	3000, 4000	480-1920	960, 1920
Displayable symbols	94	64	128	96	64	64
Function keys	32	Yes	6	6	24	24
Separate numeric keygroup	Yes	Yes	Opt.	Opt.	Opt.	Opt.
Tabulation	Yes	Yes	Yes	Yes	Yes	Opt.
Line/char insert/delete	No/No	No/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Opt./Opt.
Roll/split screen	No/Yes	No/Yes	Yes/Yes	Yes/Yes	Yes/Opt.	Opt./Opt.
Purchase price	\$12,000	\$5,729	\$7,500	\$14,000	\$19,530	\$5,800

Manufacturer and model	Incoterm 20/20	Incoterm 900 Series	Info Design 3264	Info Design 3272	Info Design 3280	Info Design 3296
No. displays per controller	64	SA	SA	SA	SA	SA
Programmable	Yes	Yes	Yes	Yes	Yes	Yes
TTY compatible	Yes	No	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	Yes	No	No	No	No	No
IBM 3270 compatible	Yes	No	No	No	No	No
Char per display/memory	480-1920	1920	2048	2304	2560	3072
Displayable symbols	64	64	64	64	64	64
Function keys	24	24	Opt.	Opt.	Opt.	Opt.
Separate numeric keygroup	Opt.	Opt.	Opt.	Opt.	Opt.	Opt.
Tabulation	Opt.	Opt.	No	No	No	No
Line/char insert/delete	Opt./Opt.	Opt./Opt.	No/No	No/No	No/No	No/No
Roll/split screen	Opt./Opt.	Opt./Opt.	Yes/Opt.	Yes/Opt.	Yes/Opt.	Yes/Opt.
Purchase price	\$25,955	\$12,000	\$1,750	\$1,895	\$1,995	\$2,495

Manufacturer and model	Info Displays IDIOM/11	Info Displays IDI graf	Infoton Vistar/GT	Infoton Vistar	Infoton Vistar Plus	Infoton Vistar Std.
No. displays per controller	6	4	SA	SA	64	SA
Programmable	Yes	Yes	No	No	No	No
TTY compatible	No	No	Yes	Yes	No	Yes
IBM 2260/2265 compatible	No	No	No	No	No	No
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	6000	3000	1920	1920	400-1600	400-1600
Displayable symbols	8300	8300	63	63	96	96
Function keys	32	10	None	None	None	None
Separate numeric keygroup	Opt.	Opt.	No	Yes	Yes	Opt.
Tabulation	Opt.	Opt.	No	No	No	No
Line/char insert/delete	Opt./Opt.	Opt./Yes	No/No	No/No	No/No	No/No
Roll/split screen	Opt./Opt.	No/Yes	Yes/No	Yes/No	Yes/No	Yes/No
Purchase price	\$66,000	\$4,000	\$1,595	\$2,295	\$3,745	\$2,695

Manufacturer and model	Infoton Vistar Basic	Jacquard J100	Jacquard J105	Jacquard J305	Jacquard J307	Kustom MCT-10
No. displays per controller	SA	32	32	SA	32	SA
Programmable	No	Yes	Yes	Yes	No	No
TTY compatible	Yes	Yes	Yes	No	No	No
IBM 2260/2265 compatible	No	Yes	Yes	No	No	No
IBM 3270 compatible	No	Yes	Yes	Yes	Yes	No
Char per display/memory	320-1280	1920	1920	480, 1920	480, 1920	256
Displayable symbols	64	96	96	96	96	64
Function keys	None	Ten	Ten	Ten	Ten	11
Separate numeric keygroup	Opt.	Yes	Yes	No	Yes	None
Tabulation	No	Yes	Yes	Yes	Yes	No
Line/char insert/delete	No/No	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	No/No
Roll/split screen	Yes/No	Yes/No	Yes/Opt.	Yes/Opt.	Yes/Lpt.	No/No
Purchase price	\$2,345	\$4,200	\$1,850	\$7,400	\$1,850	\$27,500

Manufacturer and model	Lear-Siegler ADM-2	Lear-Siegler ADM-1	Megadata SIR-1000	NCR 796-301	NCR 796-101	NCR 796-201
No. displays per controller	SA	SA	SA	SA	SA	SA
Programmable	No	No	Yes	No	No	No
TTY compatible	Yes	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	Yes	No	No	No
IBM 3270 compatible	No	No	Yes	No	No	No
Char per display/memory	1920	960, 1920	2160	1920	1920	1920
Displayable symbols	128	64	128	64	64	64
Function keys	16	None	None	None	None	None
Separate numeric keygroup	Yes	No	Yes	Yes	Yes	Yes
Tabulation	Yes	No	Yes	Yes	No	Yes
Line/char insert/delete	Yes/Yes	Yes/Yes	Yes/Yes	No/Yes	No/No	No/Yes
Roll/split screen	Yes/No	Yes/No	Yes/Yes	Yes/No	Yes/No	Yes/No
Purchase price	\$2,895	\$1,800	\$3,450	\$3,500	\$2,000	\$3,000

Manufacturer and model	Princeton Elec. 801	Quotron 800	Raytheon PTS-100	RCA Flexiterm	Research Teleray 3311	Research Teleray 3911
No. displays per controller	SA	24, 64	96	SA	SA	SA
Programmable	Yes	Yes	Yes	Yes	No	No
TTY compatible	Yes	No	Yes	No	Yes	Yes
IBM 2260/2265 compatible	No	No	Yes	Yes	No	No
IBM 3270 compatible	No	Opt.	Yes	Yes	No	No
Char per display/memory	2048-8192	800-1920	480-9600	1920	960, 1920	1920
Displayable symbols	96	96	64, 96	64	64	95
Function keys	16	11	Yes	None	None	None
Separate numeric keygroup	No	Opt.	No	Yes	Yes	Yes
Tabulation	No	Yes	Yes	Yes	No	No
Line/char insert/delete	Delete	Yes/Yes	No/Yes	Opt./Opt.	No/No	No/No
Roll/split screen	No/No	Yes/Yes	Opt./Opt.	Opt./Opt.	Yes/No	Yes/no
Purchase price	\$7,950	Contract	\$4,800	\$5,000	\$1,530	\$2,480

Oh, sure, our GTE IS/1500 key-to-disc systems are competitive in price. But we feature some other things that put us way above most other systems:

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INFORMATION RETRIEVAL NUMBER 53

more to offer than just price.



Manufacturer and model	Research Teleray 3711	Research Teleray 3511	Sanders 720	Sanders 620 & 622	Sanders 804	Sanders 810
No. displays per controller	SA	SA	12	SA	SA	8
Programmable	No	No	No	No	Yes	Yes
TTY compatible	Yes	Yes	Yes	Yes	No	No
IBM 2260/2265 compatible	No	No	Yes	Yes	Yes	Yes
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	1920	1920	2000	2000	960, 1920	960, 1920
Displayable symbols	95	64	64	64	96	96
Function keys	None	None	None	None	Yes	24
Separate numeric keygroup	Yes	Yes	Opt.	No	Opt.	Yes
Tabulation	No	No	Yes	Yes	Opt.	Opt.
Line/char insert/delete	No/No	No/No	Yes/Yes	Yes/Yes	Opt./Opt.	Opt./Opt.
Roll/split screen	Yes/No	Yes/No	No/Opt.	No/No	Opt./Opt.	Opt./Opt.
Purchase price	\$1,880	\$1,610	\$3,177	\$5,670	\$6,000	\$8,000

Manufacturer and model	Sanders 8040/41	Sanders 8100	Sanders 8170	Scientific-Meas. 1440/1920	I. P. Sharp IPSA 300	Sidereal 2001
No. displays per controller	SA	4	32	SA	16	SA
Programmable	Yes	Yes	Yes	No	Yes	No
TTY compatible	No	No	No	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	No	No	Yes	No
IBM 3270 compatible	No	No	Yes	No	Yes	No
Char per display/memory	1920	1920	480-1920	1440, 1920	1920	8000
Displayable symbols	64	96	96	128	96	127
Function keys	13	13	5	10	Yes	None
Separate numeric keygroup	Yes	Yes	Yes	Yes	Opt.	Opt.
Tabulation	Yes	Yes	Yes	Yes	Yes	Yes
Line/char insert/delete	No/No	No/No	Yes/No	Opt./Opt.	Opt./Opt.	Opt./Opt.
Roll/split screen	No/No	No/No	No/No	Yes/Opt.	Yes/Opt.	Yes/No
Purchase price	\$12,800	\$31,000	\$14,000	\$1,995/2,050	\$495	\$1,490

Manufacturer and model	Sidereal 2004	Sidereal 2005	Sperry Univac U 100	Sycor 340	Sycor 250	SYS 500 TE
No. displays per controller	SA	SA	256	SA	32	SA
Programmable	No	Yes	No	Yes	Yes	Yes
TTY compatible	Yes	Yes	No	Yes	No	No
IBM 2260/2265 compatible	No	No	Yes	No	No	No
IBM 3270 compatible	No	No	No	No	Yes	No
Char per display/memory	8000	8000	768, 1024	576	480, 1920	4000
Displayable symbols	127	127	64, 96	64	64, 96	128
Function keys	None	None	Yes	None	12	Yes
Separate numeric keygroup	Opt.	Opt.	Yes	Yes	Opt.	No
Tabulation	Yes	Yes	Yes	Yes	Yes	Yes
Line/char insert/delete	Opt./Opt.	Opt./Opt.	Yes/Yes	No/No	No/Yes	Yes/Yes
Roll/split screen	Yes/No	Yes/No	Yes/Yes	No/No	No/Yes	Yes/Yes
Purchase price	\$1,700	\$2,390	\$3,360	\$6,600	\$4,840	\$7,000

Manufacturer and model	SYS 132S	SYS 80S	TEC 410, 415, 416	TEC 420, 425, 426	TEC 430, 435, 436	TEC 440, 1440
No. displays per controller	8	16	SA	SA	SA	SA
Programmable	Yes	Yes	No	No	No	No
TTY compatible	No	No	No	No	Yes	Yes
IBM 2260/2265 compatible	Yes	Yes	No	No	No	No
IBM 3270 compatible	Yes	Yes	No	No	No	No
Char per display/memory	4000	2000	960-1920	960-1920	960-1920	1728, 1920
Displayable symbols	128	68	68	68	68	64
Function keys	Yes	Yes	None	None	None	None
Separate numeric keygroup	Yes	Yes	Opt.	Opt.	Opt.	Opt.
Tabulation	Yes	Yes	Yes	Yes	Yes	No
Line/char insert/delete	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/No
Roll/split screen	No/No	Yes/No	No/No	No/No	No/No	No/No
Purchase price	\$7,500	\$6,500	\$2,350	\$2,620	\$2,350	\$1,765/1,300

Manufacturer and model	TEC 450, 455, 456	TEC 460, 465, 466	TEC 1400	Tektronix 4010/4012	Tektronix 4013/4014	Tektronix 4015
No. displays per controller	SA	SA	SA	SA	SA	SA
Programmable	No	No	No	No	No	No
TTY compatible	Yes	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	No	No	No	No
IBM 3270 compatible	No	No	No	No	No	No
Char per display/memory	960-1920	960-1920	960	2590	2590/8512	8512
Displayable symbols	68	68	63	64, 94	182, 94	182
Function keys	None	None	None	None	None	None
Separate numeric keygroup	Opt.	Opt.	Opt.	No	No	No
Tabulation	Yes	Yes	Yes	No	No	No
Line/char insert/delete	Yes/Yes	Yes/Yes	No/No	No/No	No/No	No/No
Roll/split screen	No/No	No/No	No/No	No/No	No/No	No/No
Purchase price	\$2,390	\$3,145	\$1,300	\$3,995/5,295	\$5,495/8,995	\$9,495

"IF YOU BUY A COMPUTER JUST TO CUT YOUR OPERATING COSTS, YOU'RE NOT GETTING YOUR MONEY'S WORTH."



Dale Schilling, Assistant General Manager, Sierra Pacific Industries Retail Division

"Our company is the 12th largest manufacturer of lumber in the U.S. And we've been growing like crazy. In 1967, our sales were \$17 million. In 1972, we opened a chain of retail outlets for building materials. In 1973, our sales went over the \$125 million mark.

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"We talked to a lot of computer companies and finally chose System Ten* computer by Singer. First, because Singer has done such a fine job of translating technical data processing into a medium that the average employee can understand and use. Second, because System Ten can process a variety of jobs at the same time.

"These two advantages let us get the most out of the system. System Ten functions as the heart of an advanced accounting department, but it also works as an integral part of our entire business operation.

"Several people in the office are always using the computer at the same time for completely different jobs; it's like having a separate computer in each department. System Ten does something else that no bookkeeping system can. It's programmed to make a whole variety of management decisions. Without human intervention."

"SYSTEM TEN COVERS JUST ABOUT EVERYTHING WE DO."

"Each of our stores has four MDTs* point-of-sale data terminals and a Model 800 Individual



Store and Forward (ISF) Module. Every time a clerk rings up a sale, he enters the whole transaction into the terminal, which works just like a cash register.

"This information is stored by the ISF Modules, which are polled every night over regular telephone lines by the System Ten processor in our main office.

"From this raw data, we can pull out a daily report of each store's operations for the day and the month to date. We can pinpoint charge sales, cash sales, sales tax, credit card sales, markdowns, cost of markdowns, cost of sales, gross profit, labor costs, payment on account, returned checks, tax exempt sales, non-taxable sales, redeposited checks, average cash sale and average charge sale."

"THIS KIND OF INFORMATION HAS REALLY HELPED OUR PROFITABILITY."

"Having all of yesterday's data today is a real boon to management. If something's going wrong in an operation, they can see it on these reports and fix it up right away. The information about gross profit margins is especially important.

We can control each item, know how well it sells and have a report of all sales for less than the established price.

"And when we have a sale, we know the next day what our actual gross profit margins were. That lets us decide if sales have increased enough to compensate

for the lower percentage of gross profit."

"WE'RE GETTING TERRIFIC INVENTORY CONTROL, TOO."

"Each of our stores carries something like 25,000 inventory items. Our inventory system groups these into fine-line classes, classes and departments. We get inventory reports on each of these levels that cover: net sales, markdowns, purchases (cost and retail) percentages of markdowns, sales, inventory and gross profits, the rate of inventory turns per year, the gross margin return on investment (GMROI) and a target GMROI."

"WE'RE STILL FINDING NEW WAYS TO USE IT."

"By the time we're through, we'll be using the full capabilities of System Ten in even more ways than we are now. Right now, the central processor has 60 K of core, but in only a few minutes, a Singer Business Machines field engineer can install extra partitions in the processor and take us all the way up to 110 K.

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Manufacturer and model	Tektronix 4023	Teletype Model 40	Terminal Comm. TC275	Terminal Comm. TC277	Texas Sci E200-30/10	Texas Sci E-200
No. displays per controller	SA	SA	SA	32	32	32
Programmable	No	No	No	No	No	No
TTY compatible	Yes	Yes	No	No	No	No
IBM 2260/2265 compatible	No	No	No	No	No	No
IBM 3270 compatible	No	No	Yes	Yes	Yes	Yes
Char per display/memory	1920	1920	480, 1920	480, 1920	1920	1920
Displayable symbols	128	127	64	64	128	94
Function keys	None	None	Yes	Yes	12	16
Separate numeric keygroup	Yes	No	Yes	Yes	Yes	Yes
Tabulation	Yes	Opt.	Yes	Yes	Yes	Yes
Line/char insert/delete	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	No/Yes	No/Yes
Roll/split screen	Yes/No	No/Yes	No/No	No/No	No/Yes	No/Yes
Purchase price	\$2,995	\$2,995	\$2,995	\$3,200	\$4,480	\$4,000

Manufacturer and model	Trivex 40/80	Vector Gen. Vectrographics II	Wang 220B-1	Westinghouse W1620	Westinghouse W1600	Wiltek 500
No. displays per controller	32	4	SA	SA	24	4
Programmable	No	Yes	Yes	No	No	No
TTY compatible	No	Yes	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	Yes	Opt.	No	No	No	No
IBM 3270 compatible	No	Opt.	No	No	No	Yes
Char per display/memory	960	7200	1024	1920	1600	1998
Displayable symbols	57	96	64	64, 96	64, 96	64
Function keys	21	Yes	16	None	None	Yes
Separate numeric keygroup	Yes	Opt.	Yes	Opt.	Yes	Yes
Tabulation	Yes	Yes	Yes	No	Yes	Yes
Line/char insert/delete	No/Yes	Yes/Yes	Yes/Opt.	No/No	Yes/Yes	Yes/Yes
Roll/split screen	No/No	Yes/Yes	Yes/Yes	Yes/No	Yes/Yes	No/Yes
Purchase price	\$1,005	\$39,900	\$3,200	\$1,525	\$2,995	\$12,100

Manufacturer and model	Wyle 8000	Wyle 9000	Xerox BC200	Xerox BC100	Informer D301	Informer D302
No. displays per controller	16	32	5	5	SA	SA
Programmable	No	Yes	No	No	No	No
TTY compatible	No	No	No	No	Yes	Yes
IBM 2260/2265 compatible	Yes	Yes	No	No	No	No
IBM 3270 compatible	No	Yes	No	No	No	No
Char per display/memory	480-1920	480-1920	1600	960	512	512
Displayable symbols	64	64	93	93	64	64
Function keys	None	16	4	4	Yes	Yes
Separate numeric keygroup	Opt.	Yes	Opt.	Opt.	Yes	Yes
Tabulation	Yes	Yes	Yes	Yes	No	Yes
Line/char insert/delete	Opt./Yes	Yes/Yes	Yes/Yes	Yes/Yes	No/No	No/No
Roll/split screen	No/No	Opt./Opt.	No/No	No/No	Yes/No	No/No
Purchase price	\$2,500	\$2,500	\$6,800	\$6,800	\$1,950	\$2,050

Manufacturer and model	Informer I 211	Informer I 302	Informer R 211	Informer R 302
No. displays per controller	SA	SA	SA	SA
Programmable	No	No	No	No
TTY compatible	Yes	Yes	Yes	Yes
IBM 2260/2265 compatible	No	No	No	No
IBM 3270 compatible	No	No	No	No
Char per display/memory	512	512	512	512
Displayable symbols	64	64	64	64
Function keys	Yes	Yes	Yes	Yes
Separate numeric keygroup	No	No	No	No
Tabulation	No	Yes	No	Yes
Line/char insert/delete	No/No	No/No	No/No	No/No
Roll/split screen	Yes/No	No/No	Yes/No	No/No
Purchase price	\$1,850	\$2,050	\$1,900	\$2,050

Win a Sinclair Executive Calculator!

Complete the information on the survey card bound between pages 48 and 49. Only those cards with complete information will be selected. Only one card per reader, please. Deadline is November 1, 1974.

For complete CRT terminal data

Circle number 480 on the information retrieval card to receive information on all CRT terminals in this survey.

CRT manufacturers

Ann Arbor Terminals, Inc.

6107 Jackson Road
Ann Arbor, MI 48103
(313) 769-0926
Circle no. 201

Automatic Electronic Systems Inc.

570 McCaffrey Sctreet
Montreal, Quebec H4T1N1 Canada
(514) 341-5030
Circle no. 202

Applied Digital Data Systems, Inc.

100 Marcus Boulevard
Hauppauge, NY 11787
(516) 231-5400
Circle no. 203

Beehive Medical Electronics, Inc.

870 W. 2600 South
Salt Lake City, UT 84119
(801) 487-0741
Circle no. 204

Bendix Interactive Terminals

23850 Freeway Park Dr.
Farmington, MI 48024
(313) 477-3700
Circle no. 205

Bunker Ramo Corp.

35 Nutmeg Drive
Trumbull, CT 06609
(203) 377-4141
Circle no. 206

Burroughs Corp.

Burroughs Place
Detroit, MI 48232
(313) 972-7000
Circle no. 207

Car-Mel Electronics, Inc.

5794 Venice Blvd.
Los Angeles, CA 90019
(213) 934-1866
Circle no. 208

Computek, Inc.

143 Albany Street
Cambridge, MA 02139
(617) 864-5140
Circle no. 209

Computer Communications, Inc.

5933 W. Slauson Ave.
Culver City, CA 90230
(213) 390-7777
Circle no. 210

Computer Optics, Inc.

Berkshire Industrial Park
Bethel, CT 06801
(203) 744-6720
Circle no. 211

Conrac Corporation

600 N. Rimsdale Ave.
Covina, CA 91722
(213) 966-3511
Circle no. 212

Control Data Corporation

8100 34th Ave. So.
Minneapolis, MN 55440
(612) 853-4656
Circle no. 213

Courier Terminal Systems, Inc.

2202 E. University Drive
Phoenix, AZ 82034
(602) 244-1392
Circle no. 214

Data 100 Corporation

7725 Washington Ave. So.
Minneapolis, MN 55440
(612) 941-6500
Circle no. 215

Data Communications, Inc.

7777 Leesburg Pike—Suite 211
Falls Church, VA 22043
(703) 893-0733
Circle no. 216

Datamedia Corporation

7300 N. Crescent
Pennsauken, NJ 08110
(609) 665-2382
Circle no. 217

Datapoint Corporation

9725 Datapoint Dr.
San Antonio, TX 78284
(512) 696-4520
Circle no. 218

Digi-Log Systems, Inc.

666 Davisville Road
Willow Grove, PA 19090
(215) 659-5400
Circle no. 219

Delta Data Systems Corp.

Woodhaven Industrial Park
Cornwell Heights, PA 19020
(215) 639-9400
Circle no. 220

Digital Equipment Corp.

146 Main Street
Maynard, MA 01754
(617) 897-5111
Circle no. 221

Four Phase Systems, Inc.

10420 N. Tantau Ave.
Cupertino, CA 95014
(408) 255-0900
Circle no. 222

GTE Information Systems, Inc.

One Stamford Forum
Stamford, CT 06904
(203) 357-2627
Circle no. 223

Hazeltine Corporation

Greenlawn, NY 11740
(516) 261-7000
Circle no. 224

Hendrix Electronics

645 Harvey Road
Manchester, NH 03103
(603) 669-9050
Circle no. 225

Hewlett Packard Company

1501 Page Mill Road
Palo Alto, CA 94304
(415) 493-1501
Circle no. 226

Honeywell

60 Walnut Street
Wellesley Hills, MA 02181
(617) 237-4100
Circle no. 227

Hughes Aircraft Company

Industrial Products Div.
2020 Oceanside Blvd.
Oceanside, CA 92054
(714) 757-1200
Circle no. 228

Imlac Corporation

150 A Street
New England Industrial Center
Needham, MA 02194
(617) 449-4600
Circle no. 229

Incoterm Corporation

6 Strathmore Road
Natick, MA 01760
(617) 655-6100
Circle no. 230

Informer Inc.

2218 Cotner
Los Angeles, CA 90064
(213) 477-4216
Circle no. 231

Information Designs

Civil Air Terminal
Bedford, MA 01730
(617) 274-0190
Circle no. 232

Information Displays Inc.

333 N. Bedford Road
Mount Kisco, NY 10549
(914) 241-1000
Circle no. 233

Infoton, Inc.

Second Ave.
Burlington, MA 01803
(617) 272-6660
Circle no. 234

I. P. Sharp Associates Inc.

104 Bridge Plaza
Ogdensburg, NY 13669
(613) 257-3610
Circle no. 235

IBM

1133 Westchester Ave.
White Plains, NY 10604
(914) 696-1900
Circle no. 236

Jacquard Systems

1505 11 So.
Santa Monica, CA 90404
(213) 393-3711
Circle no. 237

Kustom Electronics Inc.

1010 W. Chestnut
Chanute, KN 66720
(316) 431-4380
Circle no. 238

Lear Siegler, Inc.

714 N. Brookhurst St.
Anaheim, CA 92803
(714) 774-1010
Circle no. 239

Megadata Computer & Comm. Corp.

10 Evergreen Place
Deer Park, NY 11729
(516) 667-2900
Circle no. 240

NCR

Main and K Street
Dayton, OH 45409
(513) 449-3605
Circle no. 241

Olivetti Corp. of America

500 Park Ave.
New York, NY 10022
(212) 371-5500
Circle no. 242

Omron

432 Toyama Drive
Sunnyvale, CA 94086
(408) 734-8400
Circle no. 243

Ontel Corporation

3 Fairchild Court
Plainview, NY 11803
(516) 822-7800
Circle no. 244

Pertec

9600 Irondale Ave.
Chatsworth, CA 91311
(213) 882-0030
Circle no. 245

Plantronics Inc.

385 Reed Street
Santa Clara, CA 95050
(408) 249-1160
Circle no. 246

Princeton Electronic Prod.

P.O. Box 101
North Brunswick, NJ 08902
(201) 297-4448
Circle No. 267

Quotron Systems, Inc.

5454 Beethoven Street
Los Angeles, CA 90066
(213) 398-2761
Circle no. 247

Raytheon Data Systems

1415 Providence Tpk.
Norwood, MA 02062
(617) 762-6700
Circle no. 248

RCA Custom Terminal Systems

8500 Balboa Boulevard
Van Nuys, CA 91409
(213) 894-8111
Circle no. 249

Research Inc.

Box 24064
Minneapolis, MN 55424
(612) 941-3300
Circle no. 250

Sanders Data Systems, Inc.

Daniel Webster Highway So.
Nashua, NH 03060
(603) 885-6685
Circle no. 251

Scientific Measurement Systems

26 Olney Avenue
Cherry Hill, NJ 08003
(609) 424-5520
Circle no. 252

Sidereal Corporation

Box 1042
Portland, OR 97207
(503) 227-0111
Circle no. 253

Sycor, Inc.

100 Phoenix Drive
Ann Arbor, MI 48104
(313) 971-0900
Circle no. 254

SYS Computer Corporation

17—25 DiCaroli Court
Hackensack, NJ 07601
(201) 488-0300
Circle no. 255

Tec, Inc.

9800 N. Oracle Road
Tucson, AZ 85704
(602) 297-1111
Circle no. 256

Tektronix, Inc.

Box 500
Beaverton, OR 97005
(503) 292-2611
Circle no. 257

Teletype Corporation

5555 Touhy Avenue
Skokie, IL 60076
(312) 982-2700
Circle no. 258

Terminal Communications, Inc.

3301 Terminal Drive
Raleigh, NC 27611
(919) 834-5251
Circle no. 259

Texas Scientific Corporation

800 Harwin Drive
Houston, TX 77036
(713) 785-7731
Circle no. 260

Trivex, Inc.

3180 Redhill Ave.
Costa Mesa, CA 92626
(714) 546-7781
Circle no. 261

Univac

Box 500
Blue Bell, PA 19422
(215) 542-4213
Circle no. 262

Westinghouse Canada Limited

Box 510
Hamilton, Ontario L8N 3K2
Canada
(416) 528-8811
Circle no. 263

Wiltek, Inc.

Glover Ave.
Norwalk, CT 06852
(203) 853-7400
Circle no. 264

Wyle Computer Products Inc.

128 Maryland Street
El Segundo, CA 90245
(213) 322-1763
Circle no. 265

Xerox Corporation

701 S. Aviation Blvd.
El Segundo, CA 90245
(213) 679-4511
Circle no. 266



System ten line expanded: Singer adds four models

Each of the four computers (110-1, 3, 4 and 5) are fully upward compatible among themselves and with other System Tens. The 110-1 and 110-3, are centered on a common processor featuring an Arithmetic Control Unit, 20,000 characters of core storage and one input/output channel. Designed for moderate-size computing volume, the two systems also feature the same Model 42 disk drive with two separate disk packs each storing 4 million characters, for a total of 8 million. At the low end, 110-1 is priced at \$25,000 and uses a Model 70 workstation for interactive communication with the processor and production of output on a serial printer at up to 25 characters per second. Multi-part forms with up to 12 copies can be used. The Singer 110-3, selling for \$34,800, uses a visual display terminal which generates a 1,920-character display in an 80-column-by-24-line format, and a Model 51S 165-characters per second matrix printer. The same basic processor used by the 110-1 and 110-3 is linked to an expansion module in the 110-4 and 110-5 configurations. The module provides additional core storage, three more I/O channels and multiprocessing capability. The standard configuration of the 110-4 Singer computer, priced at \$43,300, has 30,000 characters of core storage, two I/O channels and a Model 42 disk drive. Input/output peripherals consist of one Model 82 display and one Model 52 (100 lpm) printer. This configuration can be expanded to include an additional 10,000 characters of core; two more I/O channels; two more crts; and a Model 54 (200 lpm) printer. The standard configuration of the 110-5 selling for \$66,600, includes two Model 82 visual displays, expandable to three, and a Model 52 (100 lpm) or Model 54 (200 lpm) line printer. Instead of a Model 42 disk drive, it has two Model 40 disk drives that together provide 20 million characters of storage. The Model 42 disk drive can be field-converted to a Model 40. Deliveries are scheduled in August for the 110-4 and 110-5 and in November for the 110-1 and 110-3.

The Singer Co., 2350 Washington Ave., San Leandro, CA 94577. (415) 357-6800.

CIRCLE NO. 361

Business calculator with lower price announced by Hewlett-Packard

The 9-ounce HP-70 calculator solves common financial calculations encountered by the personal user and the professional banker, accountant, insurance and business person. In addition to the four basic arithmetic functions, 21 of the most common equations used in business and personal finance have been programmed into the calculator. Any three factors representing the number of payments, interest rate or rate of return, amount of payment, present value or future value may be entered in any sequence. Then a key is pressed for the unknown value. Any entered value can be changed without having to reenter all numbers in a calculation. If the user wants to review the values already entered, they can be displayed. Preprogrammed financial routines include accrued interest, future value of a compounded amount, effective rate of a mortgage, effective rate of return for compounded amounts, percentage difference, percentage calculations and discounted cash flow. The calculator, with its 10-digit display, is accurate to within a penny in a \$1-million transaction. Each machine is sold complete with a carrying case, an operator's manual, a rechargeable battery pack, and an AC adapter and battery recharger. The HP-70 will be available at retail outlets within 30 days. Price is \$275.

Hewlett-Packard, 1501 Page Mill Rd., Palo Alto, CA 94304. (415) 493-1501.

CIRCLE NO. 362

CalComp unveils storage systems plug-in, tapes, disks for Univac

Four Univac-compatible memory systems, the 1160 disk file subsystem, which is compatible with the Univac 1100 and 400 series computers and replaces the Univac 8460 disk file subsystem; the 8840 disk storage facility, which is compatible with the Univac 100 series computers and replaces the Univac 8440 disk subsystems; the 8924 dual density disk storage system, which is compatible with the Univac 9000 and Series 90 computers and replaces Univac 8424/8425 and 8414 systems; and the 8916 magnetic tape system, which is compatible with the Univac 9000 and Series 90 computers and replaces the Uniservo 20C, 16C, and 12C magnetic tape subsystems. The four new memory products bring the company's total number of Univac-compatible systems to six. The 1160 costs \$60,000 with single-channel controller, \$90,000 with dual channel controller and from \$13,600 per drive. Leases are available at 2.5 to 3 percent per month, maintenance excluded. Deliveries start in January. The 8840 is priced from \$81,600 for a controller. Drives are \$17,500. Deliveries begin in December. The 8924 controller is \$25,000, with drives from \$13,000, with deliveries in January. The 8916 tape system starts at \$16,000 per controller and \$14,940 per drive. Also available in January.

California Computer Products, Inc., 2411 West La Palma Ave., Anaheim, CA 92801. (714) 821-2541.

CIRCLE NO. 363

"If your terminal malfunctioned, which support system would you want to fix it?"

Z. V. Zakarian, president



Data Services Termicare®

Terminals our only business. Largest organization totally devoted to terminal support. Nationwide service locations.

Centralized service:

One toll-free call for service anywhere in the U.S.A.

Immediate response.

Centralized pool of experts with total systems capability.

Centralized record-keeping. Your terminal history immediately available.

Immediate assistance. Almost 30% of calls don't involve terminals. Many solved over the phone.

Preliminary diagnostics. Serviceman knows problem, brings what he needs.

Can monitor all terminals in a system.

Serviceman on-site supported by Termicare staff for terminal diagnostics and testing.

Follow-through: job stays open until finished. Status always available to you. Records stay on file.

Ordinary Terminal Maintenance

Terminals may compete with other products for service.

Decentralized service:

Must call area office, local office or franchised serviceman.

Could get answering service.

Major contact: one man in the field.

Usually no knowledge of your terminal history.

You have to wait until serviceman arrives.

Doesn't know what's wrong or needed until he gets there.

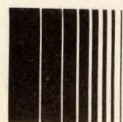
Knows what's happening at only one location.

Serviceman is usually on his own.

If you don't make follow-up calls, you could be forgotten.

Local Repair Services

If you're more than a one-location company, forget it.



Want to see Termicare in action, or a free brochure? Call 800-631-7050 (in N.J. 201-529-1170). Or write Western Union Data Services Company, 70 McKee Drive, Mahwah, N.J. 07430.

western union

data services company

INFORMATION RETRIEVAL NUMBER 59

Optical document scanner operates as an input device

Model 720 Optical Document Scanner is an input device in the Entrex shared-processor data entry environment. It can process 3000 documents an hour with a reject rate of less than one in 10,000 characters scanned. It operates concurrently with keyboard entry from up to 32 key stations into a single system 480 central control group. Model 720 sells for \$28,320 and rents for \$680 a month under a three-year lease, including maintenance. Delivery is 90 days aro.

Entrex, Inc., 168 Middlesex Turnpike, Burlington, MA 01803.
(617) 273-0480

CIRCLE NO. 364

CMC system is low end of entry line

This data entry system handles from three to eight video keysta-

tions and offers hard copy teleprinter output. A standard CMC 3 has disk capacity for temporary storage of 6000 112-character records. Through field modification, disk storage capacity can be tripled to 18,000 records. Standard system hardware consists of a supervisory console, a KSR 33 teleprinter, and three video keystations that display 112-character records as they are keyed. The supervisory console houses the system computer, magnetic disk unit, control electronics, and a choice of either a 7-track, 550/800-bpi or a 9-track, 800-bpi magnetic tape unit. Standard software consists of programs for system operation and basic data entry functions, including numerous automatic and semiautomatic aids that speed up supervisory tasks and reduce human errors in system control. Optional hardware features include an 18,000-record disk capacity, a 1600-bpi magnetic tape unit, and higher-performance standard density tape units. Either a 115-

or a 300-lines-per-minute printer is available for hard copy output. Optional software includes programs for check digit control, data validation, output reformatting, entry of batches onto disk via magnetic tape, and the accumulation of comprehensive statistics on operator performance. Price is from \$500 per month, or \$20,000 to purchase outright. Available in October.

Computer Machinery Corp., 2500 Walnut Ave., Marina del Rey, CA 90291.

(213) 390-8411.

CIRCLE NO. 365

Minicomputer system for mapping information

The Calma Interactive Mapping System is said to be the only commercially available system that enables a user to organize mapping information in a computer data base and to retrieve that information selectively in the form of maps of various kinds. The software uses a 48-bit computer word that allows nine-place decimal values. The system is a turnkey unit using a minicomputer for processing and control. It can accommodate up to four cathode ray tube/keyboard input stations and up to three automatic digital plotters operating at the same time. Through a so-called "tree-structure" data base, the user can organize mapping information in categories and sub-categories. The system permits automatic determination of linear measurements, perimeter values, and area sizes. In addition, statistical and notational data can be entered through the keyboard and positioned anywhere on the map. Both plotter error and data entry, either by digitizer or keyboard, can be maintained below 0.01 inch absolute. The Calma interactive mapping system, with input station, high speed plotter, a Data General Nova-2 minicomputer and associated peripherals, and complete operating software sells for \$130,000. Delivery is approximately 90 days aro.

Calmo Co., 707 Kifer Rd., Sunnyvale, CA 94086.
(408) 245-7522.

CIRCLE NO. 366

Power to the end-user.

The powerful ADM-2 video display terminal is an OEM dream machine—low price, high reliability, easy interface, and total customer satisfaction.

Users find it the most functional terminal that less money can buy!



Selectable transmission lets you choose from 8 rates up to 9600 baud.

Special numeric 10-key pad for accounting programs.

16 Function keys for instant access to your specific programs, forms or instructions.

Upper and lower case characters (128 alphabet and control), 24-line, 1920-character field.

Protect Mode (dual intensity) keeps important data from slipping away.

Full editing via page, line, or character with 11 cursor control keys.

Write for the ADM-2 brochure or call LSI Data Equipment at (714) 774-1010
LEAR SIEGLER, INC./ELECTRONIC INSTRUMENTATION DIVISION
714 N. Brookhurst St., Anaheim, Calif. 92803, TWX 910-591-1157, (714) 774-1010

Value to the OEM.

INFORMATION RETRIEVAL NUMBER 60

Computer service is an on-line, real time business. We're on-line. And we're on time.

Maybe you've been through the hassle of dealing with mix'n'match service groups for your mix'n'match system. Or maybe you've been working with a single company that's not responsive enough. Either way you know what a service company shouldn't be. And what you think it should be: On-line and on time.

That's what we are. We're already handling all the service for 89 mix'n'match system users from our world-wide network of service offices. On time. One happens to be a major international airline. The others run the gamut from a government agency to a brokerage firm.

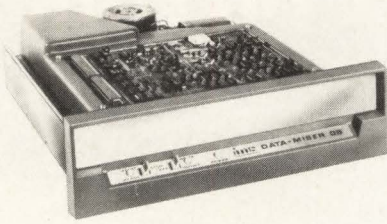
There are a lot of reasons why using us as a single source for all your computer service makes sense. One-call convenience. Technicians with the experience and the training to service and maintain every part of your system. And more, all adding up to lower cost of operation and maintenance, with fewer headaches.

You know what you want from a service company. We've got it. Why don't you get our full story, from Mike Salter, Commercial Marketing Manager, Raytheon Service Company, 12 Second Avenue, Burlington, Mass. 01803. (617) 272-9300.



RAYTHEON

New Developments Peripherals



Disk drive matches DEC minis

The Data Miser Model DM05 moving head disk drive has 1.25 million words of storage on a 14" diameter fixed disk, provides an average access time of 35 milliseconds with a track-to-track positioning time of 10 milliseconds; and the complete electronic interface of the drive is contained on a single 10" x 10" pc board equipped for daisy chain expansion to any DEC RK11/RK05 system. The model DM05 is compatible with standard DEC operating systems such as DOS, RSTS, and

RSX. Price is \$1,950; delivery is 90 days aro.

International Memory Systems,
14609 Scottsdale Rd., Scottsdale,
AZ 85260.
(602) 948-2120.

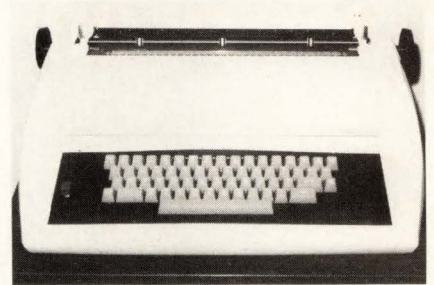
CIRCLE NO. 370

Two line printers from Data General

Two printers, available with either a 64-character set or a 96-character set, have lines 136 columns long, and can present data at either six or eight lines per inch. The 64-character printer operates at 300 lines per minute, and the 96-character printer operates at 240 lines per minute. Each can make an original and up to six copies. The 64 character printer costs \$8,500, and the 96 character printer costs \$10,500. Available 90 days aro.

Data General Corp., Southboro, MA
01772.
(617) 485-9100.

CIRCLE NO. 371



Data terminal uses Diablo printer

Selecterm System 75 is a data communications terminal which utilizes the Diablo printer mechanism. The print mechanism provides output and features 30 cps performance; interchangeable type fonts; cartridge ribbon elements; optional pin feed platen; and optional forms tractor. Selecterm 75 includes both horizontal and vertical tabbing. Other standard features include upper case only mode; automatic form feed; switch selected parity (odd, even, none, all); switch selected speed (10, 15, 30 cps); and switch selected pitch (132 or 158 column). For read/only applications, Selecterm 75 can be provided without the alphanumeric keyboard. Price for the standard model is \$5,400 and the receive-only model is \$5,200. Delivery is 30-45 days.

Selecterm, Inc., 59 Union St., Somerville, MA 02143.
(617) 623-7800.

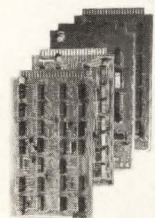
CIRCLE NO. 372

443 LOW COST VIDEO ALTERNATIVES FOR INDUSTRY

DESIGN III
Display
Terminals



Plus Keyboards, Video Monitors, & Accessories



BAREBONES
Display Terminal
PC Module Sets



SERIES 200
Display Controllers

APPLICATIONS: *Data Entry/Retrieval • Data Readout/Display • Industrial Monitoring/Control • TV/Video Tape Titling • TTY Replacement • Printer Add-On • Multi-Drop.*

TYPES: *•RO(Read Only) •KSR(Keyboard Send/Receive) •ASR(Automatic Send/Receive).*

DISPLAYS: *7 Formats, 256 to 3200 Characters.*

AVAILABLE FEATURES: *Alphanumerics, Graphics, Video Overlay •Selectable Data Rates to 9600 Baud •RS232-C, Current Loop, TTL Interfaces •I/O Multiplexing •Upper/Lower Case & Special Character Sets •Switchable Characters •Blinking, Dual Intensity, Reverse Video •New Line, Hold at EOL, Auto LF on CR •Protected Format, Compressed Transmission, Error Detection.*

Styling to match every application, configuration, and budget requirement. Engineering assistance for the toughest application. And immediate availability.

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INFORMATION RETRIEVAL NUMBER 62

Teletypewriter adds cartridge tape unit

The 1030 ASR Teleterm features a minicartridge tape system with two separate drives. Both cartridges record or write information at speeds up to 30 characters per second. Storage capacity per cartridge is 24,000 characters. It features a built-in acoustic coupler, thermal printing technique, parity checking and full duplex data transmission. Communication is at 110, 150, 300 baud. It operates on a normal electrical outlet and ordinary telephone and is priced at \$3,900. Delivery will begin in late 1974.

Computer Devices Inc., 9 Ray Ave., Burlington, MA 01803.
(617) 273-1550.

CIRCLE NO. 373

Data Comm New Developments

Data set services local, point-to-point networks

Directran Data Set is an alternative to (and an emulator[®] of) 103/113 data sets, acoustic couplers or 202C/202D data transmission devices in point-to-point networks that serve local asynchronous terminals up to 22 miles distant from a central processor. Directran operates at asynchronous data rates up to 2400 bps over four-wire twisted pair communication lines, without transformers, amplifiers or loading coils. It is available as a stand-alone, desk-top device or as a plug-in printed logic module, with all electronics—send/receive, control, logic, and power supply circuitry—mounted on one small printed circuit board. Model M611 is priced at \$370; plug-in model 631 data set with two Directrans on a single board, is priced at \$500. Delivery is 30 days aro.

Computer Transmission Corp., (TRAN), 2352 Utah Ave., El Segundo, CA 90245.
(213) 973-2222.

CIRCLE NO. 374

All-digital modem

M-96 modem is designed for use in 4-wire point-to-point applications, operates at 9600, 7200, or 4800 bps as set by user and includes extensive test features. Options include two- or four-port multiplexers and remote test (including remote loopback). Price is under \$5000 in quantity; available 60 to 90 days aro.

Paradyne Corp., 8550 Ulmerton Rd., Largo, FL 33540.

CIRCLE NO. 375

Communications board for Nova systems

The MCPI-1 communications programmable interface featuring eight serial I/O ports, allows up eight data terminals or computers of varying baud rates or code structures to communicate directly with a common mini. With a wide baud rate selection capability, transmit and receive rates are individually software programmable from 6 baud to 12,800 baud. It is also compatible with any RS-232 type modem and features send-and-receive unattended

operation. Contained on a single 15" x 15" Nova style pc card, the interface uses the existing Nova power supply. Price is \$2110 on quantities of 25; delivery is 90 days aro.

MetroData Corp., 1250 Mercer St., Seattle, WA 98109.
(206) 329-9000.

CIRCLE NO. 376

Line control unit

The model LCU-II line control unit permits binary synchronous (BSC) data communication between a central processing unit and up to 10 printers or five crt's. Price is \$3,500.
Wiltek, Inc., Glover Ave., Norwalk, CT 06850.

CIRCLE NO. 377

EXECUPORT 1200: The fast, wide-track one

The new Execuport[®] 1200 prints a fast 120 cps (but select 10, 15, 30, or 60 cps if you wish). It prints this entire advertisement in under 29 seconds... on a line up to 132 characters wide.

It's an asynchronous serial impact printing terminal, compatible with most teletypewriters, computer systems, and cassette magnetic tape units. There's a modem controller for high-speed conversational timesharing; a Bell-compatible 202 modem is available.

The Execuport 1200 makes an original and five sharp copies on standard fan-fold paper. Yet it's quiet enough for an office.

This is the ideal communications printer, billing printer, computer output lister, or remote batch terminal.

Features include full and half duplex operation; three RS232 connectors; upper and lower case; and line, local, and split modes.



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Basic character set is ASCII, with EBCDIC as an alternate. Or as an option, you can have both in a single printer. The Execuport 1200 generates the full 128-character ASCII code and prints all 96 ASCII alphanumerics and symbols.

Each character is formed as a 5 x 7 dot matrix, struck simultaneously by a full 35 pins — one per dot. This greatly increases durability and reliability while maintaining the highest print quality.

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Computer Transceiver Systems Inc.
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INFORMATION RETRIEVAL NUMBER 63

Program documentation generated from Cobol source

Super/Doc features a set of program documentation outputs that may be selectively generated from a *Cobol* source deck. Any or all ten possible outputs for program documentation as programmer aids in maintenance and debugging activities may be utilized by the user. The user may generate program cover page with dates, author, and installation data; source program list with generated sequence numbers; error list indicating syntax errors; record layout with tabular detail on each record, data reference list providing complete cross reference on data items; procedure reference list with cross reference of procedure names; special reference list of external names, literals, constants; detail flowchart of program, two dimensional; logic flowchart showing logic path and I/O; and report layout detailing positioning and headings. *Super/Doc* is

available on a 30-day trial and may be purchased for \$2,960 or leased on a monthly basis for \$225/month.

Occidental Computer Systems, Inc., 11311 Camarillo St., North Hollywood, CA 91602.
(213) 763-5144.

CIRCLE NO. 380

Scheduling system plans daily, monthly runs

The Value Computing Scheduling system combines tape library control and job scheduling and accounting capabilities to handle short-term daily planning and scheduling of operations 30 days in advance. Usable in either OS or DOS/360 environments, it is based on a constantly updated workload control file storing information on all program tapes in the system and their applications, and job requests to date. Interfacing of this file with the value scheduler package produces a tape pulling list which

schedules the use of various files in future operations. Also produced are gummed labels for id identification of the appropriate tape reels. The system is written in *Cobol* and requires 50k bytes of memory. Prices range from \$20,000 to \$33,500 depending on options and operating mode.

Value Computing, Inc., 496 North King Highway, Cherry Hill, N.J. 08034.

(609) 667-8770.

CIRCLE NO. 381

Distributed software for Xerox systems

Dual Processor Software (DPS) allows the satellite user of Xerox computers to store and load system processors from a host computer's mass storage device—even for a non-disk based satellite computer operating system. The satellite, usually possessing a minimal set of peripherals, gains access to the host computer's peripherals, such as the card reader and line printer, in a manner that is transparent to the satellite user. It also provides the capability of transferring data between computers in cases where the satellite is employed as a processor for incoming data, or as a control processor for data generated in the host. Price ranges between \$8,000 and \$13,000 depending upon specific configuration, operating systems and installation location. Delivery is 30 days assuming hardware has been installed.

Code Research Corp., 1363 So. State College Blvd., Anaheim, CA 92806.
(714) 533-6333.

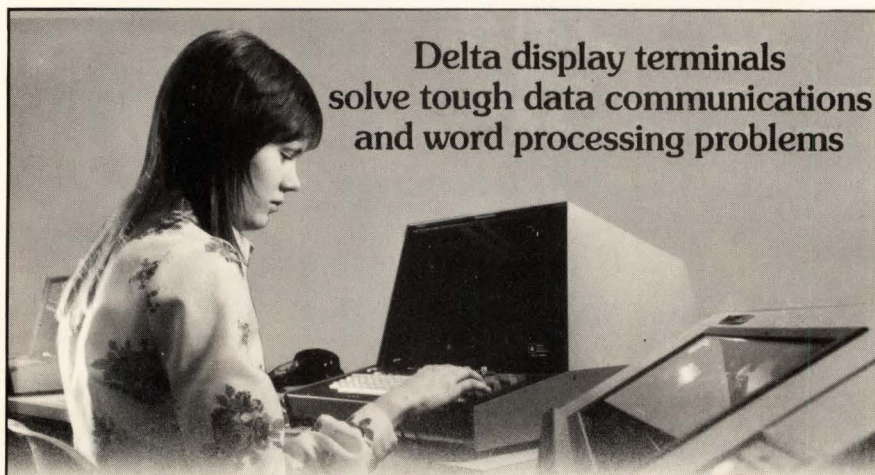
CIRCLE NO. 382

DOS System

A disk operating system for use with its SPD 10/20 and SPD 20/20 provides users with local program development, data file storage program library maintenance and peripheral device controls. Free to users.

Incoterm Corp., 6 Strathmore Rd., Natick, MA 01760.
(617) 655-6100.

CIRCLE NO. 383



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Literature

It's going around: Rotating memory systems with capacities suitable for use in terminals are the subject of this brochure.

Datum, Inc., 1363 S. State College Blvd., Anaheim, CA 92086

CIRCLE NO. 385

Well, maybe just a little: A 16-pager called *The executive's no-nonsense guide to computing calculators* is mainly concerned with the firm's offerings. But the firm's offerings pretty much cover the top end of the business. The text, both a tutorial and a soft pitch, is worth reading if your department has been screaming for lots of calculators.

Hewlett-Packard, 1501 Page Mill Rd., Palo Alto, CA 94304

CIRCLE NO. 386

It's the one: What may be the year's most literate and well-designed booklet describes Britain's Modular One computer systems. Is

the machine made of integrated circus? Only the readers will know for sure. For those of you in the computerbiz, this one is worth FYI-ing to the marketing department.

Computer Technology Ltd., Eaton Rd., Hemel Hempstead, Hertfordshire HP2 7EQ, England

CIRCLE NO. 387

It's their quickie: The model 85 is this firm's fast machine, aimed at the tough jobs in the communications market. They have a booklet that details the technical specs of unit, and they'd like you to read it if fast minis are in your cards.

Interdata, Inc., 2 Crescent Place, Oceanport, NJ 07757

CIRCLE NO. 388

To market, to market: Flyer on marketing books is written for the electronics marketer.

Mainly Marketing, P.O. Box 339, Coram, NY 11727

CIRCLE NO. 389

A handful: *The Value of Micropower* is a 160-page handbook about microcomputers in general and this firm's offerings in particular. While it serves the project engineer's needs well, it's simple enough to be read by most anyone who wants to know a little more about the LSI computer game. These will be snapped up fast, so get your bingo card in today, folks, if you want one.

General Automation, Inc., 1055 South East St., Anaheim, CA 92805

CIRCLE NO. 390

APL for the teacher? *The Computer Educator* is a new publication that is aimed at educators who are using computers in the classroom. It will begin circulation with an October issue, and will appear in tabloid newspaper format, a la People's Computer Company's paper. It's six bucks a year.

The Computer Educator, Box 674, Chicago Heights, IL 60411

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NEWSDATA...

... from page seven

A peek inside the Chicago NCC

For most of you, the National Computer Conference was a phantasmagoria of lectures and panel discussions, product exhibition booths and hospitality suites. For the press, it was all that and more. The editors of the trade publications were at once part of the audience and part of the show.



Show-stopper Sherry

In its effort to reveal and analyze the computer industry, the press has always exercised a modicum of discretion. We didn't write about a videotape of *Deep Throat* which may have been the best-attended (or most gossipped-about) part of one of last year's most academic gatherings.

Like most people, we editors find that too much secrecy lends an unhealthy clubbiness to the NCC. There are some matters that beg exposure. We have yielded to the temptation, with a hope that through better understanding we will be better citizens of the industry. Also, we can't resist sharing some of the more joyful moments with you, and truthfully, we have received cooperation from many of the parties about whom we now write.

First and foremost, there is Sherry. Sherry is the star of so many trade shows, radiating excitement from ICC's booth. Fearful of a reaction—remember John Lennon's remark that the Beatles were more popular than God—we contend that Sherry draws more interest than even a keynote speaker.

Sherry herself is more reserved about her standing as undisputed representative of whatever's right about trade shows. You'll have to

decide for yourselves. Here is our case:

Sherry Moreau is as American as Smucker's jams, the other claim to fame of her hometown Orville, OH. She studied dramatic arts at Carnegie. And she's a New Yorker now. She says, "I can't really consider living anywhere else."

With so many people noticing her, can it be true that she indeed notices others, particularly us show visitors?

"I notice quite a few, but I usually recognize the ones that go to the shows every year. I just love these people."

"Some of them are a little too embarrassed to come up to the booth—who knows for what reason—and will wait until the crowd forms. Then there are people who come up and introduce themselves."

The people who work at the exhibition halls are fans, too. At last year's New York NCC, one of the Coliseum guards would salaam as Sherry entered each day. Even the cleanup crews are turned on. Next time you're at a show where Sherry is working, you might notice that the ICC booth is both the most crowded and best swept.

Finally there is the case of one regular attendee who, after years of visits, missed a show. Just as Sherry was leaving the closing exposition, the phone rang. It was best wishes from the fan, who had been too busy to attend.

We were curious how anyone could work that hard and still look fresh. We found that the appearance and the reality are one. Other than lots of sleep and a sound diet, there is little that Sherry Moreau does—other than being Sherry Moreau—to survive the booth. And believe it or not, folks, she uses little makeup.

We will reserve a description of the condition of the editors after show week for another issue. Perhaps it will suffice to say that we are not holding up as well as Sherry.

One of the events that enables press and industry people to chat is the institution known as the press party. First, these events are usually better attended by industry than press, and second, there is usually little of the party atmosphere at these affairs. But one such meeting, filled with the chatter of editors checking out how the competition is doing and swapping the worst lines since Henny Youngman went on Dial-a-Joke, was great.

Hewlett-Packard, a firm long known for finding the best in America when it comes to technology, sent its foremost wine buffs out for some enticement. Here's how they did:

Shramsberg Blanc de Blancs is the

wine President Nixon took to China. We have been unable to find out how he got Ross Snyder to find some for his party. The Treasury of American Wines gives the champagne four stars. And Dick Gundlach, erstwhile editor and the electronic press' most distinguished grape maven says simply, "It's the best America has to offer."

It's not as if the rank and file press types are bigtime wine tasters. But we know when we've been taught something, particularly the New Yorkers whose expense accounts are often bloody reminders of the battles with local wine stewards.

Needless to say, the mellowing influence of one or two pale glasses spurred more of the kind of discourse that makes for better hard news than hard liquor ever could. The press was impressed, and more than a few good friendships within this business can be traced to that little gathering.

Every show has one event where the professionals' professionals meet. In Chicago, it was the Pioneers' Day dinner at which Dartmouth's time-sharing developers shared food and recollections among themselves, with a few press people and with some students who had won awards.

The dinner was highlighted by a contest: Each table ventured a story about the people involved in the development of the system, hoping to win a bottle of champagne. Most of the tales were for the insiders, but at least one will live on.

John Kemeny recalled telling his mother that he would be close to his New York home, only to be disappointed when the Manhattan Project turned out to be at Los Alamos. Kemeny, always a humanist, was undaunted by a claim, later disputed, that his Hungarian accent was professional pretense, and easily dissolved in a single drink.

Tom Kurtz was allegedly seen later, at another location, accepting some help from a longtime friend: Kurtz can fall asleep standing up waiting for an elevator. No wonder he wanted an interactive system!

The question on press minds these days is: Will Info match NCC?

GM goes to grouped minis for carburetor tests

The Rochester Production Division of General Motors Corporation has added new credibility to the much-discussed hierarchical or distributed concept of computer organization by putting it to work in an expansion of RPD's carburetor flow test system.

The results of using a minicomputer-based system (rather than a

centralized computer control system) are expected to be a more uniform production of carburetors to meet stricter pollution control standards.

Formerly, the more than 23,000 GM carburetors produced here each day were tested and adjusted for optimum performance at 129 test stands, all controlled by a single large processor. As production needs grew, however, an expansion of the test facility became an obvious necessity. With 129 test stands reporting to it, the existing computer was throughput-bound, and could not be expanded economically to accomplish greater production. Rather than simply add another large processor, RPD engineers took to distributed minicomputers.

"In theory, such an organization would provide more flexible test stand operation while providing a better data base and a limitless variety of tests," said Larry Barnes, Staff Production Engineer in RPD's Computer Systems Engineering group. "It also would free the large scale processor for program development and software testing.

"And in practice that's precisely what we've achieved," he added. Enclosed in each new carburetor flow test stand is an SPC-16 minicomputer from General Automation. These test stand computers report to an IBM System 7 supervisory computer in groups of 31 each. The System 7 acts as a communications concentrator for a 370/145 at the management level. Each System 7 also has two disk drives for information storage in case the 370/145 goes down. The entire system has even been designed so that it could operate with the System 7's down.

The minicomputer at each work station controls as many as 20 different test steps, performing a complete

functional checkout of Monojet, Dual jet and Quadrajete carburetors at the touch of a button. The operator places the carburetor on the stand, where it is clamped in place while an air and fuel mixture is forced through its chambers. The test stand's screwdrivers and wrenches, controlled via solenoids and stepping motors by the computer, preset the fuel and throttle adjustments and the computer then measures their performance under simulated operating conditions. The measurements are compared to test specs for the model being tested and corrective action, if necessary, is made. When automatic adjustments are finished the operator puts limiter caps on the screws so the carburetor's settings cannot be tampered with later. "To meet our growing production needs, we installed the original computer-controlled test facility in 1967," Barnes explained. "This operation has served us well, but there were some operational drawbacks that made us consider minicomputers when expansion became necessary in 1972.

"We began phasing the new test stands in during June, and we expect to have large numbers of them in use for the 1975 model year," Barnes said. "Current plans call for the use of 150 G-A test stands reporting to five System 7's over the next two years. This configuration, however, allows us to vary the size of the total system according to our production needs."

The new minicomputer-based test system will not replace the existing 129-stand network controlled by a GE-PAC 4060. Rather, it will be a new design approach to that system. Specifically, where the older one performed 14 tests on each carburetor, the new stands will perform from 18 to 20 tests.

in cash. The police, responding to calls from various coin dealers who had seen the message, arrived just minutes after the robber.

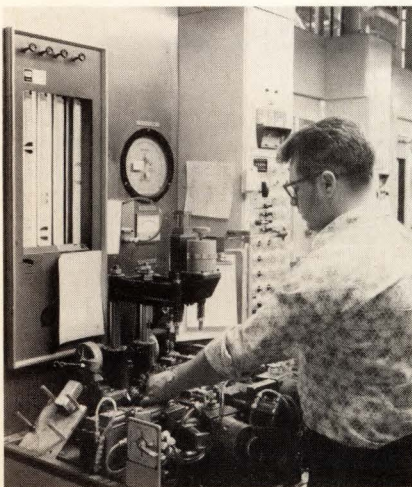
This certainly wasn't the use Burton Blumert had in mind for his computerized price quotation network for coin dealers. The network began as a teletypewriter network of about 65 coin dealers back in 1965. It turned out to be cumbersome, with everyone competing for the same phone line. Mr. Blumert got in touch with Decision, Inc., of Oakland, CA, to see if they could solve the communications problem. The result is Blumert's Facts Nationwide, located in Burlingame, CA.

The network is built around a Data General Nova minicomputer, with a disk for spooling messages and a line printer which lists message traffic. Three half-duplex lines run from the various subscribers to the minis. Each subscriber has a terminal, with the printer and reader online, and the keyboard and punch offline. Each terminal is connected to a trunk through a "stunt box," which allows the computer to address any given terminal on the line.

The three trunk lines are known as the blue, white and pink circuits. Respectively they cover Northeastern, Midwest and Southern, and Western United States.

Currently, the system has about 240 subscribers. Although the service could theoretically handle about one thousand users, it is thought to be as large as is practical. For this reason Mr. Blumert is thinking of starting another network, *Inter-Facts*, to accommodate new subscribers. And, since the Oakland robbery, there is talk of defining a system-wide mayday signal.

Detroit goes mini



Coin dealer network calls copper

"We are being robbed, call police" chattered out on Teletypes from Arizona to Idaho one evening this past July. The call for help that went out on the Facts Nationwide Teletype Circuits originated at the Oakland Coin Exchange in Oakland, CA. A man posing as an alarm repairman had handcuffed the store's owner, Wayne Skiles, and his young assistant to the bulkiest thing in the backroom—a teletypewriter that just happened to be connected to the Facts Network—while he absconded with \$54,000 in gold and six or seven thousand

Sex and the single cow, or l'amour IBM style

When placid ladies from America's West meet passionate, red-haired gentlemen from France *mon Dieu*, what an *affaire*!

Even if the ladies are domestic cows and the gentlemen Limousin bulls, the result is the same. They bill and coo (or bull and cow?) and then there are lots of little half-breed Limousin calves.

This scandalous state of transatlantic of miscegenation is furthered, or fathered, by the North American Limousin Foundation, abetted by a master plotter, an IBM System/3 model 10. The computer is used to trace the genealogical history of the steadily increasing Limousin offspring.

Defending the Franco-American liaisons, Bob Vantrease, executive vice president of the Denver foundation, declared that, "Limousin are great beef cattle." He asserted that the organization's motives were pure: Pure Limousin herds, enough to market beef to the country on a large scale.

The American ladies should be honored at the favors bestowed upon them, he said, because Limousins are aristocrats with an ancient heritage. French cavemen paid homage to them by scratching their portraits on the walls of rocky caverns 7,000 years ago.

A heifer Limousin is far better than none, so the Limousin Foundation keeps a computerized herd book. Thus any little half-calf can find out who its forebears—or forebuds—were, back to the fourth generation.

The 3,000 members of the six-year-old foundation register their newborn calves in the computer, which is programmed to compare birth, weaning and yearling weights of each animal with all others in its herd. They can then steer their bovine romancers to produce fast-growing cattle which efficiently convert feed to meat.

These limousines of cattledom, says the U.S. Meat Animal Research Center in Nebraska, are the world's most efficient at converting fuel to fine

food and have the lowest ratio of fat to meat, making the lady cows more svelte and appealing to both bulls and American consumers.

Although presently there are only 110,000 head of Limousin in the computer, the breeders can, by encouraging proper (or improper) breeding with selected bulls, build up their pure Limousin herds within three or four generations. They can choose the desirable bulls with the help of the computer. A sire summary is produced which analyzes the herds of all members and describes the histories of all bulls available for breeding.

By using the computer, the American breeders have been able to keep better records of cattle ancestry and performance than their French counterparts have done. Soon, Vantrease expects, the foundation will be sending Limousin breeding bulls back to their old chomping grounds.

Where they're at

A slip-up gave Varian Data Machines the wrong address recently, and you may have not gotten your mail through. The firm resides at 2722 Michelson Drive, Irvine, CA 92664.

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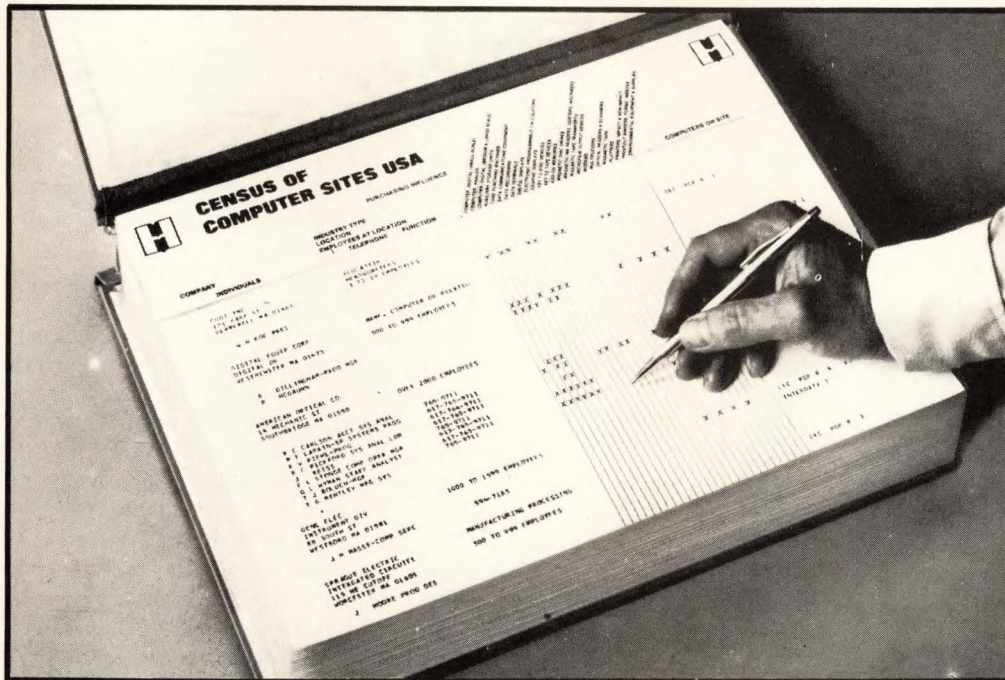
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INFORMATION RETRIEVAL NUMBER 69

Big brother is us



When it comes to information, we can take it, but we don't like to dish it out.

We check out the background of each prospective employee, delve into the business affairs of a client or supplier, or try to put together the inside story of a stock. Somehow it seems we're always looking for some more facts on which to base a decision. If we can't find them, we feel frustrated and disappointed.

On the other hand, we don't like people getting the goods on us, individually or corporately. We particularly hate collections of facts which age as our situations change. We worry that information will be inaccurate, incomplete, misinterpreted. Quite simply, we want ourselves and our business to be seen in a favorable light, which generally means we want fairness—nothing more.

After years of obvious need, the government is moving to put our feelings into law. Data banks will be regulated, it is hoped, and those with information on deposit may examine the records for accuracy. With a bit of legislative reason, we may even be able to challenge the very presence of certain data in computerized and manual record systems.

There are still two grave difficulties with the process of data bank regulation under way: The resistance of all of us to restrictions on records, and the apathy we have exhibited in shaping the legal measures to fit technological reality.

If we expect the government, the credit agencies, and other information agencies to let us restrict our own records, we must then agree to let other people do the same.

We are big brother. Whenever we gather information, we should ask ourselves why we really want it. We should also ask whether access to the information is to be restricted—that is, who should be able to use it and when. Finally, we ought to remember that the accuracy and importance of most information will decay with time. Records, if they cannot be destroyed after a certain date, may certainly be marked obsolete. That which has only historical value doesn't belong in files of current intelligence—particularly if it's there because we haven't kept up with new facts.

Apathy takes many forms. We may simply ignore questions that we know are important to us, we may slough off responsibility for questions onto another's shoulders (perhaps knowing that he will ignore the situation), or we may institutionalize our apathy by formal delegation of thought to organizations which we will ignore.

Our privacy is easily threatened; we have no choice but to speak out. The voices of others, no matter who they are, can be no substitute for our own.

It is simple enough to be heard. You can write Congressmen Koch and Goldwater, to the office of Ruth Davis at the National Bureau of Standards, to the trade publications or to the general press. You can work actively with professional organizations. You can even start your own organization.

We think that an assurance of privacy, despite the needs of business and government, despite technical problems, despite our laziness, is important. Further, we are convinced that we must act now, before the bills are passed and the courts have further defined (or muddled) their meaning.

—H.W.

COMPUTER MART

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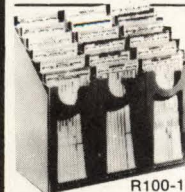
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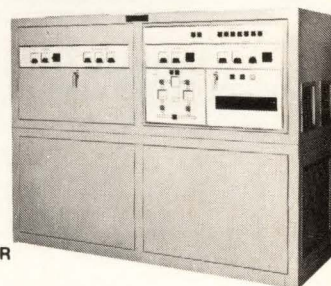
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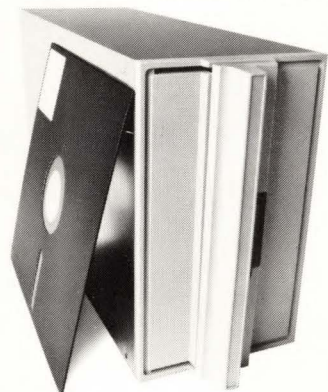
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