New Line Printer, Card Reader and Disk for PDP-8

A low-cost line printer, an optional card reader and a high-speed disk, all designed to expand the applications of its PDP-8 family of computers, have been introduced by DEC.

Line Printer:

Priced at $12,000 for the 64-character set version, the new LP08 line printer features an 80-column format and a print speed of 356 lines per minute. The LP08 also is available with 1 96-character drum and deliveries are scheduled to begin in April.

(Check customer service box #1 for more information.)

Card Readers:

The CM8/L and CM8/I mark sense card readers have a nominal speed of 200 cards per minute, and read mark sense and 12-row, 80-column punched cards with clock marks. No special pencil is needed for mark sense recognition. The optical character readers are compatible with existing PDP-8 family controllers and software. The units will cost $4,900, including interface, and be available in May.

(Check customer service box #2 for more information.)

High-Speed Disk:

The DF32D high-speed disk uses integrated circuitry and is available for either positive or negative bus PDP-8 family computers. The disk has a capacity of 32,768 12-bit words, with an average access time of 16.67 milliseconds for 60-cycle power. It has a transfer rate of 33 microseconds per word, twice that of previous models. First delivery of the $6,000 unit is scheduled for May.

(Check customer service box #3 for more information.)

These three peripherals are the first in a series which DEC will introduce during the next few months, and the peripherals will be available for the PDP-8 family, as well as several other computer lines.
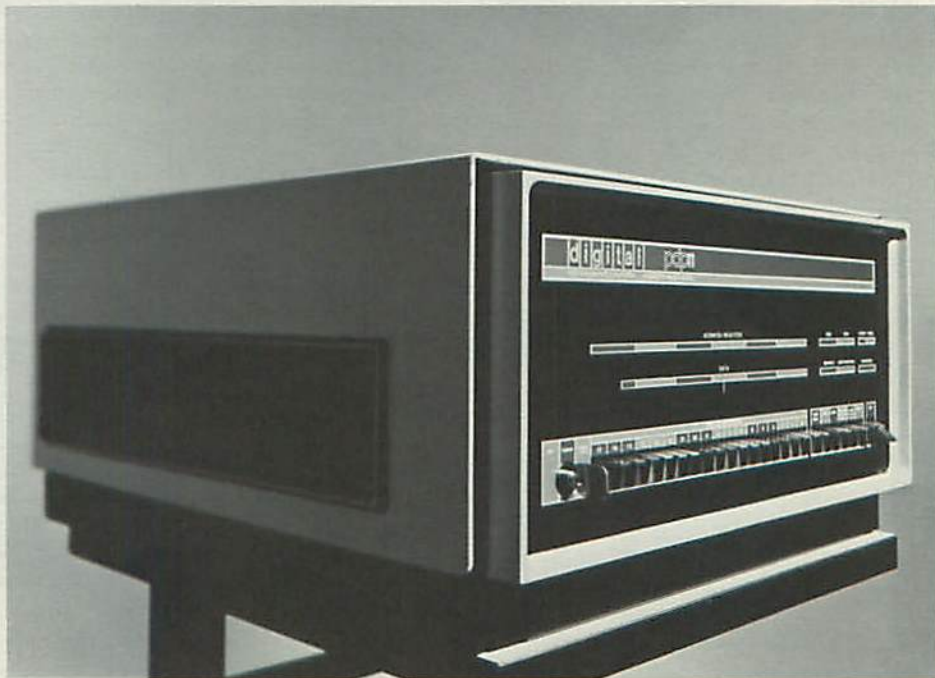
New 16-bit Computer Unveiled

Details on its new family of 16-bit computers, designed to complement existing lines of low-cost machines, plans for the development of a lower cost PDP-8, and the availability of three new small computer peripherals have been announced by DEC. (The new 16-bit PDP-11 computer line incorporates three unique features, one of which radically changes the concept of computer obsolescence, and two others that were previously found only in much larger machines.)

Two models in the PDP-11 family will be offered initially: the PDP-11/10, a dedicated controller equipped with central processor, 1,024 words of read-only memory, and 256 words of standard memory; and the PDP-11/20, a general purpose computer with central processor, 4,096 words of standard core memory expandable to 32,768 words, a programmer's control panel, and Teletype.

Price of the PDP-11/10 is $7,700, while the base price of the PDP-11/20 is $10,800. Both prices include software, automatic power-fail protection and restart, full priority interrupt, direct memory access, and customer familiarization training. Quantity discounts are available.

According to Nick J. Mazzarese, vice president in charge of both the PDP-8 and PDP-11 product lines, "the newest PDP-8 will be a completely redesigned version of existing models, but will be program and interface compatible. And," he added, "the peripherals we are introducing are designed for the PDP-8 line, and are the first offerings in a long-range program of product improvement aimed at responding to the needs of present and potential PDP-8 customers." The peripherals, which will be made available for several of DEC's other computer lines, include an optical card reader, a high speed disk storage unit, and a low-cost line printer. "These are but three of many small computer peripherals to be introduced over the next few months," the DEC vice president said.

The PDP-11, DEC's new 16-bit computer, offers radically new architecture, a powerful order code and many real-time hardware features for unique flexibility in program applications.

FOCAL For PDP-15

A single-user version of DEC's mathematically-oriented language FOCAL® is now available for the company's PDP-15 medium scale computer, according to PDP-15 Marketing Manager, Robert McInnis.

FOCAL is one of the most powerful conversational languages ever devised for the small computer. It is the company's most successful computational language and is as simple as any yet devised, according to current users. Persons with little or no knowledge can learn to use FOCAL in less than two hours.

FOCAL's 12 functions include trigonometric, logrithmic, device controls and sign part, integer part, absolute value, square root and random number. Individual character editing eliminates the need to correct an entire line because of one typographical error. A trace feature allows the operator to determine not only what the error is but also where in the program it is located. FOCAL can be operated from the Teletype keyboard alone, eliminating the possibility of program destruction by accidently engaging one of the computer keys.

Other program specifications include five arithmetic operations (exponentiation, multiply, divide, add and subtract) and an exponential range of 10 to the plus or minus 600th power. All variables may be subscripted. Two arithmetic subroutines are available so users can choose the right 6- or 10-digit precision.

First introduced in early 1968, FOCAL has gained wide acceptance for educational and engineering applications. Single and multi-user versions are available for many of DEC's other computer lines including the PDP-8, PDP-8/I, PDP-8/S, PDP-8/L, PDP-9, and PDP-9/L. Multi-user versions require a minimum of 8,192 words of core memory, the necessary additional Teletypes, and the required interfaces.

For a PDP-15 brochure, please check customer service box #4.

New KEY-EDIT System From CCS

Consolidated Computer Services Ltd. of Toronto, Ontario has developed a new entry preparation system based on a PDP-8/L computer from DEC. According to CCS, the **KEY-EDIT** system takes a big step forward in data entry preparation, not only eliminating cards, but also the need for key-to-tape units.

KEY-EDIT is a multiple station data entry system. It offers data preparation and verification, as well as editing and batch control capabilities at a price competitive with other data preparation methods.

With KEY-EDIT, the station operator keys data into the PDP-8/L core memory where editing can be done from the station. On command from the station, the computer releases the data to drum storage for holding and verification by another station operator. Another command from the console Teletype causes

data to be output from the drum to magnetic tape. The process has extensive, easy-to-operate editing features.

KEY-EDIT systems come in a variety of configurations with anywhere from four to 32 keyboard stations. The basic system is comprised of four to 16 key stations, one magnetic tape unit, one high-speed magnetic drum, one Teletype unit, and the computer. The PDP-8/L forms the heart of the system in that it is the central controlling device, which contains a process program and provides the system with its extensive editing features.

CCS believes that the potential market for KEY-EDIT is extremely high. They have estimated that there are over 500,000 keypunch machines in use today. To replace even a small portion of this market with KEY-EDIT equipment, represents a substantial sales volume.

For detailed information on the KEY-EDIT system, contact Mr. Bill Hutchison, Consolidated Computer Services Ltd., 48 Yonge St., Toronto, Ontario. Telephone: (416) 366-7643.

"Simple" Business Computer Package Offered by Data Processing International

Data Processing International of Clifton, N.J. is offering small businessmen the use of a complete computer/software system to handle typical accounting and record keeping tasks such as sales order entry, invoicing/sales analysis, accounts payable and receivable, job or production cost analysis, production control, and maintenance of mailing lists. The system is also designed to work on payroll, including automatic 941 and W2 forms.

Built around a DEC **PDP-8/L** computer, the expandable DPI 500 hardware/software system comes ready to use with a complete library of programs with easy-to-understand instructions to enable the operator to program the central processor for only $560 a month. The low cost system which uses a conversational mode between itself and a clerk typist that results in a system simple enough to be operated by even a secretary after only a few hours of instruction, is designed to run dependably for years without extensive servicing.

Interacting with the computer, the operator is able to call up various programs by

hitting the appropriate symbols . . . like "I" for invoicing, "J" for job costing, or "PC" for payroll check writing.

For example, if invoicing were the required task to be performed, the computer would instruct the operator which magnetic tape reel to insert and even where to locate it by instructions printed out on the teletypewriter. The operator would type in answers to basic questions via the teletypewriter such as the date, the starting invoice number, and the order that has been placed. On each subsequent invoice, only the customer number, quantity, and product code are required by the computer. The computer then prepares the final invoice on the Teletype printer, including description, price, extension, and discounts.

When needed, information stored by the computer during invoicing and other operations enables the user to generate sales analysis by territory, customer and product as well as a host of other valuable management data — when it is needed.

For a brochure on the PDP-8/I and PDP-8/L computers, and a discussion of computerpacks based on these two computers, please check customer service box #5.

New 16-bit Computer Unveiled

Mazzarese also pointed out that the PDP-11 will not replace the company's PDP-8 small computer family. "The PDP-11 gives us a 16-bit, byte-oriented computer that complements the 12-bit PDP-8 line in user applications requiring more power and flexibility," he said. "These two computer lines, along with smaller models of our 18-bit PDP-15 medium-scale computer and our 12-bit PDP-12 laboratory computer system, give us a range of machines we believe will fill any customer need."

The principal feature of the PDP-11 is that it essentially changes the concept of computer obsolescence by means of a single, high-speed, bidirectional transfer bus (data path), designated the Unibus." Because of this unique bus design, the central processor, core memory, and all peripheral devices are considered subassemblies. This means that the PDP-11 is physically and electrically modular, reducing maintenance costs to a minimum and making system additions and improvements a simple matter. Also, the bus permits one peripheral to interact with another without having to transfer data through the central processor.

"This latter capability permits more than one task to be carried out in the computer simultaneously," declared Andrew Knowles, PDP-11 product line manager. "For instance, an analog-to-digital converter could be gathering data and storing it on magnetic tape, while the central processor was engaged in an entirely unrelated task. Or," he continued, "a magnetic disk storage unit could 'refresh' a visual display with no assistance from core memory. Since the Unibus is asynchronous, device speed is no consideration. Data can be transferred at better than 1.3 million words a second."

Knowles added that the Unibus also offers a customer a new approach to computer expandability as well as extending computer life almost indefinitely. "The Unibus allows the PDP-11 to be configured any way the customer wants," he said. "The customer pays only for the amount of computer he needs at a given time. And, advances in technology will not affect the PDP-11. For instance, if there is a breakthrough in processor or memory technology, a customer need only replace that component, not the entire computer."

Other unique features of the PDP-11 are its general registers and its four levels of priority interrupt. There are eight general registers in the PDP-11. "All are program accessible and can be used as accumulators, pointers to memory locations, or full-word index registers, so that a customer can tailor the PDP-11 to fit the problem," Knowles said.

The four-level priority interrupt feature allows the PDP-11 to respond automatically to external or internal conditions. Any number of peripheral devices can be attached at each level. "Peripherals not wanted can be masked automatically," Knowles explained. "And, a peripheral can have its own response routine. We believe this feature will be most useful in real-time applications."

Other features include double operand addressing and the availability of over 400 useful instructions. The PDP-11 is the first small computer to offer double operand addressing, a capability that permits memory-to-memory processing and eliminates the need of using registers to store intermediate results. This means that every memory location can be treated as an accumulator, significantly reducing the length of programs and time to develop them by eliminating load and store operations. The large instruction set further simplifies programming. "A customer tells the machine what to do rather than how to do it," Knowles pointed out.

In discussing new markets for the PDP-11, Knowles said that it should have a widespread appeal where an 8-bit byte is attractive. He visualized the machine being used in real-time to communicate with larger computers, with large mass storage devices, with character-oriented display devices, and as a remote terminal. He said specific immediate market areas would include data communications, data processing, management information, and industrial data acquisition and control. He added that the new computer should have special appeal to those who wish to combine it with their own equipment in a computer-based system.

First deliveries of the PDP-11 are set for late spring. More than 100 orders already have been received.

Automation Research in U.K. Gets PDP-10

The Control Systems Centre of the University of Manchester Institute of Science and Technology in England is installing what has been described in a leading British trade paper as "one of the most powerful computing installations in the world outside aerospace companies for research into control systems design."

Acquired under a grant from the Science Research Council, the installation will be comprised of a DEC PDP-10 computer, three analog computers interfaced to it, and several Teletypewriter and display terminals. The PDP-10 will feature 32,000 words of 36-bit word core memory, a half-million word disk, six DECtapes, and a line printer.

The principal use of the equipment will be to investigate various methods of control for multivariable industrial situations such as found in the manufacture of chemicals, cement, plastic sheets and other materials and in the control of aircraft gas turbines.

The new SRC grant extends an earlier grant and will enable the Centre to enlarge its present small hybrid computing system to provide a large, real-time, multiaccess computing system.

The Centre is a post-graduate department which provides research facilities for all engineering departments in the Institute where control applications are carried out. In addition, the Centre makes its facilities available to other universities in the area for research into control problems.

Delivery of all equipment is expected to be completed by next April at which time the PDP-10 will be used for time-sharing applications. By the end of 1970, the full hybrid facility will be available. The PDP-10 will handle time-sharing and hybrid applications simultaneously.

For more information on DEC's PDP-10 computer system, please check customer service box #7.

Real-Time Clock Available for PDP-10

A new real-time clock that provides high-resolution time keeping in real-time applications has been added to the wide range of PDP-10 computer accessories.

Designated the DK10, the clock can be used with PDP-10 systems in a variety of time-critical applications such as scientific and industrial data acquisition and analysis, time-accounting, time-base maintenance, periodic high frequency interrupts and interval timing. The DK10 contains a frequency clock with a 10 μsec. resolution and can operate with a resolution as high as 2.5 μsec. by adding an external clock.

The unit can operate as an interval timer where the interval can be changed under program control. In another mode of operation the clock will stop while handling interrupts and only actual user time spent computing is counted. Under software control, the DK10 also can function as a time-of-day clock.

The unit is priced at $4500 and first deliveries are now being made.

Circuit Analyzer Tests Complex Logic

A computer-controlled functional and diagnostic test system capable of performing up to 4,000 tests per second on printed circuit boards has been introduced by General Radio Company of West Concord, Mass. The Model 1790 Logic-Circuit Analyzer, the result of two years of development of in-house test systems, is designed to rapidly test and diagnose complex logic circuits.

The flexibility of the 1790, which is built around a PDP-8/L computer, eliminates the need for costly special tooling, test fixtures, and documentation. For each circuit to be tested, only a simple adaptor and test program are required.

The PDP-8/L computer enables the 1790 to perform up to 4,000 functional or diagnostic tests per second on logic complexes with as many as 240 pins. Anything from a 14-pin IC to a 240-pin large-scale IC or a circuit board with up to 96 inputs and 144 outputs can be tested.

One of the options for the 1790 includes the DECdisk, which provides 32K words of additional memory. Another option includes programmable logic levels which permit the testing of many logic families at precisely defined voltage levels.

According to GR's 1790 Marketing Engineer Robert E. Anderson, one of the many complex circuit boards tested at GR contains an 8-bit accumulator, eight read-in gates, an 8-bit memory buffer, two 4-bit full binary adders, and eight 48-bit shift registers all made up of 40 ICs and 76 other parts. The 1300 tests for this board take only 400 milliseconds.

The typical 1790 system (with 240 inputs and outputs) will sell for $32,500. Anderson noted that this was "a quarter to a third the cost of competitive systems, many of which offer only 16 inputs and outputs."

Detailed information on the 1790 system can be obtained directly from Mr. Robert E. Anderson, General Radio Company, West Concord, Mass. 01781. Telephone: (617) 369-4400.
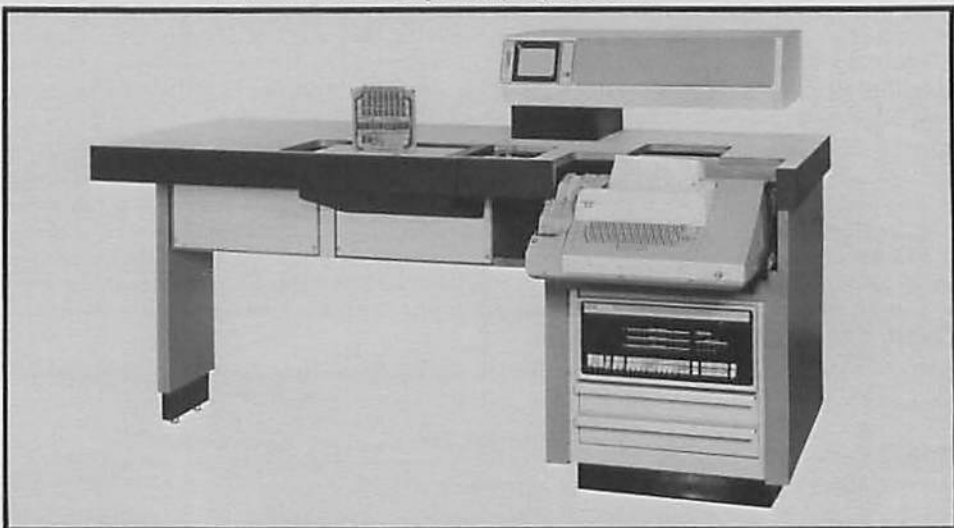
General Radio Company's Model 1790 Logic-Circuit Analyzer, which incorporates a Digital Equipment Corporation PDP-8/L computer, is designed to test and diagnose complex logic circuits on large-scale arrays or printed circuit boards. The system is capable of performing up to 4,000 tests per second on devices with as many as 240 pins.

Automated Runway Visibility System Developed

A small computer-based system to replace the slower and less accurate manual and instrument-assisted methods of determining pilot visibility at airports has been developed by **GEC-AEI (Electronics), Ltd.** of Leicester, U.K. The system, called **Instrumented Visual Range** (IVR) is scheduled for installation shortly at five United Kingdom airports—London's Heathrow and Gatwick and those in Liverpool, Manchester, and Glasgow, Scotland.

IVR was developed for the National Air Traffic Control Services organization on recommendations by a group from the International Civil Aeronautics Organization and the Fifth Air Navigation Conference. It uses photoelectric measurements of atmospheric transmittance at intervals along an airport runway. Transmittance is measured by a device called a transmissometer, which is controlled by a **PDP-8/L** computer. Also, included in the system is a device for measuring background luminance and a data link to send the visibility information to the airport control tower.

The transmissometer contains a transmitter and receiver at one end of a base line with a tetrahedral mirror at the other. Reference values are established by passing the light directly from the transmitter to the receiver. With this done the visibility is measured, and the information digitized and passed over telephone lines to the airport control tower. In the tower, a display shows runway direction, visibility at the runway threshold, at its midpoint and at the stop end. It also is possible to show visibility trends, and additional displays can be added.

The PDP-8/L calculates the runway visual range, assures calibration and integrity checking, and controls the logging and formatting of data.

The system manufacturer said that a device like IVR is a necessity if traffic is to increase at airports, as well as being a factor in any density of traffic. It said that obtaining visual range manually is slow, not very accurate, and not well suited for logging or processing. Instruments, while exempt from human error, require extensive knowledge of mathematics to operate and a knowledge of background light level and runway lamp brightness, factors automatically allowed for by the human observer.

Dutch Study Computer Controlled Power Supply Network

Computer control of the entire Electrical Power Supply Network in the Netherlands is the ultimate goal of a project currently underway at the **Delft University of Technology's Laboratory of Electrical Power Transmission** at Delft, The Netherlands.

At present, power generation in The Netherlands is manually controlled by the country's grid control centers (g.c.c.). On instructions from the g.c.c., power levels are changed at each remote station by manually altering the settings of the governor, automatic voltage regulator, and the transformer taps in order to maintain a steady and economical supply of electricity.

Research engineers at the Delft University of Technology's Laboratory of Electrical Power Transmission have interfaced a Digital Equipment Corporation PDP-7 computer to a Siemens A.C. network analyzer. The purpose of the project is to study methods of automating the entire Electrical Power Supply Network in The Netherlands.

To automate the work of the g.c.c., research engineers have interfaced a DEC **PDP-7** computer to a Siemens A.C. network analyzer. The PDP-7 computer will maintain real-time data on the network analyzer, printing out alarm messages on the teletypewriter whenever control values stored in memory — i.e., boundaries, settings, configurations, etc. — are violated.

The computer, with 8,000 words of core memory to store programs and a 1.75 microsecond memory cycle time, will measure incoming data and then do the calculations necessary to alter the control devices.

Whenever larger computations are necessary, such as loadflow, system stability, optimization, load forecasting, load shedding, etc., an IBM/360-65 will be used. The Laboratory of Electrical Power Transmission has interfaced the PDP-7 to the IBM computer for these calculations, using a conversation rate of 20,000 words of 18 bits per second between the two computers (distance 1,000 meters).

A second project underway with the PDP-7 at the Laboratory of Electrical Power Transmission is a study of transient phenomena in electrical power networks caused by switching circuit breakers and by lighting. In this case, the computer is linked to a Siemens Transient Network Analyzer to obtain information and calculate the parameters.

Without the computer, an oscilloscope display would have to be photographed and data acquired from the photographs. To date, results using the computer show great improvements in speed and accuracy.

AGA's Analytical Chemistry Robot Uses PDP-12

AGA, the manufacturer of the Auto-Chemist located at Lidingo, Sweden, a huge analytical robot used for multi-chemical analysis of blood serum and other body fluids, has just announced a new system built around DEC's PDP-12 general-purpose laboratory computer.

The AutoChemist is capable of 3,000 analyses per hour, 135 patient samples each on the AutoChemist's 24 channels, an output that would require the skills of 100 technicians using conventional methods.

Samples are placed in racks carried by conveyor into the machine where pre-determined quantities are transferred to each analysis track. Manual work is reduced to loading samples and removing empty test tubes.

Reagents are added to the samples which also undergo heating and cooling required by the individual analysis methods. Each sample may be identified automatically. The results of the analyses are measured by means of a photometer or other electrical device.

The measurement results are stored in the PDP-12 computer which also controls the chemical reactions, processes the results, and produces typewritten records either directly or remotely over any distance.

Purchasers of the system are supplied with analysis descriptions, programming, training of personnel, and assistance to adapt the system to the individual environment in which it will operate.

Programs included with the system allow for a wide range of tasks to be performed.

A monitor program decides which of the other programs will be in the computer's memory each moment. It handles interrupts that allow the computer to operate more efficiently through full utilization of its powers. Typically the computer is assigned a task every 20 seconds which

only takes about two to perform. The monitor program permits interrupts by other programs in the ensuing 18 seconds so that the computer is being fully utilized.

The operating program takes care of values coming from the AutoChemist, calculates and calibrates them, organizes them in proper order, and writes medical units.

The statistical program calculates statistics on the samples after each predetermined number of samples. Included in the statistics are the normal functions for the spread and number of abnormal results per channel.

The supervision program supervises the AutoChemist and performs quality control on results. If anything is wrong, it is indicated to the operator.

Within this program, for instance, is an alarm function carried out by sensors at various checkpoints which indicate failures and signal the computer. A report of the nature and location of the failure is typed out via Teletype.

A control program makes it possible to alter analysis methods or put in new values tables while the AutoChemist is operating. So that one group of analysis channels may be doing an analyses using one method while another method is used on another group of channels.

A comments program handles all messages typed out on the Teletype. It organizes the format for the typing out of information and allows for interruptions in the routine when a priority alarm message indicating a failure in the operation of the equipment needs to be typed out.

The new PDP-12 computer-based system will be marketed throughout the world by AGA. AutoChemist systems using other DEC computers are now in use in a number of locations in Europe and the United States.

Attleboro High School Using PDP-8/I

Mathematics and science students at Attleboro High School in Massachusetts were introduced to a new teaching aid this year — a computer that will take over some of the pen-and-pencil calculations that formerly took up valuable class time.

The computer is a PDP-8/I and can be used by two students simultaneously, each student "talking" to the computer through a teletypewriter.

"We plan to expose students taking mathematics and science on all levels to the computer," said Joaquim A. Paulo, who is in charge of the computer program. *"Within three years we expect to give every student in the school some exposure to the computer."*

All students will be taught computer programming in FOCAL, an easy-to-learn computer language developed by Digital Equipment Corporation. Through FOCAL they can solve mathematics problems, plot graphs, and determine the effectiveness of various mathematical formulas in solving a problem.

"Advanced students will have a minimum of supervision," Paulo said. *"They will be able to do some statistical work, some advanced mathematics, and we expect them to carry their computer knowledge into their science courses where they can solve mathematical problems with the computer."*

TransNet Orders TSS-8 Systems

TransNet Corporation of Red Bank, New Jersey, has installed a general-purpose TSS-8 time-sharing system for multi-purpose, multi-language time sharing. The TSS-8 system, which includes a DEC PDP-8/I computer, is able to substantially reduce the cost of time sharing. The TSS-8 system at TransNet handles 16 terminals simultaneously.

TransNet, which is 50 per cent owned by the Northeast Computer Institute, will concentrate its activities in the commercial market, with emphasis on the small and medium-sized company. Time-sharing services will also be offered to engineers, scientists, and to educational institutions.

According to John J. Wilk, president of TransNet Corporation, the company had evaluated numerous time-sharing systems and decided that the DEC system could best satisfy the requirements of its clients and offer an attractive price/performance ratio.

Delivery of a second system is scheduled for the summer of 1970.

AUTOCHEMIST SYSTEM FOR CLINICAL LABORATORY
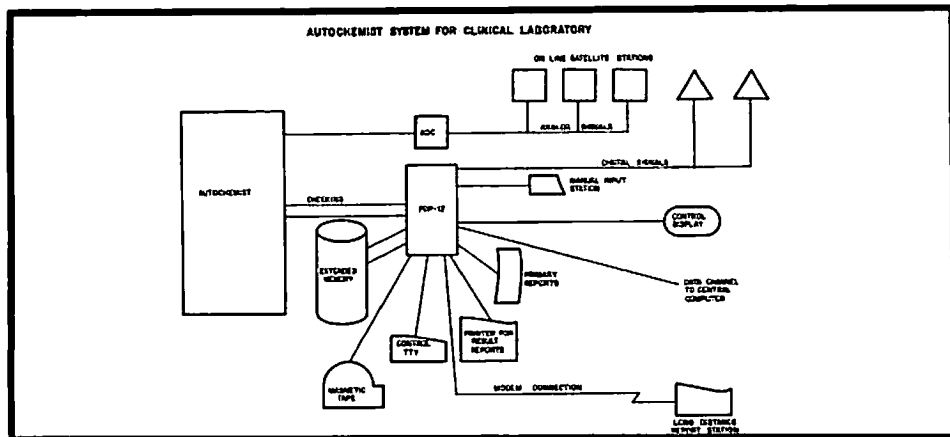
Waltham Firm Introduces New System

Data Architects, Inc. of Waltham, Mass., manufacturer of computer-based information systems, has incorporated DEC's PDP-8/L computer as the central processing unit in its new computerized order processing and inventory control system.

Designated ORDER-FLOW™, the system is the result of a detailed study and analysis made of the stocking, inventory, and order processing requirements of manufacturers, wholesale distributors, and retailers. It is designed to automate the flow of information from order entry, through distribution and credit check, into shipping and billing procedures. The ORDER-FLOW system is installed with the equipment and programming tailored to the workflow requirements of the customer. Data Architects provides full service support, training, conversion, and maintenance.

The ORDER-FLOW system is a dedicated real-time on-line system which significantly reduces the amount of paper flow and clerical labor required to process orders.

Most automation solutions to the order processing and inventory control functions suggest the use of batch processing computers with card equipment. This solution requires the addition of keypunch operators and in most cases a data processing staff.

The ORDER-FLOW solution is unique because it does not require additional staff to operate it; in fact, staff reductions are realized.

According to Arnold L. Mende, president of Data Architects, Inc., the system will reduce cost of operation and labor by more than $3,000 per month for the typical business.

Additional economic benefits are also realized through more efficient inventory management, a higher percentage of filled orders, reduction in the age of receivables, and growth capacity in sales volume without increasing staff requirements.

Operation of the system is quite simple. As orders are received, an account number is attached to the order, along with any special pricing or billing instructions. This information is then entered into the computer through a standard typewriter keyboard via a question/answer format to facilitate the proper entering of all information. The computer will then automatically process a credit check on the purchaser and alert the credit department if a marginal situation exists.

If the system sanctions credit approval, a check is made into the availability of products in inventory. A back order is made if a certain product is not available.

If available, the stock is subtracted from the finished goods inventory and the shipping room is notified. After the shipping room has "picked" the order, confirmation is made so that billing will reflect what is actually sent.

As many as 20 consoles can be added to the system to input additional information to the PDP-8/L. For instance, the credit manager's console is used to enter and update customer information, price changes, daily receipts, and answer credit queries.

The system's configuration includes the PDP-8/L, 8-12K of core memory, disk memories expandable to 524,288 12-bit words, high speed printer, magnetic tape, input/output interfacing, and up to 20 Teletype consoles.

Total purchase price of the system is $168,250 for a completely operational system, which includes all hardware, software, installation, and complete training. Data Architects, Inc. will also accept leasing arrangements.

First deliveries are scheduled for the fall.

For information on this new order processing and inventory control system, contact Data Architects, Inc. 213 Third Avenue, Waltham, Mass. 02154. Telephone: (617) 891-7730.

Little Jack's Corner
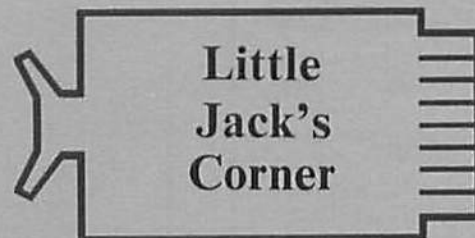
SITUATION: In large parking facilities, it is advantageous to maintain a continuous monitor of the facility's use to permit users and attendents to quickly determine the availability of space.

PROBLEM: Design a system that would count incoming vehicles, register outgoing vehicles and provide space availability information.

PROPOSED SOLUTION: A system was designed using K-Series control modules and sensor switches located at entrances and exits, interfaced to counters and display panels. As cars enter or leave and pass over the sensor, such action is recorded in an accumulator which in turn triggers a visual display at the attendent's station and the entrance. In multiple level garages, this technique can be implemented on each level, thus, not only indicating the availability of space, but on what level space is available.
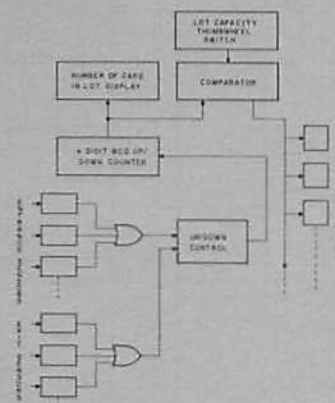
OTHER APPLICATIONS: This kind of technique can be employed in virtually any environment where units must be counted, such as transportation facilities, turnstyles, manufacturing lines and for determining pedestrian traffic.

For free design assistance with your module application, contact a module applications engineer at your local sales office or check customer service box #8.

See you next month!

Jack Courtemanche

Braille Pointer Uses DEC Modules

Engineers at **M.I.T.** have built a Braille input/output terminal that allows blind persons to have instant "touch reading" access to computer systems. Comprised of a standard teletypewriter and a Braille embosser, the terminal was developed by the **M.I.T. Center for Sensory Aids Evaluation and Development** under a grant from the Hartford Foundation. DEC **K Series modules** are used for timing control of input signals from the teletypewriter, decoding these signals, translating them into the Braille code and for driving the solenoids which control the embossing operation.

Physics Mailing List Started

DEC is now creating a mailing list especially to service customers and others interested in the application of computers in physics. Several brochures are now being prepared by the DEC Physics Applications Group for mailing to this audience.

Those publications being prepared include:

Real-Time Applications of the PDP-10

Summary of DEC Pulse-Height Analysis Systems

Application of the PDP-15 to Spark Chamber Data Acquisition

A leading supplier of computers for nuclear physics, DEC has formed the Physics Applications Group to assist research physicists and to encourage an exchange of information among users of DEC equipment.

Persons interested in receiving physics information on a continuing basis are invited to check customer service box #9.


"Interfacing a Servo-Shaft Encoder"

By Maurice Richessen Engineer
Computer Special Systems

Problem:

The output of some shaft encoders consists of two channels of square waves (A and B) with the number of pulses showing the positional changes and the phase relation indicating the direction of change. (See figure 1) The half-cycle pulse widths depend on shaft speed.

When the shaft encoder is connected to a servo device, the normal "hunting" may cause output signals as shown by A^1 and B^1 in figure 1. These signals are due to oscillation about a pulse edge with no net movement of the encoder shaft.
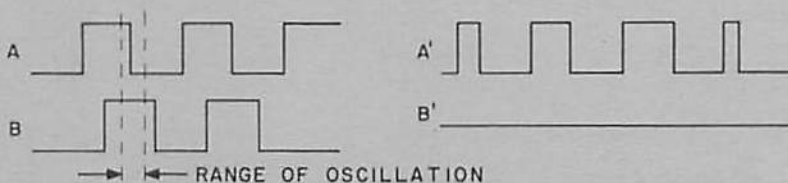
Solution:

This problem may be handled by logic which increments a clockwise register (CW) when channels A and B are the same just prior to a transition on channel A. Similarly, a counter clockwise register (CCW) is incremented if channels A and B are different just prior to a transition on channel A.

The difference between the contents of the CW and CCW registers indicates the change in encoder shaft position. The oscillation described above increments both registers and hence, no change is shown. Normal encoder shaft movement will increment only one register depending on the phase relation of A and B.
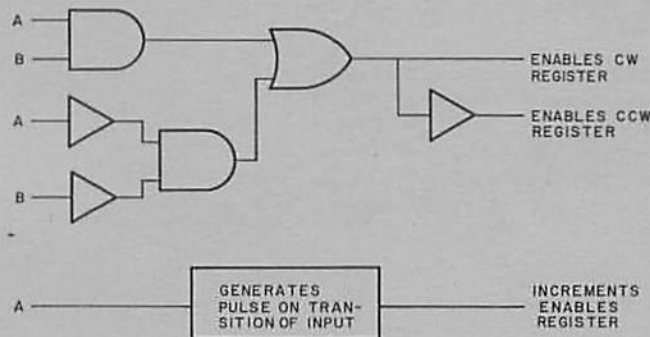
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