

## Martian Secrets Revealed by PDP-8

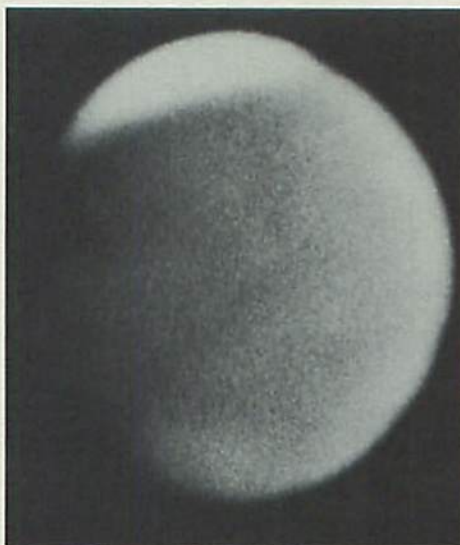
A small, powerful PDP-8 based system developed by the University of Colorado's Laboratory for Atmospheric and Space Physics (LASP) has helped to ensure that the maximum information content of the ultraviolet atmospheric data sent back from the Mariner spacecraft flying by Mars is accessible.

The ultraviolet spectrometer identifies molecules, atoms, and ions by the wavelength of light they absorb or emit. Professor C.A. Barth, scientific director of the laboratory, is the Principal Investigator of the ultraviolet spectrometer experiment. The design of the computer system and the instrument calibration was directed by Co-Investigator Dr. J.B. Pearce.

Present rocket technology requires Mariner spacecraft to be launched months in advance of the time they reach their targets. Because the present unmanned U.S. spacecraft were on "flyby" trajectories, they have had to travel over 220,000,000 miles before flashing by the planet, affording scientists only a brief glimpse at the secrets of Mars after a months-long wait and before continuing into the depths of interplanetary space. Consequently, each of the LASP-developed ultraviolet spectrometers carried aboard the spacecraft had to be checked and calibrated to maximum accuracy.

If the system designed by LASP had not been built, all spectrometer data would have to be checked by measuring tracings on strip charts, comparing them against established calibrations, and making calculations based upon these measuring tracings on strip charts, comparing them against established calibrations, and making calculations based upon these measurements. Such a task would not only be long and tedious -- LASP researchers estimate that to perform manually what their system does in a few minutes would take several hours -- but in addition, the physical measuring of the chart's peaks and the manual entry and calculations of the values allow many mistakes to creep in through human error.

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PDP-8 helped provide LASP researchers with ultraviolet atmospheric data from Mars.

## INDAC-8 at ISA Show

The first demonstration of its computer-based industrial data acquisition system, INDAC-8, will be made by DEC at the ISA Show, October 27-30. DEC will also show a full range of its solid state logic which includes its A Series analog/digital converters, M Series modules for computer instrumentation interfacing, and K Series modules for control applications in industrial and other high noise environments.

The INDAC-8 exhibit will be highlighted by a real-time "weight-in" in which a scale will be on-line to the computer system. Visitors' weights will be recorded and averages continuously calculated. A second demonstration run simultaneously on the same system will show the data acquisition and control capabilities of INDAC-8 via an automatic test of a motor-generator set.

(continued on page two)

## PDP-8/I Charts Northwest Passage

DEC is a major contributor in the long-dreamed-of conquest of the Northwest Passage. When the S.S. *Manhattan* plows her way through the Passage this year, she will have a PDP-8/I computer on board.

The Humble Oil & Refining Company ship was specially modified at Philadelphia, being cut into four sections to permit simultaneous work in different areas while an "icebreaking bow" and reinforced sides were added.

The S.S. *Manhattan's* route will take her through the Labrador Sea, Baffin Bay, where she will turn and head west, across Lancaster Sound, and into the Northwest Passage (actually called Parry Sound). From Parry Sound, the adventure continues into the Beaufort Sea and through Prudhoe Bay and the Bering Strait, finally ending at Anchorage, Alaska.

The PDP-8/I computer now on board helped to determine the ship's course before she sailed and will be used to keep the expedition on course during the months-long trip. As part of the Satellite Navigation System, the PDP-8/I predicted the days and times that the four navigation satellites will appear over the ship. When they do appear, the PDP-8/I will take signals from each satellite at two-minute intervals and measure the changing signal frequency as the satellite passes over to get an accurate navigation fix. If the measurements do not coincide with the predetermined measurements, the computer then calculates how far off course the ship is.

The PDP-8/I will also predict which of the available data will be the most useful in determining the ship's position. The

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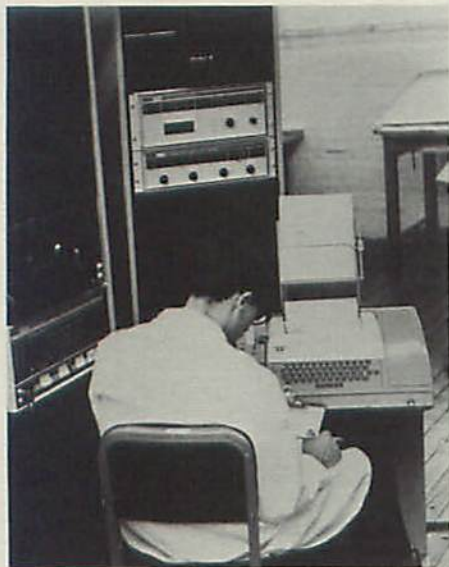
## INDAC-8 (con't from page 1)

Introduced this April, INDAC-8 is being marketed to the chemical, petrochemical, metals, utility, aerospace, and research industries. It is designed for such functions as data logging, alarming, basic set-point control, and quality testing. First deliveries are anticipated this fall.

A typical INDAC-8 system includes a DEC PDP-8/I or PDP-8/L computer with a core memory of 8,192 12-bit words; two Teletypes; disk storage facilities for up to 65,536 words; 50 contact inputs; a 100-channel analog/digital converter; and a real-time clock. Such a system is priced at approximately \$50,000, although more basic configurations of INDAC-8 sell for about \$20,000.

The INDAC-8 software package features the first compiler-level, real-time software for any small computer which has been designed for the engineer with FORTRAN level programming experience. The combination of this compiler and the systems real-time monitor permits users to realize benefits of speed and programming cost reduction over comparable computer systems.

DEC is also planning to distribute the 1970 edition of its *Control Handbook* which provides information on the latest techniques and products for implementing faster, cheaper, more reliable, solid state electronic control systems.



The INDAC-8 configuration shown here is built around a PDP-8/I computer. The system will be featured at the ISA Show in Houston, Texas, October 27-30.

For more information on INDAC-8, check customer service box # 1.

## Buying Computer Trims Cost for Project LOCAL

Buying their own computers has cut the per-student cost of supplying computer services to high school pupils by 75 percent in five Boston area schools in the 1968-1969 academic year.

Project LOCAL, (Laboratory Program for Computer-Assisted Learning), made up of the towns of Westwood, Lexington, Natick, Needham, and Wellesley, paid about \$100 per student for computer services in 1967-1968. In the 1968-1969 school year, Project LOCAL's per-student cost came to \$25 per student, said Project Director Robert N. Haven.

The difference was made by the purchase of five small PDP-8/I-based computer systems, manufactured by DEC, which replaced the outside commercial time-sharing system to which Project LOCAL subscribed. Each computer system was set up to meet the requirements of the specific school.

Buying the computers has enabled Project LOCAL itself to become a time-sharing service; in 1968-1969 eight schools were actually time-sharing customers. In the coming school year at least two more schools are expected to join the network, adding another 200 students to the approximately 1,000 who will use computers.

Project LOCAL began operating in fall, 1967 as a pilot program to demonstrate and evaluate the use of computers in teaching high school mathematics and to train teachers how to use computer programming techniques in the classroom. It is funded jointly by the member towns and under provisions of Title III of the Elementary and Secondary Education Act of 1965.

## DEC Forms Software Product Line

The formation of a software product line to offer support to users of DEC computers was announced today by Lawrence J. Portner, manager of programming.

The product line group is prepared to offer programming assistance to DEC customers in almost any application area. Typical applications in which the group has expertise includes process control, data communications, data reduction, information retrieval, biology, chemistry, numerical control, direct digital control, typesetting, simulation, financial analysis, commercial data processing, and special-purpose time-sharing.

Product line manager is Roger Pyle, a long-time DEC employee who brings to his new job 12 years experience in programming. In all, the 10-man organization has over 70 years of software experience. It was formed at customer request and after a six-month study. While new, Pyle points out that already the group is working on three projects: designing time-sharing software for a large overseas stock exchange system, assisting in the development of programs for a giant DEC PDP-10 typesetting system, and developing a small DEC PDP-8 process control system for the petroleum industry.

"Our purpose is to further increase the service we offer customers," Pyle pointed out. "We plan to work closely with our sales and field service people. They will effect customer liaison, and in most cases, provide us with necessary specifications. "However," he continued, "we will do system design work, taking full 'turn-key' responsibility should a customer desire."

## DEC Repeats PDP-8/I-8/L Maintenance Course

The recently completed System Maintenance Course for PDP-8/I and PDP-8/L computer users will be rerun again at Maynard beginning on October 27. Prior computer maintenance experience is the only prerequisite for the three week course, which is similar to the Field Service Training Course.

Content for the course includes study of the Central Processor, Power Fail, EXTMEM, DF-32 Disc, PC-8I and DM01. Maintenance, theory of operation, and actual trouble shooting are covered. Approximately twenty percent of the course is lab time.

The registration fee for the course is \$700 per person, if purchased outright. If the customer is entitled to free maintenance training, he can credit his free training (value \$300) toward the course and enroll for \$400.

An optional fourth week of TC01-TU55 training will be given on the week of Nov. 17. Customers may take this for \$300 as a standard training course or as an add-on to the PDP-8/I-8/L Systems Maintenance Course for \$200.

Persons interested in enrolling in the October PDP-8/I-8/L System Maintenance Course should contact Jim Davis, DEC Customer Training Supervisor as soon as possible. Tel: (617) 897-5111 Ext. 2534.



## Module Applications Group Expands Service

The Module Applications Group, established in 1966 to assist customers with design applications involving DEC modules, has gradually increased its involvement to include all aspects of module-based systems. The group, which assists customers with design applications in many different environments around the world, also provides technical assistance in support of DEC modules in several other key areas.

According to manager Jack Courtemanche, the group assists module users in many ways. An application specialist might find himself designing a module-based system for a customer (without charge unless special documentation is required), writing application notes for use by DEC customers, or assisting with design aids for the more general applications. On other occasions, he finds himself conducting special assistance or interfacing seminars to educate customers and salesmen with interfacing, on writing materials for the updating of DEC's widely-read Logic Handbook.

The Group becomes involved when either a customer or a DEC salesman requests assistance. When appropriate, the module application specialist will go to the customer site to study the problem and discuss possible solutions -- returning to Maynard to design the module-based system that will best do the job.

Creating a logic system design from a wide range of DEC modules, finished systems designs can usually be provided in 1-3 weeks. For those customers who prefer to have DEC build their customer designed system for them, the Control Systems Group is available for such assistance. Because DEC is the world's largest manufacturing supplier of logic modules, the system can usually be designed from existing DEC modules -- thus passing on considerable savings to the customer.

For more information about Module Applications assistance, contact a module applications engineer at your local DEC sales office.

## decus fall symposium

Las  
Vegas

Flamingo hotel  
november 17, 18, 1969

digital equipment computer users society

### GENERAL INFORMATION

The Fall Symposium of Digital Equipment Computer Users Society will be held at the Flamingo Hotel, Las Vegas, Nevada on Monday and Tuesday, November 17 and 18. Papers will be presented in the following areas:

- + Analytical Instrumentation
- + Astronomy
- + Education
- + Interactive Sciences and Computer Graphics
- + Physics - Nuclear and General
- + Computers in Clinical Medicine
- + Computers in the Life Sciences (Research)

Arrangements have been made with the FJCC Housing Bureau for a block of rooms at the Flamingo Hotel for those attending both the DECUS Fall Symposium and FJCC. Room reservations should be made by completing a reservation form (Available from the DECUS Office, Digital Equipment Corporation, Maynard, Mass. 01754 or from your nearest DEC Sales Office) and forwarding it to the DECUS Office.

Reservations will be made at the Flamingo-Capri (next to the Flamingo Hotel) for those attending just the DECUS meeting. Confirmations on all room reservations will come directly from DECUS. To cancel or change room reservations, contact the DECUS Office. Reservations are limited, so please make your reservations early!

Registration forms for the meeting will be sent to all persons on the DECUS mailing list. Others may request registration forms from the DECUS Office or from the nearest DEC Sales Office. The registration fee for DECUS members is \$25.00 and for non-members, \$35.00. It is suggested that registrations for the meeting be made in advance, however, one can register at the Flamingo Hotel on November 17 or 18. Confirmation for meeting registrations will come from DECUS. As an added feature this year in place of the usual meeting banquet, DECUS will make block reservations for one of Las Vegas's famous dinner shows. All attendees are also invited to the complementary social hour on Monday evening.

The program for the meeting and abstracts of papers to be presented will be available in October and will be sent automatically to DECUS members and registered attendees. Mini-papers (condensed versions of the complete paper) will be available at the meeting. Complete papers will be published as a Proceedings and will not be available until after the meeting.

For further information, contact the DECUS Executive Secretary, Angela J. Cossette, Digital Equipment Corporation, 146 Main Street, Maynard, Mass. 01754. Tel: (617) 897-5111 Ext. 2414.



# VPI Film At WESCON

"The Small Computer in the Chemical Laboratory", a film demonstrating the uses of small computers in the chemical laboratory, produced by the Chemistry Department of Virginia Polytechnic Institute with the assistance of an educational grant from DEC, was one of the films featured at the 1969 WESCON (Western Electronic Show and Convention) Science Film Theater.

An initial audience estimated at 50,000 viewed the film in the WESCON Science Film Theater at San Francisco's Cow Palace on August 19-22. The Science Film Theater makes available a day-long program of outstanding informational film to WESCON participants. The theater is repeated for each of four days of the WESCON program.

## 1969 Western Electronics Show and Convention Science Film Theater

This certificate is presented to

*Digital Equipment Corp.*

for an important contribution to the  
WESCON Science Film Theater program,  
held in San Francisco, California,  
August 19-22, 1969.

*Joe J. Morgan*  
Science Film Theater Chairman  
*David J. MacKenzie*  
Convention Director



Wescon is sponsored by the San Francisco Section and the Los Angeles Council (Region 6) of the Institute of Electrical and Electronics Engineers, and the Western Electronic Manufacturers Association.

A certificate of achievement was presented to DEC for its participation in the WESCON Science Film Theater. The V.P.I. produced film was made possible by a DEC educational grant.

Submission of the V.P.I. film did not mean automatic acceptance. This year, there were a record number of entries - over 50 - and competition was very high. All the submitted films were judged for technical excellence and suitability by professional members of the Information Film Producers of America (I.F.P.A. is a professional association dedicated to the advancement of communications through the film medium.) Less than half the films submitted were accepted.

The film, which features a PDP-8/I computer in the LAB-8 configuration, was produced to give chemists and students a broad overview of the different applications to which small computers can be put. It also serves to introduce computer fundamentals and associated subjects.

An interesting feature of the V.P.I. film is that titles, credits, and some diagrams were displayed either on the oscilloscope face of the LAB-8, or on Teletype paper. In effect, most of the "special effects" were performed by the PDP-8/I being demonstrated.

## New PDP-8/I-PDP-8/L Brochure

A new 22-page color brochure gives specifications, features and general descriptions of PDP-8/I and PDP-8/L general purpose computers. Listed are DEC's seven computerpacks - integrated hardware and software systems - that meet the requirements of a particular application, and application packs - software packages that solve an aspect of a general problem. The brochure details the software available for the PDP-8/I and PDP-8/L, as well as the full line of options and peripherals.

For a copy of the new PDP-8/I and PDP-8/L Brochure, check customer service box #.

### Editor's Note:

In the last issue of the NEWS-LETTER, two errors were made.

The designation for DEC's line of interfacing modules was incorrectly listed. It should have been M730 series interfacing modules.

The price of the PDP-12 in the laboratory system configuration should be \$29,900. For more PDP-12 information, see article on pg. 8 of this issue.

## New Memory Option for PDP-10

A new, lower cost per word core memory featuring a 1.8  $\mu$ sec. cycle time and 800 nanosecond read access time has been added as an option to its PDP-10 product line.

Price of the new MD10 with 32,768 words of memory, associated mounting hardware, power supply, and interfacing is \$70,000; 32K-word MD10-E extension modules are priced at \$42,000. The faster PDP-10 memory, the 1.0  $\mu$ sec. MA10, is priced at \$51,000 for 16K words of memory. The new MD10 memories will be available for delivery in early 1970.

Because memory modules of the PDP-10 systems feature their own internal timing control, they function asynchronously allowing variable speed memories to be configured together. The new MD10, therefore, can be used independently or in conjunction with the faster core memories now available for PDP-10 or PDP-6 computer systems.

As many as four 32K 36-bit word modules can be configured into a 128K-word memory package. Hardware interleaving is provided for 64K-word blocks comprised of one MD10 and one MD10-E extension module. Two- and four-way interleaving switches are provided which permit two-way interleaving with 128K and four-way interleaving with 256K.

Present PDP-10 users can choose the slower, less expensive MD10 memory for expanding their systems if the application is not time critical, noted Robert Savell, PDP-10 product line manager. He added that the "lower cost memory also reduces the initial cost of the PDP-10 for a buyer who needs extensive core but who does not require the higher speed."

The new memory joins a comprehensive line of options available from DEC for the PDP-10 including mass storage devices; magnetic tape units; card and paper tape handling equipment; and CRT display units. A number of software languages including BASIC, FORTRAN, and COBOL are available with the system.



## First "Turnkey" Communications Controller Delivered

A computer-based communications controller, designed to replace slower electro-mechanical equipment, has been delivered to the United States Defense Communications Agency by DEC.

The communications controller is the first "turnkey" system -- one equipped with the necessary software and interfacing so the buyer has only to "turn the key" to get the unit on the line -- delivered by DEC. It uses a refurbished PDP-8 computer, a 65-536-character disc storage unit, an interface to a large central computer, and a special software package.

The controller, based on the DEC 680 data communications system, increases the number of teletypewriter channels the Agency can monitor from a maximum of 10 to a total of 18. It was designed to monitor the circuits -- each sending different messages to the Defense Communications Agency -- in place of a paper tape unit which consisted of a punch and reader on each channel, and control circuit. The paper tape unit monitored all the information, which often included extraneous data, sent on the teletypewriter channel. It responded to a code that signaled that meaningful data followed, allowed the meaningful data to pass, and stopped the flow of information when a second code indicated that the essential part of the message had ended.

For more information on the 680/I Data Communications System, check customer service box #3.

The Defense Communications Agency's DEC 680 records the pertinent data and sends a complete message for the central computer to analyze as soon as the computer asks for it. The 680 also provides the central computer with a Teletype output.

The DEC 680 commonly uses a PDP-8; its successor, the 680/I uses the less expensive PDP-8/I. In the Defense Communications Agency installation, the PDP-8 is one the Agency already owned. Engineering changes not already incorporated in the computer were made by Digital Equipment Corporation before the system was assembled. The computer in the Defense Communications Agency's 680 was the 209th to come off DEC's assembly line. DEC has manufactured almost 1,500 PDP-8's.

The 680/I normally comes equipped with a software package; in the Defense Communications Agency installation however, the basic 680 subroutines made up only part of the controller's program. The balance of the program was specially written by DEC's Special Systems Group.

DEC 680/I data communications systems are used as communications controllers for large computers, low-speed line concentrators, management information systems, message switching systems, and terminal data collection systems. Over 100 DEC 680 systems have been installed.

## Martian Secrets (con't.)

The performance of the LASP-developed system is in marked contrast to such manual operations. Built around a PDP-8 computer, the system uses a special Mariner Calibration computer program to check the calibration and performance of the ultraviolet spectrometers. Data are sent from the spectrometers to the computer system in exactly the same form as is sent by Mariner spacecraft. The PDP-8 system digitizes the signals and processes the readings into IBM-compatible magnetic tape entries for detailed analysis at the University's large central computer facility.

Mariner 6 and Mariner 7 are two in a series of U.S. unmanned spacecraft that have brought scientific instruments to the vicinities of both Mars and Venus, affording American scientists their first close-up measurements of the nearby planets. A NASA program, the Mariner project is under the direction of the Jet Propulsion Laboratory in Pasadena, California. Because of our present rocket technology, Mariner spacecraft have to be launched months in advance of the time they reach their targets.

The LASP has a long history of using their PDP-8 in high-atmosphere and space research. Prior to the Mariner missions, they employed their computer system for radiotelemetry data reduction of rocket-borne spectrometers in the Earth's atmosphere. This work is continuing along with the effort on Mariner project.

## PDP-8/I Charts Northwest Passage (con't from page one)



PDP-8/I will then provide accurate navigation data so that charting of the Northwest Passage can be accomplished.

The opening of a charted passage to trade routes will have worldwide impact and will fulfill the centuries-old need for a shorter and more direct route from Europe to the Far East.

DEC is the largest supplier of computers for satellite navigation, with more than two dozen aboard ocean going vessels throughout the world, including the new luxury liner, *Queen Elizabeth II*.

In the past few months, DEC computers have been involved in many diverse scientific explorations of the moon, of the planet Mars, even in the recently announced discovery of the 104th element.



# FOCAL Programs Available From DECUS

The Digital Equipment Computer Users Society (DECUS) has instituted a new listing in the DECUS Library Catalog which encompasses all programs written in FOCAL<sup>®</sup>. In the next issue of the catalog, this section will contain abstracts of each available program listed. For immediate reference, some of the newly assigned FOCAL numbers, titles, and categories are listed.

Programs which have been approved are not immediately available from DECUS; please allow time for documentation processing. Catalogs and Addenda will contain complete abstracting information. DECUS Catalogs are published yearly, Addenda quarterly.

DECUS NUMBER	TITLE	CATEGORY
FOCAL-1	A pseudo-random number generator for the PDP-8, for use with FOCAL	Numerical Function, Numerical Input/Output
FOCAL-3	DISK FOCAL-Programming Language	Programming Language, Monitor, Programming System
FOCAL-8	Mag-tape FOCAL	Programming Language, Monitor, Programming System, Hardware Control, Demonstration
FOCAL-10	Patch to FOCAL	Hardware Control
FOCAL-11	EAE Routines for FOCAL	Programming Language, Monitor, Programming System, Numerical Function, Numerical Input/Output
FOCAL-13	3-D PLOTTER	Plotting, Display
FOCAL-17	FOCAL: How to Write New Subroutines and Use Internal Routines	Programming Language, Monitor, Programming System.
FOCAL-20	MULTIPULSE	Probability, Statistics, Curve Fitting, Scientific Application, Engineering Application.
FOCAL-21	MULTIPULSE-2	
FOCAL-22	Monte-Carlo Solution to Neutron Penetration.	Scientific Application, Engineering Application.
FOCAL-23	Seismic Refraction Sloping Layer	Scientific Application, Engineering Application.
FOCAL-25	Payroll Calculations (California, 1968)	Desk Calculator, Business Application
FOCAL-29	Second Order Differential Equation	Scientific Application, Engineering Application
FOCAL-30	One Line Routines, X <sup>3</sup> and Circle Superposition Circle	Scientific Application, Engineering Application
FOCAL-31	Sines/Factors, Figure Eight, Right Triangle Solutions	Scientific Application, Engineering Application
FOCAL-32	Translation Table-French	Programming Language, Monitor, Programming System
FOCAL-35	ROOTFINDER Program	Scientific Application, Engineering Application
FOCAL-36	DETERMINOT Program	Scientific Application, Engineering Application
FOCAL-39	Rectangular to Polar Conversion Polar to Rectangular Conversion	Numerical Function, Numerical Input/Output
FOCAL-40	Simple Chi-Square Test	Probability, Statistics, Curve Fitting
FOCAL-43	Collection of FOCAL Patches	Programming Language, Monitor, Programming System

The FOCAL language originally was designed for use by one operator of any of DEC's PDP-8 family of small computers.

Since then, two- and four-user versions have been made available for use with the PDP-8 line, as have single-, two-, and four-user versions for use on DEC's medium-scale, 18-bit computers. FOCAL, standing for FORMular CALCulator, is similar to the language JOSS and is one of the most powerful languages ever devised for the small computer. At the same time, it is as simple a computer language as any yet devised, and persons with little or no computer knowledge have mastered it in less than two hours.

FOCAL's 12 functions include trigonometric, logarithmic, 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 due to one typographical error. A trace feature allows an operator to determine not only what the error is but also where in the program it is located.

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 correct six- or ten-digit precision.

FOCAL has proven particularly valuable in education, both on the secondary and college levels; in civil engineering, aeronautical engineering, statistical work, medicine and research.

One aerospace accessory manufacturer, one of the earliest users of the language, has combined FOCAL with a PDP-8/S and substituted the system for the slide rule in jet engine component testing. In other instances, it has enabled users to substitute a small computer for the less versatile calculator.

For further information regarding FOCAL or other DECUS programs, contact Karen A. Pyszka, DECUS Office. Tel: (617) 897-511 Ext. 2524.



## Stock Analyses By Computer

An on-premises, real-time financial computer system for stock selection, portfolio surveillance, information storage and retrieval, and general-purpose financial data processing has been introduced by LV Computer Systems Inc. of New York.

Using a DEC PDP-12 computer as the central processor, the LV 3000 system collects and processes in real-time the intra-day data on all common stocks. Technical and fundamental on-line analyses can be performed and completed within 300 milliseconds after each trade is reported -- providing the user with instantaneous access to market information.

Symbols and prices of an entire portfolio (of up to 96 stocks) can be simultaneously displayed on the PDP-12's Cathode Ray Tube (CRT) screen. Additional CRT screens offer the capability of monitoring any and all common stocks on both Exchanges. Daily or weekly charts may also be displayed instantaneously on the CRT screen.

A completely automatic system requiring no computer programmers, operators, or systems analysts, the LV 3000 is designed to fit specific and private requirements of each customer. The basic leasing price of the LV 3000 system is \$2,950 per month. On a two shift basis (on-line and off-line), this is less than \$10.00 per hour.

More information on the LV 3000 financial data processing system may be obtained directly from LV Computer Systems Inc. 211 E. 43rd Street, N.Y., N.Y. 10017. Tel: (212) 682-4327.

## 5th European DECUS Seminar

A total of 39 papers, covering such fields as biomedicine, physics, chemistry, communications and computer science, were presented at the 5th European Seminar of the Digital Equipment Computer Users Society, held in Stockholm September 11-13, 1969.

DECUS, established in March, 1961, is now the second largest computer users group in the world, with over 5,000 members in all parts of the globe. It has proved to be an invaluable forum for the exchange of ideas and technology for those working with DEC computers.

The following papers were among those presented at the seminar:

"Real Time Data Acquisition and Monitoring Using PDP-9 Monitoring System" by Mr. R. Jones

"Pictures Input with a TV Camera" by Mr. T. Monnerot  
"Application of the PDP-8 in Nuclear Medicine" by Mr. W. Ammann  
"On Line Processing of Vector Cardiograms by PDP-9" by Mr. J. S. Duisterhout

Equipment demonstrated at the seminar included DEC's PDP-12 computer, designed for laboratory applications, with potential use in such fields as biomedicine, oceanography, education and a variety of industrial environments. The configuration includes: a 4,096 word memory; expandable to 32,768 words; two magnetic tape storage units; a 7 x 9 inch cathode ray tube display; a 16-channel analogue-to-digital converter and multiplexer; a data terminal; a teletypewriter and paper tape reader and punch. In addition, workshops were held for the PDP-8, PDP-9/15, and PDP-10, together with presentations for the TSS-8 and PDP-12.

## Digital Drafting System Speeds Design

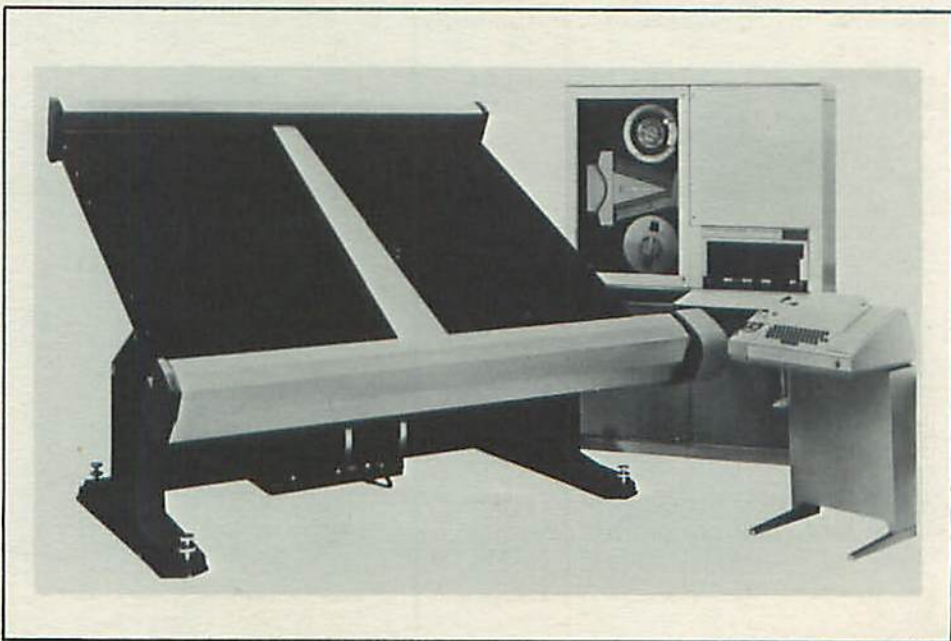
A high-speed, high-precision digital drafting system (DDS) for applications in computer aided design has been introduced by Computer Industries Inc., a subsidiary of University Computing Company.

Designed for many different low tolerance, exact registration applications in automated drafting, verification for numerical control tapes, configuration lofting, engineering drafting, and the preparation of art-work masters used in the stacking of integrated circuits, the DDS system performs digital drafting operations under the control of a PDP-8 computer.

DDS offers line drawing performance at over 600-inches per minute (10-inches per second) with overall system accuracy of 0.002-inch. The Systems' large drafting format and segmented vacuum plenum (60 x 60-inches standard, expandable in 5 foot increments) accepts conventional drafting paper as well as roll size.

Operational versatility is provided by the PDP-8 based program control system with high-speed arithmetic unit which interprets operator commands, processes input data, and monitors the drafting head position through precise high-resolution encoders on each axis. The computer's 4096 word memory provides ample storage for straight-line interpolation and character annotation routines. Extended memory capability for additional geometric functions and subroutines is optional. Geometric functions and subroutines is optional.

More information on the DDS may be obtained directly from Computer Industries Inc. 14761 Califa St., Van Nuys, Calif. 91400 Tel: (213) 781-7100.



Digital Drafting System (DDS) offered by Computer Industries Inc. of Van Nuys, California is a high-speed, high precision stored program system designed for low tolerance exact registration applications.



## DATAFAIR '69 Success for PDP-12

Visitors to DATAFAIR '69 held in Manchester, England on August 25-29, mobbed the DEC exhibit there to view the PDP-12 being demonstrated. Visitors were particularly interested in the PDP-12's hardwired software concept and were greatly impressed with the ease by which programs were developed and run on the computer using display based editors stored on magnetic tape.

The PDP-12 at DATAFAIR was demonstrated in its laboratory configuration, including: a central processor with 4,096 words of memory; two magnetic tape storage units; a seven-by-nine-inch cathode ray tube display; a 16-channel analog-to-digital converter and multiplexer; and a teletypewriter, including a paper tape punch and reader. In this configuration, the PDP-12 is priced at \$29,900.

The successor to DEC's LINC-8 computer for the laboratory, the PDP-12 offers users extreme ease of operation due to such features as hardware program loading and data loading from magnetic tape and is the key to its multi-task capability.

The set up and start procedures for running programs on the PDP-12 can be implemented quite easily due to its interactive capability. Through the display scope, the PDP-12 can actually question the user and, based on his replies, do the required program.

The PDP-12's powerful order code requires very few instructions to perform a specific task since the availability of analog and digital inputs and outputs, bulk storage devices and the CRT display all combine to make the data obtained from instruments immediately available to control a process.

Laboratory and industrial applications for the PDP-12 include collecting and analyzing data for psychological experiments, performing on-line financial data processing, analyzing data from any number of analytical instruments, and managing an assessment program for elementary school achievement.

For clinical chem., CLINICAL LAB-12 offers users in hospitals and commercial laboratories a program to monitor and collect data from various laboratory instruments. It also does the necessary sorting, calculating, and printing of analytical results. While performing this on-line function, the system can be used simultaneously for various calculations which are not automated.



Visitors to the DEC booth at DATAFAIR '69 viewed the PDP-12 computer -- designed for laboratory and industrial applications -- while programs were developed and run on the computer.

For more information on the PDP-12, check customer service box #4.

## Recent DEC Articles in Print

### "Nick Mazzaresse of Digital Equipment Speaks Out on What's Wrong With Small-Computer Specs"

by Nick Mazzaresse  
Vice President-Small Computers  
in the July, 1969 Issue  
of *EEE*

Responsible for a broad spectrum of policy decisions relating to DEC's small computer operation, Mazzaresse's article delves into problem areas in specifying small computers. The article investigates the logical way to choose a word length for a particular application, how to evaluate the price of your computer, and what factors influence the choice of a manufacturer.

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### "A Mobile Data-Logging Laboratory for Sugar Mills"

in the July, 1969 Issue  
of *Sugar y Azucar*

The solution to the problem of obtaining high quality data from all the member sugar mills in Queensland, Australia with a minimum expenditure of man hours and equipment was the development of a mobile PDP-8/S based data-logging facility capable of visiting each mill to obtain samples of operation.

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### "Sorting IC's Economically"

by Robert A. Hughes  
Manager of Component Engineering  
and W. Blaine Belecki  
Component Engineer  
in the Sept. 1, 1969 Issue of  
*Electronics*

As the number of integrated circuits present on each circuit-board module increases, the need for 100% testing of all IC's becomes essential. At DEC, an incoming inspection system executes static, dynamic, and burst tests on 2,500 IC's/hour with a self-adjusting programmable signal source guarantees the dependability of IC's used in DEC modules.

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### "Invasion of the Minicomputers"

by William H. Long  
Production Manager-Small Computers  
in the August, 1969 Issue  
of *Automation*

Technological advances have reduced computer size and temperment of small computers, enabling their use on production and process lines in relatively dirty environments. The types of production problems which can be handled by "minicomputers" are discussed.