150 Orders Received for PDP-11 in Four Days

More than 150 orders were received for DEC's newest small computer, the **PDP-11**, in the four days that followed its introduction, according to Julius Marcus, marketing manager for the product.

The new computer made its debut Monday, January 5. By the following Friday, orders had passed 150. Marcus attributes this reception of the Unibus[T.M.] concept. He said that the size of the systems ordered varied from basic models to large configurations, some with 24,576 words of core memory. Initially, the PDP-11 is being offered in two basic models: a special purpose controller at $7,700 and a general purpose computer at $10,800.

First Small DEC Time-Sharing System Installed in Europe

The first European installation of DEC's TSS-8 was recently completed at Cambridge University. Built around a **PDP-8/I** computer, the system has been installed in the school's department of applied mathematics and theoretical physics. The computer will be used primarily by students.

The Cambridge configuration includes 16 terminals with graphics capability (15 for students and 1 for the instructor). If required, the system can be interfaced to a larger computer; but present plans are to use it chiefly in experimental problems in physics, mechanics, and other disciplines involving applied mathematics.

Although there are a wide variety of languages available for use with the TSS-8, Cambridge students will do the bulk of their work in the DEC-developed conversational language FOCAL[R]. FOCAL enables the user to modify his program line-by-line, or even to modify a character within a line and to make changes in data during an experimental sequence. Each student has control over his experiment, using his own program or one designed by his instructor. For testing, the instructor can withold data from students.

DEC Announces PHA Product Line

The largest computer-based pulse height analysis product line in the industry has been announced by DEC. "We now offer 10 standard systems ranging from the PHA-8/L, a single parameter 2,048 channel analyzer at $14,150, to the PHA-15/30 a dual parameter 8,192 channel analyzer capable of background-foreground operation priced at $80,300," Richard Devlin, DEC's newly appointed physics marketing manager reported. "In spite of the marked decrease in the availability of government funds for research, we are looking forward to another year of substantially increased sales of computer-based physics systems," Devlin said.

Devlin cites two reasons for his forecast. "Research in nuclear physics is growing at about 25 per cent per year outside the U.S.," Devlin said. "In addition, physics instrumentation is getting to be so precise, and is tending to produce such vast amounts of data, that on-line computers are a must for effective data acquisition
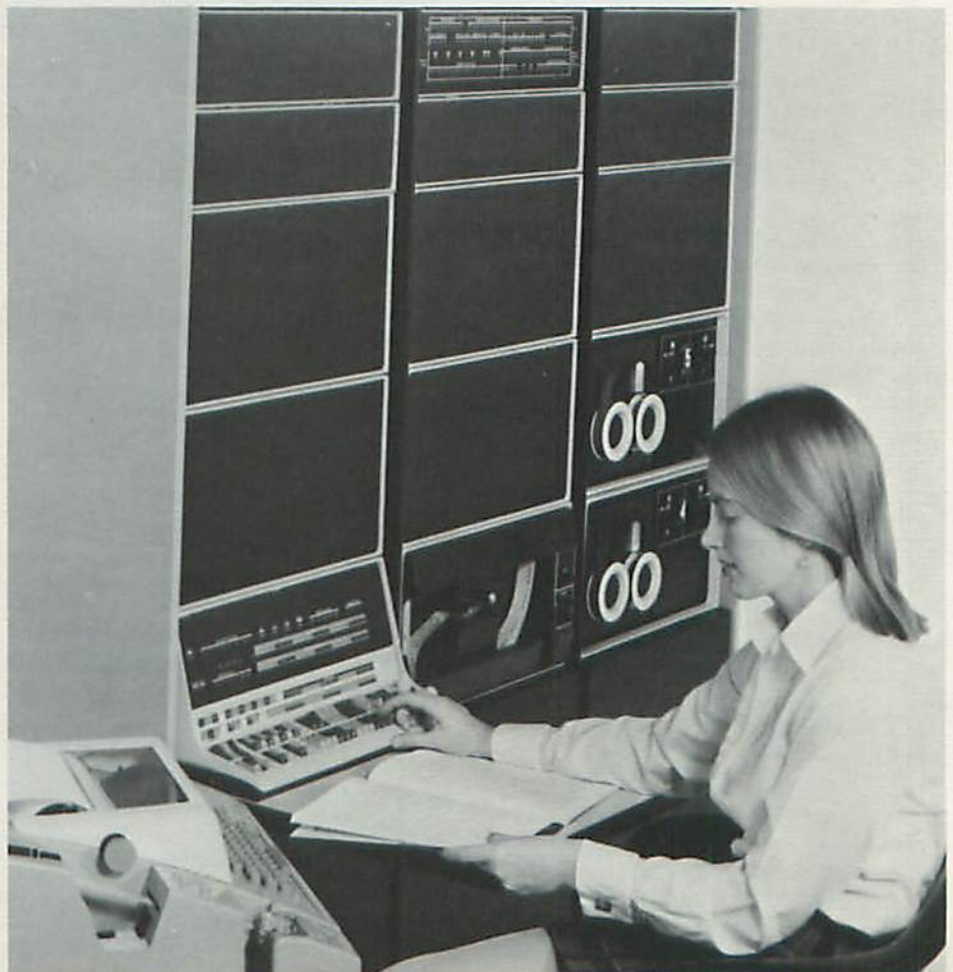
Physics Marketing Specialist Cindy Kretschmar performs program checks on PHA-15/20 system. The PHA-15/20 is one of ten new pulse height analyzers offered by DEC. Other systems utilize the PDP-8/I, PDP-12, and PDP-10. A PHA-8/I will be demonstrated at the Scintillation Counter Symposium in Washington, D.C., March 11 thru 13.

New Version of Display-Based Systems Software Offered for PDP-12

DIAL-2, a new version of the display-based systems software for its **PDP-12** computer, has been introduced by DEC. Improvements in the new software package include character editing capability, overlapped tape I/O, and a new peripheral interchange program — PIP. The DIAL-2 (Display Interactive Assembly Language) software package handles program editing, filing, and assembly, taking advantage of the PDP-12's built-in display and wide range of peripherals.

Commenting on the new features, Edward Kramer, PDP-12 Marketing Manager said, "This new version of DIAL will do much to strengthen the PDP-12's position as an easy to operate and truly interactive computer."

For more information on DEC's PDP-12, please check customer service box # 6.

Computer Controls the Stars

Providing the general public with an enjoyable and meaningful "total experience" at the **Strasenburgh Planetarium's** Star Theatre is the goal of the second phase of the computer project being undertaken jointly by the **Rochester Museum and Science Center** and **Yondata Corporation**, of Rochester, New York.

Presently, a DEC **PDP-8** computer controls only "special effects," those auxiliary projection facilities utilizing lighting and sound. These include up to 300 projectors of different sizes and types located around the periphery of the planetarium's 65-foot dome, numerous light banks, and three tape decks included in the sound system. The computer also controls a double series of 12 custom-built panoramic projectors with cross-fade capability that can be used to simulate a limitless variety of horizon scenes.

The second phase of the project will permit the PDP-8 computer to control all of the movements of the giant-sized Zeiss Model 6 Planetarium Projector, including the raising and lowering of its elevator. The project will be completed by July 1970, when all technical components of the theatre will be controlled by the computer. Thus, Rochester's Planetarium becomes the world's first totally automated "Star Theatre."

USERS CAN "TALK" to their Digital Equipment Corporation PDP-12 computers through DIAL-2, the updated version of its systems software. DIAL-2 (Display Interactive Assembly Language) uses the computer's built-in display.

Swapping Drum Added to PDP-10 Line

A high-speed fixed-head drum memory, which can significantly increase the number of simultaneous users in a typical **PDP-10** time-sharing configuration, has been added as an option to that product line by DEC.

The new **RM 10B** drum features a storage capacity of 345,600 36-bit words, access time of 10 milliseconds (at 3000 rpm) and a transfer rate of more than 200,000 words per second. Four RM 10B units can be supported by a single control unit.

According to Robert Savell, PDP-10 Product Line Manager, the access time of the new drum is nearly twice as fast as that of the swapping disk now in the product line, and the transfer rate is about three times as fast.

"A critical factor in determining the number of simultaneous users of a time-sharing system is the rate with which user programs can be swapped from external storage into core and back again," Savell explained. "This swapping speed is determined primarily by the access time and transfer rate of the drum or disk swap-ping unit. The new faster drum can substantially enhance the system's user capacity."

The new unit brings to three — drum, swapping disk, disk packs — the number of high-speed rotating memory options a customer can specify for a PDP-10 system depending upon his storage, access time and transfer rate requirements.

Priced at $50,000, the RM 10B operates under the principle of a flyball governor as a failsafe system against costly head crashes. Under this principle, the drum which is slightly tapered, automatically retracts from the 540 heads in the unit whenever rotation drops below 65 per cent of the device's operation speed. This design provides higher reliability by eliminating the hydraulic, pneumatic or electrical drive units required by other drum systems.

First deliveries are now being made.

For more information on DEC's PDP-10 computer system, please check customer service box # 2.

International Bond Stressed as Decus Election Results Announced

The incoming President of the Digital Equipment Computer Users Society (DECUS), Mr. Richard J. McQuillin, noted the increasing enthusiasm of European DECUS members as results of the 1970 elections to the DECUS executive board were announced. Mr. McQuillin, of Information International, Inc., Boston, Mass., commented that closer coordination between American and European members would doubtless be forthcoming in the ensuing months, and that some of the practices developed in European seminars will be used in forthcoming American DECUS meetings. He added that the influence was not one way. "I wouldn't be surprised to see technical papers submitted (to European seminars) from America next year," he concluded.

DECUS is one of the world's largest computer users groups, and presently the most active. Formed to permit interchange of ideas between users of Digital Equipment Corporation computers, the society has evolved into an active forum for advances in both computer hardware and software development.

The results of the DECUS Executive Board election for 1970 are:
President:
Richard J. McQuillin
Information International, Inc.
Boston, Massachusetts
Meetings Chairman:
John C. Alderman
Georgia Institute of Technology
Atlanta, Georgia
Recording Secretary:
Dr. Daniel M. Forsyth
Information International, Inc.
Boston, Massachusetts

The DECUS European committee includes representatives from England, Switzerland, Holland, Sweden, and Germany.

DECUS, in addition to publishing a monthly periodical, holds semi-annual meetings in the United States, and holds seminars in Canada and Europe. The society has approximately 6,000 members representing almost all areas of science, medicine, engineering, education, and commerce.

RICHARD MCQUILLIN, NEWLY ELECTED PRESIDENT OF DECUS FOR 1970. In his first statement as 1970 president, he noted the increased interchange between U.S. and European computer information, and predicted even closer cross-fertilization in the forthcoming year.

PHA Systems *(Continued from page 1)*

and experimental control. We feel that our low prices put an on-line computer system within the reach of most laboratories even in this tight money market."

DEC PHA systems are a totally integrated hardware/software package. These systems feature newly developed standard PHA interfaces and applications programs based upon DEC's experience with hundreds of installations around the world. The choice of nuclear hardware: detectors, amplifiers, and nuclear analog-to-digital converters are left to the decision of the individual researcher. DEC's standard PHA interfaces are designed to operate with most of the popular ADC's available on the market today.

"As good as our hardware is," Devlin pointed out, "it's software that really gives a computer system its power. Our PHA systems go out of the plant ready to work with a complete line of application programs. We don't think that a physics researcher should have to devote many months to program development before getting to his research," Devlin said.

DEC's standard software packages include subroutines for data acquisition, display, and control of selected input/output devices. Every system offers an automatic peak locating and listing subroutine. The 16K PHA-15/20 system provides subroutines for automatic isotope identification and the 24K PHA-15/30 system, in addition, simultaneously can be used for Fortran program development. All of DEC's PHA programs are modular in construction allowing the researcher to modify them according to his needs and experience.

For more information on DEC's PHA product line, please check customer service box # 1.

Local Users Groups Promote Computer Discussion

A local DECUS (Digital Equipment Computer Users Society) activity where members can get together at least once a month and swap ideas on computer hardware and software, **Local Users Groups** (LUGs) have common interests—PDP computers, modules, and their applications.

At present, there are eleven LUGs in operation around the United States and new groups at Knoxville, Tenn. and Denver, Colorado are now in the process of starting up. The emphasis in each group is on local PDP installations and application information needed by group members. Through their meetings, LUG members have a chance to maintain personal contact with other local users and learn about other member applications.

Each group conducts its meetings according to its own special needs. For example, the Atlanta group includes a technical presentation at each weekly meeting while the Boston LUG emphasizes educational systems. Most other LUGs use their meetings to find out about new product developments. A large part of any LUG session includes an "open discussion" during which anyone can ask the group for information or supply the group with information he has available. When appropriate, members may decide to give a short introduction, highlighting work performed at their installation.

If a DEC engineer is available at a meeting, he may be asked to supply the latest information on DEC products, services, and applications. He may even be requested to investigate certain items for the group with key DEC personnel back at Maynard, Mass.

Several groups have undertaken projects of interest to their local members. Some, for example, are developing local program libraries that may ultimately supply DECUS with valuable new programs. The LUG at Berkeley, California is now in the process of making a compendium of local PDP installations. This listing will contain all I/O peripherals used and the name of the designer or engineer to contact for further information about the system. LUG emphasis is clearly on local needs and interests.

Information on Local Users Groups can be obtained from Mrs. Angela Cossette, DECUS Executive Secretary, DECUS, 146 Main Street, Maynard, Mass. 01754 (Tel: (617) 897-5111 Ext. 2414) or from Mr. Sypko Andreae (DECUS Executive Board member) University of California, Lawrence Radiation Laboratory, Bldg. 50B–Room 4235A, Berkeley, Calif. 94720 (Tel: (415) 843-2740 Ext. 6341).

MOS Array Tester Developed by Salt Lake City Firm

The first general purpose computer-controlled system designed exclusively for testing MOS Large-Scale Integrated Circuit Arrays of up to 79 pins has been developed by **LSI Testing, Inc.** of Salt Lake City, Utah. The system, designated the **Model 1024 MOS Array Tester**, is designed to control as many as five completely independent circuit testers, as well as being available to a secondary user for an entirely unrelated program.

The flexibility of the Model 1024 system, which is built around a DEC **PDP-8/L** computer, reduces the risk of system obsolescense as newer and more complex MOS circuits are introduced. In addition, the PDP-8/L offers faster, more reliable testing of circuits in a conversational mode of communication between the operator and the array tester. This conversational communication allows simple and fast programming of new device tests and allows the operator to edit previously written device programs.

The operator can generate a new test program, execute an old test program, or edit existing programs. New device test data is generated by typing octal numbers on the Teletype at the request of the computer. This data may be edited immediately and stored by the computer. The operator obtains a printed copy of test data in either binary or octal format and a binary tape.

Detailed information on the Model 1024 MOS Array Tester can be obtained from LSI Testing, Inc., 2950 S. 133 West, Salt Lake City, Utah 84115. Telephone: (801) 467-5937.

PDP-11 to Highlight DEC Exhibit at IEEE

The first demonstration at a major electronics exhibition of the new 16-bit **PDP-11** computer will be the highlight of DEC's participation at the **IEEE** show to be held in New York March 23-26. Also to be shown will be a multi-user demonstration of DEC's 12-bit small computer, the **PDP-8/L**; a PDP-14 fixed-memory machine controller; an industrial logic trainer, the **K-Series Logic Lab**; and a computer logic trainer, the **Computer Lab**. The new 1970 edition of DEC's **LOGIC HANDBOOK** will be distributed at the booth at no cost.

For more information on DEC's PDP-11, please check customer service box # 3.

Financial Highlights: DEC Third in Computer Industry

FINANCIAL HIGHLIGHTS

Six Month Earnings Reported

Operating Results for the Six-Month Period Ending:

	December 27, 1969	December 28, 1968[2]
Net Sales	$60,876,200	$37,542,000
Income Before Taxes	11,028,500	7,333,500
Provision for Income Taxes	4,740,000	3,872,100
Income After Taxes	6,288,500	3,461,400
Shares Outstanding[1]	9,435,940	8,934,630
Income Per Share	.67	.39

The Company has revised its reporting method so that subsidiaries report results on the basis of a July-to-June fiscal year, the same as the parent company, rather than a May-to-April fiscal year.

1. Based on the average number of shares outstanding during the period.
2. Restated.

Sales were 62 percent higher than for the comparable period of a year ago, restated. Earnings were reported at 67 cents per share, 72 percent higher than last year's earnings of 39 cents a share.

DEC Third In The Computer Industry

Recent industrial reports indicate that DEC is in third place in the computer industry in terms of computers installed. The company has over 7,000 systems, most of which are small computers, in the field. First place is held by IBM, while the second position is held by Univac.

Plant Expansion Continues

Projects are on target concerning DEC's continuing plant expansion program:

A 60,000-square-foot facility was opened in the Leominster Industrial Park, Leominster, Mass.;

A 260,000-square-foot facility has recently been completed in Westfield, Mass.

Ground-breaking took place for a 260,000-square-foot facility in Westminster, Mass.;

An additional 72,000 square feet were added to the 900,000 square feet at DEC's Maynard headquarters;

A 58,000-square-foot facility was completed in San German, Puerto Rico;

14,500 square feet were added to DEC's Canadian plant.
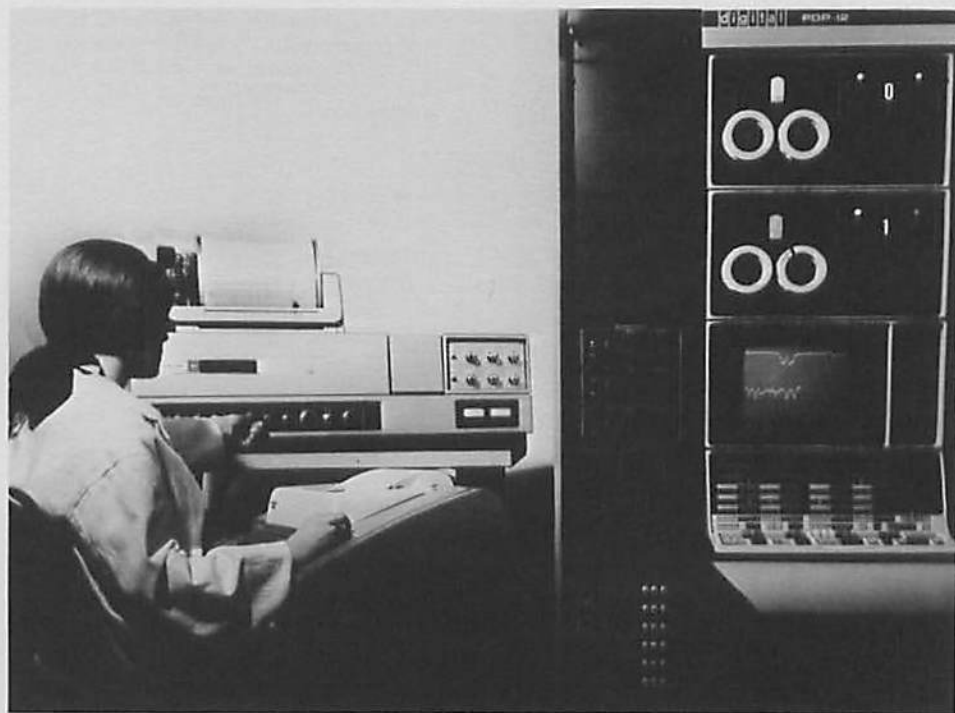
The PDP-12 will be demonstrated at the Pittsburg Conference on Analytical Chemistry and Applied Spectroscopy to be held March 2-6 in Cleveland, Ohio. A PDP-8/L, PDP-11, and a PDP-10 terminal, as well as DEC's GLC-8, will also be on display.

"ELIMINATING INSTABILITY IN COMPUTER-CONTROLLED CRT DISPLAYS"

by John Larkin
Engineering Supervisor
Computer Special Systems

Problem:

In a computer-controlled CRT display, power supply ripple can produce unstable (swimming) pictures.
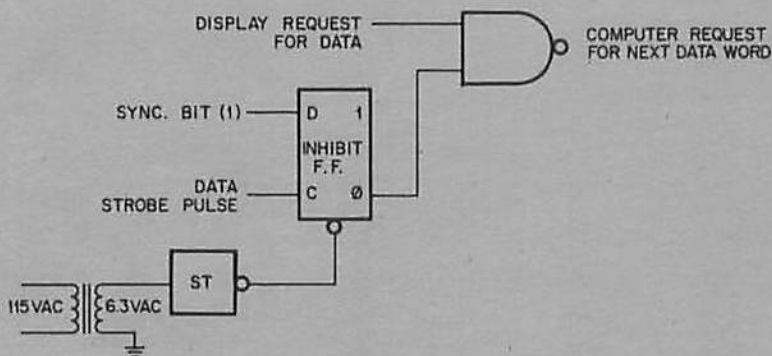
Solution:

Develop a method of synchronizing each picture frame with the power line frequency. In the computer's memory, in a display data file, the first and only word of the entire picture frame is written to contain a bit designated as a sync bit. This bit is stored in an Inhibit flip-flop. The Inhibit flip-flop will prevent the Display Request for Data signal from going to the computer to fetch the next display data word. The inhibit condition will be cleared when the threshold of a Schmitt trigger circuit (ST) has been reached. This is driven by a sine wave produced by a step-down transformer connected to the line power. When the Inhibit flip-flop is cleared, the Display Request for Data signal is allowed to reach the computer as a Computer Request for the next data word. This provides synchronization for the beginning of each frame of the picture on the CRT. By this means, the picture is static rather than rippling at the line frequency or harmonics.

The Computer Special Systems Group has a skilled staff of application engineers, programmers, and manufacturing specialists, who are capable of interfacing DEC computers to customer equipment for data accumulation and control. The group specializes in areas such as numerical, process, and experimental control; communications; physics; chemical, and biomedical instrumentation; interfacing to mass storage devices; hybrid systems; display systems; and interactive terminals. The group also builds special peripherals and even interfaces DEC systems to competitive computers.

Additional information about how Computer Special Systems can help you meet your system design needs may be obtained from your local DEC Sales Office.

Georgia Tech Prepares Future Computer Executives

Many experts agree that we are entering the Information Age, an era where the successful business will be the one that best gathers, analyzes, and utilizes information. These experts also agree that a very important tool to carry out this task will be the computer. However, there is much less agreement as to whom the executive in charge will be.

He could be a graduate of a unique program offered by the Georgia Institute of Technology, which is pioneering a new area of study — information sciences. Georgia Tech's School of Information Science, the first of its type in the country, presently offers graduate degrees and plans an undergraduate program in 1970. Graduates of this school are not computer programmers in the popular sense of this term. Although second to none in technical knowledge in the information processing field, they possibly are better described as the corporate computer executives of the future.

They study an impressive variety of courses in one of three areas. The first is theoretically oriented, seeking an understanding of the properties, structures, and behavior of information, and of the laws underlying the processes of information generation, recognition, transmission, transformation, storage, and use. The second is a professional program emphasizing the design of advanced information systems, such as corporate information systems. The third emphasizes the engineering design of computer systems and utilities.

The curriculum of the school consists of nearly fifty courses in areas such as theory of information communication and control; descriptive and mathematical linguistics; engineering analysis, design and management of information and computer systems; theory and techniques of information processes; applied mathematics; theory of programming (rather than programming itself); and such abstract areas as mathematical logic, semiotics (advanced study of the theory of signs and symbols and their artificial and natural systems), philosophy of mind, cybernetics, artifical intelligence, and automata theory.

Integral to the program is a laboratory complete with its own minicomputer system, a PDP-8/I. The laboratory also contains terminals (including the PDP-8/I) to the University Computer Center's large Burroughs and UNIVAC systems. The PDP-8/I, interfaced to a variety of peripheral devices, is used in demonstrations and research projects representative of all types of computer and communications applications.

PDP-8/I User's Bookshelf

Software manuals described below enable the user to gain maximum efficiency from this PDP-8/I, 8/L, 8, 8/S, or PDP-5 computer system. Software manuals can be obtained from DEC Sales Offices or by sending a written request (with check or money order) to Program Library, Digital Equipment Corporation, Maynard, Mass. 01754.

Introduction to Programming (paperback)   January 1969

An introductory textbook for learning programming on DEC's PDP-8 family computers. Computer Fundamentals, Programming Fundamentals, Elementary Programming Techniques, System Description and Operation, I/O Programming, Operating the System Software, Disk and DECtape Systems, Time-Sharing System, a complete manual on FOCAL programming, and advanced discussion of PDP-8 family computers in the sciences is presented. 432 pages.

Order No. C-18 $2.00

FOCAL-8   Revised, July 1969

Guide to the use of FOCAL and the PDP-8 computers, designed to help scientists, engineers, and students solve numerical problems of any complexity without having to master computer programming. Every aspect of the conversational language is explored. 75 pages.

Order No. DEC-08-AJAD-D $2.00

8K SABR Assembler   May 1969

SABR, an advanced one-pass assembler for 8K to 32K PDP-8 family computers, is discussed. SABR automatically generates off-page and off-field references, simulating skip instructions from page-to-page and field-to-field, and produces relocatable binary code. Essential information is summarized in the appendices. 70 pages.

Order No. DEC-08-ARXA-D $2.00

8K FORTRAN   April 1969

Describes a more powerful version of FORTRAN designed specifically for the PDP-8 family computers with 8K or more of core memory. Details the language elements and statements, FORTRAN compiler, SABR Assembler, Linking Loader, and a library of subprograms. Complete operating procedures, error messages, and implementation notes are included. 70 pages.

Order No. DEC-08-KFXB-D $1.75

Paper Tape System User's Guide   Revised, September 1969

Guide for use at the PDP-8/I, 8/L, 8, 8/S or PDP-5 computer console. Explains use of switches and indicators on the console, ASR33 Teletype, high speed paper tape reader and punch, and DECtape transport units. Oneline operating procedures for all paper tape system software programs with summarized commands, error messages, and other frequently needed references.

Order No. DEC-08-NGCC-D $3.00

Time-Sharing System User's Guide   Available, November 1969

Describes in detail the TSS-8 Time-Sharing System, a general-purpose, stand-alone time-sharing system, offering users a comprehensive library of system, utility, and service programs which provide for editing, compiling, loading, saving, retrieving, and debugging user programs on-line, and also two conversational languages, FOCAL-8 and BASIC-8. TSS-8 Monitor is discussed. 95 pages.

Order No. DEC-T8-MRFB-D $3.00

DDT-8   Revised, September 1969

Keyboard-oriented dynamic debugging technique is explored. Appendices contain a summary of commands and a listing of permanent symbols. 32 pages.

Order No. DEC-08-CDDB-D $2.00

Disk Monitor System   Revised, March 1969

Describes the keyboard-oriented Disk Monitor System, explaining its fast access to central processor and DECdisk for storage and retrieval of programs in the storage library as well as user programs. Appendices cover system generation, system formats, Command Decoder, Disk System Binary Loader, internal storage allocation, etc. 87 pages.

Order No. DEC-D8—SDAB-D $2.75

PAL-D Assembler   Revised, October 1969

Programmer's reference manual of the 4K assembly system for use with the Disk Monitor and TSS-8 systems. Explains format of statements, syntax and rules governing PAL-D language, pseudo-operators, program preparation, assembler output, error messages, operating instructions and interaction with the Disk Monitor and TSS-8 systems. 45 pages.

Order No. DEC-D8-ASAB-D $1.50

PAL III Assembler   March 1967

General introduction to symbolic assembler, followed by description of PAL III language, syntax, pseudo-operators, program preparation, assembly run performance and output, and error messages. 32 pages.

Order o. DEC-08-ASAB-D $2.00

MACRO-8 Assembler   February 1966

Part 1 (Basic Information) explains how MACRO-8 handles binary, octal and decimal numbers, forms binary instructions, and user organization of programs. Part 2 (MACRO-8 Language) covers pseudo-instructions, macros, operating instructions, and error messages.

Order No. DEC-08-CMAA-D $2.00

4K FORTRAN   May 1968

Covers FORTRAN programming on a 4K PDP-8 family computer. Full discussion of FORTRAN statements, arithmetic expressions and number representation, subscripts and arrays, the debugging aid (Symbol-print), and use of DECtape. 72 pages.

Order No. DEC-08-AFCO-D $2.00

DECtape Programming   January 1968

Manual applicable to both the TC01-TU55 and 552-555 DECtape control and transport units. 50 pages.

Order No. DEC-08-SUBO-D $2.00

338 Display Programming   October 1967

A guide explaining how to operate and program the 338 Display System and its remotely slaved CRT's. Topics include a function description of the entire system, data formats for the Control State and Data State commands and IOT instructions, VC38 Character Generator, its function and control characters. 58 pages.

Order No. DEC-08-G61D-D $2.00

BASIC-8   March 1969

Tutorial guide to learning and using BASIC-8 in the TSS-8 Time-Sharing System. Language elements are explained and illustrated, followed by advanced programming techniques. Appendices contain summaries of edit and control commands, operating procedures for use with system, and error messages.

Order No. DEC-T8-KJZA-D $2.50

Bendix Spectrometers Study Infrared Spectrum of Air Pollutants

The Aerospace Systems Division of the Bendix Corporation in Ann Arbor, Michigan is currently building computer-based infrared spectrometers to be used by the U.S. Government for the detection and measurement of infrared absorbing air pollutants. According to project engineer Dr. Arnold Prostak, two of the chief indicators of atmospheric offensiveness, ozone and sulphur dioxide, are measurable by this technique.

To date, two such spectrometers have been built for studying air pollution — each incorporating a DEC **PDP-8** computer for instrument control, data gathering, computation, formatting, and output control. A third unit, built around a DEC **PDP-8/L** computer, is now being constructed for the National Air Pollution Control Administration of the Public Health Service.

The computer uses digitally integrated signals from the wavelengths selected for examination to calculate a weighted sum which is proportional to the concentration of each pollutant. Every two milliseconds, the computer generates a bar chart display of the most recently completed infrared spectral scan as well as the computed amount of each pollutant. This display is viewed on an oscilloscope.

Using the instrument control panel, the operator can cause a spectrum to be produced on a Teletype or a high-speed reader/punch in either decimal or hexadecimal form. In addition, the concentration of each pollutant is printed on the

INFRARED ABSORBING AIR POLLUTANTS are currently being studied with computer-based spectrometers manufactured by the Aerospace Systems Division of the Bendix Corporation at Ann Arbor, Michigan. Each system uses a PDP-8 family computer for instrument control, data gathering, computation, formatting, and output control.

Teletype. Further, using paper tape, the infrared spectrum obtained can be analyzed off-line by a larger computer.

For more information on DEC's PDP-8/I and PDP-8/L, please check customer service box # 4.

DSI System Offers New Information Storage and Retrieval Service

The speed, storage capacity and multiple access capability of the time-sharing computer and the economy and compactness of microfilm are combined in a new, low-cost information storage and retrieval service being offered by DSI Systems, Inc. of Rockville, Md. Among the many applications for the service are inventory control, computer-aided instruction in education and maintenance of personnel records.

Cary W. Armstrong, DSI's Washington, D.C. branch manager, said the service gives customers the ability to store computer-generated data for five cents a page, one cent a page less than the lowest cost impact printing method currently used. And, data is fully abstracted and indexed and can be updated at any time, making the service highly viable, rather

than archival. Data can be retrieved in 10 seconds or less.

The service is based on a system that uses a microfilm reader/computer terminal of DSI's design and manufacture and a DEC **PDP-10** computer. The reader/terminal permits customers to view desired data with up-to-date changes, while at the same time gaining access to the PDP-10 in which the abstracts and indices reside.

The service is the first of its type and is being made available to customers in the Washington, New York City and Chicago areas at present with a fourth branch office scheduled to be opened by year's end.

The PDP-10 in this application has 32,768 words of core memory, each 36 bits in length, and over 80 million words of magnetic tape and disk storage.

DEC Makes Software Improvements in TSS-8

Improvements in the software monitor for its small computer-based timesharing system TSS-8 and the BASIC language available with that system were announced recently by DEC. The improvements make the system more reliable, more efficient, and easier to use.

James D. Bailey, TSS-8 marketing specialist, pointed out that the monitor is what is used to operate and control the system. It includes a 4,096-word swapping area for each user and subroutines that enable each user to summon for his own use any system peripheral — the disk storage unit, magnetic tape storage, or the paper tape reader and punch. "The ability to summon these peripherals on demand means that a user can keep his files in the manner most convenient to him," Bailey said.

The monitor, which is written in PAL-3, is also used to summon the variety of TSS-8 programming languages. These include an assembler, two compilers (BASIC and FOCAL[R]), and an interpreter.

Bailey explained that the monitor is made more responsive by such things as improved scheduling and a more efficient method of throughput. These changes result in better response times. "It is impossible to say quantitatively how much the monitor is improved," Bailey said, "but we know the effort has resulted in a significantly better monitor."

Improvements in the area of system operation allow the operator to communicate with and, if desired, control the actions of individual users. These improvements have resulted in the generation of extensive new documentation. Now available are a 50-page system manager's guide and a 200-page system user's guide.

Improvements to the BASIC language were primarily in conventions, and like those made to the monitor, cannot be measured quantitatively.

For more information on DEC's TSS-8, please check customer service box #5.

ERRATA

Please note the following changes in the PDP-11 brochure mailed with the DEC Newsletter, Vol. 2, No. 7, January, 1970

Specifications — Functional — Direct Memory Access: Rate: 833,000 words/second

Configurations — PDP-11/10 Dedicated Controllers $7,700, MR11-A — 1K words, 500 nanoseconds access time, Read-Only memory.

Recent Articles in Print

"Pioneering Computer-Tech Training in the High School"

by Charles Hand
Superintendent of Schools
Ayer, Boxboro, and Shirley School System
Ayer, Massachusetts

in the September 1969 issue
of *School Shop*

Computer technology courses at the high school level have been highly successful in providing hard core knowledge for those students who wish to continue their education in electronics and in securing employment for students who desire immediate employment. Courses make use of a commercially available teaching device, the COMPUTER LAB, in learning fundamentals of computer logic. Discussion of course goals for Electronics I and Electronics II are presented.

"Motion Picture Animation by Computer"

by Stephen A. Kallis, Jr.
Applications Engineer

in the November 1969 issue
of *Computers and Automation*

Discussion of professional motion picture animation to people in the computer industry. Article covers history of animated films and shows how computer technology has advanced beyond photographing CRT images to full control of professional motion picture equipment.

"Automated Chemistry Laboratory: Application of a Novel Time-Shared Computer System"

by Peter G. Katona
Case Western Reserve University
Cleveland, Ohio
and A. Neil Pappalardo, Curtis W. Marble,
G. Octo Barnett, and Margaret M. Pashby
Laboratory of Computer Science
Massachusetts General Hospital
Harvard Medical School
Boston, Mass.

in the November 1969 issue
of *Proceedings of the IEEE*

A multiterminal, real-time, remote access computer system has been in service at the Clinical Chemistry Laboratory of the Massachusetts General Hospital since 1968. The system accepts typed-in requisition information, creates patient files, and generates schedules for centrifuging blood samples and for the performing of all tests. The system also accepts test results and provides reports on individual patients.

Little Jack's Corner

SITUATION: In the interest of efficient traffic flow, a state turnpike authority was planning to install multiple message boards at strategic points along the highway. These signs consisted of three triangular drums stacked vertically to present a message over the roadway or ramp. Each of the drums had three possible messages which could be configured by rotating the drums.

PROBLEM: Develop a reliable control system for a number of traffic signs that could be operated locally (up to 2 miles) or remotely (up to 36 miles) from the signs. The system would have to provide for expansion of the number of signs and messages and for possible interface to a computer.

PROPOSED SOLUTION: A system was designed in which the message on the boards could be composed from a remote control station by an operator using a drum position selection switch. K-Series control logic at the board would receive the positioning signal and control the small fractional horsepower motor which drives the individual drums. When the drums have been rotated to the desired position, a signal is transmitted to the operator informing him that the message has been displayed.

OTHER APPLICATIONS: A technique similar to this can be used for maintenance of a variety of message displays such as might be found in factories, offices, stores and sporting facilities.
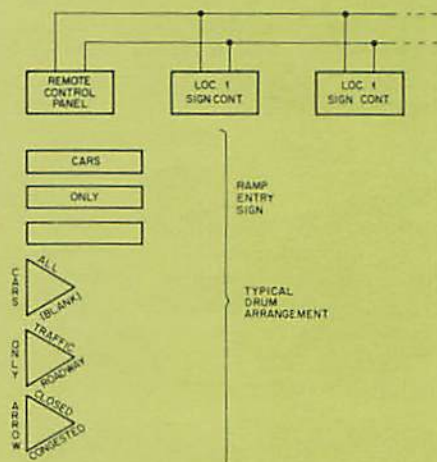
For similar design assistance with your module application, contact a module applications engineer at your local sales office or check customer service box # 7.

See you next month!

Jack Courtemanche

"Determination of Accelerator Tune from Perturbed Closed Orbits"

by M.Q. Barton, R. Frankel, and M. Month
Brookhaven National Laboratory
Upton, New York

in the November 1969 issue
of *Review of Scientific Instruments*

Description of a method for determining the "tune" of an accelerator. The effect of a perturbation on the closed orbit is measured and compared with the theoretical expression for a dipole perturbation by a least squares procedure. This yields the v value as well as information on the amplitude function and betatron phases.

Returning Modules?

In order to expedite the processing of any DEC module being returned to Maynard for repair, customers should obtain a proper **Return Authorization Number** from the local office. This number should be noted on the DEC-supplied mailing label provided with each module and computer shipment. The purpose of this number is to alert DEC's receiving personnel as to the nature of the package and what action is to be taken. Customer cooperation in adhering to this procedure will assure the most efficient handling of repair requests.