

K-Series Manual Controls Added

A selection of manual control modules which can be used to enter data into or display data from logic control systems built with DEC modules has been added to the company's K-Series control module line.

According to Frederick Gould, Module Product Manager, customers will now be able to select indicator lights, toggle, push-button, and thumbwheel switches, or timer controls so that they can preset specific logic functions. "Prior to the availability of these products," Gould added, "it was necessary for the user to design and wire his own manual controls."

The new units, all double-height circuit boards, can be used with or without a new magnetic mounting panel which has also been added to the K-Series line. As many as 32 units can be mounted on the panel.

(Continued on page two)

AEC Selects DEC Computers

The Atomic Energy Commission at Oak Ridge, Tenn., has begun development of a computer-based system to completely automate *Nuclear Science Abstracts (NSA)*, the principal abstracting journal devoted to nuclear science. Selected to form the base of this system, which is expected to cut production time in half, is a large DEC PDP-10 computer, three small DEC PDP-8/T's, and 24 of the company's KV Graphics Displays.

As envisioned by the AEC's Division of Technical Information Extension, the system will at first be used in the production of the abstract portions of the journal. However, the various index sections, now produced on other computer-based systems, will ultimately be put on the new system as well. Robert L. Shannon, Extension Manager, said that the

(Continued on page four)

Interactive Display System for PDP-15

The VT15, a low-cost interactive graphics display system for use with DEC's new medium-scale PDP-15 computer, has been announced. The new display system, which includes a VT15 Graphics Display Processor and a VT04 Graphics Display Console, will sell for \$18,900. A 374 light pen is available for \$700.

According to PDP-15 Graphics Systems Marketing Manager, Robert Katz, the VT15, like the computer it is designed to complement, is built with an autonomous systems structure. "Once the terminal is turned on," Katz said, "it operates asynchronously from the basic processor."

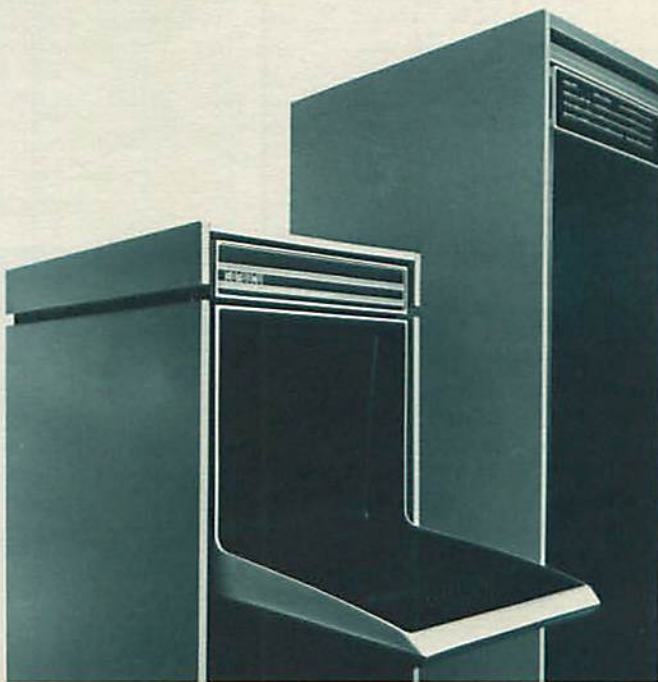
Katz noted that, "The VT15 can be used as a basic graphics processor, a smart terminal with full field handling capability and rapid turn around for large systems data processing, or it can be used to format and display information from a data file, make changes in the data, and store the information in the file again."

The VT15 has a standard 17-inch CRT display, a 68-character and central hardware generator, six function buttons, and eight-directional vector, a hardware program counter, and fast displaying (8 μ sec. average) flicker-free characters.

According to Katz, other options that will become available in the coming months are a keyboard, writing tablet, multiplexer, and random vector capability.

Software available with the system at no extra cost will include a FORTRAN and MACRO primitive package, and a text editor. The software will enable users of the VT15 to store material generated on the display and obtain printed reproductions of the data on an optional copying device or plotter.

For more information on the VT15 interactive display system, please check customer service box # 1.



The VT04 Graphics Display Console (left) and the VT15 Graphics Display Processor comprise DEC's new VT15 Graphics Display system for the recently announced medium-scale PDP-15 computer.

Auto Manufacturer Using PDP-14

A PDP-14 machine controller is being used by a leading automotive manufacturer to drive a grinder used in the production of transmission sprockets. As described in the October 13th issue of *Metalworking News*, a leading trade journal for that industry, the controller has replaced magnetic relay controls.

The article noted that the designers did not have to compromise in their development of the system because of relay limitations. In addition, the company's maintenance men are now free to handle other jobs in the plant because the solid state electronics in the new controller do not wear out.

As quoted from the *Metalworking News* article, a company spokesman noted, "We've got a system now that will operate in a dusty, hot area of our plant where the conventional relay panels aren't capable of doing as well."

The controller has been in one of the company's plants since May, and has registered absolutely no downtime ac-

ording to the report. "We've had a limit switch and pushbutton failure, but these were on the machine tool, not the controller."

Metalworking News noted that the machine operates eight hours a day and produces about 60 sprockets. It operates next to a number of similar grinders under conventional relay control which produce the same number of parts. By comparing these machines they are able to contrast the two types of controls which will lead to a better evaluation.

Explaining the programming techniques for the controller, the spokesman added, "We convert a diagram to Boolean control equations, and put this together with a program on a computer. The result of this is a tape output which can then be fed into a wire wrap machine." (Much of the controller's reliability stems from the use of a braided wire, read-only memory.) "This produces the read-only memory which stores the information in practically permanent form."

PDP-15 Graphics System At FJCC

A demonstration of the VT15 interactive display system, will highlight DEC's participation at the Fall Joint Computer Conference in Las Vegas, Nevada.

Also to be shown at the DEC booth will be a fail-safe, special purpose, time-sharing system that includes DEC's PDP-8/L computer. The four-user system's per-terminal cost is lower than many sophisticated desk calculators, and less than the annual rent of a time-sharing

terminal. The system uses FOCAL, an easy-to-learn language now being used in many secondary schools and colleges throughout the country.

The company also will present its one-card interfacing modules used to connect different types of equipment to DEC computers. The one-card modules have brought the cost of interfacing from a base price of \$1,500 to under \$500, including cables.

We Need Your Help!

To better serve our readers, the Digital NEWSLETTER will be adding several new technical features to its pages on a regular basis. However, simply adding feature items will not tell us if we are providing you, the reader, with the type of information concerning DEC products, applications, and services you need from the NEWSLETTER.

Using the customer service card attached between pages 4-5, a few seconds of your time in answering a few basic questions will greatly assist us in upgrading informational support provided by the NEWSLETTER. By filling out the customer service card, you will not only be indicating to us what path future issues should take, but also whether or not you wish to receive the NEWSLETTER in the future.

A few seconds of your time can certainly benefit you in months to come with improved NEWSLETTER material better suited to your application needs!



Manual control modules enable K-Series control module users to preset specific logic functions.

K-Series

(Continued from page one)

The new units are:

K410 INDICATOR LIGHTS — a five-lamp board for displaying binary, decimal, octal or bi-quinary readouts.
Price: \$18.00

K420 — contains three 3-position toggle switches each of which features inverted and uninverted outputs which can drive 15 unit loads.
Price: \$33.00

K422 THUMBWHEEL ENCODER — a dual thumbwheel encoder used with K-Series inverters to allow BCD data to be entered into the logic system.
Price: \$27.00

K424 THUMBWHEEL DECODER — a dual thumbwheel decoder used with K-Series BCD up counters to allow the counter modulus (c.q.) to be selected manually from 1 through 10.
Price: \$27.00

K432 TIMER CONTROL — used with K-Series timer and one-shots to allow timer delays to be adjusted from a front panel by rotating a knob-pot.
Price: \$33.00

These units join more than 200 products in DEC's noise-immune K-Series module line used to build industrial and other types of control systems. In addition to this line, DEC produces a line of high-speed interfacing modules, M-Series, used for computer interfacing and instrumentation design. Of the new additions to K-Series, the K410, K420 and K432 can be used with either K-Series or M-Series logic systems.

Additional information on the K-Series line is available in the 1970 edition of DEC's *Control Handbook*.

For your copy of the 1970 *Control Handbook*, please check customer service box # 2.

Digital Expands Production Facilities

Digital Equipment of Canada Ltd. is expanding its manufacturing plant in Carleton Place. The expansion is designed to add 12,000 square feet of manufacturing space necessary to house 49 new wire wrap machines for increased production in computer sub-assemblies.

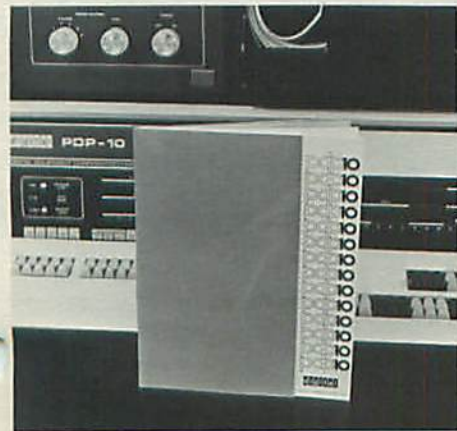
Digital presently manufactures cables, power supplies, COMPUTER LABS, and logic frames for PDP-8/I computers. The logic frames are currently produced on eleven wire wrap machines numerically controlled by Digital's own PDP-8. Each wire wrap machine operator can wire more than 100 wires per hour.

Digital's expansion will be in the form of increased facilities for manufacturing logic frames and is proceeding on schedule. Mr. Bert Couillard, the Canadian company's manufacturing manager, reports, "We are installing our second lot of wire wrap machines now. By the end of October '69, we expect to have 50 machines in operation with 10 more to be installed in early 1970."

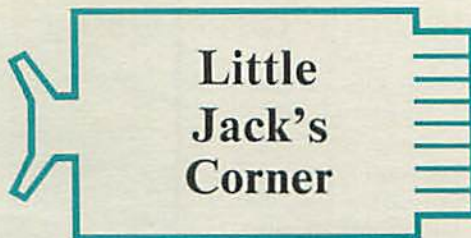
The new machines will increase Digital's production capability severalfold and the added capacity will be used to manufacture logic frames for the PDP-8/L, PDP-10, and the PDP-12 as well as for increased production on the PDP-8/I frames.

PDP-10 Brochure Available

A 32-page color brochure describing the DEC PDP-10 is now available. It features a discussion of hardware, software, peripherals, service, and applications for the PDP-10 computer.



For a copy of the new PDP-10 brochure, please check customer service box # 3.



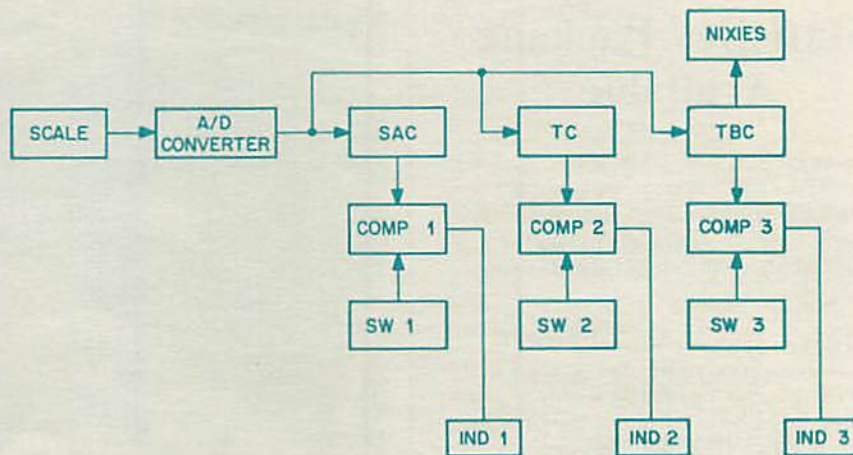
EDITOR'S NOTE: In this issue, we begin a new monthly feature which brings you ideas about how DEC modules can be used. Our purpose is not to present detailed documentation on module systems, but to provide a general indication of how such module-based systems can be used. Jack, by the way, is Jack Courtemanche, supervisor of DEC's **module application group** which provides module application services to users of DEC modules. Material presented here is from design projects undertaken by the group.

Monitoring Scales at a Truck Weigh-In Station

Module Application: The interstate Commerce Commission and many state and local agencies require that multiple-axled trucks not exceed prescribed statutory weights. Truck weigh-in stations are found throughout the country. In high-traffic areas, it is especially important to be able to conduct the weigh-in procedure as quickly as possible.

Problem: Design a system which would allow the station attendant to monitor the weigh-in remotely and not be required to manually check scales or calculate weights. The system should also permit the truck to be weighed without it coming to a full stop. It must function reliably without being affected by external electrical noise.

Proposed Solution: Taking advantage of the high noise immunity and flexibility of K-Series control modules, each scale can be interfaced to a monitoring console in the station. As trucks approach, the attendant visually determines the number of axles and sets this number on a thumbwheel indicator. The maximum individual and aggregate axle weight allowed for that size truck is then stored in logic memory. As the truck passes over the scales at a speed of about 20 mph, each axle weight and the aggregate weight is registered in memory and compared to stored maximum allowable weight held in memory. If the truck's weight is within the allowed limit, it continues through the station uninterrupted; if it exceeds the limit, audio and visual indicators are triggered which direct the driver to bring the truck to a halt.



Other Applications: This technique can be used in virtually any environment where bulk weights must be determined on a time-important basis such as materials handling, conveyor and pipeline systems, and airline baggages and freight handling systems.

For similar design assistance with your module application, contact a module applications engineer at your local sales office.

See you next month!

Jack Courtemanche

AEC (Cont. from pg. 1)

new system might reduce total production time from almost eight weeks to less than four weeks.

Nuclear Science Abstracts contains abstract and index information on the world's literature in the nuclear science field and is published semimonthly. Indexes are cumulated semiannually, annually, and every five years.

The Technical Information Extension, and its parent body, the AEC Division of Technical Information in Washington, D.C., is similar to the information organizations of the National Aeronautics and Space Administration, the Department of Defense, and the Library of Medicine. The information in *Nuclear Science Abstracts* is of interest to researchers in nuclear science whether the study be physics, chemistry, biology, medicine, engineering or instrumentation. Semimonthly issues are the size of an average city's telephone directory. The five-year summary probably would fill most of the shelves in an average size book case.

Shannon is optimistic that the system can be successfully developed, but cautions, "We must talk in the language of the physicist," he said. "This is not a language of just words and numbers but one that contains a great number of symbols. We estimate that we are dealing with 1,700 different characters."

DEC has long been a supplier of computers to the AEC. Almost 100 are presently in use at Oak Ridge.

PDP-15 Statistics Package Available

A general-purpose statistics package called STATPAC, is now available for the PDP-15 medium-scale computer. The package permits the user to perform a variety of descriptive statistical analysis operations on his data.

STATPAC comprises several FORTRAN software modules which can be used with any PDP-15 that has 8,192 words of core memory, a high-speed paper tape reader/punch, and two DECTape transports.

The five modules currently available are control, input, descriptive statistics, stepwise linear regression, and multiple linear regression.

The control module performs the necessary executive communication functions so that the user can interact with the system with a minimal knowledge of the

computer's operation. The input module prepares and converts the input data to the format required for statistical analysis.

The descriptive statistics module provides an easy means of determining whether a given set of statistical algorithms can be applied to a given set of data. This module can develop statistic results such as a mean, a standard error of the mean, a standard deviation, variances, skewness, kurtoses, maximum/minimum range, and correlation matrices.

STATPAC also offers two modules that are used to perform regression analyses. The multiple linear regression module uses an input matrix and supplies the values of the coefficients of an equation used to represent a model. The stepwise linear regression module performs analysis upon multiple variables, by examining their contribution to the model and including or excluding them based on pre-established significance levels.

For more information on STATPAC for the PDP-15, please check customer service box # 4.

DEC/ADI Hybrid Systems Possible

Powerful, accurate, and economic hybrid systems capable of solving exceedingly complex problems at extremely high rates of speed are now possible by interfacing

DEC's PDP-9, PDP-10, or PDP-15 computers to an Applied Dynamics, Inc. AD/FOUR 100 volt analog computer. Using a new Applied Dynamics interface sub-system, plus the complementary analog or digital computer, owners of either ADI or DEC systems can easily expand to a fully operational hybrid facility.

Advanced modeling and simulation techniques in the engineering and scientific disciplines are currently being used by the University of Michigan in one such hybrid installation - a PDP-9/AD/FOUR. Sikorsky Aircraft is using its PDP-10/AD/FOUR for a variety of problem solving applications in the aerospace research and development field.

Another PDP-10/AD/FOUR is employed by Union Carbide at the Atomic Energy Commission's Oak Ridge National Laboratory to study the control dynamics of large nuclear reactors; while investigations into chemical kinetics and petrochemical processes will be the primary concern of American Oil's petrochemical hybrid PDP-15/AD/FOUR facility.

Advanced hybrid software and total systems responsibility are normally provided by Applied Dynamics Inc. for these DEC/ADI hybrid systems. In addition to the digital portion of these hybrid systems, DEC provides hybrid programming software for the PDP-9 and PDP-15/AD/FOUR systems.

More information on DEC/ADI hybrid systems can be obtained directly from Applied Dynamics Inc., Box 1488, Ann Arbor, Michigan 48106 Tel: (313) 971-4444.



STATPAC general-purpose statistics package enables PDP-15 users to perform descriptive statistical analysis operations using control modules to perform the necessary executive communication functions.

Computer Studies Fish Guidance System

Various species of fish may have a built-in internal guidance system according to Dr. Herman Kleerekoper at the Institute of Life and Science, Texas A & M University at College Station, Texas. The discovery could help unravel many of the mysteries associated with animal navigation.

Using the PDP-8/S computer, Kleerekoper's group tested common household goldfish. "We were able to determine that these fish are capable of compensating left-and-right-hand turns, and maintaining an approximately straight course of progression," Kleerekoper said. "The goldfish maintained this capability at a high level of efficiency without directional cues from their environment. Hence, this raises the possibility of an internal guidance system."

The test was set up with the fish con-

tained in a tank 16 feet by 16 feet. Their movements were monitored by a series of illuminated photo-conductor cells, which were interfaced to the PDP-8/S computer.

When the goldfish shaded one of the nearly 2,000 rays of light generated by the photoconductor cells, an electrical input was sent to the computer, which noted the location of the cell in question.

The PDP-8/S monitored frequency and angles of turns, sequential relationships, and the lengths of intervening straight movements. The data was outputted to a Teletype, a cathode ray tube display, a plotter for analysis, or a magnetic tape storage unit for additional processing. The computer was also used to calculate the values of the velocity of locomotion and the orientation of the goldfish to their environment.

PDP-8/S Controls Concrete Batching System

A typewriter-sized computer is helping concrete contractors get precisely the blend of sand, gravel, water and cement that is required for constructions jobs ranging from sidewalks and home foundations to pre-stressed concrete girders and high-rise apartment buildings.

The computer, a PDP-8/S, is the heart of the Mark II Selectron, a computerized batching control made by Advanced Electronic Controls, a subsidiary of American Hoist and Derrick Co., that can precisely measure and blend tons of various grades of sand and gravel with different types of cement, add the proper amount of water, and either mix the ingredients in a central location or load them on a concrete truck that can mix them on the way to the destination. The 75-pound computer can "memorize" as many as 100 different formulas for concrete and mix them within tolerances set for each.

An operator at the Selectron console can enter a formula to be mixed through a teleprinter and have it recorded in the computer's memory. When the concrete is to be mixed, the operator types a code that tells the computer what amount of concrete should be mixed.

The computer controls the amount of each ingredient by monitoring scales that weigh the material. It also controls gates that allow the material to flow into the central mixer.

The operator can call for a printout of running totals of materials used during a specific period of time; he can determine the amount still on hand, and he can use the statistics to determine inventory, use of various formulas, and truck usage. The Mark II Selectron also can produce a paper tape listing all or part of the day's activities for input to data processing machines.

Module Products Forecasting System Developed

A computer-based module products sales forecasting and inventory control system has been developed by DEC as one of several measurement and evaluation approaches the Company is taking to meet the growing demands for its solid state modules.

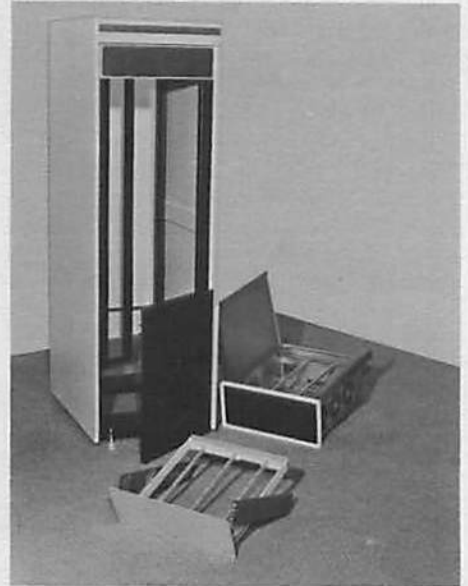
The system is designed to project long range manufacturing requirements for module products based upon historical and current sales data. Initially it will maintain information on inventory levels of the most popular module products available from DEC. The system incorporates a PDP-8/I computer.

According to Frederick Gould, Module Product Manager, "this system provides us with the type of information we need to ensure that we meet our customer's demands for both a wide range of products and timely delivery."

In addition to the sales forecasting system, DEC is implementing a number of new manufacturing techniques aimed at increasing production rates for its modules. These include: the installation of computer-controlled component insertion equipment which increases insertion rates by a factor of four over semi-automatic techniques; expansion of its facilities for

Cabinetry Brochure Available

A new 12-page brochure describing DEC's expanded line of equipment cabinetry is now available. The brochure details cabinetry which is particularly suited for mounting DEC logic module systems, computer peripherals, and other devices which are on-line to DEC computers. A comprehensive price list accompanies the brochure.



The cabinets described are electrically and mechanically compatible with cabinets that house DEC computers and also can be used to house electronic equipment not manufactured by DEC.

Cabinet configurations offered include module drawers, computer cabinets, and various option cabinets. Also included are plenum doors, casters, and associated hardware.

For a copy of the Cabinetry Brochure, please check customer service box # 5.

computerized checkout of finished modules; and development of an automatic digitizer used to create paper tapes that drive template fabrication equipment.

Also, DEC has expanded its incoming component checkout facilities, and introduced advanced equipment to accelerate the checkout procedure.

Gould added that expansion of DEC's subassembly plants in Canada and Puerto Rico, and the recently announced new plant construction in Massachusetts "... will contribute significantly to our ability to maintain high volume production."

Analog Subsystem for PDP-10

An analog subsystem is now available as a standard interface for PDP-10 computers used in real-time data acquisition applications. Designated the AD10, the unit was designed by DEC's Computer Special Systems Group.

The AD10 subsystem can service from 64 to 192 analog input channels from any combination of analytical instruments such as gas chromatographs, mass spectrometers and clinical analyzers. Under software control, the AD10 selects the desired analog input channel, provides the proper gain and digitizes the input at a maximum rate of 10,000 samples per second.

The AD10 features a differential input multiplexer which provides complete programmable gain selection over the entire range of ± 10 mV to ± 10.24 volts full scale. An automatic gain selector allows two gain selection modes: the program mode in which software designates one of the ranges, or the auto ranging mode in which the multiplexer automatically selects the range for optimum subsystem performance.



The AD10 Analog Input Subsystem combines a reliable solid state multiplexer with a high resolution analog-to-digital converter for real time applications of data acquisition and the reduction of time dependent analog voltage signals from laboratory devices.

The AD10 is priced from under \$50,000 and first deliveries are now being made. It is an addition to the PDP-10 product line's full range of peripheral options and software designed for real-time applications.

For a brochure highlighting the AD10 Analog Input Subsystem for the PDP-10, please check customer service box # 6.

DEC Reports First Quarter Earnings

Record sales and earnings for the first quarter of Fiscal 1970 have been reported by DEC.

Company President Kenneth H. Olsen announced that sales for the three-month period ending September 30 were \$28,942,700, a 57 per cent increase over first quarter sales reported September 30, 1968. Earnings for the period were \$2,952,400 or 32 cents a share, compared with \$1,864,000 or 21 cents a share for the corresponding period last year. This represents a 58 per cent gain in earnings.

In explaining the increases, Olsen pointed out that sales of the company's line of small computers were on target for the quarter. "Competitive pressures continued to have little effect on our overall performance," he said.

Deliveries of both the PDP-8/I and PDP-8/L each passed the 1,500 mark this quarter, the PDP-8/L in less than a year. More than 5,000 PDP-8 Family computers are now in the field.

Olsen indicated that he was very pleased with the progress of the company's large-scale computer, the PDP-10. More than 80 of these systems have already been installed. Early customer acceptance of the PDP-12 laboratory computer system and PDP-15 medium-scale computer systems was also reported.

First deliveries of the company's PDP-14 were made during the quarter and, the LAB-K, a new solid-state logic system designed to assist life science researchers in building laboratory instrumentation, control, and monitoring devices, was announced. In addition, a software product line was formed, and a West Coast training center was opened.

Operating Results for the Three-Month Period Ending:

	Sept. 30, 1969	Sept. 30, 1968 ²
Net Sales	\$28,942,700	\$18,401,000
Income before Taxes	5,793,400	3,884,000
Provision for Income Taxes	2,841,000	2,020,000
Income After Taxes	2,952,400	1,864,000
Shares Outstanding ¹	9,354,720	8,839,515
Income per Share	.32	.21

The company has revised its reporting method so that foreign subsidiaries report results on the basis of a July to June fiscal year rather than a May to April fiscal year.

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

Four-Community High School Computer Project Underway

A four-community project in Northeast Rhode Island, established to offer low-cost computer training at the high school level, has become a reality with the delivery of a PDP-8/L computer system specifically designed for this type of application.

The project is called the Northeast Rhode Island Computer Project. It is the brainchild of the superintendents of schools in Cumberland, Lincoln, North Smithfield, and Woonsocket, the four communities involved, and Arthur J. McMahon, consultant in mathematics education for the state. It was established so that every high school student in these communities will have some exposure to the computer, a necessity in this age, according to Mc-

Mahon, at a cost that can be borne by even the smallest community involved.

The computer on which these students will receive the instruction is a special-purpose time-sharing system built around DEC's lowest-priced computer, the PDP-8/L, and makes use of a DEC-developed, mathematics-oriented, conversational computer language called FOCAL^R. The program package is so written that up to four communities can use the computer simultaneously. Four Teletype input/output terminals are included with the system. Its per terminal cost - below \$5,000 - is less than that of many less versatile electronic calculators or the per terminal cost of most other

(Continued on next page)

time-sharing systems. It is the first application of this system, which was announced by DEC in late August.

McMahon explained that a terminal will be located in each school, and the computer housed at the Cumberland High School. This plan was the result of a careful study to determine the most economical employment of local telephone lines, the medium over which students will communicate with the computer. "By incorporating, each school system can share the communications costs equally," McMahon said. "Careful planning was needed on even the most minute details to make the project a reality."

"The training will be mathematics oriented," McMahon continued, "but we plan to teach students taking science and business courses. This means that eventually all students will have received some exposure. We will start with the seniors and work down," he said. Besides mathematics instruction, the course will include principles of programming.

The system, which can be used in a variety of engineering applications, as well as in education, allows from two to seven users to work on different problems at the same time, as if each had his own computer. FOCAL^R can be mastered by a person with no prior experience in less than two hours. The Rhode Island project's system includes only the basic computer and 8,192 words of core memory. Larger versions require disk storage, but can be expanded with the addition of other options to accommodate 16 or more terminals. Expansion also gives the system a general-purpose capability, permitting the use of a variety of computer languages.

McMahon pointed out that this was the first system of its type in Rhode Island, but hopes that every school in the state will have access to some type of system like this within two years. He sees no problem in devising courses for the computer, since instruction in computer programming has been offered high school teachers by Rhode Island colleges and The University of Rhode Island for several years.

Heading the project is Robert Potenza, superintendent of schools in North Smithfield, who serves as its president. Richard Sheehan, Lincoln school superintendent is vice president. Edward J. Condon, Woonsocket school superintendent is treasurer, and Robert G. Condon, Cumberland school superintendent is secretary. Erleen Mari, a Cumberland teacher, is acting as project coordinator.

"Remote Sensing of a Contact Closure"

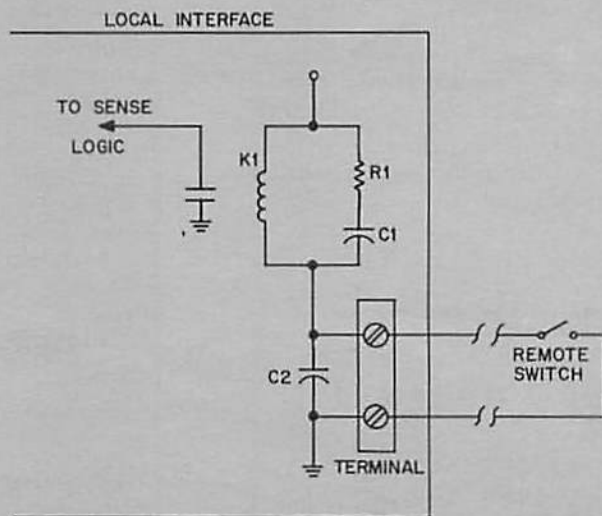
By Robert Hurley, Engineering Supervisor
Computer Special Systems

Problem:

In designing special interfaces to computer-based analytical instruments such as gas chromatographs or mass spectrometers or for limit switches such as liquid level controls or pressure switches in industrial applications, it is usually necessary to overcome the line resistance present in remotely located switch contacts. Noise is an associated problem due to line length.

Solution:

Install a "wide range" relay!



Rather than use transformer isolation, a more economical technique is to employ a "wide range" relay which operates with variable line resistances while isolating noise between the outside contact and the interface logic.

In this case, local relay contact is sensed by the local interface logic to determine a switch closure. It may even be possible to use a less expensive contact switch in this type of operation since relay output operation is insensitive to series type resistances.

There is, however, a maximum line length associated with a chosen relay. In the example above, we have used a #26 AWG wire for the 3000 foot line.

In the months to follow, we hope to make the Computer Special Systems DESIGN NOTEBOOK a regular feature in the Digital NEWSLETTER - highlighting interesting solutions to design problems.

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.

St. John's Prep Receives "Math" Computer

Junior and senior mathematics students at St. John's Preparatory School in Danvers, Mass. are using a PDP-8/S computer to solve mathematics problems.

The students who will use the computer receive 15 class periods of introduction to the machine, according to Brother John O'Connell, of St. John's mathematics department, who is in charge of the computer program. In addition, the students receive at least five hours of instruction on the computer before they begin using it as a computational tool.

After a student has demonstrated he can handle the steps for a relatively difficult problem, he begins working on his own. Brother O'Connell said there are 18 math students, mostly seniors, now in the introductory program.

Free Publicity!!!

Do you have an interesting application involving DEC computers or modules that you would like to see publicized in a future issue of the NEWSLETTER?

Each month, the Public Relations staff develops application stories about DEC customers — highlighting their use of PDP computers and modules from information supplied to us. Working together with customers, we develop application stories and attempt to place them with the proper media. Very often, our efforts yield substantial coverage in the ranking trade publications.

To fully evaluate your application for a mutual publicity effort, we need to know something about you. If you will send us some basic information, including: Your name; organization; telephone number; and something about your application, we will evaluate it for possible development. Obviously, the more you can tell us about your use of DEC equipment, the better we will be able to explore the possibilities of developing your application story for the NEWSLETTER and, possibly, for general release!!

If the idea of free publicity appeals to you, write: Public Relations Manager, Digital Equipment Corporation, Maynard, Mass. 01754.

New Interface Modules Announced

Seven new modules have been added to DEC's M-Series line of design and computer interface IC modules.

M107 Device Selector:

A double-height, single card interface through which the computer user can select via Teletype or software instruction as many as seven peripheral devices. It provides seven discrete I/O transfer pulses for the devices, plus five additional pulses which reduce software requirements by permitting combination of I/O transfer pulses.

M-107 Device Selector . \$115.00

M-730 Positive Bus Interface:

Provides complete output interface control logic to the programmed I/O transfer bus. The module receives from the positive bus computer 12-bits of data from the BAC bus, IOP pulses from the IOP bus, as well as sending two pulses to the external devices to control the flags and routing 12-bits of data to the external device. The M-730 provides a complete positive output interface.

M-730 Positive Bus Interface \$185.00

M-731 Negative Bus Interface:

Provides negative output interface control logic for the positive bus PDP-8/I or PDP-8/L. It receives from the positive bus computer 12-bits of data from the BAC bus, IOP pulses from the IOP bus, and sends two flags to the computer via the skip bus. Two pulses are sent to the external device to control the flags, along with 12-bits of data that goes out to the external device. The M-731 negative bus output is a complete interface.

M-731 Negative Bus Interface \$185.00

M-732 Positive Input Bus Interface:

Provides a complete positive input control logic interface for the positive bus PDP-8/I or PDP-8/L. Receives 12 parallel bits of data from the external device and transmits 12-bits of data from the storage register to the computer via the BAC bus under computer control. It accepts from the positive bus computer the device selection code from the MB bus, IOP pulses

from the IOP bus, and can send two timing pulses to the external device. Timing pulses are variable from 5-25 microseconds by use of potentiometers mounted on the module. Device or system to be interfaced must have data transfer rate of less than 20 KHz.

M-732 Positive Input Bus Interface \$185.00

M-733 8/I Negative Bus Interface:

Provides flexible interface control logic to connect devices, systems, and instruments to the input half of the programmed I/O transfer bus of either a positive bus PDP-8/I or a PDP-8/L computer. Peripheral equipment which operates asynchronously or synchronously to a computer and expects to transmit data can, to a large degree, be interfaced by the M-733, providing that information being transmitted to the computer is a negative voltage of less than a 20 KHz data transfer rate.

M-733 8/I Negative Bus Interface \$190.00

M-737 12-bit Bus Receiver Interface:

A double-height, single width module designed to receive and store in a buffer register 12 parallel data bits from the positive bus of the PDP-8/I or PDP-8/L. It is pin compatible with the M-738 counter buffer interface and the M-107 Device Selector. The M-737 consists of a device selector, flag and buffer register.

M-737 Bus Receiver Interface \$120.00

M-738 Counter Buffer Interface:

A double-height, single width board designed to strobe 12 parallel bits onto the positive bus of DEC PDP-8/I or PDP-8/L computers. The unit consists of a 12-bit bus driver, 12-bit Up Counter and a clock input gate.

M-738 Counter Buffer Interface \$105.00

Additional information on these and other modules is available in DEC's Logic Handbook.

For a copy of the Logic Handbook, please check customer service box # 7.