

ONLINE

FEBRUARY

DIGITAL EQUIPMENT CORPORATION

Computer Line Announced

The latest in a long line of small, general purpose computers, actually a family of 8/16 bit, byte-oriented machines has been announced by President Ken Olsen.

He said that, in its most basic form, a control unit could sell for \$4000 to \$5000. The line features extreme ease of programming and a unique range of peripheral devices.

The introduction of the new product is expected in 3 to 4 months, he added.



We're Third in Australia

Robin Frith, Australia District Manager and the 21 other Australians who operate DEC's district office in their native country are servicing one of the company's most promising and rapidly expanding markets.

continued on page 3

PDP-10: 1.5 Million Hrs.

More than 1.5 million console hours have been logged by users of the PDP-10 and its predecessor, the PDP-6.

Forty installations include such diverse applications as university computing centers, medical research laboratories, avionics simulation, and factory monitoring.

The Radiation Health Division of the University of Pittsburgh's Graduate School of Public Health uses a PDP-10 to assist the study of chromosomes in blood cells.

The PDP-10 analyzes data collected by a PDP-7 and instruments used to investigate genetic information carried by chromosomes.

The object of these efforts is to solve health problems including congenital abnormalities and cancer. They also help determine the effects of such environmental agents as radiation and chemicals.



PDP-10

Among equipment on-line to this PDP-10 is a PDP-7. The older computer controls a microscope and other instruments.

This research is funded primarily by a N.I.H. - N.A.S.A. grant.

continued on page 5



Digital President Ken Olsen was the first to give blood in the company's Red Cross Blood drive.

Another Gain DEC Earnings Reported

Operating Results for Six Months Ending:

	December 28, 1968	December 30, 1967
Net Sales	\$ 36,897,000	\$ 23,753,000
Income Before Taxes	7,530,000	5,533,000
Provision for Income Taxes	3,976,000	2,656,000
Income After Taxes	3,554,000	2,877,000
Shares Outstanding*	2,978,210	2,912,095
Income Per Share	1.19	.99

*Based on the average number of shares outstanding during the period.

IC's, Tigers, Bug Eaters ...

Variety Is Spice of Life

The Purchasing Department is one of the company's most important functions, but it has its lighter side.

"I was flipping through some recent purchase orders the other day," said Bill Burns of the Purchasing Department, "and I noticed a 'rental for one tiger'. I thought that someone was kidding."

The purchase order was no joke, as Advertising had called upon Purchasing to rent Warren, a tiger cub, from Franklin Park Zoo, for some promotional photographs (ON LINE, December 1968, Page 1).

Another unusual purchase involved animals, but in a more negative aspect. Years ago, Purchasing was asked to help dispose of some unwanted feathered friends. Pigeons had adopted dive-bombing tactics against DEC employees and visitors.

Purchasing bought "Roost-No-More" by the bagful. When spread on windowsills, this was supposed to discourage birds from resting there.

"The Pigeons loved it," said Henry Crouse, Purchasing Department Manager. "They began using it to make nests," added Fabrication Shop Foreman John Trebendis, who worked in Purchasing at the time. Fortunately, most of Purchasing's acquisitions prove more successful than the "Roost-No-More" adventure.

Some of the most interesting stories come from the "unfilled requisitions" file. One such purchase order arrived at the Purchasing Department shortly before Christmas requesting the "Total Christmas Package".

According to the request, the package was to include a Santa Claus, Christmas tree, refreshments, and gifts for everyone in the department.

"We filed that purchase order with the ones we received for Lincoln Continentals. They appear periodically," said Henry.

Another "unfilled requisition; but one made seriously, called for purchasing hundreds of praying mantises. The rationale behind this held that since these insects devour other insects, they would be helpful during the summer months.

This request was not fulfilled because it was thought that the large praying mantises might bother some people more than the insects they were supposed to combat.

Would you know what to do if someone asked you to buy about 15 tons of turkey? The Purchasing Department met this request from the Personnel Department without the slightest display of strain.

Purchasing approached between 10 and 15 meat dealers to select the best turkeys for DEC's Christmas gifts. Final arrangements involved a New Hampshire-based company shipping the birds in from Wisconsin.

Dick King, now in Plant Engineering; Bill Burns; and Tom Kennedy laughed as they recalled these episodes.

The Purchasing Department annually spends millions of dollars on sophisticated electronic equipment, all raw materials necessary to manufacture millions of modules, hundreds of computers. It buys a myriad of other items required in the day-to-day operations of a large corporation.

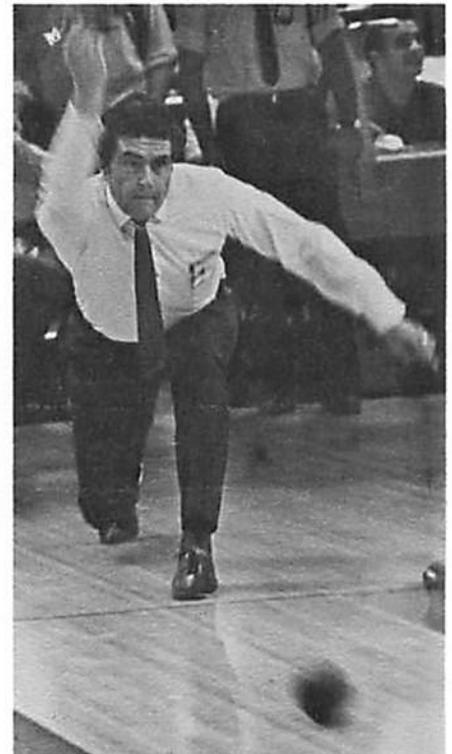


What's 6 x 6 ?



School children in California solve their arithmetic problems on Digital computers at Stanford University via remote consoles.

British Kegler Steals Show



THE RIGHT "ENGLISH" FOR A STRIKE should be on this bowling ball, since the bowler is Rick Jacobs, a Digital Equipment Corp. (United Kingdom) Ltd. employee. Rick was in Maynard for a course on the company's computers. Other foreign DEC employees who participated in the Maynard bowling league while they were here taking courses were Britishers Dave Lyons and Noel Smith, and Australian Barrie Hunter.

We're Third Australia Operation Booming

continued from page 1

As of June 1968, Australia had 600 stored program computers installed, of which 70 were DEC machines. This 11.6% rates us third behind IBM and ICT.

"Growth," as much as any other word, summarizes DEC's Australian office, as it does the rest of the company. "Growth" refers to all aspects of the Australian operation, computers installed, people employed, diversity of applications, and geographic area covered.

In only the past three years, our representatives "down under" have installed the bulk of their 70 computers, and the market grows.

What began as a one-city operation in Sydney now stretches from there to Melbourne, Brisbane, and 2,500 miles west to Perth. The DEC Australians also service New Zealand, an important market.

One striking aspect of the Australia/New Zealand installations is the pro-

portion of PDP-10's. Four of the 80 computers belong to DEC's family of large computers, with two more on order.

Queensland University in Brisbane has a dual processor PDP-10 as the main computer in its central computing center. The PDP-10 performs scientific computation for the University's undergraduates and for its research programs.

Remote consoles in Brisbane connected to the University's PDP-10 will serve commerce and industry. This type of operation is rare among universities.

The Melbourne Aeronautical Research Laboratory uses a PDP-10 in recording and analyzing data from its scientific investigations.

A PDP-6 serves the University computing center of the University of Western Australia. It also functions as the main scientific computer in Perth, a city of 500,000 people. The University rents time on its PDP-6 to local industry.

The Australian government's Common-

wealth Scientific and Industrial Research Organization in New South Wales, has a PDP-9 controlling a 210-foot diameter radio telescope. Based on data it analyzes, the computer focuses the telescope on certain stars.

Peter Watt, Software Support Manager for Australia, is working on one of the most interesting and potentially valuable applications being developed by DEC.

The plan includes installing a PDP-10 in the Melbourne Stock Exchange. Remote consoles will extend from the Melbourne Stock Exchange to all local stock brokerages. Brokers will be able to instantaneously obtain the latest price information from the PDP-10 in the Stock Exchange.

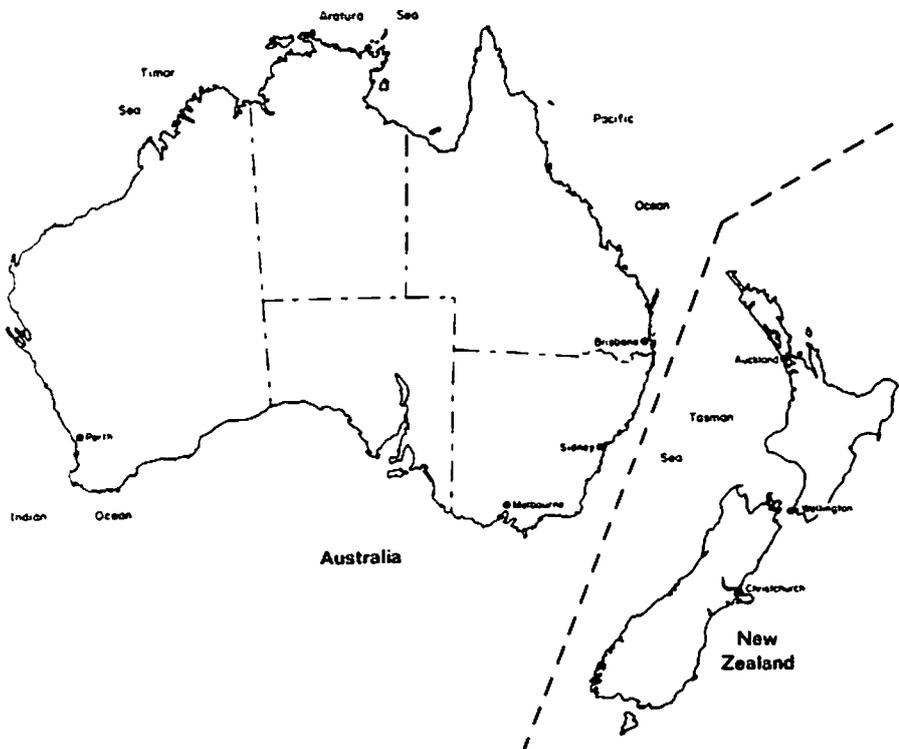
The brokers will simply transmit a stock code to the PDP-10, and will receive back such information as the price of the last sale, the bid, and high and low prices for the day.

Installations in three New Zealand cities, Christchurch, Wellington, and Auckland, necessitate frequent forays across the Tasman Sea.

DEC has two PDP-8's, one 8/S and one LINC-8 installed in New Zealand, with a 9/L and 8/L on order. Two additional PDP-8/1 systems ordered through an OEM will be installed presently.

The New Zealand government's Department of Science and Industrial Research, in the country's capital, Wellington, uses a PDP-8 in nuclear physics research. The PDP-8 directs and controls a 10 M.E.V. (million electron volts) accelerator.

Although we associate the LINC-8 with biomedical applications, one is aiding oceanographic research off the New Zealand coast near Auckland. It analyzes data recorded on magnetic tape by oceanographic sensing devices. Now strictly a "land-lubber," the LINC-8 will presently become ocean-going.



MODULES

Many people think of Digital as the world's leading small computer manufacturer. Very few realize that we are also the world's largest manufacturing supplier of logic modules. Last year the Module Product Line accounted for 14% of the Corporate sales. In fact, enough modules roll off the production line every year to span the state of Massachusetts, if placed end to end.

Digital started out as a module manufacturer. After a very short time, we were recognized as a leader and pacesetter in this industry, a position which we have never relinquished. Our module products have changed over years and evolved into the three groups of products which we now produce and actively market.

We offer over 340 different modules, the majority of them in the A, K, and M Series.

Our customers range from physics research to the manufacturer of automotive parts. Each of the series of modules appeals to a different type of customer.

A Series modules are primarily used to perform analog-to-digital and digital-to-analog conversions. The world of the computer is digital in nature but the real world around us is analog. These modules allow the marriage of the two worlds. For example, the Imperial Oil Company, Ontario, Canada, uses A Series modules to measure factors like the speed, pressure, and temperature of oil as it flows through the pipelines.

K Series modules primary uses are in control systems related to industrial operations. They were specifically designed to operate in this environment which is normally hostile to electronic circuitry. A manufacturer in the Ann Arbor area uses K Series to control the machinery which produces the familiar foam plastic coffee cup. The Landis Tool Company of Waynesboro, Pennsylvania, uses K Series to control automobile crankshaft grinders. One of these crankshafts may be in your next automobile!

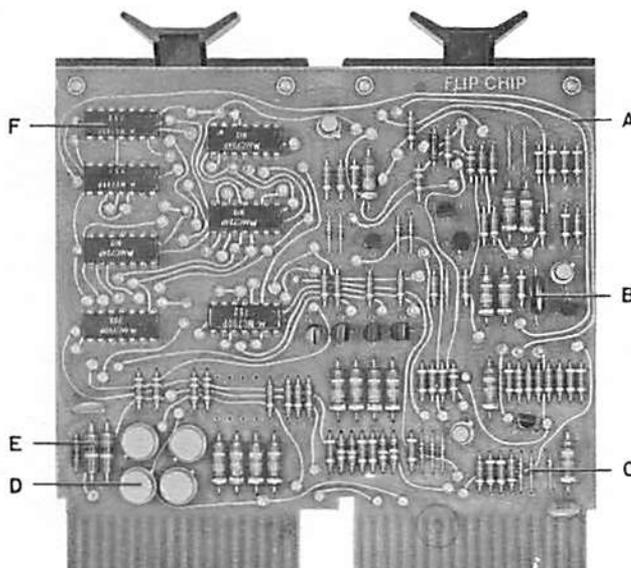
Al Devault, Module Product Line Manager, said that K Series modules replace bulky and unreliable relays which now control most machines.

More than anything else, M Series is used to interface or connect our small computers to various electronic instruments. For instance, M Series have been used to connect electrocardiogram (EKG) inputs to our computers.

Massachusetts General Hospital has a PDP-9 interfaced to various biomedical testing instruments with our modules.

Bill McNamara, Module Marketing Manager, helped develop a device using M-Series modules, that analyzed metal to determine if it could be used as nuclear reactor fuel.

Modules are a significant part of our business, supported by a world wide sales force. We are number one and we intend to stay there.



- A. CIRCUITRY: conducts electric current from one component to the next.
- B. CAPACITOR: stores electricity for very short periods.
- C. DIODE: allows current to pass through in one direction only.
- D. TRANSISTOR: electronic switch that turns current on or off through certain parts of the circuit.
- E. RESISTOR: restricts flow of current through parts of a circuit.
- F. INTEGRATED CIRCUITS: complete circuits reduced to micro-miniature size. Each IC has the functions of transistors, resistors, and diodes.

Computers' Appearance Counts



Jim Jordan

Most DEC employees are aware of the talent that contributes to each company development in hardware and software. But, how many of us appreciate the expertise and care involved in designing the external appearance of our products?

The color of the panels, the size and location of the switches, and the size and shape of the cabinet are not decided arbitrarily. Trained, experienced industrial designers considered a variety of factors before the PDP-12 made its entrance as the "Green Machine."

Jim Jordan and Jack Carroll, DEC's Industrial Designers, strive for four general objectives when they design the company's computers and peripherals. "Color and form are the 'tools' we use," according to Jim.

One aim of their efforts is to produce aesthetically pleasing electronic devices. People see what a computer looks like before they see it perform. The important "first impression" depends to a large measure on the computer's appearance.

Secondly, Jim and Jack attempt to design computers to make them as easy to use as possible. Basically, computers operate on a binary system. The console has switches which can be set in two positions to produce binary language instructions.

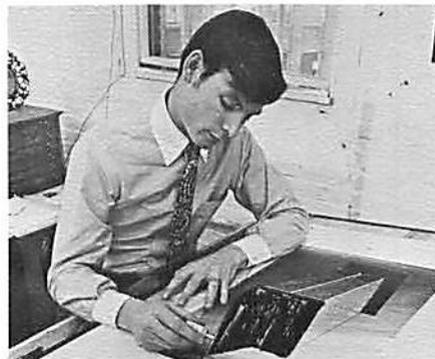
Twenty-four switches in a row, all the same color, might easily confuse the operator. The industrial designer's solution is to divide the switches, using color, into small groups.

A third objective in designing the external appearance of computers and their peripherals is to instill in DEC's computers their own identity. They want DEC products to be distinctive, to leave impressions in people's memories. This will help DEC establish itself not only in the scientific community where it is already known, but in industry, secondary education, and other markets.

Fourthly, the designers try to specialize systems for specific markets. They try to tailor DEC computers headed for a certain application to fit that application. LINC-8's, and PDP-12's employed in similar applications will share certain design features to make them more effective in these environments.

As the competition stiffens and computer manufacturers adopt each others' developments, computers will tend to become more alike in size and capabilities. This too will place a greater emphasis on appearance.

Jim said, "We are trying to help solidify DEC's position in the computer market by placing there computers that are distinctive and attractive. We want our computers to attract attention, make a favorable first impression, and remain in the memories of those who see them."



Jack Carroll



PDP-10

continued from page 1

Many PDP-10 Systems are used in commercial timesharing. Interactive Sciences, Braintree, Massachusetts, Computibility, Boston; and Interactive Computing Corporation, Santa Ana, California rank among PDP-10 customers in this activity.

DEC has installed one of its largest computers, the PDP-10/50, at the University of Western Ontario. The University's PDP-10/50 is interfaced with an IBM 7040.

The combined system is used for teaching and research in natural sciences, medical science, computer science, business administration, and engineering.

Sikorsky Aircraft Corporation in Stamford, Connecticut, a division of United Aircraft Corporation, uses a PDP-10 in simulating dynamic properties of helicopters. This assists design and development.

Chase Brass and Copper Company in Ohio uses a PDP-10 in realtime management information system in their brass rod mill. The computer actually directs the overall operation of their production cycle.

The First National City Bank of New York employs a PDP-10 for internal timesharing. The bulk of the computer's time is occupied in economic analysis.

Regardless of what configuration the customer buys, he receives a bargain. Bob Savell, PDP-10 Product Line Manager, recently said, "No other system in the price range of the PDP-10 allows the user to carry on real time operations, run batch programs, and have on-line timesharing simultaneously."



FEBRUARY

ANNIVERSARIES

Pass Review Board

4 Achieve Engineering Status

10 Years

George Gerelds
Paul Gadaire, Jr.

7 Years

Benedetta Barilone
Wilmer Brackett
James Castano
Helen Hatch
Cy Kendrick
James Sullivan
Anastacia Taylor
John Trebendis
Stephanie Whigham

6 Years

Alan Kotok
Charles LaValley

5 Years

Anthony Baublis
Douglas Cox
Ronald DeVoyd
John Mutzeneek
Ronald Smart

4 Years

Joseph Gaffney
Marvin Horovitz
James Jordan

3 Years

Laszlo Balogh
Mary Bean
Richard Bernier
Christine Czerw
Margaret Dorman
Paul Gallagher
John Gaudet
Patricia Keller
Ronald Masula
M. Joan Pierce
Evelyn Sadler
Margaret Scandariato
Irene Tompkins
Josephine Williams

Sometimes we tend to think that the prerequisites for a professional career are the classroom and a diploma.

This is not necessarily the case, particularly at Digital where an individual can also achieve professional status through on-the-job training and demonstrated ability. That was the route taken by four technicians who made the transition to engineer classification with Digital during 1968.

Reclassified by the Engineering Review Board during 1968 were Dick Clemente, Mechanical Engineering, Dennis O'Connor, PDP-9 Engineering, Bill Vaillancourt, PDP-8/I Production, and Joseph Zeh, PDP-9 Engineering.



Dick Clemente

Dick is a mechanical design graduate of Boston's Wentworth Institute where he was a dean's list student and class president. Since coming to DEC he has continued to work toward a bachelor's degree by taking evening courses at Lowell Tech. He is currently the project engineer for the mechanical aspects of development of a new medium-sized computer. Previously, he helped set up the various new processes in the Plated Through Hole circuit board facility. He has an associate's degree in mechanical engineering.



Dennis O'Connor

Dennis is in charge of circuit design for medium-sized computer product line engineering. He came to DEC in 1962 after obtaining an associate's degree in electrical engineering from Worcester Junior College. Last June, several years of evening study culminated in a bachelor of science degree from Northeastern University. He has worked in several areas at DEC, including displays and PDP-7 memory development, and he also spent several months with Personnel in a special recruiting project.



Bill Vaillancourt

Bill got his start in engineering with courses from Chicago's DeVry Technical Institute. He came to DEC seven years ago and worked in special systems and checkout of PDP-1's, PDP-4's and PDP-7's. He designed test equipment for the PDP-9 and introduced into production the PDP-9, PDP-8/I, and PDP-9/L and is presently in production engineering. He is currently taking courses toward an industrial management degree.



Joe Zeh

Less than four years ago Joe was working as a farm hand while studying electronics at Hudson Valley Community College. He came to DEC as a test technician in 1964 and then moved to projects of increasing importance. He was responsible for checkout and logic design of the PDP-9/T and was deeply involved in the design of the PDP-9/L memory.



New Physics Group Formed

Since DEC's physics market involves all products, a cross-product marketing group has been formed to serve it.

Ken Larsen, Manager, Physics Applications, classified the physics area as a "major market" for DEC modules and computers.

"Our group will represent all DEC products from five-dollar modules to million-dollar computer systems," added Ken.

Ken emphasized that his group will provide salesmen with a single source of sales support information. Salesmen with potential physics sales to customers unsure of what computer to buy, will know where to go for the information they need. Ken's group will have the information consolidated.

Having a marketing group devoted exclusively to physics applications will permit the men to concentrate on the subject and develop the expertise necessary to serve this technological field.

DEC has established a strong position in the physics market. The new marketing group will maintain and enlarge that position, not establish a new one. DEC computers are involved in nuclear physics, astrophysics, ionosphere physics, biophysics, and geophysics.

The Canadian National Research Council and Hegelson Nuclear Services use PDP-8/S's in "Whole Body Scanning," which includes routine procedures of radiation protection surveys and personnel monitoring.

PDP-8/S's also aid plotting the intensity profile of radiation therapy units. These plots permit the operator to accurately adjust the therapy unit to realize prescribed dosages.

continued on page 8



Dot takes Mary Hudson's temperature. Mary works in Module Check-Out.

Nurses' Job Vital, Varied

The little office marked by a red cross on the south wall of Building 5-4 is a center of activity as intense as that in any section of the mill complex.

This is the nurses' office where Dot Hudson and Sirkka Kallio, both registered nurses, administer first aid, record absentee reports, deal with workmen's compensation cases, maintain the company's medical records, plan health programs, and perform a host of other vital tasks. Barbara Bahlkow serves the night shift employees.

About 1,000 employees per month, nearly half the Maynard work force, or about 50 every working day, appear here for help of various sorts. Usually their complaints are minor, but sometimes the nurses uncover problems of which the employee had been unaware.

"I refer between 50 and 100 employees each month to a physician," said Dot. "Of course, we never attempt to treat anything that looks serious, but always suggest that the employee consult a doctor."

Many times employees report to the nurses' office with a minor complaint like a headache, but personal, non-medical problems suddenly spring forth in the conversation. The problem could be marital difficulty or anxiety over a child doing poorly in school.

If the employee is seeking professional guidance, the nurses refer him to one of the local public agencies specializing in this sort of problem. "Frequently, they just want a friend and

confidant, someone they can trust not to repeat what they say," said Dot. In this role our nurses have helped to ease employees' minds who were concerned with personal problems.

When any on-the-job accident occurs, the nurses determine the cause and inform the Safety Engineer of the hazard.

Maintenance of company health records, recording employees' statements of ailments or accidents that struck them while on company property are typical of the routine yet necessary tasks that the nurses perform without much recognition.

"The central fact to keep in mind in our job," according to Dot, "is that people are the most important factor. Our job is to keep DEC's employees healthy through preventive medicine and help cure them when this fails."



Dot treats a minor burn for Ed Maxwell of the Fabrication Shop.



W. Bonin Is Local Leader

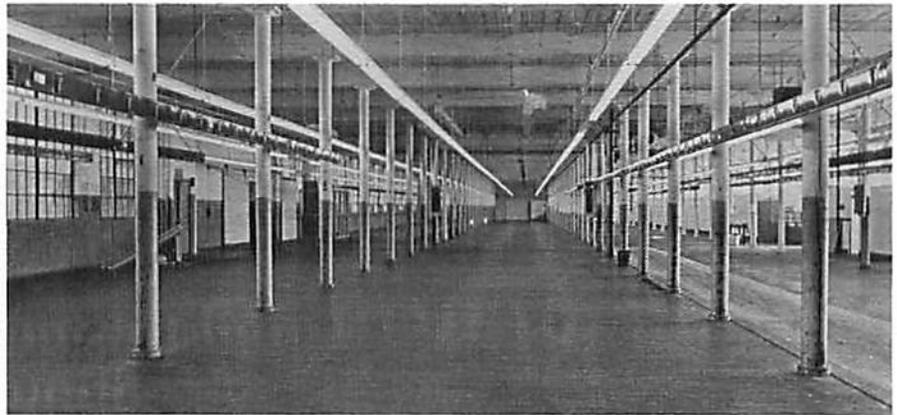
Walter Bonin, Silk Screen Supervisor, who became Marlboro's youngest City Councillor when he was elected last year, is now that city's youngest Council President.

Twenty-seven-year-old Walter was elected Council President by his 10 Council colleagues in January becoming the first councillor in Marlboro's history to be elected president during his first term.

Walter's election victory last year was hailed as one of Marlboro's biggest upsets when he defeated a seven-term veteran.

Since his election, he has been active improving local recreation facilities, starting new public works projects and creating a student City Council.

He has been with DEC since 1965. Prior to his current position in Silk Screening, he worked in the semi-conductor lab, and helped set up the Plated-Through-Hole Facility.



BEFORE



AFTER

BEFORE & AFTER: Building 5-4's interior appearance was transformed radically in a relatively short period of time by installing the PDP-8/I assembly line.



Walter Bonin, right, discusses production with one of his men, Tony Bader.

New Physics Group Formed

continued from page 7

A PDP-8 is involved in the "Gas Buggy" project conducted by the Livermore Radiation Laboratory, Livermore, California and the El Paso Natural Gas Company. "Gas Buggy" is an experiment designed to free natural gas trapped in shale rock. The project involved a nuclear device.

This new approach to the physics market reflects DEC's efforts in other areas; it attempts to provide the customer with a selection of hardware/software packages wide enough to satisfy all his needs.

The PDP-8/I offers customers an inexpensive computer that has proven itself in pulse height analysis, data acquisition, and nuclear reactor Monitoring and Film Measuring.

The PDP-9 family lends itself to high resolution pulse height analysis. PDP-9's can receive information or control several experiments simultaneously.

The PDP-10's ability to accommodate as many as 50 users simultaneously is as useful to physics as to others. Nor will the physics marketing experts neglect the module; DEC's first product figures significantly in physics applications.

Ken gained experience when his previous position as Western Regional Manager introduced him to such customers as Lawrence Radiation Laboratories, Stanford University's Linear Accelerator Center, and Los Alamos Science Laboratory. He and the experts he will hire to form his department should provide valuable support to the salesman.

