W. Long Named PDP-8 Manager

Bill Long has been appointed PDP-8 Product Line Manager. His former position, Manager of Computer Special Systems, will be filled by Brad Vachon.

As Computer Special Systems Manager, Bill had cross-product line responsibility for developing specialized hardware for customers to use in specific tasks. Bill's department produced hardware for physics, biomedical, communications, industrial data acquisition and control, and education applications.

During the four years that Bill was Special Systems Manager, the department has grown at a pace consistant with DEC's rapid expansion. The Computer Special Systems Department

Holiday Party

Module Production workers l. to r. Ingeborg Tolentino, Millie Franciosci, and Eileen Sinicki, enjoy their department's Christmas party. Similar parties were held Christmas Eve by many departments.

PDP-12 Is Introduced

The invasion of the Green Machines has begun!

The Green Machines are not insidious flying saucers invading our planet, but rather DEC's newest computer, the PDP-12, invading the computer market.

The PDP-12 is a laboratory oriented computer designed to succeed the LINC-8. Ed Kramer, PDP-12 Marketing Manager, designated it as the Green Machine because of the color of its front panel.

The PDP-12's "message", according to Product Line Manager Dick Clayton, is that, for the single user in a laboratory or university environment, DEC has produced a hardware-software package with which the user can really interact with convenience, comfort and ease.

Dick defined "interaction" as the ability of the computer to lead the user with questions and the ability of the user to answer the questions based on his laboratory data.

Dick's phrase, "hardware-software package" underlines an important difference between the PDP-12 and other DEC products. Other computers, the PDP-8 and PDP-9 for example, were designed basically as minimum hardware configurations of a central processor, memory, and teletypewriters. The PDP-12 was designed to perform certain relatively complex tasks in the primary configuration, and therefore includes certain peripherals that would normally be options.

The PDP-12 group is careful to stress that this computer is not primarily a biomedical computer, but rather a
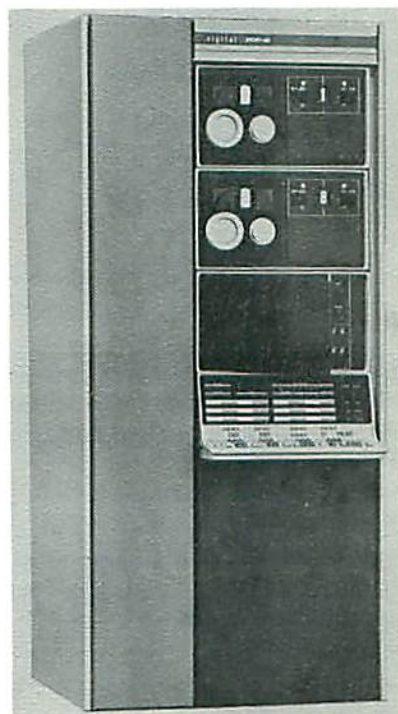
THIS IS IT!, our newest computer, the PDP-12.

general-purpose laboratory instrument. Physicists, speech therapists, chemists, oceanographers, electrical engineers, and a host of other scientists are expected to utilize this computer.

Since the PDP-12 has many "peripherals" in its basic package, Ed anticipates many university computer science departments using it to teach computer operations.

A wide variety of laboratory, industrial and academic uses for a diminutive price tag is what the PDP-12 offers DEC customers. Judging from the initial reaction, (three months' production has been ordered), the message is getting to the market.

Global Field Service
"Fix-It" Men Travel Far & Wide

Metropolis may have a superman, but DEC has hundreds of them. Rather than disguising them as mild-mannered reporters, the company sends them canvassing the world as mild-mannered field service representatives.

The criminals they pursue around the globe are systems problems, burned-out transistors, and faulty modules. Sometimes because of exotic places they visit, and sometimes because of weird problems they face, their exploits provide some of the most interesting DEC assignments.

East Africa

Take Henry Fitek's trip along the east coast of Africa for example. Henry boarded the vessel "Robert Conrad" at Capetown, Union of South Africa with his oscilloscope, spare transistors and modules, and various teletype parts.

This oceanographical research ship of Columbia University's, (N.Y.), Lamont Geological Observatory was beginning a ten-month voyage with a PDP-8/S aiding navigation.

Henry's job for the month he would be aboard was two-fold. He had to keep the PDP-8/S working and train the ship's maintenance man to do so for the ensuing nine months.

He sailed south below the tip of Africa, then east into the Indian Ocean, finally north to the island of Mauritius where he debarked. His job done, Henry took vacation time and went to the mainland.

"I tried to make as many stops in Eastern Africa as I could," said Henry. Among the places he visited were Madagascar, Zanzibar, Mt. Kilamanjaro, Nairobi, and Moshi.

California

Jim McPherson, Regional Field Service Manager of the West Coast, and his staff, encountered a problem whose solution required little travel, but much ingenuity.

They were confronted with a PDP-8/S that was kept in an open warehouse.

at night, it malfunctioned in the freezing temperatures and biting winds. This presented them with a momentarily baffling dilemma, since everytime they ran the machine during the daytime warmth, it worked.

Jim's friendship with a local Safeway grocery store manager helped him solve the problem. He obtained the friend's permission to install the PDP-8/S in his walk-in meat refrigerator. There, he could keep the machine cool while he examined it, and he fixed it quickly.

Henry Fitek is by no means the only seafaring field service representative. One whose voyage must have been more enjoyable than Henry's was Roy Sparrowhawk's of the department's United Kingdom office.

DEC's Field Service men canvass the globe maintaining the company's products. Their efforts contribute significantly to DEC's reputation for reliability.

"Queen Elizabeth II"

Roy's enviable assignment last month was to accompany a PDP-8/I on the Queen Elizabeth II's maiden voyage. According to Vince Marshall, Field Service Manager for the U.K., "The engineer's tool kit for this cruise as a guest of the Cunard Lines included a dinner jacket."

Just as Roy Sparrowhawk modified his equipment to include a dinner jacket for his assignment, Jim McPherson reports an unconventional tool kit he once used. It consisted of one foot of hollow spaghetti, a cigarette, a match, a coconut chocolate cookie and a mouse trap.

These tools were combined into a variation of the "stick and carrot" technique to induce two mice to vacate their home in the memory stack of a PDP-9. His "stick" was the spaghetti which he inserted into the memory stack near one mouse and through it blew cigarette smoke in the creature's face. This drove the mouse into the trap.

His "carrot" was the cookie which he used to coax the other mouse into the trap. The little rodent paid dearly for his sweet tooth.

This computer was used in a field desert project; hence the presence of mice.

As you read this article, scores of Field Service men are criss-crossing the earth encountering technological brain-teasers which make Marco Polo's travels and adventures sound like family Sunday outings. One significant reason that DEC equipment enjoys its reputation for reliability and ease of maintenance is that Field Service men repair the inevitable malfunctions before the customers have time to worry about them.

LINC-8 in Biomed Show
DEC's Personnel In Japan

DEC JAPAN BRANCH MANAGER Howard Painter is shown at his desk in Japan.

FIELD SERVICE MANAGER Bob Brackelt tests a PDP-8/I.

DEC COMPUTERS A B R O A D -- Dr. Tukemi, Director of the Japanese Medical Society, listens to Akira Mita's explanation of the LINC-8. The photograph was taken at a U.S. Trade Center Biomedical Show in Tokyo.

JAPAN STAFF MEN N. Sugiyama (standing left), Applications Engineer; Kenji Horikoshi (standing), Field Service Engineer; and Akira Mita pose for snapshot.

FABLED ORIENTAL FEMININE CHARM is exemplified by Y. Kathy Kurihara, a secretary in the Japan office.

P.R. Plant
In DEC Family

DEC employees in San German, Puerto Rico celebrated their first Christmas as members of the DEC family, joyfully and enthusiastically.

The theme of the festivities, held at the plant on Christmas eve, was "Familia Digital", (Spanish for Digital Family).

The Christmas celebration started off as many separate departmental parties, according to Jaime Ferro of the P.R. plant.

"Gradually everyone mixed, said Jaime, and then it wound up as one big family party."

The idea in Puerto Rico of being part of the Digital Family is not limited to parties, however. Thanks largely to Jaime's efforts, the feeling of being part of the Digital Family pervades the plant.

Traditional Puerto Rican and international customs produced a colorful celebration. The 70-odd employees exchanged gifts and feasted on dishes which they prepared and brought to the plant.

Some of the traditional Puerto Rican dishes served were "arroz con gandulos" and "pasteles." The former is a tasty combination of rice, beans and pork. "Pasteles" is ground, spiced plantain mixed with pork.

In Case of Theft . . .

Any theft of or damage to DEC property should be immediately reported to Reeves Akin. Once this is done, the company can determine whether or not it should file an insurance claim. All thefts should be reported to the police and the DEC employee should try to obtain a copy of the police report.

3

Computers helping build computers... controlling machines...testing components... checking circuits and wiring...performing scores of other tasks.

This is not a world of science fiction, but DEC's corporate headquarters in Maynard. Here over 200 DEC-designed and built computers are used to render company operations more efficient.

The ratio is approximately one computer for every ten Maynard employees, perhaps the highest among computer manufacturers.

Module Test

Ed Gianetto, Module Test Supervisor, uses two PDP-4's and a PDP-7 to test about 80% of the company's modules produced in Maynard and Puerto Rico. As many people are required to test the remaining 20% without computer assistance as are needed to do the 80% with computers.

Speed and accuracy account for adding computers to this operation, according to Ed. The Automatic Module Tester conducts between 150 and 200 tests in four to five seconds, a rate which humans obviously cannot match.

As effective as this method is, Ed's department is not satisfied with it. Short-range plans include a PDP-9 and a more sophisticated "tester."

Cheryl Maynard, (foreground), and Sheila Ford, both of the Program Library, work on the library's PDP-8 which punches the paper tape distributed by that office.

The computer tells the operator what malfunctioned, but not why. The operator knows that the module failed a test, but not what particular defect caused it to fail.

To identify the defect, a module repair specialist consults one of the manuals, called "cook books." These tell her that when a module fails a test, it is likely that a certain component was defective.

The girl makes this change and retests the module to determine if that was indeed the error. If not, she proceeds to the second most likely defect, and so on until she locates the fault.

With the new tester, the computer will tell the operator not only that the module failed a certain test, but why and how to repair it. The main difference, according to Ed, will not be in using the new tester, but in more advanced software. Don White designed this new tester. Ulrich Skowronek and Carl Alsing of the Programming Department wrote the PDP-9's program.

On about one of every 10 modules tested here, the operator must perform one function more than plugging the module into the tester. She must flip a switch or adjust a dial first. If she forgets, the computer, rather than directing the test and diagnosing a defect in the module when unfavorable results appear, reminds the operator of her omission.

Bob Whittan, Bob Kudera, Nelson Roy, Earl Bouse, Charlie Duff, and Stan Harackiewicz are responsible for routine maintenance of and writing new programs for this machine.

Power Supply Test

In another section of Ed's group, he uses a PDP-8 to test power supplies. Here again, we find a DEC computer and a DEC-designed Automatic Power Supply Tester. The relationship between the two is similar to that between his other computer-tester combination. The computer instructs the tester and evaluates its results.

Ann-Marie Lowe of the Programming Department works on PDP-10 programs on the PDP-10 assigned to her department.

In this department too, we find a DEC computer controlling a DEC-designed testing machine called, appropriately enough, an Integrated Circuit Tester.

An experienced operator using these devices can test as many as 1,200 integrated circuits per hour. Unassisted by the computer and automatic tester, the same person could test a maximum to 50 circuits per hour.

As with the module testing department, even outstanding results do not satisfy the managers constantly striving for perfection. Daymarc Corporation has designed a new device to feed the circuits into the tester. Rather than the current process which entails inserting them individually, the new system requires only that they be dumped en masse into a basket. This modification will double the number of circuits that one person can test per hour.

Fab Shop

As mentioned in last month's article on Dan Sullivan's Fabrication Shop, that department recently bought four Pratt & Whitney Tapeomatic Milling Machines whose operations are directed by paper tape punched by a computer.

Dan now has access to a PDP-8/1 which he uses for this purpose. He is acquiring his own PDP-8/L for not only programming, but machine tool control also.

ls Company's Operations

Assembly Lines

A quick survey of DEC computers used in the Peripheral Production area found 37 PDP-8's and six PDP-9's. Testing a PDP-8/I peripheral used to occupy a skilled technician for 45 minutes; the computer performs an equally thorough test in less than one second.

Wired main frames arrive at the first station of the PDP-8/I assembly line. The wiring has been done by DEC's Canada manufacturing facility or a vendor. Here, the first computer tests over 4,000 wires in 10 minutes. It used to take four girls an entire day to perform this test.

Purchasing

The Purchasing Department employs a PDP-7 to test integrated circuits that DEC buys. Although these circuits pass quality control examinations of the vendors before they reach Maynard, this does not meet DEC's standard of excellence. Purchasing tests each circuit before passing it to the various production sections for inclusion in company products. Failures are returned to the vendor.

At the next station, the memory modules and memory stack are added to the main frame. A master computer which directs four computers, tests four main frames with memory peripherals simultaneously. In three to four hours, the assembly is tested as thoroughly as an electronic technician could test it in a day and a half.

Lee Fleuette tests peripherals such as the PR-68, a type-setting reader, on this PDP-8.

After this, the central processor must pass the CP Test Station. This test is run by a PDP-8 also.

Complete Inspection

At the next test area, one PDP-8 running 15 substations greets the main frame and memory. Diagnostic programs stored here test the assembly at normal operating temperature, at 135 degrees, and with a voltage regulator. The time saving here is as startling as elsewhere. The main frame and memory are tested by 12 programs, each of which used to require 1 hour. Now, all 12 programs are run in about 10 seconds.

The entire assembly line features time and labor saving computer utilization like these examples. The acceptance test duplicates former tests, but subjects the new computer to them for a longer period. This test's main purpose is to identify those parts that, al-

Barbara Manard checks a module using Module Testing's PDP-4 and automatic tester.

though installed properly, would fail shortly after delivery to the customer.

For final acceptance, the main frame, power supply, console, and cabinet are tested as an entity by PDP-8's. This insures not only that the individual components function properly, but that they function as a unit. The final acceptance also acts as a check on the previous stations.

Processing Engineering

Tom Stockebrand is responsible for DEC's process engineering, the company's effort to improve its production methods. One such improvement that he has developed is the automatic wire-wrap process.

This process has increased the speed and reliability of wiring PDP-8/I panels, while decreasing the expense. Working by hand the typical wirer can solder about 65 wires onto

George Turner checks data on the PDP-8 used to operate the automatic wirewrap machine.

a computer panel per hour. With the computer's assistance, the average rises to about twice as many.

The overall failure rate with the computer is less than 1/10 of one percent, according to Tom. The cost of wiring by the machine is about 1/4 the cost of doing it by hand.

PDP-8 wire lists diagram how wires are to be affixed to the computer panel's pins. These lists are stored on the memory disk of a PDP-8 which runs the automatic wire-wrap machine. The machine moves the computer panel in the pattern in which it is to be wired past a fixed point. The wirer solders the wires to the pins as the pins appear at the fixed point.

The PDP-8 in Maynard used in this operation can direct up to six automatic wire-wrap machines and the PDP-8 in DEC's Canada plant can run 12 of these machines.

Beautiful System

"The beauty of the system is that it lets the machine do the part of the job which machines can do best, and the person do the part of the job that humans do best," said Tom.

The machine does the tedious job of lining the pins with the fixed point, a routine task boring to people, but not machines. The human is present

New Booklet Series Begins

The first in a new series of small-computer handbooks has been published. It is Introduction To Programming, a 432-page paperback.

According to DEC President Ken Olsen, "...this book will be useful to both teachers and students as a training text and reference handbook. ... it will also be the basic programming reference source for use in conjunction with the many small computer systems of the PDP-8 family ..."

The preface states that the book "offers two approaches to learning computer programming:

(1) learning to program in machine language ... and (2) learning to program in a common programming language ..."

As an indication of initial reaction, 2,500 copies of the book were handed out at DEC's Fall Joint Computer Conference booth within two hours.

Advertising's Chris Scott coordinated the efforts of many people to produce this handbook. Software Group Supervisor George Arnold and software technical writers Dave Symmes, Bob Jeans, Cecil Brooks, and Tom Elliot wrote the copy. Artists Elliot Hendrickson, Dave Raymond, and Norm Royle played an important role in producing the book.

The Training Department's Jim Davis, Ray Wheeler, and Ed Converse provided valuable advice. Programming's Jackie Aumann's last-minute typing spree of the large index and glossary rates an honorable mention.

Bob Jeans commented, "I've worked on many projects in the past 10 to 12 years, but never one that went as smoothly as this one."

Employees interested in obtaining a copy of Introduction To Programming should stop at Direct Mail, Building 5-3.

All PDP-1's Still In Use

With the development of new computers, we sometimes tend to forget the company's first such product, the PDP-1. Far from being obsolete, every PDP-1 ever manufactured is still in use. Fifty-three of these computers are scattered around the globe from Canada to Alabama, from California to New York, to England and France. After 11 years, these durable computers still function with a minimum of maintenance.

Besides being separated by vast expanses of territory, DEC's first computers perform a wide variety of tasks. Some are used in university computing laboratories. The University of Massachusetts employs the first PDP-1 produced to teach industrial applications of computers. PDP-1's are also installed at M.I.T., Harvard, Yale, Princeton, and Michigan universities among others.

I.T.T. owns the lion's share of the 53 with 11 PDP-1's. This company has installed one in the American Embassy in Paris where the computer sifts information emanating from the Viet Nam peace talks. All of I.T.T.'s PDP-1's operate in some type of communication control.

Aircraft simulators rely upon PDP-1's to create flight-like conditions on the ground. Scientists have used these computers to simulate flight conditions of aircraft from helicopters to the Apollo three-man space capsule. These are analog-to-digital hybrid systems.

The Systems Research Laboratory at Wright Patterson Air Force Base, Dayton, Ohio uses a PDP-1 to direct sensing devices that record human reaction to space-simulated conditions.

Another PDP-1 at Wright Patterson A.F.B. monitors a centrifuge in which humans are tested. If the centrifuge malfunctions, the computer immediately reports this so that the machine can be stopped before the man is injured.

100% reliable would be a good way to describe the PDP-1. Every one of DEC's first computer line is still in use.

A centrifuge is a device using centrifugal force to increase apparent gravity beyond one G.

Stanford University, Palo Alto, Calif. uses a PDP-1 in computer assisted teaching. Part of this program entails teaching grade school students how to solve their arithmetic problems on a computer.

Various universities have used PDP-1's to automate the measurement of data recorded from a high-pressure bubble chamber on photographic film. A bubble chamber is so designed that the pressure of the liquid hydrogen can be raised above, or lowered below the boiling point. With the hydrogen above its boiling point, a stream of charged particles is injected into the chamber and leaves a "track" of bubbles. The shape and quantity of the tracks reveals much about the characteristics of the particles, adding to man's knowledge of the atoms.

Although we usually associate timesharing with only the latest computers, Bolt Beranek & Newman, M.I.T., and Stanford University's early timesharing efforts were started on PDP-1's. Far from being "put out to pasture," DEC's first computers continue to serve a wide variety of uses and users.

New PDP-8 Prod. Line Mgr.

Bill Long

hums with the activity of over 40 people, more than three times the number of people who worked there when Bill took over.

Many standard peripherals offered by DEC were developed by Special Systems under Bill. He worked extensively on "340" displays before taking charge of Special Systems.

Bill is scheduled to return from the United Kingdom, where he is establishing a Special Systems Group, on February 17. At that time, he will assume the duties of PDP-8 Product Line Manager.

WHAT'S COOKING? Nothing. Josephine Stevens, Purchasing, is testing integrated circuits by dipping them alternately in hot and cold water.

Appointments

Ken Stone has been appointed to the recently created position of Software Support Manager for the Mid-Atlantic Region. He was promoted from a Regional Staff Engineer's position.

Dave Denniston, Mid-Atlantic Regional Manager, described Ken's responsibility as "assisting customer with use and modification of DEC-supplied software."

Ken graduated Phi Beta Kappa from Midwestern University, Texas, and earned the Distinguished Flying Cross and Air Medal while serving as a U.S. Air Force officer.

Gerry Butler has been appointed PDP-9 Engineering Manager. He is leading the development effort of new technology and is a member of the Engineering Committee. Gerry worked five years at the Lawrence Radiation Lab with the group that developed the spiral reader system and came to Digital in 1966 to provide engineering support to our physics marketing effort.

William G. Segal has been appointed Software Support Manager. In this position, he will be responsible for establishing DEC's software support function, which will advise and assist the company's customers.

DEC has 25 software support men throughout Europe, Canada, Australia, and the United States. Seven men are in training in Maynard, with 10 hired and about to commence training. Fifteen similar jobs have yet to be filled.

Bill established the Programming Department's Applications Group. This group develops large-scale application software to meet requests by DEC's product lines.

He was also responsible for the negotiation and implementation of FORTRAN on the PDP-6.

Bill has played an instrumental part in the development of the Programming Department and in formulating programming policy.

Ken Stone

Gerry Butler

Bill Segal

Technology Aids Company's Operations

to compensate for unpredictable problems such as a bent pin or missing wire.

The Training Department has 18 computers at its disposal for teaching both DEC employees and customers computer operation and maintenance. The whole PDP-8 family, PDP-8, PDP-8/I, and PDP-8/L is represented in this department. Also present are PDP-9's and PDP-10's.

The Programming Department possesses

another block of DEC computers. This department has not only the currently manufactured computers such as the PDP-8, PDP-9, and PDP-10, but discontinued models also.

As is evident from these examples, DEC customers are not the only ones benefitting from the company's position at the vanguard of computer science. DEC's internal procedures reap the rewards of the company's technology.

7

DEC FJCC Booth Popular

KEEPING BUSY was not difficult for the DEC employees who manned the company's booth at the recent Fall Joint Computer Conference in San Francisco. As this photograph demonstrates, our displays attracted many spectators.

DEC made its largest trade show effort at the recent Fall Joint Computer Conference in San Francisco, and in the opinion of many our booth ranked as one of the show's best.

The event, held in San Francisco's Brook's Hall last month, was the first trade show in which DEC displayed three large timesharing systems simultaneously.

The booth included a 48-K memory PDP-10/50, a Time-Shared-8 and a PDP-9 with a 339 display. The PDP-10/50, DEC's largest system, alone covered 28 feet from end-to-end. Twelve teletypes, color coded with the machines to which they were connected, allowed visitors to try out the systems.

To transport, install, operate and dismantle so much hardware was no small undertaking. A 40 foot padded van bedecked with DEC's huge "Realtime-sharing" poster, made a cross-continent journey from Maynard to San Francisco. Then many DEC people, including the entire Palo Alto Field Service staff, pitched in to install the equipment.

The effort was well worth it. Some 18,000 persons, predominantly computer oriented and technically sophisticated, visited the show.

Some comments received by Roy Gould, who manages DEC's exhibits, included:

"The press thought we had one of the best exhibits on the floor."

"The quality of the DEC representatives was probably unsurpassed by any other exhibitor. We had ideal balance between marketing, technical and sales personnel."

"Probably the best technical presentation."

"I have to really thank a lot of people," says Roy, "many DEC people helped tremendously and the Palo Alto Field Service staff was great."

FJCC, traditionally held in the West, and it's sister show, the Spring Joint Computer Conference held in the East, are two of the most important computer shows in which DEC participates. We also participate in some 60 other U.S. and International shows.

JANUARY ANNIVERSARIES

10 Years

Richard Best
John Culkins

9 Years

William Davison

8 Years

Fred Gould
Josephine Milewski
Katherine Pareago

7 Years

Lucille Chisholm
Galen Davis
Francis Fortin

Richard King
Stella Kodzis
Joseph Kosiewski
Richard Mangsen
John Trubiano

6 Years

Anita Carton
Lois Evans
Jack Hagerty

Ingeborg Tolentino
Veronica Trebendis

5 Years

Leo Bolduc
Robin Frith
Mary B. Thomas

4 Years

Leo Landry
Marjorie Mahoney
James Murphy, Jr.

In Memoriam

HARRY S. MANN
1917-1968
Vice President, Finance
Digital Equipment Corporation
1965-1968