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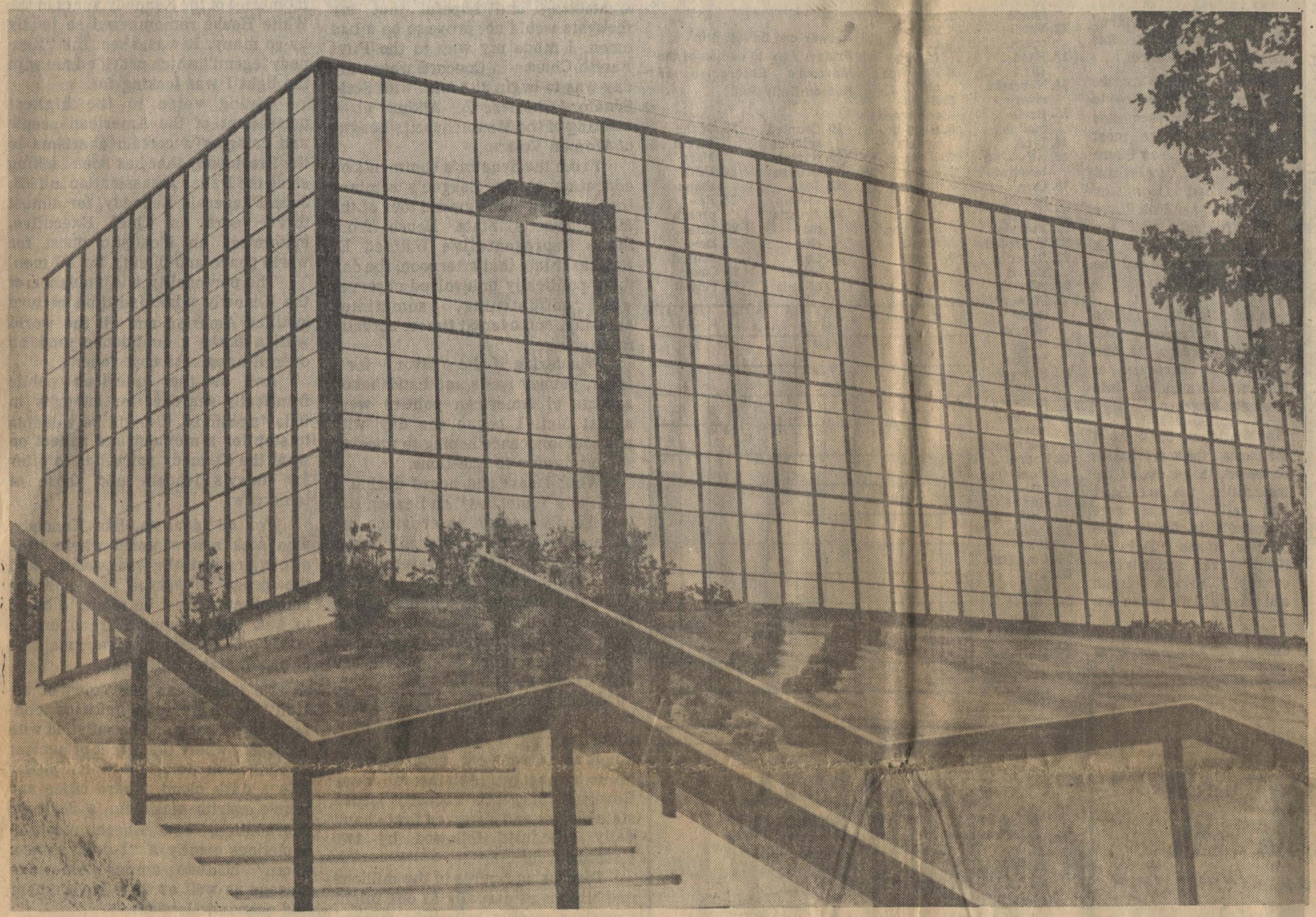
250 MAPLE ST., MARLBORO, MASS.

Office building will become showplace

Digital to house computer museum



Staff photo by Art Phaneuf

THIS BUILDING will house a new computer museum planned by Digital officials for Marlboro. Kenneth Olsen, president of the Digital Equipment Corporation, told members of the Marlboro Rotary Club yesterday that he has been looking for space for the museum for some time and the Marlboro branch of the company is ideally suited for his purpose.

by EMDON D. MacKAY
(Of the Enterprise-Sun Staff)

MARLBORO — "We'll have one of the best, if not the best, museum in the world" in the Marlboro division of Digital Corp., according to Kenneth H. Olsen, president of the firm that is known as the largerst manufacturer of minicomputers in the world.

Olsen, who spoke at the meeting of the Rotary Thursday noon at Marlboro Country Club, said the former Marlboro RCA complex is ideally suited for the computer museum to house Digital equipment beginning with the first whirlwind models.

He added that Digital has been looking for space for a museum for several years, but "every time we found floor space, we decided it would be more economical to use the area for building or testing new computers."

Olsen, who introduced John Leng as plant manager of the Marlboro Digital complex, said that, although Digital is known as a manufacturer of minicomputers, the ones built in Marlboro will be the "king-size" DEC system-10, the largest made by the firm.

Of the 1,000 Digital employes expected to be employed in the Marlboro plant by mid-1974, many will be local residents, Olsen said. "We could conceivably have more local people, but it is not our policy to rob employes from other industries," he added.

Olsen said the Marlboro plant will bring the company to a total of 3.5 million square feet of floor space occupied by Digital plants worldwide.

Besides the headquarters in Maynard, "where it all started in 1957,"Olsen said,other plants in the Bay State are located in Westminster and Westfield. Digital also has plants in Puerto Rico and in Ireland.

Grow Carefully

"Why did it take us a year to make up our minds to move to Marlboro?" Olsen answered his own question by reminding the audience that it always has been the policy of Digital to "grow carefully and with caution."

Besides, he said, "many people didn't want to leave the old mill." Olsen noted — in tracing the history of Digital — that the former American Woolen Mills building where the first Digital computers were designed was taken over floor by floor in keeping with the company policy of caution in growth.

In fact, Olsen said that when Digital was developing, "growth wasn't important . . .we just wanted to a job we could be proud of."

He said that when Digital started, they didn't want government money, and, in addition, unlike most other companies, were determined to be a profiit-making industry.

The $70,000 that Digital borrowed to get started, was taken with the promise "that we'd make money," Olsen said. In answer to a question, Olsen noted that the $70,000 loan has never been repaid, but those who lent the money now own 80 per cent of Digital stock.

Founded in 1957

Founded by Olsen in 1957, Digital occupied 8,500 square feet of floor space in the Maynard mill, and there were three employes. Olsen noted that one of his chores, in addition to designing the early computers, was to fill in as janitor.

Today, the company has more than 13,000 employes worldwide, with more than 7,500 of these in its Massachusetts plants. Digital ranks second to IBM in the number of computers installed worldwide, but is the world's leader in the minicomputer field.

It manufactures more minicomputers than all other computer companies combined.

Olsen noted that the first true minicomputer was the PDP-5, introduced by Digital in 1963. This handmade machine, costing $27,000, created a market that industry analysts estimate will top the $1 billion mark by 1975.

By contrast, the DECsystem-10, the computer to be manufactured in Marlboro, will cost up to $2 million, depending on the use it will be put to. It is a time-sharing computer, which can be used by several customers

Olsen cautioned the Rotarians that he cannot guarantee that Digital will not go the way of RCA (which dropped the computer business and closed its Marlboro operations about two years ago) but "we intend to keep designing and making computers as if we were going to be there forever."

He added that the move to Marlboro was made, "because we needed the space . . . and I feel we're wanted here."

digital

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Business&Money

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BOSTON SUNDAY GLOBE JULY 15, 2001

STEVEN SYRE & CHARLES STEIN

Boston Capital

A long shot on short list for head of the FDA

Michael J. Astrue, one of the state's most visible biotechnology executives, is stuck in the middle of an escalating dispute between the White House and Democrats led by Senator Edward M. Kennedy.

Astrue, general counsel of Transkaryotic Therapies Inc. of Cambridge and chairman of the Massachusetts Biotechnology Council, surfaced last week as a leading candidate to become the new head of the Food and Drug Administration.

The short list for FDA commissioner is also believed to include Eve Slater, a senior executive at Merck & Co., and possibly Lynn Drake, an academic. The selection of Astrue or Slater would be a departure from the typical choice of medical doctors or academic scientists.

Michael J. Astrue

The FDA commissioner's confirmation process runs through the Senate Health, Education, Labor and Pensions committee. Kennedy, who chairs the committee, had voiced opposition to the idea of an industry nominee in news reports about Astrue last week.

By late Friday, seven of the committee's 10 Democrats closed ranks on the issue in a letter to President Bush, which was obtained by the Globe.

"We understand that a number of candidates are under serious consideration," the letter said. "We would emphasize, however, that it would be unprecedented for the commissioner to be appointed from an industry regulated by the FDA. To do so could raise irresolvable conflicts of interest, undercut public confidence, and undermine the agency's worldwide reputation as the gold standard of public health regulators."

Besides Kennedy, the letter was signed by Jeff Bingaman of New Mexico, Jack

BOSTON CAPITAL, Page E5

GLOBE STAFF FILE PHOTO

Ken Olsen, former chairman of Digital Equipment Corp., standing outside the Mill in Maynard in 1988.

The legend and lessons of Digital

An exhibit in Silicon Valley chronicles how Maynard company helped pioneer computer age — then failed to take advantage of the technology it had borne

By Anthony Shadid
GLOBE STAFF

MOUNTAIN VIEW, Calif. — Before the dot-com boom and its spectacular display of hubris, even before the two-guys-in-a-garage bravado of Silicon Valley, there was Digital Equipment Corp.

And while the rags-to-riches-to-rags story of Digital may have lacked the romantic quality of Steve Jobs and Steve Wozniak building the Apple 1 on a shoestring budget, it came *close, both in substance and vision.*

Digital's "garage" was a converted woolen mill in Maynard that produced uniforms and blankets during the Civil War, and its pioneers were Ken Olsen and Harlan Anderson, two engineers from the Massachusetts Institute of Technology. In 1957, when computers were still stored behind glass and consulted with oracle-like reverence, they opened for business with an idea to take brash new products and an irreverent, engineer-inspired culture and change the world.

They almost did.

Their story, a parable of the computer age, is now part of one of the most ambitious efforts to chronicle the history of a technology company. Archivists from the Computer Museum History Center here have interviewed more than 60 Digital alumni, compiled reams of pages of transcripts, and taped more than 10 hours of video from a museum-sponsored reunion that drew nearly 200 former employees last month.

The work, which will eventually be indexed and available to the public, complements an extensive collection of Digital artifacts (among them, the circular screen of the PDP-1, Digital's first computer, on a hexagon-shaped terminal) that tell the company's history.

With those stories, made more honest by the passage of time, have come new insights into a company whose arc packed the drama of a dot-com burnout — from start-up, to the world's second-largest computer company with a payroll of 121,500, to takeover target by upstart Compaq Computer Corp. Even now, Digital's legacy casts a shadow over Silicon Valley, whose very identity owes a debt to the chaotic but, for a time, extremely effective culture that Digital pioneered in New England.

This is also a story, writ large, of corporate extinction. Digital's goods, from the technological revolution of the PDP-1 to the commercial revolution of the PDP-8 to the engineering revolution of the VAX family of computers, defined the industry in its era. But the company's stubborn pride in its own prowess and products prevented it from adapting to developments its technology made possible.

...

"If an organization is to be successful, it must follow a vision. It doesn't have to be your vision, but it has to be someone's vision. It was Ken's vision we all followed. We didn't always agree, but we followed it and we understood it." — Stan Olsen, Ken's younger brother

DIGITAL, Page E5

A Digital life

THE BEGINNING, 1957
Ken Olsen and Harlan Anderson found Digital Equipment Corp. and set up shop in 8,500 square feet of product space in a converted woolen mill in Maynard.

A COMPUTER IS BORN, 1960
Digital introduces the PDP-1, the first small interactive computer and the beginning of a product line that would help establish the company.

GOLDEN ERA STARTS, 1974
Digital becomes a Fortune 500 company.

THE TOP PRODUCT, 1977
Digital introduces the first member of the wildly successful VAX computer family.

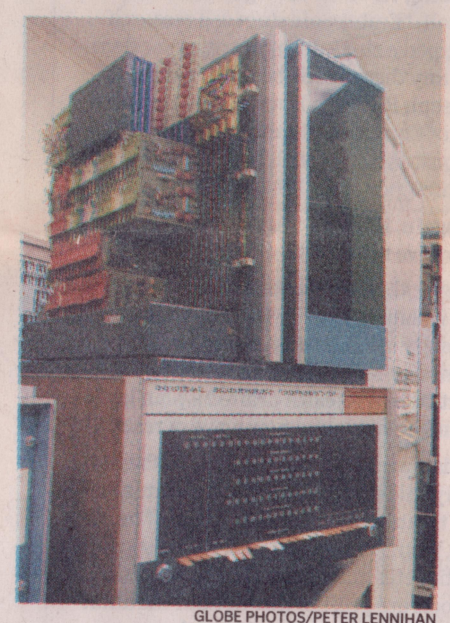
THE PEAK, 1988
At 121,500, Digital reaches its peak number of employees. It is the second-largest computer company in the world, behind only IBM.

THE SLIDE BEGINS, 1990
Digital posts its first quarterly loss and announces first layoffs.

OLSEN'S OUSTER, 1992
Digital board replaces Ken Olsen with Robert Palmer as CEO.

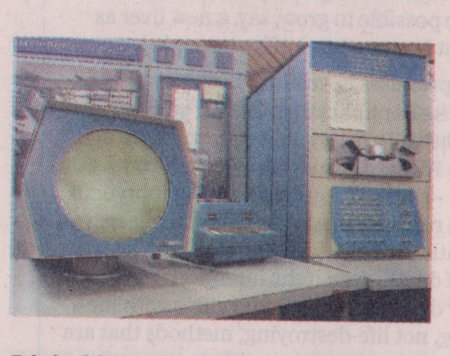
THE END, 1998
Compaq Computer Corp. buys Digital for $9.6 billion.

From the exhibit



GLOBE PHOTOS/PETER LENNIHAN

Digital's PDP-8 from 1965, recognized as the world's first commercially successful minicomputer.



Digital introduced its breakthrough interactive computer, the PDP-1, in 1960, selling it for $120,000 as an alternative to the mainframe.

Digital promotional items from over the years are also on display at the Computer Museum History Center in Mountain View, Calif.

Inside Today

David Warsh
Embryonic stem cells are pluripotent — that is, they can grow into good medicine and big business. But they're a monster political heartache, too. **E2**

BostonWorks H

Transitions
Rock 'n' roll fantasy turns into reality as high-tech executive's new gig combines business, guitars. **H13**

GLOBE STAFF PHOTO/TOM LANDERS

Outlook

How Digital failed to capitalize on the technology it pioneered

▶ DIGITAL
Continued from Page E1

and the first to join the company after the founders.

...

The problem, at least in the early days, was the chaos that Ken Olsen's vision inspired.

For the first teams seeking to build an alternative to IBM's mainframes in the 1960s — what later became known as the minicomputer, though the early versions still took up the floor space of several refrigerators — the environment at Digital was so freewheeling that management seemed more an idea than a reality.

Even the dilapidated building reflected the ethos: Birds flew through windows and spilled coffee sometimes wound up on the crisp plans of an engineer on the floor below.

"It was so irreverent," recalls Joe DiNucci, a 17-year sales veteran at Digital. "What was so amazing was that the irreverence was in Massachusetts, it wasn't in California."

Without a doubt, the style fostered an engineer's culture. That ethos, in fact, was so dominant that it often bullied other parts of the company. Olsen, an engineer himself, was once quoted as saying: "If you get the product right, the sales force is irrelevant."

The engineers couldn't get enough of it.

They were with some of the smartest people they had ever worked with. And the exchange of ideas, during days that made a mockery of 9-to-5, was freewheeling and invigorating. One of Digital's mottoes — "he who proposes, does" — was taken seriously, from Olsen down to employees hired out of college.

Today, that culture reminds Win Hindle, a former senior vice president, of the dot-com exuberance that would be celebrated just as Digital was finally fading from the scene.

"Employees felt empowered to get it done," Hindle said. "They didn't feel there were roadblocks in the way put up by the organization. The fervor, the enthusiasm, the dedicated 18-hours-a-day kind of thing — there was a kind of excitement and fervor that dominated, particularly, the engineering projects at Digital those days. The kind of dedication to the task and getting to that goal almost became a religious experience to the people."

And the products they built worked.

...

"Back in the early days of computing, machines were very large, they were in glass rooms. In order to use them, people delivered decks of cards, punched cards, with their programs and data, and somebody else took those cards and ran the program through the machine and gave you the results. You never touched the computer. And Digital basically went into the business of providing machines where the user actually sat at the keyboard, typed his program, you know, did the work." — Ed Kramer, a Digital senior vice president, in an interview conducted by the computer museum.

...

In the computer's early days, the hardware was encased in an aura of inaccessibility. Some suggested the mentality of a priesthood-reflected business strategy — "we're the only ones that can do it" — as much as it did the technology.

Digital was conscious of that and of the power of IBM Corp., then the dominant player in the computer industry.

When Digital introduced its breakthrough interactive computer in 1960, selling for $120,000, a fraction of the millions that companies and laboratories were paying for mainframes, it hesitated even to call it a computer. It was instead christened PDP-1, or programmable data processor — a nod to the computer's formidable reputation and to an idea that a data processor would seem a less onerous capital acquisition for a company.

It started the line of PDPs that made the reputation of the early company, most notably the PDP-8 in 1965, recognized as the world's first commercially successful minicomputer.

While the brown-and-cream switches and wood paneling today seem more detritus of a dated science fiction B-movie, the technology and marketing were revolutionary for their time. In all, 190,000 were built, selling for $16,000 apiece. When other computers required air-conditioned rooms, the PDP-8 could sit on a laboratory bench.

Even then, Digital saw a new era dawning.

"We were building kind of the first personal computers, the first computer that researchers, engineers, scientists, people in the biological sciences could use," said Grant Saviers, a former vice president. "This really changed the world."

Just as revolutionary was Digital's VAX family of computers. Its development is credited to Gordon Bell, who ran Digital's engineering from 1972 to 1983 and was the mind behind many of the company's breakthroughs. Bell, who came up with the idea while diving with his family in Tahiti, envisioned it as a computer that could operate at three levels — personal, departmental, and as a mainframe — using the same software.

It became the marquee scientific computer of the day, earning more than $100 billion in revenue. Its market dominance sent Digital's shares through the roof, and during its peak in the mid-1980s, the company's earnings nearly quadrupled. Fortune named Olsen "America's most successful entrepreneur" in 1986.

...

"No matter how good you were at the old model, once the genie's out of the bottle, you have to change your model, you have to abandon your model, you have to abandon your young. If you don't, someone else will." — DiNucci.

...

It was an irony that, even as the company reached its peak in the 1980s, the market had already changed so much that Digital's demise was, in hindsight, only a matter of time.

Olsen, who seldom speaks publicly, is at the center of a debate still raging today over who was to blame for the missteps that doomed Digital: ignoring the arrival of the PC, remaining wedded to proprietary systems even as so-called open systems became the standard, and putting vast resources into a mainframe as the PC was dominating.

His supporters say Olsen should be remembered for the culture he helped create that led to two decades of breakthroughs.

Others point to his comments that may be remembered a generation from now — his dismissal of Unix (a multiuser, multitask operating system) as "snake oil," and his widely quoted aside that there's no reason for anyone to have a computer at home.

Bell, for one, takes a harsh view of those decisions.

"I frankly don't think of Ken as a computer guy," Bell said. "Therein lies one of the issues. Ken was a CEO of a computer company, and I think he understands computers as well or maybe better than many computer CEOs. But he really didn't understand the technology, the real heart of the technology, which was programming, what's the role of the computer in the world and how it all fits together."

Others blame the company itself. Ironically, Digital as it evolved may have begun approaching the technology with the same glasshouse imperiousness of its early-day rivals. It was as if all the nonconformist, change-the-world engineers of the '60s had become their parents.

"Digital had a dim view of nontechnical people using computers," Kramer said. "It built sophisticated tools for sophisticated users. That was its strength. And I would argue the bulk of the PC business is nonsophisticated tools for nonsophisticated users."

Hindle puts it more directly: "We were a little cocky."

Arrogant or not, Digital's last years were a string of setbacks, some almost legendary. A belated attempt to enter the PC market with the Rainbow was a disaster, and the Alpha chip, while technologically the best of its day, never won market share.

By 1990, the company posted its first quarterly loss and layoffs followed. Olsen was forced to step down in 1992 and, six years later, having shrunk to 54,400 employees, Digital's familiar logo — each letter of the company in a precise box — ceased to exist as the company was absorbed by Compaq.

So what is its legacy, preserved at the museum in words and artifacts? Culture, perhaps. Maybe product. Or, in the eyes of some, starting a revolution it couldn't finish.

"If you go 100 years from now, it'll be seen as evolutionary. It was the first stage toward personal computing. It pushed the concept that a researcher should have his own machine but it never foresaw a person in every home having a computer," Kramer said. "The whole thing has turned on its head."

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Preserving the past as path

By Anthony Shadid
GLOBE STAFF

MOUNTAIN VIEW, Calif. — Leave it to the Computer Museum History Center here in Silicon Valley to make an artifact out of a machine built in the 1970s.

The museum, a work in progress whose origins lie in Boston, is home to the recently obsolete equipment that makes up the history of the Computer Age: vacuum tubes, panels wired by Scandinavian women adept at needlepoint, consoles built with ashtrays, and units sprawling across walls that pack less power than today's run-of-the-mill PC.

Chronicling that history makes its advocates sound like Luddites.

"People want the next new thing, and the lessons of the past are being forgotten," said John C. Toole, the center's executive director. "It's important to try to preserve where you came from."

The center got its start in the 1970s when Ken Olsen, Digital's president, started collecting computer artifacts that his company helped create. Those items eventually went to the former Computer Museum in Boston, which sent them west starting in 1996.

Today, the collection is stored in a glorified warehouse on the edge of Moffett Field, home to NASA's Ames Research Center. Within its walls are 2,000 films and videotapes, 5,000 photographs and 3,000 artifacts from the greats and not-so greats: Apple, Xerox, IBM, Commodore, Atari, Digital and Radio Shack. By 2005, the museum plans to build a 114,000-square-foot structure on a three-acre plot.

Some gems intersperse the jumble.

There's the Cray-1A, the world's fastest computer when it was introduced in 1976. Its concentric bench that surrounded the main tower earned it the title of "the world's most expensive loveseat." The Apple 1 is on view, including its circuit board, bag of parts and 16-page assembly manual. Users had to provide a keyboard and monitor.

Then there's the SAGE, IBM's massive continental air defense system. Written in pencil on knobs on its console were lines like "don't you feel useless" and "I can't stand it," hints at the quality of work the system entailed.

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Fed orders U.S. Trust to pay $10m in fines

BLOOMBERG NEWS

WASHINGTON — Charles Schwab Corp.'s U.S. Trust Corp., a money manager for wealthy individuals, was fined $10 million for violating bank secrecy laws and failing to keep complete records in a special trading unit.

The penalty imposed by the US Federal Reserve and New York State Banking Department marked the first time the 148-year-old firm has been fined for misconduct.

The bank received a "cease and desist" order, a step short of having its license revoked.

U.S. Trust was cited for "lack of internal controls and procedures and inadequate compliance with the Bank Secrecy Act" by the Fed and the New York regulators, according to a joint statement.

The company, without admitting guilt, will pay $5 million to the Fed and $5 million to New York.

"Our rapid growth over the last five years has stretched our compliance infrastructure," said U.S. Trust chief executive Jeffrey Maurer, 54, in an interview. He assumed his post in January after 11 years at the firm. Its assets under management tripled to $119 billion between October 1995 and March 2001.

Schwab, which bought the firm for $2.8 billion last year, said it's taking over the 20-person Strategic Trading Group, the U.S. Trust unit singled out by regulators for failing to "to maintain accurate and complete books and records."

The unit serves private equity funds, their partners and executives of companies. It's a broker for restricted securities, such as shares of closely held companies and also sells hedges and derivatives.

The group, founded in 1992 by Rob Garrett and Jay Luby, reported to John Deignan, head of operations and support services at U.S. Trust.

All three remain at U.S. Trust, which bought Strategic Trading in December 1998. It will likely become part of Schwab's capital markets unit, headed by Lon Gorman.

Garrett declined to comment. Deighnan and Luby couldn't be reached for comment. The company said in a statement "appropriate disciplinary action will be taken when and where warranted."

The fine ranks among the 15 biggest since the early 1990s, according to the Fed.

The biggest was a $200 million penalty imposed on the Bank of Credit and Commerce International, shut down in 1991 after international banking regulators found it defrauded depositors and investors of $9 billion.

No details about the wrongdoing were disclosed.

Maurer said the penalty will not have a "material" effect on earnings.

A long shot on short list for FDA chief

▶ BOSTON CAPITAL
Continued from Page E1

Reed of Rhode Island, Barbara A. Mikulski of Maryland, Paul Wellstone of Minnesota, John Edwards of North Carolina, and Hillary Rodham Clinton of New York.

They noted the historical medical or scientific background of FDA commissioners and said that "such expertise has proven to be an important consideration in selecting the head of our premier public health regulatory agency."

Astrue declined to comment on the letter.

Rating the FDA's work handling applications for new drugs and other medical products depends a great deal on who you ask. Some, particularly investors and some industry insiders, believe the agency has taken a big step backward recently from dramatic progress speeding approval times during the 1990s.

A much broader range of observers agree that the FDA faces greater challenges in the immediate years ahead coping with a wave of new products created by biotechnology and genomics companies that offer better options to treat increasingly specific problems and situations.

Biotech industry officials and many others were excited by the possibility of Astrue, 44, taking the FDA reins at a time when evolving medical technology is entering such a promising stage. They point to his blend of experience in the patent process from an industry perspective and as an administrator with a government background.

Astrue, who served as general counsel at Biogen Inc. before moving to Transkaryotic, has extensive experience working inside government bureaucracy for the Reagan and the previous Bush administrations, including a turn as general counsel at the Department of Health and Human Services, which oversees the FDA.

"The industry knows and respects Mike a lot and believes he's absolutely well-qualified to be commissioner," said Steve Lawton, vice president of regulatory affairs at the Biotechnology Industry Organization in Washington.

How big is the biotech bulge in the FDA pipeline? The agency, which has approved about 100 biotechnology products during the industry's 25-year history, has about 350 more in some later stage of evaluation today.

The FDA's more recent track record on new drug evaluations has turned more cautious, though it is still much speedier than the pace of a decade ago.

The time it took to pass judgment on a new drug application fell dramatically in the 1990s, thanks largely to the Prescription Drug User Fee Act. The law, passed in 1992, gave drug companies access to an accelerated process for a hefty fee. Though controversial, the legislation was propelled by the potent political force of the AIDS crisis and hopes that new drugs could save lives.

The duration of a typical drug application shrank from about 30 months to about 11 months, but has grown in the last year and a half (it's still roughly half the average application duration of the early 1990s).

Biotech stock analysts point to a string of cases in which the FDA has delayed approvals and sought additional test data in the past year. The FDA dealt a blow to Genentech Inc. this month when it delayed approval of Xolair, the company's asthma treatment under development with Novartis AG.

"I think the view on Wall Street is that things have slowed down and the agency is somewhat paralyzed," said Linda Miller, who invests in biotechnology stocks for John Hancock Funds Inc. in Boston.

"There seems to be a redirection of agency [resources] from approval to enforcement activities. There seems to be risk aversion going on," she said.

The FDA may be more risk averse because consumer advocates and doctors have grown increasingly vocal in their criticism of speedy drug approvals. They point to the FDA's decision to withdraw at least seven drugs from the marketplace over the last three years.

The agency, lambasted for sitting on its hands amid the AIDS crisis a decade ago, is taking heat for exactly the opposite policy. Meanwhile, the FDA has been run by an acting commissioner since Jane Henney resigned the top job in January.

"There's nobody in charge to clarify the situation," said Miller.

Now the odds look a lot longer that an industry executive will become the one who steps in to change that.

Steven Syre (617-929-2918) and Charles Stein (617-929-2922) can be reached by e-mail at boscap@globe.com.

For a more detailed timeline, see:
http://weblib.ako.dec.com/clg/cc/tminhome.htm

digital

1957-1997

40 years of

Innovation and Customer Success

digital

1957

Ken Olsen and Harlan Anderson found Digital Equipment Corp. They set up shop in an old woolen mill in Maynard, Mass. DIGITAL opened for business with three employees and 8,500 square-feet of production space.

The company's first product is Laboratory Modules, intended to sit on an engineer's workbench or be mounted in a scientist's equipment rack.

1958

By the end of its first fiscal year, DIGITAL sells $94,000 worth of laboratory and systems modules and has 60 employees.

1959

A young hardware engineer, Ben Gurley, is hired to design the first DIGITAL computer, the Programmed Data Processor-1 (PDP-1). Three and a half months later, the prototype was complete.

1960

The first DIGITAL Logic Handbook is published, an early project of Ben Gurley. Stephenson, the first woman hired as an engineer at DIGITAL, The Logic Handbook is the first in a long series of handbooks that worked both as textbooks and promotional tools.

The PDP-1, the world's first small, interactive computer is delivered to Bolt, Beranek and Newman (BBN), a computer-consulting firm in Cambridge, Mass.

1961

DECUS, the DIGITAL Computer Users Society, meets for the first time in Lexington, Mass. Founded on the idea of open exchange of information between user and manufacturer, DECUS has grown to be one of the largest users' groups in the computer industry, with a total membership of about 100,000 and 23 chapters worldwide.

1962

The PDP-1 operating system (the world's first timesharing system) is written by engineers at MIT and BBN for the PDP-1.

Timesharing made interactive access to computers economically viable by allowing various users to share the computer simultaneously.

1963

DIGITAL unveils its first 36-bit computer, the PDP-6, designed to be a powerful, timeshared machine oriented to scientific use. It was the first commercially available computer with manufacturer-provided software for general purpose applications.

TOPS-10 is developed as the major user software interface for DIGITAL's 36-bit machines.

DIGITAL is issued its first patent, for magnetic-core memory. The inventors are Ken Olsen and Dick Best. By 1971, DIGITAL was the largest consumer of magnetic core memories other than IBM. DIGITAL built its own magnetic core manufacturing business and by the mid-1970s was producing 30 billion magnetic cores per year.

1965

Introduction of the PDP-8, the world's first mass-produced minicomputer.

In what is believed to be the earliest example of around-the-world networking, a link is made by operating a PDP-6 in Perth, Australia from Boston via a telex link. The PDP-6 was operated and programmed from Boston using a 12,000 mile, 5-hole telex code.
It proved very difficult to generate a control C in 5 hole code. At one point in the session, Robin Firth in Perth asks Alan Kotok in Massachusetts, "Do you think you could let us poor Aussies have a bit of core?"

1966

The LINC-8 is introduced for the emerging biomedical computer market. The computer incorporated both the LINC (Laboratory Instrument Computer) processor and the PDP-8 processor unit.

1967

1968

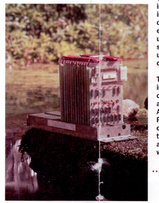
The PDP-8/I is DIGITAL's third 12-bit computer system and the first to be implemented with integrated circuits.

EDUsystems are introduced using the BASIC language developed by Dartmouth College. It brought computers into elementary and secondary schools.

The TYPESET-8, the pioneer of the "turnkey" computer system, is introduced. This hardware and software package originally sold with the classic PDP-8 as its CPU. It functioned as a computerized type-setting system for use in hot metal and photocomposition typesetting.

1969

FOCAL version 1.0 is issued. The name stood for FOrmula CALculator. It was the company's first registered international trademark. FOCAL was the only language that ran on every DIGITAL computer at the time.



1970

DIGITAL installed its 10,000th computer system.

The PDP-11/20, the first of DIGITAL's 16-bit family of machines, is delivered. The PDP-11/20 was the first minicomputer to interface all system elements - processor, memory and peripherals – to a single, bi-directional, asynchronous bus. The PDP-11 became the world's most successful family of minicomputers.

DIGITAL introduces three new peripherals: the LA30 DECwriter, the TU10 magnetic tape unit and the VT05 alphanumeric keyboard terminal. The VT05 was the first video terminal by DIGITAL.

1971

RSTS-11, a timesharing operating system for the PDP-11, is introduced. It was the first general purpose small computer operating system with generalized device handling.

The DECsystem-10 is introduced, marking a change in the marketing philosophy of the PDP-10 group. The entire DECsystem-10 line used the same basic monitor system to give users unequaled expansion capability.

The RTM (PDP-16) is introduced, beginning a new concept in small computers and digital controllers. Announced initially as the PDP-16, this series of printed circuit modules could be tailored to any application and made to operate with or without programs.

1973

DIGITAL develops DEC Data Communications Message Protocol (DDCMP) as a standard for its future computer-to-computer communications. Used to develop DIGITAL's Network Architecture (DECnet), DDCMP was based on peer-to-peer communications where information is managed by members of the networks itself; communication is from processor to processor, rather than from processor to terminal.

1974

MPS, DIGITAL's first microprocessor, is introduced as DIGITAL's first entry into LSI (Large-Scale Integration) technology.

DIGITAL announces the LA36 DECwriter II, the company's first commercially successful keyboard terminal. It became the de facto market standard.

1975

The LSI-11, DIGITAL's first 16-bit microcomputer, is introduced.

The powerful PDP-11/70 is added to the PDP-11 family, the first PDP-11 to use cache memory.

Introduction of DIGITAL's Network Architecture (DECnet). Unlike competitors' network offerings, DECnet was not a terminal network, but a true computer-to-computer capability for distributed computing systems.

The VAX architecture committee meets for the first time. Work begins on a computer with 32-bit architecture; the goal: to build a machine culturally compatible to the PDP-11 — but with increased address space. The result: VAX, the "Virtual Address Extension" of the PDP-11's 16-bit architecture to 32-bit architecture. The new computer required a new operating system, so VMS, the "Virtual Memory System" was developed simultaneously.

The VT52, DIGITAL's first commercially produced video terminal is announced.

1976

Introduction of 36-bit DECSYSTEM-20, the lowest-priced general-purpose timesharing system on the market. TOPS-20, a new virtual memory operating system, is introduced for use with the DECSYSTEM-20.

DIGITAL enters the word-processing market with the WPS-8, a stand-alone, single terminal, single user word processing system.

1977

Introduction of the VAX-11/780, the first member of the VAX computer family.

1978

V1.0 of the VMS (Virtual Memory System) operating system ships.

DIGITAL ships the first DECsystem 2020, introduced as "the world's lowest cost mainframe computer system."

The VT100 terminal is introduced, DIGITAL's first ANSI-compliant video terminal. It became the industry's best selling terminal and the de facto market standard.

1979

The F-11 microprocessor is announced. It was DIGITAL's second 16-bit – and first internally designed – microprocessor. The F-11 shipped in the LSI-11/23 board.

1980

Introduction of DECnet Phase III, making it possible to build networks of more than 200 nodes-very large for 1980.

DIGITAL, Intel and Xerox cooperate in Ethernet local area network project.

Introduction of the VAX-11/750, the second member of the VAX family and the industry's first Large Scale Integration (LSI) 32-bit minicomputer.

The RM80 disk drive is introduced. DIGITAL's first product based on Winchester technology, incorporating advanced microprocessor control and industry leadership RAMP features.

1981

DIGITAL announces the DECmate "Work Processor," which integrated an array of functions such as word processing, communications, financial planning, budgeting support and engineering calculations in a single marketing focus.

VAX information architecture is introduced. It included a family of information management software products including VAX-11 FMS, DATATRIEVE, CDD, RMS and DBMS. The key to the products was an integrated architecture that allowed functions to be added as they were needed.

1982

DIGITAL introduces a range of new personal computers, including the Professional 300 series based on the DPP-11, the Rainbow 100 based on the Intel 8086, and the DECmate II based on the PDP-8.

A new concept in integrated office software is introduced-ALL-IN-1, integrated office software that would run on a network and could mix and match custom applications such as word processing, mail, calendars and databases.

1983

DIGITAL announces VAXclusters, which tied VAX processors together to operate as a single system, extending the characteristics of VAX to high capacity and high availability applications.

DIGITAL ships the HSC50 controller, its first intelligent disk subsystem. The HSC50 contained local intelligence capable of managing the physical activity of the drives, optimizing subsystem throughput, detecting and correcting physical errors.

DECtalk, a text-to-speech system that allows computers to talk, is announced. DECtalk accepted ASCII text from an RS232C terminal port and spoke the text rather than printing it, the first such device offered by any major computer manufacturer. Entertainer Stevie Wonder introduced DECtalk at the Park Plaza Hotel in Boston.

1984

DIGITAL announces the Rdb relational database management system.

Introduction of the VAXstation I, the company's first true 32-bit single-user workstation, the first in a new family of MicroVAX-based technical workstations.

1985

DIGITAL introduces VAX ACMS (Application, Control and Management System), DIGITAL's first transaction processing product. It provided an environment for creating and controlling on-line transaction processing applications on VMS.

The MicroVAX chip is announced for the MicroVAX II, DIGITAL's first 32-bit microprocessor and the first manufactured with internally developed semiconductor technology. The revolutionary "VAX-on-a-chip" had the highest level of functionality of any 32-bit processor in the industry. With the MicroVAX chip, DIGITAL became the first company to register a new semiconductor chip under the Semiconductor Protection Act of 1984.

Introduction of the VAXstation II/GPX, DIGITAL's first technical workstation for the UNIX marketplace.

1986

Introduction of the top-of-the-line VAX 8800 and the midrange VAX 8300 and VAX 8200, the first VAX systems to support dual processors.

1987

The VAXstation 2000 is introduced, a low-cost, single-user VAXstation based on the MicroVAX CPU and FPU chip set. It was DIGITAL's first workstation with a cost of less than $5,000 and became the highest volume workstation in the industry.

DIGITAL unveils a new generation of its MicroVAX computer family with the introduction of the MicroVAX 3500 and MicroVAX 3600 systems, which included the CVAX chip, DIGITAL's second 32-bit microprocessor design and the first manufactured with internally developed 2.0-micrometer CMOS technology.

1988

DECtp is introduced, a systems environment that integrated the functions required to build large-scale transaction processing applications, effectively enabling DIGITAL systems to process up to 100 transactions per second.

1989

DIGITAL announces its broadest set of desktop solutions to date, including DECwindows, its X-based windowing system; the VAXstation 3100 based on the CVAX chip; and the DECstation 3100, its first RISC workstation.

The VAX 9000 mainframe is introduced, incorporating numerous technological advances, including high-density ECL macrocells, multi-chip module packaging and heavily micropipelined architecture. The VAX 9000 was DIGITAL's last system not based on microprocessor technology.

1990

Adding fault-tolerant technology to the VAX family, DIGITAL introduces the VAXft 3000 system, the first fault-tolerant system in the industry to run a mainstream operating system (VMS) and the first system in which every component, was mirrored.

The 20th anniversary of the introduction of the first PDP-11 computer is marked by the introduction of two new PDP-11 systems: the MicroPDP-11/93 and the PDP-11/94, the latest members of the longest-lived family of general-purpose computers. At this point, the series included over 20 members; more than 600,000 had been installed.

DIGITAL announces its intention to "open VMS." With Open VMS, VMS now supported the widely accepted POSIX standards of the IEEE (Institute of Electrical and Electronics Engineers).

1991

The industry's first implementation of an object request broker is shipped under the same Application Control Architecture (ACA) Services, late renamed ObjectBroker. DIGITAL subsequently made significant contribution to the Object Management Group's Common Object Request Broker Architecture (COBRA).

The VVAX chip, DIGITAL's fourth VAX microprocessor, is implemented in 0.75-micrometer CMOS technology and ships in the VAX 6600. The VVAX incorporated the pipelined performance of the VAX 9000 and was the fastest CISC chip of it time.

DIGITAL and Microsoft announce an alliance allowing Microsoft Widows to retrieve and exxange data with local area network servers running DIGITAL PATHWORKS software. The DIGITAL and Microsoft development work assured seanless integration between selcted office technologies suc as Microsoft Word, Excel, Visual Basic, TeamLinks, PATHWORKS and ALL-IN-1 Mail.

1992

DIGITAL announces Alpha, its program for 21st century computing. Alpha was a totally new, open, 64-bit RISC architecture, addressing the needs of a broad range of computer users, engineered to support multiple operating systems and designed to increase performance by a factor of 1000 over its anticipated 25-year life. The first Alpha chip was the 21064, which provided record-setting 200-MHz performance.

DIGITAL introduces the DECpc LP series, its first internally designed, internally manufactured PCs based on the Intel 386 and 486 processors.

DIGITAL introduces 64-bit computing with five new workstations and servers and the OpenVMS operating system.

1993

DIGITAL ships OSF/1 UNIX for Alpha systems.

DIGITAL and Microsoft ship the Windows NT operating system for Alpha systems. DIGITAL began shipping Windows NT preloaded on the DECpc AXP 150 personal computer just five weeks after Microsoft's initial release. By the end of 1993, over 500 applications from DIGITAL and other software vendors would run on the DECpc AXP 150 under Windows NT.

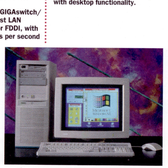
DIGITAL introduces GIGAswitch/FDDI, the world's first LAN backplane switch for FDDI, with more than 3 gigabits per second of bandwidth.

DIGITAL delivers its first video-on-demand system for an early broadband communications trial.

1994

DIGITAL describes the 21164, its newest Alpha microprocessor, a next generation of Alpha chip that provided peak processing power of more than one billion instructions per second. The chip was the industry's first to operate at 300 MHz; performance was estimated at 500 SPECint92 and 600 transactions per second.

DIGITAL introduces the Celebris family of performance-oriented desktop PCs.



DIGITAL introduces the Venturis family of desktop PCs for general business use.

DIGITAL introduces the GIGAswitch/ATM. With the introduction of the GIGAswitch/ATM system and the ATMworks 750 adapter, DIGITAL had the highest performance ATM products in the industry.

DIGITAL introduces the HiNote Ultra. Only 1-inch thick and weighing less than four pounds, the Ultra is the first portable computer to combine light weight with desktop functionality.

1995

DIGITAL and Microsoft announce a strategic alliance that combines Microsoft client/server products with DIGITAL's leadership in enterprise systems, service, support and systems integration.

DIGITAL introduces the AlphaServer 8400, its most powerful computer system to date. The new AlphaServer 8400 supported up to twelve 21164 microprocessors and 14 gigabytes of memory. The 8400 created breakthroughs in very large database performance and provided a viable alternative to supercomputers and mainframes.

DIGITAL outlines its plan for virtual networking and the integration of LANs, WANs and ATM. The enVISN (Enterprise Virtual Intelligent Switched Networks) architecture combined virtual LAN technology, distributed routing and high-speed switching with centralized, policy-based administration to create flexible virtual networks.

DIGITAL introduces FXI32, an advanced software translation and emulation technology that provides Alpha users with transparent access to 32-bit Windows applications.

DIGITAL introduces AltaVista, the most advanced information search and indexing technology available for the World Wide Web.

1996

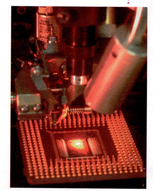
DIGITAL announces the Priioris ZX 5133MP superserver, the premier product in a new line of Symmetric Multiprocessing (SMP) enterprise PC servers.

DIGITAL announces the SA-110 StrongARM microprocessor, the first processor to combine the performance of a supercomputer with power dissipation low enough to run on AA batteries. The new chips will power personal digital assistants (PDAs), electronic organizers, set-top boxes and video games.

DIGITAL launches its entry into the Internet software business. The first product announced is AltaVista Mail server software.

DIGITAL announces 500MHz and 433MHz versions of its Alpha 21164 RISC microprocessor, strengthening its four-year claim to the world's fastest and highest-performance microprocessors.

DIGITAL unveils the new Prioris HX 6000 series of 200 MHz Pentium Pro-based application servers.



Forty Years Of Innovation and Customer Success

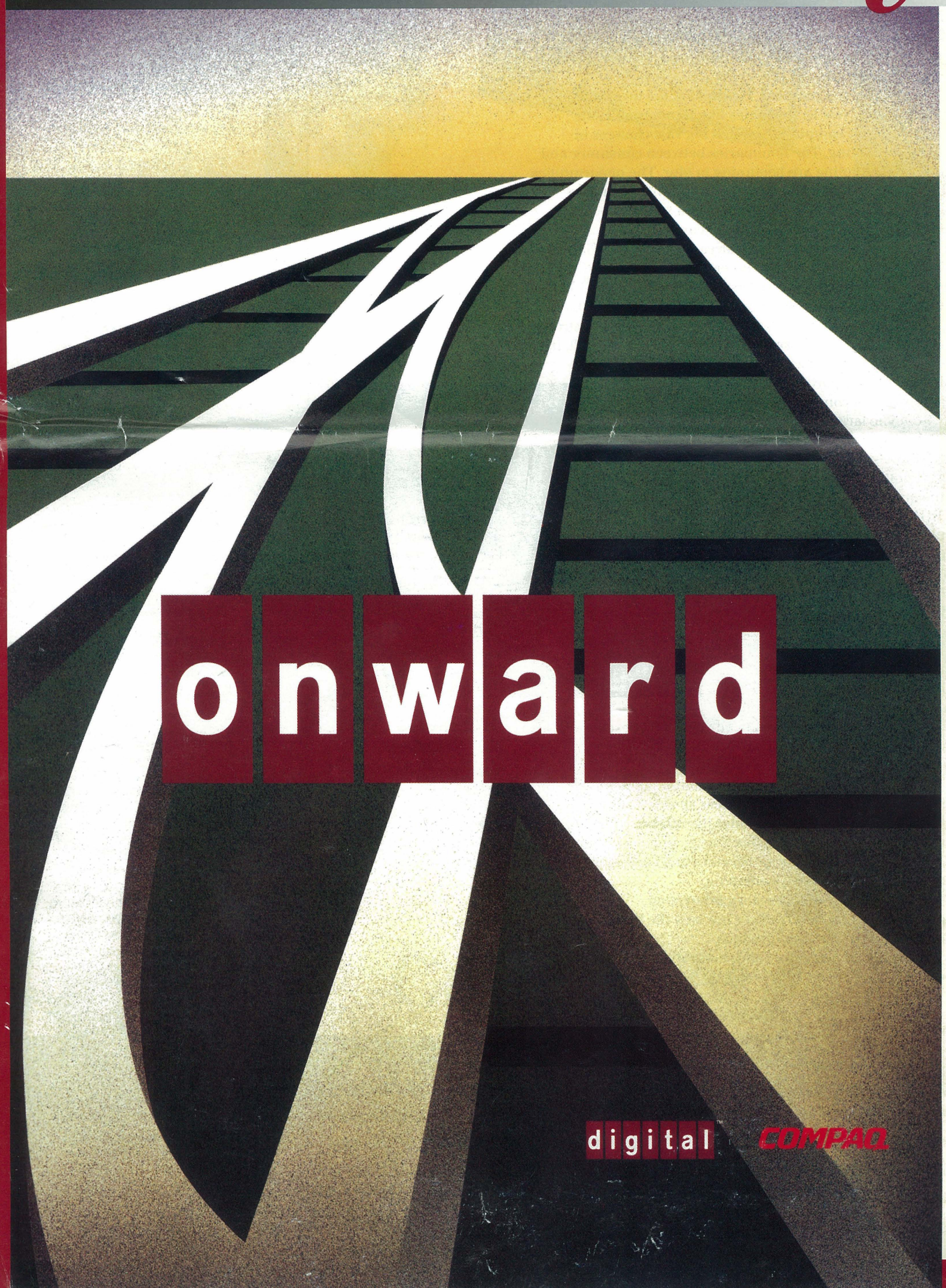
digital

DIGITAL Today

The Global Newspaper for DIGITAL Employees

Commemorative Edition

Volume 3W, Issue 10



As we move onward, DIGITAL employees can take great pride in our collective impact on the computer industry.

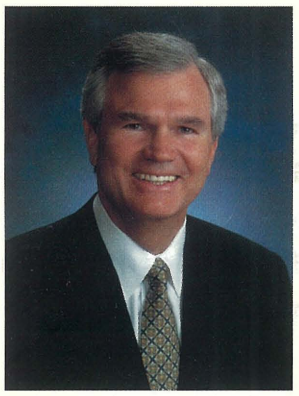
We championed interactive, networked, computing, and we've seen it become the dominant style of computing in the IT industry.

We championed 64-bit computing and, in doing so, contributed a cornerstone to the foundation of computing in the 21st Century.

We also shared passion and spirit that were as important as technological innovation in making the DIGITAL experience unique.

This commemorative edition of DIGITAL Today offers a brief visual reflection on 40 years of people, products and services, as we move onward to meet new challenges and forge new breakthroughs as part of Compaq.

Eckhard Pfeiffer's letter to DIGITAL employees



Eckhard Pfeiffer

The joining of Compaq and DIGITAL is an historic moment for our companies, our customers and the computer industry worldwide...it brings together two companies with proud traditions of technology innovation and industry leadership. With its minicomputers, DIGITAL defined the computing paradigm of the 1970s and much of the 1980s. With its industry standard personal computers–including the first PC server–Compaq defined the computing paradigm of the 1980s and 1990s. But what I find most exciting is the opportunity we now have–together–to define the future of computing.

Think about it for a moment. We stand at the threshold of a new millennium. New technologies like Windows NT, the Internet and 64-bit computing are driving vast changes in enterprise computing. The boundaries between consumer and commercial computing are beginning to blur. The opportunities to deliver value to customers are almost unlimited. And no company–not IBM, not HP, not Dell–is in a stronger position than Compaq to lead this new world of computing.

As a combined company, we are already the clear leader, or one of the leaders, in established and emerging IT markets: PCs for consumers and businesses...servers...Windows NT...the Internet...64-bit computing (with Alpha, DIGITAL UNIX and OpenVMS)...global service and support...and storage. We have strong relationships with best-of-breed partners, such as Microsoft, Intel, SAP, Oracle and many others. And our product and service portfolio spans the entire world of computing, from a family PC to the largest global enterprise.

Compaq Corporate headquarters

Of all our competitive strengths, however, nothing is more important than the quality of our employees–and DIGITAL employees are among the industry's best. I know how hard you have worked during the past few years. You overcame significant challenges. You take great and justifiable pride in DIGITAL and what it represents.

I also know that many of you approach this acquisition with mixed emotions as one chapter in DIGITAL's history closes and another one begins. But I believe that Compaq and what it represents will also be a source of pride for you.

This is really a beginning, not an end. We have a lot of work to do in the coming weeks and months to continue the integration of our companies, execute our business strategies and begin to establish Compaq as the global leader in enterprise computing.

I am confident that we have what it takes to succeed, including:

- a sharp focus on customer satisfaction and customer success,
- a track record of industry leadership,
- a common heritage of technology innovation,
- a mutual commitment to deliver not only the best products and services, but the best solutions,
- a strong management team, and, most of all,
- talented and dedicated employees.

Welcome to Compaq. I look forward to working with you to make this the best computer company in the industry.

Eckhard Pfeiffer
President and Chief Executive Officer

DIGITAL Today

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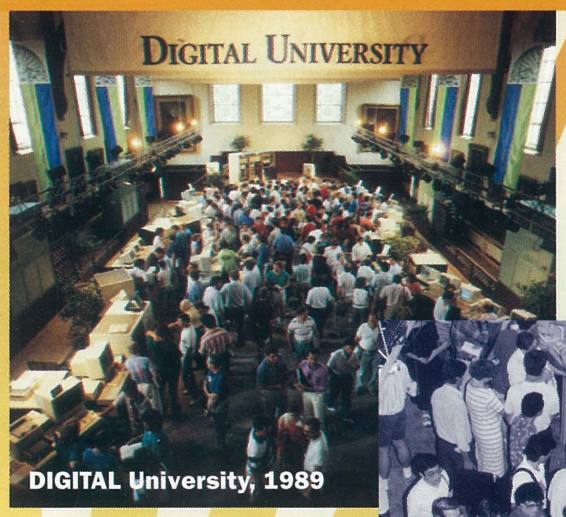
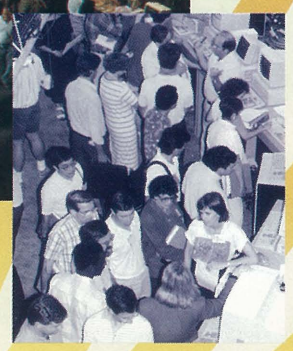
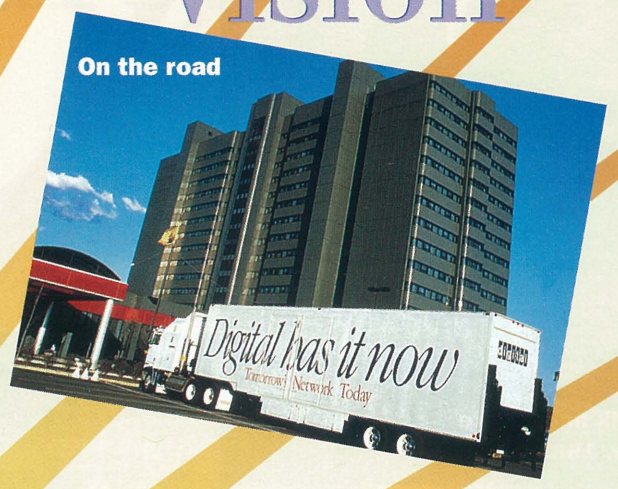
The Spirit of DIGITAL

Vision



DIGITAL University, 1989

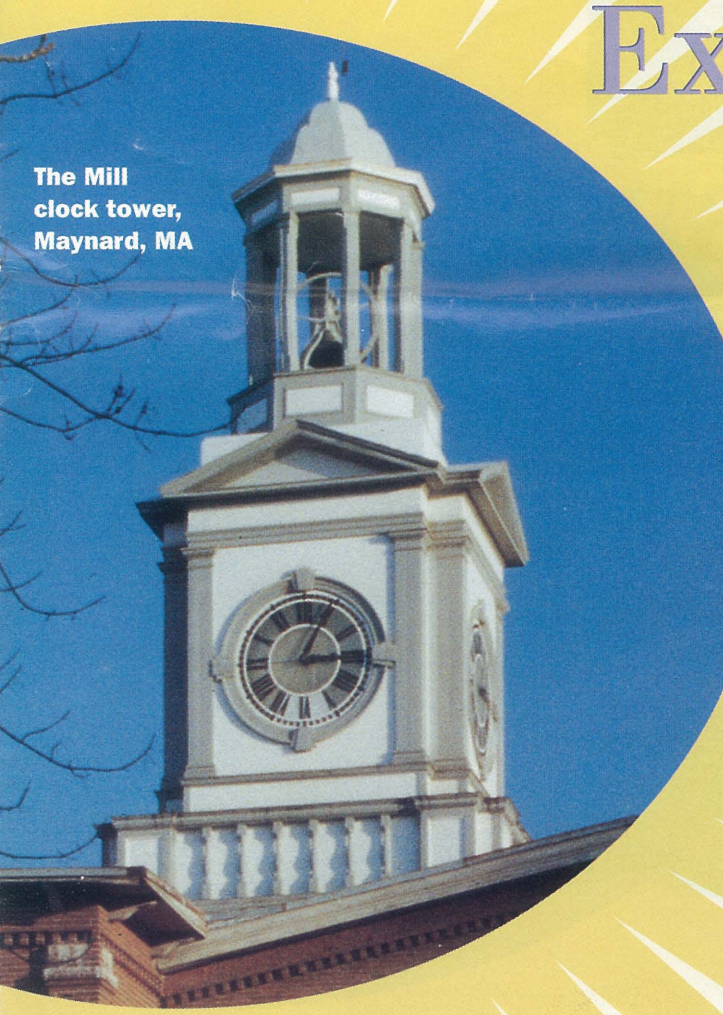




On the road


Quality control, 1963

Integrity


The Mill clock tower, Maynard, MA

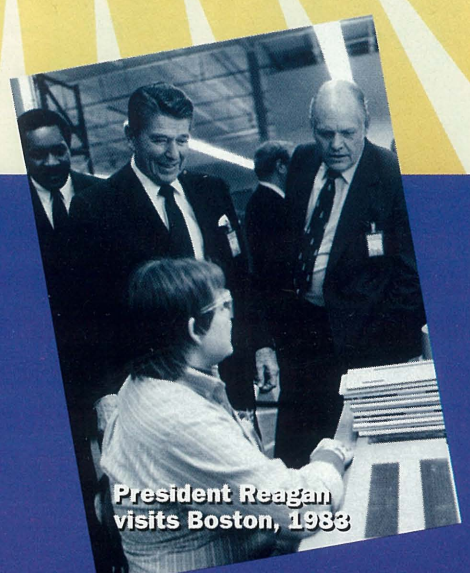
Excellence

PDP-1, 1960


Cannes, France, 1988

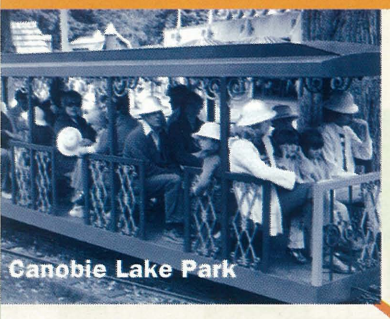
Accountability

Colleagues

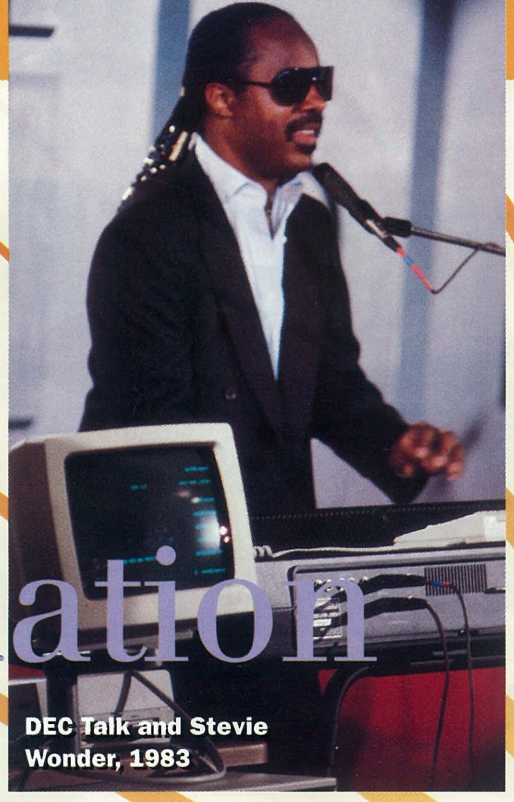

President Reagan visits Boston, 1983

"We had a dream for interactive computing. Normal computing was considered big, expensive, awesome, beyond ordinary people. Interactive computing was exciting and fun, and people could interact directly with the computer. We had demonstrated the usefulness of this at MIT. It was our dream to show the world what it could do."

—Ken Olsen



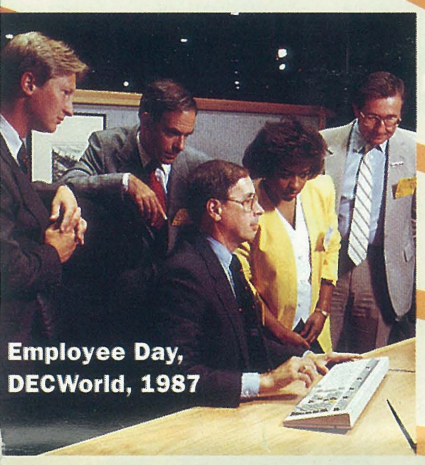
Canobie Lake Park



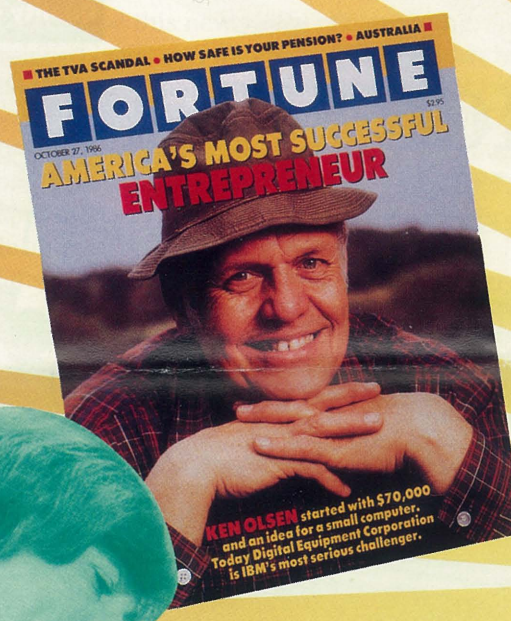
DEC Talk and Stevie Wonder, 1983

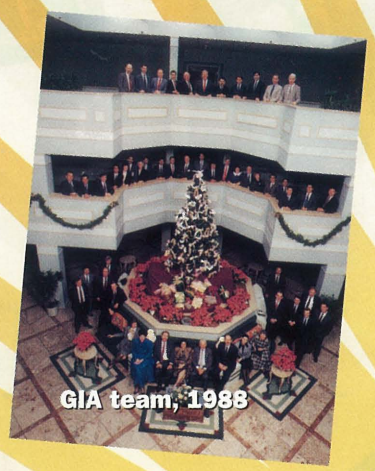
Manufacturing, Taiwan, 1994

Imagination



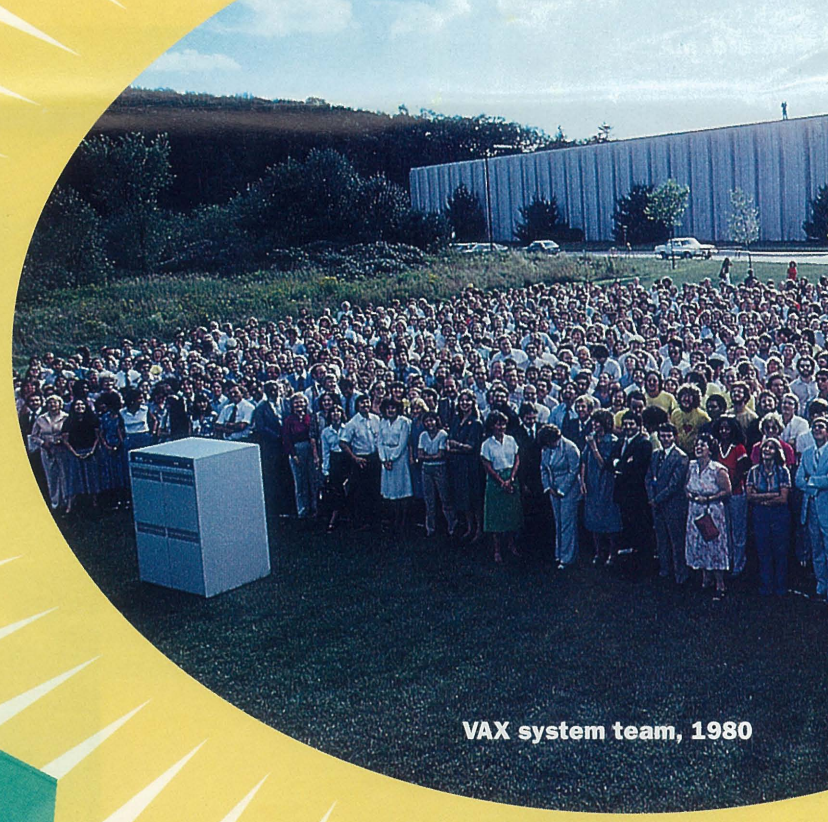
Employee Day, DECWorld, 1987





GIA team, 1988

Diversity

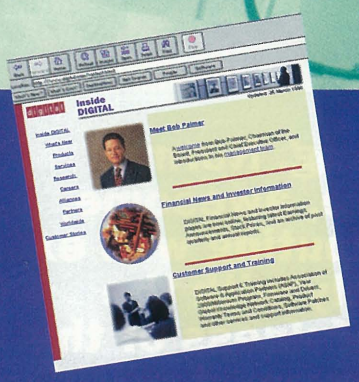


VAX system team, 1980

1957

StorageWorks manufacturing, Ayr, Scotland, 1995

Commitme

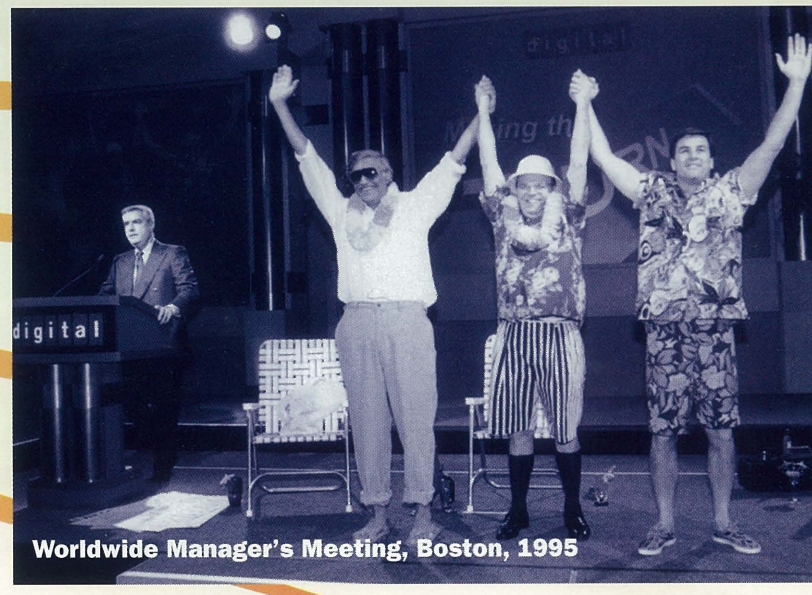


"The Internet is dramatically changing how we manage and distribute information. We have an opportunity to not only transform business, but transform society in many important ways. I do not think there has ever been a more exciting time to be involved in the information technology industry."

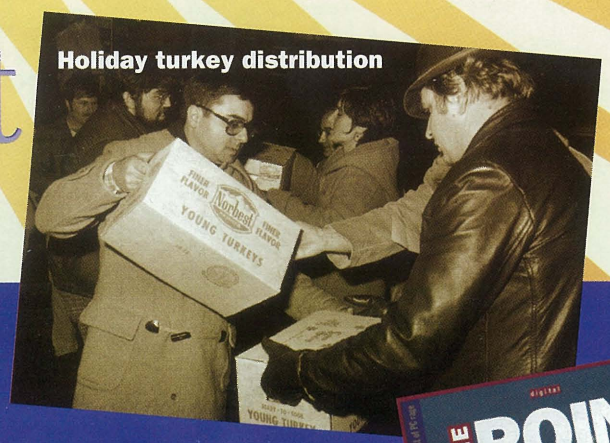
—Bob Palmer

Alliances

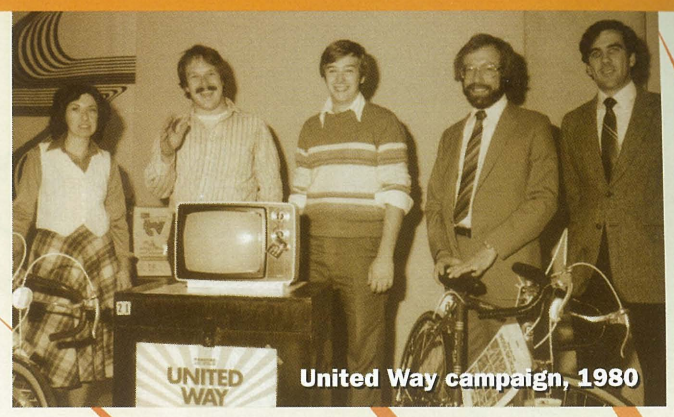
Innovation



Global




VMS team, 1978



United Way campaign, 1980

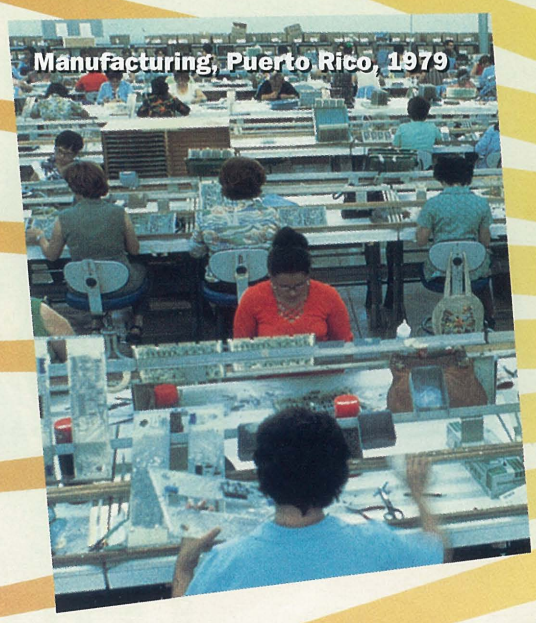
1998

Eckhard Pfeiffer and Bob Palmer, 1998


Roxbury, MA, 1990

Opportunity


DECmate team, 1981

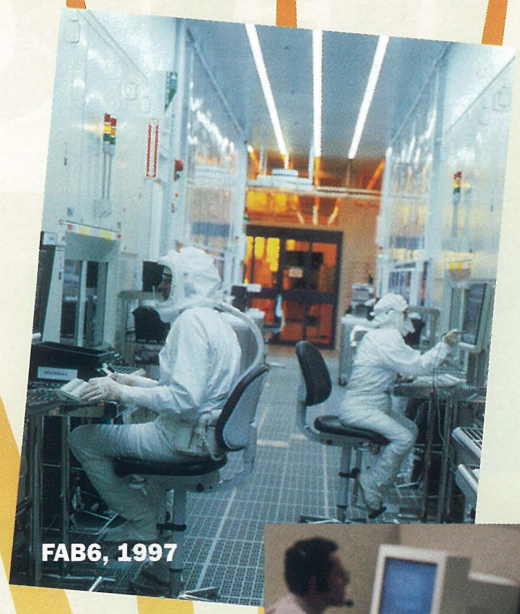

Manufacturing, Puerto Rico, 1979

Customer Success

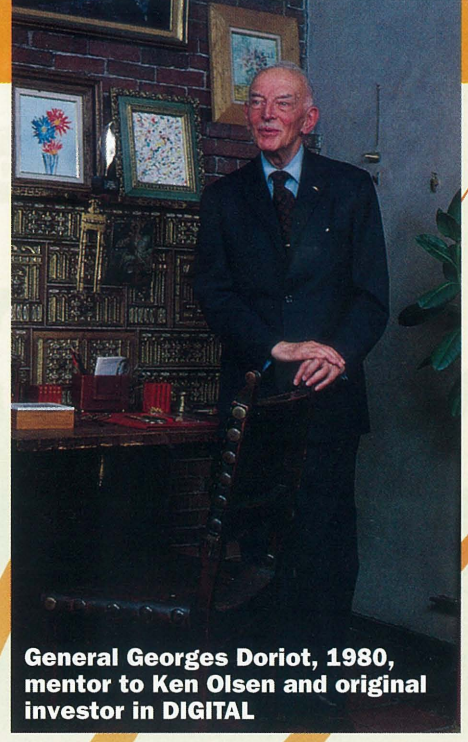
"The dynamic combination of DIGITAL and Compaq will...make us the strongest and most viable Windows NT solutions provider in the business. This is a very positive and exciting development for our customers, our partners and the industry."

—Bob Palmer

Investment


FAB6, 1997


DIGITAL Call Center, 1997


General Georges Doriot, 1980, mentor to Ken Olsen and original investor in DIGITAL

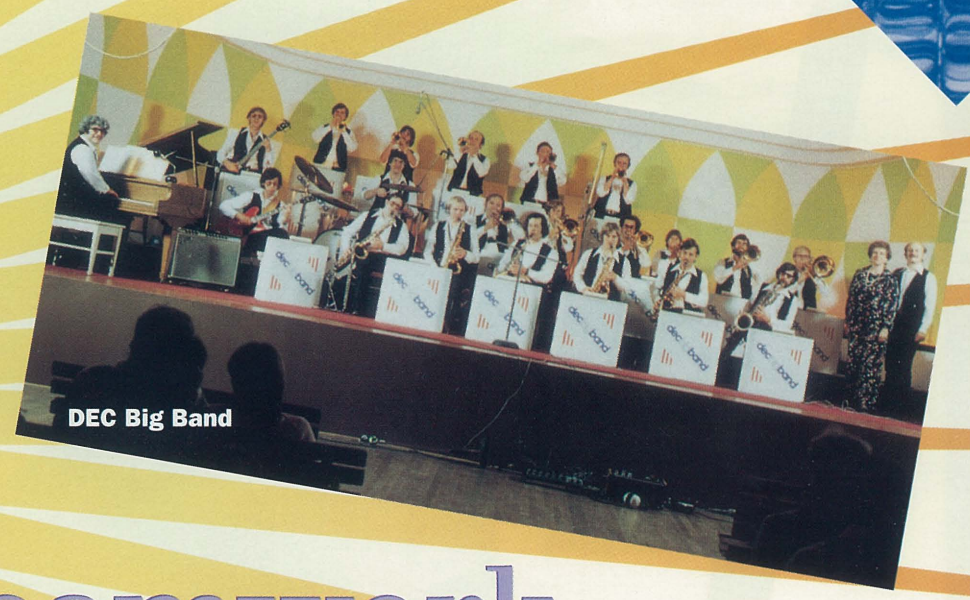

DIGITAL aviation helicopter fleet


DIGITAL Board of Directors at stockholders meeting, 1970

Success

Performance

DECWorld, 1987 featuring the QE2 below


DEC Big Band

Teamwork


DIGITAL Today

August 1997

A special report: Worldwide Sales & Marketing Kicked Off

FY '98

Growth through Teamwork

Palmer optimistic on growth prospects for FY '98

Q4 profit doubles

Solutions for Web-based enterprise computing


digital today

VAX 9000

VAX 9000 named 'Product of th

Takes 1st place in DATAMATION Syster

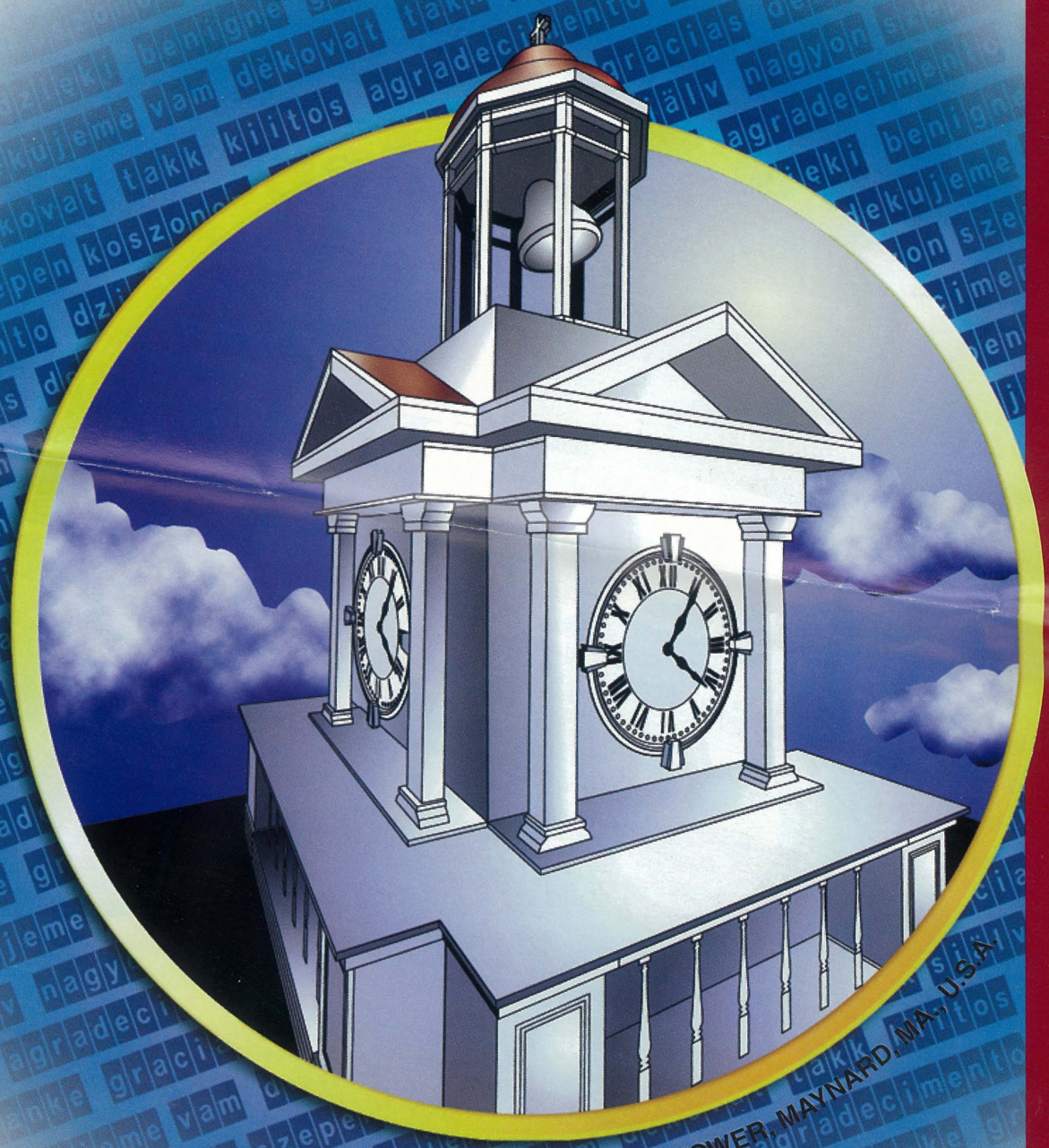
digitales

DECville '86

- off to a good start!

digital™

Thank You!



THE MILL CLOCK TOWER, MAYNARD, MA., U.S.A.

Commemorating

40 years

of people, products, and services