Ken Olsen

Kenneth Harry Olsen's early experiences, both as a child and as a young man in the U.S. Navy, put him on the road to becoming a topnotch engineer and entrepreneur. His early life centered on machines and electronics, laying the foundations for his future work with computers.

Ken Olsen, circa 1965.
(Photo courtesy of Ken H. Olsen)

A Love of Machines and Electronics

Ken Olsen was born in Bridgeport, Connecticut, in 1926 and grew up in the neighboring town of Stratford. His father came from Norway, and his mother, from Sweden. His father was a designer of machine tools and imbued Ken and his two brothers with his interest in machines. Much of the boys' spare time was spent in the family's basement tinkering with tools and repairing neighbors' radios.[1] All three boys became engineers.

Olsen was drafted in World War II and was sent to the Navy's electronics school, where he learned to maintain the radar, sonar, navigation, and other electronic equipment found on ships. In a 1988 interview for the Smithsonian Institution, Olsen expressed the view that the Navy's education programs did much to stimulate the growth of the U.S. electronics industry.[2] Many of the technicians trained by the Navy subsequently went to college and pursued careers in electronics. Olsen himself went to the Massachusetts Institute of Technology (MIT) in 1947, where he studied electrical engineering, receiving his B.S. and M.S.

MIT and Lincoln Laboratory

At MIT, Olsen joined a group of engineers working under Jay Forrester on the Whirlwind computer. The Whirlwind was originally conceived by the Navy as an aircraft flight simulator, but the project had evolved into a more ambitious effort to develop a general-purpose computer that could provide real-time information.

After the Soviet Union detonated an atomic bomb in 1949 and with Cold War tensions increasing, MIT persuaded the U.S. Air Force that Whirlwind computers could provide the brains for an air defense system. MIT established Lincoln Laboratory to do the necessary research. Ken Olsen worked on core memory, which was based on magnetized ceramic material and was much more reliable than vacuum tubes. He led a team that built a small computer to test the new approach to memory before it was incorporated in Whirlwind. Later, Olsen was chosen to be the liaison between Lincoln Lab and IBM, which had been selected to build the computers for the Semi-Automatic Ground Environment (SAGE) defense sys-

Massachusetts Institute of Technology computers. *(Photo courtesy of the Boston Public Library, Print Department)*

tem. In this capacity, Olsen was exposed to two contrasting management models—the free-wheeling environment of Lincoln Lab and the more bureaucratic style of IBM. Later, in his own company, Olsen would try to follow the Lincoln Lab approach.[3]

Olsen next worked on developing the TX-0 computer, which was the first general-purpose computer to use transistors rather than vacuum tubes.[4] The TX-0 was interactive, and the immediate feedback generated much excitement among users. However, Olsen was frustrated. In his Smithsonian interview, he said that research alone was not satisfying. He wanted people to care and to put his ideas into action.[5]

Establishing DEC

In 1957, Ken Olsen and an MIT colleague, Harlan Anderson, decided to start their own firm. They believed strongly that "electronics was going to revolutionize industry."[6] They approached the American Research and Development (ARD) Corporation, an early venture capital firm, to fund their business. They received $70,000 in equity and the promise of a loan of $30,000 in exchange for a 70-percent interest in the company.

General Georges Doriot, the head of ARD and a highly regarded professor at the Harvard Business School, was intrigued by Olsen and Anderson's idea that they could build computers more cheaply than IBM.[7] However, in preparing their business plan for ARD's board, Olsen and Anderson were counseled to downplay the concept of "computer." It was a new industry, dominated by large, established firms, and some of these were losing money in their computer operations. So, Digital Computer Corporation became Digital Equipment Corporation (DEC).

Olsen and Anderson started their company in the small town of Maynard, Massachusetts, in a woolen mill built in 1845. Ken Olsen's brother Stanley became the first employee. The first products were computer modules that were sold to universities and other research organizations that wanted to experiment with computer technology. After a year, they had made a small profit.

PDP-1 and PDP-8

DEC's first complete computer was the PDP-1. PDP stands for Programmed Data Processor. The name was chosen to get around restrictions on U.S. government organizations' acquiring more computers until existing computers were more fully used.[8] The PDP-1 was simple and fast

and, compared with other computers of the time, relatively inexpensive at $120,000. It was interactive, so the operator could receive immediate feedback. Mistakes in inputting information could be detected at once. Scientists could analyze experimental results and know right away whether the experiment had been done correctly.

Customers for the PDP-1 were engineers and scientists, who would develop their own software. DEC had originally contracted with some MIT professors to supply software, but they did not deliver; so DEC marketed the PDP-1 as a machine for users who could write their own programs.[9] The first PDP-1s were sold one at a time to separate customers, but in 1962 International Telephone and Telegraph made a large purchase of 15.[10]

DEC's big success came with the introduction of the PDP-8 in 1965. Regarded as the "first commercially successful minicomputer,"[11] the PDP-8 was priced aggressively at $18,000. This low price greatly expanded the market. The PDP-8 was popular for scientific and industrial uses. Often, it was sold to companies that incorporated the PDP-8 into larger systems, including components from other vendors and customized software. These companies, called original equipment manufacturers (OEMs), then sold the packages to final customers. Educational institutions were important customers, particularly after the price was reduced even more; the relatively simple PDP-8 was very useful in teaching how computers work.

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In designing the PDP-8, considerable attention was paid to its physical appearance. Olsen took a personal interest and drew upon ideas found in household appliances to make the PDP-8 colorful and attractive.[12] The term "minicomputer" originated with correspondence from DEC's representative in England during the 1960s; he drew a link between the small computer and mini skirts and his Mini Minor car.[13]

The PDP-8 was followed by the very successful PDP-11 and later the VAX series of computers. During the 1970s, key customers were the OEMs, telephone and utility customers, medical users, universities and government, and manufacturers who used the computers for controlling and monitoring processes. With its greatly expandable memory system, the VAX was popular for design work, and software written for one model would also work on others.

Rapid Growth and Competitive Pressures

DEC grew rapidly in the 1970s, as demand for computers soared. Worldwide employment increased from 7,800 in 1972 to 67,000 in 1982.[14] Despite failing to develop a strong contender in the market for personal computers, DEC continued to prosper through most of the 1980s. DEC began to move into the commercial business market, long dominated by

ARD Annual Meeting Dinner, March 1971. Seated, left to right: Herbert H. Lank, CED Director; Ken H. Olsen, DEC; Robert M. Beckett, Adage. Standing, left to right: E. Hervey Evans, McNair; G. William Miller, Textron; George F. Doriot; Nicholas DeWolfe, Teradyne; Claude Janssen, EED Director; Dr. Maurice Ponte, ANVAR. *(Photo courtesy of Ken H. Olsen)*

IBM. Powerful VAX super-minicomputers could perform tasks once the realm of mainframes. DEC was a pioneer in networking, and linking VAX units together magnified their already formidable capabilities. By the late 1980s, DEC employed more than 100,000 people worldwide.

Despite these successes, DEC began to come under intensifying competitive pressure. Minicomputers began to be challenged by workstations, powerful versions of the personal computer configured and equipped for business uses. Additionally, the industry was moving more and more to common software, whereas one of DEC's strengths had been the compatibility of all of its machines using its own proprietary software. DEC was not alone in its struggles; all the major minicomputer companies were losing ground.

DEC experienced losses in the early 1990s and found itself having to make large layoffs. Layoffs were anathema to Ken Olsen, who had taken pride in treating DEC's employees well. In 1992, he left the firm. He became involved with a small computer company that provided assistance to companies with their older "legacy" computer applications. DEC was unable to regain its momentum and in 1998 was acquired by Compaq Computer, a manufacturer of personal computers. In 2002, Compaq merged into Hewlett Packard.

Management Approach

Under Olsen's leadership, the links between academia and DEC were strong. Although a few senior people did not have college degrees, most employees were engineering graduates, and many had advanced degrees. In his Smithsonian interview, Olsen makes frequent references to MIT and the MIT way of doing things. The atmosphere at DEC was informal and egalitarian, much like a university setting. People were expected to propose new ideas and argue strongly for their projects, again much like the environment of a top research university. Olsen clearly valued smart people and thought that competition between them was productive.

In the mid-1960s, to foster creativity and commitment, Olsen developed a management approach centered on product lines. Product-line managers were responsible for carrying their projects through to fulfillment. They competed fiercely with one another for senior management support and for the manufacturing, sales, and other resources necessary to carry out their projects. Once support and resources were secured, however, they had considerable authority and freedom in execution. The product lines were

Ken Olsen and associates at the New York Stock Exchange. (*Photo courtesy of* Ken H. Olsen)

overlaid on a more traditional management hierarchy. This structure could be confusing and stressful at times, but it seemed to serve DEC well for many years and was adopted by many other high technology companies.

Other New England Minicomputer Companies

DEC was the most prominent of several minicomputer companies that flourished in New England in the 1970s and 1980s and that came to symbolize the region's transformation from a mature economy oriented to textiles and leather goods to a dynamic, knowledge-based economy.

Wang Laboratories was founded in 1951 by An Wang. While at Harvard in the late 1940s, Dr. Wang wrote papers on core memory that inspired Jay Forrester to follow this approach for the Whirlwind. Wang's first major successes came in the 1960s with electronic calculators. In the 1970s, Wang shifted into computers oriented to word processing. Wang systems were very popular, but during the second half of the 1980s, competition from personal computers led to the firm's collapse. In 1992, Wang Laboratories declared bankruptcy. The much smaller Wang that emerged was eventually acquired by a European information and communications company.

Data General was founded in 1968. Edson de Castro had been a top DEC engineer who had worked on the PDP-8. When his ideas for developing a more powerful computer were rejected, he left with several colleagues to start his own firm. Data General quickly produced the Nova computer, which was fast and powerful and which sold very well. In the 1980s, Data General started to struggle as it faced competition from DEC's VAX series and later from personal computers and workstations. It survived until 1999, when it was acquired by EMC.

Although the departure of de Castro deeply angered Ken Olsen, the formation of Data General has often been cited as an illustration of how spinoffs of high technology companies and entrepreneurial role models helped transform New England.[15]

Prime Computer was founded in 1972. It produced fast computers for scientific users. It had a strong software orientation and was a pioneer in networking. Prime flourished in the early 1980s, but, as the decade progressed, it faced growing competition from workstations. It was further weakened by

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efforts to avoid a hostile takeover following its own acquisition of ComputerVision, a specialist in computer-aided-design and manufacturing. In 1992, Prime's operations were terminated, although ComputerVision continued to exist.

Several other computer companies spun off from Prime and Data General.

All of the minicomputer companies did very well during the 1970s and early 1980s. They created many new jobs in central and eastern Massachusetts and southern New Hampshire, and their success coincided with a more general resurgence in the regional economy. They were a highly visible demonstration of the increasing technological sophistication of the region's industry and the growing importance of education and industry/university linkages.

Legacy of Olsen and DEC

Olsen and DEC contributed importantly to the development of the computer industry. They created the minicomputer and, with their aggressive pricing, expanded the market for computers. They were pioneers in computer networking. Olsen placed great emphasis on the interactive nature of computers and the idea that computers should be fun and exciting. A host of computer enthusiasts developed as a result of exposure to early DEC machines. The technical capabilities and elegance of DEC products were very appealing. Former users often speak passionately about them; in one private conversation, a former DEC customer described the PDP-11 as "graceful" and "stealthful."

DEC was an important company. It created many jobs in New England and, for a time, was the largest private employer in both Massachusetts and New Hampshire. It also symbolized the more general transformation taking place in the region during the 1980s. Both the reality and the image of New England changed during this period. In the early 1970s, New England was seen as a tired and possibly declining region. By the 1980s, the region was regarded as a center of innovation and creativity that other parts of the country sought to emulate. DEC was the most dramatic example of the new New England.

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Endnotes

[1] Glenn Rifkin and George Harrar. *The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corporation.* Contemporary Books, 1988, p. 27.

[2] Interview with Ken Olsen conducted by David Allison, September 28-29, 1988. (Henceforth, this is referred to as the Allison Smithsonian interview.) The section of the interview referenced here is "Electronics Developments in the Navy." (http://americanhistory.si.edu/csr/comphist/olsen.html)

[3] "Box 4.1 — Project Whirlwind and SAGE." National Research Council, *Funding a Revolution.* National Academic Press, 1999. (http://www.nap.edu/readingroom/books/far/ch4_b1.html)

[4] Leslie Goff. "1956: Little-known computer creates vast legacy." May 6, 1999. (http://www.cnn.com/TECH/computing/9905/06/1956.idg)

[5] Allison Smithsonian interview, "The TX-0 Computer."

[6] *Semiconductor Magazine.* June 2001, Vol. 2 No. 6, p. 1. (http://www.semi.org/web/wm)

[7] Rifkin and Harrar, p. 12.

[8] Allison Smithsonian interview, "PDP—The Origins of the Name."

[9] Allison Smithsonian interview, "Digital Customers Developing Software."

[10] Rifkin and Harrar, p. 55.

[11] http://www.computerhistory.org/timeline/topics/computers. Entry for the year 1965.

[12] Allison Smithsonian interview, "Designing the PDP-8."

[13] Rifkin and Harrar, p. 72.

[14] Rifkin and Harrar, p. 128 and p. 217.

[15] For example, see John K. Hekman and John S. Strong. "The Evolution of New England Industry," *New England Economic Review*, March/April 1981.

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Allinson, David. Interview with Ken Olsen on September 28-29, 1988, for the Smithsonian Institution. (http://americanhistory.si.educ/csr/comphist/olsen.html)

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Private conversations with former DEC employees and customers provided useful insights and information.

Information on the transformation of New England was based on Lynn Elaine Browne and Seven Sass, "The Transition from a Mill-based to a Knowledge-based Economy: New England, 1940-2000," in *Engines of Enterprise*, edited by Peter Temin. Cambridge, Massachusetts: Harvard University Press, 2000.

Information on other minicomputer companies besides DEC was obtained from various sources. Web sites maintained by former employees were especially helpful in describing the companies' downfalls.