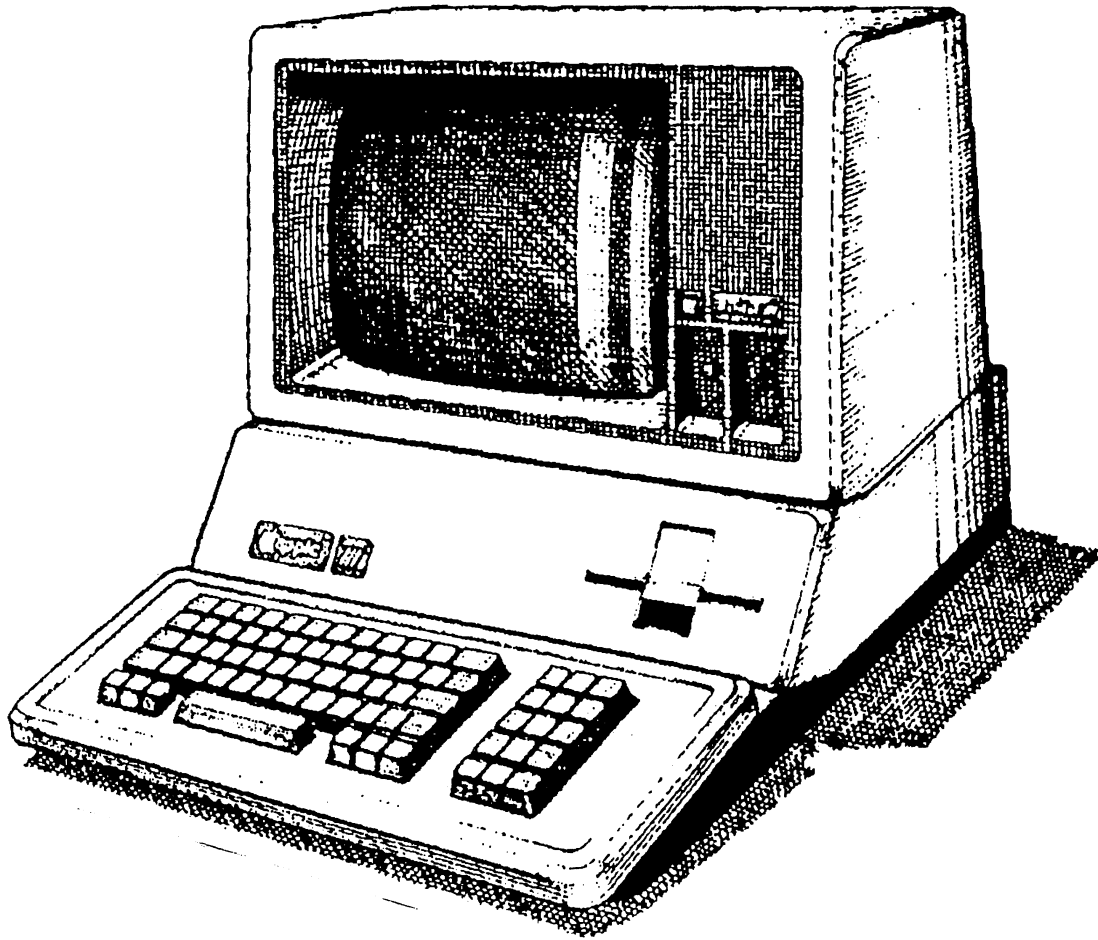




Apple /// Computer Information



| DOCUMENT NAME | # |
|---|----|
| APPLE III HISTORY FROM BOOK "FIRE IN THE VALLEY" 1984 | 15 |

Ex Libris David T. Craig

Information about
the
Apple /// computer

from

Fire in the Valley

Paul Freiberger

Michael Swaine

1984

1/10

DAVID T. CRAIG

*Committee marketing decisions—that was
the major source of all the problems.*

Dan Kottke

The Apple III Fiasco

During Apple's third fiscal year, which ended on September 30, 1979, sales of the Apple II increased to 35,100, more than quadruple those of the previous year. Nevertheless, the company recognized a need to develop another product soon. No one believed that the Apple II could remain a best-seller for more than another year or two.

In 1978 Apple took several steps to gear up for the challenge. Chuck Peddle was hired in the summer although his responsibilities were unclear. As the designer of both the 6502 microprocessor and Commodore's PET computer, which was competing with the Apple, he seemed like a good person to have around. Before Apple had emerged from the garage, Peddle had tried to convince Commodore to purchase the small operation. But Apple and Commodore were unable to come to terms. Peddle's PET (said to stand for Personal Electronic Transactor or Peddle's Ego Trip, but actually named after the pet rock phenomenon of the day) was introduced at the same time as the Apple II at the First West Coast Computer Faire in 1977. The PET did not greatly influence the development of the American personal computer industry because company president Jack Tramiel opted to concentrate on European sales and because Commodore was slow to provide a disk drive. Eventually, Apple executives failed to agree with Peddle on his role, and he returned to Commodore at the end of 1978.

By that time Tom Whitney, Woz's former boss at Hewlett-Packard and a student at Iowa State University with Wendell Sander, was hired to supervise and enlarge the engineering department in order to begin designing new products.

In late 1978 several new computer projects were started. The first, an enhanced version of the Apple II with custom chips, was code-named Annie. Woz worked with another engineer on it but didn't complete the project. Moreover, he didn't pursue it with the intensity he had given his previous computer designs or the disk drive. Executives also discussed having Woz design a supercomputer utilizing bit-sliced architecture, which would spread the capabilities of the microprocessor over several identical chips. Its chief advantages were speed and variable precision, that is, high precision for scientific data and low precision for integer and character data. An engineering staff was put together for this computer, code-named Lisa. The Lisa project started slowly and passed through many incarnations over several years. Eventually a

2/10

former Hewlett-Packard engineer hired by Tom Whitney took over as its project director.

Meanwhile, Wendell Sander took charge of designing the next Apple computer, the Apple III. Sander, one of Apple's most trusted employees, was being asked to design a machine that would equal the success of all the other Apple products. When he commenced work, the company told him that it hoped he could finish it within a year.

Woz had designed the Apple II to be what *he* wanted in a computer. But Sander had constraints from the outset. They derived from a meeting of the executive staff that at the time still included Chuck Peddle. The staff compiled a general and somewhat vague list of guidelines, mentioning such desiderata as enhanced graphics and more memory. There were a few detailed, specific concepts as well. For instance, executives said, the machine should be able to display 80 columns rather than 40, and it should have both upper- and lowercase characters.

Sander was told that the new machine should be able to run software designed for the Apple II. Although this compatibility was desirable considering the large pool of software being developed for the Apple II by outside programmers, it posed a problem. Designing a computer that is significantly different from another machine but that can still run the other's software is not an easy task. The hardware itself determines, at bottom, what the software must do. The microprocessor chip determines the possible machine language operations, and the disk drive determines the features of the operating system software. When this hardware differs between two machines, the computers can only run the same applications software through an intermediate layer of software built into the machine to permit an "emulation mode." The intermediate layer intercepts commands from the applications program and translates them into corresponding commands—or sequences of commands—for the underlying hardware. The process is inherently inefficient and the inefficiency shows most in programs where timing is vital. The most critical hardware feature in the emulation problem is the microprocessor, and Apple decided to simplify this aspect of it by using the Apple II's processor, the 6502.

The emulation edict was not without controversy. Apple engineers and programmers felt that emulation would limit the capabilities of the breakthrough machine they were supposed to create. *They* wouldn't want this kind of machine, they felt. But the marketing staff saw emulation as a stimulus to sales. First, an existing body of software could run on it immediately. Second, Apple could claim it was designing a family of computers. The decree was not rescinded.

In a sense, emulation boxed Sander in, limiting his creativity. The most important decision in the design of a computer—selection of a microprocessor—had been made by others. In fact, designers of the 6502 hadn't intended it to be used as the central processor in a computer. Apple considered adding an additional processor, a second brain, with some capacity to switch from one to

3/10

the other. But a dual-processor machine would have been more expensive than the company wanted. Sander wasn't a person to protest. He liked computer designing, and he took the guidelines and set out to implement them. Dan Kottke worked as Sander's technician on the project. Each day Sander would hand him a drawing of a new part of the computer, and each day Kottke would copy over the schematic to make it more legible, and then put his stereo headphones on and wire-wrap the computer to music. Within a few months Sander had laid out a prototype of the main board.

About that time the company assembled a software team to design an operating system and a few applications for the new computer. Management wanted the Apple III to have a better operating system than the simple one that Woz had created for the Apple II. Indeed, the Apple III required a more complex system to handle its extra memory. Although the 6502 microprocessor could normally handle only 64K of memory, Sander was sidestepping that limitation by a technique known as bank switching. The computer would have several banks of 64K, and the operating system would keep track of which bank was currently active and what information was in each bank. The operating system would move from bank to bank as necessary. The microprocessor would act just as though the machine had only 64K. But the applications software could act as though the machine were handling 128K or 256K directly. Sander labored on the computer throughout 1979. He discovered that the emulation requirement also limited the extent to which he could improve the new computer's graphics. In the Apple II, a chunk of memory was reserved for symbols representing the colors of pixels (small squares) on the screen. Apple II software went to this graphics screen map whenever it needed to update the screen with lines and pictures. The Apple III had to have the *same* map: the same size, the same location in memory, and the same means of access. This need foreclosed many possibilities for enhancing graphics on the Apple III.

Woz occasionally consulted with Sander on the project but he trusted his colleague, who was "an incredible engineer." Nevertheless, Woz later complained about emulation. He would have done it differently. "Apple claims they've got it and they don't," he said.

Since no project had completely captured his attention, Woz was in a joking mood. One day he sneaked into a programmer's cubicle and placed a mouse inside his computer. When the programmer returned it took him more than a few minutes to figure out why his Apple was squeaking.

Delays in the Apple III were soon causing concern in the marketing department. The growing pains of the young company were beginning to show at last. The Apple III was, in fact, the first computer that Apple — as a company — had built from scratch. When the company formed, the Apple II was already near completion. The III was also the first Apple not built by Steve Wozniak in pursuit of his dream machine. Instead it was an awkward collage, pasted together by the many hands of a committee. Often the left hand didn't like what the right hand was doing.

4/10

Moreover, the pressure put on the Apple III project group for a swift completion probably wasn't even necessary. Although new companies were entering the personal computer market, Apple had erased the gap with Radio Shack and had become the leading personal computer company. In 1980, Apple II sales doubled to more than 78,000. Nevertheless the marketing people were worried. The Apple III must be announced.

Sander consented to introduce the new machine at the National Computer Conference in May 1980 in Anaheim, California. He felt that curtain raising was a bit premature. Nonetheless, there were a few working prototypes and the operating system software was "in workable shape." Perhaps it could be managed.

At the NCC the Apple III was well received by the industry and the press. The glamor story was continuing. In addition to unveiling the computer, Apple also announced the software it intended to have for the machine when shipping began a few months later: a word processor, a spreadsheet program, an enhanced BASIC, and a "sophisticated" operating system. The marketing plan was to portray the III as a serious computer that could be used in the office. It seemed likely to succeed.

A few months later, continuing to ride the tide of acclaim, Apple announced its first public stock offering. The *Wall Street Journal* wrote, "Not since Eve has an apple posed such temptation." When Apple was first formed, Mike Markkula dreamed of building the largest privately-held company in the nation, a company fully owned by its employees. But the industry was growing faster than anyone had foreseen. To keep pace, investment for research and development as well as advertising and marketing was essential. On November 7, 1980, when the company filed its registration with the Securities and Exchange Commission for an initial public offering, Apple revealed that its advertising budget for the year had doubled to \$4.5 million.

Once shipments of the Apple III commenced in the fall of 1980, it became apparent that the machines were defective. Users brought the computers back to their dealers complaining that programs were crashing inexplicably. The dealers started complaining to Apple.

The Apple III staff began attempting to isolate the problem, carrying out the diagnostic tests they should have done before the computer was announced, or at least before it was released. As mishaps with the III became public knowledge, Apple slowed its promotion of the new computer and called a temporary halt to production. Soon the staff had identified one problem: a loose connector. While working on the Apple III, Dan Kottke had noticed that on occasion the machine would die. When he picked it up a half inch off the table and let it drop, it would turn on again. Kottke suspected a faulty connector. But he had hesitated, as a lowly technician, to broach his doubts to his superiors. And Sander, an engineer, was not involved with mechanical details like connectors. The problem had fallen through the cracks.

5/10

Another shortcoming stemmed from a bad break. Sander had counted on having a special National Semiconductor chip to use as an internal electronic clock. National finally informed him that the chip would not be available. Apple considered other chips and finally scrapped the entire idea. But since the Apple III had been advertised as having an internal electronic clock, the price had to be lowered since a promised feature was absent.

The problems were identified by January 1981, but selling a defective computer for several months had hurt Apple's reputation. Until then the company had done no wrong, and a certain overconfidence led Jobs, Markkula, and Scott to release the computer without proper testing.

6/10



Wendell Sander, designer of the Apple III
(Photo courtesy of Apple Computer)

7/10



Steve Jobs and Steve Wozniak at an
Apple computer show in Boston in 1982
(Photo by Russell Fine)

8/10



The Apple III in an early stage of development (notice the code name SARA on the disk drive)
(Photo courtesy of Dan Kottke)

9/10



The Apple III
(Photo courtesy of Apple Computer)

10/10