

# A History of the Electronic Digital Computer (part 4)

P. Reany

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## Abstract

This paper is a slightly edited version of the paper originally published in the April 1997 issue of *Phasor* (pp. 2-4), a computer journal (in PDF) for the computer user group MACRO, which was defunct in mid-1997, IIRC. I was the editor of the journal during its very short run.

## Part 4: 1970–1979

By way of a little review, in 1951, Remington Rand sold UNIVAC I to the Bureau of Census, which was the first commercial sales of general-purpose digital electronic computer. By 1953, IBM and Rand were tops in computer manufacturing. But IBM had been at first reluctant to get into the computer market because of its high cost and unsure future. At that time, computer programs were stored on punched cards. One day, IBM learned that it had better create a new technology to replace their punchcard technology or else face losing customers who were being inundated by rooms full of punch card for their customers. The new technology was the use of tape to store data.

But all was not well in computer land. The human-computer interface was appalling, and a new metaphor of interface was needed. In 1968, Douglas Englebart presented his vision of the computer of the future, which he had made already: A client computer (terminal) interfacing with a mainframe over radio, and using a keyboard and mouse to interface with the terminal, using a graphical user interface. So, why didn't this vision immediately catch on then for public use? Well, a number of reasons. First is because computers were still expensive for very little power. Second, because they were still difficult to operate. And third, because they still didn't have much in the way of applications to run. A deeper question is why this vision didn't catch on for big business, such as IBM.

Perhaps this had to be. The state of the art for both hardware and software was in such a state of flux that just keeping up was difficult. The first change came during the late 1940s when three Bell Labs physicists invented the

transistor, which would replace the failure prone and hot-running vacuum tube technology of ENIAC, for example.

The beginning of the space race between the U.S. and the Soviet Union was another funding source to drive computer technology along. The trip to the moon would require a powerful and compact on-board computer for the trip. Compaction came partially because of the integrated circuit developed in 1959. Then in 1968, the most revolutionary device ever produced by humanity was invented – the Microprocessor.

The technology was there and ready to be used. The real problem to get the computer onto the desktop, first at work and later at every home, was the lack of vision. IBM types just had to watch how computers were used on STAR TREK to get the big picture. On STAR TREK the ubiquitous computer was used for anything and everything. But IBM just couldn't get it. So the future of the desktop computers throughout the 1970s lay in the hands on electronic hobbyists who were willing to nurse the poor—even pathetic—“computers” to productive use, through trial and error if they had to. Oh, and there was one other player at that time – Xerox – but we'll get back to them shortly.

In 1974, a small electronic company in Albuquerque, New Mexico that sold to hobbyists was on the brink of bankruptcy. The name of the company was Micro Instrumentation Telemetry Systems (MITS), cofounded by Ed Roberts. Roberts decided to build a computer kit for hobbyists. It would use the Intel 8080 chip, and if you worked very hard with it, you might even find some use for the finished kit. The kit was called the “Altair,” named by the daughter of an editor of the Popular Electronics magazine that took the advertisement for the kit. The name “Altair” was from a STAR TREK episode.

This is a good time to use a quote from Albert Einstein: “Imagination is better than knowledge.” There were two young men at that time who imagined a potentially great future for the Altair. They were Paul Allen (age 22) and Bill Gates (age 20). They knew a good use for the machine, considering the overwhelming interest in it by hobbyists. They wrote a version of BASIC that ran on it, and licensed MITS to use it on the Altair.

Allen and Gates formed Microsoft to license software to computer companies. Soon they licensed BASIC to Commodore and to Tandy for use on its Radio Shack TRS-80 computer.

But Allen and Gates were not the only upstarts to come of the Altair revolution. Next up were Steve Wozniak and Steve Jobs. Both these young men were members of a San Francisco computer club called the Homebrew Computer Club, which was dedicated to getting the Altair to do neat things. When I use the term “revolution” regarding the Altair I mean just that: Viewed psychologically, the Altair was more than a toy to its devotees; it was “power to the people” at the same time period that the government and Big Business, such as IBM, were being vilified by hippie types as tyrannical “Big Brother.” After Wozniak, the engineering whiz, had improved the Altair with the then new eight-bit 6502 microprocessor, he and Jobs, the entrepreneur, got together to form Apple Computer Company. Then came the Apple II, which had Microsoft BASIC and used a keyboard. The desktop computer had arrived. Now people

could “do their own thing” by writing their own programs. To those who do it, there is an immense satisfaction of being both creative and technical at the same time.

The Wosniak-Jobs team combination is not new, of course, in the way that their talents complemented each other. The same was true of the Eckert-Mauchly team.

By 1977, Microsoft was selling other programming languages, such as FORTRAN and COBOL. By the end of the decade, Apple was selling one-fifth of its Apple II line just because it supported a so-called “killer” application called, VisiCalc, a spread-sheet developed by Dan Bricklin in 1979. Microsoft started in New Mexico, but in 1978 moved (back) to Washington.

By 1978, Ed Roberts, who had started the microcomputer revolution a couple years earlier, got out of the business altogether. By the end of the 1970s, the Apple II was a great success. But a new machine would be needed for Apple to sell to reach a very large but at that time untapped potential market for desktop computers. As happens so often in life, serendipity (or fate) stepped in. In 1971, Xerox, determined to dominate the paperless office of the future, set up a research center in Palo Alto, called the Palo Alto Research Center, (Xerox) PARC, with top manager Bob Taylor. By 1973, PARC had developed the World’s “first” GUI (Graphical User Interface, rather than the ubiquitous CLI, or Command Line Interface) with mouse. They had also developed the first ethernet and WYSIWYG printing.

Here again, I run into a controversy on who was really first at inventing the GUI (using the graphical metaphor of a desktop) and mouse. At the beginning of this article we saw that Mr. Engelbart was alleged to have invented GUI and mouse in 1968. It’s all very reminiscent of the controversy between Atanasoff-Mauchly on the invention of the first electronic digital computer, and between Mauchly-Eckert and von Neumann on the invention of the idea of memory-stored programming.

By the time Steve Jobs visited Xerox PARC, the PARCers had long lost the battle with their own company to understand the technological and financial significance of the innovations they had fostered. So, to keep their inventions from being “lost” they were glad to show them off to computer visionaries. Jobs was immediately impressed by the GUI and mouse, and also the networking capability. By his own admission, he was less interested in the Object-Oriented Programming (OOP) techniques at that time.

With Xerox PARC humbly minding their “place” in the computing industry, Steve Jobs went off with a new vision for Apple Computers—and that vision was encased in a philosophy that using a computer should be the next best thing to doing effortless programming: no unnecessary key presses. But where is IBM in all this?

#### POSTSCRIPT:

Unfortunately, I presented no follow up series installment to this question, as the MACRO computer club, due to a long run of diminishing club enrollment,

disbanded soon after this fourth issue was published. There being no longer any need to protect the copyrights of the articles in the club, they naturally return to the original authors published in *Phasor*.

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