The new Xerox Sigma 6 computer system was installed in 1973.

Andrews Computing History Still Alive and Well in Seattle

For a long period of our history, there was only one computer on the campus of Andrews University. In 1973, Andrews switched from a succession of early IBM computers and card equipment to a Xerox Sigma 6. The 1972 computer selection committee report is a classic and copies still exist on various Adventist college campuses. That report studied several computing options in detail and recommended the acquisition of the Sigma 6 with 256 KB of main memory, 100 MB of disk storage, and 16 communication lines. It also recommended hiring a full-time systems programmer.

Xerox entered the mainframe computer business in 1969 with the billion-dollar acquisition of the real-time computer company Scientific Data Systems or SDS. SDS served a niche market, which included NASA, power companies, high-energy physics and airline flight simulators. Their Sigma line was well suited for general business computing, including time-sharing, and was making inroads into the university market. However, Xerox never achieved recognition as dwarf status (IBM was “Snow White” and the other computer companies were the “Seven Dwarfs”). Xerox had no idea how to even manage a computer company. In 1975, after a campaign saying
how they wouldn’t “love you and leave you,” Xerox left the mainframe computer business with many high-valued contracts on the table.

System software was free in those days. The Sigma 6 came with the long-delayed UTS (Universal Time-Sharing System) operating system whose name was soon changed to CP-V or Control Program-fiVe to help ameliorate some of the bad press garnered over the years. CP-V is an event-driven, real-time operating system that was ahead of its time in many ways, such as security and programs running seamlessly across multiple access modes like online or batch.

Andrews hired George Plue as the systems programmer. However, George’s job soon expanded from just software programming to helping engineers assigned to fix the hardware. When they couldn’t fix it before leaving for the day, he would fix it at night when they were gone, allowing production to keep running. With Xerox exiting the mainframe computer business, obtaining expansion equipment and good maintenance soon became problematic.

By 1979 the Xerox system had expanded to 512 KB of main memory, 500 MB of disk storage, and 64 communication lines. The new communication lines were designed by George and built internally. Several important decisions were made at that time. Andrews would start providing their own “in-house” maintenance and the computing center would expand with now readily available used equipment. Keith Calkins had been hired in 1978 to replace Dan Bidwell as systems programmer but was soon pressed into hardware service and Dan returned as the programmer. By 1980 the academic and administrative computer systems had been split onto separate Sigma 6/7 computer systems. In 1983 George Plue left for Arizona to provide time-sharing services using Xerox Sigma mainframes for the Ritland family medical practice in Flagstaff, Arizona.

From 1984–1985 Keith and his technical support staff converted the two Andrews mainframe computer systems onto Sigma 9s, which were about 50 percent faster and could handle much more main memory. A cooperative software development and maintenance arrangement with Telefile brought tri-density tape drives to campus. By 1990 similar work with Belo-Box resulted in smaller, higher capacity disk drives.

By 1992, University administration decided to sell the entire collection of Sigma equipment. A few minor details needed to be addressed since George had first right of refusal, plus the Sigmas still ran all the software for the University’s financial and grading systems. Keith Calkins ended up purchasing the 80 tons of equipment and sold to George Plue what he wanted. This time the Sigma 9 had 152 communication lines, with many of those connected to a terminal server providing access to many more. It also had 16 MB of main memory and 4 GB of disk storage.

One of the eight Sigma 9s Andrews University owned came from the University of Southern Mississippi. In November 1985, Robert Moon, Keith Calkins and Jim Massena disassembled it there and loaded it onto a truck for transport. That Sigma 9 CPU (Central Processing Unit) was used for testing within the Andrews computing center. In February 1990 it was sold to George Plue and Keith hauled it out to Flagstaff in a 24' Ryder truck. Since it overheated when the air conditioning failed at the University of Southern Mississippi, George had some challenges
getting it to run reliably. It was used until the mid-90s, when the Ritlands converted their business onto personal computers.

George Plue moved back to Berrien Springs in 1997. In late September he gave Keith a call and said he wanted to write an emulator for the Sigma computer. Keith came right over with diagnostics code and within a month they were running the CP-V operating system. In December, George went back to Arizona to convert his backup tapes. During the spring of 1998 Keith added the decimal instructions and George added floating point. They also added large memory and terminal support. The emulator was a project that stretched all their hardware, software and personal computer knowledge. The emulator was also instrumental in helping to preserve the software to this time; since many “permanent” save tapes had been scratched.

Although George never bothered to finish a degree at Andrews he was inspirational to many, providing technical support in the pursuit of their education. Dan Bidwell obtained his PhD by porting the C language onto the Sigma and utilizing its real-time capabilities to precisely time differences in code optimization schemes. Jim Wolfer obtained his PhD in image processing, another area of interest to George. Keith Calkins obtained his PhD in metrology, the study of measure, in part due to extensive work with statistics on the Sigmas. Devin Zimmerman obtained his doctorate in medicine while honing his diagnostic skills repairing terminals and writing code.

George died in 2010 but had already made contact with the Living Computer Museum (LCM). The LCM is the brainchild of Paul Allen, cofounder of Microsoft with Bill Gates, and thus about the 25th richest person in the U.S. George wanted to see CP-V on his Sigma computer kept running and that was consistent with Paul’s goals for the museum. In the fast-paced computer industry it is easy to lose vital parts of our rich heritage.

Stanley Ritland delivered five truckloads of computer equipment from Flagstaff, Arizona, and Berrien Springs, Michigan, to the Seattle museum in 2011. In 2012 the museum contracted with Keith to bring the Sigma 9 back to running order. Keith spent 12 weeks there over the next 2.5 years and in December 2014 LCM announced that the CP-V operating system, a copy of the actual boot tape last used at Andrews University, is running on a Sigma 9 once owned by Andrews University.

CP-V ran Andrews University’s business on Xerox Sigma mainframes for over 20 years, from 1973–94. During the 70s it was also the only computer available for student use. It is thus familiar to many workers and students from that era. The Andrews technical support staff made substantial changes to the operating system, associated processors, languages and hardware over the years, molding it to the many and varied needs of the University. George Plue, Keith Calkins and their technical support staff saved the University more than $2 million by extending the Sigma era into the 1980s and 90s.

This era marked the beginning of a philosophy of Andrews Information Technology staff to provide significant support “in-house” rather than through vendor provided maintenance, resulting in very significant cost savings. It also encouraged a spirit of innovation that still marks the department today.
If you are ever in Seattle, consider stopping by the LCM to see a big part of Andrews computing history running there with many other computers of that era.

Submitted by Keith Calkins