It was the era of Big Iron—an era when multimillion dollar computer systems came packaged in a dozen or more refrigerator-sized cabinets wired together with cables the size of pythons. In the late 1950s, computers were celebrating nearly a decade of commercial availability. IBM was in the forefront of scientific and business computing even then, though it had competitors such as Remington-Rand (with its UNIVAC system), RCA, and Burroughs.

Most computers made in the 1950s—IBM’s included—fell into these two broad categories: Customers were either using them as “number crunchers” or for business and accounting purposes. On the one hand, scientific users required high speed and often dealt with very large or very small numbers. Business users, on the other hand, required only moderate speed and dealt with the relatively small decimal numbers seen in business.

These powerful—and gigantic—machines are long gone … or are they? As Margaret Mead famously noted, “Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.” Thanks to one such thoughtful, committed citizen—Paul Pierce of Portland, Oregon—several of these legendary computer systems from the dawn of
commercial computing survive. Pierce, a former Intel engineer who worked on supercomputers for a living, accumulated these machines over several decades. It was a tough slog—collecting mainframe computers is neither easy nor inexpensive. Because one Big Iron system can require thousands of square feet of storage space, even when closely packed, Pierce moved occasionally to larger or more convenient storage spaces before eventually acquiring his own warehouse. Pierce’s commitment to rescuing the systems is based on a deep respect, and even love, for the skillful engineering, impressive size, and unique computing technologies of a bygone era.

Early in 2014, the Museum and Pierce began discussions about finding a good home for some of his largest systems. Pierce was satisfied with his collecting, and while he had entertained the notion of starting his own computer museum in the future, he no longer wished to pursue that option. We were thrilled that an opportunity to add these classic computers to the Museum’s Permanent Collection had arrived. A site visit was arranged and a detailed inventory was created. The Museum decided to accept the following complete systems: the IBM 650, IBM 709, IBM 7094, and Bendix G-15.

What are these computers and how were they used?

Let’s start with the IBM 650. This medium-sized computer system was IBM’s first mass-produced electronic computer, with over 2,000 machines manufactured between 1953 and 1962. In a world with only a few thousand computers, that was a huge deal. The IBM 650 was equally at home with scientific applications as it was with business ones—a rare case of a computer appealing to both major computing markets. It was also during this time that IBM was showing its customers a new way of computing, one without plugboards—a turn-of-the-century technology that was adopted to electromechanical business equipment and some early computers. Instead of wiring up a rat’s nest of colored wires to tell a machine what to do, instructions could be stored in the computer itself and changed rapidly through a stored program. As an IBM announcement at the time stated, the 650 would be “a vital factor in familiarizing business and industry with stored program principles.” All computers today are stored-program computers.

The IBM 650 also had a big influence on early generations of programmers, many of whom first learned to program on one. The most famous is undoubtedly Stanford University professor of computer science Donald Knuth, who learned how to program a 650 in college. In his memoirs, Knuth remarks: “There was something special about the IBM 650, something that has provided the inspiration for much of my life’s work. Somehow this machine is powerful in spite of its severe limitations. Somehow it is friendly in spite of its primitive man-machine interface.”

The next mainframe system from Pierce is the IBM 709, a large-scale scientific and business-oriented computing system, comprising 10 closet-sized cabinets, 6 feet tall, and built using vacuum tubes. Announced in August of 1958, the 709 was an improved version of an earlier large-scale computer, the IBM 704 (1954), which sported magnetic core memory, a then-new technology that became central to all computers built over the next 20 years.

Just over a year after the IBM 709, IBM announced a transistorized version of it, called the IBM 7090, a system designed for scientific and engineering applications. The IBM 7090 was six times faster than its year-old brother and rented for less than half the price. This small one-year difference shows the speed of technological change in this era. The transition from vacuum tubes to transistors offered immediate benefits: smaller size, lower cost, and less power. IBM made use of transistors beginning
with an internal company policy to “go solid-state in ’58.” (“Solid-state” meant using transistors).

Twenty-two 6-foot-tall cabinets make up Pierce’s IBM 7094 system, an enhanced and speedier IBM 7090, which was in production from January 1962 until July 1969—a remarkably long run. The IBM 7094 was IBM’s flagship scientific computing system for much of the 1960s and played a crucial role in the US space program (Mercury and Gemini), oil exploration, weather forecasting, and all-purpose scientific computing, especially in government, the military, and universities. A 7094 with 32K 36-bit words of memory then cost about $3.5 million (about $27 million today).

The final machine donated to the Museum from Pierce’s collection is the Bendix G-15, a personal computer—in the sense that it was made for just one user at a time and cost a fraction of what mainframe systems cost. Designed by 2013 Museum Fellow Harry Huskey, the G-15 was released in 1956 and was one of a small number of single-user computer systems like the Librascope LGP-30 and RNC 4000. It sold for about $60,000—a very low price for its capabilities—and was used in engineering and scientific offices, as well as in universities for teaching computer science.

In early summer of last year, three massive trucks finally delivered Pierce’s very special cargo of historic computer systems to the Museum’s offsite environmentally controlled storage facility. After unloading, items were carefully vacuumed and cleaned, packaged for storage, and placed on pallets. Receiving over 40 gigantic cabinets—not including 14 pallets of cabling—is not a casual procedure, but the Museum’s Collections team processed it quickly and efficiently. It was a magical day for the Museum—all of these systems were on our historical wish list as highly significant computers that tell important stories about the early days of computing. A few months later, Pierce himself visited the Museum’s storage facility to see the progress, reminding us all of how being able to see these long-extinct computer systems in real life and knowing that they are now preserved for history is what the Museum is all about. ☺