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Individual Transistors and Magnetic Core Memory Made up a Second-Generation Computer

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Description

A computer that uses discrete transistors rather than vacuum tubes is known as a transistor computer, or second-generation computer. Vacuum tubes were used in the first generation of electronic computers. They were heavy, unreliable, and produced a lot of heat. Through the latter half of the 1950s and the early 1960s, circuit boards containing individual transistors and magnetic core memory made up a second-generation computer. Until the late 1960s, when integrated circuits began to appear, these machines remained the standard design. This led to the development of the third-generation computer. In November 1953, the University of Manchester's experimental transistor computer went live. It is widely believed to have been the first transistor computer to work anywhere in the world. The Transistor Computer came in two flavour's the smaller version, which went into operation in April 1955, and the larger one, which went into operation in 1953.

Second-Generation Computer

STC-made 550 diodes and 92 point-contact transistors made up the 1953 machine. It had a machine word of 48 bits. The machine of 1955 used 150 watts of power and had a total of 1300 point diodes and 200 point-contact transistors. In 1955, the average error-free run was only 1.5 hours, and the initial batches of transistors had significant reliability issues. In addition, the clock generator of the Transistor Computer contained only a small number of tubes, making it not the first machine that was entirely transistorized. Metropolitan-Vickers, based in Manchester, adopted the full-size transistor computer design and changed all of the circuits to use junction transistors that were more dependable. The Metrovick 950, the production version, was produced from 1956 to the point where six or seven machines were primarily for internal use or commercially used within the company." A number of similar machines appeared in the middle of the 1950s. One of these was the Bell Laboratories TRADIC, which was completed in January 1954 and supplied its 1-MHz clock power with a single high-power output vacuum tube amplifier. Either the prototype IBM 604 transistor calculator or the Harwell CADET, which first ran in February 1955 but only ran at a slow speed of 58 kHz, were the first fully transistorized computers. The Burroughs Corporation claimed that the "world's first operational transistorized computer" was the SM-65 Atlas ICBM THOR ABLE guidance computer it delivered to the US Air Force in June 1957 at the Cape Canaveral missile range. MIT's Lincoln Laboratory began working on a transistorized computer in 1956 with the TX-0. Further transistorized computers became operational in July 1956 in Japan, 1957 in Canada DRTE Computer, and Austria. These were the initial transistorized computers in Asia, Canada, and mainland Europe, respectively. The IBM 608 transistor calculator was introduced by IBM in April 1955 and went on sale for the first time in December 1957. As a result, the IBM 608 is regarded as the first all-solid-state computing machine to be sold commercially by IBM and a number of historians. The 604's experimental all-transistor version was prototyped prior to the 608's development. In October 1954, this was built and demonstrated, but it was never sold. The first commercially available large-scale all-transistor computers were the Philco Transac models S-1000 scientific computer and S-2000 electronic data processing computer they were made public in 1957, but they didn't start shipping until after the fall of 1958. The term "Transac" refers to a computer manufactured by Pico.

Surface-Barrier Transistor

The surface-barrier transistor, the first high-frequency transistor designed specifically for high-speed computers, was utilized in the circuitry of both of these Pico computer models. Pico created the surface-barrier transistor in 1953. The Olivetti Elea 9003, which was sold in Italy in 1959, was the company's first fully transistorized commercial computer. IBM, which dominated the data processing industry for the majority of the 20th century, introduced its first commercial transistorized computers in 1958 with the IBM 7070, a ten-digit word decimal machine. In 1959, the IBM 7090, a scientific machine with 36 bits, the immensely popular IBM 1401, which was designed to replace punched card tabulating machines, and the desk-sized IBM 1620, a machine with variable length decimals, came along. Different data formats, instruction sets, and even character encodings were used in IBM's 7000 and 1400 series designs, which were all constructed with the IBM Standard Modular System (SMS) series of electronic modules. In 1957, the TX-0's

creators left to found the Digital Equipment Corporation. The PDP-1, PDP-6, PDP-7, and early PDP-8 were all transistorized from the start, kicking off the minicomputer revolution. Beginning with the PDP-8 model in 1968, the third generation of PDP-8 computers made use of interconnected circuits. In 1964, IBM announced the System/360, a collection of computers with a unified architecture that covered a wide range of capabilities and prices and would replace its earlier models. IBM built the S/360 series with IBM's Solid Logic Technology (SLT) modules instead of betting the company on the early 1960s' unproven monolithic IC technology. In contrast to monolithic IC manufacturing, the diodes and transistors in an SLT module were individually placed and connected at the end of each module's assembly. SLT was able to package several individual transistors and individual diodes with deposited resistors and interconnections in a module that was one-half inch square, roughly equivalent to the logic of the earlier IBM Standard Modular System card. Schools and hobbyists who wanted to build their own first-generation computers were mostly out of reach due to the high cost of the many vacuum tubes needed though relay-based computer projects were done. Due to the fact that the majority of the design work was performed within the integrated circuit package, the fourth generation (VLSI) was also largely out of reach although this barrier was also removed later. As a result, the design of computers of the second and third generations LSI and transistors might have been best suited for hobbyists and schools.