

Hollerith's invention allowed him to start a company called the Tabulating Machine Company, which sold his machines to others. That company eventually became the International Business Machines Corporation (IBM).

Hollerith's machine was an electro-mechanical device that used gears and wheels and other mechanical parts, but was powered by electricity.

In 1944, IBM built the Mark I. The machine used a combination of electrical signals and mechanical gears to quickly add and subtract large numbers. The machine was 51 feet long and 8 feet high, and included almost 500 miles of wires. The Mark I was the most elaborate electro-mechanical computer ever built.

The era of electronic computers was about to dawn.

ELECTRONIC COMPUTERS

In 1946, the Electronic Numerical Integrator and Computer (ENIAC) was developed by John William Mauchly and John Presper Eckert. ENIAC was one of the first computers without mechanical parts.

Instead of mechanical switches and gears, ENIAC used electronic switching devices called vacuum tubes. Figure 1-2 shows a row of vacuum tubes. Vacuum tubes made ENIAC about 1000 times faster than the Mark I.

By the late 1950's, the transistor began to replace the vacuum tube in computers (see Figure 1-3). Transistors accomplish the same work as vacuum tubes, but are smaller and faster. The transistor also proved to be more reliable than vacuum tubes, which had to be replaced often.

In the 1960's the integrated circuit, commonly called a chip, was developed. An *integrated circuit* is a thin slice of photo-sensitive silicon, usually smaller than a dime, upon which microscopic circuits have been inscribed. The first integrated circuits usually performed only one function, such as adding. But in the 1970's, designers began to put multiple functions on a single chip. Soon, nearly all of the main functions of a computer were placed on a single chip. This new invention was called the *microprocessor*, shown in Figure 1-4.



FIGURE 1 - 2
The vacuum tube began the era of electronic computers.

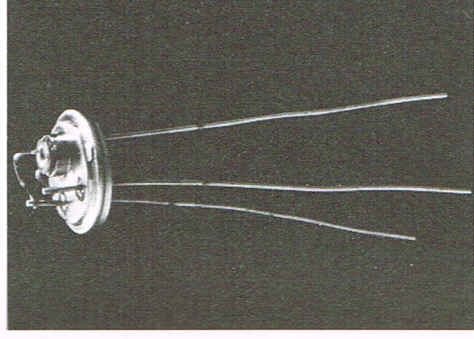


FIGURE 1 - 3
Transistors were a faster, smaller, and more reliable alternative to the vacuum tube.

A revolution began as manufacturers started building complete computer systems that had microprocessors at their core. The first microcomputers became available in the 1970's.

Since the 1970's, microcomputers have evolved more rapidly than ever. Each new model does more and costs less than the one before. The timeline below shows some of the major events in microcomputers from 1975 to the early 1990's. You may not recognize many of the items on the timeline. That is because most of them quickly became history. The timeline is intended to show you how rapidly the industry has evolved since the 1970's. The computers you are using today will probably become obsolete as quickly as the computers in this timeline.

- 1971 ▶ The first microprocessor (the Intel 4004)
- 1975 ▶ The first real microcomputer (the Altair 8800)
- 1976 ▶ Apple I appears and Apple Computer is founded
- 1977 ▶ Apple II
- ▶ Radio Shack TRS-80 Model I
- 1978 ▶ Epson introduces the first affordable dot-matrix printer
- 1979 ▶ Intel 8088 microprocessor (later used in the first IBM PC)
- ▶ Motorola 68000 microprocessor (later used in the first Macintosh)
- 1980 ▶ Commodore VIC-20
- ▶ Apple III
- ▶ TRS-80 Color Computer

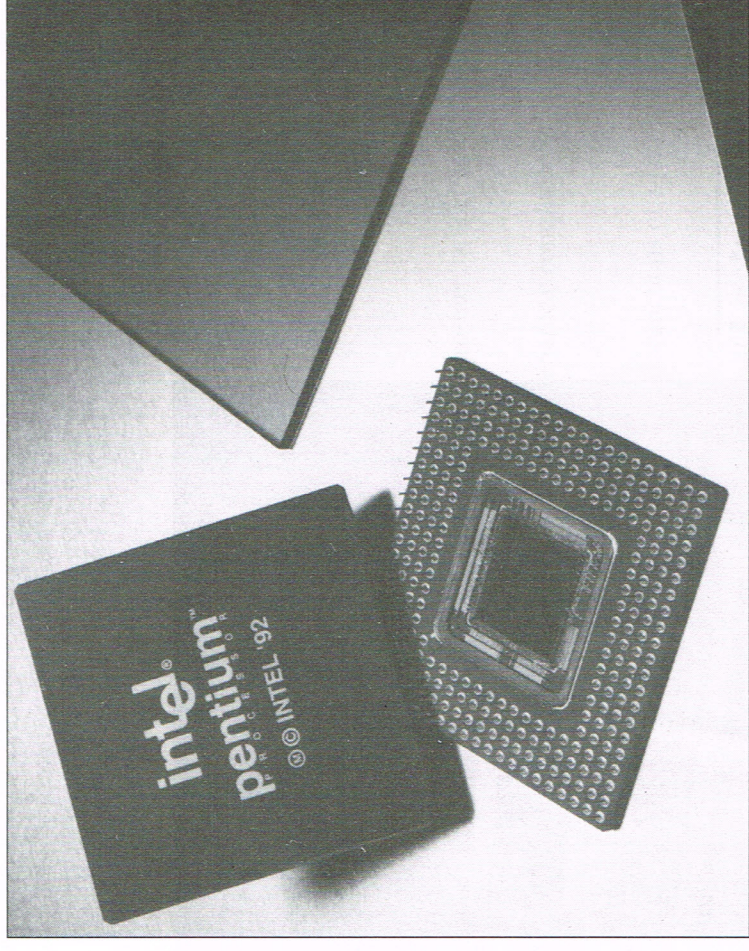


FIGURE 1 - 4
The microprocessor is the device that put computers within reach of small businesses and individuals.