

Topic Page: [Calculators](#)

Definition: **calculator** from *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*
Pocket-sized electronic computing device for performing numerical calculations. It can add, subtract, multiply, and divide; many calculators also compute squares and roots and have advanced trigonometric and statistical functions. The first electronic calculator was manufactured by the Bell Punch Company in the USA in 1963.

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Napier's bones

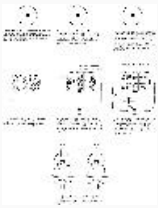


Image from:

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Summary Article: **calculator**

From *The Columbia Encyclopedia*

or calculating machine, device for performing numerical computations; it may be mechanical, electromechanical, or electronic. The electronic computer is also a calculator but performs other functions as well.

Mechanical and Electromechanical Calculators

Early devices used to aid in calculation include the abacus (still common in E Asia) and the counting rods, or “bones,” of the Scottish mathematician John Napier. The slide rule, invented in 1622 by William Oughtred, an English mathematician, was widely used to make approximate calculations, but it has been replaced by the electronic calculator. In 1642, Blaise Pascal devised what was probably the first simple adding machine using geared wheels.

In 1671 an improved mechanism for performing multiplication by the process of repeated addition was designed by Gottfried W. von Leibniz. A machine using the Leibniz mechanism was the first to be produced successfully on a commercial scale; devised in 1820 by the Frenchman Charles X. Thomas, it could be used for adding, subtracting, multiplying, or dividing. A mechanism permitting the construction of a more compact machine than the Leibniz mechanism was incorporated into a machine devised late in the 19th cent. by the American inventor Frank S. Baldwin. Later the machine was redesigned by Baldwin and another American inventor, Jay R. Monroe. At about the same time, W. T. Odhner of Russia constructed a machine using the same device as Baldwin's. Charles Babbage, an English mathematician, and William S. Burroughs, an American inventor, also made important contributions to the development of the calculating machine.

Early mechanical adding machines were equipped with a keyboard on which numbers to be added were

entered, a lever to actuate the addition process, and an accumulator to display the results. A full keyboard consisted of 10 columns of keys with 9 keys in each column, numbered 1 through 9. Each column could be used to enter a figure in a particular decimal place so that a number up to 10 digits long could be entered; if no key was pressed in a given column, a zero was entered in that decimal place. The lever was pulled in one direction when a number was to be added and in the opposite direction when it was to be subtracted. The accumulator was a set of geared wheels, each corresponding to a decimal place and having the digits 0 through 9 printed on its circumference. When a given wheel made a complete rotation, the next wheel was advanced by one digit. The mechanical adding machine remained essentially the same until the mid-1960s, with improvements consisting of motors to actuate additions and subtractions and mechanisms to print out results on a paper tape.

Electronic Calculators

Electronic calculators, which became available in the early 1960s, at first were merely faster and quieter adding machines. The invention of the microprocessor and advances in integrated-circuit technology made small, but highly sophisticated, calculators possible, and by the mid-1970s they were in wide use. Simple calculators perform only the basic four functions of addition, subtraction, multiplication, and division. More sophisticated calculators can perform trigonometric, statistical, logarithmic, and other advanced calculations.

Some electronic calculators are actually small computers with limited memory and programming capabilities. Some of these programmable calculators can accept plug-in semiconductor memory cards or programming modules for special applications, such as financial calculations, unit, currency, or number-system conversions, or engineering calculations. Others are also available that include nonmathematical functions such as data storage and schedule organizing. The personal digital assistant, a hand-held device optimized as an organizer with communications capability and accepting handwritten input, is a bridge from calculators to full computer function.

Early electronic calculators had numeric displays made from light-emitting diodes (LEDs). They have been supplanted by liquid-crystal displays (LCDs), whose lower power consumption helps to reduce battery drain. Some calculators use an LCD readout to provide a graphic, as well as numeric, display. CMOS, or complementary metal-oxide-semiconductor (see integrated circuit), technology is also preferred for battery-operated models because of its low-power requirements. Some calculators are powered by solar cells in ordinary room light.

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