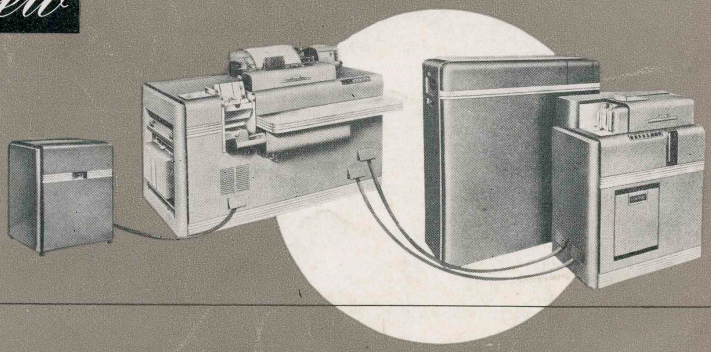
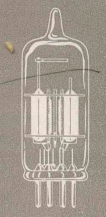
new



IBM

card-programmed electronic calculator



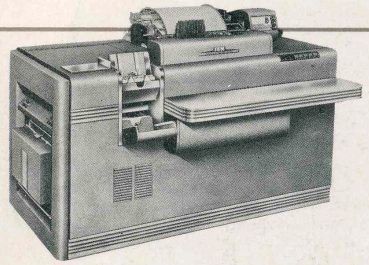
performs in one operation computations previously requiring a series of operations

The IBM Card-programmed Electronic Calculator, through its capacity to remember information, permits continuous operation on problems of a sequential or repetitive nature.

Developed as a result of IBM's experience in the construction of large calculators for pure and applied science, it embodies many of their advantages and automatically performs engineering, scientific, actuarial, and other types of complex computing.

This combination of machine units includes a calculating unit which performs additions, subtractions, multiplications, and divisions at electronic speed. For example, utilizing five-digit numbers, this unit computes at the rate of 2174 additions or subtractions, 79 multiplications, or 65 divisions—*in one second.*

Also included are a unit for interpreting instructions from IBM cards and for accumulating and printing results, a unit for retaining information for later use in a problem, and another for punching results into IBM cards.



ACCOUNTING MACHINE

The IBM cards used in any operation are fed into the Accounting Machine. This unit will record in printed form any of the data punched in a card, thus supplying a record of the operation. Data from the card can be accumulated, or can be relayed to the other units for calculation, for punching into another card, or for retention until later in the problem. The Accounting Machine prints the results of any steps in the operation.

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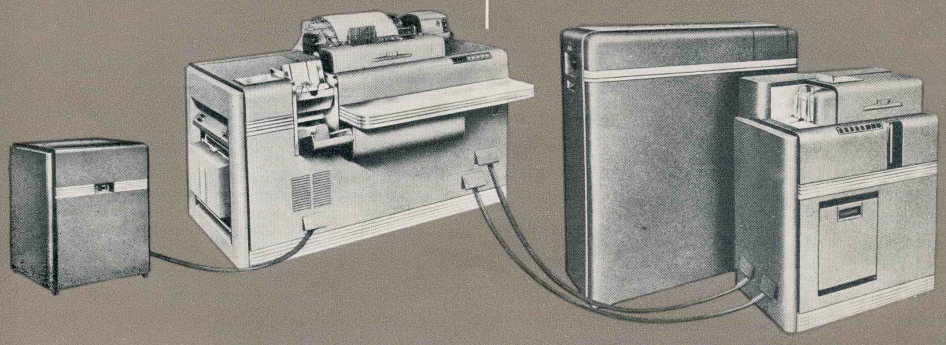
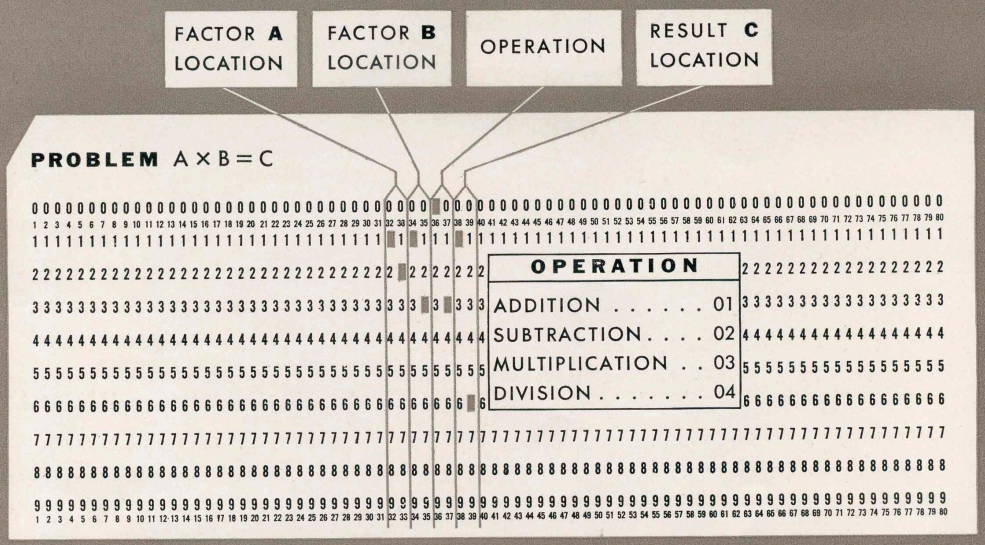
for scientific, engineering and actuarial uses

including

1. stress analysis
2. vibration analysis
3. ballistics computation
4. electrical network analysis
5. combustion analysis
6. optical ray tracing
7. actuarial calculation
8. formula evaluation
9. matrix manipulation
10. integration of differential equations
11. reduction of experimental data
12. analysis of variance in curve fitting



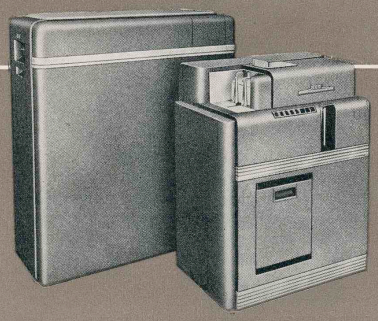
an **IBM** card controls each step



Each card passing through the Accounting Machine carries instructions which indicate the arithmetical operation to be performed, the location of the two factors, and the disposition to be made of the result—whether to print it, punch it in another card, hold it for later use, or perform a combination of these possibilities. In addition to the instructions, the card carries any new factors to be introduced during this step of the problem.

In the instructions, the factors are identified by numbers representing their positions in storage; arithmetical operations are identified by predetermined codes.

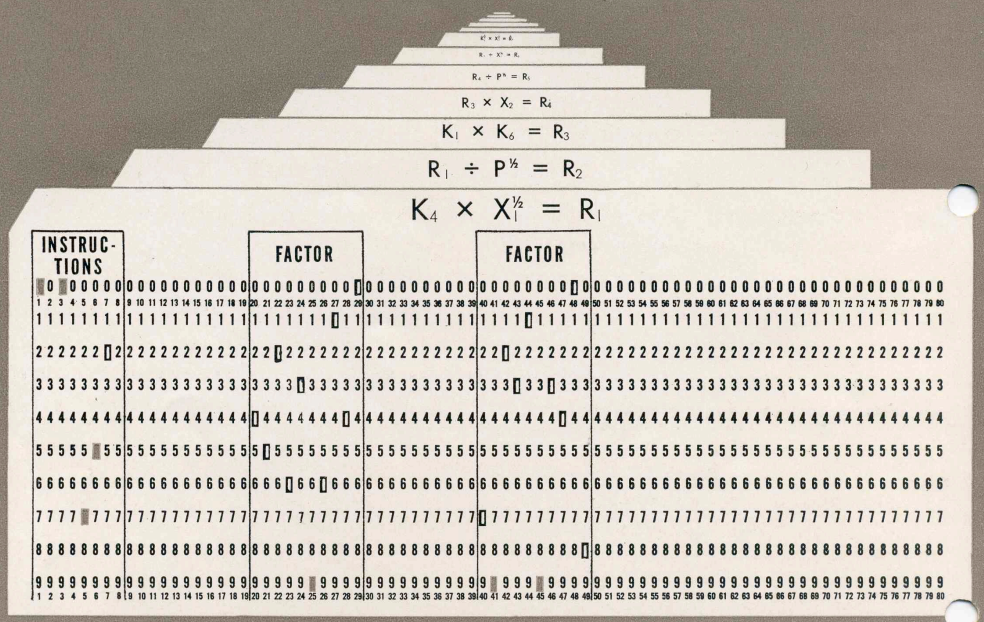
Applying this to the illustration above, the instructions tell the calculator to take Factor A from position 12 and Factor B from position 13 of the Storage Unit, to multiply Factor A by Factor B, and to enter the result into storage position 16. For purposes of illustration only, the arithmetical operations are identified by the numbers 01 through 04.



The Electronic Calculating Unit performs additions, subtractions, multiplications, and divisions at a high speed. Any of these arithmetical operations can be combined. Results, as directed by the instructions in the cards, are recorded in IBM cards by the punching unit, relayed to the Accounting Machine for printing, or to the Storage Unit for subsequent use in the operation.

ELECTRONIC CALCULATOR — SUMMARY PUNCH

problems of any length

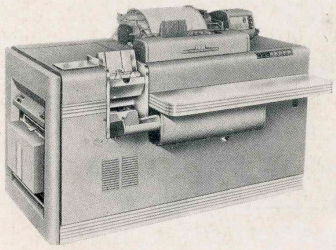


The number of cards used for solving a problem depends upon the number of arithmetical steps in the computation.

The Supplemental Storage Unit retains for later use in an operation as many as 16 ten-place factors relayed to it from the Accounting Machine, the Electronic Calculating Punch, or both.

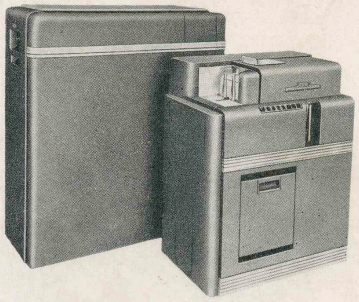
SUPPLEMENTAL STORAGE UNIT

units can be operated individually to perform standard accounting functions



When not being used as a unit of the Card-programmed Electronic Calculator, the Accounting Machine may be disconnected and used individually to perform standard accounting functions. The two types of accounting machines available operate at speeds of 80, 100, or 150 lines a minute for detail printing, while both perform accumulation without detail printing at a speed of 150 cards a minute.

The Electronic Calculating Punch, operated as a separate unit, will add, subtract, multiply, and divide data in punched cards, recording the results in the same cards at a speed of 6000 cards an hour. Several independent problems can be performed and the results punched in the card in the same operation.



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