

ELECTRONIC DIGITAL COMPUTERS

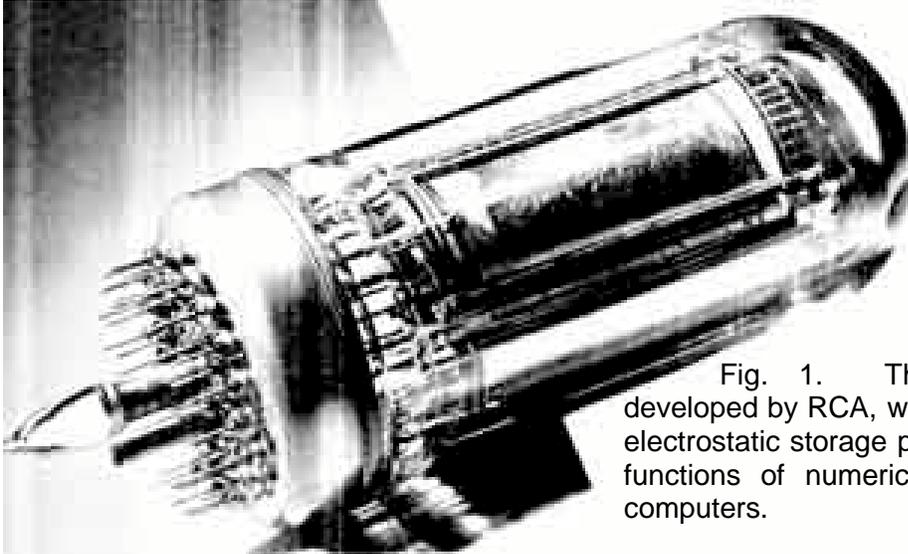


Fig. 1. The "Selectron" tube developed by RCA, which makes use of the electrostatic storage principle to accomplish functions of numerical memory in digital computers.

By David Fidelman
(excerpt)

A type of electronic device which has memory properties suitable for use in electronic digital computers is a recently developed special-purpose tube called the Selectron. A photograph of this tube is shown in Fig. 1. The Selectron makes use of the principle of electrostatic storage to store the on-off signals which accomplish the memory function. It is particularly suitable for binary counters, since a binary system uses only two digits -- one and zero -- which correspond to on and off in the Selectron.

In this tube, two sets of parallel wires at right angles to each other are located between an extended source of electrons and an insulating surface so that they can intercept the flow of electrons. The two sets of wires create a checkerboard of windows which can be closed or opened to the passage of electrons. The wires are connected internally in such a

way that applying voltages to a relatively small number of sealed-in leads, the flow of electrons can be controlled through individual windows. The selection of the particular window through which the electrons are to flow represents the number registered by the Selectron. The storage of electrons on the insulating surface represents the memory characteristics of the tube.

Storage is accomplished by allowing electrons to pass through all the windows in the open condition, forcefully maintaining the potential of subdivided areas on the insulator. To register a signal, during the bombardment of electrons a specific window is opened to the exclusion of all others and a voltage pulse is applied to a metallic plate backing the insulating layer. This pulse, positive or negative depending on the polarity of the signal, overpowers the local electronic locking mechanism. Immediately following this registration, all windows are opened again, and the registered potentials are locked in. The signal can be read by opening the proper window and obtaining a signal from the backing plate. The registration of a signal is completed in a few microseconds and requires no previous erasing, and the reading is also accomplished in a few microseconds and can be repeatedly indefinitely.

A single Selectron of this type is capable of registering 64x64 or a total of 4096 on-off signals.

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