# Protonic Memory Encyclopedia Article

## Protonic Memory

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# Protonic Memory

Protonic **memory** uses embedded protons as a memory storage medium. The embedded protons remain in place even when the power has been turned off. The information embedded in the protons is not lost. In devices such as dynamic **random access memory** (DRAM), which are based on the flow of electrons, the cessation of power results in the loss of the information.

Development of the process occurred at the Sandia National Labs, in Albuquerque, New Mexico in the mid to late 1990s. The researchers created a protonic memory-retentive chip by incorporating a few steps to the hundreds of steps used to make microchips. The key was putting the hot microchip in an atmosphere of hydrogen gas. Protons become trapped in the central layer of silicone dioxide in the chip. In this condition, the protons respond to positive or negative charges. A positive low voltage sends the protons to the far side of the central layer, which represents a binary "1." Negative low voltage has the opposite effect, attracting the protons to the near side of the silicone dioxide layer, which represents a binary "0." The protons remain in their respective positions when the power is turned off, retaining the information in the chip.

The simplicity, economy, and memory preserving ability of the protonic chip may allow them to replace a computer's main memory. Exploration of the commercial potential of protonic memory has begun.