
Memory - In a "Flash"

You use it everyday - flash memory - in the BIOS chip of your computer, in the storage card on in your digital camera (CompactFlash, Secure Digital, MultiMedia Cards, Memory Stick, etc.), in your video game console and in that funny little "flash drive" you're carrying around to back up or share files. Yes, flash memory is an important piece of technology but what is it REALLY, and how does it work?

Flash memory is really an EEPROM chip that is comprised of a grid - columns and rows of cells with two transistors, separated by an oxide layer, at each intersection. One of the transistors is a floating gate, the other a control gate. The floating gate's path to the grid is through the control gate, and when the path is available, the cell has a value of "1". To change the value to "0", an electrical charge is applied to the floating gate.

The charge causes the floating gate to act like an electron gun - pushing electrons through to the oxide layer, giving it a negative charge. These negatively charge ions block the path to the control gate, causing the cell value to change to "0".

Erasing the memory is performed by applying an electric field or higher voltage charge. Changing a number of cells to "1" and erasing the targeted area (multiple cells) on the chip.

Why flash memory? It's noiseless (no hard drive sounds), it's faster than a hard drive, it's smaller than a hard drive, it's lighter than a hard drive, and, it has no moving parts!

However, it's more expensive (on a per GB basis) than a hard drive (even with prices falling!) and capacities are limited when compared to a hard drive 4-8GB versus 400-500GB.

So the next time you are using that flash drive - think about how the drive is REALLY working - charges, control gates, floating gates.....

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