RAM Research Paper

Random Access Memory

Kyle Kotlan

Due 4-14-06
This will be a little tale about a well known component in every one's computers called RAM. We all of course know what ram does, some more then others of course, but this research paper will talk about Random Access Memory. We are going to go back in time to talk about how this important piece of hardware in our computers came about, how it has evolved, and what the future may hold. RAM has a very important place in computers and without it, we probably wouldn't be able to do what we can with computers. RAM will also be a key piece of hardware in the future of computers as they evolve. Hopefully from the research paper you will be a bit more knowledgeable about RAM.

RAM truly came about in 1966 when Robert Dennard from IBM's research center came up with the basic idea for Dynamic Random Access Memory (commonly referred to as DRAM or mostly RAM). Dennard had gone home for the day, and shortly later was some how inspired by the basic idea for making DRAM. This turned out to be the most important advances in computer technology. This was just the beginning. It wasn't until the 1970s, that Intel released the first RAM chip called the 1103. The size of this very first RAM chip was 1k bit or common terms would be 125 bytes, and as we all know it takes 1024 bytes to make 1 kilobyte. To put in another perspective, by the time I finish typing this research paper, the file format I have saved it as will be over 100 kilobytes big. Any way by 1972 the Intel 1103 was the best selling semiconductor, and the first computer it was available in was the HP 9800 series. Before that even though was Core-Memory, which was invited in 1949 by An Wang and Way-Dong Woo. The two were working at Harvard Universities, Computation laboratory when they invited Core memory. Luckily for the both of them Harvard was interested promoting inventions in their labs, so Wang and Woo were able to get the patent on their own for the invention. Core memory got so popular and cheap that it eventually replaced Drum memory and Vacuum Tubes by the 1960s. Drum memory was invented by G. Taushek in 1932 in Australia. Drum memory is most notably associated with punch cards. Some people have heard stories, and fewer people remember making punch cards to program a computer to do some sort of task. Eventually as you all know by now, this was all replaced with silicon chips thanks to Robert Dennard.

Now days RAM has evolved greatly since it was first envisioned in 1966, by Robert Dennard. Most modern computer systems run at least 256 Megabytes of DDR RAM (double data rate RAM, where as your high end gaming computers run in the range of 1 Gigabyte to 2 Gigabytes of RAM. Today we have the game industry driving the newest and greatest technologies in speed and computational power. Sure other industries are driving it as well, but for the most part it is video games. The reason for that is video games and their advanced 3D graphics require a lot of computer performance. One of the newest things that is coming about in the video game industry is the addition of real time physic calculations to objects and the environment in video games. Current generations of computers run DDR RAM or the newer DDR2 RAM. DDR runs at a maximum of 400/533mhz where as DDR2 RAM can run at 800mhz. With the most popular operating system Microsoft's Windows, the physical RAM limitations are 4 Gigabyte RAM (over 4000 Mbs). Unlike the past we now have various types of RAM built into many devices in our computers. The upper end sound cards are now being built with RAM in them. For example Creative's Sound Blaster X-Fi Fatality audio card has 64MB of
RAM installed for game developers to exploit. Other things that have forms of RAM installed in them are CPUs, in other words called L1, L2, and L3 cache for various processor instructions. Hard drives are another device that has a cache RAM installed on them, which helps speed up data access on the larger hard drives. As you can see now days RAM is very important and is in lots of our devices in our computers.

The future of ram will turn it into legacy hardware in the future, but I will get back to that. The future of ram is coming sooner then you think. Currently a new RAM type that is just starting to be seen in video cards, DDR3 is the new standard that is coming that should eventually find its way into our computers in the not so distant future. DDR3 RAM has a current possible speed of 1.6 ghz (1600mhz), which is twice as fast as DDR2 and four times as DDR. Currently only one thing takes advantage of DDR3 memory, and that is video cards. That alone is an example how video games are the determining factor in the newest technologies. Currently the amount of RAM for Microsoft's Windows operating system only allows us a maximum of 4 Gigabytes of ram, where as the next major operating system due in 2007 will greatly increase that amount. A new technology just coming about that may or may not catch on are RAM-Hard drives. A couple manufactures out there are coming out with hard drives that are actually made of a RAM. Currently there is a only a few applications for something like this so it really hasn't caught on, but for the series gamer really trying to squeeze as much performance out of their systems, this is for them. Only problem with this technology is the fact, if you loose power to the drive, you will loose all your information saved on the drive. Though I'm sure all that will be obsolete any way when Atom Chip's product, the non-volatile Quantum-Optical Ram begins to be mass produced and supported. Were talking a revolution in computing if their claims are true. They did show off their laptop in the January 2006 Computer Electronics Show, but little information was provided when something like this would be released. On their website they advertise/show a laptop with 2 TERABYTEs of RAM and 2 TERABYTEs of Hard drive space. All running on a 6.8ghz processor, made by them as well. Their website is called http://www.atomchip.com. I encourage any one reading this to check it out, as well as keep up on any news around this chip. This thing will be the future of computing. The first 40 years of computing was revolutionary, and the next 40 years should be just as revolutionary with products like this down the line.

This day and age with how fast technology is evolving like my examples above, you may quickly find RAM being the next piece of legacy hardware in your system next week. Even more so now when we start hearing about about quantum computing. If the proof of concept, quantum laptop ever gets mass produced, things will change quickly for computers. RAM has evolved tremendously in speed and size since it was first invented. Currently were still in the silicon era of computing, but I bet soon were going to be going to the next era of computing.
"How Much RAM Do You Really Need?."  
_Tom's Hardware Guide._  
_http://www.tomshardware.com_  
11 Apr. 2006

Schmid, Patric and Roos, Achim. "A New RAM Hard Drive from HyperOs."  
_Tom's Hardware Guide._  
_http://www.tomshardware.com/2005/12/05/hyperos_dram_hard_drive_on_the_block_  
12 Apr. 2006

"Creative's Sound Blaster X-Fi Fatal1ty audio card."  
_The Tech Report._  
_http://techreport.com/reviews/2006q1/xfi-fatal1ty/index.x?pg=1_  
11 Apr. 2006

"The History of RAM."  
_About._  
_http://inventors.about.com/library/inventors/blram.htm_  
12 Apr. 2006

"Random Access Memory."  
_Wikipedia._  
12 Apr. 2006

"Elpida Enables 1.60GHz DDR3 Memory with New Technologies."  
_Xbit Laboratories._  
12 Apr. 2006

"Quantum Chip Manufacturer"  
_Atom Chip._  
_http://atomchip.com/  
12 Apr. 2006

"US 'world genius' touts 6.8GHz 'quantum-optical' CPU."  
_The Register._  
_http://www.theregister.co.uk/2005/09/07/atom_chip_miracle_machine/  
12 Apr. 2006