

RAM Notes

You should always touch the metal case of the computer before touching any electronic computer devices to eliminate ESD from your body discharging into and damaging any electronic computer device.

Before adding or removing memory modules, you must unplug the computer and if it is a laptop, remove the battery. Then, press the power button to discharge any residual electricity from the motherboard.

You should hold the memory module by any of the edges except for the edge with the contacts to avoid damaging the memory from ESD.

DDR – double data rate – double pumping the data bus by transferring data on the rising and falling edges of the bus clock signal basically causing two transfers per clock cycle.

ECC – error correction code – an extra data lane used for correcting minor errors making the memory more accurate but also causing more processing thus making ECC RAM more expensive and a little slower than non-ECC RAM.

Unbuffered memory – accessed directly by the memory controller where as Buffered Memory "caches" or stores and forwards the contents prior to the controller's access thus making it more stable.

The most popular form of memory sold and used today is unbuffered non-ECC SDRAM.

Buffered ECC RAM is used for critical applications like servers.

The 32bit versions of Windows (XP, Vista, 7 and 8) can use around 3.5 GB of memory, but no more than 4GB.

DDR2 has double the transfers per clock cycle of DDR making it able to run twice as fast.

DDR3 has double the transfers per clock cycle of DDR2 making it able to run twice as fast.

DDR4 has double the transfers per clock cycle of DDR3 making it able to run twice as fast. However, DDR4 also includes some additional features and is so new that it's exact performance is yet to be established with certainty.

SDRAM – synchronous dynamic random access memory – the type of RAM used as system RAM in computers. It requires constant power and periodic refreshing to retain its data and is therefore called volatile.

SRAM – static random access memory – the type of RAM used for cache. Although it requires constant power like SDRAM to retain its data and is therefore called volatile, it does not have to be refreshed so it is faster than SDRAM but more expensive.

FLASH – the type of memory used for applications where data needs to be retained without power (non-volatile) such as USB drives, digital audio players, digital cameras and mobile phones.

A hard disk is a type of memory but it is really more accurate to call it storage than memory.

DIMM – dual in-line memory module – memory modules mounted on printed circuit boards with separate electrical contacts on each side of the module.

SODIMM – small outline dual in-line memory module – the same as a DIMM but smaller for use in notebooks, laptops and netbooks.

Adding memory to a laptop is not difficult.

Dual-channel, triple-channel and quad-channel modes increase throughput by causing the memory to operate more efficiently. That is why it is best to install dual-channel memory in pairs of two, triple channel memory in pairs of three and quad-channel memory in pairs of four. It is also best to buy your pairs in a kit to ensure that the sticks are compatible with each other.

Overclocking RAM is when you run it faster than its rated speed.

The speed of RAM is measured in MHz which stands for Megahertz which is a million cycles per second.

To convert memory speed to bandwidth, you multiply by 8. For example, DDR3 with a speed of 1066 MHz has a bandwidth of 8500 MB/sec while DDR3 with a speed of 1333 MHz has a bandwidth of 10666 MB/sec. Often, these speeds are rounded off and some of them have similar values (1066 speed versus 10666 bandwidth) so you need to be rather careful when choosing memory. That is why places like Micro Center, Tigerdirect and Newegg, offer motherboard/memory bundles so that the customer knows the two will be compatible.

When you power on a computer, it reads all the information needed to start Windows from the hard drive into the memory.

Once Windows is loaded, the computer loads programs and files you open from the hard drive into memory because the memory is much faster than the hard drive.

Usually, memory slots on a motherboard are color coded so that you know which slots to use to pair up your memory to enable dual-channel, triple-channel or quad-channel mode.

Notches in the memory module align with keys in the memory slots of the motherboard to prevent you from putting the memory module into the slot backwards.

You should not push the tabs at the end of the memory slots into the edge of the memory modules since pushing down on the memory causes these tabs to automatically snap into the edge of the module. If the tabs do not snap all the way in, then push down harder on the memory module to fully seat it.

Heatsinks or heatspreaders are used on memory modules to help keep them cool especially when they are overclocked.