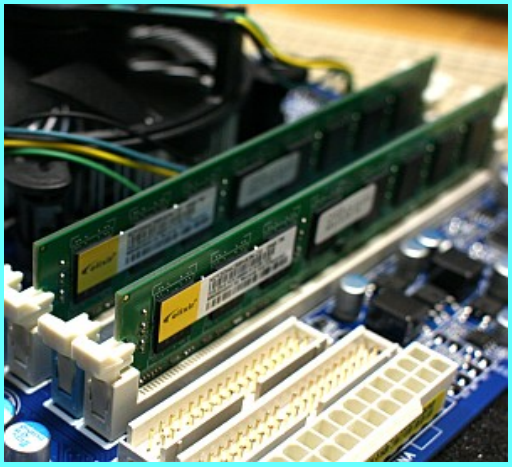
COMPUTER MEMORY

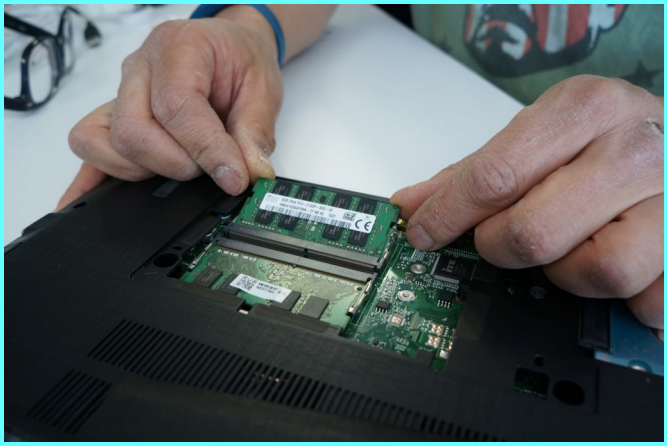
1. Many types of memory in a computer exist, the most basic distinction is between primary memory, often called system memory, and secondary memory, which is more commonly called storage. The key difference between primary and secondary memory is speed of access.

2. **Primary memory** includes RAM modules that are installed directly on the computer motherboard, enabling the CPU to read data very quickly. It is used to store data that the CPU needs so that it does not have to wait for it to be delivered.

RAM Modules



RAM Modules mounted on Motherboard



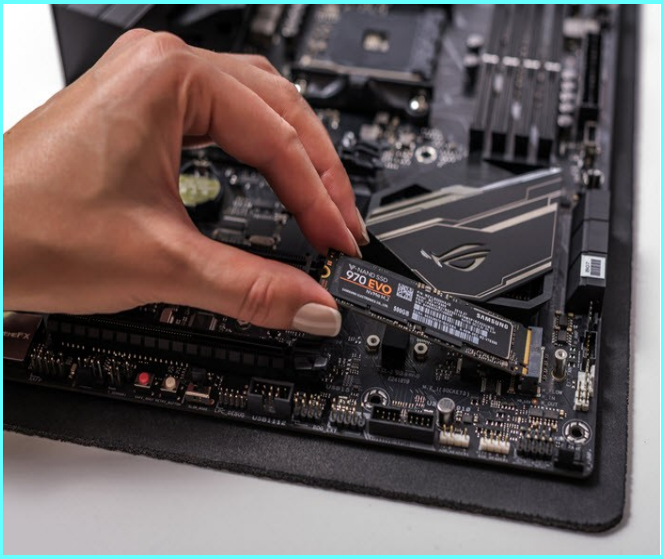
Laptop RAM Module
Much smaller than desktop RAM

3. **Secondary memory** is usually physically located within a separate storage device, such as a hard disk drive or solid state drive (SSD) which is connected to the computer system either directly by cables or special connectors, such as the M.2 Connector for SSD's.

SATA Mechanical Hard Drive

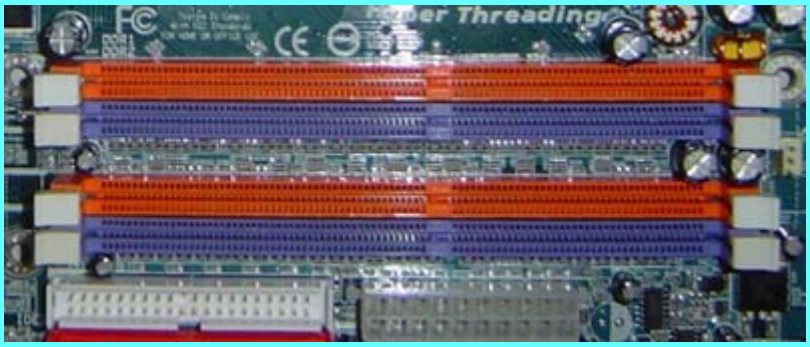
Solid State Hard Drive (SSD)

M.2 Solid State Hard Drive. Plugs directly into Motherboard.



Inserting M.2 SSD onto Motherboard

4. Dual-channel architecture describes a technology that effectively doubles data output from RAM to the Memory Controller. Dual channel-enabled memory controllers utilize two 64-bit data channels, resulting in a total bandwidth of 128-bits, to move data from RAM to the CPU. In order to achieve this, the memory modules must be installed into matching banks, which are usually colour coded on the Motherboard.



Identical modules MUST be used, Modules rated at different speeds and size will not run in dual channel mode. Some motherboards have compatibility issues with certain brands or models of modules when attempting to use them in dual channel mode. For this reason it is strongly advised to use identical pairs of memory modules and most memory manufacturers now sell kits of matched pair DIMMs. Several motherboard manufacturers only support configurations where a "matched pair" of modules are used. Dual-channel architecture is a technology embraced by motherboard manufactures and does not apply to memory modules. In other words, any matched pair of memory modules may support single and dual-channel operation, provided the motherboard supports this architecture. Consult your motherboard manual on how to install the memory modules for dual channel.

5. Differences in RAM Modules: