

# How Memory Works

**M**emory plays various roles inside (and outside) a PC. **ROM** (read-only memory) helps the PC start up, and various types of **RAM** (random-access memory) hold data for the CPU (central processing unit), speed up graphics on your monitor, and act as data-holding areas for peripherals such as printers. Here is a quick overview of how memory works on a PC, along with some explanations of the various types of RAM.

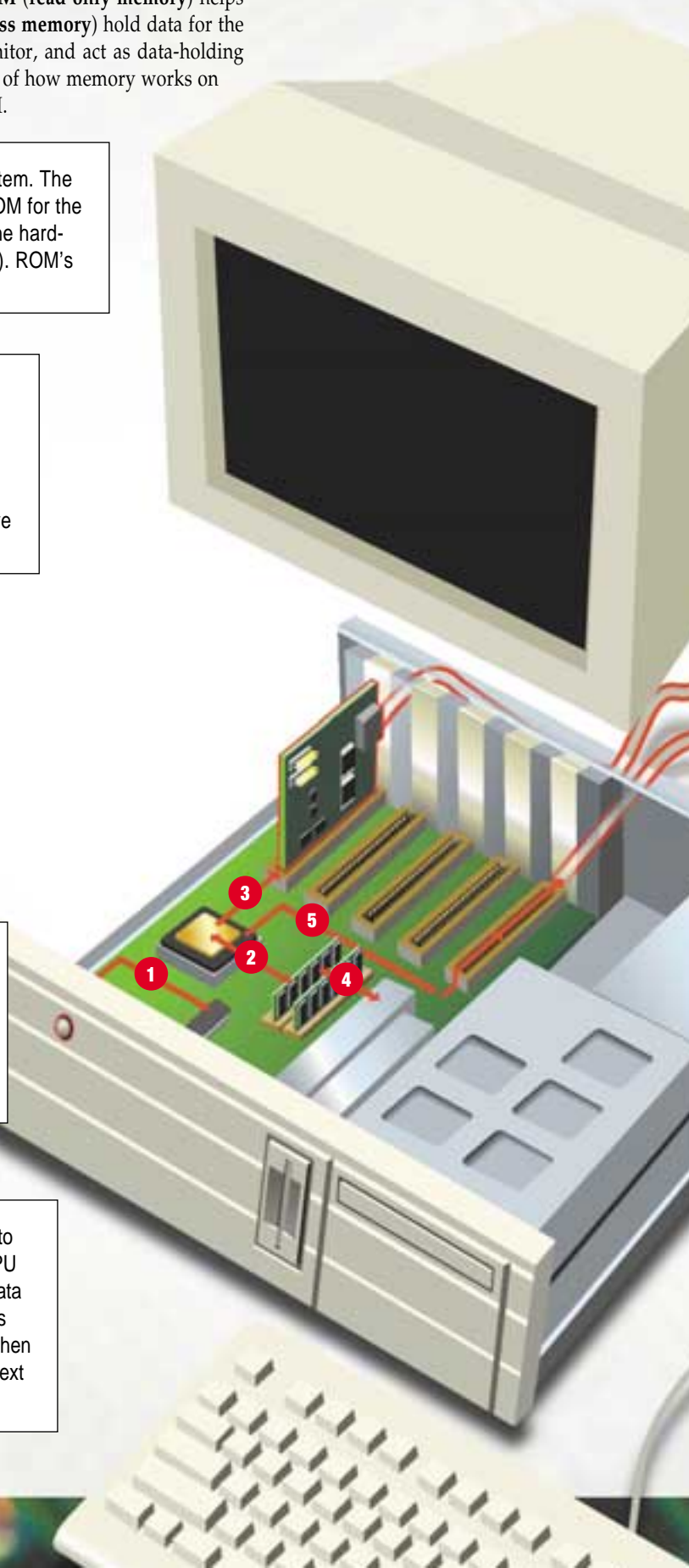
**1** Push the power button to turn on your system. The processor immediately queries the system ROM for the BIOS instructions. The BIOS then activates the hardware and launches the OS (operating system). ROM's job is done.

**2** Open a business proposal you are composing in Microsoft Word. A copy of the document travels from the hard drive to the CPU and into RAM. As you add words to the document, the amount of data held in memory increases. If your computer locks up or loses power right now, you will lose all the new text you have entered so far.

**3** While you work on your document, the CPU sends a constant stream of data to the monitor. En route, the data gathers in the frame buffer, where it compiles into a single image before appearing on-screen. The frame buffer resides in video memory.

**4** Changes you make to your document won't be recorded to the hard drive until you activate the Save command or the AutoSave function automatically saves the document for you. Either way, the data contained in RAM copies back to the hard drive, where it overwrites the old version of your document.

**5** Once you finish composing the proposal, it's time to print it. When you activate the Print command, the CPU copies the data from RAM to the printer buffer. The data remains in the printer buffer until the printer completes the print job. Finally, close Microsoft Word. The data then clears out of RAM, leaving plenty of memory for the next program you want to run.



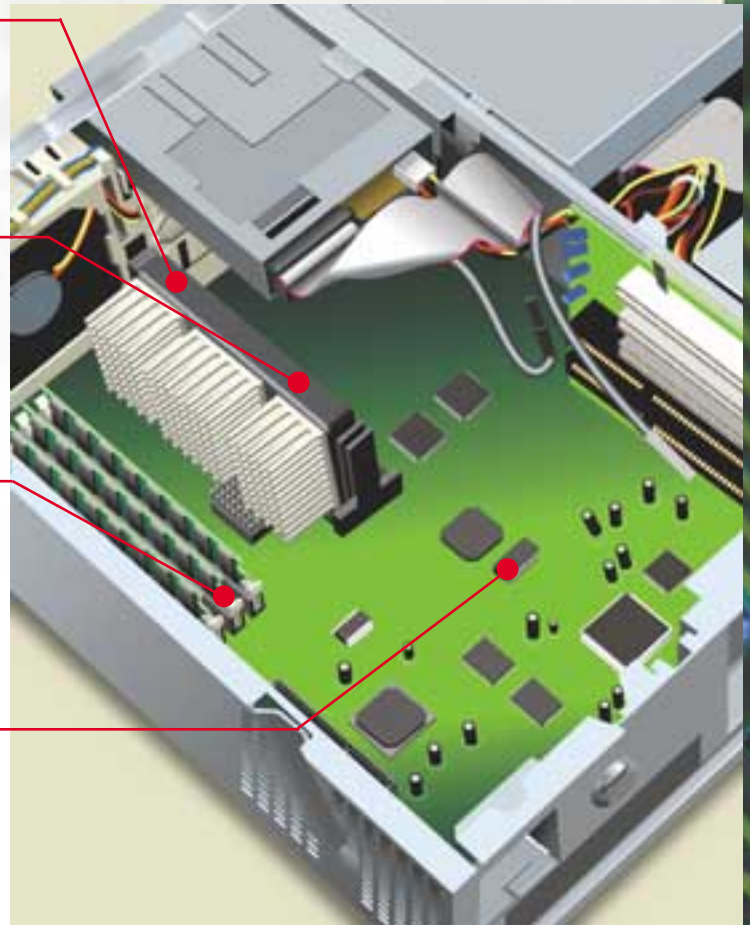
# Types Of Memory

**L1 Cache**—L1 cache is also known as internal memory because it exists inside the CPU. This is the first place the CPU checks when it's searching for data. Your computer doesn't have very much L1 cache, probably 128KB or less.

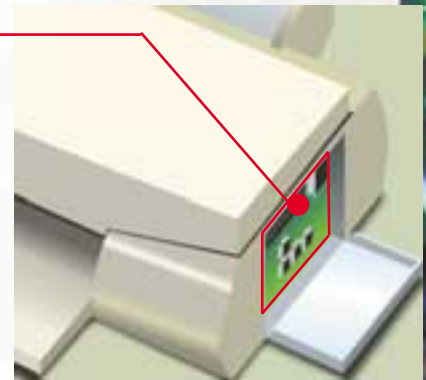
**L2 Cache**—L2 cache is known as secondary cache because it's the second place the CPU looks for data. There are several types of L2 cache. Your computer probably has synchronous burst L2 cache or pipelined burst L2 cache. Check the users manual to find out which one. Most computers sold today have 256KB of L2 cache.

**DRAM Memory Modules**—If you want to upgrade your system memory, this is what you need to replace. Your system will support only one type of DRAM memory module, though, so check your users manual carefully before attempting a memory upgrade.

**ROM Chip**—The ROM chip stores the BIOS (Basic Input/Output System), which walks your PC through the startup process each time you turn on the power. Data stored on the ROM chip is intended to remain there indefinitely. Changing ROM data requires special tools or processes.



**Printer Buffer**—The CPU can process data much faster than your printer can print it. In order to compensate for the difference, most printers contain a printer buffer, which holds the data it receives from the CPU until the printer gets around to printing it. This aspect lets you use the computer for other tasks while you wait for the printer to finish its business.



**Video Memory**—Your PC must have some memory allocated specifically for the computer display. In most systems, the video memory resides directly on the video card. In some low-end PCs, the computer uses a portion of the system DRAM for video memory.

