

## The Right Kind of RAM

“Incompatibilities and outdated technology haunt RAM upgrades.”

by Pete Choppin

I have seen on several [discussion groups](#) computer users constantly complaining that they have purchased RAM (Random Access Memory) that is not recognized at all by their computers, or the computer recognizes only half, or even a quarter of its actual capacity. Usually the RAM is not at fault, but rather is just incompatible with the computer's motherboard. The problem arises because new types of RAM modules are introduced, and the older motherboard chipsets are not designed to recognize them.

A particular motherboard will have been designed to run the range of RAM modules that were on the market when it was released, but its manufacturer cannot anticipate changes in technology in its design; consequently, the motherboard's manual will list only the types of RAM that the motherboard supports at the time it was made available. Unfortunately, very few motherboard manufacturers update their manuals to report incompatibilities with types of RAM modules that were not available when the motherboard was released.

So how do you determine what type of RAM to purchase? Let's take a look at some ways to find out, and also what to consider when purchasing a motherboard that will take full advantage of the RAM installed on it.

### Which Type of RAM Do I Need?

The best way I have found to determine the type of RAM required for any given motherboard is to use something called a memory advisor. This will ensure that you don't purchase RAM that is not supported by your brand-name desktop or laptop computer or the computer's motherboard. Most major manufacturers of RAM have these. Go to [Crucial](#) and check the Crucial Memory Advisor. All you will need to know is the manufacturer and model of your motherboard. A good practice before buying a new motherboard is to find out if it is listed by Crucial before you buy it; that way, you will know that you can match the correct RAM for that motherboard if you want to upgrade the memory.

Another favorite manufacturer of mine is Corsair. Its quality of RAM is excellent. In my opinion, it is slightly higher quality than Crucial. Corsair also has a similar memory search function; however, your computer must be from a major manufacturer, or you will not be on the company's list. For example, I have a computer where I work that was ordered from an online vendor. This does not mean you cannot use Corsair memory in your system, but the search will not find your custom-built computer, so you will need to know exactly what you are doing. One way to find the type of RAM you need from Corsair is to use the Crucial Memory Advisor, and then be sure to match the exact type with the Corsair RAM.

If you don't know the make and model of the motherboard installed in your computer, there is a free utility called [Belarc Advisor](#). It is found by going to the free download link. The Belarc Advisor creates an analysis of the hardware and software on a personal computer. It will provide tons of information about your computer.

### DDR/DDR2/DDR3

Most of the current desktop PCs and laptop PCs have motherboards that use DDR or DDR2 memory. However, DDR3 memory is now available and, of course, more motherboards will be using it.

The latest Intel Socket LGA1366 quad-core Core i7 processors (CPUs) can run only on DDR3 memory (Socket LGA1366 motherboards require DDR3 memory and Core i7 processors can run only on Socket LGA1366 motherboards).

When upgrading memory, it is essential that you purchase the right type of memory module, because DDR, DDR2, and DDR3 memory are incompatible with each other. You cannot use a DDR2 module in a DDR DIMM slot, etc. However, some motherboards can have slots for both DDR/DDR2 or DDR2/DDR3 modules. No motherboards support all three types. A motherboard that supports DDR3 will not support DDR memory. It might, but not necessarily, support DDR2 memory. The motherboard's manual or the PC's user guide should provide the information required to be able to tell which type of slots are provided.

DIMM modules showing notch to prevent installation of the wrong memory module.

### **Triple-Channel Mode**

Now, with the arrival of DDR3 memory and Intel's Core i7 processors that run on Socket LGA1366 motherboards, for the first time Intel has a range of processors with a built-in memory controller that can run memory in triple-channel mode (three memory modules that can be accessed at the same time as if a single module). DDR3 DIMM modules will soon be available in packs of three to make use of the six DIMM memory slots that Socket LGA1366 motherboards have in order to use triple-channel mode. If all six slots are filled with identical modules, you will have two sets of modules running in triple-channel mode. As with dual-channel mode, triple-channel mode provides a small gain in performance.

Triple-channel motherboard has six DIMM memory slots.

### **More Than Four Gigabytes of RAM**

There is a hardware limit to the 32-bit architecture. This limitation put a halt on how much RAM could be used. That theoretical 32-bit limit is four gigabytes, although Windows machines will achieve only 3.0 to 3.5 gigabytes due to set-aside device addresses for video cards, etc. Just a few years ago, no one really cared about this limit (except maybe server administrators), because software did not require near this amount of memory. Pretty much anything over two gigabytes was a waste. Moreover, it was not cost effective to install any more than that. RAM prices were much higher at the time, and if it was just a waste, why buy it?

Things have changed. The 64-bit architecture is now increasing in popularity. New hardware

and software are becoming more affordable and available. The demand for more RAM is rising.

If you want to install more than 4GB of RAM memory and have Windows support it, the computer must have a 64-bit motherboard and processor, which many new computers now have, and must also run a 64-bit version of the operating system that supports more than 4GB. To be a 64-bit system, a computer must be running a 64-bit operating system, such as the latest versions of Linux, or the 64-bit versions of Windows 7, Windows Vista, or Windows XP Professional. The table below shows the versions of Windows 7 and the RAM limits for each version.

#### Memory limits Windows 7.

Computer memory can have a significant impact on the performance of your computer. The general rule is the more RAM, the better (although this is not always the case). It is important to know how to take full advantage of the memory you have installed because it is easy to make the wrong purchase and leave half your RAM inaccessible. Knowing how both your hardware and software works and uses RAM is crucial to the performance of your computer. (Did you like the pun?)