Purchasing and Installing Memory in a Microsoft Windows Computer

One of the less expensive and more effective ways to speed up a computer, make it capable of processing more programs at the same time, and enable it to handle graphics, gaming, and other high-level programs is to increase the amount of memory. The process of increasing memory is accomplished in two phases — purchasing the memory and installing the memory. To purchase memory for a computer, complete the following steps:

1. Determine the amount of memory currently in the computer by completing the following steps:
   a. Click the Start button on the Windows XP taskbar.
   b. Point to All Programs on the Start menu, point to Accessories on the All Programs submenu, point to System Tools on the Accessories submenu, and then click System Information on the System Tools submenu. Windows displays a system summary in the right side of the window. The amount of memory that your computers has is listed under Total Physical Memory.
2. Determine the maximum amount of memory your computer can contain. This value can change for different computers, based primarily on the number of slots on the motherboard available for memory and the size of the memory modules you can place in each slot. On most computers, different size memory modules can be inserted in slots. A computer, therefore, might allow a 128 MB, 256 MB, or 512 MB memory module to be inserted in each slot. To determine the maximum memory for a computer, multiply the number of memory slots on the computer by the maximum size memory module that can be inserted in each slot.

   For example, if a computer contains four memory slots and is able to accept memory modules of 128 MB, 256 MB, or 512 MB in each of its memory slots, the maximum amount of memory the computer can contain is 2 GB (4 x 512 MB).

   You can find the number of slots and the allowable sizes of each memory module by contacting the computer manufacturer, looking in the computer's documentation, or contacting sellers of memory such as Kingston (www.kingston.com) or Crucial (www.crucial.com) on the Web. These sellers have documentation for most computers, and even programs you can download to run on your computer that will specify how much memory your computer currently has and how much you can add.
3. Determine how much memory you want to add, which will be somewhere between the current memory and the maximum memory allowed on the computer.
4. Determine the current configuration of memory on the computer. For example, if a computer with four memory slots contains 512 MB of memory, it could be using one memory module of 512 MB in a single slot and the other three slots would be empty; two memory modules of 256 MB each in two slots with two slots empty; one memory module of 256 MB and two memory modules of 128 MB each in three slots with one slot empty; or four memory modules of 128 MB each in four slots with no slots empty. You may be required to look inside the system unit to make this determination. The current memory configuration on a computer will determine what new memory modules you should buy to increase the memory to the amount determined in Step 3.

   You also should be aware that a few computers require memory to be installed in matching pairs. This means a computer with four slots could obtain 512 MB of memory with

two memory modules of 256 MB in two slots, or four memory modules of 128 MB in four slots.

5. Determine the number of available memory slots on your computer and the number and size memory modules you must buy to fulfill your requirement. Several scenarios can occur (in the following examples, assume you can install memory one module at a time).
   a. Scenario 1: The computer has one or more open slots. In this case, you might be able to purchase memory module that matches the amount of memory increase you desire. For example, if you want to increase memory by 256 MB, you should purchase a 256 MB memory module for insertion in the open slot. Generally, you should buy the maximum size module you can for an open slot. So, if you find two empty slots and wish to increase memory by 256 MB, it is smarter to buy one 256 MB module and leave one empty slot rather than buy two 128 MB memory modules and use both slots. This allows you to increase memory again without removing currently used modules.
   b. Scenario 2: The computer has no open slots. For example, a computer containing 512 MB of memory could have four slots each containing 128 MB memory modules. If you want to increase the memory on the computer to 1 GB, you will have to remove some of the 128 MB memory modules and replace them with the new memory modules you purchase. In this example, you want to increase the memory by 512 MB. You would have several options: (1) You could replace all four 128 MB memory modules with 256 MB memory modules; (2) You could replace all four 128 MB memory modules with two 512 MB memory modules; (3) You could replace one 128 MB memory module with a 512 MB memory module, and replace a second 128 MB module with a 256 MB memory module. Each of these options results in a total memory of 1 GB. The best option will depend on the price of memory and whether you anticipate increasing the memory size at a later time. The least expensive option probably would be number 3.
   c. Scenario 3: Many combinations can occur. You may have to perform calculations to decide the combination of modules that will work for the number of slots on the computer and the desired additional memory.
6. Determine the type of memory to buy for the computer. Computer memory has many types and configurations, and it is critical that you buy the kind of memory for which the computer was designed. It is preferable to buy the same type of memory that currently is found in the computer. That is, if the memory is DDR SDRAM with a certain clock speed, then that is the type of additional memory you should place in the computer. The documentation for the computer should specify the memory type. In addition, the Web sites cited above, and others as well, will present a list of memory modules that will work with your computer. Enough emphasis cannot be placed on the fact that the memory you buy must be compatible with the type of memory usable on your computer. Because there are so many types and configurations, you must be especially diligent to ensure you purchase the proper memory for your computer.
7. Once you have determined the type and size of memory to purchase, buy it from a reputable dealer. Buying poor or mismatched memory is a major reason for a computer's erratic performance and is a difficult problem to troubleshoot.

After purchasing the memory, you must install it on your computer. Complete the following steps to install memory:

1. Unplug the computer, and remove all electrical cords and device cables from the ports on the computer. Open the case of the system unit. You may want to consult the computer's documentation to determine the exact procedure.
2. Ground yourself so you do not generate static electricity that can cause memory or other components within the system unit to be damaged. To do this, wear an antistatic wristband you can purchase inexpensively in a computer or electronics store; or, before you touch any component within the system unit, touch an unpainted metal surface. If you are not wearing an antistatic wristband, periodically touch an unpainted metal surface to dissipate any static electricity.
3. Within the system unit, find the memory slots on the motherboard. The easiest way to do this is look for memory modules that are similar to those you purchased. The memory slots often are located near the processor. If you cannot find the slots, consult the documentation. A diagram often is available to help you spot the memory slots.
4. Insert the memory module in the next empty slot. Orient the memory module in the slot to match the modules currently installed. A notch or notches on the memory module will ensure you do not install the module backwards. If your memory module is a DIMM, insert the module straight down into grooves on the clips and then apply gentle pressure. If your memory is SIMM, insert the module at a 45 degree angle and then rotate it to a vertical position until the module snaps into place.
5. If you must remove one or more memory modules before inserting the new memory, carefully release the clips before lifting the memory module out of the memory slot.
6. Plug in the machine and replace all the device cables without replacing the cover.
7. Start the computer. In most cases, the new memory will be recognized and the computer will run normally. If an error message appears, determine the cause of the error.
8. Replace the computer cover.