

Expanding your PC memory

- **Do I need more memory?**
- **What memory do I need?**
- **How do I fit it?**

Do I need more memory?
Does your software run too slowly?
Does your hard drive rattle away all the time?
Does your screen sometime freeze up for long periods?

If the answer to any of these questions is "yes" then you have probably got a memory problem. Now there are two types of memory or storage to be considered here and Windows uses advanced memory management to combine the two every time you run a program.

Your real memory (once called RAM or Random Access Memory) is the

actual electronic memory connected to your processor and is used for storage of programs run and data being worked with while you are using your computer.

Your hard drives, floppy drives and your CDROM also have a memory capacity and may be used

for storage of both programs and data. Newcomers to computing often have terrible trouble keeping clear which is which, a situation definitely not helped by Windows ability to use "Virtual Memory", a clever memory management system that can tell when you have almost used up all of your real electronic memory. It will then take chunks of data from your real memory that are not being used at the time and store them temporarily in unused parts of your hard drive until they are needed. This frees off real memory for use by the active parts of the programs running, meaning that you can squeeze the equivalent of a quart into a pint pot!

The trade off here is of course that it takes time for your PC to keep shuffling data to and fro from storage to memory and back. In extreme cases this will lead to your programs locking up for long periods every time a new action is initiated, to the point where the system becomes unusable.

What memory do I need?

The first thing to do is to decide what sort of extra memory your PC requires. Memory is supplied on miniature printed circuit boards that simply plug into sockets on your motherboard inside the PC. So, in essence, all you need to do is to unplug everything, undo the case screws, find the spare sockets and plug the new memory in before putting it all back together again. However there are a few little complications before you can do that, as you might expect!

There is more than one type of memory plug in, although most

computers do thankfully use the same format. The most common types these days are 72 pin DIMM memory, "Dual Inline Memory Module", or the latest 168 pin PC100 modules for systems having a 100MHz bus, but older PC's might have smaller 30 pin SIMM "Single Inline Memory Module" sockets, and for a while, combinations of the 30 and 72 pin were possible on the same motherboard.

If your PC is one where only SIMM memory is used, it probably has a very old (by computer standards) motherboard fitted and you should look seriously at the possibility of upgrading the PC more drastically by changing the entire motherboard and CPU, as well as the memory used.

Those most forward thinking of you, who have kept the original motherboard or system manual, should be able to look up memory or memory expansion and find quite quickly what type of memory should be fitted. It is important to realise that there are sometimes restrictions on the number and type of memory that may be fitted, and it is usually only in the original booklet that these restrictions become apparent.

For example, it may be a requirement that you fit memory modules in pairs, especially for the older SIMM or DIMM's usually need to be of the same size or capacity to work together. If you don't have the booklet, or even if you do and would like to make sure you buy the right memory product, there are a couple more things you can try before going out to buy your memory.

What memory do I have?

Before you go any further, do you know how much memory you already have? You can find out by clicking your Windows 95/98/2000 "Start" button, selecting "Settings", then choosing "Control Panel". Once this window opens, double click the "System" line or icon and wait for that tabbed display to open up. The first tab will already be selected and will show how much memory is fitted to your PC, in Megabytes, or MB, for example, "48.0MB RAM".

This at least gives you some idea of how much memory is inadequate for

your needs, and you can look at a minimum of doubling the amount fitted for a noticeable speed increase. Remember that the more memory you can afford to buy, the faster and smoother your problem programs will usually run.

The next thing to do is to lift the lid of your PC and take a good look. This is always worth doing in any case, even if you think you have found the right information, as motherboards have always changed design very fast, and it is just possible that your documentation won't always strictly agree with the actual contents of that mysterious cream box!

Once you have successfully removed the lid of your PC, take a look at the large square or rectangular motherboard inside the case. Ignore the large plug in circuits and spare sockets. There may be one, two or three spare sockets, depending on the memory type and capacity already fitted.

Take a close look at the circuit board to see what is written beside the sockets. If there are, say, two sockets, one occupied, one empty and they are marked "Bank 0" and "Bank 1", or similar, it is easy to see that you simply need to buy one new DIMM to fit in "Bank 1". If there are four sockets, and two of the sockets are occupied, are they both marked as one bank, or are there four banks of memory there? You usually have to fill one complete bank of memory at a time, so that may be one socket, or two sockets.

So, to give a 64MB expansion, you may need just one 64MB DIMM, or your motherboard may require 2 x 32MB SIMM's. It does tend to be the older SIMM based motherboards that need sockets filled in pairs, but do look carefully at any printed information in the manuals and anything that may give you a clue on the motherboard around the memory sockets.

Once you have decided which bank to plug the new memory modules into, simply plug them in firmly and clip the clips shut to hold them in place. The very old SIMM modules need to be plugged into the SIMM sockets at an angle and then snapped upright, but

you are unlikely to be fitting them to most modern motherboards. Note that they will only fit one way around, so if they don't fit, turn them through 180 degrees!

All that you need to do now is to close the case up and refit the screws, plug the keyboard, mouse, monitor and power leads and so on back into the PC and you are ready to try your upgraded system.

When you first switch the PC on, look for the normal boot up screen. If it doesn't appear after a second or two as usual, switch off immediately and recheck your work. Likewise, if your PC makes a series of long beeping sounds, it probably means you have fitted the memory incorrectly.

All being well, hit the delete key to enter the BIOS program. This usually registers the new memory with the system and you may then exit the BIOS and let the PC restart without any further need for setting up. Newer PC's may not need this stage.

Now use your new memory and enjoy the speed increase and smooth performance you have made possible.

Before you start to take screws out of the case, you should unplug everything, especially the mains supply cables. Modern PC power supplies are very well insulated, even once you lift the lid of your PC, but it simply isn't worth taking chances with either your safety, or your PC's! One touch with a screwdriver in the wrong place inside a PC that is inadvertently switched on will easily destroy the fine foil tracks on your motherboard.

Once everything is safely unplugged and you have the base unit standing on a stable well lit surface, turn it around to look at the rear of the case. The screws that hold the lid on should be quite easy to see, usually cross head or Philips screws. Try your best to take off only those that do hold the outer case lid on, or things may fall off inside your PC! There will probably be additional screws in either the sides of the case, or underneath each side rim or flange where it wraps under the chassis.

Once you have undone the screws, you should be able to fairly easily slide the lid back and up to take it off completely, for a normal desktop or slimline case. Tower and mini-tower cases are often very similar, although some have a separate plate or part lid that may be removed to gain access to the top of the motherboard.

There are also a few case designs where the entire front panel and case surround is like a large sleeve that will need to be withdrawn from the front of the PC once the screws are removed, like a draw. These designs won't have a flanged arrangement at the rear of the case, though screws at the rear and side of the case may well still fix them.

