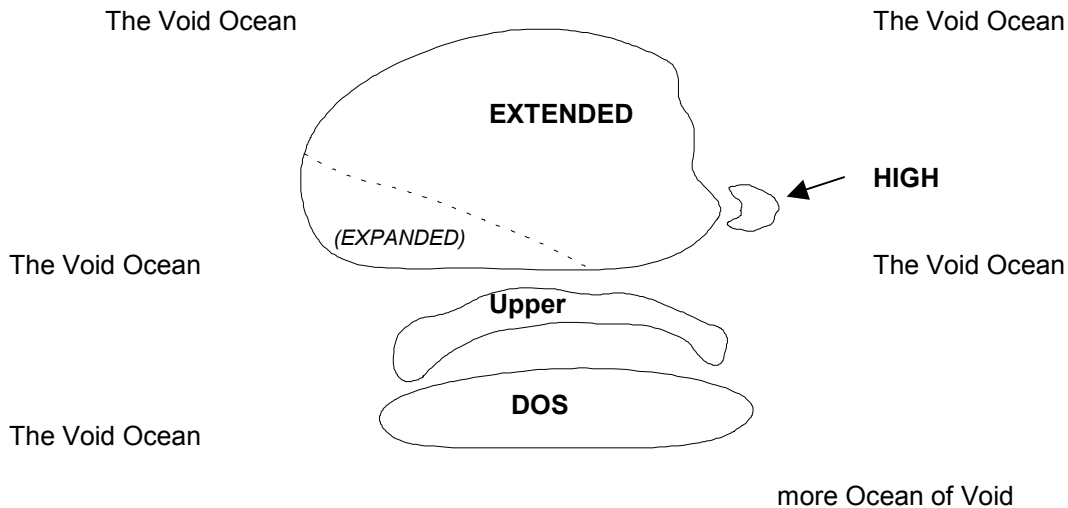


THE COMPUTER CORNER

A Map of the Planet *MEMORY*

- by Stan Kaplan, WB9RQR
 105 Martin Drive
 Port Washington, WI 53074-9654
 (262) 284-9346
 skaplan@mcw.edu



CONTINENT NAME	AREA COVERED	SPACE OCCUPIED
DOS or Conventional	0 – 640 kb (minus 1 byte)	640 kb
Upper	640 kb - 1024kb (1 Mb)	384 kb
Extended	1024 kb and up	Variable
High (an island off the coast of Extended; part of Extended)	1024 kb – 1088 kb	64 kb
(Expanded)	1088 kb and up, if needed	None, unless needed, in which case it is carved out of extended

This month is an attempt to make clear the various regions of memory in a computer. To do so, I ask you to think of your computer's memory as a planet in some solar system. An ocean, the Ocean of Void, largely covers the planet. It consists of pure water, which we all know has no business or function inside a computer. So, we can forget about it – remove it from your memory!

The basic continent, upon which everything rests, is DOS. You can see in the table that it occupies 640,000 bytes of space (actually, 639,999 bytes, but we can get sloppy on occasion). When running in REAL (DOS) mode, all the user programs stay on this continent. They are not allowed to use any of the space on any other continent. Moreover, when a program is running in this mode, it can use all available DOS memory not used by DOS itself. When it is done, and only then, can a different program take over the continent.

Upper memory is another smaller continent, just above DOS. The video card uses some of this continent, as can some other expansion cards. The system BIOS itself uses some, too, in the north region of the continent. Often, there is unused space on this continent. The EMM386.EXE program that comes with DOS and Windows 95 and 98 (abbreviated Win9x) manages memory.

It can assign the unused space on this continent to device drivers, Terminate-and-Stay-Resident (TSR) programs and the like. That helps, because these programs need space somewhere. If EMM386.EXE does not make space for them on the Upper Memory continent, they take up space on DOS. Moving them to Upper frees up space for your user programs on DOS.

Oh, by the way, the continents of DOS and Upper together occupy 1 megabyte of space. Extended can be a huge continent, depending upon how much RAM you bought with your computer. If you buy just 64 megabytes, 63 are in Extended, and DOS and Upper occupy only one. Win9x takes over all 63, but parcels it out to programs that need the space on a temporary basis. It loans space to a program, or several, while they are running. It takes it all back when a program finishes with it. No program can occupy space on this continent without asking permission from Win9x! Win9x also prevents conflicts by parceling out territory on the continent. It will never let one program step over its boundary into another program's territory! Of course, that wasn't a problem on the continent of DOS, because only one program could be there at a given time. However, up in Extended, more than one program can be running (and occupying memory space) at a time. Someone has to keep the peace, and Win9x took on the job.

Oh, yes, we forgot to consider High. High is really not a continent – it is too small. We consider it an island, off the coast of (and part of) Extended. It is there because a programmer made an error back when DOS was being written for 286 machines. The error created this little island, only 64,000 bytes in size, which no one was using – it was totally uninhabited. To recoup the wasted space, programmers of DOS 5 introduced HIMEM.SYS, a little device driver. The driver is able to put part of DOS itself on the island, thus making use of the space and freeing up a little more memory on the continent of DOS. A nice touch.

We can ignore Expanded. Hardly anyone uses it anymore. When it is needed to run some ancient program that can't use Extended, we can tell EMM386.EXE to carve some space out of Extended and rename it Expanded. Oh, it does work a bit differently than all the other memories do, but I won't go into that. It was devised a long time ago when machines couldn't access more than 1 megabyte of memory space, because there were not enough wires embedded in the motherboard. You see, computers are a bit like an old-fashioned post office. If you a postal clerk about to hand-sort letters, you had better have enough cubbyholes, with numbers on them, to take care of all the addresses. There were not enough wires in older computers to address more than 1 megabyte of memory. But that's another story ... Happy computing!

PS: Here's a tip to make your life just a little easier. An absolutely **wonderful** wireless mouse can be purchased for very close to \$20, including delivery. It is really a slick device, and even sports a scrolling wheel. I bought one and liked it so much that I purchased three more for gifts. Call Johanna Garcia toll free at 1-877-505-4689, or navigate to www.easybuy2000.com to order one. I promise you will like it.