

2.7. Address Wraparound

There are two types of wraparounds. One is within a single segment and the other is inside the whole

physical memory. Segment wraparound occurs when during the effective address calculation a carry is generated. This carry is dropped giving the effect that when we try to access beyond the segment limit, we are actually wrapped around to the first cell in the segment.

For example if $BX=9100$, $DS=1500$ and the access is $[bx+0x7000]$ we form the effective address $9100 + 7000 = 10100$. The carry generated is dropped forming the actual effective address of 0100. Just like a circle when we reached the end we started again from the beginning. An arc at 370 degrees is the same as an arc at 10 degrees. We tried to cross the segment boundary and it pushed us back to the start. This is called segment wraparound. The physical address in the above example will be 15100.

The same can also happen at the time of physical address calculation. For example $BX=0100$, $DS=FFF0$ and the access under consideration is $[bx+0x0100]$. The effective address will be 0200 and the physical address will be 100100. This is a 21bit answer and cannot be sent on the address bus which is 20 bits

wide. The carry is dropped and just like the segment wraparound our physical memory has wrapped

around at its very top. When we tried to access beyond limits the actual access is made at the very start.

This second wraparound is a bit different in newer processors with more address lines, but that will be explained in later chapters.