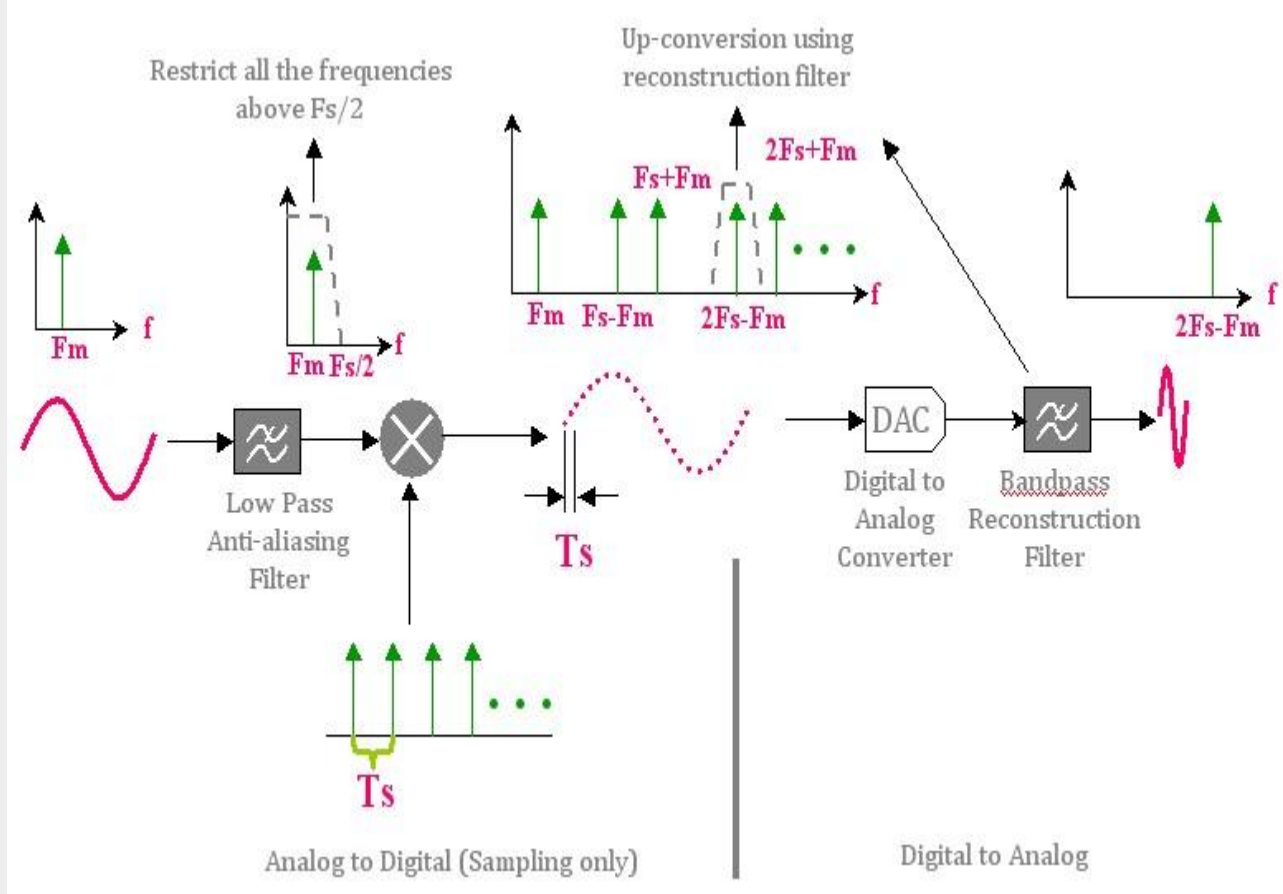
APPLICATION : UP-CONVERSION

In the above examples, the reconstruction filter was conceived as a low pass filter that is designed to pass only the baseband frequency components after reconstruction. Remember that any frequency component present in zone 1 will be reflected in all the zones (with frequency reversals in even zones and without frequency reversals in odd zones). So, if we design the reconstruction filter to be a bandpass filter selection the reflected frequencies in any of the zones expect zone 1, then we achieve up-conversion. In any communication system, the digital signal that comes out of a digital signal processor cannot be transmitted across as such. The processed signal (which is in the digital domain) has to be converted to analog signal and the analog signal has to be translated to appropriate frequency of operation that fits the medium of transmission. For example, in an RF system, a baseband signal is converted to higher frequency (up-conversion) using a multiplier and oscillator and then the high frequency signal is transmitted across the

medium. If we have a band-pass reconstruction filter at the output of the DAC, we can directly achieve up-conversion (which saves us from using a multiplier and oscillator). The following figure illustrates this concept.



Application : Upconversion

Source: http://www.gaussianwaves.com/2011/07/sampling-theorem-baseband-sampling/