Re: Anti−aliasing ADC samples

Source: http://sci.tech−archive.net/Archive/sci.electronics.design/2006−05/msg01204.html

- *From*: John_H <johnhandwork@xxxxxxxx>

- *Date*: Mon, 08 May 2006 13:15:57 GMT

eliben wrote:

> Hello all,
>
> I have an ADC that samples some analog signal at 1 Msps. The samples
> are then processed by a digital logic / software. To avoid aliasing, I
> must make sure that signals entering the ADC have no harmonics at > 500
> KHz. Is the only way to do it by an analog lowpass filter (i.e. RC)
> before the ADC ? I assume that there is no way whatsoever to filter out
> the unwanted frequencies digitally after the ADC, since the ADC
> sampling itself already got distorted because of aliasing, is this
> right ?
>
> And yet, in some places I've seen mentioned digital lowpass filters for
> anti−aliasing. How is this possible ?
>
> Thanks

If you want to analyze frequency content to 500 kHz, the design of a "brick wall" low pass filter makes the filter design extremely difficult. If you sampled at 10 MHz, your low pass filter just needs to supply the proper rejection at nearly 20x your frequency of interest making the analog filter very simple. The digital filtering would be applied to the high sample rate to deliver the necessary "brick wall" filter and deliver your signals of interest up to 500 kHz without significant aliasing or other distortions that an analog filter would typically produce.

It's the oversampling that allows digital filters to deliver such great performance for antialiasing. The analog filter is still needed, it's just so much simpler.
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