Sample Champion - Application note # 5

Using square and ramp signal types

Sample Champion main purpose is MLS analysis, but the signal generator can synthesize and play also pure tones, square and ramp waves. These signals can be useful for many kinds of acoustical analyses and also for testing the sound card itself.

When selecting the **square wave** signal type, the generator will play a square signal at the selected frequency **only for half of the sampling time**. This has been explicitly designed because the input and output lengths are 2^N -1 samples long and it was not possible to generate a square wave with this length **and** with the right harmonic content. But this is not a problem when analyzing a measurement of this signal: the trick is selecting an input buffer length 2 or 4 times longer than the FFT size.



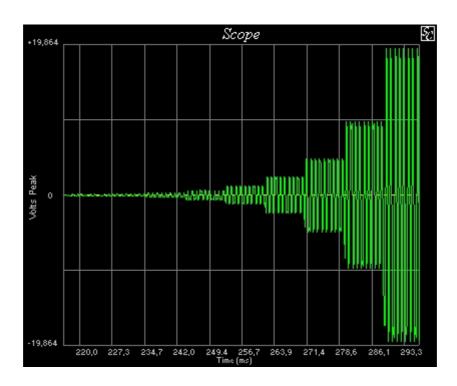
For example a setup could be (see figure):

- Square signal of the desired frequency
- Input length 16K
- FFT length 8K
- Full Blackman-Harris weighting window
- Average 64 cycles

The "Selection A" starts from the first sample and ends on the last sample of the square wave.

IMPORTANT: it is recommended to avoid the use of an external signal generator when the average feature is enabled because this could cause wrong results.

Another useful signal generated by Sample Champion is "Ramp". This signal is a series of small portions of square wave with amplitude varying from 0 to +/-2^15, each of them has amplitude 2^K where k=0..15. This signal is designed for testing the monotonicity of the D/A and A/D converters of the audio device.



To see the least significative bits, just zoom the Y axis.

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