2D DAC Technology

2 Dimensional DAC Technology and Computer Audio

Audio is represented in a y/x-axis system: the y-axis for amplitude and the x-axis for time. Mostly because of analog audio's sensitivity problems in the y-axis, digital audio was introduced. But digital audio not only quantizes the y-axis, it does so as well on the x-axis. Sounds like we got more than we wanted – true and too bad. A typical state-of-the-art DAC converts between quantization levels in the digital y-axis and the analog y-axis and is completely transparent and open as to what happens on the x-axis (time domain). Sounds like we forgot the quantization on the x-axis.

This oversight forced us to treat digital audio signals as if they were analog: use special cables, use all kinds of mechanical devices for our CD players, power conditioners for digital audio etc. Looks like we just shifted the original problem from the y-axis to the x-axis, but the issues are still the same. Instead of interference or crosstalk we now call it clock jitter.

Almost all DACs available today deal with the y-axis only and rely on external devices for the x-axis, such as complicated master/slave clock arrangements or external sync clock generators. At best these devices are band-aids on a wide open wound deep inside the DAC. They help, but do not resolve the problem at the source. We need a 2-dimensional DAC that not only works on the y-axis, but also on the x-axis. With this we can separate the digital world completely from the analog one and render any digital cable, transmission format, storage media and application completely irrelevant to the final sonic performance. The only analog problems that we still have then are clock jitter inherent in the source created during recording and the separation of the power supplies for digital and analog.

The DAC inside the Playback Designs product line does exactly that: clock jitter from incoming digital audio signals can be described as an analog signal that gets mixed together with a quantized digital signal (our ideal and constant sample rate clock). So before any processing can happen we need to bring these 2 components into the same domain: The Playback Designs system quantizes the clock jitter into a digital signal, where it then can be subtracted from the original sample rate while the latter is converted to analog at the same time. Of the course, the DAC also works independently in the y-axis by using a set of unique algorithms in a completely discrete architecture (not even a single Op-Amp is used).

With this unique technology all Playback Designs products separate its sensitive analog circuitry from the digital source connected to its digital inputs and virtually eliminate any clock jitter caused by cables and components in the source player.