Products Designed for Music, Not Measurements

Technical Measurements are indispensable in the development of any audio product. They enable a designer to determine if a circuit is evolving in the right direction and ensure no gross errors are committed during the prototyping phase. Like other credible High End Audio manufacturers, Brinkmann employ state-of-the-art measurement equipment (AudioPrecision APx525, Agilent 500Mhz scopes, Wavetek signal generator, etc.) as part of the methodology by which we assess the progress of our designs.

Although technical measurements are helpful in avoiding glaring mistakes and uncovering manufacturing defects, they neither dictate our circuit design nor are they a substitute for the meticulous fine-tuning we feel is necessary to achieve optimal sound quality.

Brinkmann have two fundamental reasons for these beliefs:

1. Compared to the complexity of our auditory system, the very few parameters that are measurable only represent a small part of what we hear and are therefore a poor predictor of sound quality.
2. Better measured specifications do not necessarily yield better sound quality. In fact, it is often quite the opposite.

There are even products currently available which have facilities (switches or multiple outputs) which enable the user to choose between “Measure” and “Listen” mode (iFiAudio’s nano-iOne, for example). The reason for these “Multiple Modes” is that the circuit or signal path which offers the best measurements often sacrifices sound quality. Better measurements are an effective marketing tool as they suggest that it’s possible to quantify sound quality. Unfortunately, measured specifications still cannot predict musical realism. Today, listeners still need to trust their ears—and not measurements—to judge sound quality. And that’s what we do at Brinkmann.

We use measurements as a tool during development to ensure that nothing fundamental goes wrong. To achieve the sound quality for which Brinkmann products are renowned, we use highest quality playback equipment (Vandersteen 7s, Vivid B1s, Revel Salon 2s) in hundreds of listening sessions to optimize and fine tune the sound of our components.

Increased distortion at low frequencies

We use a tube output stage with low feedback which, as tubes have non-linear bias curves, naturally causes a certain amount of distortion. Any competent circuit designer has the means to lower distortion by adding feedback, but we achieved audibly superior performance by keeping feedback to a minimum. By lowering feedback, the bandwidth of the tube output circuit is in the region of 5Mhz with low output resistance, which yielded better sonic performance than could be obtained by adding feedback.

One special feature of our circuitry is that we don’t use any kind of filtering; rather, we borrow a technique from pro-audio (mixing consoles, etc.) and employ a coupling transformer which works as a filter because of its limited bandwidth. With a bandwidth of more than 100kHz, however, this transformer imposes no limitation of the audible frequency range.

An additional benefit, this transformer decouples the differential outputs of the DAC Chips without the need to use capacitors. The only coupling capacitor is in the tube output stage. The rising distortion figures at low frequencies are aspects of this transformer and the coupling caps, but these values do no influence performance in the audio bandwidth, nor do they affect sound quality.

Noise level and dynamics

We employ vacuum tubes in the Nyquist's output stage, as we find them to be sonically superior to transistor output stages. Vacuum tubes naturally produce a slightly increased noise level. The Nyquist noise level measures in the range of -110dB to -120 dB. Attempting to push noise below -120 dB by using transistor output stages instead of tubes would degrade sound quality and we would gain nothing except better measurements. Even from a purely technical standpoint, a Signal-to-Noise figure above 120dB has no benefit whatsoever. The ear has a dynamic range of around 120 dB from absolute silence to the threshold of discomfort, but recorded music never reaches a dynamic range of 120 dB (extreme recordings probably reach 80-90 db max.).

Sidebands in the jitter spectrum

We have devoted considerable attention to the power supplies employed in both our analogue and most especially our digital circuitry. Over damping (i.e., filtering) the incoming power might result in better measured values, but often kills the life in the music. Hence each and every power regulator (there are 11 in the DAC-module alone!) is optimized for best sonic results. The sidebands visible in the jitter spectrum are not related to jitter. They are also visible with a jitter-free signal and are well below -110 dB. They are a result of power supplies designed for best sound quality by avoiding over-damping of the power lines.

In our opinion, music reproducing machines such as Nyquist are created to maximize musical satisfaction: music, not measurements, is their ultimate purpose. We call our Nyquist DAC an "analogue DAC" because we favored sonic advantages, such as those provided by our turntables, over measurement data. We encourage serious aficionados of both music and fine audio componentry to experience Nyquist and determine the validity of our design approach….