

## LKV at CES

**On January 8<sup>th</sup> and 9<sup>th</sup>, LKV's Chief Designer, Bill Hutchins, attended the Consumer Electronics Show held in Las Vegas. A large section of this show is devoted to High End Audio. Here is Bill's report:**

The two days I spent at the CES were very productive for LKV, in terms of making good contacts with complementary manufacturers, identifying potential suppliers, and investigating new technologies that LKV can use in upcoming products.

We are always looking for opportunities to cooperate for mutual benefit with manufacturers of phono-related products with which LKV does not directly compete. Companies that do their manufacturing in the U.S. are of particular interest. To this end, I introduced LKV and our Phono 2-SB preamp to two turntable manufacturers, both of whom showed considerable interest in the product. They are Basis Audio of New Hampshire and VTL Industries, which is based in New Jersey. I will shortly be taking each of them an early production Phono 2-SB for listening and evaluation in their own systems.

As part of LKV's effort to add digital audio capability to our products, I met with several companies that design and manufacture digital audio modules (e.g., USB systems and digital analogue converters) on an OEM basis. One of these, Danville Signal Processing appears to be capable of providing what LKV needs: high quality digital technology at reasonable prices. Danville's President and principal designer, Al Clark, is an industry veteran who cut his teeth designing phono preamps many years ago and has since become expert in digital design. Al expects to have available by the end of second quarter 2013 a module that can accept a USB signal at up to 24 bits and 192 KHz sample rate, re-clock the data to minimize jitter, and convert it from digital to analogue. Such a module would allow LKV to include digital USB inputs to the forthcoming preamp and the integrated amp we are now developing.

Speaking of integrated amplifiers brings us to what I think was the most exciting technology I encountered at the show: Class D (switching) amplifiers. These amps produce their output power and shape the musical signal by switching their output transistors on and off, very rapidly. The result is that they can generate substantial power from a very small package and with very little heat. Their small size and low heat dissipation make them ideal for incorporation into integrated amps and other multi-function devices. A Danish company, ICEpower, demonstrated a series of very intriguing Class D amp modules. For example, one such module that is built on a circuit board about 6" x 3" in size is said to be able to deliver two channels of 125 Watts each into a 4 ohm load.

ICEpower sells these modules in quantities as small as 24 to manufacturers for incorporation into consumer products. I plan to obtain a sample and build it into an amp for testing and listening. There are a number of technical issues that have to be solved when working with Class D amplification.

And, of course, the ultimate question for Class D amps as for all others is "How do they sound?" I will listen and test very thoroughly, for LKV will not market any product that does not deliver great sound. We will report on the results on this page.

Finally, for me, the most interesting conversation I had at CES was with John Atkinson, the Editor of Stereophile magazine. John personally tests and measures virtually all the products to which Stereophile gives a full review. In doing so, he has accumulated perhaps the largest data base in the world of test results and corresponding subjective reviews of high end audio products. One of his goals in launching this testing effort was to see how test measurements correlate with listeners' subjective impressions of sound quality. When I asked what success he has had in this effort, he candidly admitted some disappointment. He said he has had the most success with loudspeakers, where his measurements enable him to identify which speakers will sound "good," as opposed to mediocre or bad, but he still cannot separate the good from the great speakers on the basis of test measurements alone. When it comes to amplifiers the effort has been somewhat less successful; but he did mention several measurements that can be used to predict acceptable sound quality.

As I thought about this conversation afterwards, I analyzed the situation in this fashion. Speakers and amplifiers are physical devices that conform to the laws of physics (electronics, acoustics, etc.). It should be possible to measure very accurately how they perform. Why can't we devise tests that will tell us with a high level of accuracy how they will sound? I think the answer may lie in the fact that we are really dealing with two different questions: 1) How is the device (speaker, or amplifier) performing? That is, what is it doing to the waveform we introduce into it? 2) How will the human ear/brain system respond to the music that is produced by that resulting wave form? The first is a question of physics. The second, a matter of psychoacoustics. My hypothesis is that while we are pretty good at the first (measuring what the physical device under test is doing to the wave form), we are much less able at present to say how human ears and brains will react. If I'm right, what we need to make our measurements more predictive of good and great sound is some very sophisticated psycho-acoustic research.

Until we get such research, the final design decisions and trade-offs will still have to be done by ear.