

July 17th, 2022 - Atlanta Audio Club Meeting

Jim Weir of Hottinger Bruel & Kjaer Labs

The meeting was attended by approximately 24 members and guests. Jim Weir started his program with a brief history of Hottinger Bruel & Kjaer. Jim mentioned that measurements shown many years ago in Stereo Review and Audio magazine were made with B&K equipment providing graphs on paper in the days before digital records. HBK now supplies equipment to the automobile, airplane, and many other companies to measure sound, noise, and vibration. For more information visit the HBK website at <https://www.bksv.com/>.

Jim started his presentation with a video he made earlier this year called "Eight Minutes on Sound". Use this link to view the video: <https://www.youtube.com/watch?v=9UI6CDRECGM>. The video shows the dynamics of music played in his personal listening room using the B&K 2245 sound meter. This meter starts at about \$3000, the more advanced model 2255 starts at \$5600.

Jim mentioned some interesting fact about sound measuring equipment such as at a 60dB level a typical condenser microphone diaphragm's movement is the same as the diameter of a hydrogen atom. Jim then let a discussion about different microphone technologies.

Jim talked about how the human ear and brain process sound into speech and music. He asked the group if any of us had ever listened to live music at the Velvet Note in Marietta, only a couple of members raised their hands.

Jim stated that good recordings require a good recording and mixing studio sound systems. Unfortunately, many studios don't have good sound systems which compromises the recording and mastering process.

Flaws in recording can come from several sources including, microphones, microphone placement, spatial processing (reverb & equalization), level panning, acoustical and reproduction differentiation, distribution master limitations (compressors and limiters), unknown expectations and listening history of the producer/artist.

Jim Weir gave a definition of natural and reproduced sound:

Natural Sound – One or more decorrelated sources, two somewhat correlated pressure variations.

Reproduced Sound – One or more somewhat correlated sources, two somewhat correlated pressure variations.

Jim talked about how what a person sees affects what they hear, this is known as the McGurk effect - Auditory Illusion – shown in this BBC Horizon Clip:

<https://www.youtube.com/watch?v=2k8fHR9jKVM&t=6s>.

Jim listed three stages of stereo reproduction:

1. Signal Processing – Transducers such as microphones, cartridges, tape heads, recording and playback equipment.
2. Electro-Room Acoustics – How speakers interact with the room and listening position.
3. Psychoacoustics – What happens between the ears.

Jim showed an eye-opening video about what digital audio sources look like while being played back. Contrary to what many people think, there are no stairsteps in the reproduced digital waveforms. The video can be seen here:

<https://www.youtube.com/watch?v=cIQ9IXSUzuM&t=1s> . The key to understanding this is that most digital to analog converters use output filtering getting rid of any frequencies above half the sampling rate.

Jim expressed his opinion that when performing very critical listening to audio systems it should be done in mono. This can be a mono signal sent to one speaker or both speakers. He contends that when the brain is listening to a stereo signal the brain has to deal with complex phase and positioning in the recorded sound from 2 speakers making it very hard to critically listen to the actual sound of the speaker.

One of Jim's interesting recordings is from a group Lake City Dive called "I Want You Back". It can be found on YouTube at <https://www.youtube.com/watch?v=Je09RttzeQ> and on streaming music services.

The very nice listening system Jim used in his presentation was a pair of JBL LSR305 powered speakers and a JBL LSR310S powered subwoofer. Jim had taken measurements of the sound in the listening room and added corrections to the digital processor he was using to control the system.

Minutes written by Steve Gooding
President of the Atlanta Audio Club