

The Audio Soundscape Consciousness Arena

(written by Tony Andrews, Funktion One)

It has been said that if bad sound was lethal it would be a leading cause of death. Our sense of hearing is not given the attention it deserves. We underrate it and regard it as secondary to sight. Consider the lack of attention paid to the acoustics of public spaces by architects and interior designers. It's not even appreciated how badly a child's education is affected by the disastrous acoustics of the average classroom. Even in club land with areas dedicated to thousands of watts of audio it is unusual for room acoustics to be given their due care and attention.

Consider these contrasts with the sense of sight:-
Hearing is always on and active, however eyes can be shut.
We are all woken by noise far more than visuals.
Audio is sensed from all directions, eyes only look forward.
The range of frequencies it can detect extends over ten octaves whereas the rainbow of light is only one octave.

Our hearing is an amazing sense, honed for survival, yet we seem unaware of the depth and strength of our auditory system and its power to affect our mood and demeanour. Sadly our general disregard for audio has crept into music production so I want to examine where we are with audio, how we got here, how it is limiting us and what we can do about it.

My biggest problem is how the continuing dumbing down of audio quality is preventing us from realising music's full potential. Its ability to transport the mind and generate wonderful depth of emotion is being lost.

This dumbing down of audio has gone hand in hand with the onset of the digital age. This has brought us entirely inadequate music files, bad sound cards and bad analogue to digital and digital to analogue converters. Furthermore this sorry state of the hardware is compounded by a seeming indifference to gain structure. In other words when a meter shows red it means the equipment is maxed out and can only deliver distorted sound so why do so many djs do this? Please stop. Audio and music is not an offensive weapon! I believe we have a duty of care to our audiences.

I'm not against digital as a musical medium. In fact done properly digital sound quality can surpass analogue. However, to get digital right involves so many more processes and specialised bits of equipment compared with analogue that it invariably goes wrong. So what do we need to be mindful of to ensure that digital realises its full potential.

A sound system is a chain of events and equipment. It is only as good as the weakest link in the chain. Imagine that you are looking at a scene through a series of windows. It only takes one dirty window to destroy your clarity of view. It is really important to have a lucid audio signal path to hear truth. In fact, without a high quality reference system, it is difficult to assess the audio integrity of any individual components in the audio chain because the flaws of one device will mask the performance of another's. The end result is confusion.

Let's start at the beginning of the chain with the original sample or microphone input. The signal needs to be clean, clear and of sufficient resolution - 96 KHz sample rate and 24 bit depth which translates to 4608 Kbps is good. It should not be an MP3 even if it is so called high quality of 320 Kb/per sec.

**MP3****WAV**

This has only 7% of the information required to pay proper respect to human hearing. MP3s have become an unnecessary bad habit. They were born from the limitations of the early internet, low bandwidth and costly storage. This situation is no longer with us and we should abandon them.

Earlier I mentioned gain structure and the negative results of overdriving. It is also important to have sufficient level. Digital resolution is stated as sample rate which is the number of slices of time per second and bit depth which is the number of steps of level or dynamic range, Bit depth is distributed between minimum and maximum level so if input level is too low your nice 24 bit depth hardware is turned into a nasty 8 bit device.

Moving on to mixing: Digital hardware can be compromised in many ways - a jittery clock, bad algorithms, inaccurate maths and bad converters to mention some salient points. There is also a core problem with digital which is timing or latency.



Coherent Timing



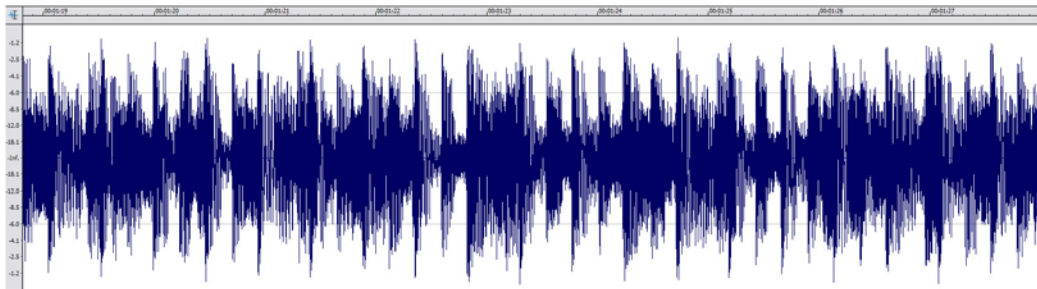
Smeared Timing

Varying digital processes take different amounts of time to complete. These latencies are very small but the thing is that the human auditory system is so finely tuned for survival that it is sensitive to these small time delays. It can perceive individual time events as little as 20 millionths of a second apart because that tells

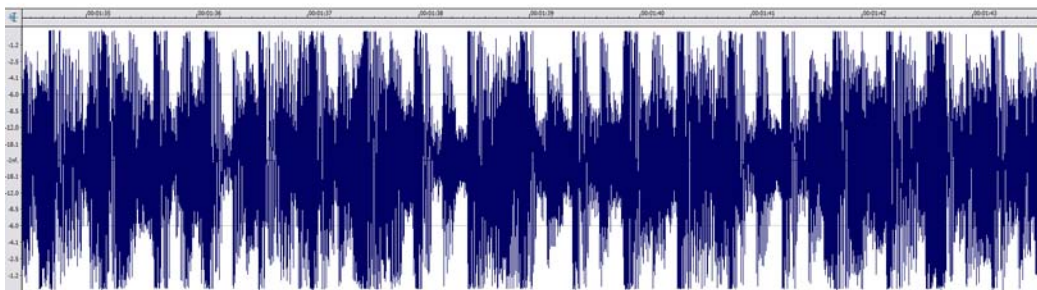
us where and how far away events are in our environment. When differing latency musical signals are assembled into a final mix our hearing system knows the information is time smeared, finds it confusing and disengages spatially and emotionally.

Software mixers, sequences and audio file players can suffer from similar problems to hardware. Bear in mind that the more plug ins and processes applied to a sound the more mashed it becomes. So uncheck any extra layers of unnecessary processing such as auto gain and levelling in global preferences.

When it comes to the final mix use a quality file format, obviously not MP3, and do not kill the audio dynamics with over compression. The recent initiative of Dynamic Range Day was great to see. About five years ago I bought a CD of a house track. It sounded so awful that I bought another one from a different seller, thinking the first one was a pirated copy. It was just as bad. This is what its waveform looked like compared with a sensible level.



Sensible Level



Stupid Level

The whole mix is so crushed to the roof that it is even badly distorted. This destruction is just to be louder than somebody

else's track when most listeners can reach for the volume control. Another common problem is tonal or spectral imbalance. Human hearing is not equally sensitive at all frequencies and has a peak of sensitivity at around 4 KHz which is generally described as high mid frequency. This is where the definition frequencies or consonants such as "t" or "k" sounds occur. Incidentally this is also where a baby's cry is centred. So this is an attention grabbing frequency area and far too many mixes over exploit this fact with the resulting tonal imbalance being harsh and shrill. It is like a colour print with too much blue.

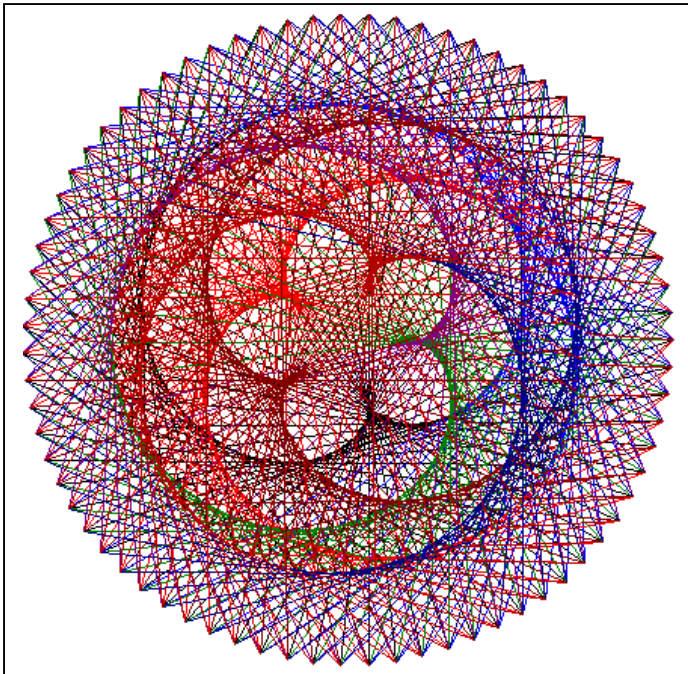
There are many more ways of corrupting audio than we have time to discuss but they all boil down to one word...DISTORTION. Distortion can be thought of as a twisting of truth or lies which of course nobody wants to listen to. So we have stopped deep involved listening and are now only superficially hearing. Daniel Levitin a professor of psychology and neurosciences has said that music stimulates more parts of the brain than any other known kind of input. When a person is not enjoying listening to music the fight or flight hormone, adrenaline is released and when music is being enjoyed the pleasure hormone dopamine is released. I would suggest that this contrast in neurotransmitter effect extends to distorted audio and true audio. So even if a person is enjoying music the distortion content will block full emotional involvement because unpleasant audio will be driving the mind into a fight or flight condition.

Humans adapt to what they experience and there is now a generation that has only experienced digital audio nonsense. They have never heard transparent crystalline high frequencies. What they have heard is audio sandpaper and are so used to it that they believe this is how it is supposed to be. In fact this syndrome extends right through the audio industry. Substandard audio has become the accepted norm and our audio and musical culture is demeaned by it. So if you wish to redefine the DJ then how about guardians of our audio soundscape consciousness arena?

I have given my opinion on the sorry state of 21st century audio and aspects of hardware and processing to be mindful of but why does this matter? After all the world seems quite happy with the status quo. One of the most exciting things about stereo is the

infinite space that it opens up inside your mind. This is commonly known as the sound stage and only appears when every link in the audio chain is of sufficient quality to allow a reconstruction of the stereo image. Low quality sound cannot do this therefore it has no dimension or accessibility for example imagine the differences between a fuzzy, two dimensional picture of a landscape, contrasted with actually being in the three dimensional reality of that landscape. Involvement in the multi dimensional soundscape is a transcendent experience. The fact that brain wave patterns are the same in a person meditating or listening deeply to music bears this out. Meditating is usually a personal experience whereas listening to music is very often communal. I would propose that amazing concerts and dance floor experiences are not only because of a personal involvement with audio and music but also because we are connecting with others also in the audio soundscape consciousness arena. This may be a door to a badly needed new state of being. For me this is why audio quality is so important.

So far I have focused mainly on audio quality but I find that many of these concepts also apply to the musical content. My personal taste is for harmonious, tuneful, rhythmically satisfying and uplifting music. I believe that music is an expression of the structure and architecture of the Universe so I do not do darkness and chaos. The harmonic arrangements of everything from atomic particles to the planets and the harmony of musical scales illustrate this.



**Eight Year
Dance of Earth
and Venus**

A natural attraction to harmony and aversion to discord stems from our sense of and our connectedness with the Universe. Natural rhythms such as heartbeat, breathing, day and night and the cycle of the seasons are all steady and life affirming unlike some of today's rhythms which if translated to a person's heartbeat would hospitalise them. So even with brilliant audio, discord, disjointed rhythms and distorted sounds will tend to release the dealing with stress hormone adrenaline. This means that there may well be more musical adrenaline junkies in today's world than there were at the beginnings of House Music in the 1980s. The music of that time met nearly all of the dopamine releasing requirements, satisfying rhythm, melody, key changes etc. This not only gave us enormous fun but also the huge possibilities of communal consciousness. The Universe is all vibration and music is part of the great dance of frequencies. Tune into their deepest meaning and music might just save the World.