



# distorting the truth

Tony Andrews of Funktion One talks about a subject close to his heart and asks for some clarity in the audio industry.

We 'Men of Audio' as my dear friend Clifford Henricksen put it in one of his frequent moments of levity, fight the good fight for good sound or high fidelity.

Lets just take a look at the words high fidelity or hi fi. Taken literally hi fi means large quantities of faithfulness. This *faithfulness* refers to the original sound so in single words we are talking truth or purity. So the next issue is how shall ye judge fidelity and how do you maximise it?

## Criteria for Fidelity

- Even frequency response

The desirability of flat response is self evident but in practice this is not as important as believed. This is fortunate for loudspeaker manufacturers as very few products are in fact flat.

- The sound system is able to run comfortably delivering the required sound levels

This is common sense and good practice when operating any kind of machine. As far as audio goes it *maintains* headroom giving peak signals room to breathe.

- Absence of clipping, harmonics, artifacts, etc.

This is where it goes horribly wrong and is often completely out of control. As it is the most important aspect of fidelity we find ourselves, all too frequently, in an uncomfortable audio experience. One is able to ameliorate frequency response and a flat out sound system can always be turned down. As this is very often psychologically difficult for some people one can always get in more amplifiers and speakers. However, it is very rare, if not impossible, to regenerate a degraded signal. The concept of fidelity is replaced by all manner of noxious wave forms which, as you can probably tell by the fact that I am writing this, is a matter of great concern to me. Apart from being entirely offensive it is actually very damaging to human hearing. In fact distortion, in my and many others experience, is more damaging to hearing than level. This is because distortion is often clipped signal i.e. a smooth sinusoidal waveform with the top chopped off leaving very sharp corners which now approximates a square wave, containing excessive amounts of unwanted harmonics, which I think is very unnatural - our ears and brain are not designed to deal with such wave forms for extended periods. If responsibility and care is not brought to bear on the situation the

ian level legislation where in fact the real culprit is distortion. Some of the worst offenders are clubs. I think I have only encountered a minority of DJ's in my entire life who didn't run the outputs of their mixers solidly into the red. There is not much you can do with the signal after that. Engineers are thus reduced to subterfuge and doctor the controls/meters so that even when they are solidly into the red the output signal is still reasonable.

- In my mind distortion means twisting away from truth

Distortion is the opposite of fidelity and is alarmingly easy to end up with. It comes in many varieties and can be introduced at any point in the signal path. Common events are over driving either the input or output levels as in the previously mentioned example. Another is the source material itself. A more recent introduction are the horrible results from inadequate A to D and D to A (this has spawned an industry wide revival in valve based processing products). Certain of the early samplers were a glaring example of this. All these points can be summed up as maintenance of signal path integrity. I have left the most damning example of distortion introduction to last which is of course the loudspeakers.

Notwithstanding operator abuse the intrinsic distortion figures of loudspeakers working at just 10% of their rated power (when does that happen in real life?) dwarf anything which can be found in other parts of the signal path which are not being overdriven. There are some very guilty loudspeakers out there! Loudspeakers can introduce distortion with harmonic resonance which can sometimes be greater than the fundamental. Odd harmonics seem to be musically worse than even harmonics. None is obviously best. Another common occurrence is ringing which is basically the cone or diaphragm carrying on bouncing around long after the original signal has ceased. The cure for this is more dampening. However, the most frequent source of distortion is over driving the loudspeakers. I am not talking about giving them more watts than their voice coils are able to handle temperature wise but the sheer inability of most loudspeakers to deliver clean sound at just 50% of their rated power, bearing in mind how large the harmonic distortion numbers are at the AES standard of 10% of rated power. Whilst I am on this subject I really must

ridiculous measurement parameter that has been introduced in the last 20 years, namely, the terminal SPL figure. This is a function of power rating, sensitivity and power compression. Taking into account the above points 100% power input into a loudspeaker is going to result in the most dreadful audio and therefore is completely irrelevant. In contrast I cannot help but notice a dearth of published distortion figures for most speaker systems now on the market. This was not the case in the past, so I am concluding that in fact the business has in some respects gone backwards and there has been a general tacit agreement not to publish these embarrassing specifications anymore. Over all we have exchanged purity for level. This does rather look like the old saying, "never mind the quality, feel the width". The above is my criteria for distortion. But why does it matter? The difference between clean, well defined sound and the all too frequent torrent of white noise cannot be over emphasised. Firstly, working in the usual stereo mode, the producer will have his instruments mapped out on the sound stage and in the multi-dimensional internal listening space the separation and placement of these instruments will be apparent and beatable. Distortion prevents this subtle, mental reconstruction process by changing the audio information. This is bad enough on its own but even more important to me is the fact that ugly sound literally drives you away, just as you would wish to leave the company of an aggressive and vexatious person. There is no way under these conditions that you are going to open your mind to the possibilities of a multi-dimensional sound stage inside your head. I am beginning to realise that there are many so called audio engineers who have lived with awful sound systems for so long that they have no idea what I am talking about. You know the kind of people I mean - the ones who say, "make their ears bleed". Crushing level is absolutely NOT what the audio experience is about. It is about internal space. Anyone who really knows will understand that a righteous audio experience is akin to meditation. A yet further aspect of this is the complete abuse of fee paying audiences with horrendous sound. Let's remember that music and sound are one of our freedoms and it breaks my heart to see it so consistently abused and misapplied. ®