

SOUND REINFORCEMENT

OPINION

FUNKTION ONE'S TONY ANDREWS CALLS FOR MORE ATTENTION TO THE DETAIL IN THE AUDIO PATH

The dismay of distortion

UK – In audio we should strive for high fidelity, or in other words, a faithful reproduction of the original signal. In a word, we seek purity, or truth. The criteria for maximising this fidelity depends on three things: an even frequency response; that the sound system is able to run comfortably delivering the required sound levels; and the absence of clipping, harmonics and artefacts.

One is able to ameliorate frequency response and a flat out sound system can always be turned down. However, it is very rare, if not impossible, to regenerate a degraded signal. The concept of fidelity is replaced by all manner of noxious waveforms which, apart from being entirely offensive, can be 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 – that is, 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. I think this is very unnatural – our ears and brain are not designed to deal with such waveforms for extended periods. If responsibility and care is not brought to bear on the situation the whole industry is going to be faced with draconian level legislation where in fact the real culprit is distortion.

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. It can occur

by overdriving either the input or output levels. The source material itself can be distorted: A more recent introduction are the horrible results from inadequate A-Ds and D-As, which has spawned an industry wide revival in valve based processing products. All these points can be summed up as [the requirement for the] 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 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 overdriving the loudspeakers. Not forcing them to cope with more wattage than their voice coils are able to handle, but the sheer inability of most loudspeakers to deliver clean sound at just 50% of



Tony Andrews: don't make his ears bleed

these embarrassing specifications anymore. Overall 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 what causes 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 locatable.

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

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their rated power, bearing in mind how large the harmonic distortion numbers are at the AES standard of 10% of rated power.

Use of the "terminal SPL" measurement doesn't aid the situation. 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

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. Engineers 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 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.

TONY ANDREWS

FUNKTION ONE RESEARCH

Tel: +44 1306 712820

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