

Pre-processing audio for digital

BY DAN ROACH

It's been a very poorly-kept secret that, from the dawn of digital processing and continuing to the present day, digital processors and stereo generators have generally been able to benefit from having an analog gain-controller placed just upstream, in front of them. Now, with increasing interest in optimized audio for streaming applications, the need is being felt even more.

The first-generation digital boxes were notoriously finicky to set up in the first place. Anything you could do to narrow the variations in the quality of material that the digital processor saw would reduce the amount of fiddling around with what were then little-understood controls once the audio was in the digital domain. In a way, it's surprising, but this is still true, even with the newer generations of digital whiz-bangs—uniformity of product on the input yields better sound with fewer artefacts on the output.

This must be partly due to the variations in the quality of the source material that we provide. We should always keep in mind that our processor gurus are optimizing their algorithms and designing primarily for a form of audio that is becoming a rarer and rarer bird, indeed—"unprocessed" or "raw" audio.

Even if we take pains to use a storage system that is uncompressed, and perhaps even an STL system that doesn't use bit-reduction techniques, we still need to be concerned about our audio sources—as

commercials are swapped back and forth between radio stations and studios, MP3 files are being created and re-expanded, sometimes with more care than others. The music distribution services seem to be taking some care but, here again, consumer-oriented AAC and MP3 files of "difficult-to-get" music seem to have a way of seeping into systems, past even the most vigilant and discerning audio policemen. And increasingly, and even more disturbingly, music is being mastered by the record companies with built-in crunching, compressing, and even clipping.

Well, these are variations that we might just have to accept. As the world continues to change, maybe we'll eventually drift into an alternate universe where we will once again have control over these things, but in that respect it will not resemble the one we're in right now. So we're going to have to make the best of the situation in which we find ourselves, and fix what we can.

Whether the audio that's going to be processed ends up in a non-bit-reduced form such as an FM composite signal, or gets crunched down mercilessly to a low-bit-rate creature such as an Internet stream, what can we do to get the most out of our nth-generation digital bit-flinger?

Consistent input levels and equalization are desirable, but not if they come along with "analog" artefacts such as



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pumping and breathing noises... and, we're told by all the designers of bit-reducing algorithms, absolutely with no added clipping. We need something gentle and slow—a gated, automated gain-rider like the Audimax and Texars of yesteryear. Preferably with several audio bands, not so much for equalizing, and definitely not for pre-emphasis, but only to help keep the "tonal balance" more similar between different audio sources.

The guys that developed the CBS Dynamic Presence Equalizer, a fairly terrible box from oh-so-many years ago, might have been on to something after all. Or maybe just the beginning of something.

Come to think about it, something like this (in the digital domain) might be just what's needed to rein in the audio level problems being experienced by HDTV stations, for completely different reasons (only they'll need it for 5.1 audio!).

We live at the dawn of this digital age, and it's comforting to think that in a few years our level control and quality control problems will all have been solved. In retrospect, some of our approaches to today's problems will no doubt seem quaint. At the same time, it seems ironic that the key to ironing out some of these troubles may lie in the audio processing techniques of the past.

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