

# Monitoring surround sound audio for broadcast

BY DAN ROACH

Many of us noted through the NTSC era that the quality of the audio always played second fiddle to the pretty pictures. As a consequence, so long as the sound channel was more-or-less intelligible, 99% of the effort and expense went into the video. Surprisingly, it proved to be pretty easy to manage one mono channel of audio.

Now that we're entering the age of ATSC, these audio problems, rather than going away, are coming home to greet us, but in a new, expanded, much more complex form. It has become clear that any workable solutions are going to require new thinking as well.

So let's look at what's being bruted about by the great minds just to be able to monitor and detect ATSC audio problems. Presumably detection will lead to understanding and, eventually, correction!

The good news here is that we no longer have to worry about deterioration of audio through transport, dubbing and transmission processes. The absolute audio levels are now effectively set "at the factory" in production, and shouldn't change unless we purposely adjust them.

The bad news is that in an environment where the standards are left subjective, audio from different sources is going to lack consistency.

In the past, radio stations faced a similar problem, which was often controlled by limiting the "carting" of audio to only a few staff that understood the problem and practiced in-house discipline, to keep levels and tightness the same from cart to cart—in effect, they developed tighter in-house standards. That system broke down when CDs came along, and music stopped being carted before on-air use.

Level consistency did come back to radio when audio once again had to be "carted" into automation systems. And was at least partially lost again with the purchase of complete music libraries on hard drive from vendors that lack those tight in-house standards.

In the beginning, there was the VU meter. For this discussion, I don't think we need to go farther back than the 1920s. Carefully specified ballistics, that more or less mimicked the human ear's notion of loudness, and two zones colourfully laid out in black and red. You could give a new operator a notion of correct operating level by simply stating that they should keep the needle from going into the red.

Intuitive and easy to understand; look how long the VU meter has reigned supreme, despite attempts to improve upon it in the 1970s with the ill-fated PPM meters that briefly became fashionable.



I think the main problem with the PPM was that, once again, the reference level and consequent use became subjective. The meter's response was tightly specified, but there was not one obvious way to use the meter. And there was more than one PPM standard out there.

Mike Dorrough entered the scene with a creative LED display that simultaneously showed peak and VU levels, but it certainly didn't get the industry-wide acceptance of the VU meter.

Then along came stereo, and suddenly level control of two related channels wasn't enough—we had to keep an eye on the phase relation between left and right as well. The classic way to do this was with an oscilloscope lissajous figure, with left driving horizontal and right vertical. L+R represented by a +45 degree line, and L-R by the -45 degree axis.

Some folks (notably Tektronix) rotated the whole display by 45 degrees, so now you had a sort of view of the sound field, with L+R forward and back, and L-R left to right. Which was a bit better.

But while the lissajous remained the standard viewer for phase information, it didn't really catch on with studios or broadcasters. Not like the VU meter.

Today's ATSC supports Surround 5.1 audio, which increases the demands for monitoring many fold. First of all, we need to monitor left, right, centre, left surround and right surround channels, and the low frequency channel. Then we need to keep an eye on the relationships between them. And, as we'll see, there's even more than that.

Our VU meters just aren't going to cut it for this problem!

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