When Hearing Starts To Drift

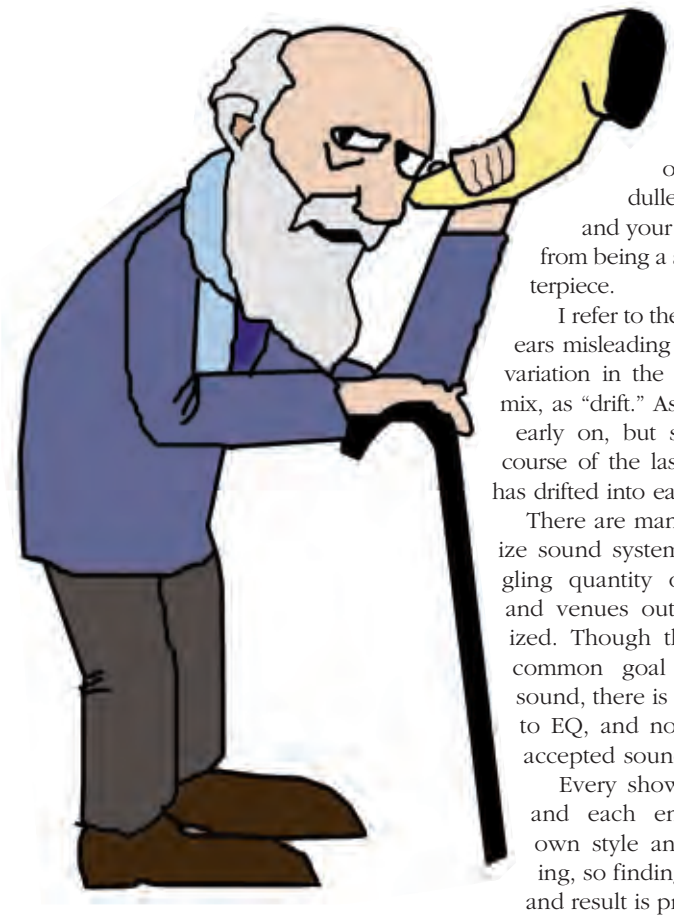
Avoid becoming "EQ oblivious"

By Dave Rat

Ever notice that some shows sound really bright, I mean, the "ouch kind-of-crazy painful" type of bright – and what is the engineer thinking?

You're a month into a tour, getting off a plane en route to another show. Hmm… Wonder if your ears are the same trustworthy, spring-fresh little helpers they were three weeks ago?

Or maybe – just maybe – the rigors of travel combined with that head cold, eight beers and four hours of sleep last night has dulled the senses a bit, and your mix has drifted away from being a sonically perfect masterpiece.



Pick your weapon in the fight against hearing drift.

I refer to the phenomenon of our ears misleading us, and the resulting variation in the tonal balance of the mix, as "drift." As in "it sounded great early on, but somewhere over the course of the last 30 shows, the mix has drifted into ear bleed zone."

There are many methods to equalize sound systems, and a mind-boggling quantity of different systems and venues out there to be equalized. Though there is a somewhat common goal of a smooth, flat sound, there is no standardized way to EQ, and not even a universally accepted sound to go for.

Every show has unique needs, and each engineer has his/her own style and approach to mixing, so finding a common method and result is pretty much out of the question. And even if a standard did exist, the reality is that the opening act or the third band at a "no soundcheck" festival is at the mercy of the whims of whomever EQ'd the system.

To make matters worse, the touring life can wreak havoc on our most important tool, our ears. Even on a good day, well rested and healthy, is the mix going to be as well balanced and as smooth as it was 30 shows, two continents and five plane flights ago?

Getting a grasp on a consistent sonic footprint to present to each new audience is one of the most difficult and overlooked aspects of being a sound engineer. How, among all the variables, does the engineer find that "grounding point" that can be carried from show to show?

And how does one avoid being oblivious to possibly subjecting that 30th audience to a mix that sounds like broken glass and razor blades?

REFERENCE POINTS

There are a few fairly simple methods that can help engineers avoid drifting away and getting lost in the sonic landscape of misperception. Having reference points is extremely useful for identifying, locking on and preventing a mix from tonally drifting over the course of a tour or even throughout the show.

Our ears are our primary source of information, but they're also just one of our five basic senses. However, smell is highly unlikely to be useful in all but the most extreme situations, and we don't have the time to really run around tasting the equipment. So we're left with sound, sight and touch,

along with the ability to compare with the past to help us out.

Some people use their voice, some use a CD, while others use pink noise and some sort of sophisticated test equipment such as (SIA) SMAART, (Meyer) SIM or an RTA (real-time analyzer).

From a sound engineer's perspective, there are several dilemmas and obstacles in the real world. As already noted, our hearing can be inconsistent over time for numerous reasons, and using your voice or a CD is perception based. Therefore, they can typically be inconsistent over time.

So using an RTA or one of the PC-based analyzers can be a consistent non-perception-based method that's helpful. But note that this approach sometimes just isn't practical, and I've yet to use a measurement system that provides consistently usable results without also needing "touch up" via ear.

Often there isn't the opportunity to play a test CD, let alone the problem of subjecting 30,000 people to hearing "check one, two" or pink noise for 15 minutes of tuning. Simply put, what is needed is a trustworthy, repeatable reference point that can be easily carried and utilized anywhere, anytime without affecting the show, a way to get enough information for an optimized mix without putting a single instrument through the system.

COPYING IS EASY

Rather than trying to remember the sound you're looking for, and hoping your ears are honest, there's an easier, more dependable method. For example, a small system with an accurate tonal balance already dialed in can serve as a good point of comparison.

Simply, "A/B" the two systems and adjust the big system to sound similar to the smaller one. All that's really needed is an accurate pair of sealed headphones and a CD that sounds similar to the mix to be achieved.

Though most headphones won't do many favors in the very low frequency region, a decent pair will provide a very usable reference point from 100 Hz or so, on up. Using the headphones as a real-time comparative reference, play the CD through the system while it's also cued up in the headphones, and then EQ the system to sound like the headphones.

If the chosen CD is relatively well balanced and mixed, and the engineer has done a reasonable job of copying its sound, the result should be with a surprisingly good system EQ.

Think of the system EQ as the tool for compensating and bringing the venue/system combination to a "correct" tonal balance. Think of channel EQ as the tool for getting the instrument/microphone combination to the "desired" tonal balance. If done properly, the mix bus of the console should carry signal that is somewhat close in tonal balance to prerecorded music.

Therefore, CDs should sound good through the system with no channel EQ. An offshoot of this – usually used at festivals where it's not possible to play a preferred CD – is to simply use whatever house music is being played as the comparative reference in my headphones. The system can be EQ'd on the spot with no disruption to the event.

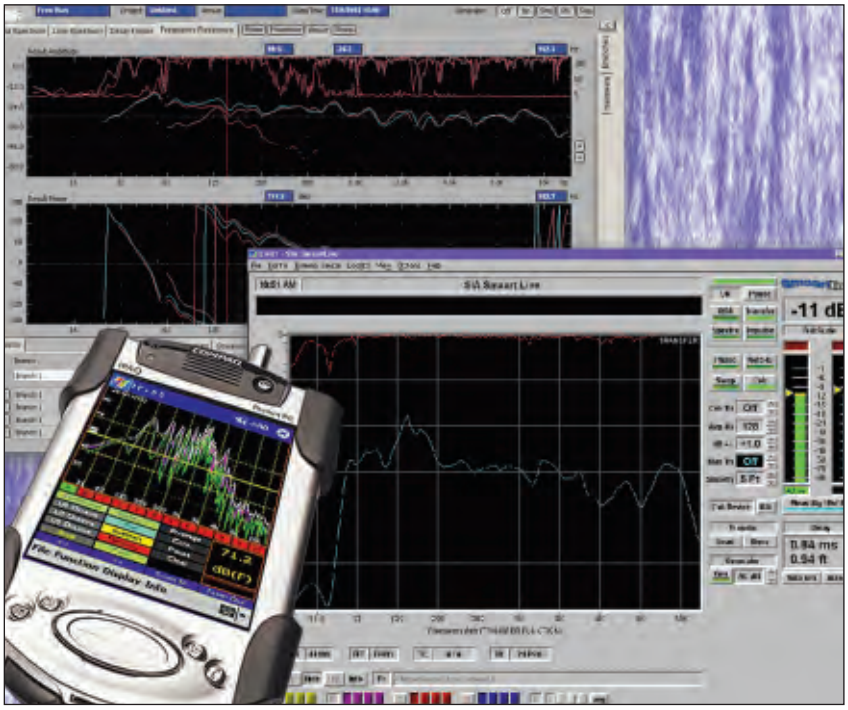
The beauty of this is that if your ears are dull, both the headphones and system will sound dull, and therefore you should still be able to match them up. It can also make you aware that your ears are indeed dull when you experience an overwhelming desire to crank up the high-frequency EQ.

SEEING, BELIEVING

Having a comparative audible reference is one useful tool in the bag of tricks, but not enough to guarantee being on the right track. Another tool is all about using the eyes. Whether it's a conventional RTA or a PC-based analyzer, having an accurate visual reference is extremely helpful in preventing a mix from drifting. What's needed is an analyzer with at least a 30 dB window and 2 dB (or better) resolution.

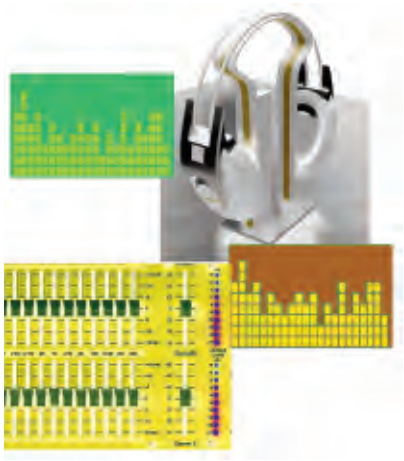
To make any analyzer truly useful in achieving show-to-show tonal consistency, there has to be a way to determine and store a desirable curve. With a bit of attention to the analyzer, it should become obvious that the best sounding shows will tend look a certain way. (And be sure to use a very slow release time on the analyzer).

Typically this "curve" shows up as an angled line gently sloping downward from left to right, at a rate somewhere between 1 dB and 3 dB per octave. For a good starting point, try a straight diagonal line starting at the



Be sure to list out console assignments.

Reality Check



top of the screen at 20 HZ and ending 20 dB down at 20 kHz. It doesn't really matter how the curve is saved/stored – RTAs allow curves to be stored and shown, others don't.

An easy "recall" method I've come up with is "ultra-high tech." Stick a piece of clear tape to the analyzer screen, and use a thin indelible marker ("Sharpie") to draw your line. Trace a show that really sounded good. Or, as I've done when I don't have my personal Sound Technology RTA 4000 (or even clear tape), peel a long thread from a roll of gaff tape and stick it to the screen.

Keep in mind that I'm not telling you what's absolutely "right" and/ or "wrong," or what a curve should look like; but rather, focusing on the tools to consistently recreate the desired sound. When in doubt, cheat. Use the answers from yesterday!

RELATIVELY THE SAME

A third reference point is the mechanical position of the console knobs. Assuming the system is tuned so that the reference CD sounds correct in the " super accurate" headphones; similar mics are being used from the previous show; and the band gear is somewhat similar, then the console EQ knob positions should be in relatively the same spot regardless of the venue or system type.

This may sound like a stretch, but think about it. There's no real reason for the console knobs to radically change from day to day, particularly if the system/room combinations are similar. I realized this when doing a live recording of a band I've mixed for many years. While in the recording truck, I noticed that the console EQ knobs were nearly identical to the settings I use live.

I then noticed, over the course of many shows, that when my console EQ knobs varied more than slightly from those settings, it was because the system was EQ'd poorly. Further, when I played CDs, they also required EQ to sound balanced.

If you find yourself boosting high frequencies on every channel, then most likely your system EQ is too dull or you're mixing bright. If 2.5 kHz is cut on more than half of the channels, then most likely there's too much 2.5 kHz in the system EQ. Use this information of how the knobs are positioned to help refine system EQ. Over time, refine the curve.

If you think you're getting off course, pop in the reference CD mid show if needed (be sure it's muted in the PA of course) and listen to it on headphones. Do a comparison to your mix during the show. Even with different music or songs, this can provide a good idea of whether the mix is tonally balanced or drifting.

Finally, run a board tape from the left and right mix, pre system EQ. This will show if the system EQ method is working. It's a checkpoint – the tapes should sound listenable and tonally balanced when compared to a CD on headphones (and, for that matter, on smaller hi-fi systems).

If not, make the adjustments in the system EQ to compensate at the next show, and remember, a dull tape means the system EQ is too bright, and visa-versa.

The key is to use the tools at your disposal to help keep you on track. I've seen many a great engineer scrambling for a mix at festivals. I've seen tour after tour come through where you can tell how long the sound crew has been on the road by how hard the power amplifiers for the high-frequency 2-inch drivers are clipping.

With a bit of thought and self-control, each and every mix can be made to sound a certain way, regardless of how honest our ears might be at a given time. Now, actually mixing the show – that's a whole different deal! ■

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