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Designing Vocals: Part III

● Parts I and II of this series on designing vocals have focused on the important foundational principles for capturing an inspired performance on tape—and doing it with all the necessary technical savvy. These are extremely important steps in the process, for a poorly recorded track or a spotty performance will undoubtedly come back to haunt you in the mix. In the case of flawed tracks, it's amazing what a creative and technically competent engineer can do to redeem the song, but it's really very wise to make sure your vocal tracks are solid, both technically and performance-wise before going into a mix. It's like the parable of the house built on solid rock versus the house built on sand: which one do you suppose could survive a storm with its torrential rains and blustering winds?

Mixing can be compared to a storm in that it starts out in utter chaos—all the tracks are separate, competing entities, needing to be placed in proper relationship to each other. Establishing order from chaos is a rigorous task whose outcome can be frustrating or satisfying depending on certain factors. For example, the more well-defined the individual tracks are, the easier it will be to find their proper niche. With vocals, it is best to have dynamics somewhat restricted during the recording process, as it can be rather nightmarish to try placing a vocal in the mix when it is unpredictably loud or soft. When applied during a mix, a compressor or limiter might have to work so hard to compensate for this that the track would end up sounding flat and lifeless. So the importance of starting a mix with good tracks should not be underestimated.

Still, the mix itself is probably the most critical stage in the recording process; it is (proverbially speaking) "where the rubber meets the road," for it is at this stage that all relationships between instruments, vocals and the sonic environment are permanently defined. The product of this mixing session is what ultimately reaches the ears of the listener, so an engineer needs to exercise the greatest degree of discernment or else even well-recorded tracks will fail to shine. Good tracks, particularly vocal tracks, can easily get bogged down in a bad mix. If they are dull or harsh, too far under or over the music, or are buried beneath a wave of excessive effects, your brilliant engineering and production will all be in vain. It is therefore extremely important that we carry a high level of technical and aesthetic awareness through the final stages of production. With this in mind, let's take a look at some of the critical factors in mixing vocals.

CONTROLLING TRANSIENT DYNAMICS

Vocal tracks will (in most cases) have been subjected to some form of dynamics control—limiting, compression or both—while they were being recorded, but at mix time it is frequently necessary to further control the transient dynamics. (When I use the term transient dynamics, I am referring to the short-term peaks that make a track difficult to record and also to place in the mix.) Smooth sounding vocals are definitely a mark of professional-sounding recording. High-end studios have very sophisticated (and expensive) devices which apply both compression and limiting, and assure that the output of the track remains at a steady level—irrespective of the input. If you, like most of us, cannot afford the big-bucks devices, you can still achieve a sophisticated vocal sound by re-compressing and/or limiting the track on mixdown.

Whether you'll utilize compression or limiting depends on lots of factors. You'll need to experiment in both modes to see which works best. The safest route in most cases though, is to limit the vocal on recording, so as to preserve the nuances of the performance without overloading the tape; limiting (with the threshold properly set) just lops off the large dynamic peaks in the performance without really affecting the moderate and lower level signals. Then later, upon mixdown, if you really want a much tighter uni-dynamical sound, you can apply some heavy compression to iron out all the wrinkles, or some lighter compression to just tighten it up a bit.

There are many differences between types of compressors/limiters. Some respond to peaks, and some (RMS sensitive devices) respond to an average energy profile, rather than every little blip that passes by. Each type has its strengths and weaknesses and each vocal performance is a unique event, so while you can easily develop some rules of thumb, don't allow yourself to lapse into formula. It's usually best to (as quickly as possible) try several different settings of limiting or compression and see which renders the desired effect. Controlling short-term dynamics is one of the first things that should be done before you attempt to place the vocal track within the mix. When this has been accomplished, you can confidently move on to adjusting EQ and creating a vocal ambience.

SOME TIPS ON EQUALIZATION

If there is but one axiom you should remember with regard to equalization of vocals, it is this: "Don't overdo it!" Many people equate an excellent vocal sound with a certain shimmering bril-

liance in the high end. This, I am sure, started out as an attempt to duplicate the frequency response of expensive studio microphones—which can accurately capture the high-end harmonics in a voice. But as time rolled on, people became entranced by the magic of high frequencies, no longer to compensate for deficiencies, but for the sheer thrill of coming up with the hottest possible sound. With this quest, of course, came problems—lots of them. When excessively laden with highs, a vocal can quickly become shrill and robbed of its power, and words containing strong *s* sounds (sibilants) become altered into *sh* sounds.

DE-ESSING

Some of this can be treated after the fact by running the vocal through a de-esser (a fast limiter which is maximally sensitive to a frequency responsible for the sibilance). Although the de-esser can momentarily suppress peaks in the fundamental range of sibilance and fool the ear into thinking it's not there, this device cannot totally undo the mutation of the sound. Some vocalists are more prone to "messy esses" than others because of the anatomy of their mouth, but in most cases, otherwise normal vocalists are made to sound like hissing dragons due to the excesses of an engineer who EQ'd the voice at some dangerous frequency. Often, the problem of sibilance is not picked up until it is too late—when the master is being prepared for duplication. So if there is a moral in this message, it is this: unless you have a real good reason to do so and you're absolutely sure that it won't cause excessive sibilance, avoid positive EQ in the range of 6 k to 9 k. Negative EQ might frequently be used to diminish sibilance, but positive EQ should probably be avoided like the plague!

The next logical question is, how do we get sparkle into the vocal and do it safely? If your mixing console has a high frequency shelf (usually affecting every frequency above 10 k), a small boost here (2-4 dB) will usually do quite nicely. Other consoles have peaking equalizers (affecting a select narrow band) in the high frequency range. In this case, a couple of options are open to you: a modest boost in the 10 k range will give you a strong dose of very powerful highs, but be conservative here because 10 k is close to 9 k; it is just outside the range of sibilance and if the cue (bandwidth) of the equalizer is wide enough to overlap, you could possibly be augmenting the sibilance, so monitor carefully. Another option preferred by many engineers is to give a liberal dose of positive EQ in a portion of the range most distant from the sibilance, say 15 k, 16 k or higher. The effect here is to boost the weaker high harmonics of the voice. Since the ear is not so sensitive to frequencies up that high, 6 dB or more can be added without any deleterious results.

While we're on the subject of EQ, it's worth noting a few more key frequencies that can really help you place a vocal in the mix. For example, 5 k is usually considered some sort of a magic number when trying to get vocals to cut through in a mix. It is a powerful upper midrange frequency that can really alter the apparent "presence" of a track. In other words, adding 5 k will cause the track to proceed (move forward towards the listener), and subtracting 5 k will cause the track to recede (move away from the listener). This is, of course, only an illusion; it is a psychoacoustical phenomenon based on the fact that human ears are maximally sensitive in the region of 5 kHz. Any track that is exciting the eardrum at that frequency will seem like it's closer. Excesses in this area are to be avoided lest the voice becomes brassy and hornlike.

OTHER AREAS

Other areas of great power can also be found. There are narrow frequency ranges called "formants" which differ for male and female vocalists, and also between individuals. They are tied in to the anatomy of the throat and head, and resonate at a characteristic fixed frequency irrespective of the pitch of the note being sung. (For a more detailed discussion on formants and EQ, see my article, *The Art Of Equalization: Part 2* in the May/June 1990 edition of **db Magazine**.) You really have to fool around with a good sweepable equalizer to home in on a formant, but once you hit it, you will find that small amounts of boost in this area will increase the apparent power of the track appreciably. Statistically, there are considered to be two formant areas worthy of your investigation: the low formant, which is roughly around 500 Hz for men and 1 k for women, and the high formant, which is centered around 2.8 k for men and around 3.2 k for women. If you use these figures as starting points and carefully sweep the area below and above, you can usually find some sort of a "hot" area which will prove useful in shaping your vocal sound.

One quick word on background vocals. Getting background vocals to blend with a lead vocal is sometimes a little difficult when both lead and background vocals are full bandwidth tracks. In other words, when both leads and backgrounds have been EQ'd to sound magnificent—with sizzling highs, a tight, powerful midrange and a warm low end—it is possible that their timbres will compete with each other, thereby diminishing the overall clarity of the mix. In that case, something has got to give, and in most cases, it ought to be the background vocals. Usually, by shaping the backgrounds in some sort of complimentary way, things will fit a lot more easily. One of my favorite techniques is radically rolling off both the highs and lows on the backgrounds, leaving the midrange intact. In this way, the backgrounds retain much of their power and fullness, but draw less attention to themselves because they are not full range tracks. Under alternate circumstances, the exact opposite technique can also work quite well: rolling off lots of midrange power, but leaving the high end sizzle and low end woof. The point is to differentiate the lead and the background vocal, and this is usually accomplished by weakening the backgrounds so that they don't dominate such a large region in the frequency spectrum.

One major factor remains to be explored: creating a vocal ambience with echo, early reflections, reverb, chorus, doubling, delay and so on. We will do so in depth when **Designing Vocals** continues in the next issue of **db Magazine**. db