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THE ELECTRONIC COTTAGE

Hot Tips: Designing Vocals: Part I

• It is amazing how excellent musical tracks sound today, even if they were recorded in the humblest of electronic cottages. Very often, the tracks sound like they were recorded in a state-of-the art facility, and fact is, they were. If you are doing electronic production using drum samples and high-tech 1990s synthesizers, you are effectively accessing the studio in which those samples were recorded and the expensive electronics through which the signal was processed, not to mention the expertise of the engineers who captured and packaged the sound for you. A drummer and a team of engineers might labor all day long to get a digital recording of the quintessential snare smack, and you simply push a key and there it is, perfect performance every time. It is not hard to get great sounding tracks these days; that aspect of electronic recording is almost idiot-proof.

There is one aspect of recording, however, that is definitely not idiot-proof—recording vocals. It is lamentable how many otherwise decent productions are mired by inadequate vocal tracks. It is here that the art and science of engineering comes to the foreground. Unlike synthesizers and drum machines, you cannot push a button and get excellent vocal tracks. It takes both technique and musical sensitivity to elicit and capture a good vocal performance—and it is not easy to do. There is a long chain of events between the very thought of a sound originating in the psyche of a singer to the final placement of the recorded vocal in the mix. You are dealing with the intersection of tangible factors (such as amplitudes and frequency of waveforms) with intangible factors (such as the emotional complexion of the singer at a given point in time). The difference between an excellent vocal track and a horrible one can often boil down to knowing when to try another mic or offer the vocalist a cup of tea with honey and lemon. The point is this: there are a tremendous number of factors involved in producing vocal tracks, and the more factors you are aware of, the greater control you can exercise. Good vocal tracks are constructed thoughtfully from ground floor to rooftop. That is why this article is entitled "Designing Vocals."

TWO SIDES TO EVERY VOCAL

It is helpful to keep in mind that all the complexities of vocal design fit under one of two banners: the technical side and the talent side. Ideally, both sides should be equally considered, but all too often the system is out of balance. Two exaggerated examples: the inspired but impetuous musician-type who records a vocal without sufficiently testing levels. He ends up with a great, fresh sounding performance, but it is noisy or distorted. The opposite approach is the technoid engineer-type who is ultra careful and clinical in recording.

Unfortunately, he may be so busy trying to craft the sound that he is oblivious to a peak vocal performance while it is happening. The vocalist, now blown out and frustrated, is often unable to recoup, although she continues to sing. The result is a clinically perfect, but emotionally dead vocal track. Both extremes are to be consciously avoided, and the best way to do this is to go through a mental checklist of both technical and talent factors which need to be considered when designing vocals. Some technical factors include mic selection and placement, accoutrements (pop filters, acoustical baffles) and signal processing (pre-amps, compressors/limiters, etc.). Some talent factors include vocal quality, vocal problems (intonation, range), the emotional environment (mood) and performance strategy. Let's give each of these factors a closer look.

MIC SELECTION

The technical side of designing vocals begins with choice of mic. While the pundits might argue about which of the world-class mics is the superior vocal mic, most experienced engineers will agree that different mics work best for different voice qualities. Sometimes a relatively cheap mic will render a more appropriate sound than an expensive one. Some professional singers, once they stumble upon a unique studio sound, carry around their favorite mic from session to session. Often it is the mic's unique limitations that match it so perfectly with a certain voice.

For example, classic old-fashioned ribbon mics have a characteristic low-end resonance and high-end roll-off which lend them a reputation of having a "warm" sound. But a warm sounding mic is probably not the best choice for a warm sounding vocalist—the result might be rather dull sounding; but for a brilliant vocalist whose timbre sits right on the border of shrillness, the ribbon mic will be an excellent compliment, smoothing out lots of the brittle peaks associated with high voices.

Hitting on the most appropriate mic can save you lots of time later on in terms of experimental EQ and signal processing. Getting it right from the beginning is always the best way to go. If you cannot afford a selection of quality mics, get the one or two best mics you can afford and learn how to use them. You may have to make certain compensations for their deficiencies in frequency response, but you still can get a very acceptable sound from a moderately priced vocal mic. To save time, write down typical equalization settings for different voices so you do not have to experiment every time you record a vocal.

MIC PLACEMENT

Once you have decided which mic to use, focus on the appropriate placement of the mic for that par-

ticular vocalist. All kinds of questions should be asked here. For example: does the vocalist have a strong, dynamic voice or a softer, more evenly textured voice? (The dynamic vocalist should probably be placed further away from the mic in order to take advantage of the acoustical compression that occurs when a sound wave is forced through air. The softer vocalist does not need the acoustical compression, but instead needs to be placed closer to the mic to increase the signal-to-noise ratio, and also so he can "work" the mic if he should need to compensate for some lack of dynamics.)

Other questions also need to be considered when determining mic distance. For example, how much of the room (reflected sounds) do you want coming into the mic? If the answer is, as little as possible, then the vocalist should be placed closer to the mic. Occasionally the room sound may be flattering, in which case distance is the choice.

MIC ANGLE

The angle of the mic—relative to the stream of air coming forth from the vocalist's mouth—is also a factor. The vocalist does not always need to be on-axis with the pickup pattern of the mic; the only requirement is that he consistently be in the same relative position. By adjusting the mic angle, a certain amount of natural equalization can be achieved. One of the most useful positions is to have the mic raised to approximately eye level and pointing downward towards the vocalist's nose at about a 45 degree angle. In this way, the real brunt of the air pressure evades a direct hit on the mic capsule, avoiding explosive pops. Other positions may be beneficial, so you must experiment here.

Once you have locked into a sound, it is important to be able to retain it for the entire session—through punch-ins, through coffee breaks, and so on. The best way to achieve that is to note the position of the vocalist's feet relative to the mic. A strip of tape on the floor will help the vocalist's return to the same position later on.

ACCOUTREMENTS

This is a catch-all phrase referring to all the little gizmos—like pop filters or windscreens or shock mounts—that help keep unwanted impulses away from the mic. It can also refer to little necessities like music stands which can sometimes wreak havoc with the sound, or things like sound absorbent baffles or hard reflective panels which can selectively be moved to alter room acoustics. Accoutrements are all the physical things relative to the mic that have an effect on the sound. These may seem like little things, but they have a way of factoring into the equation.

For example, note the music stand mentioned earlier. When used by vocalists, music stands have a nasty way of reflecting out-of-phase signals back into the mic, making the vocals sound a little tunnel-like. The heavy duty sheet metal construction on some music stands may subtly ring at resonant frequencies, adding another problem to the sound. What are you going to do? If someone needs a stand, you must give it to him, but you have to locate it in such a way that it does not deteriorate the sound.

On the positive side, an accoutrement is usually a helpful item—like a pop filter. Simply a hoop with some nylon hosiery stretched over it (see **db Magazine's** July/August 1989 issue for a DIY version of this item), the pop filter (when attached several inches to a foot in front of a mic) effectively diffuses hard blasts of air—called "plosives"—which would normally wreak havoc with the mic. It is a great way to alleviate "pops" and also provide a way for the vocalist to mark his position (for example, one handspan in front of the filter). On the other hand, pop filters cannot be used in every case. If, for example, you are going for a very intimate "in-your-face" sort of sound, the pop filter will not help. For that kind of revealing sound, the singer must be on top of the mic, and a pop filter is not very effective when brought in this close. Yet, believe it or not, a pencil taped right across the middle of the mic's grille screen will effectively reduce much of the popping associated with close-up singing.

Shock-mounts (a bunch of glorified rubber bands suspending the mic) can be very helpful if your client likes to dance while he sings, because sometimes vibration from the floor can travel up the mic stand and modulate the input signal, causing distortion.

Sometimes studios have moveable baffles or even walls that have been covered with sound absorbent material, and sometimes the sound absorbers can be selectively moved out of the way revealing a hard, reflective surface. The ratio of hard to soft surfaces (reflection versus absorption) is a characteristic that can be used creatively to color the vocal sound in subtle, but quite audible ways. Portable baffles (gobos) can also be moved in or out from the vocal area, helping to redefine the acoustical space. The point of this section is simply that you need to be aware of the small factors that can add up, either enhancing the sound or detracting from it.

SIGNAL PROCESSING

Thus far, the focus has been on what occurs at the mic or in the environment around it, but what goes on at the other end of the mic cable is of no less importance. The object of the game is to get the lowest noise signal recorded on tape at the highest possible level (short of distortion), and this is true for digital as well as analog recording.

THE CHAIN OF COMMAND

In the chain of command from mic to tape, probably the single most important element is the mic preamp (usually found in the front-end of recording consoles). While mics have a certain amount of inherent noise and vary in their output levels, the most significant amount of gain is taken at the console mic preamp (perhaps 40 or 50 dB). The preamp then, must be an extremely clean unit; it must not contribute

any significant noise to the signal. Since the signal-to-noise ratio of the entire chain is established here, it is important to find out whether the pre-amps normally installed on your board are adequate for the job.

On some lower priced consoles (which happen to be perfectly clean with line-level signals), the mic inputs can be a bit noisy. (That is how the price is kept so reasonable; the manufacturer skimps somewhere, and he does it on the mic pre-amps.) If that is the case with your board, get yourself a stand-alone mic pre-amp that has respectable noise specs. You only need to get one good pre-amp just for vocals (you do not need sixteen or however many inputs your board has). Even with a good mic pre-amp, you still need to learn how to operate it properly to absolutely maximize the signal-to-noise ratio—so be prepared to experiment; the results will definitely be worth the effort.

Finally, after going through the pre-amp and perhaps a channel on your board, the vocal signal must be recorded on tape. Here, too, we want to maximize the signal-to-noise ratio, or at least (especially in the case of digital) not crash the headroom of the recorder into distortion. Here compression and limiting are of some practical value. While classical purists would positively gag at this thought, I personally would never even think of doing a vocal session without applying some limiting or compression to the signal. For any pop music application, restricting the dynamics is always beneficial. While this can certainly be done during the mix, there is great merit in applying at least a modicum of limiting or compression while recording the track.

The question is, when do you use limiting and when do you use compression? The answer usually lies in understanding the overall impact of the production itself. For example, if the musical tracks are constant, driving and rather unidynamic—such as dance music or intense rock 'n roll, then your vocal must also be unidynamic if it is to be heard through relentless density of music. Here, compression (set with moderate ratios, but very low threshold) is the choice. This will smash down loud passages while effectively raising the relative level of soft passages. The dynamic range will be rather narrow, facilitating a hot signal on tape (while recording) and later upon mixing, making it easier to place the vocal within the intensity of the music.

On the other hand, limiting is usually preferable when the song itself contains lots of dynamics. A good example would be a sensitive, romantic ballad which utilizes the technique of "additive production" (for example, starting off with only a piano and ending up with an orchestra). In situations like this, where low level dynamics need to remain intact, it is good to simply put a ceiling on the output by applying limiting (high ratio and high threshold) to the signal. This prevents overstepping the headroom of the tape by trapping any ridiculous peaks, while still leaving the lesser dynamics in tact.

All the above-mentioned technical considerations are important factors in getting professional sounding vocal tracks, but almost any recordist can attain excellence in these things with proper equipment and proper training. Where most recordists fall short is in eliciting a great performance from the talent. Even the cleanest recording will not be esteemed if the performance is lifeless, and while a vocalist may be an excellent singer, it may take some interpersonal diplomacy to have that person "open up" in front of the mic. It is this important area that will be discussed in Part II of "Designing Vocals." db

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THE ELECTRONIC COTTAGE

MARK MAULUCCI

Drummers And Bands In The MIDI Studio

• Hello! In last issue's column about the guitarist in the MIDI studio, I discussed the integration of the "organic"- minded guitarist into the more hi-tech environment usually associated with the keyboardist. In this issue, I will take this concept one step further: the presence of drummers and whole bands in the MIDI studio.

When MIDI exploded in the mid-Eighties, one of its most attractive attributes was that one person could do it all. The individual could compose, arrange and perform a piece in its entirety without the aid of others. I must admit this appealed to me greatly. I'd been a songwriter for many years and had long struggled with obstacles in just trying to record demos. It was liberating to be able to program the drums, bass and keys without having to rely on others with busy schedules and strong opinions. I felt very self-sufficient and inspired. I could do it myself at my convenience, developing my engineering chops along the way. I had long dreamed of having a home stu-