

technique

stereo
mixing tips

wide angle

IMPROVING YOUR STEREO MIXING

Paul White explores how you can give your mixes more stereo depth and width - not only using the more commonly recognised methods, but also with a few lesser-known tricks of the trade...



For me, mixing is the part of a project where the fun really starts, because that's where you can really make a difference. All the hard work of tracking is behind you and it's time to get creative. There have already been a number of articles on general mixing techniques within the pages of SOS, in which the principles of level balancing and effects processing have been covered, so what I'd like to focus on in this article is sound placement within stereo mixes.

It is important to realise from the outset that much of what we do when mixing for stereo tends to be fairly unnatural. In most normal music venues, the levels of reverberation normally mask most of the acoustic information you need in order to determine the positions of the sound sources with any degree of accuracy. You'll usually perceive something about the characteristics of the space you're in, but it'll be difficult or impossible to figure out exactly where specific sounds are coming from. Studio recording allows us to get around the limitations that nature imposes on us, because we can artificially separate sounds and we can control the amount and qualities of any reverberation we add later. Most modern music production now takes full advantage of studio technology, the goal being to achieve the most artistically pleasing results, even if they are not necessarily the most technically accurate. With this in mind, I would like to explain the basics of mixing for stereo, but also introduce a few more unusual techniques that might help you add a little more stereo interest and width to your productions.

However, before starting on any considerations of stereo placement, it's important that you get your overall mix balance somewhere close to where it needs to be. When the basic tracks have been recorded, set up an initial balance and make such EQ adjustments as you feel are necessary, but don't get too pedantic at this stage, as things will change slightly as you start to refine the mix. It usually helps if everything is panned to mono while you're setting up the initial balance, so that you can see how much natural separation the sounds have. Checking the overall balance from outside the control-room door in the time-honoured way can also be very revealing.

Accepted Wisdom

Once a workable balance has been achieved, you can start to work on the effects being used (try to keep these to a modest level in the early stages) and the basic panning of the different sounds. The most important thing to bear in mind here is that low-frequency sounds work best when panned to the centre. Low-frequencies contain most of the energy within a typical mix, so it is best to share the load of reproducing them equally across both speakers in the end user's hi-fi system -- this means bass guitars, bass synths and kick drums shouldn't be allowed to wander very far from the centre of the soundstage.

If you have an artistic reason for putting a heavy bass sound to one side of the stereo spectrum, then it's worth knowing that our ears can't glean much in the way of directional information from low-frequencies. This means that you can get away with using a mastering plug-in or processor to sum all the frequencies below about 120Hz to mono, without disturbing the stereo image -- most bass and drum sounds have ample mid-frequency content which can be panned to produce the illusion of localisation even when all that power-hungry low-frequency energy is bang in the middle of the stereo field.

Lead vocals are usually positioned centre stage, simply because that's where we expect the vocalist to be, but if you have an artistic reason for doing otherwise then that shouldn't cause any problems. Similarly, backing vocals can go wherever it suits you, though splitting them left and right can be effective in creating a more interesting stereo image. However, whenever you do split something left and right, take care not to make the image too wide -- spreading sounds between the nine o'clock and three o'clock positions of your pan controls can often work more effectively, as can spreading them between one extreme and the centre (if you want the stereo image to be off to one side).

The same applies to the stereo outputs of synths or sound modules, where the stereo aspect of the sound is created by the use of effects or by the layering of different sounds in such a way that some emerge from one speaker and some from the other. These pseudo-stereo sounds can dominate the sound stage if panned hard to the extremes of the image -- it is often tempting to do this with piano and drum-kit patches, but there is the danger in doing this that they end up sounding unfeasibly wide. Using the pan controls on the console/virtual mixer to narrow stereo signals down often helps improve the focus of the mix enormously, as well as allowing any sounds that you really *do* want to pan to the extremes to work better in contrast. However, one thing that should always be set to maximum stereo width is the return from any stereo reverb unit.

A Sense Of Space

While panning might be the mainstay of stereo mixing technique, there are also a number of other important tools with which you can enhance the stereo experience. Possibly the most powerful of these is digital reverberation -- by mixing in different patterns of closely spaced delays in the left and right channels, a digital reverb unit can approximate the way sound bounces around in a real space, and can thereby create a sense of width and depth. However, it has to be carefully used, because increasing the overall sense of width and depth in this way can make it increasingly hard to localise the actual sounds themselves, just as is the case in real life.

One way of reducing the blurring of the stereo image by reverb is to use mono reverb for some sounds, panning the reverb return to the same position. This approach lets you retain the sound's focus and can be particularly useful with acoustic guitars -- a mono recording teamed with a mono reverb can often sound a lot more solid and supportive than an elaborate stereo recording of the same instrument, especially within the context of a mix.

However, focus isn't something we always need, and one of the simplest ways to give a

mono, close-miked sound the sense that it belongs in a real space is by adding a little stereo reverb or ambience to it. Ambience is much like reverb, but comprises mainly early reflections, creating a sense of space and reality without clouding the sound -- it is probably one of the most common mixing techniques in pop music production. Note that, with a conventional stereo reverb, the reverb output level will be similar in the left and right channels regardless of the position of the original signal. Again this mirrors real life where the direct sound provides directional clues, but the reverb build-up just gives a sense of the space in which the sounds exists.

Reversing The Psychology

In real life, we perceive the position of a sound source using a number of auditory clues, yet a pan pot controls only one of these -- the level difference between sound arriving at our left and right ears. In reality, when sounds come at us from one side, they also arrive at one ear a fraction of a second before the other. In addition, when the sound arrives at the more distant of the two ears it is masked by the head, which introduces a degree of high-end cut. Finally, the outer ear imposes slightly different frequency responses on sounds depending on their angle of arrival -- this is believed to be an important mechanism in determining whether sounds are coming from in front or behind, and from above or below.

You can exploit this extra knowledge of auditory localisation in order to give your mixes extra depth and variety. For example, you can approximate the effect of real-life interaural delays by panning a mono signal one way and a delayed version of the same sound the other way. Experiment with up to 20mS or so of delay and you'll find that the sound will appear to come from the undelayed side, even when the signal levels are the same for both channels. This is due to a psychoacoustic phenomenon known as the Precedence Effect, or Haas Effect -- namely, that the earliest of any closely spaced group of similar sounds provides the strongest directional clues. To most accurately simulate the magnitude of the delay that normally occurs for human listeners, drop the delay time to between one and two milliseconds, which roughly corresponds to the extra time it takes for sound from one side to reach a listener's opposite ear by passing around their head.

Figure 1 shows a simple way to set up this effect using a DDL patched from a channel insert send point. You want to take a feed without breaking the channel's signal path, and there are a number of ways to do this: you can use a TRS jack with the tip and ring connections soldered together; or, with some mixers, you can just use a mono jack pushed halfway into the insert point; or, more conveniently, you use the top socket of a semi-normalised patchbay if it carries your insert points. Set the DDL to use no modulation and no feedback and adjust the mix control such that only the delayed sound is passed. The next stage in our quest for realism is to drop the level of the delayed sound by a few dB and also to roll off some top end to emulate the effect of head masking. This should reinforce the impression that the sound is coming from the undelayed side. Furthermore, if you then add a little presence (EQ boost between 4kHz and 8kHz) to the undelayed signal, you can create the impression that the sound has moved even further to the side -- the outer ear perceives sounds as being brighter when coming from the side. Commercial processors for three-dimensional audio work on a rather more precise application of these principles, and can fool your ears into thinking that sounds originate from outside the area bounded by the loudspeakers. The main improvement with such systems is that the EQ changes they use are usually based on measurements taken using miniature microphones fitted into the ears of volunteers, so the emulation of the outer ear's

Ye Olde Phase Trick

Yet another enhancement trick can be applied to existing stereo sounds to increase their stereo width. The technique is no secret -- it's been used in small portable music centres for years -- but it's a useful trick to have up your sleeve nevertheless. In effect, this little dodge makes the stereo image seem to extend beyond the

filtering effect is much more accurate. However, such systems are generally beyond the budget of most home studios, and the DIY approach described in Figure 1 is still capable of improving localisation considerably.

Faking Stereo

Many musicians find that they wish to widen a mono sound in order to occupy more space in the stereo image. Though the application of a stereo reverb would be the most obvious first course of action, and would probably produce the most natural results, it is not necessarily 'naturalness' that a lot of musicians are after. As a result, a number of more unusual techniques have evolved which widen the stereo image in sonically interesting ways. One very effective one is to split a sound left and right, and then to treat just one side of it with a fairly gentle mono chorus effect -- this creates stereo movement between the speakers, as well as producing a spacious and rich sound. If you've only ever tried stereo chorus before, you may be surprised at how wide this effect sounds! The trick works especially well with pad sounds and guitars, but less well with vocals and drums because it tends to widen the perceived sound source at the expense of exact localisation.

Another effective and equally artificial method for turning mono into pseudo-stereo is to use a graphic equaliser to mimic the comb filtering that happens when a real sound is heard in a real space with reflective boundaries. To set up the effect, route the original signal to a mixer channel and pan it dead centre. Next take a feed from that channel's insert send, just as you did when you were trying the delay panning of Figure 1, and feed it into one channel of a graphic equaliser -- the more bands the better. Now use a split lead (Y cable) to feed the output of the graphic equaliser into two more mixer channels, panning these hard left and right. Finally, press the phase-invert button on one of the mixer channels which is being fed from the equaliser output. If you don't have a phase button and your EQ has balanced outputs, make up a phase-invert lead with the hot and cold pins swapped over at one end -- however, make sure it's clearly marked so that it doesn't find its way in amongst your normal leads.

The equaliser needs to be set to produce a number of bumps and dips in the audio spectrum, which is easily achieved by pulling alternate faders up and down. However, as we want bass frequencies to stay in the middle, it's best to leave all the EQ bands below 100Hz set to their maximum cut. If all three channels are set to the same level, you'll find that you have the original sound plus the EQ peaks at one side of the mix, and the original sound minus the EQ peaks at the other side. Figure 2 shows this whole setup in action.


Though, once again, this technique is not a very accurate emulation of real comb filtering, it causes the sound to spread in quite a convincing manner between the speakers. However, as with the other pseudo-stereo treatment, you'll lose out on the sense of localisation in gaining the extra sense of width. A nice advantage of this system is that the result is completely mono compatible, because the parts you've added are equal and opposite in both channels -- they simply cancel out when you hit the mono button, leaving you with only the original central sound.

loudspeakers. All you have to do is take some of the right-hand signal and feed it to the left channel out of phase, while at the same time taking some of the left-hand signal and feeding it to the right channel out of phase. Figure 3 shows how to set up this effect using any mixer that allows line inputs to be phase inverted.

If too much of the out-of-phase signal is added you'll get a 'hole' in the centre of the mix, or you might even end up with the stereo image swapping sides, but this trick can be quite handy when used with care. Many of you may recognise this effect from using the SPL Vitalizer -- its stereo width control does much the same thing. Rather than use this technique on the whole mix, try just using it on sounds that you want to push out to the sides of the mix, after first mixing them to a stereo subgroup. The most important thing to make sure of when implementing it manually, as in Figure 3, is that you keep the faders on the out-of-phase channels at the same settings, moving them simultaneously to control the width expansion.

This technique was used to fake some early stereo records from mono masters, but I would never advocate doing this to a whole mix nowadays. Best to use it only on a part of the mix, for contrast with other more accurately localised sounds.

Try Something Different

You can produce a perfectly good stereo mix just by using panning and following the 'bass sounds in the middle' rule, but just occasionally it can be worth trying something a little different to add some extra interest to your mix. The above suggestions have shown some of the ways in which you can experiment with stereo mixing, and they all provide scope for further development once you've tried them all out in their basic form -- you could put a very slow chorus before the equaliser in the pseudo-stereo patch, for example. To be on the safe side, I wouldn't suggest trying any radical treatments on any of the main sounds in your mix -- pad sounds, occasional percussion and sound effects benefit much more from interesting stereo effects. However, in these 'convenience' times, when so many effects are available as presets, making the effort to come up with something just that little bit different can really pay off. 

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