

## Building A Mix

You've probably been wondering when we were going to get around to telling you how to use your mixer for mixing. Well, mixing is an art, a craft, and a skill, and you can't learn how to do it from a book. In this section, we'll attempt to present at least one view of what goes into a mix and you can take it from there.

Mixing is much more than the mechanical process of combining a bunch of sources. You have to look at all the elements to the mix together, and see the big picture. Mixing means continually listening, re-evaluating what you have, and trying different things to get all the pieces to balance with each other. Balance is the key in fact, in Britain, they used the term "balance engineer" for what we in the US call a recording engineer.

There's a lot of personal taste involved – your taste, the artist's, the producer's, and sometimes the drummer's girlfriend's. Sometimes you, as the mixing engineer, won't get to make all the decisions, but at least you should have an opinion, and you learn to form valid opinions from doing a lot of listening and a lot of mixing.

A lot of the work should have been done in the arrangement, but today we have a tendency, at least when recording, to throw in everything including the kitchen sink and then see if it fits when we finally have an opportunity to listen to the whole thing. The easiest tracks to mix are those where the arranger has thought the piece through and has a good idea of how they'll fit together at the time the parts were written or arranged. Think of the classical composers who never actually heard their symphonies until they handed out sheet music to the orchestra for the first time. They had to mix with pen on manuscript paper with just a little help from the conductor. You have a lot more control in the studio but you have to use it intelligently and most important, musically.

Enough philosophy, let's get down to business.

### Space In The Mix

The most important thing to understand about a mix is that everything has its place. The dimensions you have available into which you must put all the pieces are measured in volume, pan position, and depth (foreground or background).

Even a mono mix need not be flat, it can give you a sense that some things are closer and others farther away. A stereo mix with no other manipulation than

panning will have no depth and will be boring. In order to give the mix a feeling of three dimensional space, you have to apply panning, effects such as equalization, reverberation and delay, and things have to be at realistic volume levels relative to each other in the mix.

### Panning

This should be no mystery by now. Splitting a mono channel out to two loudspeakers and varying the proportion of the signal sent to each gives the sense that something is closer to the right or left speaker. This works pretty well when you're seated between the two speakers, but a listener off to one side or the other won't hear the same perspective. It's important to find panning that works for everyone, even though not everyone will hear exactly the same thing.

### Depth

When you hear a sound followed by a long echo, your brain tells you that the sound source must be pretty far away. We create the sense of depth or distance in a mix by applying echo or reverberation. The more you add relative to the "dry" source, the farther away it appears.

It's easy to understand this concept if you imagine yourself standing in a very live room or maybe even a large cave. All that space will have very little effect on the sound of someone talking right next to you, but when your friend calls to you from the other side of the room, you hear as much or more reverberation surrounding his voice as you hear of his direct, unaffected voice. Your brain processes this and tells you that he's further away than the person right next to you.

### Panning Positions

Start your panning with the most important elements of the music. Pan them toward the center so you'll have room at the sides to build up support around them. Jazz, folk, and classical music is usually panned the same way the group sets up to perform, but that's not a strict rule. With pop music, in which the sound of a recording often is often impossible to recreate in performance, you can be more liberal, but there are some important considerations.

### Front and Center

The center is the dominant position of the mix, so

that's where you want the listener to focus his attention.

For a typical rock song, putting the lead vocal, bass, kick and snare drums in the center is pretty standard. If the vocal is the only melodic element that's occupying dead center, there's less chance that other instruments will compete with it for the same frequency range.

In the vinyl record days (still important for certain forms of music), there are technical reasons for centering the low-frequency instruments – bass panned far to one side can cause the needle to jump out of the groove. You may choose to pan a bass solo played up the neck off to one side a bit, but the power behind the mix really belongs solidly in the middle.

### **Far Out – Hard Left and Right**

Usually full (“hard”) left or right panning is reserved for things that are recorded in stereo, stereo effects, delays to create a pseudo-stereo image, or special effects such as doubled or tripled parts, a “whispered” vocal track, or that incidental percussion instrument that you hear once or twice in a song. A hard panned source playing throughout the song tends to be distracting to the listener, taking the focus away from the lead parts.

In the early days of stereo recording, we didn't have mixers with pan pots (go back far enough and we didn't even have mixers) and everything was either hard left, hard right, or direct center. Listen to an early Beatles record and you'll realize that it's possible to be creative without panning, but they had to work hard at it. So don't take the “only hard-pan this or that” as a rule. Just a suggestion based on contemporary practice.

### **Left- or Right-of-Center**

This is where to put your guitars and keyboards —things that support the lead vocal. The more important an element is to the song, the closer it should be panned to the center. Of course they're all important, but think about what supports the vocal most. That's what should be adjacent. Those instruments that get their own solo space in the song, such as lead guitars, can be somewhat off-center, giving the listener a chance to shift his focus a bit.

You want to avoid a position that makes an instrument stick out and sound unnatural, but using panning to separate instruments that occupy similar portions of the spectrum is a good thing. Placing fiddles and accordions, or trumpets and alto saxes on

opposite sides of center are good, unless your concept is to make those sound like a single instrument – which can also be a good thing.

## **Analyze The Mix**

Once you've made some initial decisions about how to pan things, start the playback, bring up the faders so that you can hear everything, and push the Play button.

### **HANDS OFF THE CONSOLE!**

Just sit back and enjoy the tune one or two times through. Don't fiddle with the knobs or solo tracks yet. Listen to your first very simple mix and analyze what you hear.

Once you've become familiar with the song in this state (you may already be familiar with it from tracking, but it never hurts to step back and give a fresh listen), start thinking about the dynamics of the mix. How does the song build? Does it start with a few instruments and build to the full band? Should it? Could it? What can't you hear? What do you hear too much of? Most importantly, is the focus really on the song or the melody if it's an instrumental?

When the guitar solo comes in, it should temporarily replace the vocalist as the dominant element of the mix. It will if it's just a little off center, but it won't if it's panned way off to one side – it'll sound tacked on like an afterthought. If the keyboard plays a hook in the chorus, you need space for it to be heard as clearly as the vocal. This might mean turning down the rhythm guitar during that hook. Experiment to find out what works once you've decided what you're after.

How does the song build, energy-wise? To be exciting, the energy level has to move, and while it can build and relax throughout the song, it should climax at the most important parts. Remember, you can't tell where the high points are if there aren't any low points for contrast.

Sometimes something just has to go, and this is the time to make those decisions. Having that same hot guitar lick constantly running throughout the song won't necessarily make it exciting. It will be cool the first time, but after three or four blistering blasts, the listener (other than the guitarist's boyfriend) will wonder what other licks she's got. Start making some notes as to where those hot licks are effective and when to shut her up.

## Mix Decisions

Here's where the fun starts. You really want everything to be up-front, but it can't be. It's too much of a sensory overload for the listener. You've already decided which elements are the main focus and which take on a supporting role. In a rock song, the bass, kick, and snare are supporting, but they drive the song, so they're really important, too. The mix should center around the rhythm and the vocal, and everything else should fill in the spaces.

In contemporary rock music, it's pretty common for the drums to be just about as loud as the vocal. This is a judgment call, but it's probably what your listeners are accustomed to hearing. The relationship between the kick drum and bass is also important in driving a song, so you don't want to lose the bass either. The bass/kick balance is often the best place to start mixing.

### EQ In The Mix Context

It's important to understand that EQ in mixing isn't about the sound of the instrument or voice on its own, it's about the sound in context of the mix. Previously, we discussed using equalization to help blend sounds in the mix by carving out spaces in the frequency spectrum to make room for things. Now is the time to apply that knowledge.

When you initially record a track, you want to capture the full range of an instrument, and every nuance. You might have recorded the world's greatest sounding acoustic rhythm guitar track, but once you put it into the mix, that rich, full-spectrum sound will clobber something else if you don't tame it. The same principle applies when you're mixing live sound, only there you have to make decisions in real time, and be ready to defend yourself when the bass player's girlfriend comes up to you and says, "Jason's bass sounds much boomier than that when he plays it at home. Can you turn up the bass?"

Work with EQ so that you can clearly separate all the parts into their relative lead/support roles. The idea is to use EQ to constrain the different sounds so they aren't competing for space in the mix. If you're constantly having to turn something up in order to hear it, it's probably because something else is in its way. You might solve the problem with EQ, or maybe with panning, but reserve riding the faders for smoothing out playing or singing once you have the basic levels set.

Good planning while you're arranging, and paying attention to the mix while tracking can go a long way toward making mixing easier. If the keyboardist is playing in the same register as the singer, suggest that he take it up or down an octave. That sort of thing can become a problem that you really can't fix very well in the mix.

What you want to end up with is a musical "notch" into which each instrument can fit neatly. Much of the time, you don't need to hear the full frequency spectrum of an instrument to recognize what instrument it is - a taste of its sound can often make the listener think it's all there. Understanding that principle and making it work without being obvious that you're tricking the listener can give you a lot of space in which to mix.

Consider EQ in relation to pan positions. You want to have a solid bottom to your mix, so it's reasonable to add some 100 Hz to the kick, bass, and snare, which are panned to the center. The bass may need some presence boost around 800 Hz, and some zing in the strings around 6 kHz, but those won't get in the way of the on-center lead vocal who might get a little 3 kHz presence boost, and maybe some 250 Hz "warmth." Neither will a 1 kHz boost to get some crack to the snare. Boost any of those centered instruments in the 2 to 5 kHz vocal region, however, and they'll start to crowd the singer's mix space.

Guitars and keyboards are usually panned somewhat off-center, so it's OK to give them a little 3 kHz, or 7 kHz that you might also add to the vocal for a little "air." Leave the high boosts at 10 kHz or so for things that are panned out to the sides. Chances are they'll be off-axis to the listener so a little high frequency boost will help bring them back into focus.

## Using Reverb to Create Depth

Once you've found a place in left/right and frequency spaces for all the instruments, you'll want to make them sound like they're not all lined up like targets in a shooting gallery. Adding the fore-and-aft dimension can also help reduce crowding in the mix. The more reverb you add (reducing the dry signal to maintain the overall balance), the farther back the instrument will appear.

Today's digital reverbs are so flexible that you can simulate just about any space as well as create some really unlikely ones. Start out your front-to-back mixing by using a reasonable sized room simulation that's appropriate for the style of music you're mixing, and experiment with sending different amounts

of the background instruments to the reverb unit. You may choose to put the lead singer into a smaller, less reverberant room than the backup musicians since he's the one who's in your face full time. It's fairly common to use several different reverb units in a contemporary music mix with each one programmed to simulate a different space. Deciding what kind of reverb and how much to use is an acquired skill. Take your time and listen carefully.

## Panning With Delays

While we tend to set pan pots "by eye" and figure that's where we'll hear the phantom image, it turns out that if you're listening in the sweet spot (centered between the speakers), the center image is remarkably solid. There can be as much as a 3 dB difference in level between the two speakers of a center-panned source before you'll hear it move off center. On the other hand, you don't have to move your listening position very far off center before the source sounds like it's coming from just one speaker. It kind of makes you wonder why you bother using anything but left, right, and center panning. In fact, many mix engineers routinely use only five pan positions (half-left and half-right in addition to the obvious ones).

There's a principle of psychoacoustics known as the precedence effect that causes us, when we hear something coming from two sources at slightly different times, to perceive that it's coming from the source from which it first arrives at our ears.

Panning an instrument fully right and delaying it by 0.1 to 1 ms in the left speaker will make it sound like it's coming from somewhere between the speakers, and that position will be maintained pretty solidly over the full listening space. Changing the amount of delay adjusts the apparent position. It's an alternative to using the pan pots, and it can even be quite effective to give a stereo feel to a live sound mix. You can position something off center that won't get lost for a listener on the opposite side of the house since it will appear in both speakers at the same level, just at different times.

## Fixing It In The Mix

Hopefully by now your mix will need only a little fine tuning. You may need to re-adjust some volume levels or reverb sends. You may want to boost up a word that the singer swallows or raise the level of the guitar during a solo. These are the things you should start noting.

You will almost always find some places in your mix where you'll have to "ride the faders" – that is, make dynamic adjustments as the music is playing. Mixing is a performance just like playing an instrument and it requires the same kind of skills. You need to be familiar enough with the song to know when your cue is coming, you need to practice so you'll push the fader up just the right amount (and move the correct fader), and be able to re-establish the basic mix after you've made the move.

If there's one guitar track with both rhythm and lead parts, you may find that it fits into the mix better with both different panning position and EQ when switching roles. A good way to handle this is to split the track out to two mixer channels, setting one up for lead and the other for rhythm. When you mix, cross-fade between the two or mute one and un-mute the other. The guitarist did his job in the studio, now as the "console player," it's up to you to get the timing and levels right.

## Using Compression

Some people think a mix isn't done unless something (or everything) is compressed. A compression ratio of 3:1 with the threshold set so that there's 2-3 dB of gain reduction on peaks can even out a vocal track nicely, but the track has to be pretty good to begin with. A compressor isn't a substitute for a vocalist with good mic technique and control, nor is it an automatic volume control so that you don't need to ride a fader.

It's pretty common to use light compression on the total mix (connect a stereo compressor through the MAIN INSERT jacks) to bring out some of the quieter elements of the mix. A compression ratio of about 1.5:1 with fairly long attack and release times won't be very obtrusive. Some people prefer to mix with this kind of compression in place from the beginning, others like to add it at the end if it helps. Again, there are no rules.

As an aside, if you can't get your mix to sound like the commercial recording you're using as a model, it could be that you don't have enough tracks and you don't have enough signal processors. On a really busy project with 40 or more tracks going into a mix, it's almost impossible to mix without compressing nearly all of them to some extent. If your resources are limited, consider compression as you're tracking.

## Golden Rules of Mixing

Mixing has a lot in common with playing a musical instrument. You don't learn to do either well overnight. With your mixer and your ears, you have all the tools you need. Here are a few things to keep in mind that will help you keep your focus:

- Decide what's most important and build your mix around that.
- Put up the faders and just listen for a while. Learn the song. Learn when all the solos and background parts come in.
- When you decide that an adjustment is needed, turn the knob far enough so that you can hear a change. Don't boost the keyboard by 1 dB at 8.5 kHz because you read in a magazine that a famous engineer did that on one of your favorite recordings. He most likely had a different keyboard or was using it in a different context.
- Listen to your mix on different speakers, take notes as to what you hear and what you don't, and then tweak your mix some more. It's perfectly normal for a mix not to sound the same every place you hear it. What's important is that it sounds good every place you hear it, and that might take some tweaking.

## Notes

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