LCR Panning – an introduction to three-channel live systems

There is stereo panning and there is LCR panning. So what's the difference and why would you want to choose LCR panning? After all, it adds quite a cost to a console and stereo is stereo right?

Well, not really. Let's just remind ourselves that Stereo panning simply adjusts the amount of signal sent to the left and right outputs. The actual mix output may not be totally stereo, and probably includes a high degree of spoken words as well as singing which is mono. This is particularly true in Dramatic performances and Houses of Worship, and being able to pan voices to their true stage position can be difficult in straight stereo. This is because we are always balancing the voices between the left and right speaker positions. Some voice will always come out of both speakers unless panned hard one way or the other.
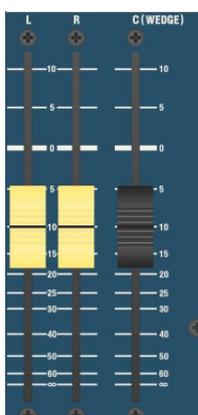
What's the objective?

In performance or worship venues, clarity of speech is paramount. Therefore we are aiming for everyone, wherever they are seated, to clearly hear the actors or preachers, whether music is playing simultaneously or not. Enjoyment of the worship experience or theatrical production can be easily marred by poor intelligibility.

Placing speech and vocals within the same stereo music reproduction channels can lead to spatial problems for the mono speech, and it is sometimes difficult to get speech only to sound 'natural' and reduce 'plosives'.
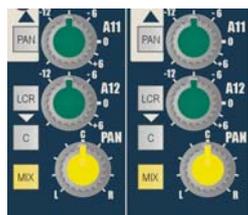
We already know that music is best served by a stereo system, while speech is more intelligible when served by a centre cluster.

If we separate the vocals from the music they would of course be clearer.

So what's the solution?

LCR Panning, which is essentially a three-output mix, gives us this possibility. Putting vocals in the center channel gives us the separation we are looking for. In fact, if you've experienced Home Theatre systems, the 5.1 Surround system actually uses the center channel for the film dialogue/spoken parts, keeping most of the music in the left and right (and rear) channels.
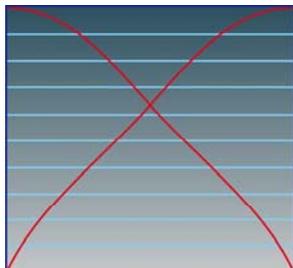
In LCR, the C is the Center (or centre) channel and is not the same as the 'C' you find in the middle of a normal stereo panpot. When you route a channel to the C output, you are creating a separate output from the left/right music outputs for the vocals. We'll look at how the panning differs in a moment.

To produce the sounds from this center channel, we will need to provide a third set of loudspeakers to cope with it, although as typically the center channel is used for vocals, this third set of loudspeakers may not need the full range of drivers that the music channels normally utilise. For example, a sub-bass driver would be fairly ineffective on vocals as they do not reach such low frequencies.
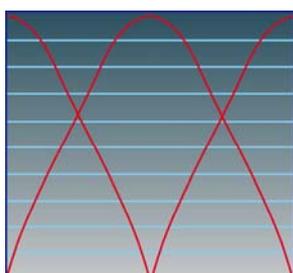
Panning

So let's see how the panning works.

Normal stereo panning is quite simple. When the pan pot is turned hard left (L), all the channel signal is sent to the left mix output with no signal sent to the right output. As we move the control towards the middle, we begin to reduce the amount of signal sent to the left, and increase the amount sent to the right output. When the control is in the middle (often called center), equal amounts of the signal are sent to the left and right outputs.

LCR panning is a little more complex. For a start, you are normally able to decide which of the three outputs you send the signal to – the LR bus and/or the C bus. Most musical signals will only be sent to the L&R outputs, nothing to our new, separate Center channel. In this case, the pan control acts exactly the same as above.

But now we can also switch to the Center channel. In this case we can adjust the pan as follows:

When in the C position, the signal is fed completely to the center channel, and ONLY the center channel. Nothing is sent to the L and R outputs, unlike in normal stereo pan mode. OK so far?

This is where it gets a bit trickier. As we pan to the left, the signal sent to the left channel increases and to the center decreases. We're still sending nothing to the right. This means that we can actually position our voices on stage with more accuracy. As an actor crosses the stage to the left, we can pan him left and the sound follows his movements. The audience feels the sound to be more realistic. When panned hard left we have a similar situation to stereo panning. The sound is sent fully to the left output and nowhere else.

Now as we pan back towards the center, we decrease the feed to left and increase the center, till we're back at the C position. Now pan right and we increase the signal going right while decreasing that to the center, this time nothing at all going left. It's surprising how effective the positioning of a voice in LCR mixes can be.

Where do I put this third set of speakers?

The normal solution is a center 'cluster' positioned exactly between the left and right speaker systems and high up. The cluster is normally a set of loudspeakers arranged to face all parts of the audience so that everyone gets to hear the vocals with more intelligibility. This paper does not delve into the aspects of loudspeaker system design and placement, for further information contact our sister company JBL Professional (www.jblpro.com).

Are all consoles with LCR output faders really true LCR panning systems?

Some consoles have three master output faders labelled LRC (or LCR) but even then may not have a separate mono bus, providing only a mono sum of the stereo mix. These will not have true LCR panning.

Some systems do have an independent mono bus but without LCR panning facilities, which does give a useful controllable mono cluster output independent of the stereo mix.

The only real way to check is for an 'LCR mode' switch or control on the input channels, which converts the pan pot from normal stereo mode to LCR panning. True LCR panning is not a low-cost feature.

For example, the Soundcraft MH2, MH3, MH4 and Series FIVE consoles have true LCR capability, while the GB4, GB8, LX7ii and Series TWO have independent mono bus routing in addition to Mix routing to deliver an independent mono cluster feed.

Is it for me?

A full LCR system provides an integrated high quality music system with a highly intelligible speech system.

Obviously it usually costs more to run an LCR system – more speakers, more amps, more cables, and a more expensive desk. If you have a large theatre or auditorium or house of worship, consider it very seriously.

On the other hand, not all venues are suitable for an LCR installation. The centre channel must cover a very high proportion of the seating area (about 90%), so in general the area must be deeper than it is wide. There are several publications that cover the room geometry in more detail (see Jim Brown's paper on the subject, http://www.audiosystemsgroup.com/mix3ch.pdf)

Go to a venue with an LCR system and listen.
You'll soon make your own mind up.