



The Decca Tree

The Decca Tree has been a staple stereo recording technique for more than 50 years. Mark Cousins goes back to its roots.

There are many ways of mic'ing a stereo sound source, from spaced omnis to Blumlein pairs, but it's arguably the Decca Tree arrangement that is most commonly called on when it comes to recording classical music and soundtracks. It's less likely to be used for popular music productions, but it's nonetheless a fascinating insight into the art of stereo recording, offering one of the most effective ways of capturing the full width of an orchestral soundstage and a tight, focussed central image.

That's not the end of the story – the Decca Tree goes further, fast becoming one of the most logical choices for surround sound recording. But what exactly is a Decca Tree and how does it differ from other stereo recording setups?

To the roots

To appreciate what the Decca Tree offers, we first need to take a step back and consider the two

principal ways in which a stereo recording can be made – in other words, the differences between a coincident pair of microphones and a so-called spaced pair.

Our auditory perception of stereo is based primarily on two conditions: the relative levels between the two ears (the left ear hearing a sound proportionately louder than the right ear, for example), and timing

discrepancies between sound arriving first at one ear and then travelling to the next.

The two stereo recording techniques most commonly used individually address these issues rather than providing a solution that takes both factors into account. The coincident pair (sometimes also known as an X/Y configuration) comprises two

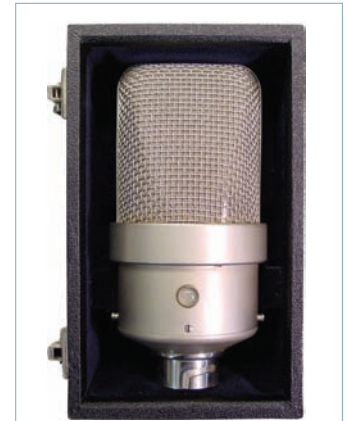
directional capsules placed directly above or below one another, with the alignment of the two microphones effectively picking up level differences between the left- and right-hand sides of the stereo signal accordingly. Although a coincident pair provides an accurate and coherent image, it can fail to capture a full and flattering representation of the width. By contrast, a spaced pair

of omni-directional microphones addresses timing differences between the left- and right-hand sides of the stereo image. It captures plenty of width, but sometimes at the expense of a coherent 'middle'.

Tree surgeon

The Decca Tree evolved as a means of reconciling the problems presented by a spaced pair, providing the wide, spacious sound of a spaced pair of omnis but without the compulsory hole in the middle of the soundstage. The technique actually dates back to the late 50s, the work of four engineers (Arthur Haddy, Roy Wallace, Kenneth Wilkinson and Stan Goodall) overseeing Decca Records' early experiments with stereo orchestral recording.

Thanks to the results achieved by the Decca boffins, the technique soon became a popular way of recording orchestras (along with spot mics for the individual sections) and, in particular, the de



Classic Decca Tree arrangements made use of the original Neumann M50.

facto choice for film-scoring mixers, who found the array particularly forgiving when passed through the various matrixing systems used for audio delivery.

The Decca Tree is an arrangement of three microphones strategically mounted on a triangular metal support in the shape of a T. The size of the tree will vary to suit the size of the soundstage, but, on the whole, the

The Decca Tree offers a fascinating insight into the art of stereo recording.

width tends to extend to about two metres, while the depth is around 1–1.5 metres. To the extreme left and right of the stand are two Neumann M50s or other suitable omni-directional microphones (the original setup used two Neumann KM56s in this position). In effect, these microphones mimic a spaced pair, picking up the all-important timing differences between the left and right components and presenting a pleasingly 'wide' output.

In the middle

The key to the Decca Tree's success is the centre mic; usually this will be another Neumann M50, aimed directly at the orchestra. By virtue of its position on the stand, it sits slightly in front of the left and right channel mics. Distributed equally between the left and right channels (although usually at a slightly lower level to avoid the mix becoming too mono), the centre microphone provides the all-important definition and articulation



A Decca Tree (above the conductor's head) in use during an orchestral session. Notice the outrigger microphone to the right-hand side of the soundstage.



By placing two omni-directional microphones at the rear of the soundstage you can upgrade a standard Decca Tree arrangement into a full 5.1 surround array.

towards the middle of the soundstage. What's more, because it's slightly further forward, sound tends to arrive at its capsule first. Although the results are subtle, this positioning helps to pull the centre of the soundstage forward slightly, with the stereo imaging almost 'flowering out' from this point.

A full orchestra covers a fair amount of space, so a Decca Tree will often be augmented by two

Another often-seen twist on the traditional Decca Tree concept is to replace the centre mic with either an X/Y coincident pair or M/S (Mid/Side) array. Going back to the original concept of a stereo signal inherently having both level and time differences between the two channels, this hybrid solution – combining both a coincident pair and a spaced array – arguably creates one the most

Tree line

With countless soundtracks and CDs having been recorded using the Decca Tree method, it's clear that this humble microphone array has more than made its mark in the audio industry. In recent years, however, the Decca Tree has also witnessed a new lease of life, offering an ideal solution for surround recording.

A 5.1 surround mix, for example, comprises five principal channels of information (left, right, centre, surround left and surround right), with the .1 channel denoting the use of a sub speaker for low-frequency effects or simply as a bass management system for the other bass-deficient surround speakers. Clearly, with this number of channels to fill, a two-channel stereo configuration isn't going to be a practical solution.

Using the three principal channels of a Decca Tree, it's easy to see how an expanded version of the array can map to a 5.1 mix – effectively, sending the left, right and centre microphones to their

channels, with the surround channels used as additional ambience mics.

Lifetime guarantee

More than 50 years after the engineers at Decca first assembled the prototype Decca Tree, it's pleasing to see the technique in daily use across scoring stages around the world. Equally, thanks to its new lease of life as a solution for surround sound recordings, the use of the Decca Tree could extend into a range of other music-production activities, from recording a drum kit to capturing the ambience (in full 5.1 surround sound) of a band playing live in a studio.

Ultimately, though, the continued success of the Decca Tree is testament to the original engineers' ingenuity and willingness to experiment, trying to capture the full magic of an orchestra using the simplest collection of microphones, each contributing in a unique and important way. **MTM**

The continued success of the Decca Tree is testament to the original engineers' ingenuity.

outrigger microphones (also set up in an omni-directional polar pattern), usually placed midway between the centre of the soundstage and the extreme left or right-hand sides accordingly. Mixed selectively, the outriggers tend to provide an even greater sense of width and space, as well as picking up the back rows of the violins and double basses that are sometimes overlooked by the centre-biased Decca Tree.

complete stereo-recording solutions, enabling the mix engineer to carefully control the balance of 'clear articulation' and 'width' contributed by each set of microphones.

Of the two configurations, the M/S array probably provides the most flexibility, particularly if the side mic is dropped, leaving the forward-facing middle mic playing much the same role as the centre mic in a typical Decca Tree.

corresponding surround channels. By placing two large-diaphragm mics (ideally as a spaced pair) somewhere towards the rear of the soundstage, you can create the two rear surround channels that should help envelop the sound, as well as picking up the ambient properties of the room you're recording in. If the surround mix needs to be down-mixed to a stereo mix, the existing Decca Tree can be rationalised to two

Tech Terms

Mid/side

A middle-and-side array comprises two microphones: a forward-facing cardioid and a side-facing figure-8.

Matrixing

Matrixing is the technique of folding-down a surround mix to two or more audio tracks of a film print, which is decoded (back to the original streams) on playback. An example of this is Dolby Pro Logic.

Omni-directional

An omni-directional mic has no directional sensitivity – in other words, it picks up sound from all directions.

FURTHER INFO

- For more information on stereo recording in general, go to: www.musictechmag.co.uk/mtm/features/stereo-recording
- To find out more about orchestral recording and mixing, visit: www.musictechmag.co.uk/mtm/features/creating-an-epic-soundtrack-part-one and www.musictechmag.co.uk/mtm/features/creating-an-epic-soundtrack-part-two
- For more information on alternative choices for recording in surround, see: www.musictechmag.co.uk/mtm/features/10mm-117-surround-sound-microphones

The traditional Decca Tree arrangement consists of three spaced omni-directional microphones arranged in a triangle. If the soundstage is particularly wide, additional outrigger microphones might be deployed.

