

Surrounded with Secrecy

Ambisonics and Dolby Stereo

Roger Derry

Ambisonics and Dolby Stereo represent the last survivors of the 70's battle of the quadrophonic systems. Both are far from dead as was testified to by the crowded meeting held in Birmingham by the IBS and the BKSTS. Held in the home of The Archers, Pebble Mill studio 3, the attendance was so great that some even had to resort to sitting on the FX staircase. Our reporter Roger Derry describes this every day tale of surround sound people.

The Archers is probably the only soap opera ever to have been recorded in quadrophonic sound back in the days of the battle of the Quad systems. So it was appropriate that we were mingling with the Archers' Aga, fridge and kitchen sink. *The Archers* were recorded in Quad for one week using the BBC's Matrix H system. The rival Matrix J had so much in common with it that eventually an agreed common standard was established 'Universal' HJ normally known as UHJ. This is still used by Nimbus on their compact discs (even though it may not say so on the label) and, as we learned during the meeting, on some BBC radio transmissions. Which ones is hard to say because they don't like to talk about it let alone advertise or bill it. So there is no easy way to find out about the transmissions although, nudge nudge wink wink, you might try your ambisonics decoder across music and drama coming from Birmingham who will, of course, deny

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LINE UP

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everything. Quite coincidentally, (it says here), the Ambisonics part of the evening was presented by BBC Pebble Mill Senior Audio Supervisor Mark Decker who, of course never uses the system himself - well hardly ever!

Dolby Surround

The meeting was chaired by Michael Talbot-Smith and began with Graham Carter of Dolby Laboratories introducing the Dolby Surround system. A comprehensive technical description of this appeared in an article written by Roger Dressler in the April 1989 edition of *Line Up*.

The existence of Dolby Surround is almost as secret as Ambisonics. It is only now that people are beginning to realise that films bought or hired on videocassette contain the surround information that is heard in the cinema as the mix is identical to those that appearing on the Dolby Stereo optical tracks of the release prints).

The Simple Way

At its simplest you can get surprisingly good surround sound merely by tapping an extra loudspeaker across the +ve terminals of your hifi and placing it behind you - I can say from personal experience that even with this primitive arrangement the De Lorian car really does come from behind you in *Back to the Future*. Early domestic units were simply designed to derive the 'S' signal in a similar way. Additionally they had a variable delay line so that you could simulate them being on a cinema wall 40 feet away even in your small living room ensuring the dominance of the front speakers. The latest devices carry the legend "Pro-Logic" and use additional circuitry to steer the gain between the loudspeakers. In the home market the term Dolby

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Surround is used reserving the term Dolby Stereo for its cinema incarnation.

Ideal Rig

The ideal rig has four or more loudspeakers; left, centre and right laid out in front of you. The surround output should be fed to a loudspeaker, or preferably loudspeakers, behind you. In the domestic environment the centre speaker can sometimes be dispensed with especially if the decoder has the facility to derive a phantom centre speaker. The cinema needed the centre speaker to anchor the dialogue so that someone at the extreme left or right of the auditorium did not get a peculiar balance. Now this is a problem that television stereo sound also has to face. While we would all like to imagine a dedicated viewer at the apex of the traditional equilateral triangle it is more likely that the family is sprawled in various favourite chairs around the room. So why not use the technique for programmes? Surround sound information is broadcast perforce whenever a film with a Dolby Stereo soundtrack is transmitted on NICAM. In the USA sport is what is selling stereo sound receivers and Dolby Surround is used to beef up many a sports event including football and baseball. Graham showed a number of videotapes with impressive results in sport, drama and music showing its excellence at providing ambience and excitement.

Best Kept Secret

Surely it cannot be too long now before stereo sound with TV ceases to be the best kept secret in the country and the public will be allowed to be aware of what is available. When that day comes I wonder how long it will be before our producer's will want to add this extra dimension to their programmes especially as they will be compared with Dolby

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Ambisonics

Stereo films also going out on the same network.

Ambisonics seem entirely complementary to Dolby Surround. As Mark Decker said Dolby Stereo had been devised for cinema presentation and was then extended to home use. The Ambisonics system started from the other end - designed system for use in smallish rooms. It is fully expandable and there are professional systems that are fully capable of giving presentations in large auditoria. My own impression of ambisonic sound is that it increases naturalness and is at its best when the effect is subtle allowing you to take the enhancement for granted (only when the decoder is switched off do the walls then suddenly rush in on you).

Soundfield Mic

Nimbus's continuing use and interest in the technique was reflected by the fact that both Dr Jonathan Halliday and Stuart Garman of Nimbus were at the meeting. Roger Furness of Minim was also there as supplier of the decoding units.

Traditionally Ambisonic recordings have been made with the AMS Soundfield mic but the encoders now have the facility for multimiking and panning; as Mark demonstrated with a Radio 2 example. He also played radio drama recorded using the system as well as music for Radio3. The drama was a Lord Peter Wimsey story - not something esoteric. It was possible to hear that Ambisonics are an entirely practical system for broadcasting.

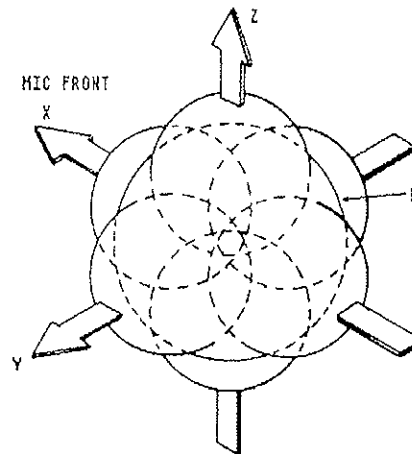
The Soundfield mic itself is essentially a cluster of four cardioid mics disposed in all three dimensions to cover the whole 360° sphere and electrically equalized to be exactly coincident.

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LINEA

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This 'A-format' is matrixed to 'B-Format' which produces four outputs; W,X,Y & Z, which are equivalent to an omnidirectional mic (W), a forward facing figure-of-eight(X), a sideways facing figure-of-eight(Y) and an upwards facing figure-of-eight(Z). For those of you into formats there also exists types C and D which are the UHJ matrix itself which is then decoded into D format which is what is fed to the loudspeakers.



With suitable electronic processing of B-format you can end up with the microphone electrically pointing in any direction you want without actually moving it (ideal for mics slung high over an audience). If you have a 4-track recording medium recording in 'B-Format' allows you electrically to change the mic's polar diagram after the event. In the past when BBC Radio studios were equipped only with ribbon mics the principle was often been discovered the hard way by trainee studio managers. They discovered that putting two ribbons at right



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angles did not produce a circular pickup suitable for four people around a table but instead a derived figure-of-eight pointing half way between the two. Changing the gains rotates the derived figure-of-eight. With the AMS Soundfield mic the control box has various controls with names like azimuth and dominance. Mark gave us some insights as to how it can solve everyday problems in music and drama as you can change the apparent position of the mic or zoom in on the action in post-production. The RDAT specification has provision for 4-track recording. I think the first firm to produce a professional machine with this facility will clean up; for as well as being ideal for ambisonics B-Format it would also allow you two personal mics and stereo ambience tracks for ordinary stereo location work.

Rumours

I had heard rumours that Nimbus used a home brew system using commercial capsules which effectively produced B-format directly. When I asked Dr Halliday he replied with a wide smile confirming that they did use a home brew system and followed this with a pregnant pause indicating that he was not telling any more!

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What he did do though was to let us into the secret that Nimbus were negotiating to obtain the rights to Ambisonics with a view to promoting the system. Since then they have been successful (see page xx) and I think we will be hearing much more of the technique.

1580 words

Altogether it was a compelling and stimulating evening. The comparison between the two systems revealed that they were different rather than better or worse than each other. I think that most of the audience will have left wanting both.