

# We haven't seen the back of AMBISONICS

**There have been some embarrassing moments in the history of hi-fi. Many a red-cheeked journalist has had to do an about-face on 'the truth, the whole truth, and nothing but the truth' — so help us God. One of the better known debacles involved quadrasonic sound. Dead? Well, not quite. Barry Fox demystifies surround-sound, ambisonics and looks at their potential resurrection in the light of the current growth of hi-fi video**

The newly released compact disc of Great Romantic Organ Music, recorded in York Minster, comes with a label and sleeve note which will puzzle anyone who is relatively new to the world of high fidelity audio.

The note, and disc label, explain that the disc is a 'Stereo/Ambisonic UHJ surround-sound recording'. The sleeve note goes on to explain that 'normal stereo playback will give enhanced depth' and that 'surround playback is obtained with a UHJ decoder, an additional stereo amplifier and two extra speakers.'

Domestic UHJ decoders, the sleeve advises, can be obtained from Minim Electronics, Lent Rise Road, Burnham, Slough SL1 7NY; in-car decoders are manufactured by Troy Ambisonic, PO Box 246, London SW18 5JS.

By now, anyone who has bought the record, knowing nothing of surround-sound or Ambisonic UHJ, is likely to be very puzzled indeed. The York Music record catalogue (obtainable, like the records, from Banks and Son, 18 Lendal, York YO1 2AU) adds the further puzzling titbit that 'Ambisonics is a major step forward in audio technology and should not be confused with quadrasonic or simulated ambience systems'.

So what are Ambisonic, quadrasonic and simulated ambience systems?

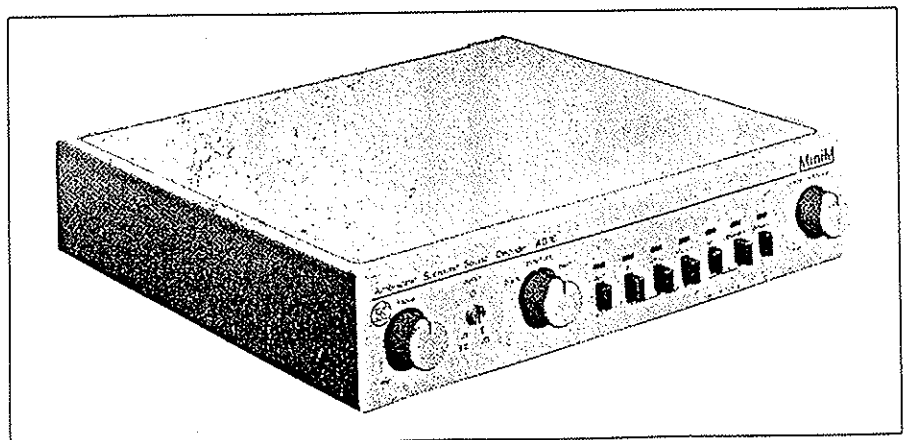
In the late 60s and early 70s, the audio industry woke up to the fact that when we listen to music in a concert hall, the sound arrives not just from the front, directly from the orchestra, but also from the rear and sides as reflections off the walls and ceiling. Two loudspeakers cannot simulate this

effect, so engineers tried using extra mics in the concert hall, facing backwards and upwards from the orchestra. These extra mics fed extra recording channels and the recorded sound was reproduced by extra loudspeakers, round the listening room. Because most rooms are rectangular, it was most convenient to use four loudspeakers. It also seemed logical to use four recording channels, one for each loudspeaker. This gave birth to the word 'quadrasonic'. It was shortened to 'quad' which infuriated the makers of Quad hi-fi gear, because they never sold four channel equipment and argued that quadrasonic was a dead duck.

The Japanese electronics industry loved the idea of quadrasonic, however. It meant the chance to sell two extra loudspeakers and an extra stereo amplifier.

LP stereo discs, stereo tapes and stereo broadcasts only carry two channels of sound. So engineers looked for ways of squeezing four channels into two — 'putting a quart into a pint pot', as it was known.

Of many quadrasonic systems developed, four came to the market: SQ from CBS, QS from Sansui, CD-4 from JVC and UD-4 from Nippon-Columbia/Denon. SQ and QS were matrix systems: the four channels are mixed into two at the recording stage and then unmixed again for reproduction — or more accurately partially unmixed. The CD-4 and UD-4 systems were discrete: the extra two channels of information are recorded on high frequency carriers. All four systems failed commercially, because none was perfect, all were incompatible and the trade and public ended up thoroughly muddled.



MINIM'S AMBISONIC SURROUND SOUND DECODER — THE TRUE UHJ SYSTEM

WHICH COMPACT DISC?

Meanwhile . . . several firms sold pseudo quadraphonic or simulated ambience systems. These fed some of the front sound signals from a stereo source to rear channel loudspeakers, often with artificial delay.

Meanwhile . . . a team of British researchers developed the Ambisonic system. This rejected the idea that it was necessary to record four channels for four loudspeakers. Ambisonics records a modified signal, spread over 2, 3 or 4 channels — depending on how many recording or transmission channels are available and whether height information is to be recorded as well as a horizontal spread. The recorded signal can then be decoded for reproduction through any number of loudspeakers.


For live recordings, a Soundfield microphone, as made by British firm Calrec, is used. If the music is multitracked pop, the signal comes from a modified studio mixing system, made by another British firm Audio Design. The method of coding the surround signal into two channels is known as UHJ. This is tailored to offer compatibility with conventional mono and stereo reproduction equipment.

So, when a stereo UHJ signal is replayed on a conventional hi-fi system, it provides conventional mono or stereo sound; some say better than conventional. But if the UHJ signal is fed through an Ambisonic UHJ decoder, extra signals are produced which, when amplified, are used to feed extra loudspeakers round the room and behind the listener. This creates a surround-sound effect which is a creditable illusion of the original surround-sound heard in a live situation, or a pop illusion of all-enveloping studio sound.

The advantage of Ambisonic surround-sound is that the effect stays much the same irrespective of where the listener sits. The old quadraphonic systems only gave a good effect when the listener sat in a central position inside the speaker ring.

Ambisonics has never succeeded commercially. This is partly because the system came too late, when surround-sound and quadrasonics had already earned a bad name. It is also partly because the system was very clumsily marketed. Probably it is now too late to start again.

The failure of Ambisonics is a pity because the effect of playing an Ambisonic UHJ recording through a matching decoder, whether at home or in a car, can be subtly pleasing. This contrasts starkly with most of the quadraphonic recordings released in the 70s. They put the listener in the middle of an orchestra, band or rock group. This created an unnatural effect which was at first exciting but soon fatiguing.

 **The advantage of Ambisonic surround-sound is that the effect stays much the same irrespective of where the listener sits. The old quadraphonic systems only gave a good effect when the listener sat in a central position** 