

dB

● Geoffrey Howard on a British development that should revolutionise car stereos.

Four-channel stereo

DESPITE THE COMMON USE of four-speaker systems in 'today's cars, stereo sound is still very much a two-channel experience. And although front-mounted speakers give a realistic stereo effect, stereo perception tails off significantly with rear-mounted speakers, especially when the listener's head is turned away from the straight ahead. Whatever the listener chooses to do with the front/rear fader, he'll find an in-car audio has a flat (in the physical, not musical sense) sound down each side of the cabin.

Before stereo, audio reproduction was acoustically very flat all over, emanating from a single source. A mono microphone was used for the recording or broadcasting. That was the least of the problems as sound engineers struggled to eliminate distortion, background noise and signal fading. FM broadcasting, when it arrived, allowed the multiplexing of two channels on the same carrier wave. It opened the stereo door at the same time as it took the quality of radio reception through a quantum leap.

On tape, eight-track quadrasonic players (remember those huge eight-track cartridges with four tracks a 'side'?) turned simple stereo into a very crude kind of all-round sensation, which was severely limited by the direction insensitivity and poor switching capabilities of the early stereo mikes. Some early Beatles classics were actually ruined by artificial track mixing to create phoney stereo effects.

But the audio industry (with the exception of the USA, where eight-track

cartridge systems became widespread overnight) has settled on a consistent two-channel system to give universal compatibility between radio, cassette and conventional discs.

By and large it gives reasonable stereo effects, provided the listener is not positioned too far from the speakers and preferably faces them.

For the best reproduction, particularly of base frequencies where the boot volume makes an effective sounding box, the rear parcel shelf has become the preferred location for the main part of most installations. That puts much of the dominant sound source behind the occupants, dulling the stereo effect. Front speakers, where fitted, merely reproduce the sounds coming from the rear, to allow less intrusion of the entertainment for those in the front from vehicle generated noise. The exception, of course, is where the rear speaker system is base-loaded by cross-over filtering to drive big base or sub-base woofers.

With the four-speaker systems now fitted to many up-market cars from new – essential for any kind of worthwhile ICE system – the potential is there to do more than split the sound left and right. That's where a new phenomenon called ambisonic surround-technology comes in, developed over the past 10 years by the National Research and Development Corporation in Britain and incorporating

inventions from the USA, Japan and the UK. Used with a new kind of signal coding, developed in conjunction with the BBC, it promises to be the system of the future for every kind of high-quality audio reproduction, from cars and domestic entertainment to video soundtracks and audio-visual presentations.

Ambisonics is far from being the crude quadrasonic sound used quite sensationally in the cinema several years ago. That was simply two separate stereo sound tracks used to give front and rear effects in the auditorium. Ambisonics is a new technology that creates a 'phantom' speaker

(or sound source) that moves all around as required by the recording or broadcasting engineer, instead of between left and right speakers as in conventional stereo. It has been designed first to be fully compatible with all existing stereo equipment, and then to move on and take advantage of the digital encoding used with compact discs now and digital broadcasting in the future to add extra dimensions through three or four multiplex channels, for a three-dimensional reproduction that eventually will include overhead and underfoot effects.

The first bit of ambisonic kit to arrive on the ICE market was launched towards the end of last year by Troy Ambisonic of Chessington, Surrey, a new company set up largely by previous members of the Pioneer organisation in the UK.

It takes the form of a processor that fits between an existing car audio system and either its amplified or pre-amp output, when it effectively takes the place of a graphic equaliser. For best results (and easy installation), there is a matched power amp offered by Troy which doubles the processor price of £90 to £180, including VAT. It has three operation modes – By-pass (for setting up speaker balance), Enhance (for ambisonic effects using today's systems) and UHJ (standing for Universal H-matrix J-proposal, as specified for the next generation of ambisonic encoding already appearing on some compact discs).

What it does with today's systems is artificially to separate front and rear-speakers each side by

phase modulation. It puts a minute delay between their outputs which adds a kind of two-dimensional contour to the sound created on each side of the car. To find out what it's like, a test unit was fitted to a Ford Escort between a Pioneer KEH 8830 medium-priced combination unit and a set of Clarion SE-630 60watt 6.3in speakers. The Troy unit normally comes set up for an amplified output of an integral system, but it can be hooked into a pre-amp output using a special DIN-plug interface provided an internal link is cut by the dealer.

To separate the four speakers entirely, the standard Ford joystick balance/fader was removed and the common speaker earth wires for left and right channels in the Ford loom confined to the rear by adding separate front, left and right earth leads. Installation was otherwise simple, using a special Pioneer interface lead provided by Troy, although the handy four-deck C-Box cassette storage in the Escort centre console had to be removed to make a space for the ambisonic processor.

In by-pass mode the left/right balance and front/rear fader were set up to give uniform sound at the driver's seat in the usual

way, using the controls built into the Pioneer unit. That procedure is essential because as soon as the Enhance mode is selected the sense of sound direction becomes indeterminate. In a way the effect is uncanny as the ear, conditioned to the separation of conventional stereo sounds, initially becomes confused by the all-round result. But the realism is ultimately most impressive. Sound 'depth' can be varied by a control on the processor labelled 'width'. It 'moves' the rear speakers away or towards the driver's ears by a process that involves some slight additional echo, combined with changes to the front/rear phasing.

Anyone who expects ambisonics to provide a dramatic demonstration of gimmicky sound effects, like some of the re-verboration

and echo systems available at the sensational end of the market, is in for a disappointment. The detectable difference is more like the subtle distinction between Lindt and Cadbury's chocolate, between Beaujolais Nouveau and a 1978 Volnay or (in my case) between the behaviour of two cars – a Golf GTi and an Escort XR3i. It's a silk versus polyester texture that many listeners might not appreciate and one that may be easily overshadowed by general in-vehicle commotion.

But a new sound era has been born, even if sales are still only slow but steady, to quote Troy's marketing manager, Kevin O'Byrne. Ever since I sat in a darkened auditorium at Eindhoven while a Philips' engineer (with the aid of several hundred microphones and speakers and an acoustic computer) dramatically 'moved' the walls back 10ft at a time, I have been eagerly waiting for surround-sound to arrive. Ambisonics provides all that is needed to put a new dimension into stereo listening, even in its technically contrived current form.

