

Introducing a new hi-fi product into the UK is difficult enough but introducing a totally new format in place of stereo is quite daunting

This, however, is precisely the job an all-British company called Troy Ambisonic has undertaken.

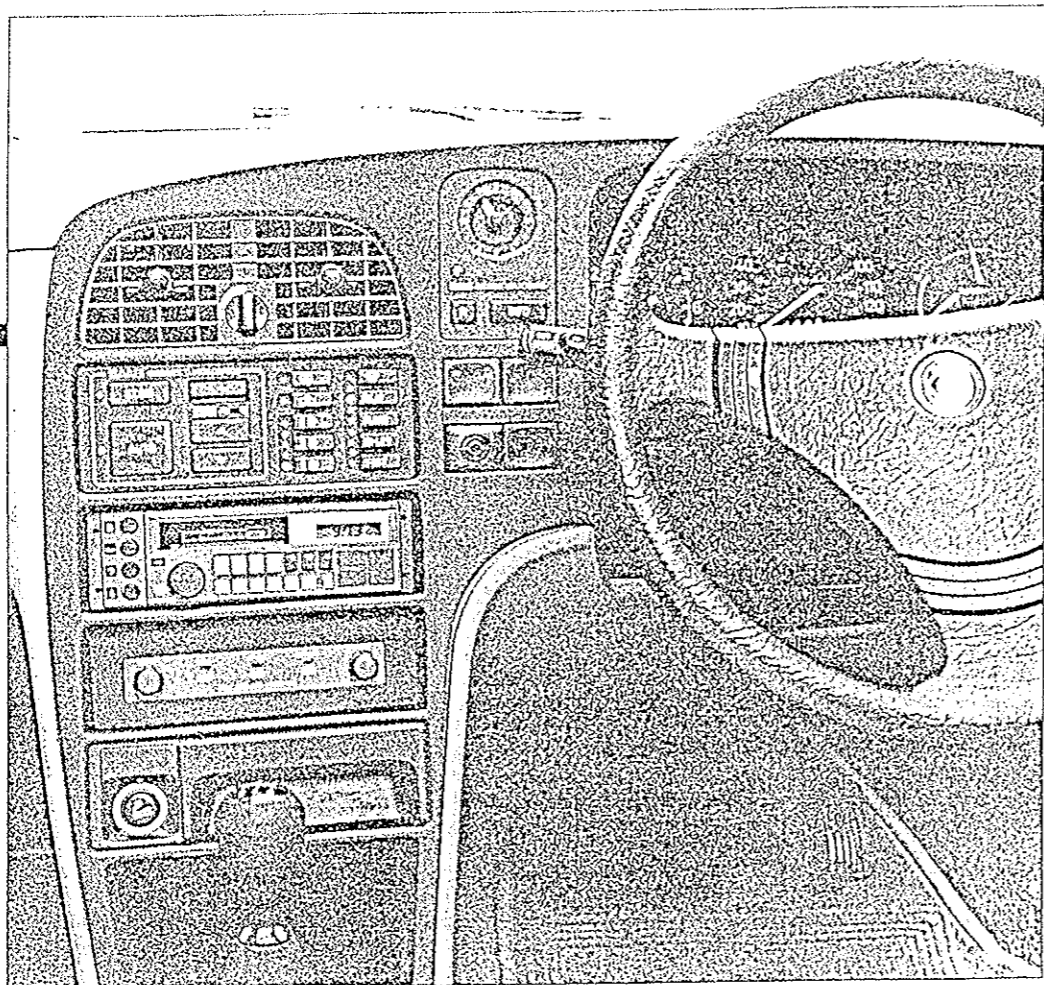
Ambisonic Surround Sound is the latest technology being used in the world of professional recording and audio reproduction. It represents a new format that is likely to have a major effect on the music industry's future hardware and software as Troy's Managing Director Alan Sexton explained.

'When people first got used to stereo listening, the subtlety of stereo versus mono became like a sledgehammer. Ambisonics will be like a sledgehammer when compared to stereo.'

Ambisonic technology is based on the study of sound waves evident during a live musical performance. Sound waves travel in straight lines and if they could be seen in a known acoustical environment, such as a theatre, they would be seen to make up a complicated sound field comprising of many 'direct' and 'reflected' sound waves.

To recreate these sound fields in another environment from a recorded piece of music is not simple and requires the use of an Ambisonic decoder. The decoder separates the direct and reflected sounds through a phase amplitude matrix and a series of electronic filters before eventually feeding the output into the required number of outlets.

The usual number of speakers to be used with an Ambisonic system is four. Arguably, though, the more speakers used, the more effective the surround sound performance. The need to



All around my car

have four speakers has also provided one of the reasons why Ambisonics has been slow to take off world wide. Even the BBC, who have conducted a great deal of research into Ambisonically encoded broadcasts, decided that the number of households owning four speaker audio systems was too small to warrant further investment.

Nonetheless, there is still the occasional music and drama programme which, having been Ambisonic (UHQ) encoded, is transmitted as such.

Consequently, Troy Ambisonic chose one of the world's fastest growing four speaker environments to aim their product at. Troy launched the world's first Ambisonic UHQ Surround Sound Processor for use in the car.

Even though car hi-fi has improved dramatically over the years, the car has always presented major acoustical problems along with an imperfect sound structure. Most car audio systems use the simplistic method of doubling up speaker outputs, thus creating a repeat of the front speaker sounds through a second pair of speakers mounted in the rear.

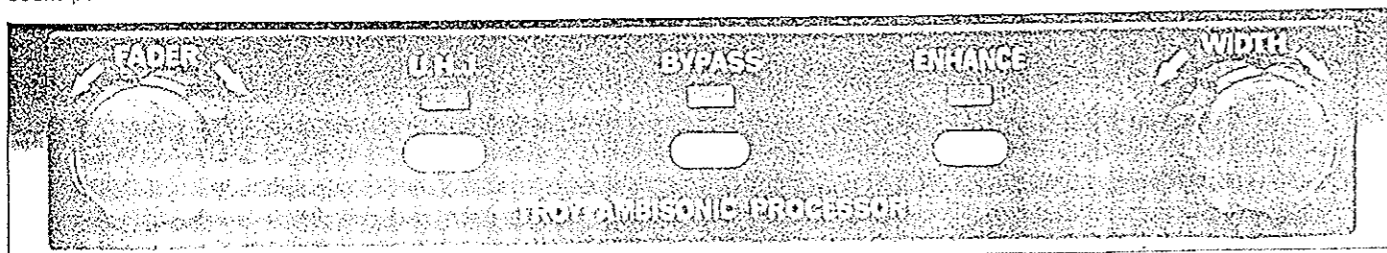
The overall sound picture is wrong and whether you call it poor stereo imagery or just a poor system, the syndrome is something that stereo alone can never put right. Troy certainly believe that Ambisonics are the answer to many of the problems evident in both car audio and domestic hi-fi systems.

One of the major tasks set for

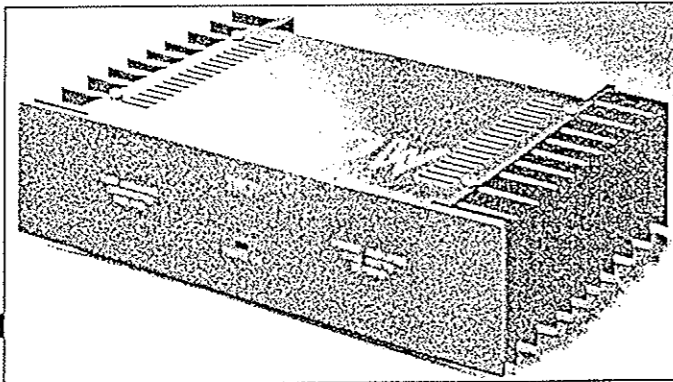
Troy and Ambisonic technology is how to educate the public. Past reluctance to become involved with Ambisonics has shown that many people believe it is another form of quadrophonic reproduction or a type of echo/reverb unit. Troy are at pains to point out that this is not the case.

The only other system to compare with Ambisonics is Dolby Surround Sound. This, however, is only associated with AV systems and even Dolby admit, apparently, that without the pictures the sound images can be very confusing.

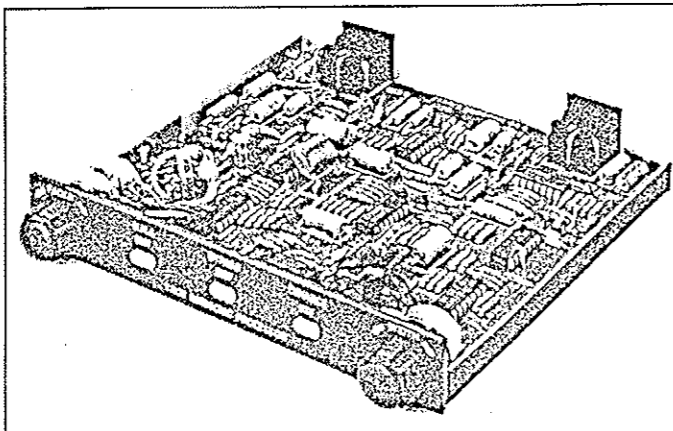
'Hi-fi manufacturers are becoming increasingly aware of surround sound', commented Sexton, 'but we feel that it's only when there are much more



Troy Ambisonic Processor: a small, car-hifi sized unit which can be easily stowed out of sight either in or under a car dashboard



Troy Ambisonics TA-100W: 25watts of music power per channel



Troy TA-110P: offers enhancement and true UHJ reproduction

sophisticated combined AV and hi-fi systems around that Ambisonics should be moved into the purely domestic market.'

But what of the car? The Troy Ambisonic UHJ surround sound processor TA-110P is a small half-DIN sized unit which will easily fit in or under a car dashboard. The product itself is quite singular in that it can be integrated into almost any make of car audio system.

To facilitate this, Troy have provided a large number of connecting interface leads which are individually tailored to suit various types of plugs and electronic impedance matching characteristics. It also saves hours of rewiring and soldering on the part of the installer.

As well as a four speaker system, you also need a four channel amplifier to power them. This can be provided by any two stereo amplifiers of your own choice or by Troy's own TA-100W four channel amp. The latter has the added bonus of boosting any low power system up to some 4 x 25watts of music power.

As long as you can mount a small pair of speakers in the rear of the vehicle there should be no problems. This is due to the way the Ambisonic decoder selects certain frequencies, as well as phasing, which are fed into the rear speakers where heavy, low frequencies are removed.

In most vehicles this is desirable and suits the normally limited size of speakers that can be fitted. For vehicles relying on their rear speakers to produce a healthy bass response, Troy make a bass enhance unit, the TA-25B at £19, to do just that. Troy appear to have catered for most people's needs.

For our road test, we indulged in the use of a humble Ford Sierra with its factory fit radiocassette unit and four speakers. The installation of the Troy equipment was fairly straightforward, with only minor modifications.

Firstly, the Ford ECU1 combination unit employed a BPTL output requiring a new interface lead to make sure the output negatives were not joined together. A further rewiring process had to be undertaken to by-pass the Ford speaker balance control and take each speaker feed directly to the

TA-100W four channel amplifier.

Due to the compact size of the amp, it was possible to mount it under the passenger side of the dashboard. The TA-110P was slipped into a slot conveniently positioned under the radio.

The TA-110P processor offers five separate controls. Fader is a rotary control that acts as a front to rear speaker balancer. Width is also a rotary control with the effect of narrowing or widening the presented stereo image. One way simulates a movement towards the direct sounds and the other a movement away from them. Bypass is a soft-touch push-button that places the processor into a neutral position for normal stereo listening.

UHJ is the code name given to all Ambisonically encoded tapes, CDs and FM broadcasts. This button should be pressed if the listening material is known to be UHJ encoded. Enhance provides the normal listening mode for all mono or stereo materials not UHJ encoded. This button offers Ambisonic surround sound enhancement for all materials.

At this point, it seemed worth while asking why, with all that

Ambisonic enhancement can do, do we need UHJ? Sexton's answer is that the replacement for stereo will be surround sound, 'Ambisonic UHJ will be the system on which surround sound will be judged.'

With the system in bypass mode, it was already sounding better, due to the additional power amp. The fader was set to the mid listening position with the width turned clockwise for maximum effect.

'Ambisonics will be like a sledgehammer compared to stereo'

Initially, it was hard to appreciate exactly what had happened when we switched to Enhance mode. A track from our faithful Grace Jones' tape, full of tingling cymbals and chimes, had suddenly changed shape. Sounds previously coming from the lower dashboard speakers had moved towards our listening position. At the same time, the musical effects had risen to a focal point about half way up the door post.

The most astounding feeling

occurred, however, as your head moved from side to side. After listening to the sound from a static position there seemed no doubt that what you heard was coming from behind as well as in front. Yet when turning your head the focal point remained in the same place. What was previously felt to be coming from the back was suddenly diminished.

This experience was repeated on many other tapes and soon became very pleasurable. The effects were felt even more dramatically when seated in the back of the vehicle. When the system was switched into enhance, sounds coming from the rear speakers were greatly reduced and the focal point of the music moved forward to the front seats. Most disconcerting.

Ball and Chain from the Eurythmics' album *Be Yourself Tonight*, produced a surprising effect. The track itself makes good use of flangers to produce the phasing or spiralling effect heard on many records. When listening to this in enhance mode, however, there was no mistaking the full 360 degree revolution of the musical instruments.

Using the sound track from the UHJ encoded film *Conan the Destroyer* produced some very obvious movements across the audio picture without clutter or confusion. While in the UHJ mode, there was also less gain needed in order to produce similar effects to those made in enhance.

Other tracks included offerings from the Alan Parsons Project album *Stereotomy*. The sound quality and effects were excellent but we could find no attempts to explore the potential of UHJ encoding. It should be remembered, though, that moving from auditorium realism into studio recording effects is not what Ambisonics is all about.

The TA-110P is a simple unit to operate. The attendant hardware, the power amp, is similarly unobtrusive. Yet from something that looks so unassuming, the Troy Ambisonics System presents an audible effect that can't be ignored. Rob Barnicoat

THE TROY SYSTEMS

System A TA-110P, TA-100W, interface	typically £207
System B TA-110P and interface	typically £156
Options TA-25B bass enhancer	typically £19

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