Pointing the way to the future: the Meridian D6000, with its inbuilt digital signal processing technology, is a design first

MERIDIAN D6000

Digital loudspeakers have been the subject of excited speculation for several years now. But while others talked, Meridian set about producing the first commercial model

Audiophile Awards

Judging the first Audiophile Awards was a long, intense process. The original list of nominations was hacked apart in the first day-long debate; more nominations had to be made for the second session. Debate was full, frank and sometimes passionate; on occasion the jury was split down the middle and there was no alternative, after each faction had failed to sway the other, but to call a formal vote.

Nonetheless there were one or two of the original nominations which survived unscathed, and which were approved with little more than a unanimous nod of assent from around the table. The Meridian D6000 was one of them.

It was inevitable, in hindsight, that Meridian's Bob Stuart should be one of the first designers to marry digital technology to the active loudspeaker. Meridian's very first loudspeaker, the imposing M1, was an active design (that is, one with separate power amplifiers for each drive unit, preceded by an electronic crossover), and every one to follow it has been too.

Primarily because the integrated active speaker precludes any choice of amplification, it has never been a hit with hair-shirt audiophiles. Many small companies who, in the late seventies and early eighties, climbed eagerly aboard the active speaker bandwagon soon found themselves playing their own last post. But Meridian has remained faithful to the active concept, both for its design advantages and for its minimisation of the system clutter that enthusiasts take for granted but which many other buyers of quality audio equipment detest.

Add this long history of active speaker design to Meridian's determined and creative participation in digital audio, and it becomes obvious that a digital loudspeaker – an active speaker with on-board digital-to-analogue conversion – would sooner or later bear the Meridian name.

The surprise was just how soon Meridian stole a march on its larger, better-resourced competitors. D6000, introduced in September 1990, was not the first; it was preceded by the D600, which first saw the light of day in late 1988. More than three years hence, Meridian is still alone in offering a digital speaker and looks like remaining so until the middle of this year, when Philips' DSS930 is due in the shops (see State of the Art, page 25).

Were the D6000 merely a conventional active speaker with a digital-to-analogue converter tacked on front, it would be a digital loudspeaker of a basic and distinctly unpraiseworthy kind. But it is not. It uses digital signal processing (DSP) to take full advantage of the possibilities offered up by a loudspeaker fed with a digital input signal.

The first and most obvious of the functions performed by the D6000's DSP circuitry is crossover filtering. Digital filtering can provide steep and accurate crossover slopes without the problems of circuit complexity and component tolerance which are inherent to analogue filtering, whether performed actively or passively. With the D6000 the opportunity is also taken to ensure a linear phase response.

D6000 takes full advantage of the possibilities offered up by a loadspeaker fed with a digital input signal

Second, the DSP is used to provide frequency response equalisation which is individually adjusted for each unit. This ensures an accuracy and consistency of performance which is very difficult to achieve using analogue circuitry.

Third, as an example of DSP's potential to provide forms of compensation undreamt of in conventional speakers, it adjusts for the compression effects which result from fluctuating voice coil resistance, caused by the heating effect of signal current.

In addition to these technical benefits, the D6000's digital circuits provide convenience benefits also. The speaker can be addressed by a remote handset which provides a wide range of control functions: source selection (when used with Meridian source components), volume up/down, balance control, tonal balance adjustment and so on. All of which make the D6000 ideal for multi-room applications – another field in which Meridian has been a pioneer.

Impressive as all this is, it would count for little in the view of Audiophile hard-cases were the D6000 not to convert its high technology into the highest fidelity. But there is no cause for disappointment here either. As Alvin Gold wrote in his June 1991 review: 'In a number of areas the D6000 sets new standards. Its combination of bass depth, authority and control is quite without precedent ... a key quality of the system is its tremendous openness and clarity ... what Meridian has achieved is nothing short of a triumphant vindication of the thinking that inspired the system.'

The digital loudspeaker – where to now?

Definitive predictions about the future of the digital loudspeaker, and of digital signal processing in general, are strictly for the brave and foolhardy. Even where their benefits are obvious and irrefutable, the crystal ball is clouded by uncertainties.

Principal of these is continuing doubt regarding the wide acceptability of active loudspeakers. Digital speakers are of necessity active designs, with in-built power amplifiers. Speakers of this general type have existed for many years and, even without DSP, enjoy undoubted technical advantages over conventional passive loudspeakers.

Yet despite this they have remained the exception rather than the rule, marginalised by the hi-fi enthusiast's desires to exercise choice and give him or herself the option of upgradability. Audiophiles have become habituated to regarding power amplifiers and loudspeakers as separate items that should never be brought together.

This deep-rooted conservatism – which is by no means an idiosyncratic feature of the British hi-fi market – will only change if, ecu for ecu and dollar for dollar, digital loudspeakers across a wide range of prices prove themselves superior to conventional amplifier/speaker combinations.

It is not to be assumed that they will, at least not initially, since the electronics and acoustics expertise necessary to create an outstanding digital loudspeaker do not always, or even regularly, reside cheek by jowel in one manufacturer.

It may well prove that digital signal processing's high-potential contribution to hi-fi will, during the early years, find better expression and greater acceptance in the form of separate DSP units.

Marantz's AX1000 Audio Computer, reviewed on page 72, is an early albeit limited example of the breed. Forthcoming DSP units promise customised phase correction and some measure of time domain room acoustics compensation – both of which features might offer sound quality improvements sufficient to postpone any large-scale trend to digital speakers. That is, if DSPs can be devised with sufficient processing power, at a price which will be seen as realistic.

There remains the bogeyman of the 'true' digital loudspeaker, not one which uses conventional drive unit technology, digital only by dint of having digital electronics on-board, but one which is digital by its very nature – an acoustical digital-to-analogue converter. Designs for such speakers are to be found scattered around the world's patent offices. All of them are unsatisfactory devices. But in 20 years time perhaps an award will go to a very different type of digital loudspeaker.