

## Meridian 7.1 Digital Surround

Meridian's 565 Updated  
for all the sound  
formats on DVD-Video



### Background

Since its introduction in July 1994, the Meridian 565 DSP Surround Processor has become widely recognized as the benchmark processor.

The proprietary DSP in 565 redefines expectations for movie sound and creates a paradigm shift for music listening by enabling immeasurably improved 'stereo' with 3 to 8-speaker systems. The 565 is also unique in offering digital decoding of Ambisonics.

The Meridian 565 has been voted Class 'A' by Stereophile and received the prestigious EISA award for 'Home Theatre Decoder of 1995'. Among a total of 12 awards, the 565 was voted 'Home Theatre Decoder of the Year' by Home Entertainment in both 1995 and 1996.

A major reason for the success of the 565 has been the fact that all the surround processing – including AC-3 – has been done in powerful general-purpose audio computers, using algorithms and code developed by Meridian.

In 1995, we introduced an important upgrade to 565, giving it the ability to decode Dolby Digital (AC-3) using Meridian's own DSP software. This 565 was not only the first high-end implementation of Dolby Digital, it has also been seen to be the best.

### 565 upgrade for DVD

We live in an era of very rapid change. Sources and audio coding methods are evolving rapidly.

The recent release of music and movie material using DTS Coherent Surround coding will soon be followed by wide availability (via satellite and DVD) of material encoded in Dolby Digital AC-3, MPEG Audio, MPEG Surround, DTS, extended PCM formats and a variety of lossless coding formats.

From the outset, Meridian were not content to offer Pro Logic, THX or AC-3 by fitting someone else's chip or software. We reviewed the options and found that the available third-party chip solutions for these digital surround formats fell below our standards for transparency, clarity and flexibility of function. In many cases, third-party solutions do not offer the facilities needed to extract all the audio formats, loudspeaker arrangements and language streams for DVD.

Accordingly Meridian have developed a new processor card – Z3 – for the 565 that gives us an incredible performance doubling over even our original AC-3 version. This new card is based on the Motorola 56303 powerhouse which delivers unprecedented speed and, just to be sure, we gave it extra memory.

This Meridian Z3 card currently runs in-house software implementations for Dolby Digital AC-3 and DTS, and can decode the various versions of MPEG – including 7.1 channels.

Z3 will not be fitted to all 565s as standard, but any 565 past or future can be upgraded to include this more powerful processor.

## Movie formats

Dolby Digital is the preferred sound format for DVD in NTSC territories. The Dolby Digital decoder built by Meridian is the most powerful on the market and succeeds on extreme bitstream tests.

Dolby Digital is also available on NTSC LaserDiscs – to replay these, a Meridian 519 Demodulator is also required.

MPEG Surround is the preferred audio format for DVD in PAL territories. However, MPEG audio is widely available – including in US satellite broadcasts and in computer multimedia; it will also be used worldwide for music and performance videos on DVD.

The MPEG decoder provided in the 7.1 version of 565 is the best-sounding so far.

In addition to AC-3 and MPEG, the 565 will decode DTS. The processor fitted to 565 is fully capable of decoding all the DTS formats seen on DVD – as well as the high-data-rate DTS now available on LaserDiscs and CDs.

Finally, the 565 uses very carefully crafted DSP methods to ensure that high-precision PCM inputs can be used to the maximum benefit. The 565 will accept up to 24-bit PCM and gives the maximum resolution on these signals.

## More on DTS

DTS is unusual among the compressed surround formats, in that it can deliver high quality music at high bit-rates.

CDs and LaserDiscs are available now on which the normal digital audio has been replaced by a DTS stream. We understand that this form of DTS may also appear on DVD – however low bit-rate DTS is also allowed for in the DVD specification: Meridian have taken account of this in designing this upgrade, and so 565 will decode DTS at all delivered bit-rates for 44.1kHz and 48kHz sample rates.

## What is special about 7.1 formats in the 565?

The single most important feature in all our DSP products – including 565 – is the incredibly high standard we set for sonic performance.

An important differentiating feature is that, unlike with proprietary chips that have 'burnt-in' algorithms, Meridian's signal processing is software based, and therefore can be improved or modified in future. For example, AC-3 itself has progressed a lot since the initial standard was set; the DVD application also brings new requirements.

By taking a software solution to AC-3, DTS and MPEG we are also able to take advantage of some of the more interesting user features like 'speech leveling', 'dynamic-range control', 'multi-language', speaker layouts etc. which other decoders may not offer.

Most important though is providing improved sound by fitting a highly accurate, 24-bit decoding algorithm right at the heart of the world's best sounding surround decoder. Crude solutions – like outboard decoders with six analogue outputs, or multiple plug-in third-party decoder cards – can never approach the sound, function or facilities of the Meridian 565 architecture.

## System integration

With all these different formats able to appear at the inputs of a decoder there is room for confusion. However, 565 does not get confused if AC-3 or DTS arrives when it was expecting a CD!

565 continually monitors the IEC1937 digital input and automatically loads the correct decoding software for the format, speaker layout and encoding of the incoming signal.

You can also store separate user parameters for each source (like LaserDisc) depending on whether the incoming signal is PCM (Pro Logic decode), AC-3, DTS or MPEG.

Along with the release of this version, Meridian will be making software updates for 562V and 518 that streamline the addition of these new formats to your installation.

## How does THX fit in?

THX Cinema has a huge amount to offer in the 5.1 era. The 565 has all the signal processing in place to comply with THX requirements for Dolby Digital, DTS and MPEG. The front channels carry re-equalisation; the surrounds use a new timbre-match curve and an updated de-correlation technique.

## Bass management

The 5.1/7.1 signal has the potential to require a 12dB increase in bass power handling in a system. Not only can the LFE (Low-Frequency Effects – i.e. 0.1) channel convey 10dB more bass, but the potential exists for that to happen as well as full bass level in the other five channels.

Although the Dolby Digital, DTS and MPEG encoders limit the total bass level to +15dB, the resulting bass energy can still be incredibly demanding for even the very best systems – and equally important – may be disastrous for other, less capable, speakers.

The Meridian 565 incorporates a very sophisticated series of bass protection schemes for digital surround formats.

The overall amount of LFE added in can be controlled by the user. In addition, the 565 has a bass limiting function (adjusted in Setup) which limits the total amount of bass passed to the system.

As well as the overall bass protection, the 565 can monitor all eight speaker outputs. A sophisticated DSP function determines how hard each individual speaker is working and compares that to a capacity rating given for each speaker when the system is installed. If the signal demands more bass than a speaker can supply, a proprietary, psycho-acoustically optimised limiting filter momentarily and elegantly reduces the load on that speaker. This unique protection method means you can get the most out of all the speakers in the room without any fear of damage or unpleasant overload noises.

## Upgrading?

We have a number of upgrade plans for current 565 owners. Please contact your dealer for further information.