

# Dolby Model 585

The ability to shrink, stretch and alter the pitch of programme is a routine requirement in front-line postproduction. There are a number of ways to achieve it and now Dolby has released a one box solution.

ROB JAMES checks out its time scaling processor.

**EVER HAD THE FEELING** that your favourite juve lead isn't sounding quite as butch as you remembered? Or that the leading lady is even more shrill than she was in the cinema? Or if you are blessed/cursed with perfect pitch, does the music sound wrong? If you are watching a film on TV in any country with 50Hz mains, or come to that a VHS or even DVD, chances are you're right. Not only that, the film will finish sooner and it isn't the censors at work. The sad truth is that films are shot and seen in the cinema at 24FPS but telecined at 25FPS, which means they run 4.16 recurring percent faster than they should and are pitched up by the same amount unless steps are taken to ameliorate the problem.

You may already be thinking, 'so why don't they just pitch-change by a reciprocal amount?' Well, sometimes 'they' do. But pitch-changing introduces artefacts and, truth to tell, I've only ever come across one stereo pitch-changer I would even consider using on an entire movie in real time. (I don't intend to embarrass other manufacturers by naming it...) The emphasis should be on the word 'stereo' because up to this point I have not heard any pitch-changer I would even think about using on an entire 5.1 movie. (And I'm quite prepared to be convinced otherwise, if other manufacturers are feeling slighted.) One problem is phase coherence between channels. Phase shifts are undesirable in any case, but can be catastrophic when the 'extra' channels are downmixed for poor unfortunates listening in mono or stereo.

Movies are not by any means the only application for a time-scaling processor. Adverts are another obvious target since they are frequently made for the cinema but used for TV or vice-versa and here time really is money. A 30-second slot is just that. Broadcast is another rich seam. As schedules become ever more inflexible, programmes are stretched or shrunk to fit. If programmes can be scaled with few audio artefacts this is likely to prove a better and less expensive solution than editing them.

There are three groups of time-scaling technologies available, frequency-domain, time-domain and modelling.

The first practical device for restoring correct pitch to a speeded up or slowed down tape was time-domain based and employed a rotating playback head on a conventional analogue tape transport. This repeated or discarded sections of material to achieve its results. At best this could be described as 'lo-fi', but I well remember using an EMI 'Eltro' tape machine equipped with just such a system in the early 1970s to convert TV film rushes tapes from 24FPS to 25FPS in the absence of any viable alternative.

A frequency domain solution proposed by Schroeder in 1967 produced characteristic artefacts including phase and loss of transient definition and frequency domain processes have never taken off.

Later time-domain solutions are, unsurprisingly, digital variations on the original rotating head splicing technique using circular memory buffers with algorithms looking for zero crossing points to make the joins less audible. More sophisticated versions analyse the signal content in an attempt to minimise artefacts such as echoes, stuttering and loss of definition.

Modelling emerged as a bright hope in the 1980s, but only proved to be applicable to less complex material and each model tended to be highly specific to a few types of audio. Processing time is significant so this is not an obvious choice for a near real-time solution.

The best chance has always seemed to be a sophisticated analysis engine controlling a time-domain process and this is substantially what the Dolby 585 offer is, but in an interesting package and at a competitive price of UK£4450 plus VAT. Psycho-acoustic analysis and processing techniques similar to those employed in data-reduction audio coding schemes are used to minimise artefacts. The unit has a fair claim to the title 'Time Scaling Processor' rather than simply pitch-shifter, partly because of the way information is presented but also because it can record

a limited amount of material and play it back time-scaled by up to 15%. (23 minutes 11 seconds of mono, pro-rata for multichannel formats.)

The 585 is housed in a 2U with a sculpted alloy front panel in keeping with other recent Dolby products. In the same vein, it interfaces with the rest of the world via BNCs for audio at a nominal 48kHz sampling rate. In, Loop-through and Out connections are provided for the four pairs of AES-EBU channels along with AES reference In and Loop-through. 9-pin D-sub connectors allow for remote RS232 updating of the software and GP I-O for remote reporting the 585's status. Four further ports, not currently active, service Metadata to and from Dolby E devices and Remote (9-pin) in and out.

Around the front, the oval screen is backlit in orange and accompanied by six buttons, a knob and three indicator LEDs. There is no immediate indication as to the health of reference or audio input signals on the front panel or the main status menu, you have to use the cursor keys to get to the Digital In or Reference screens.

Twenty four different Program Configuration permutations of the eight channels range from 5.1 + 2 through every practical combination up to 7.1. Display Mode allows the choice of units for pitch shifting, frames, cents or percent. The display conveniently tells you when the percentage is appropriate for the common 24FPS to 25FPS and vice-versa conversions.

As with any pitch shifting device, latency is an issue. The 585 allows the user to choose a value between 400 and 480mS. With the lower value still approaching half a second, real-time time-scaling will either require separate video and audio passes, the introduction of a significant video delay or separate video and audio sources with a timecode offset.

The oval screen, reminiscent of a thousand sci-fi images, is not as informative as it could be. Operation in a hurry with a mere six buttons and a knob isn't too much fun either. In Transport mode, all the buttons take on new functions, not entirely intuitive.

None of this would matter a jot if the unit actually achieved its goal — i.e. Time Scaling/Pitch changing without audible artefacts. Even on short acquaintance and with not especially challenging material I could hear it in action. Playing with the sensitivity setting helps, but artefacts are still audible and the requirement to adjust the process sensitivity to suit the material takes it out of the 'plug-and-forget' category.

This should not be taken as a negative verdict. The 585 finishes a considerable distance ahead of the rest of the pack. The artefacts are less objectionable than usual and, in the absence of the other leading contenders for direct comparison, I believe the 585 is at least as good in multichannel as it's nearest rival is in stereo only. The 585 is certainly the best option I've come across for the function it is most obviously optimised for — adverts. I would still think carefully about routinely applying it to entire movies in real-time. ■

## PROS

Phase synchronous pitch shifting/time scaling; this is as good as it gets.

## CONS

Artefacts still audible; not the most intuitive user interface; only 48kHz nominal sampling rate.

## Contact

DOLBY:  
Website: [www.dolby.com](http://www.dolby.com)

