


; file: AudioQuality_DDvsDTSand HDDVDvsBLURAY
; FEW 1/11/08
;
; notes: Future direction of Audio Recording Quality...
; Dolby Digital 5.1 compared to DTS (Digital Theater Sound) encoding
; How is Blu Ray different from HD DVD encoding as far as audio goes.
;
; From: <http://forums.audioreview.com/showthread.php?t=24050>

From these experts who seem very knowledgeable, DTS and BluRay will be best choice
For near future audio quality.

09-05-2007, 07:13 PM #12

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FA -

The short of it might be that the DTS track was playing ~4 db louder than the DD track. But, there are other differences at work ...

The similarity between Dolby Digital and DTS is that they are both compressed "lossy" formats. Conceptually, this is similar to how MP3 or AAC compress the data from a CD to ~1/12 of the original file size. PCM is a "lossless" format that's used for CD audio and the vast majority of professional digital recording. It's inherently less efficient, because all sounds consume the same amount of data, no matter how little of that data the audio signal will actually use. But, it represents the full uncompressed data. "Lossy" formats will discard data that's in the less audible ranges.

The difference as others have pointed out is that DTS uses a higher data rate than DD. DTS has a standard data rate of 1.5k, and a more commonly used 768k half-bitrate version. By comparison, Dolby Digital has standard data rates of 448k and 384k for DVD, as well as a higher bitrate of 640k that was previously used with Laserdiscs and currently used with Blu-ray discs. 384k DD is also the standard 5.1 audio format for HDTV.

For reference, audio CDs use a data rate of 1.5k for only two channels. DD and DTS are both cramming 5.1 (or in the case of DTS ES, 6.1) channels into a considerably smaller bitstream. Two-channel MP3 files are typically encoded at a datarate of 128k to 192k.

As far as comparisons between the two formats, I think the two biggest strikes against DD in direct comparisons are 1) high frequency channel joining and 2) dialog normalization.

The high frequency channel joining is Dolby's technique of having the channels "share" high frequency information in order to conserve data space for other more audible sounds in lower frequencies. With 448k DD, sounds above 15 kHz are shared by all channels, which is not in the primary range of most music sounds. But, with 384k DD, the sounds above 10 kHz are shared by all channels, and here the channel joining is more audible and tends to make the surround imaging sound "fatter" and less distinct.

The other feature of Dolby Digital that often puts it at a disadvantage in A/B comparisons is dialog normalization. This is a feature that purportedly standardizes the dialog level between different Dolby Digital sources. (see diagram below) The default value for Dolby Digital encoders is -4 db, and this is probably the most common value for DVD soundtracks. Since DTS does not use dialog normalization, it will almost always play back louder than the DD track (with a 4 db difference most common).

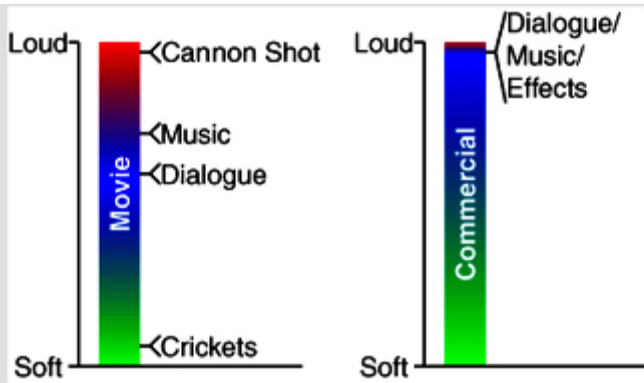


Fig. 2 - Sample Program Transition
(no Dialogue Normalization)

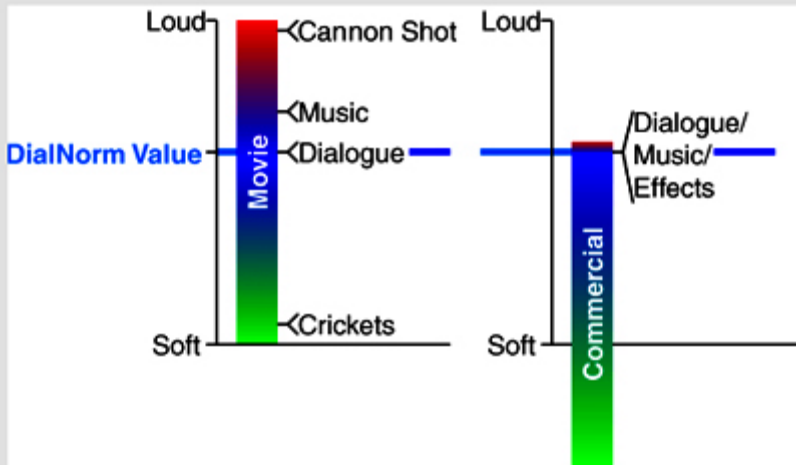


Fig. 3 - Sample Program Transition
(with Dialogue Normalization)

<http://www.hometheaterhifi.com/volum...on-6-2000.html>

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(with Dialogue Normalization)

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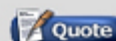
Another factor to consider is that early on, all of the DTS encoding was done by DTS with their engineers. Often, the DTS encodes used higher resolution masters that were remixed, while the DD track would be transferred from the theatrical print master with no remixing or other reengineering. A good example of this is the Signature Selection DVD of *Gladiator*, where the DTS track clearly blows away the DD track. But, because the DTS track was first remixed and transferred using a higher resolution master, it was not exactly a fair comparison.

I agree that DTS tracks will offer up at least subtly better audio quality than DD most of the time. But, if you're doing level matched comparisons with sources known to have been transferred under comparable conditions (the Director's Cut series for *Lethal Weapon* was done this way), the differences between DD and DTS are not as huge as often touted.

Wooch's Home Theater 1.0

The Neverending DVD Collection

Subwoofer Setup and Parametric EQ Results



Boy,
I wish I was as smart as you are my friend!

I just wanted to add a bit to this great post. Until we have gotten to HDM on disc, there has not ever been a huge increase in audio resolution for film. They have always come in baby steps, and Dts is several baby steps up from DD.

One of the most important things to consider is the goal of each of the encoders. Dolby's encoding goals are to reduce as much data as possible while maintaining good audio sound. Dts's goal is to process as much of the original PCM data as possible within its bit budget.

Dolby achillies heel is not just dialog norm and channel joining. The worst offender in the Dolby process is global bit sharing. This is a process that moves bits from one channel to the next as the demands increases in that channel. The problem lies in the fact that with this kind of routine, you can often "starve" one channel to feed another, thereby reducing and often degrading sound quality in other channels.

Another problem with DD is when all channels are pushed to the hilt, all of Dolby digital's channels become starved resulting in a hard midrange, and a ear shattering treble. When combined with the aggressive data reduction technique, it makes this codec sound ragged at high sound levels with all channels engaged.

Even Dolby had to agree that Dts at 1.5mbps is a well designed codec, and said as much in their sorry white paper that evaluates Dts. The great thing about this codec is the fact it can operate in a lossy mode, and in a lossless mode as well. Dts as the channel demands go down will go into a lossless mode, preserving all of the data intact without any data reducing techniques. Its reliance on perceptual encoding also decreases with the higher bitrate(Dolby's never does, and relies heavily on perceptual encoding). All of this allows Dts to preserve almost all the soundfield information(Dolby cannot), its Global bit allocation allows it to maintain channel separation all the way past 19khz at 1.5mbps, and 15khz with 754kbps, which is why its perceived channel separation is much better than Dolby's. Another advantage in Dts's favor is the phase between its LFE and bass in the main channels. Dts has just a 76 degree lead in the LFE at 80hz versus the main channels bass. This is why it has a tighter bass response. Dolby on the other hand has a LAG of about 225 degrees at 80, and increases gradually to its brickwall limit of 120hz. This often gives Dolby Digital a boomy quality to its bass because its is approximately 7 milliseconds behind in the LFE versus the main channels. In other words the bass smears which gives it a boomy, non distinct character.

Another, and last great quality of Dts is its relevance as a core codec on both Bluray and HD DVD. Dts at 1.5mbps is the foundation to Dts HD MA. It was also used as a transcoding codec for HD DVD on Dolby trueHD decoding for the digital outputs. Dolby Digital at 448kbps has been relegated to second tier, if found at all. Dolby digital plus is just basic DD with extension data added, but the core process is the same. As Roger Dressler commented on at AVS, the real benefit of DD+ lies in lower bitrate processing, not higher bitrate processing. So DD+ will only sound marginally better beyond the core 640kbps bitrate. That is not the case for Dts.

In the end both codecs sound very good for the amount of processing done at encoding. I think DD is a more efficient codec(which comes at a price in sonics), and Dts is very good at preserving all of the original data(which unfortunately takes up more space on disc). Performance wise, it is all Dts.

Wooch, I have participated in Dts's double blind testing when I was at Paramount. It is indeed is as transparent as they say it is, which is why I am, and always have been a big fan of the Dts codec.

By the way, hello everyone! Its been a long time since I last visited, and it is dam good to see the old regulars around still.

Sir Terrence