

Bryston In The Movies

Check out the new movie
The Fast And The Furious

This is the movie featuring
kid's street racing exotic cars
-mostly Honda's as I recall.

Right at the opening credits
the male lead actor comes
on and explains that these
are stunt drivers on stunt
tracks and is definitely not to
be tried at home.

He is standing in the re-
cording studio the film was
scored in, and in the back-
ground behind his right
shoulder you will see two
Bryston 4B ST Amplifiers.



So it appears Bryston has
finally achieved movie star-
dom. Next thing you know,
we will be getting our own
star and faceplate imprint on
the Hollywood Walk of
Fame.



This Issue

DVD Audio—SACD? **P.1**

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DVD Audio—SACD?

So here we go again -two new high quality multi-bit, high sampling audio playback systems have emerged recently, DVD Audio and SACD (Super Audio Compact Disc). Which one should you invest in? Which one is technically superior? Which one is the most likely to succeed? The jury is still out but some points should be made.

DVD-Audio, like the compact disc before it, is based on Pulse Code Modulation (PCM) digital audio technology. In this process, incoming analog audio is fed to an analog-to-digital converter that essentially measures or samples the instantaneous value of the signal and stores the result as a binary number: a "digital word." This is done tens of thousands of times a second - 44,100 samples per second in the case of the compact disc, and up to 96,000 or even 192,000 times per second for DVD-Audio. The more samples per second (the higher the "sample rate"), the better the quality -up to a point. There is some evidence to support the fact that we really can't hear any significant difference above about 64,000 samples per second but if sample rates up to 192K are possible - why not??

PCM stores each sample as a digital word. The number of bits determines the noise floor and dynamic range of the digital system, and in some cases the amount of low level detail you can capture. The current compact disc format uses 16-bit words to give a noise floor at about minus 96dB. DVD-Video generally uses 20-bit words. And DVD-Audio can use up to 24-bit words. Above about 22-24 bits, there is no point in

adding bits, as the noise floor of the system is below the threshold of thermal noise and other effects. Most audio components are hard pressed to reach minus 120dB (Bryston amps do) so 24 bits is certainly ample. Generally it is felt that 24 bits and 96 kHz sampling is just about right for high quality PCM and most industry people feel this will ultimately become the standard at both the recording and playback end of the market.

Sony and Philips on the other hand instead of using PCM encoding have been developing a technology, called "Direct Stream Digital" or DSD. DSD differs fundamentally from PCM in the way that it stores digital information. Instead of storing the digital sample values as "words" with up to 24 or so bits, a stream of individual bits is stored. Each bit has to indicate whether the sample is louder or quieter than the one before. The sample rate used in DSD (Super Audio Compact Disc-SACD) is enormous: 2.82 MHz, or 64 times the conventional sample rate of CD, although "oversampling" is also commonly used in conventional PCM. This theoretically offers SACD an extended high-frequency capability. The DA converters in the SACD system though require low-pass filters so the quality and affect of the filters is a major concern with this type of technology.

A commonly stated benefit of the SACD system is that discs can be dual-layer, with a standard Red Book CD-compatible layer on top of the high-resolution DSD information thus allowing SACDs to play on conventional CD players, This is also possible with DVD Audio as well but it is rarely utilized.



One complaint against SACD is that DSD process introduces a very high level of ultrasonic noise. Demonstrations of SACD often make special mention of the audio system's wide frequency range, including, for example, tweeters that will handle up to 100 kHz. The DSD process may produce a high level of noise at such frequencies, and if the replay system cannot handle it, it may fail. You are therefore left with two choices: either use more robust equipment that will handle absurdly high levels at absurdly high frequencies, or filter the input signal and thereby remove one of the main alleged benefits of DSD, namely an extended HF response, by "turning it down "to 96 kHz PCM levels. You will usually find these filters (using an optional switch) on the rear of current SACD players.

The other main issue is in the handling of DSP operations necessary in the process of making most recordings, where mixing, level changes, EQ and compression take place in the digital domain. The DSD signal must be decimated (turned into something very much like PCM), processed and then returned to the bit stream format in order to allow manipulation of the signal. There is arguably little point in using DSD if you are going to turn it into something like PCM on the way to the master. I am sure DSD processing type equipment will become more available at the recording end

of the industry if SACD becomes more dominant.

DVD-Audio on the other hand is hobbling itself by silliness over watermarking.

So it appears that some of the discussions about the superiority or advantages between SACD and DVD Audio are not as obvious as one might assume given the marketing hype to date.

The obvious conclusion is if we are going to continue to expand the multi-bit formats we need high quality audio disc players that are universal and play any type of digital format -CD, CDR, DVD, DVD-A and SACD. The technologies are very close as far as getting data off the disc is concerned, and although there are currently not many chip sets available that will decode all types of data, I am sure they would become available almost at once given more demand. The consumer would not have to choose which system to buy and the producers could choose the recording technology that would provide the best results for their specific material and recording technique, much in the same way that Dolby Digital and DTS have been able to coexist in the DVD arena.

BRYSTON

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Bryston Ltd.
677 Neal Drive
Peterborough, Ontario
CANADA
K9J 6X7
Phone: 705-742-5325 or 1-800-632-8217
Fax: 705-742-0882
Email: contact@bryston.com
Web: <http://www.bryston.com>

Editor: James Tanner, Vice President of Sales and Marketing
Email: jamestanner@bryston.com