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Bryston DAC's, A Brief Sample

Over the past few months I have received overwhelmingly positive feedback on the excellent sound quality in our recently introduced BP20/25-DA Preamplifier and B60-DA Integrated Amplifier. It certainly has raised a lot of interest in what Bryston is doing specifically in the implementation of this digital technology.

So...here goes.

The DAC chip we use is the Crystal CS43122. This is a hybrid multi-bit delta-sigma DAC (digital to analogue converter) device. Before the digital data reaches the delta-sigma modulator, it is run through an 8x over-sampling process and digital interpolation filter. Due to the inherent over-sampling process of delta-sigma modulator architecture, the overall interpolation ratio of the device is 128 times.

Over-sampling and up-sampling have some great benefits when implemented correctly. I should point out there is a significant difference between up-sampling and over-sampling.

Over-sampling is when the samples are repeated (2x, 4x, 8x, etc.) to create a new sampling frequency. The new samples are then generally run through an interpolation filter to create a more analog-like waveform.

Up-sampling usually refers to a mathematical process in which the new sample rate is not a multiple of the old sample rate, and the numbers have to be calculated in real-time.

This is what is happening when a sample rate con-

verter chip is in an up-convert mode. So in the BP25 DA, if a 44.1 kHz signal is present: we up-sample to 96 kHz (with the Sample Rate Converter) and then the DAC will internally 8x over-sample that signal. The great benefit of both of these methods is that it relaxes the requirements of the analog filter after the DAC. This is important, because it allows designers to implement higher cut-off frequencies with slower roll-offs, which results in a phase linear circuit in the audio band.

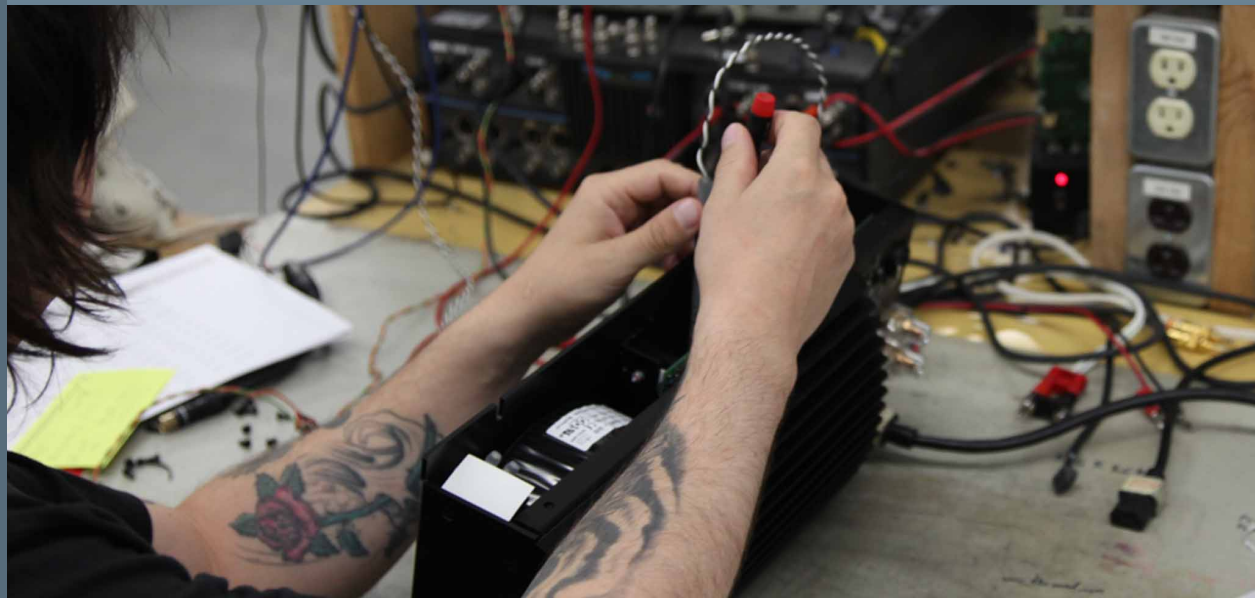
The up-sampling method, when implemented correctly, also has the side effect of jitter reduction, since the output clock is usually asynchronous from the input clock. Another thing to note is that if the over-sampling or up-sampling processes are implemented poorly, they can actually introduce jitter. This is usually a result of poor power supply implementation.



Bryston BP25-DA Preamplifier

So, in the BP20/25 DA and B60 DA, each stage in the digital chain (input receiver > sample rate converter > digital audio converter) is independently regulated to prevent any interactions and to provide rock solid power supplies for any up-sampling/over-sampling process.

All of this being said – and pay attention cause this is



really important – the most critical part of the DAC circuit in the BP20/25 Preamplifiers and B60 DA Integrated Amplifiers is that the output from the D to A is directly connected to a pair of Bryston proprietary Class A Discrete Operational Amplifiers rather than

the typical IC chips employed in most other products. This makes a huge difference in resolution and dynamic headroom performance.

So, thank you everyone for the great feedback on the sound quality of our new DA Preamplifiers and Inte-

Reviews From The Trenches

Hi James,

I have just received the new BP25DA preamp today and installed it in my home system. My other components are a Bryston BP1.5 Phono preamp, Bryston 3BSST and Tannoy D700 loudspeakers. I am an avid LP collector and have around 8000 LP's at the moment. I have had a couple of Bryston preamps in the past and they have always had outstanding Phono performance, which was the largest factor for their purchase. The new BP1.5 is levels better than the older generation of preamps as is the new BP25.

I am very familiar with the new line and its capabilities and was interested to hear what the new DAC might offer my present set-up as well as have its expansion possibilities on tap. My current playback unit is a very nice DVD machine with 24 bit/96kHz performance. After an hour of listening to several different CD's the differences become apparent. It seems that the Bryston DAC has a tremendous level of voltage swing and or dynamic headroom, which gives it the ability to create a deeper soundstage and a more open and dynamic presentation. One thing that stood out listen after listen was the midrange clarity and presence, which seems to be more ruler flat and honest than what is produced by the other machine.

What I have compared it to here was a very competent DAC inside a rather expensive DVD machine and what has me most excited and the reason that I actually decided to invest in the DAC version of the BP25 is the future improvement to any digital cable or satellite music system that we connect. Those nasty boxes that they install for free are in for a by-pass.

Sincerely,

Bill Robertson

President

Uptown Audio

Mr. Tanner,

The Belgian surrealist artist René Magritte once painted what, at first sight, was a disorienting work.

It was a picture of a smoking briar pipe, with the caption, "This is not a pipe". It was a picture with a moral. Magritte was saying he had painted a picture of a pipe, not a real pipe. As an audiophile, I am constantly reminded of the lesson of Magritte's painting. Those of us who share the sweet madness of pursuing an image of live music, must never forget that all our splendid gear, like the product of Magritte's palette, can give us beauty and joy, but ultimately it cannot give us the real thing. Electronically reproduced music is only an



image of live music.

Yet we pursue the dream of getting as close to reality as possible because the quest itself is fun and the result can be thrilling. I have been in that pursuit for about thirty years, with Bryston helping me along the way for over twenty four of those years.

Because I never wanted the pleasure of a hobby to become certifiable madness, a harmful addiction, many years ago I recognized that it was necessary for my mental health, and my bank account, to avoid the Siren's call to spend whatever it takes chasing the dream. I insisted on world class quality and performance as close to real sound as possible, but at a price sane people with limited means can afford.

For all these years, Brystons products have met these standards, and thrown in, as a bonus, the industry's most remarkable warranty. When I bought my first 4B amplifier, I was given a five-year warranty, only to learn fifteen years later that Bryston had decided to give its products a twenty-year warranty, retroactively. I still had five years of coverage on my original purchase!

It's not surprising that I went on to buy a 4BST, and

then two 7BSTs, as well as a BP20 preamplifier.

Recently, I decided to purchase a BP20DA, Brystons preamp with a built-in DAC. I was able to compare it closely with my aging Theta ProBasic IIIa DAC, which had given me good sound and service for many years. The BP20DA, however, is a clear winner over even the highly reputed Theta. I could attempt to fill this note with all the jargon of audio magazine reviews, but I am not a reviewer. I am just an audiophile. The bottom line for me is that the BP20DA is undoubtedly a great preamp made even better by having a superb DAC in it. Most of all, it does precisely what I believe an outstanding high-end audio device must do -- it moves the sound of my system significantly nearer to the real thing.

And that's no pipe dream.

DW

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