

hifi

& records

The Magazine For High-Quality Music Reproduction

10 Years Anniversary Edition / Edition 4/2007

Anniversary Special: "Highest High End"

GTE Trinity DAC

Article: Highest High End

PMC King: Trinity DAC

By far the most expensive D/A converter in the world does not come from the U.S., it comes from Germany. But is it the best?

That's really the last straw. A company that nobody has ever heard of in hifi circles simply pops up on the market with a first-time product, a converter that blasts away all benchmarks. Not only does the Trinity DAC come in a price range that is in the super high-class luxury limousine category and in three heavy-weight parts with an unusual triangular shape. No. To top it all, the Trinity also claims loud and clear to be the world's best DAC of all times.

But first, let's cool down. Until we get things sorted out, let's just take things real slow and let's start right from the beginning. Who is GTE, anyway? The company is made up of the design engineer who invented the Trinity DAC, Dietmar Bräuer, and Ralf Weigel, CEO of the Gesellschaft für technische Entwicklungen (company for technical developments), in short GTE. For many years GTE developed sensors and measuring instruments of the very best for high-tech applications all over the world. While developing switch capacitor filters, the core technology of the Trinity DAC more or less came to light as a byproduct. Since Bräuer and Weigel were longstanding audio freaks, it was no wonder that they realized the audiophile potential of using the filter they had designed for a totally different purpose.

Nonetheless, it took four more years to go from the realization to the end product. They finally made it by 2006, and today the Trinity DAC has already been seen at quite a few trade shows, and – what is more astounding – it has already found a few buyers mainly among people who can spend a couple of dollars more for super hifi than most of us. In other words, in Hong Kong, Japan, as well as in Dubai. There, it probably goes down very well that the "Trinity" from Germany is also available in gold. The Trinity is made "on demand", which is hardly surprising when you look at the price tag, and this probably raises the buyer's thrill and excitement. So, is the Trinity DAC simply a toy for millionaires?

Not just. It is also interesting for all those who want to know what is technically possible when it comes to sound stored on digital media. Digital data carriers, to be more precise, those that contain PCM data. Therefore, it has priority over CDs. Of course, PCM converters are almost old hat. But not the Trinity DAC. But you won't find any analog filter at the output of the D/A converter to separate unwanted signal products. As analog filters exert such a strong influence on converter sound, it is much better in the end if there is no analog filter in the first place. That's why there is none in the Trinity. It is simply superfluous because, due to the way the signal is converted, the signal is presented in a form that approaches the ideal stepless analog signal to such an extent that it can be described as an analog signal form.

This is achieved by a technical trick which is brilliant in its simplicity and which GTE was well advised to patent. Several D/A converter stages are switched in parallel. You think that's old hat? You're right! It really is nothing new to operate several converter stages with their inputs and outputs switched in parallel. What is novel here is that the Trinity DAC operates the converter stages at different time intervals. Only the outputs are switched together. The inputs are fed by the same digital audio signal, but at a slight time offset. This results in a "spreading", or smoothing, of the analog signal along the time axis. This is an effect that is obtained from conventional analog filters but which can impair the sound to a greater or lesser extent. However, since the Trinity uses a total of 16 converter stages of type PCM 1704, it produces an analog signal form that almost corresponds with the original analog music signal from the aggregate signal of the chronological converter processes alone. As the time-based control of the inputs of the 16 converter stages is apparently critical, GTE was obliged to invest an enormous amount of experience in designing and implementing the circuitry. In the end, this was achieved by making the circuitry extremely compact and the signal paths as short as possible.

Surprisingly, it turns out that this innovative signal processing method also makes the oversampling of active digital filters superfluous. Digital filters are otherwise needed by D/A converters to improve the sound. At least at a sampling rate of 192 KHz, the Trinity supplies ideal analog signals to the output without any need for input filters. At a sampling rate of 96 KHz, the shape of the analog output signals is still admirable, but no longer ideal. For this reason, the Trinity uses eightfold oversampling at this sampling rate downwards – i.e. for CD replay. All in all, the GTE development is not only an interesting variant to conventional converter technology, it also has apparently enormous potential to extract more sound from digital PCM material. How far this potential was exhausted by the Trinity is the 64-million dollar question, which we will try to fathom as best we can.

So, before we answer the question all audiophiles are burning to ask, let's have a closer look at the DAC. The housing shape was not selected in three triangular units just for design's sake. It was chosen in order to obtain the shortest possible signal paths, fault-free function, and an incredible signal-to-noise ratio by optimally separating the stereo channels. This is achieved by stacking the three housings or placing them next to each other. The converter arrangement is accommodated in a separate channel for each channel. A third housing contains the control circuits. It is left to the customer to select the inputs and this is what is customized by the producer. The symmetrical outputs are available with or without transformers. If the customer wishes, the three-part Trinity can be connected directly to the final stage(s) without preamplifier and the customer can enjoy the pure sound of the Trinity.

So that customers may enjoy pure sound without regret, Dietmar Bräuer has given the Trinity a volume control of the very finest. A rotary switch with high-precision, extremely close-toleranced, noise-optimized metal-film resistors are fitted directly on the converter board to keep the signal paths to the volume control as short as possible. To insure that the contact resistances remain low even after several years of use, the switch contacts are made of gold-plated silver alloy. Contrary to conventional volume controls with impedances ranging from 10 to 500 Kohms, the impedance of the GTE in-house product is only 110 ohms – an unusually low value that results from the compact design of the rotary switch, among other things. But the really awesome thing with this megahertz-range volume control is that the input and output impedances remain constant no matter what the position of the variable transformer. In fact, we have here a (remote-controllable) volume control that links the Trinity DAC just a tad cleaner to my Soullution output stage than via the Soullution preamp. This is something I've never come across before. In the same way, I've never heard such a pure sound from CD and DVD-A as with the Trinity DAC.

Subject: CD; player: dCS Verdi; comparator converter: dCS Delius. The Delius sounds much thinner, choppy in timing, more digital, in fact. But when you feed it with a

CD signal via the dCS Purcell Upsampler, it raises its converter efficiency by increasing the sampling rate. At an upsampling rate of 192 KHz, however, it is still audibly below the level of the signal output directly from the Trinity 44.1 KHz signal, which does the job more smoothly and, above all, more vividly. Since the Verdi has several outputs and the Trinity has several inputs that can be switched rapidly, it is relatively simple to make an A/B test to see how direct CD signals sound in comparison to the 192 KHz upsampled signal routed through the Trinity. The signal is in fact identical (this provides strong proof that upsampling is not a question of the sampling rate but of the digital filter).

So now we have a right mess! Original 44.1 KHz signals still sound better on the Trinity DAC than maximum upsampled signals output by the dCS Delius. For me, this means that my dCS setup with CDs is clearly worse than the Trinity DAC. Only when it comes to SACD does the dCS setup reach the grade – but only because original 192 KHz signals from DVD-A are now practically non-existent on the market. So if you feed the Trinity with such digital super-signals (Dietmar Bräuer was nice enough to supply me with a suitable player), you will discover several DVD-As later that it's really a pity that the medium has disappeared from the market. If this were not the case, we would not only have a serious contender to SACD, but probably a much superior sound medium. At least, DSD will have to be very careful, especially if conversion is left up to a Trinity DAC.

So, in the end, GTE's claim is not empty after all. The Trinity DAC really is the best PCM converter of all times, if not the best overall converter, and this is why it was selected as the King of PCM by this magazine. (Trumpet fanfare please!) Pity I cannot afford to buy this noble product. Although the Trinity left my audio room a couple of weeks ago, its aura can still be clearly felt. It's almost as if a little of the brilliance of this super-converter has become lodged in my hifi set. I just hope it stays there for as long as possible.

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