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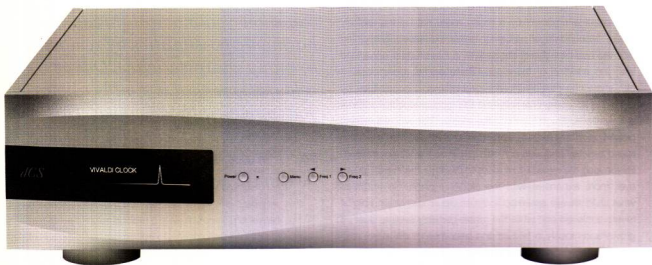


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dCS Vivaldi System Part 2

by Chris Thomas



Last issue, in the first part of the review, I spoke mainly of the Vivaldi as a two-box CD player and what a profound improvement it was on the four-box Paganini system I had grown so accustomed to over the past couple of years. Using just the Vivaldi CD/SACD transport and the DAC, driving power amplification directly and without a preamplifier could never be considered a low-cost option but, if CD replay is required, it is the cheapest way into the Vivaldi system. It showed me in no uncertain terms that many of the sonic artefacts I had always associated with the format either vanished or were greatly reduced. Soundstage width and depth, bass articulation and pitch, shuddering dynamics, a massive reduction in the compressed space between instruments and their range of tonal colour were all of a different order. But it was really the improved sense of musical communication and involvement that was the most persuasive. Put simply, I had better and longer listening sessions, finding myself involved the musicianship and recordings on a deeper and more fascinating and personal level.

The Master Clock is a far more precise way of synchronizing the musical flow through the Vivaldi components. It sits outside the signal path regulating the

beating heart of the system by performing all the clocking in one place (when just the transport and DAC are in use the former is slaved to the clock in the DAC). This locks all the digital operations within the three other boxes to the single, highly accurate master clock that is orders of magnitude more precise than those built into each component.

When the Master Clock arrived I was expecting a greater sense of precision and sharper timing and an enhanced feel of the music being more solidly planted with perhaps better strength. I certainly got those, but it was the other directions that the music moved that were so interesting.

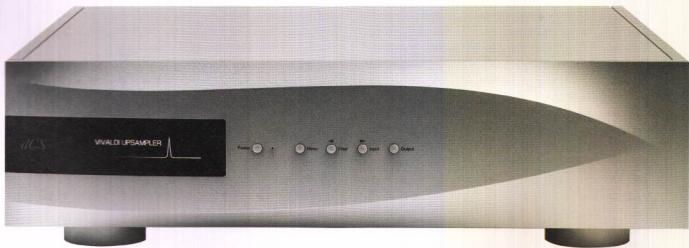
Incorporating the clock into the transport and DAC system produced some barely believable results. Yes, the music is more direct, powerful and better grounded and the anticipated feeling of stability throughout the bandwidth is certainly undeniable, but the clock removes as much as it adds and it is what it leaves behind that is so significant. Once again the system moves further from sounding anything like a ▶

► conventional CD player. What we have come to accept as the 'digital sound' or should I say, the 'sound of digital' recedes even further. Harshness and the spiteful leading edge that so many CDs seem to be embedded with, falls away. Voices, in particular are less artificial, more open and much sweeter. The bitter compressive squeeze that surrounds so many vocal harmonies is replaced by a much more natural feel entirely where each individual part is far better expressed. Everything that the two-box Vivaldi did so well is even further enhanced with the addition of the clock. There are no downsides. It can show you musical threads and harmonic possibilities by removing so many characteristic CD-type colourations that it simply allows you to relax into the music. This was something picked up at a very early stage by Chris Binns when he came round to listen and was only reinforced as the weeks passed. By allowing the music more room to breathe, the Vivaldi grows ever more expansive with the clock in place. So much of what I had always assumed to be studio ambience and digital reverb vanished and while the music certainly seems 'drier', it grows enormously in texture and becomes much more 'real' and touchable. Once again and like the initial two-box set-up, it made me question and re-evaluate so much of what I had taken for granted about CD replay and by definition, what I had always accepted as some of the limitations of home audio.

But while well produced CDs revealed layers of musical delights that I had never heard before, I soon began delving to the back of the piles of discs to find those rather unpleasant sounding examples, expediently released in the 1980's. These would be transfers, largely from analogue master tapes, of music that originally had existed domestically only in vinyl and cassette form. So often these are thin, rather nasty and mean

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sounding discs, flat as a pancake with a built-in harshness and generally uninspiring sound quality that irritates rather than delights. They characterise so much of why some people still dislike CD. I started working my way through the Santana, Steely Dan and Weather Report early catalogues, expecting little. How wrong I was. Now, I don't claim that they were miraculously rejuvenated into masterpieces of digital transfers. The original studio recordings themselves are actually pretty good. Many of the old characteristics were still there but vastly reduced. Paper-thin drums now had a sense of dynamic weight and impressive impact, voices lost much



dCS VIVALDI – TECHNICAL DETAILS

by Chris Blinn

Despite the legacy of the company's previous Scarlatti reference, the dCS Vivaldi has been planned from the ground up to take advantage of the very latest electronic components. The use of FPGA's (field programmable gate arrays) and cutting edge DSP chips has endowed the hardware with massive processing capability (some 200 times greater than its predecessor) and very high data transfer speeds. It also allows the software to control more of the machine's operation.

The Esoteric mechanism is machined from solid steel ingots. A large diameter Duralumin clamp holds the disc securely against the heavy flywheel platter, which is driven by a substantial brushless motor for greater speed stability. The whole assembly is critically damped and mechanically isolated from the rest of the casework and has its own independent power supplies. The Vivaldi transport offers the option of upsampling 44.1 KHz CD data to DXD - 24 bit / 352.8KHz with a data rate of 8.4672 Mbs - or to DSD, the encoding pattern used by SACD, which is played unaltered with a lower data rate of 2.8224Mbs.

The upsampler acts as the hub of the system by accepting digital information from a variety of sources. Connection is available to a network via a RJ45 socket and to computers through both type A and B asynchronous USB (to provide better isolation from the usually less than clean computer clock) and direct input on four SPDIF sockets, two RCA, one BNC and one TosLink. To enable playback of DSD files from a PC or server dCS developed the DSD over PCM (DoP) protocol, a now widely adopted open standard framework. Type A USB will directly play files stored on a stick, with access and information available on the display panel. Direct digital playback is available from Apple devices, because the Vivaldi bypasses the internal DAC and other electronics.

The DAC can cope with any digital data stream at all standard sampling rates. Central to this is dCS's proprietary Ring DAC. This operates by mapping the incoming signal into a unique five-bit code that is used to open and close latches connected to a current source and five resistors of nominally the same value. Because these cannot be made absolutely identical, an array of matched resistors are used and the audio signal is randomly shifted between them with the result of converting what would be amplitude errors into low level random white noise,

which can be easily dealt with. It is this process of passing the signal 'around' that has led to the title of 'Ring DAC'. The end result is a cleaner, more accurate waveform with less noise on its tail that does not require extreme measures to remove.

Filters are available for each sample rate, and these are accessed via the remote control or the front panel. Six of these are filters for PCM decoding and four for DSD, which vary only in the cut off frequency.

Where previous generations of the Ring DAC core consisted of high-speed quad latches and metal-film resistors, the Vivaldi uses individual latch chips. This eliminates the on-chip crosstalk between the latches and therefore improves the jitter performance. Additionally, the total number of latches has been increased to make better use of the available dynamic range.

The analogue output stage has better capability to drive a power amplifier directly, while the redesigned gain switching offers a more consistent performance at both 2v and 6v output settings. A number of other changes including separate low-noise regulators for each channel and opting for discrete transistors in the analogue stage resulted in improved crosstalk and a lower noise floor.

While the other three Vivaldi boxes have their own clocks and will run quite happily independently, the dCS Master clock provides an ultra clean, highly precise clock signal that is ten times more accurate than those in the individual chassis. The crystal reference oscillators are selected for long-term stability and heat-treated before final calibration to ensure a more consistent performance.

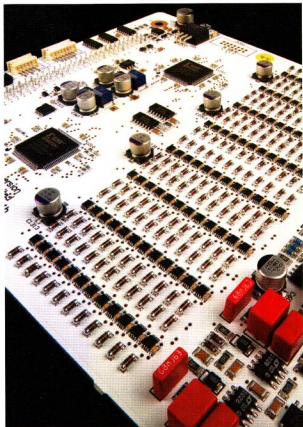
Having heard the full system several times at Chris's house and at the dCS factory, I feel compelled to add some short comment on my personal impressions. Conscious at first of the immense amount of processing going on, I realised that as a result of this my brain was having to do less work in order for the music to reach inside and work on an emotional level. This was CD stripped of all the mechanical artefacts that strangle musical communication, and I found that I had to make little or no effort to concentrate on what I was hearing.

As a recording engineer I spend a considerable amount of time in studios dealing with events further up the line, which does sometimes influence my expectations when listening to music for enjoyment. But I have to say that this is the most fulfilling digital replay I've ever experienced in a domestic environment.

▶ of their boring, one-dimensional character and the whole tonal balance improved out of sight. Again, that irritating CD 'edge' was greatly diminished and there was now a much better feeling of depth, body and stability from these unloved shelf-fillers. Rediscovering older music that you used to love on vinyl but simply couldn't listen to on CD is one of Vivaldi's greatest tricks for me as before I would estimate that up to around 60% plus of my CDs were poor to average sounding. Now that is down to about 25-30%.

The time had come for the family of components to be united and the Vivaldi Upsampler was duly installed alongside a complete wireless network with server. Every component arrival had heralded yet another cabling adventure, but now I was able to hear the full Vivaldi installation doing its thing with more than just CD as a source. Again, I had pondered what kind of improvements the Upsampler might bring. After all, the transport offers limited upsampling abilities from DXD to DSD but the dedicated unit slips between transport and DAC and expands this enormously as well as offering more comprehensive processing and dedicated, isolated power supplies. Connecting either a computer or a NAS drive is simple and the Upsampler can also support DSD over USB, a dCS-originated protocol that also allows the playing of DSD files from a network server. All the processing options that are available to CD replay are also available for the network or computer playback. There is a dCS app that allows full library access and control of playback from the server and the Upsampler will also cater for USB memory sticks, again selectable and controlled through the app. I used both the hard disc storage and USB stick high def. playback extensively during my time with the Vivaldi. I should add that, at this stage, it becomes easier to get lost in the options where the upsampling and filter settings are concerned and it will take a few days of tinkering fun before you settle on your own personal preferences. The Vivaldi, at the heart of a fully blown network/CD, replay system that can also incorporate Apple devices, really is a complete digital processing station.

Even with the network now fully operational I still preferred DSD. Like the Clock upgrade, the Upsampler bought some of the anticipated improvements but there were the big surprises too. Yes, there was another new dimension of seamlessness to the music and more breathing space for each and every instrument or voice but once again, it was what had been stripped away that was so vital. Whoever said "You don't know what you've got 'til it's gone" could have been talking about the Vivaldi. The improvements the Upsampler brings are completely across the board. From the lowest bass note and the exposure of its pitch, tone and character to the most



"Whoever said "You don't know what you've got 'til it's gone" could have been talking about the Vivaldi. The improvements the Upsampler brings are completely across the board."

airy treble suggestion that would have floated by unheard and unloved, the Upsampler knits it all together as the intriguing icing on an already sumptuous cake. The layering of musical perspectives and the lack of instrumental smearing are unique, but like all true improvements it is perhaps somewhat unspectacular to those seeking more Hi-Fi. What it brings is actually less Hi-Fi. It irons out the remaining compressive edges and leaves music sounding tonally rich, whole and rhythmically and dynamically unconstrained and gives you a far better view of each and every instrument with an excellent ▶

▶ and intriguing view of their note envelopes. To say that it is a revelation would be selling it short. It is simply at another level completely. I always say that if you want analogue music, then buy a turntable. But I am bound to say that the full Vivaldi system bears an uncanny resemblance to the best of that format. Though this is not the way I like to think about things generally, I include it for perhaps a clearer picture of what Vivaldi can achieve.

I have been impressed but never completely convinced by SACD to the extent where I would say that the format itself made the difference. I have heard both good and bad SACDs but, listening through the Vivaldi and particularly to the Esoteric SACD Classical re-masters, has just about converted me. The body, musical power and tonal depth are very impressive and of a new order. Textural balance from stringed instruments is completely transformed and the accentuation I am used to hearing between the bow and the string now seems to have shifted to include the body of the instrument to a much greater extent. Similarly, I have never heard brass conveyed with such power and rasp and transient impact. System resolution now reaches much, much deeper into the recording to include a more illustrative view of the shape and size of the orchestra. The balance of the instrumentation just seems so much more natural and warmer through SACD than I have ever heard before and it felt to me as if I was listening to completely re-re-mastered discs.

There is certainly a debate to be had about the staggering cost of the full four-box Vivaldi set-up and depending on how their digitally stored music is sourced, some users

won't require the full system. But the fact is that dCS, a UK company, have essentially redefined both CD replay and digital processing within one family of products. What started as a desire to expand the Ring DAC's potential resulted in an incredibly brave undertaking that was not without risks. They have succeeded hugely I think. No doubt rich buyers, many of them in other markets, will revel in the technical delights. As a CD user I too want one but, alas, cannot afford it. I would happily settle for the two-box version myself and perhaps, if I gave up food and relied on the charity of friends, I could eventually add the other boxes. But, thinking of the entire package costs, I doubt if even that would be enough. I, rather selfishly, want one for the way it makes me feel and for what it can teach me about music. To be able to settle down for the evening, alongside a Vivaldi, with the music of your choice is rather like seeing the curtains draw back for a performance. After just a few bars of music you can see the stage-set before you and can let go of the world, knowing that the musicians will take you on a journey. It becomes an event.

The Vivaldi has much to show us. Harmonic complexity and the explicit nature of instrumental and vocal character, playing techniques and phrasing are a far cry from the bleached and harsh tonality of those high-end machines that seem dedicated to needpoint informational retrieval, but at the expense of the musical experience. I can't help but smile when I see the current silliness that is written about CD replay and the brave new world of streaming audio. It will almost certainly get there, but is not there yet. Then again, I know that none of the writers have probably experienced a Vivaldi in full flow.



When I read a review of any piece of audio I always ask myself why should I buy this and what can it do for me musically? As the years have rolled by and the flow of equipment through my hands has increased I have become ever more music-centric. I would keep the technical prowess of the Vivaldi in my back pocket. It is ultimately the sense of anticipation and the emotional intensity of the musicianship that interests me, alongside the sheer pleasure of just listening to the art. It is both the Vivaldi's greatest achievement and what has kept me interested in high-end audio for so many years. Without the promise of new musical insights and the sheer thrill of the human heart that drives the performances I doubt I could sustain any interest at all. But those deep personal attachments, fascinations and commitments that I feel to the music I love have been given an enormous boost by the dCS Vivaldi and I must thank the company for some lovely moments.

This is what Vivaldi achieves. It is genuinely exciting and compelling to listen to because it is so involving and will draw you into the music, show and even teach you things that will inspire you. Put simply, it is a new generation and level of digital replay. But the music wins every time. +

dCS – FROM 1990 TO VIVALDI

by Chris Thomas

When Data Conversion Systems (dCS) was founded in Cambridge back in 1990, it was to build very high quality digital converters for military applications. But it wasn't until 1997 that dCS released the Elgar, its first product for public consumption, having thoroughly tested the audio waters with a string of professional converters that were used throughout Europe in recording studios.

The Ring DAC, so central to the dCS philosophy, was invented in 1987 to provide conversion from digital to analogue and the latest version, identical in principle but vastly improved technically, is to be found in the Vivaldi DAC. The entry into the professional market came and dCS then developed the world's first 24-bit converters intended for music playback that became a huge success due to their precision, linearity and reliability. It soon became apparent that the digital recording industry and the markets they offered were well suited to the particular skill set of the engineers in Cambridge.

Studios from Abbey Road, the BBC, Bob Ludwig, Cheskey, Denon Records, Panasonic the US Library

dCS VIVALDI PRICE STRUCTURE

Price information:

dCS Vivaldi Master Clock: £9,699

dCS Vivaldi Upsampler: £12,499

Price information from last issue:

dCS Vivaldi CD/SACD transport: £24,999

dCS Vivaldi DAC: £19,999

dCS Vivaldi complete system: £67,196

Manufactured by: Data Conversion Systems Ltd

URL: www.dcsfild.co.uk

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Of Congress, Sony Classics and even Walt Disney Imagineering, as well as many, many others still employ dCS converters every day in their work.

The emphasis these days is strictly on domestic high-end audio and dCS components have achieved an enviable reputation worldwide. The company does have its own way of doing things and it is certainly technology based. It also has a sound of its own, which could be loosely termed high-resolution, common across its scope of digital products from CD transports to DACs, Upsamplers and clocks, all hand assembled in their new premises outside Cambridge.

When I asked MD David Steven what were the first steps on the road to the remarkable Vivaldi system, he said that he had asked the engineers to take the Ring DAC as far as they could with no compromises. What followed sounds like a domino effect development program, where one breakthrough was quickly followed by another as new boards were needed and designed to realise the huge Ring DAC improvements. The rest, as they say, is history – and that is what makes dCS a true British success story.