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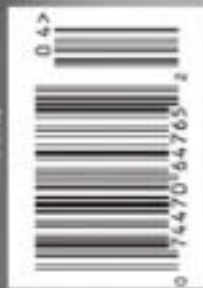
APRIL 2025



dCS Varèse Digital Playback System

15 Pages of Music Reviews

APRIL 2025



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Discover how dCS engineers set new standards in audio performance, with an in-depth look at the unique features and technologies in the Varèse Music System



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dCS Varèse Digital
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BY JACOB HEILBRUNN • PHOTOS BY WRIGHT-STEEL

LEAP





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IN

June 1971 an article appeared in *Stereo Review* about an iconoclastic French-born composer. It was titled “Edgard: the Idol of My Youth.” In it, Frank Zappa recounted that

as a 13-year-old, upon reading an article in *Look* magazine about Sam Goody’s Record Store in Manhattan that mentioned an album of Edgard Varèse’s forays into electronic sound, he became obsessed with finding it. After a months-long quest, Zappa finally struck paydirt in a record bin at



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an audio store in La Mesa, California: “I nearly (this is true, ladies and gentlemen) peed in my pants...THERE IT WAS.” Night after night, Zappa would listen to it with religious fervor in his bedroom (one hearing was enough for his mother to forbid him from playing the LP in the family living room ever again). Zappa always remained faithful to his childhood idol. “His music is completely unique,” Zappa wrote. “If you haven’t heard it yet, go hear it.”

Something similar might be said about the magnificent new five-box dCS Varèse. Like its namesake, this digital colossus is unique, and if

you haven’t heard it yet, go hear it. What you’ll be hearing is nothing short of sonic sorcery. So compelling is the engineering alchemy behind the Varèse system that it casts a spell that endures long after the music has faded away.

Here’s the deal: After he and I heard a demo of the Varèse at Innovative Audio in Manhattan, even longtime LP stalwart Michael Fremer surrendered to its charms: “The attack, sustain, decay, and imaging finally rival good vinyl.” And when my fellow TAS reviewer Alan Taffel recently visited me, he initially commented, “It doesn’t sound like streaming. It sounds analog.”



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By the end of our listening session, which included the last movement of Mahler's monumental "Resurrection" symphony with the Chicago Symphony Orchestra and chorus going full tilt (Solti at the helm), Taffel, agog, like me, at the ability of the Varèse to deliver the whole shebang with nary a hint of dynamic compression, stated: "Your digital has taken a quantum leap." Yeah, baby!

Founded in 1987 and located on the outskirts of Cambridge, England, dCS was originally focused on radar technology and other defense applications before turning its sights to the au-

dio realm. Its first audio product was the dCS 900, a 24-bit analog-to-digital converter, which was way ahead of its time.

My own dCS odyssey began later in the game with the Scarlatti stack, a three-box system comprising CD transport, DAC, and clock, launched in 2007. When the Vivaldi stack (which was upgraded to Apex status about two years ago) appeared, I upgraded to it after hearing it in Manhattan in September 2012 at the audio store Ears Nova. The Vivaldi took a leap forward with the introduction of the Apex analog board in 2022. Apex, as it turns out, was a



With all the changes that dCS has made, I was confident that the new flagship Varèse would sound better. But how much better?

direct spinoff from the research that dCS was conducting for the Varèse, which began as the proverbial blank sheet of paper. Now, in bringing Varèse to a successful conclusion, dCS has done itself proud.

Thanks to an invitation from company director David Steven, I was able to visit dCS headquarters in Cambridge, where I was squired around by the affable Andrew Szelke, a long-time aficionado of all things dCS who recently joined the company as its Program Manager. Steven, the head of the company since 2009, when his father David M. Steven unexpectedly passed away, is understated and intense. Under his leadership over the past decade, dCS has greatly expanded its range of offerings, from its Lina system to the Varèse. The company has around 50 employees and a dedicated listening room, where I heard the Varèse on both Wilson Audio and Magico loudspeakers.

My visit allowed me to gather a wealth of insights into both the Varèse's performance and the Herculean effort that has gone into devising and manufacturing it. (For a full explanation of the passel of new technologies employed in the Varèse see Robert Harley's sidebar.) Particularly illuminating, because they offered an object

lesson in the professionalism and sheer effort required to produce products like the Varèse, were visits to the local factories that mill the casework and produce the electronic boards for dCS. After I donned a white lab coat and attached a yellow anti-static strip from my shoe sole to sock before entering a local contract manufacturer, I almost felt ready to have a go at it myself.

At the heart of dCS' technological efforts are two gifted engineers, Chris Hales and Andy McHarg, both of whom have been with the company for several decades. Hales, who is the director of product development, and McHarg, who is the technical director, underscored to me the difficulties inherent in employing mono DACs (as opposed to a single stereo DAC), but they came up with an ingenious clock-based solution called Tomix to ensure that the two DACs operate in synchronicity. As it happens, Tomix is only one of the many changes that dCS has instituted in the Varèse, including its bespoke Mosaic ACTUS app, improved power-supply regulation (always a good thing), and a "balanced" Ring DAC that converts digital data to an analog output signal. The Varèse also employs a continuous flex-rigid circuit board that

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brings multiple advantages, including the ability to operate at constant impedance because the copper traces are never broken and to put components directly adjacent to heat sinking.

Then there is the hefty pre-DAC Core. This nifty device dispenses with the congeries of digital connections that snake like boa constrictors and pythons up and down the rear of a four-box Vivaldi system. In the brave new world of Varèse, it requires only a single ACTUS cable, which deploys three clusters of pins that are internally insulated from each other (one cluster carries the audio signal and the other two consist of 44.1 and 44.8 clock pairs), to connect each unit to the mother ship. Beam me up, Scotty!

In using the Varèse—its Mosaic ACTUS app (Audio Control and Timing Unified System), its Varèse remote control dial, and its Varèse User Interface, which employs an LCD screen that displays the album cover, track data, and pretty much everything else you could desire—I never experienced any issues. Indeed, everything I saw and heard induced confidence in the rock-solid quality and performance of the Varèse, which corresponds to my own trouble-free use of dCS gear in the past.

With all the changes that dCS has made, I was confident that the new flagship Varèse would sound better. But how much better?

When company head honcho David Steven visited me this past fall, he himself was pretty wowed by the sound of the Vivaldi coupled to the Avantgarde G3 Trios, writing on the dCS Instagram page that “I found myself interpreting songs I know in a different way. I was drawn in and began thinking deeply about the performers and how they were communicating.” It should come as no surprise, then, that I was keenly curious to hear what more the Varèse might deliver.

My first chance came at a local audio store in Bethesda, Maryland, JS Audio, where the Varèse’s pristine treble was instantly audible. Whistle whetted. But let’s face it: There’s no

No sooner did we fire up the Varèse than I immediately heard the distinctions between it and the Vivaldi.

place like home when it comes to auditioning audio equipment. A few months later, the Varèse arrived on a sizable pallet and was installed by the company’s effervescent North American head of sales, Emron Mangelson. Initially, he wanted to set up the Vivaldi side-by-side for the sake of direct comparisons. I demurred. Having lived with the Vivaldi for over a decade, I reckoned that it was firmly imprinted in my sonic memory. I wanted full immersion—the Full Monty, as it were.

No sooner did we fire up the Varèse than I immediately heard the distinctions between it and the Vivaldi. But perhaps not as starkly as you might expect. This unnerved Mangelson but came as no surprise to me. The Varèse sounded more panoramic and detailed and smoother than the Vivaldi, but it clearly needed a goodly amount of break-in. The engineers at dCS told me that around 100 hours should constitute the majority of break-in, but I think that it continues to change after several hundred hours of operation.

What ensued after I had run the Varèse in for a couple hundred hours, however, was most impressive. The lowering of the noise floor by at least 5dB has a multitude of sonic benefits. For one thing, it induces a sense of serenity in the way music is projected. On the instrument that I am most familiar with from my own playing days, it was revelatory to hear not simply superior transient accuracy but also the silky ease with which the Varèse reproduced adagio passages. The abundance of micro-detail that the Varèse extracts from a recording means that the smallest quaver in a legato passage is immediately audible, endowing it with a sense of lifelike realism that it did not possess with the Vivaldi. Take the celebrated German trumpeter Matthias Höfs. The Varèse did an impeccable job of conveying his nimble, pure, lithe playing on a variety of tracks, including on an album on the Es-Dur label that was devoted to transcriptions of Bach sonatas.



Another attribute of the Varèse that shone on this and other recordings was its irreproachable imaging. Put bluntly, I have not previously heard various instruments reproduced with such unwavering fidelity. There was not even a hint of one instrument intruding upon another. Instead, on the Es-Dur label trumpet recording, the accompanying harpsichord and bassoon were locked into place. Another way of putting this is that the spatial relationships of the instruments rivaled what you would hear on a well-recorded LP.

The Varèse also demonstrated remarkable prowess at situating a solo piano, long one of the most difficult instruments to record, firmly in the concert hall without any blurring or smearing or hardening of the notes. On a recording of Valery Afanassiev playing Beethoven's *Moonlight* sonata, I was struck by the lucidity of the playback. It was simplicity itself to discern the various musical lines, accented notes, and pedal work. The rhythmic surety of the Varèse is something that is never less than striking and a direct product of its interstitial silence. Add in the decays that seem to linger into infinity on the first adagio movement of the *Moonlight* sonata, and it packed a real emotional wallop. In 1837, a decade after Beethoven perished, Stuart Isacoff reports in his recent book *Musical Revolutions*, Franz Liszt played the funeral first movement of the *Moonlight* in the evening for Hector Berlioz and other friends in a salon lit by a single candle whose flame went out. As they listened in the pitch-black darkness, the host reported that "the rest of us remained rooted to the spot where we happened to be, no one attempting to move....I had dropped into an armchair, and above my head heard stifled sobs and moans. It was Berlioz."

The opening electric guitar riff, played by Keith Richards, emerged like the roar of a jet engine, while the drums delivered a sense of finality because of the Varèse's ability to dig deep into the nether regions.

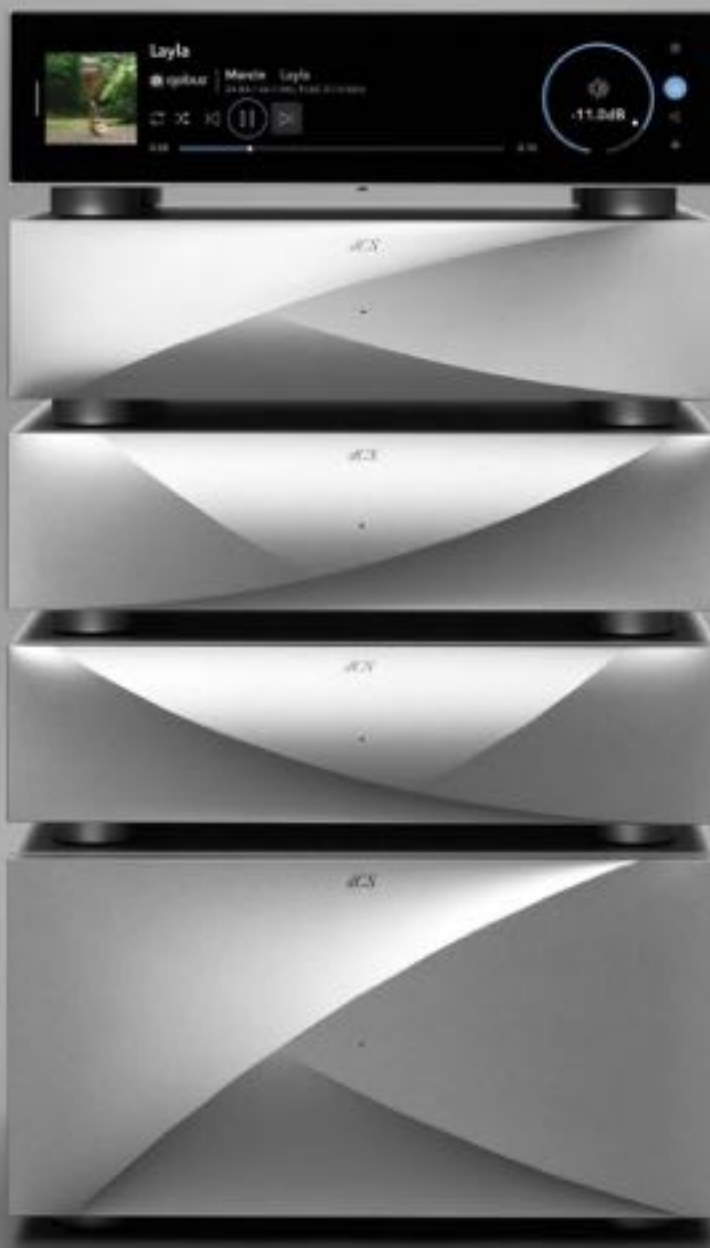
Maybe I wasn't reduced to sobbing and moaning, but it was moving to hear this solemn movement conveyed by the Varèse with such resonant fidelity. Hitherto, digital playback, it must be said, has always suffered in comparison to LP in recreating the ambience of a musical venue, but the Varèse narrows, if not closes, the gap to a degree that may unsettle, even unnerve, enthusiasts of vinyl playback.

Then there is its dynamic prowess. The lower noise floor creates the sensation that the Varèse is playing more loudly than the Vivaldi at the very same volume setting. This is a phenomenon that I observed in my own system. It also occurred during the aforementioned event at Elliot Fishkin's Innovative Audio store, where a certain bearded former editor of *Stereophile* pulled out his trusty meter to verify that the sound pressure levels were the same, even though the Varèse seemed to be subjectively louder.

For all its finesse, then, the Varèse was unstinting when it came to large-scale dynamics. One track that I played several times was "Can't You Hear Me Knocking" from the Rolling Stones' 1971 album *Sticky Fingers*. As it happens, hearing it was no problem. The opening electric guitar riff, played by Keith Richards, emerged like the roar of a jet engine, while the drums delivered a sense of finality because of the ability of the Varèse to dig deep into the nether regions. No, the Varèse can't compensate for some of the lingering hash in the original Stones recording, but it sure sounded compelling.

The Stones, needless to say, are a British band. Another outfit from the United Kingdom, the London Philharmonic on a nifty Decca recording of Benjamin Britten conducting his *The Young Person's Guide to the Orchestra* and the *Simple Symphony for Orchestra*, also sounded superb on the Varèse. The reason is that the dCS unit doesn't harden or get overwhelmed on an orchestral crescendo but instead maintains its composure. Take the opening fanfares of the *Young Person's Guide*. The trumpet section sounded as if its notes were expanding in space in real time and the ensuing cymbal crashes had much the same effect.

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At the same time, the Varèse precisely rendered the pizzicato violin passages. The clacking of wood blocks sounded spookily realistic. The Varèse was not only able to capture the transient impact of a note but also to reproduce it resounding in space in what seemed like real time in Kingsway Hall. It was the sonic equivalent of watching a contrail emerge and fade away in the upper atmosphere behind a jet engine. Another recording on which the Varèse delivered tremendous oomph was on a Delos recording of Andrew Litton conducting the Dallas Symphony Orchestra on Shostakovich's Eighth symphony.

Some of this sense of deep bass and instrumental specificity, I hasten to add, on these re-

dCS Varèse Digital Playback System

Specs & Pricing

Type: Varèse Music System

Color: Silver

D/A converter: dCS Differential Ring DAC

Analog outputs: 2x pair balanced outputs on 4x XLR connectors (output impedance: 1.5 ohms); 2x pair unbalanced outputs on 4x RCA connectors (output impedance: 52 ohms)

Maximum load: 600 ohms (10k–100k ohms is recommended)

Output levels: 0.2V, 0.6V, 2V, 6V rms for a full-scale input, set in the menu

Digital inputs: Ethernet on RJ45 connector for network streaming; USB Type A connector for mass storage devices (navigated using Mosaic ACTUS); If the Digital I/O Module is fitted to the Varèse Core: USB 2.0 interface on B-type connector, accepts 24-bit 44.1–384kS/s PCM, DSD/64 & DSD128 in DoP format; 3x AES/EBU inputs on 3-pin female XLR connectors, accepts 24-bit 44.1–192kS/s PCM & DSD/64 in DoP format; AES1+2 act as a Dual AES pair, accepts 24-bit 88.2–384kS/s PCM, DSD/64 & DSD/128 in DoP format

Digital outputs: If the Digital I/O Module is fitted to the Varèse Core, 1x SPDIF interface on RCA phono connector, outputs 24-bit 44.1–192kS/s PCM, DSD/64 in DoP format

Word clock I/O: If the Digital I/O Module is fitted to the Varèse Core, 1x Word Clock output on 1x BNC connector; outputs a TTL-compatible Word clock at either 44.1kHz or 48kHz depending on the input sample rate

Sample frequencies and formats: 44.1–384kS/s up to 24 bits; DSD/64, DSD/128, DSD/256, DSD/512; native DSD + DoP; FLAC, WAV, AIFF

Residual noise: Better than 118dB0, 20Hz–20kHz

Spurious responses: Better than -115dB0, 20Hz–20kHz

Power supply: Self-selecting for 100, 115, 220, and 230V AC 50–60Hz

Dimensions: User interface: 131mm x 444mm

x 450mm / 17.5" x 5.2" x 17.8" (includes Bluetooth aerial depth); master clock: 131mm x 444mm x 437mm / 17.5" x 5.2" x 17.3"; left mono DAC: 17.5" x 5.2" x 17.3"; right mono DAC: 17.5" x 5.2" x 17.3"; core: 17.5" x 9.7" x 17.3"

Weight: User interface: 14.6 kg/32.2 lbs.; master clock: 15.7 kg/34.7 lbs.; left mono DAC: 18.7 kg/41.3 lbs.; right mono DAC: 18.7 kg/41.3 lbs.; core: 33.1 kg/73 lbs.

Price: \$254,000

DATA CONVERSION SYSTEMS

Unit 1, Buckingham Business Park
Anderson Road
Cambridge, CB24 4AE
United Kingdom
dcsaudio.com

Associated Equipment

Loudspeakers: Avantgarde Trio G3 with six Avantgarde SpaceHorns

Subwoofers: Wilson Bensech IGx infrasonic generators (two pairs)

Linestage: darTZeel NHB-18NS Mk. 2

Phonostage: CH Precision P10, DS Audio Grand Master

Power amplifier: darTZeel NHB-468 mono-block, BWS 6384-SE monoblock

Analog source: Wilson Benesch GMT One, TechDas Air Force Zero

Phono cartridges: DS Audio Grand Master EX, Miyajima Infinity mono, Wilson Benesch Tesselate Ti

Digital source: Vivaldi SACD/CD playback system

Cable and interconnect: Transparent Magnum Opus, Nordost Odin 2

Power cords: AudioQuest Dragon, Nordost Odin, ESP Essence, Isoclean Supreme Focus

Power conditioner: Nordost QBase, Equitech 10WQ

Support Systems: Stillpoints Ultra ESS, Harmonic Resolution Systems VXR



The ability of the Varèse to produce a majestic and imperturbable soundstage was unparalleled in my experience.

cordings is because there has been something of a British invasion in my system in recent months that includes the installation of no fewer than four Wilson Benesch IGx infrasonic subwoofers—two in the front of my room and two in the rear—that dig deep, very deep, into the bass frequencies and relieve the imposing Avantgarde SpaceHorns of the burden of diving much below 40Hz. But it was the Varèse, of course, that was feeding the signal in the first place.

Overall, the ability of the Varèse to produce a majestic and imperturbable soundstage was unparalleled in my experience, close, on some orchestral recordings, to the real thing, at least in terms of visceral force and ambience and tonal accuracy. To further move away from strict audiophile terms for a moment, there is an overwhelming generosity to the sound, a warmth, richness and refinement that banish quotidian cares and carry you away into a higher musical realm. Quantum leap, indeed.

Robert Harley on Varèse's Technology

Warèse is an incredibly sophisticated system that introduces a host of innovations along with significantly improved execution of the company's established technologies. As described by Jacob, Varèse comprises five chassis: the Core that performs nearly all the digital signal processing, the Master Clock that synchronizes the system, the User Interface, and the dual Mono DACs. Let's take a deeper look at the new technologies developed for Varèse.

ACTUS INTERFACE

Varèse requires the equivalent of five AES/EBU interfaces, five BNC connections, and two RS232 cables to connect each of the five chassis and allow them to work as a unit. Given the number and complexity of the signals transmitted between the components, dCS created its own interface both to simplify connection and to improve performance. Rather than leave the quality of these connections to chance, and to make installation easier, dCS created its own interface called ACTUS (Audio Control and Timing Unified System). A combination of a new multi-pin connector and software, ACTUS carries asynchronous and error-corrected digital audio, control signals, and master clock signals. The dual DACs, Master Clock, and User Interface components each connect to the Core with one 12-pin ACTUS interface. The ACTUS interface allows the five components that comprise Varèse to communicate with each other and act as one. Moreover, rather than transmitting audio over a synchronous interface such as AES/EBU, ACTUS uses an asynchronous error-corrected interface, meaning that there's bi-directional communication between source and receiver. ACTUS doesn't rely on any standard interface protocols, instead creating an entirely new system that fits the demands of Varèse's architecture.

THE RING DAC REIMAGINED

dCS is justifiably famous for its Ring DAC architecture, which has proven itself in countless products over the past three decades. It is essentially a hybrid of multi-bit and sigma-delta (one-bit) conversion techniques that randomizes the inevitable conversion errors, turning what would be audible distortions into a very low level of noise.

The Ring DAC resembles a ladder DAC in many ways, but rather than rely on binary weighting between the ladder "rungs," in which each successive rung has double the value of the rung below it in the binary progression 1, 2, 4, 8, 16, etc., each of the 48 rungs is fed a current source of equal value. The current source for each rung isn't fixed but rather is shifted by a field programmable gate array so that any differences in the value of the current source due to the inevitable component tolerances are randomized between the rungs.

The Ring DAC receives oversampled and filtered audio data. The DAC then modulates that data to a five-bit code. It's this five-bit code that is input to the Mapper, which distributes it to the current sources in the DAC. Now, here's where the Ring DAC gets its name: The five-bit code is passed around the rungs so that any errors caused by component tolerances in the rungs are randomized. The Ring DAC combines the best features of one-bit and multi-bit DACs, avoiding the compromises of each.

dCS has taken this core technology and reimagined it in a cost-no-object execution. Specifically, the Varèse's ring DAC is now differential, meaning that the circuitry is doubled, with one half of the circuit processing the audio signal and the other half processing the same signal but polarity inverted. One set of 48 current sources generates the analog signal in positive polarity, and a second set of 48 current sources generates the analog signal in inverted polarity. When the two signals are summed, any remaining non-linearities created by resistor tolerances in the Ring DAC are removed from the output signal. This technique confers many advantages, including obviating the need for DC-offset correction, lowering distortion, and lowering the noise floor by 5dB (that's a lot).

As mentioned, this differential Ring DAC requires double the circuitry with the concomitant cost increase per DAC. Each channel has its own differential Ring DAC along with its own power supplies (and separate clock supplies)

POWER SUPPLY IMPROVEMENTS

In addition to these new or reimagined technologies, dCS has implemented the supporting circuitry at the highest level. The power supply is quite sophisticated, with dual power transformers in each mono DAC, each optimized for supplying digital or analog circuits. dCS developed a new power-supply regulation topology with power sequencing under IC control for precise circuit activation and deactivation. The DC supplying the audio circuits undergoes an additional level of regulation, resulting in smoother and quieter DC. In addition, the circuit board layouts have been redesigned to reduce connections between separate PC boards.

MONO DAC CLOCKING

Housing the left and right channel DACs in their own chassis creates a challenge in precisely clocking and synchronizing the two channels. This isn't an issue with a stereo DAC where the same clock feeds both DAC channels that are housed in the same chassis. To overcome this challenge, dCS developed a technology called Tomix. Here's how it works. The Varèse Core sends a clock to each Mono DAC but adds a time stamp to each audio sample before sending it to the DACs. A field-programmable gate array (FPGA) in each DAC reads the time stamp embedded in the clock so that the two DACs can be perfectly synchronized. Significantly, Tomix doesn't just align the clocks' leading edges with each other; that could result in one DAC being exactly one or more clock cycles out of sync with the other DAC. The time stamp embedded in the clock's trailing edge allows both left and right clocks to ensure that one DAC isn't leading or lagging by one or more samples. How dCS embeds the time stamp in the clock is extremely innovative, but beyond the scope of this description. dCS has been awarded a patent for Tomix. This is perhaps the most impressive piece of engineering and innovation in Varèse.

SUMMING UP

Varèse is packed with innovative new technologies (ACTUS interface, Tomix clocking), the ultimate realization of their Ring DAC with differential circuitry and other refinements, improved power supply design, and an array of small tweaks. It is an amazingly sophisticated product that advances digital audio playback technology. 