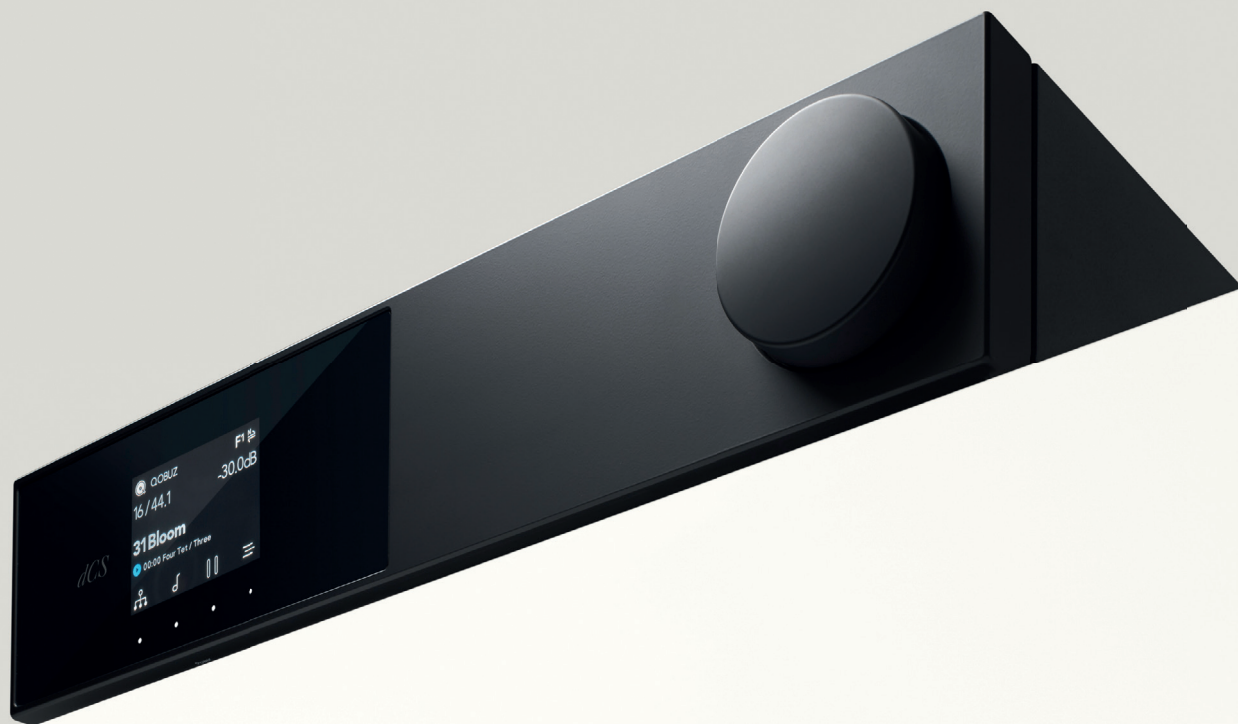


dCS Lina DAC X digital converter

Rafael Todes



By dCS standards, Lina DAC X's £13,500 price tag is quite modest compared to their offerings that cost significantly more. The Bartók with APEX is £19,000 and is a staple in my system; it delivers an exceptional high-end digital performance that extracts every bit of detail from a well-recorded piece. The Lina DAC X builds upon the basic Lina, increasing the unit's size - the Lina is 22cm wide, while the X measures 44cm. Essentially, the standard Lina was designed for a headphone-based system, whereas the DAC X is probably better suited for a speaker-based system.

The other notable differences include the large volume knob for quick volume adjustments and infrared control. The unit is crafted from solid aluminium billet and is available in an aluminium or black finish. It is reassuringly heavy, weighing 14kg. The remote is made from alloy and, aside from servicing the usual functions, also manages the setup menu, upsampling, phase and filters.

Driving amps

The Lina DAC X can drive a power amplifier directly, with both XLR and single-ended outputs. It has two AES/EBU inputs, which can be used as a pair to support incoming sample rates of up to 384kHz, one S/PDIF BNC coax, an S/PDIF RCA, a Toslink, a USB PCM, DSD, DSDx2 in asynchronous mode, and a USB connector which can attach to a storage unit. There is also a USB-B port for PC or Mac connectivity.

The other feature of dCS systems, which I very much value, is the ability to adjust output voltages directly from within the Mosaic app. This can range from 0.2V to 6V. I discovered that the optimal setting for the Bartók was achieved by using the highest voltage available and an external passive preamp to manage the overall volume. The unit doesn't operate wirelessly, so it must be connected via a network cable. If a wired connection is problematic, this can be resolved by using a mesh system with a wired link to a satellite mesh receiver.



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Within the well-designed Mosaic App, there are a variety of filters that apply at different sample rates. A particularly impressive feature is the ability to upsample to DSDx2, which, based on my experiments with the Bartók, is the smoothest and most airy option. The display is a departure from most dCS designs, except Varèse. The screen features four lights that you press to make a selection, whereas the Bartók has buttons on the side.

dCS is excellent about its firmware updates. The Bartók now is a different beast from the original Bartók, both in terms of hardware and firmware. The APEX modification made a night-and-day difference, while the Mosaic updates brought new filters and functionality. This is a clear sign of a company that takes its corporate responsibilities seriously, giving users the confidence that their investment in digital electronics is safe. Expect Lina DAC X to be the same.

Listening

I did my listening using a Lina Clock, which gave additional spatial information that I found highly worthwhile. I fed the Lina DAC X into a Townshend Allegri Reference preamplifier into a pair of VAC Signature 200iq power amplifiers driving a pair of B&W 802D4s. I used a PS Audio PS10 power regenerator and Townshend Audio cabling throughout.

First listening is a trusty favourite, Bach Brandenburg No 4, conducted by Raymond Leppard with the ECO, initially recorded by Philips in analogue in 1974. It remains a fabulous recording and something of a classic! There

is a lovely sense of an orchestra in front of me, with considerable spatial detail, and the sense that it portrays musicians interacting and enjoying themselves in 1974.

The colours and textures of the instruments are all beautifully portrayed, perhaps a little short of the mighty Bartók at over £10,000 more, but utterly credible and highly communicative and enjoyable from a listener's point of view. There is a precision to the attack of the bows on strings, notes start and stop with an accuracy I have come to expect from dCS.

The different textures of the strings, harpsichord and two recorders are kept sanitarly separate - thus the sonic picture is a highly detailed one.

Next up, a superb Decca recording of the Scherzo from Mahler's 7th Symphony, with the Chicago Symphony Orchestra, recorded in 1971 and brilliantly transcribed to digital. My first reaction to what I'm hearing is like I'm listening back "in the box" from a master tape source.

The sound is ultra clean and detailed - there are some difficult-to-reproduce mutterings from the bass drum, which the dCS Lina DAC X does with consummate ease. The double basses are earthy and gritty, the violin section is extensive and weighty, and the neurosis of Mahler's score translates brilliantly. The violins are a little brighter than Bartók's version, I note in passing, but superbly clear. Rhythmically, the Lina is stunning - exemplary timing of the orchestra's forces. All extraordinary from a recording that is 54 years old!





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» Jazz-time

Moving on to jazz, *We Get Requests*, Oscar Peterson and his trio, with 'You Look Good to Me', of course. The trio's performance is immaculate, swift, and precise. The swing of the music is also beautifully conveyed through the Lina DAC X's flawless timing, making it toe-tapping. The piano is nuanced, the percussion is tight, and the bowed bass rasps - you can feel the lower strings vibrating in a close-miked recording, and altogether this exemplifies what great audio does, making the listener believe they are right there!

Listening to Antonio Forcione's *Tears of Joy*, the opening track shows how superb an acoustic guitar can sound when digital is properly implemented. The attack on the pizzicato is precise and swift; spatially, the supporting instruments are layered holographically in space. The cello's texture is incredibly lifelike, the overall presentation is immensely dynamic, and I have rarely heard this sound better. It's like viewing the performance through a freshly cleaned window, where it feels as if nothing obstructs the speakers and performers. I haven't heard a network DAC at this price point sound as convincing as this.

'Chitlins Con Carne' is a track from one of Kenny Burrell's Blue Note sessions, and was recorded in 1963. I have the original release on vinyl, and for my money, the digital version on the dCS Lina DAC X just sounds better. It's more dynamic, more communicative and quieter on the noise front. Without wishing to step into the digital/analogue standoff, there are recordings which, when transferred at high resolution from the master tape, have so many fewer processes going on that it is not difficult for them to sound better, and in this case, it does. Texture, space, and attack - with the dCS, this recording is in a different league compared to the original analogue vinyl pressing, now streamed on Qobuz.

Hall of fame

So the dCS Lina DAC X rightly earns its place in the dCS Hall of Fame. It embodies the dCS house philosophy,

characterised by meticulous, no-compromise engineering, an absence of a sonic signature in the best sense, and fits seamlessly into the illustrious line-up of Bartók, Vivaldi, and Varèse. It is attractive, very easy to operate, and is certain to become a timeless classic! +

Technical specifications

Type: Digital converter with streaming and preamp functionality

Digital Inputs: 2 x AES/EBU Used as a Dual AES pair (1+2), supports sample rates up to 384kHz, 1 x S/PDIF BNC Coax 44.1-192kHz, 1 x S/PDIF on RCA 44.1-192kHz, 1 x Toslink 44.1-96kHz, 1 x USB Type B 44.1-384kHz PCM and DSD, DSDx2 in Asynchronous Mode

Network connection: 1x RJ45 (Ethernet), 2x RJ45 (Power Link connection)

Mass Storage: 1 x USB Type A connector (navigated using Mosaic)

Analogue Outputs: 1 stereo balanced pair on 2x 3-pin male XLR connectors, 1 stereo unbalanced pair on 2x RCA Phono connectors.

Formats supported: PCM 44.1-384kHz, up to 24-bit, DSD/64, DSD/128. Native DSD + DoP, FLAC, WAV, AIFF, MQA

Streaming supports the following platforms and services: UPnP, Internet Radio, Qobuz, Spotify, Deezer, Tidal, Roon Ready; QQ Music

Upsampling: Multi-stage DXD oversampling with switchable DSD Upsampling

Dimensions (WxHxD) 44.4x12.2x35.6cm

Weight: 14kg

Price: £13,500

Manufacturer Data Conversion Systems Ltd

🌐 dcsaudio.com

UK distributor Absolute Sounds

🌐 www.absolutesounds.com ☎ +44(0)208 971 3909



dCS Lina DAC X Technologies

Lina DAC X combines established dCS technologies and several new innovations. Some of these stemmed from the development of Varèse, our latest flagship system. The company's aim with Lina DAC X was to deliver all the benefits listeners have come to expect from dCS and utilise some of the advances it had made working on Varèse, which encompassed a series of research projects carried out over the past six years. This research has been carried out across mechanical design, electronics design and software engineering, all seeing radical innovation (in the dCS world at least) within the last few years.

We spoke with James Cook, dCS Product Marketing Manager, on the technologies seen in the new Lina DAC X.

Flex-Rigid PCBs

Several dCS products, including Lina DAC X, now feature flex-rigid printed circuit boards (PCBs). This development stemmed from a Varèse research project looking at electronics design.

A flex-rigid PCB is a single printed circuit board made up of multiple pieces, which are connected by continuous flexible conductors.

Utilising a flex-rigid PCB allows us to have what would otherwise be multiple PCBs (one board for signal processing, another for the digital-to-analogue converter, another for I/O and so on) unified onto a single board. This means there are no interconnects between separate PCBs.

This removes any possibility for slight differences in how interconnects are routed – a few millimetres difference in how a ribbon

cable is placed can have effects on the performance, for example. Using flex-rigid PCBs allows for short signal paths for key signals (such as clock circuitry, analogue signals), helping to maintain signal integrity throughout the product – all of which helps to ensure optimal performance and sound quality during playback.

It also reduces the risk of crosstalk and helps to further improve reliability. An additional advantage is that the flex-rigid PCBs are easier to test.

Flex-rigid PCBs are challenging to manufacture – to our knowledge, we are the only audio manufacturer to utilise them in our products – but their use brings several benefits.

The Lina DAC X PCB contains over 2,000 surface mount components on a 12-layer flex-rigid PCB, which folds four ways to fit the Lina DAC X chassis.

Chassis Design

As part of the Varèse project, we investigated how we could improve our chassis design. Typically, the chassis of an audio product would be made from multiple individual panels – one for the top, one for the bottom, and one for each side – which are then secured together. Previous dCS products have used separate panels milled from billet aluminium, which are secured together with no visible fixings.

Our latest products, including Lina DAC X, feature a more ambitious, complex chassis. The main structure of the Lina DAC X chassis is constructed from just two parts: the top and sides are all milled from one single billet and the base, front and rear from a second. Reducing the number of panels means a more electrically sealed environment, as there are fewer gaps in the chassis

for any unwanted interference to get into or out of.

It also allows us to incorporate other elements – such as mounting points or standoffs for PCBs – into the metalwork of the chassis. Other designs separate PCBs from the chassis with plastic or metal standoffs, which are pressed into the chassis and then secured with self-tapping screws. This can create some variance in how far the PCB is mounted from the chassis, which can have performance implications (consistency of board height compared to the ground plane – the chassis – aids performance).

The standoffs within Lina DAC X are machined from the same aluminium billet as the chassis plates (including screw threads), so there is no variance in their height and no self-tapping screws needed. This provides great consistency of the height between the PCB and chassis.

The chassis design of Lina DAC X, coupled with the use of a flex-rigid PCB, has also allowed us to isolate power supplies from other components. The top plate of the unit includes a significant aluminium channel that runs along the centre line of the product. Viewed from the front, the left-hand side of the channel houses the PCB, and the right-hand side houses the mains transformer. This separation is made possible thanks to the flex-rigid PCB keeping all of the electronics housed in one half of the chassis, leaving the other half free for the transformer.

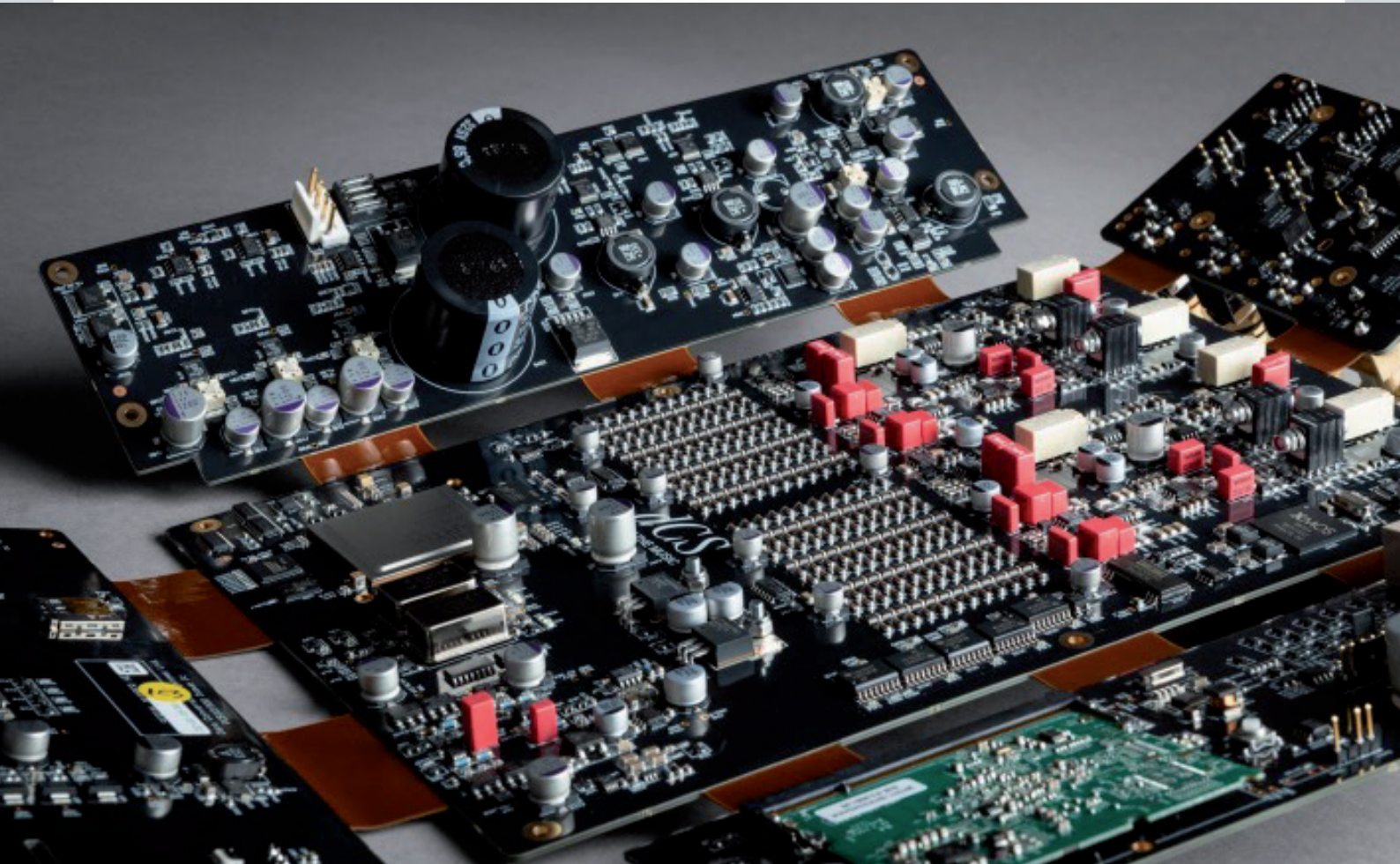
Ring DAC

Like all dCS products, Lina DAC X utilises several technologies that are unique to dCS – some of which have been carefully honed and refined





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The four-way flex-rigid PCB found inside a Lina DAC X

» over many years. The most notable of these is the Ring DAC, a bespoke D/A converter that is found at the heart of all dCS DACs and music players. It allows the Lina DAC X to convert signals to analogue with vanishingly low levels of distortion.

This low distortion level is true at any signal level, even at low amplitudes (such as quiet musical passages or delicate reverb tails) where other DAC architectures will often lose fine detail to distortion. The Lina DAC X benefits from our advanced Mapper algorithms, which distribute digital audio samples to the

Ring DAC current sources at ~6MHz, ensuring no unwanted interactions between current sources occur.

The hardware of the Ring DAC is composed of an array of 0.1% precision metal film resistors, each with an accompanying latch to activate or deactivate the current source based on the Mapper. The latches are fed a clock signal generated by ultra-high quality VCXOs (voltage controlled quartz crystal oscillators) that operate within our bespoke Phase Locked Loop circuitry – a section that other manufacturers simply use off-the-shelf chipsets for.

A number of elements inside the Lina DAC X are locked to the VCXOs – such as the switching power supply elements and the front panel display – to ensure no unwanted noise is generated inside the product. This means listeners do not need to perform tasks such as turning the display off to achieve the best sound quality.

Lina DAC X is an important product for the company, as it brings the core values and performance that dCS has to offer at a price that introduces the brand to a new generation of music lovers. +