VUMETRE #3
MAGAZINE HI-FI INDEPENDANT NON CONFORMISTE

CERRONE

Exclusive
Heed Obelisk Si & X2
30th anniversary series!

The exception that proves the rule

CH Precision D1.5, X1, C1.2 & T1

DAC/CONTROLLER, CD/SACD PLAYER, EXTERNAL POWER SUPPLY AND EXTERNAL CLOCK

CH PRECISION C1.2, D1.5, X1 & T1

Laurent Thorin

The in-depth review of the CD/SACD player/transporter in issue 43, was only the first article in a new series. Indeed, instead of getting its D1.5 back, CH Precision lent us the new C1.2 DAC/Controller, the separate X1 power supply and the T1 external clock. This in the spirit of enlightenment, introducing us to the wider reality of the global product concept developed and elaborated by the redoubtable Swiss team. We might not be scaling the top of its digital performance pyramid (THAT involves nine separate boxes) but we are already traversing the upper slopes of musicality. This is how, for several months, we have been able to enjoy this exceptional digital source, whose philosophy and performance we are about to try to describe to you. This almost "full set" represents 84 kg of high technology and 20 years of research...

In our first article about CH Precision, back in issue 40, we established the Swiss manufacturer's philosophy and their focus on a systemic approach. This way of thinking, initially developed in the social sciences, is particularly appropriate to the field of hi-fi, where each system responds, by definition, to its own logic. In order to identify the logic, one must first understand the way information circulates within that system.

A system must be understood holistically, as a totality. Assuming that it is well designed, its appeal should lie in the fact that the whole is greater than the sum of its parts. Each part modifies both the system as a whole and the functioning of its other parts. Any individual part does not necessarily behave in the same way in one system as in another. This is why the system's performance changes as soon as you add or subtract any part of it. Ultimately, this is both the key to and what makes the concept so interesting: that change can be introduced by any part or element of the system.

Of course, this careful observation applies to any system: not only to a system composed of several CH Precision components, but also to each CH Precision component independently. After all, each device is itself a system and the product of a system. This is a daunting thought, because once you appreciate the high standards of this Swiss manufacturer, you know that they'll leave absolutely no parameter or detail to chance. This is the founding philosophy of CH Precision: everything must tend to perfection. On the last page of the company's beautiful brochure, it quotes Sir Henry Royce, a quote that encapsulates this perfectly: *"Strive for perfection in everything you do. Take the best that exists and make it even better. And if it doesn't exist, create it."*

VUMETRE RE!MARKABLE!

TECHNICAL SHEET

ORIGIN
Switzerland

PRICE
€ 35.600 (D1.5)
€ 16.000 (X1)
€ 32.850 (C1.2)
€ 23.200 (T1)

DIMENSIONS
440 x 440 x 133 mm

WEIGHT
20-22 kg

Once you combine that obsessive demand for quality and performance with the knowledge that the brand's founders were also responsible for one of the best audio design ateliers, you get a much clearer picture of how CH Precision has approached its digital source. In a way, its actual goal, its true and final digital source, is the nine-chassis configuration. In terms of thinking, that's the starting point. But to make this reality accessible, even if only on a practical level, each function has been separately assigned, implanted in an independent box, each one connected to the others by a series of intelligent links.

Since, in practice, economic pressures are all too real, the company has made it possible to acquire the boxes by stages, starting with just a single unit, that first

brick being the D1.5 player. Given the performance goals of the digital system as a whole, it's hardly surprising that each link in the chain is exceptional in its own right. But the rigour of this Swiss systematic approach ensures that the whole is still greater than the sum of its parts, something that's obvious as soon as you start adding extra bricks...

The level and intricacy of the technological sophistication deployed across these four machines is simply insane. You couldn't cover it given a whole issue of VUmètre. That's why we have concentrated on describing the brand's philosophy and our listening experiences, rather than dissecting the devices component by component. For those of you who wish to know more, the company offers a detailed description and technological breakdown of each product on its website as well as in a magnificent printed brochure that you can consult at your leisure.

A LITTLE BIT OF PLAYBACK

It all starts with the CD/SACD transport/player. Having analyzed the D1.5 in depth in issue No. 43 (September/October 2022), we won't go back over its technical details. What we can say is that in this four-box system, it serves as a dedicated transport. It reads optical discs, but it does not provide any D/A conversion. The signal leaves the D1.5 for the C1.2 converter in standard digital formats or via the CH-LINK HD cable. This is a proprietary inter-

TECHNICAL SHEET

D1.5

FREQUENCY RESPONSE
DC - 20 kHz for CD / DC - 50 kHz for SACD

FULL SCALE ANALOGUE OUTPUT LEVEL
4V RMS balanced
2V RMS unbalanced

DYNAMIC RANGE
> 96dB for CD and > 120 dB for SACD

SIGNAL TO NOISE RATIO
120 dB for CD and SACD

TOTAL HARMONIC DISTORTION + NOISE
< 0.002% for CD < 0.0015% for SACD

C1.2

< 0.002% for CD < 0.0015% for SACD

DSP PROCESSING CH-PETER
Sampler, synchronous, DSD to PCM conversion and resolution amplifier

ANALOGUE OUTPUT LEVELS
5.1V RMS balanced
2.55V RMS unbalanced

SIGNAL TO NOISE RATIO
> 120 dB

TOTAL HARMONIC DISTORTION + NOISE
< 0,001 %, pleine échelle, bande passante 22 kHz

T1

NOMINAL FREQUENCY
10 MHz, +/- 20 ppb, internal mode
10 MHz, +/- 1ppb maximum,
GPS option locked for 1 hour

PHASE NOISE PERFORMANCE
< -105 dBc/Hz at 1 Hz
< -125 dBc/Hz at 10 Hz
< -145 dBc/Hz at 100 Hz
< -155 dBc/Hz @ 1 kHz
< -165 dBc/Hz @ 1 kHz and above

OUTPUT LEVEL
500 mV or 1 V, peak-to-peak, loaded with 75 Ω
Sine or square wave
6 BNC 75 Ω outputs

EXTERNAL REFERENCE INPUT LEVEL
5V TTL
50 Ω BNC input

ACCEPTED REFERENCE INPUT FREQUENCIES
1 PPS, 44,1 kHz, 48 kHz, 88,2 kHz, 96 kHz, 176,4 kHz, 192 kHz, 100 kHz

MAXIMUM REFERENCE INPUT FREQUENCY DEVIATION
+/- 0,1ppm


Designed and manufactured in Switzerland by
CH Precision Sàrl
ZI Le Trési 6D
1028 Préverenges
www.ch-precision.com
C1.2 2-channel D/A controller
Serial: 0Y9F1407
Max power: 100W
MQA
MQA and the Sound Wave Device are registered trade marks of MQA Limited © 2016
Analog Out
Analog In
USB In
Digital In
Streaming HD
Sync I/O
Signal Ground
Chassis Earth & Digital Ground
External DC Power Supply
Power Switch
Mains voltage selector + fuses
Voltage: 90 - 264V AC
Frequency: 47 - 63Hz
T1.6A for 230V AC
T3.15A for 115V AC
T3.15A for 100V AC
T250mA for 230V AC
T500mA for 115V AC
T500mA for 100V
DO NOT OPEN DURING OPERATION, RISK OF ELECTRIC SHOCK
D1.5 SACD/CD unit
Serial: 0Y3F1201
Max power: 100W
Digital Out
Control
CLASS 1 LASER PRODUCT
T1 Time Reference
Serial: 0Y3D0806
Max power: 60W
10 MHz 75Ω clock outputs (sine/square)
Output 1
Output 2
Output 3
Output 4
Output 5
Output 6
TTL Ref Input
USB firmware update
Ethernet control PoE compliant
Power source
Self-test & Front LED Brightness
Firmware update & Display message ON/Short/OFF
USB f/w update FAT32 disk only
Local DC regulators for analog & digital power supplies
Auto On / Off
X1 External Power Supply
Serial: 0Z130403
Max power: 400W

connection offering optimal transmission of native digital data. The CH-Link is directly derived from high speed, high bandwidth data transfer solutions. It is capable of achieving data rates of 10 GB/s, using impedance matched differential lines. The chassis plug and cable terminations are fully shielded, which, along with the extensively shielded cable design, ensures minimal radiation and maximum external noise rejection. The robust construction ensures consistent performance and long life. Depending on your installation, you can request a length of one, two, three or five metres when ordering.

THE BENEFITS OF GOOD NUTRITION!

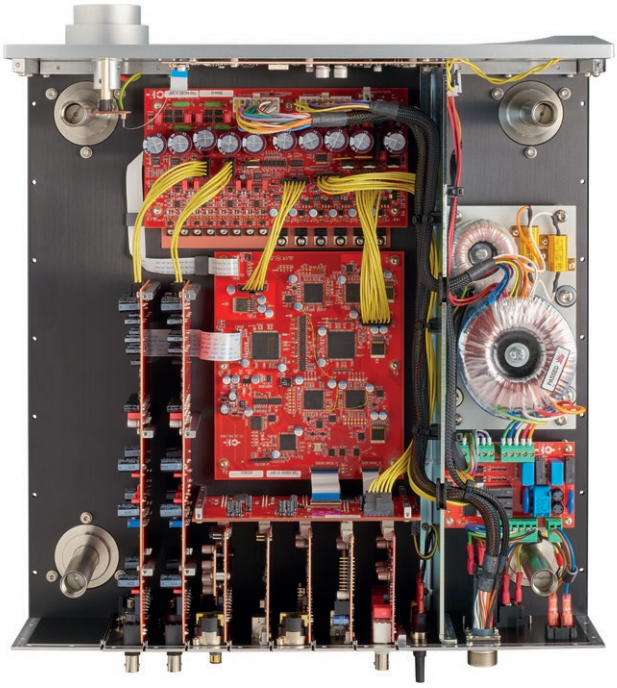
"Anima sana in corporé Sano": you know this maxim! Eating well is the basis of well-being. Well, it's exactly the same for hi-fi. Good nutrition is the basis for everything. If healthy food is your fuel, then electricity is the fuel for your hi-fi system. So it's vital that you take the utmost care over its quality. Experience has shown that locating power supply circuits away from the signal path is extremely beneficial. Because they handle very low amplitude signals, sources are particular sensitive to this consideration. The X1 external power supply has been designed to provide the best possible current to one or even two CH Precision components. Each X1 chassis can accomodate one or two output circuits. It can be ordered with a pair of outputs, or a second output can be added later, with no difference in cost.

The X1 provides an absolutely silent DC supply, thanks to circuitry constructed entirely from discrete components and featuring extensive and highly sophisticated regulation. Of course, the X1 includes extensive filtering for each of the two, significantly over-sized, toroidal transformers (the first dedicated to the analog circuitry in the unit the X1 is supplying, the second to its digital section). IN audio lore, the bigger the power supply the better it works. But the other side of this coin is that the bigger it is, the more it vibrates. CH has devoted considerable effort to mechanically isolating the circuitry and eliminating vibrational energy, using an extremely clever suspension system. When you receive your X1, you'll first need to carefully turn it over so that you can remove the three transit screws that anchor that suspension. At this point, you'll feel the critical circuits decoupling from the chassis.

LET YOURSELF BE CONVERTED...

The new C1.2 is the replacement for the C1. Not only does it succeed it after eleven years of loyal service, but the owner of a C1 can have his unit converted into a C1.2 by sending it back to the parent company and paying the difference in price between the two devices. Obsolescence has no place at CH Precision!

Introducing the C1.2 moves performance levels to another world. It should be connected to the D1.5 via the proprietary CH-Link HD interface, which allows the transfer of native DSD and MQA data in the digital domain. For other sources, the AES/EBU and S/PDIF inputs accept PCM data up to 192 kHz/24-bit resolution, while the HD streaming input accepts PCM data up to 768 kHz/32-bit resolution and DSD512(8x). CH's R&D has fastened on the two problems critical to converter operation: noise and jitter. To better combat these malign influences, it has developed a completely new



MEMS-based clock with closly controlled thermal behavior. This considerably improves the accuracy of the overall clock circuit. Of course, even more accurate system clocking can be achieved using the T1 Time Reference external clock.

Compared to the C1, the C1.2 has quadrupled its processing power, increasing input compatibility to include all high-resolution digital formats, whether from optical sources or file playback. The DAC itself uses four converter chips per channel in a fully differential, dual mono topology. The analog output stage is fully discrete, biased pure Class A and DC coupled.

Like all CH Precision products, the C1.2 is fully configurable, both in terms of inputs and operation. In addition to AES/EBU, S/PDIF and TosLink digital inputs, it can be equipped with a USB input card and streaming functionality via a dedicated Ethernet input socket. In addition to the various digital inputs and synchronization options, the C1.2 is equipped with a (completely bypassable) true hybrid volume control, combining large steps in the analog with finer control in the digital domain. Finally, an optional A/D conversion function allows the C1.2 to accept balanced and/or unbalanced analog inputs, turning the C1.2 into the nerve center of your system regardless of the sources used.

A QUESTION OF TIME

Transmitting information in the digital domain has an unfortunate tendency to propogate jitter. This is a critical factor even within a single machine, but as soon as a separate transport and converter are used, jitter levels can increase exponentially. The simplest solution is to synchronize the separate clocks in the two units, designating one of them as “master” and the other as “client”. CH offers a range of synchronization options, based on the data transmission, the addition of dedicated clock links (using the SYNC-I/O cards) and ultimately, an external reference.

The T1 Time Reference is built around a high frequency 10MHz OCXO; for Oven Controlled X-tal(Crystal) Oscillator – which translates as “thermostatically controlled quartz oscillator”. The term refers to a technique that regulates the temperature of a crystal oscillator to improve its accuracy. In this case, CH Precision stabilizes the temperature of the oscillator by encapsulating it in a mechanically insulated aluminum block. By paying close attention to the physical and thermal engineering of the OCXO circuit, providing multiple buffer stages and a sophisticated power supply, the company exceeds the

performance of rubidium clocks (used by 99% of manufacturers) without the associated problems. CH Precision refuses to use rubidium because it's a radioactive substance with a limited life span of eight years at most. Once again, we see the desire to maintain performance and longevity beyond generally accepted limits. And if you insist on using an 'atomic' clock, the T1 synchronizes with the GPS network, whose satellites are controlled by caesium clocks, the most stable and accurate time source in the world.

The use of the T1 external clock requires the use of dedicated clock cables equipped with BNC connectors. CH Precision supply one which is made by Argento. This is a recommendation, but not an obligation. You can easily use an appropriate cable from your favorite brand. It just has to meet the necessary 75Ω specification.

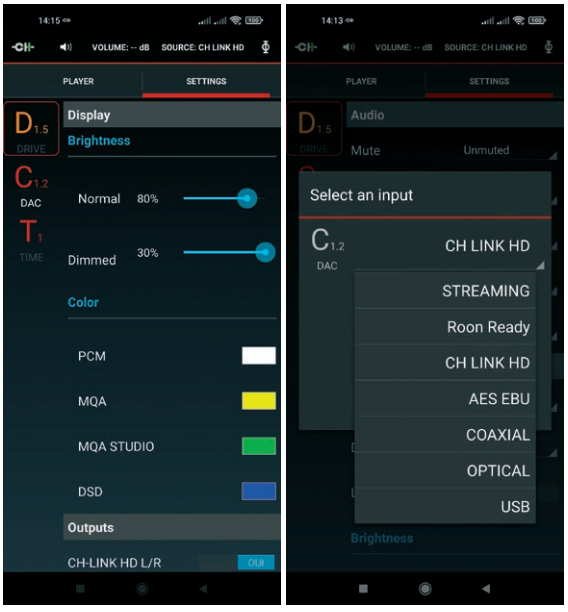
INSTALLATION

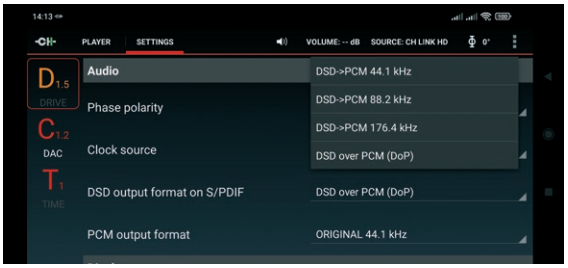
Let's not kid ourselves, the implementation of such a system requires a lot of time, care and attention – but also material. Just to put the four elements in place, you need a dedicated piece of furniture with four wide, deep and rigid shelves. We were able to install the CH Precision system on our Centaure L modules. Once unpacked and installed, it is necessary to adjust the level of each element so that it is in a perfectly horizontal plane. This operation is very simple, thanks to the intelligence of the Swiss manufacturer's design. All the tools are provided. Once installed, it is time to connect the units. CH provides the proprietary cable to connect the D1.5 to the C1.2. The same goes for connecting these two devices to the power supply and to the clock. Each time the connectors are specific.

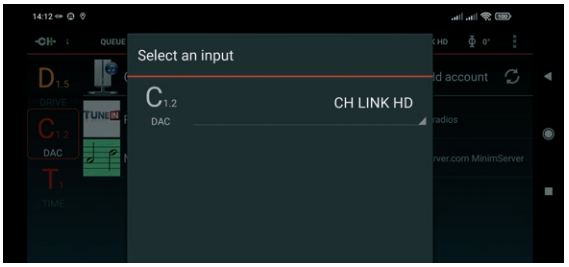
For our tests, we chose two complete sets of cables, one from Absolue Creations, the other from The Chord Co. This allowed us to understand the part played by the two sets of cables and to better understand the products. During the many weeks of testing, we tried several very high-end amplifiers, from ASR, Hegel, Jadis and SPEC. Once the system is properly installed and warmed up, comparisons between different configurations were easy to make, thanks to the CH Precision Control App and the sophistication of the menus. A simple cable swap was all that was required, day-to-day operation significantly simplified by the App's easy access to all the function and interface menus.

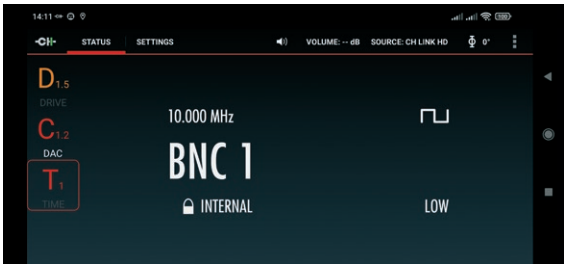
THE SOUND

The manufacturer has presented us with a clear evolutionary path and we obviously had to respect that philosophy to the letter. That meant proceeding gradually, listened to the sys-









tem configuration in three distinct steps. The first was to add the X1 external power supply to the D1.5. The second was to substitute the C1.2 converter for the internal converters in the player. The third and last step was the introduction of the T1 clock which allowed independent synchronization of the D1.5 transport and the C1.2 converter. We will not return to the sound of the D1.5 player alone. For that, we refer you to the extensive article featured on the front page of issue 43.

D1.5 + X1 : DAMN IT !

Adding the power supply to the player doesn't change its sound identity at all. Instead, it magnifies it. Ironically, it makes most sense to analyze

this addition through subtraction. Reproducing a coherent musical signal, implies the loss of as little information as possible during that process. The D1.5/X1 combination reproduces the same quantity of sound as the D1.5: it just does it better. There is simply less signal loss. The reduction of background noise, the reduction of dross, the removal of those tiny little pollutants that aggregate with the signal and degrade it – all that disappears. The X1's contribution is similar to the infinitely more precise focusing you get from a lens with a bigger aperture. It's as if the sharpness of the image and the depth of field were significantly improved. A bit like going from a very good zoom to a remarkable fixed focal length. The sound is more relaxed. Freed from dynamic and rhythmic constraints, the player delivers a smoother and more expressive sound that is also faster. Melodic lines are more easily traced and interlock more naturally, without any smearing or confusion. You can understand the structure of the music and nature of the performance with remarkable ease and clarity.

When we first received these four boxes, we naturally wondered about the order of the system evolution. Now we understand why CH suggest adding the separate power supply before any

other change. It not only allows the D1.5 to demonstrate its true musical potential, it does it with the lowest cost option!

D1.5 + C1.2 + X1: THE FOURTH DIMENSION

Adding the C1.2 digital/analog convertor, changes the status of the D1.5 from player to transport, moving the conversion itself from the (excellent) integral DACs in the D1.5, to the proprietary R-2R type conversion used in the C1.2. Just as clearly, this switch moves us into another universe. The overall philosophy driving the process is the same, but the operation itself is in a completly different league. So, it turns out, are the musical results.

Partly as a result, the first few seconds of listening with the C1.2 are slightly disconcerting. The brain is suddenly working overtime to try and identify the most striking changes in what is a very different level of performance. And what becomes apparent is that it's the architecture of the soundstage that is transformed. The introduction of the C1.2 into the system has an immediate impact on the image. You immediately notice the unusual degree and definition of depth. With a very good digital source, it is possible to recreate a credible, three-dimensional soundstage. But with this combination, you feel as if you are in the listening room with the musicians, placed exactly where the sound engineer has placed his microphones. Once again, CH Precision has managed to change the paradigm. The difference is not just big, it is really significant? And what is really disturbing is that we are not used to rises in performance of anything like this scale with most digital sources.

So, the soundstage is the first thing you notice, but immediately after that comes the exceptional silence that backs the music. This is often the problem with sources: a background that's not quite as black as you would like. With truly high-end models, this noise might well be less obvious. But here, it's undetectable. This is a profound silence of unaccustomed depth. The sound stops completely. Therefore, when it resumes, it's almost shocking in its energy and vitality. Musical contrasts unfold with surprising drama and impact. This is why the reproduction of dynamics is so palpable. Violently struck chords on a piano keyboard, for example, have the sensation of real power. You could almost believe yourself there – and just like live events, you can be startled, even shocked. The CH Precision set-up manages to reproduce a combination of harmonic fluidity and expressive power that is unsurpassed to our knowledge. Some very high-end digital sources can be more expansive, others more baroque, others still capable of deconstructing with more insistence, but none of them marries so beautifully the intelligibility

and emotional response. If the musical communication occasionally achieves an almost quintissential level, we are perfectly placed to enjoy it.

D1.5 + C1.2 + X1 + T1: LOCKING EVERYTHING DOWN FOR GREATER FREEDOM

The biggest challenge with an article like this is to convey in words the accumulated experience of hundreds of hours spent listening. The narrative is often far from simple, because that listening generates multiple response on multiple levels. Yet the single notion of squaring the circle has never seemed so obvious to us.

In theory, the external clock ensures a perfect connection between the transport and the converter: It should ensure the total integrity of the data stream. But, even with only three boxes, we already felt that we were touching perfection, so we were understandably sceptical. However, in practice, once again it is impossible to ignore the benefits of this fourth box.

The T1 achieves a level of system synchronization that is as rare as it is obvious. It is almost like having the final piece of a 1000 piece jig-saw puzzle. In percentage terms, one missing piece is nothing, but in perceptual terms, it is all that you notice. Once you add the T1 clock to the CH system, something magical happens. At this point, on good recordings (and it's very important to point out this qualification), the machines, the process, completely disappear. Ahmad Jamal came to pay you a courtesy call. Luckily, he brought his piano and his musicians. Billie Eilish stopped by to share an aperitif. We shouldn't

say it, but we had a little impromptu party with the best sound system in the world. You've never heard Daft Punk sound like this. This sound is beyond the norm.

The acid test is, as always, purely acoustic recordings: solo piano, opera, string quartet, symphony, you name it... Or maybe a jazz trio, a piece of original music like the last Joël Grare record ('Des pas sous la neige' on Alpha) or a Hadouk trio. It's on such simple, unvarnished recordings that you will really appreciate the natural substance of the reproduction. Cheating is not possible. A piano is a piano. A woodblock is a wood-block and a cymbal is a cymbal. On this type of recording, the CH Precision quartet made all the difference. We could go on for paragraphs describing the wide bandwidth, its absolute linearity, its almost otherworldly naturalness, its astonishing and unprece-

dented dynamics, but in the end, we would risk drowning you in superlatives (which we've perhaps already done). That would be the opposite of the desired goal. The great strength of the CH Precision is, above all, the accuracy, the relevance, the right amount of sound, in the right proportions in the right place at the right time. No exaggeration. That's it. Everything is there: accuracy, naturalness, control, timing. And everything else is just literature.

OUR CONCLUSION

The first thing we should emphasize is that a product (or products) like this propels us into a world that we rarely visit. Most listeners, even among the most experienced and knowledgeable, are actually unaware of the degree of natural precision and purity that can be extracted from recordings that we think we know by heart. It is a reality that is difficult to conceive until one has experienced it. Even for old hands like us, the staggering performance of such a source can leave you wondering.

Only the world's best achievements will take you into such territory. We are thinking in particular of machines such as those from dCS, MSB and Linn, with which we have been able to experience a roughly comparable level of performance. These machines are out of our financial reach, even with a very large discount. But perhaps that's why the myth they embody is so alive. Having had the great privilege of living with the CH units for a few months, we know for a fact that they are a cut above the rest. You only need to listen to the response of the many listeners who have visited and heard them, each with a slightly awed tremolo in their voice...

What is really amazing about this four-box digital source is that the purity and control of the signal it produces is such that it seems to make our amplifier much more powerful than it really is. The musical energy injected into the amplifier is so broad, so complete, so coherent, that there's almost nothing for the amp to do. We have been lucky enough to work in this field for many years, and we have some very nice equipment. So products come and products go, normally without too much regret. But not in this case. The void left by the four CH pieces is so noticeable, that for several days, we will only listen to vinyl, so as to avoid the painful comparison. ■