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HIFICRITIC

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SWISS PRECISION

CH Precision's painstaking design and logical, modular approach delivers a superb – and upgradable – phono and amplification solution

PETER QVORTRUP
The founder of Audio Note on the changes he has seen over 40+ years – and why most of them have been for the worse

TITAN KUDOS 505
Why these very superior British standmounts fully deserve their name

HOWARD ON FEEDBACK
Keith takes a long look at why feedback is good – and bad

A SPEAKER REVOLUTION?
KEF's Metamaterial Absorption Technology

HiGH-END AND PERSONAL
Top headphone models from Stax and Sennheiser

BROTHERS IN ARMS?
New player/amplifier pairings from Denon and Marantz show different approaches

CABLES
Colloms gets to grips with interconnects and speaker cables

PLUS
Spendor Classic 4/5
Totem Skylight
And music from The Grateful Dead to Prokofiev

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Completing another (partial) lock down issue, I feel very fortunate that we were able to create and sign off the varied content for this, our 60th issue. Magazine production has been held to our customary if somewhat delayed scheduling, and all at HIFICRITIC hope that our readers are in good shape. Flexible planning and keeping going, if you can, is one way of dealing with these strange times. I would be the first to admit it has helped preserve my peace of mind.

Many thanks are due to our team of home working freelancers. I would also like to thank the audio industry who have put themselves out and generously supplied a host of exceptional products for the HIFICRITIC team to evaluate. My own contributions began with a report on eight interconnect and loudspeaker cables, while a few more turned up in conjunction with another massive audio electronics review.

I was intrigued by the KEF announcement of a new high precision 'Meta' standing wave rear energy termination for a loudspeaker, initially targeted at the high frequency unit of their own concentric Uni-Q driver. I found the technology sufficiently interesting to prompt a story with content reaching back 70 years on this acoustic metamaterial development, initially adopted in the new version of the LS50, the LS50m.

The massive feature review I mentioned embraces a shimmering set of CH Precision, a system of all-analogue electronics from Switzerland. Its many intriguing design aspects proved well worth an extended exploration. Give or take a few thousand, including my own three-box streamer, support frames and loudspeakers, the entire system topped out at over £250,000. We had covered the preceding CH A1 power amplifier in mid-2016 and were suitably impressed. Now this model has grown into the A1.5 with almost twice the power and is here partnered by the P1 reference level phono, the L1 line and the dual output X1 outboard power supply upgrade. The P1 offers two of the increasingly fashionable 'current' input mode for moving coil and low impedance cartridges, plus a conventional 'voltage' mode input of exceptional versatility. And we also interview CH co-founder, Florian Cossy.

Chris Frankland finds sonic reward in the sound of the Totem Skylight loudspeaker from Canada while Andrew Everard, in another of his comprehensive and highly informative comparative analyses, takes on two pairs of a kind, the Denon DCD-A110 SACD/CD player and matching £3199 PMA-A110 integrated amplifier. These are contrasted with the Marantz SACD30n SACD/CD/network player/DAC and matching Model 30 integrated amplifier. The conclusions are surprising.

We interview Audio Note (UK) founder Peter Qvortrup, noting that it is 36 years since he set up his first company, Audio Innovations, while *Stan's Safari* poses the question 'So what is high end hi-fi?'

On the theoretical side our tech guru Keith Howard extemporises on this contentious subject of amplifier feedback correction, and this is timely since the CH A1.5 power amp review in this issue has significant content on this subject. The CH design offers user control of this parameter, including by remote touchpad, during real time listening. Keith also used his headphone measurement expertise to review the Sennheiser HD800S in depth. Jon Honeyball contributes another headphone feature, this time the STAX SR-L700MK2, with matching SRM-D50 energiser.

Ed Selley waxes lyrical about the new Spendor compact, the Classic 4/5 while Chris Kelly explores the larger than life Kudos Titan 505 stand mount loudspeaker.

Our music pages include a searching essay on The Grateful Dead, marking the 50th anniversary of two classic albums by rock guru Mark Prendergast, coinciding with the 50th anniversary of two classic albums, while Andrew Mellor covers classical releases, and Andrew Everard keeps an eye on the DSD jazz scene.

Finally, we mark this, the 60th issue, with a look back at 14 years of HIFICRITIC since its foundation, recalling the magazine's mission statement from founding editor Paul Messenger, which appeared in the first issue.

Martin Colloms
Editor-in-Chief

From Source to Loudspeaker

ALL-ANALOGUE AUDIO ELECTRONICS FROM CH PRECISION GET THE IN-DEPTH COLLOMS EXAMINATION, TAKING IN A MODULAR, EXPANDABLE PHONO STAGE, AND A PRE/POWER AMPLIFIER BUILT WITH A SIMILAR VIEW TO LONG-TERM SYSTEM GROWTH

A series of diplomatic felicitations combined with impressive professionalism from the EU based PR contact for CH Precision, Louise Ford of Marketing Effects, inexorably led me to undertake this feature review of a four-unit all analogue CH amplifier system, which installation – in and out of lockdown pauses – was ably supported by Kevin Kevin Scott of UK dealer Definitive Audio.

The term 'system' is key. While each submitted audio component may well stand alone, with a defined identity, CH has excelled on an exceptional connectivity between its components, mutually referencing their optimal versatility while centralising their logical operation settings and control.

Simplified presentations on the supplied Android tablet app of this extraordinarily versatile system and its total interoperability are well contrived, making for relatively easy use once the basics have been learned; meanwhile sub-menus are accessed and adjusted via nested control layers, presented both on the units' front panels and the tablet. It all allows for a close to astonishing versatility for on-the-fly matching and adjustment, while automatic muting avoids any drama, even when swapping between connected pickup cartridges.

Three CH audio components plus an additional dual power supply coexist in this system review, and none have digital audio capability. Internal microprocessors, electrically near silent, wait in the background ready for action when required, to change configurations, select inputs and outputs, monitor hazards and offer fire-up protection. They also control the many options for analogue disc replay and not least facilitate on-the-fly setting of the power amplifier negative feedback and input gain to fine-tune the sound. These microprocessors interface with each other via an inexpensive optocoupled ethernet linked control system which sits in the background and coordinates settings.

Our chain can be said to begin with the company's P1 phono-preamplifier-equaliser, which in standard form is self-powered, with a conventional mains connection, and fitted with a pair of stereo, low output cartridge moving coil pickup inputs of a special virtual-earth 'current' input format. In addition there's a conventional universal 'voltage' input, also offering a huge range of possible loadings – not least automated cartridge frequency response matching.

Also available is a variable phono equalisation card, adding another £1,600 on top of the £25,300 'basic' price – this was fitted to the review sample supplied.

The current input is a very low noise circuit design, comparable with many line stages and suppressing hum and hiss to quite inaudible levels, while further noise suppression is also provided in the form of the company's internal suspension system, which is used across its range.

Through a series of intelligently devised stages of upgrade, the intrinsically more than effective stereo P1 may be enhanced from the single, self-powered unit with a chosen stereo input facility to a fully configured four box double mono set, this including a pair of matching X1 double output external power supplies, at £17,400 apiece. Designed to be used with multiple cartridges, arms and turntables, the P1's inputs may be chosen via the remote control app, with exact settings for equalisation, gain and loading available on the fly. This is all precision relay controlled and achieved without audible hum or clicks.

These facilities and the 'upgrades' do not require any technical changes: all is rendered quite foolproof, and adding the external X1 supply invokes automatic changeover of the internal configuration of the unit with which it's used to suit the presence of the external supply.

However, installer Definitive Audio had left nothing to chance: the P1 was augmented with an external X1 power supply, fitted with the fully isolated, two output power option: one output served as the additional regulated supply upgrade for the P1, the other for the L1 line amplifier/control unit (which is intrinsically self-powered and will function without the X1 augmentation).

As an aside, similar expansion scope is also possible from CH if you were to go the digital audio route, for example choosing a CD-SACD player 'D1', the 'C1' DAC with precision on-board volume control, and then a precision clock 'T1', plus the option of

those additional X1 power supplies and finally a choice of power amplifier. Upgrades to the operating systems of all these designs are performed via a CH supplied USB stick.

An initial significant investment in stand-alone CH audio units may be augmented in stages at relatively modest cost, such as adding these power supply improvements, notwithstanding the requirement for more shelf space and likely more audio racks.

The L1 line control (£28,000) is pure analogue and comes fully factory configured with a host of SE and balanced inputs and outputs, but also has expansion potential. A second L1 may be installed providing dual mono operation, and then there are those power supply options, of which more later.

Completing the review set-up is the new A1.5 150W/channel stereo power amplifier at £31,800, which is no means exempt from its own option/upgrade potential, for example to monoblock operation, since it is much like the larger M1.1 flagship. Despite its moniker the M1.1 is itself a stereo design which can offer 200W channel but is

The System

Constellation Inspiration 1.0 pre, Townshend Allegri Plus and Reference, CH Precision L1-X1 control units; Naim NAP500DR power amplifier, Constellation Performance Centaur II 500, CH Precision A1.5 Stereo power amplifiers , Naim SuperLine, CH Precision P1 current input phono pre, with Linn LP12 player with Keel chassis and Radikal motor control, Naim ARO arm, Lyra Delos cartridge, Naim UnitiCore network server and S/PDIF source; Linn Klimax Katalyst streamer-DAC; Naim ND555 Streamer-DAC, 555 PS(DR)x2, Wilson Audio Sabrina, Sasha DAW, Magico S-5II Spod , Quad ESL63, BBC LS3/5a (15ohm) speakers; Naim FRAIM racks; Transparent XL MM2 , Naim NAC A5, Chord Sarum T, Argento speaker cables: Naim Super Lumina, Argento, Chord Sarum T, Transparent MM2, Vertere Redline RCA, and Van den Hul Carbon TFU interconnect cables.

more frequently used in paired monoblock mode to massively lift peak dynamic range to potentially 700W/ch/8ohms. The A1.5 in monoblock mode can also deliver a massive 500W/ch/8ohms when similarly bridged, and should you already own the outgoing A1 power amplifier it may be rebuilt as an A1.5 for an additional £15,800.

At the heart of the physically massive A1.5 power amplifier lies the screened toroidal mains transformer, with a 1.7kW capacity – substantially greater than the 1kW in the outgoing A1. Adjacent are the similarly current-capable low ESR 82,000uF reservoir capacitors, of new design with lowered impedance at high frequencies and greater peak current, linked by massive copper bus bars.

To control vibration and mechanical hum, the transformer benefits from its own isolation system so as not to disturb local circuitry, and is also screened to block possible electromagnetic interference. The new power amp has been designed to deliver a good measure of the reference M1.1's performance this rather larger power transformer was a major step, complemented by the new capacitors to enable still lower coloration along with that increased current, which should improve bass extension and slam. Power rectification is by low noise, hyper-fast, soft recovery diodes.

Ultra-wide bandwidth

Details of the audio design include the custom discrete transistor/FET input circuitry, fully symmetrical class A and direct coupled throughout. The ultra-wide internal bandwidth. of -3dB at about 450kHz, is not unlike that of the DartZeel power amplifier reviewed in the last issue, so high linearity in the audio band is assured (see lab report).

A class A driver stage leads to the unitary output block comprising a stabilised bias fully complementary, high current 'buffer' output stage. Built with bi-polar transistors, this is distinguished by the option for easy user adjustment of local negative feedback around this stage, on a scale running from 'zero' to '100%'. In addition, the power amplifier offers user-adjustable gain for each channel, in 0.5dB steps over a total of 24dB, with a mind to precise alignment of a multi- amplifier loudspeaker system.

There is no potentially invasive output relay in the signal path, though full electronic short circuit protection avoids fuses, while voltage, current and temperature monitoring protects the amplifier, which idles in low power Class A/B.

Stable output biasing utilises integrated on-chip instantaneous temperature sensing diodes, while over -current and adverse voltage issues are sensed by a non-invasive, very low noise DSP monitor which engages ultra-fast fault protection.

The massive binding posts are made by Danish company Argento, which has also custom-built audio cables for CH, while the internal vertical rod suspension system for this power amplifier is effective, adds value and is well worth invoking.

As well as all the CH electronics having their internal floating-spike-on-steel tower-suspension systems correctly deployed, I found that my point-contact Naim FRAIM stands would happily serve for the quite deep L1 and P1 if augmented with a pair of high rigidity resin laminated supports, in the form of Living Voice G-Platforms (£575 each) mounted on Grand Prix Audio Apex Feet, these having silicon nitride point contacts and selling at £2,800 for six.

Additionally, a three-point two-tier sound table with steel spikes on footers – the Living Voice G2 at £8,500 – was supplied by Definitive Audio and and supported the A1.5 and the X1. All parties were happy with the supply of Chord Company Sarum T wiring looms, including the three 13A mains cables and one 20A power amp cable.

Late in the review project some matching Argento CH line and loudspeaker cables were delivered, and it proved worthwhile to try these out too.

CH L1 Line stage sound quality

As delivered the L1 was set up with additional supply power from the X1, and I checked that adding the P1 to the shared X1 had no audible effect on the L1. Adding the X1 to the L1 definitely had an effect, and while it was subtle it was beneficial. It is hard to ascribe any sound at all to the L1 as it is one of the most audibly invisible line controls I have yet encountered, yet adding the X1 supply almost mysteriously expanded the stereo listening space a little more, with even better far field depth and detail plus a tighter grip on all musical transients, from the bass to the high treble. Is it possible to guess how a double L1/double X1, four-box combo line preamp might sound?

Most of the sound quality reporting in this system review is associated with the A1.5 power amp and the P1 phono stage, with the L1 the included constant. With perfectly symmetrical internal topology, the provision of absolute phase inversion has value, and while playing recordings via the L1 – feeding my closed box MagicoS5II loudspeakers, with their superior phase response – many sounded a little better-founded, weightier and more relaxed with 'correct' absolute phase option invoked. I have not heard absolute phase correction work so clearly with previous review product, and the effect was particularly noticeable for classic recordings such as those from Decca – in particular the excellent Delibes *Sylvia* conducted by Richard Bonynge, a great CD issue.

Remarkably, comparisons with interconnect cables frequently showed more sound quality differences than with the CH L1 itself, showing just how neutral and accurate it really was. I spent many weeks listening to the whole system with a variety of cables, and continued to admire the consistently high sound quality, the high definition bass, the even-handed neutrality and the sheer grip exerted on the Magicos (mounted on Spod footers). In particular the Argento silver ribbon cables had some kind of synergy with these electronics and the Magicos, which were made to sit up and perform at their very best. Basslines on Alabama3 *Woke up this morning* were simply outstanding.

CH P1 Phono Preamp/Equaliser sound quality

Here I majored with the P1-X1 combination feeding the L1, first trying out the conventional 'voltage' input for my trusty Lyra Delos MC cartridge, an example chosen for exceptional neutrality. I experimented with the available resistance loading options, also checking that the CH P1 chassis transport screw had been removed to free up the disc board suspension.

The results were undoubtedly very fine, placing the P1 in the first rank of RIAA equalisers for clarity, neutrality and retrieval of detail, while seemingly holding back residual groove distortion and noise. The auto calibration on the voltage input was effective, working almost as a corrective tone control with the various options: it would be still more useful with high output and moving magnet cartridges, compensating for the greater frequency response variations with make, type and model.

However, the crowning glory was the current mode input, without a doubt taking the listener rather nearer the original master, performing some kind of magic on these miniscule cartridge output signals. At the listening seat there was not a trace of audible hum or hiss: surface noise and clicks on older records were seemingly subdued, falling into the background, while rich, luscious, original analogue recordings blossomed in the expansive stereo soundfield.

Stuff from the late 1960s I had not played for years came up fresh, well timed, dynamic, and – well, I have to say it – natural, with a feeling of being able to hear right back down the recording chain. My copy of the Sheffield direct-cut release of Dave Grusin's *Discovered Again* has been played hundreds of times for cartridge listening tests and

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inevitably shows signs of use in odd clicks and pops, yet strangely via the CH P1 current input it was reproduced with no other signs of wear. Distortion sounded really low, the image was deep and spacious and I swear I could hear the velvet signature of the tubed electronics used both for the microphones and the cutter head for this direct to disc, so skilfully mastered in real time by Doug Sax.

Many recordings followed as I explored my disc library, finding excellence with great recordings but also new discoveries which I had missed at the time. Stylus up, at full volume, there was virtual silence from the loudspeakers, which was equally amazing!

Checking out the *infrasonic* rumble filter – here labelled as it was 'subsonic' –it was judged to be only slightly intrusive, and helpful on old recordings with heavy ventilation fan rumble at the venue. However, the sound quality was still better with this filter switched off.

Phase improvements

That Sheffield disc has an instruction from Doug to correct an unintended absolute phase inversion on the recording: with this invoked on the CH L1, there is a small but worthwhile improvement in the sense of 'groundedness' and of scale and of image stability. My well-worn original of DS *Brothers in Arms* sounded – well – worn, but the music and the performances shone through: dynamic and involving, they were better musically than the subsequent CD release (which is still pretty good).

I stumbled upon *Rough Mix* by Townsend and Lane in my stack, unplayed for 30 years! With the CH phono pack, this LP – also mastered by Doug Sax – got played right through, both sides, and much enjoyed. The usual favourites followed: Little Feat: *Time Loves a Hero* , Mingus *Ah Um* , Abdulla Ibrahim *Good News From Africa* and many, many more.

Replaying a variety of classical and rock LP material I enjoyed experimenting with the subtle disc replay equalisation options, on offer at a touch on the app: Standard RIAA, Columbia, Decca ffrr, DGG, EMI, Teldec and Neumann 2 pole. The EQ name did not always fit the sound on the disc label, but most times it was worth trying. Both perspective and tonal balance could be optimised. However, an LP afficionado would find even the unadorned CH P1 with current input quite compelling.

A1.5 power amplifier sound quality

For this auditioning I benefited from a certain familiarity with the A1 (HIFICRITIC Vol 10 No 4 2016), which had set something of an enduring reference standard in its class, and was keen to hear how its considerable sound quality could be improved. Would the A1.5 lift the performance again in my system, and if so, how?

The A1's bass was already close to a 'sledgehammer on anvil' quality for slam, while collecting a tidy stack of superlatives for many other qualities. And it is true that sometimes a larger version fails to improve on the previous act: it may be louder, but may perhaps missing out on speed and refinement.

I had no need to worry: the A1.5 was every bit as agile, yet sounded almost twice the size and power. The sense of grip on the Magico S5II loudspeakers was more than impressive, and frequently outstanding. One aspect I returned to many times was this amplifier's imperturbability. Consistent high-quality sound was on tap no matter the origin, style, loudness or complexity of the music.

Within the chain it was almost invisible, essentially adding no discernible character, and I also noted that in this system stereo imaging was particularly good, with very wide, very spacious and deep soundstages, and with no focus ambiguity even to the image extremes. Aided no doubt by the high-class supporting acts which comprise the rest of this CH system, image depth was absolutely exceptional, also a very good sign.

Those output matching choices for 'advance gain' and for 'local negative feedback' had less effect than I had found with the A1, suggesting perhaps that the higher power A1.5 output stage was even more tolerant to adverse loudspeaker loading, to the point where such fine tuning could be considered less relevant. In my system, using the 4 ohm-rated Magicos, with two current hungry 255mm bass drivers per channel, a subtle quality plateau was found with the A1.5 at +6dB of input gain combined with negative feedback set to 20% or 40% of the notional quantity of negative feedback available.

Respectively, the +6dB for input gain gave a touch more agility and sparkle than 0dB while the 40% feedback suggested a more upbeat tempo and slightly better bass flow than say for 100%, but this difference is quite subtle, really hard to convey unless you have tried it for yourself. Perhaps an 'uptight' overdamped sounding loudspeaker/room combination might well do best with the lowest '0%' local output stage feedback.

Superb bass

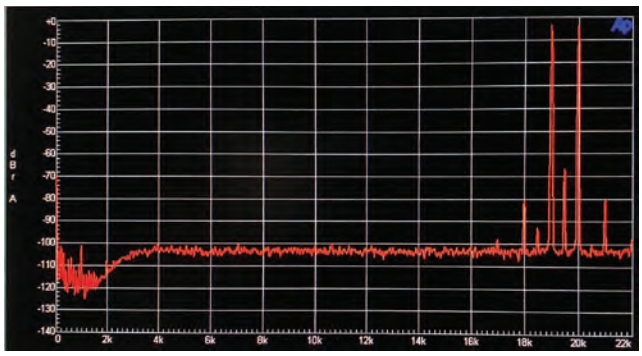
The A1.5's bass deserves special mention for its fully extended, crisp, fast, tuneful, and impressively dynamic delivery combined with ample slam. The percussion on Neil Cowley's *Louder, Louder, Stop* album has never sounded this live in my room, wholly exemplifying the term 'punchy'.

In truth there is not much to say about the A1.5 as it's so self-effacing, and subjectively so extremely neutral. Somehow it manages to retrieve subtle and complex musical detail right back into the far corners of the soundstage, making almost every track tried something of a refreshed experience.

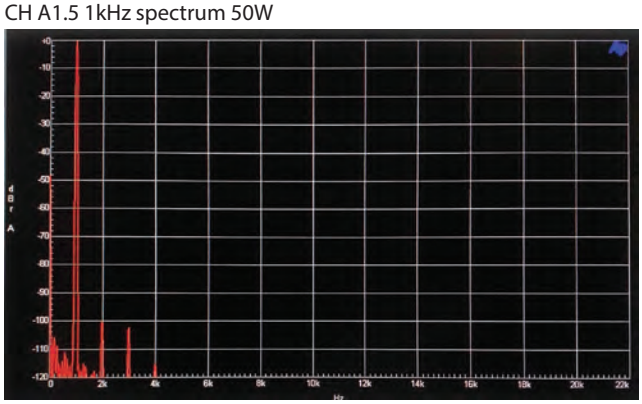
It doesn't alter discernibly in character with either programme complexity or loudness, making it easy to audition for hours on end. It will play very loudly, easily sounding like 200W/ch/8ohm-400W/ch/4ohm of anybody's money. And if you ever do manage to drive this amplifier to the power limit it clips gracefully, with a progressive overload into mild audible distortion, and with no surprises.

Timbres are very neutral, more satin stainless steel than polished bronze, and I came to value this exceptional neutrality which readily conveyed the innate character and tonal balance of source components and not least the music played

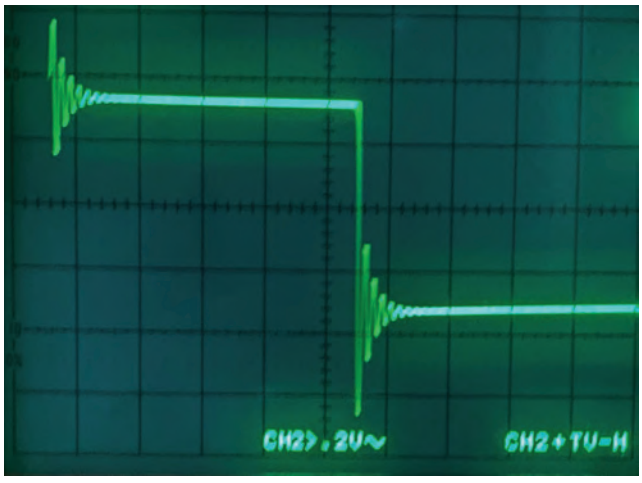
CH A1.5 full power high frequency I/M



CH A1.5 1kHz spectrum 50W



CH A1.5 power amplifier 1kHz square wave, simulated electrostatic load



through it. Again, its stereo imaging is so obviously right that you quickly forget that the A1.5 lies in the signal path. With such high transparency the image depth seems without limit, and it goes almost without saying that focus and stage width together match the remarkable transparency.

An Audio Excellence rating is awarded without qualification.

CH Precision complete system sound

While noting that one could add many more CH boxes according to ambition, and not least further significant finance, it was time to assess the complete review system as supplied.

From the outset it was obvious that the components were all of a kind and complemented each other really well. The consistency of sound quality obtained from a range of sources inspired confidence in this series, and having trialled the A1.5 power amplifier with other reference components, it was good to find that adding the L1 line control unit took nothing away.

While the operating system needed some getting used to, even for a fairly well trained techno freak such as myself, once familiarised you could begin to explore the remarkable versatility and matching potential whereby everything – and I mean everything – can be calibrated, matched, fine-tuned, to function just right, and all from the comfort of the listening chair.

It would be unwise to underestimate the value of this underlying programmability because some of the performance potential of a system lies in optimal matching, of which art CH here demonstrates complete mastery. That intense CH focus has also been unwavering upon each audio component and it shows in the consistency of sound quality observed. For example, by using calibrated bypass methods it was possible to show that the control unit, in context, was almost perfectly transparent, barely altering the inherent high quality of the power amplifier. Without prevarication, with this system CH has now closely approached the state of the art.

Precise adjustments

After some familiarisation, the system controls and settings for each component may be trialled, explored and adjusted to fine tune the details of matching and then the musical experience. Furthermore, useful effective optimisations for the phono stage in respect to pickup cartridge signals, including load matching, the current or voltage sensing option, enhanced signal to noise ratios, non-invasive infrasonic filtering, then lead to a wide choice of characteristic mastering equalisations from RIAA to Columbia. And not least, note the individual automatic calibration on the cartridge 'voltage' input for frequency response, output level, electrical loading and channel balance for your own choice of cartridge. This may well add significant value to your installation. The exceptional compatibility and adaptability extends to a wide range of pick-up cartridges of almost any output level, loading and technology.

Neutrality is a key aspect of the CH sound as there is almost no identifiable character, demonstrating consistent truthfulness to the sources and the music drawn from them. The more I used it the more I was able to forget just how it was done and simply enjoy the results, the inky black noise floors, the ample recorded ambience rising out of silent backdrops. There is no false richness no, extra bass kick, no airy, tinkling treble, not a trace of hum, just truthfulness to your sources and especially to your recordings, which more than frequently sounded just like you always imagined they should.

To do it justice I am driven to say something about the connected system sound, noting that Chord Company Sarum T series was the primary cable type used to hook it all together, also supported by Townshend F1 for the loudspeaker link plus Naim Super Lumina for interconnect from the dual supply powered ND 555 streamer.

When the late-arriving Argento CH Silver cables arrived from Denmark and were pressed into service, transparency and image dimension, plus detail and focus, expanded even more while rhythmic expression was somewhat enhanced. Perhaps this was not surprising since CH uses specified Argento cables itself.

The sound of silence

As promised from the specifications, with nothing playing and the system set to high volume I could put my ear against my fairly sensitive Magico speakers and hear almost nothing; and at the listening seat there was absolutely nothing even on the current feed input for moving coil cartridge. These electronics are whisper quiet, which is actually less common than you might expect: often one might well think the CH audio system is muted, until the music breaks forth and fully commands the virtual soundstage.

Familiar sources – CD replay, streaming, phono cartridges – all sounded just as expected, but with still more detail, image depth, stage width, low level detail, bass tune playing, dynamic power and drive than usually encountered. While this performance was partly dependant on the dominant system cabling for this review I also substituted others in order to get a handle on the innate CH sound and found it elusive, so very neutral are these components. During the

evaluation I needed to temporarily break up the system – when recommissioning it a week later, and despite prior experience, it was still a surprise to rediscover just how seriously impressive these audio components are. Concerning emotional content, while the power, clarity, dynamics and resolution here were highly satisfying and very neutral, the system was, like many 'super' amplifier set-ups, just a little reticent on rock-related rhythmic expression. While this was somewhat cable-dependant, as the Argento example illustrates with a more upbeat result, it was undoubtedly well-paced overall, engendering strong listener involvement.

The sound was also highly consistent, whether playing loud or soft, and with simple or complex programme content of any style. Lasting memories are of the sense of supremely cool control; that crisply-defined almost thunderous low frequency slam, with appropriately tuneful bass lines; huge, crystal clear, highly focused soundstages; and superb detail, revealing so much unexpected musical content in so many familiar recordings.

CH Precision A1.5 Tech Report (set in stereo mode)

A full lab report proved impossible in the circumstances but I did gain a sufficient overview which told me much about the performance. While one should never abuse a power amplifier with careless settings or loadin, this will occasionally happen in the lab when exploring the limits, for example for power or output current – however this amplifier is well defended and shrugged off any unintended abuse.

Both channels driven into 8 Ohms raised a massive 195W/ch and the more arduous 4 Ohm loading was also sustained, here with 360W/ch, just to clip point. Singly driven, with a driven duty cycle more like music, there was a little more power, here with less uplift than usual, this confirming the very sturdy power supply of almost fully regulated stability, and with correspondingly low noise.

Well designed, the power amplifier behaved well in clipping, with fast recovery from overload, here maintaining full control, and with negligible associated distortion. As such it will play even louder than its specification suggests, as I also found on audition. Make no mistake, this a most capable powerhouse, and most of the time the two-channel performance was so solid that it was more like testing a more powerful double mono design.

The frequency response was very wide, just -0.15dB down at 10Hz, and an inaudible -0.5dB at 81kHz, way past the notional Hi Res SACD audible bandwidth limit. Channel balance was superb, better than 0.05dB while the -3dB upper frequency limit (8ohms load) was way into the bat range at 210kHz. Unusually clean signal waveforms were maintained even at these high frequencies.

The very wide linear bandwidth is supported by the results for two-tone intermodulation where the arduous 19/20kHz test tones at 8 Ohms load produced a remarkable result of better than -100dB or just 0.001% for high frequency I/M distortion, this at full power, and hardly different at 4 Ohms.

Consistent performer

This bears out the remarkable consistency of sound quality with loudness, music complexity and loudspeaker loading. The 'low to zero settings' on offer for final stage local negative feedback resulted in excellent impulse responses, where the square wave output demonstrated superbly controlled overshoot, and stability margins were clearly very high. Again, this points to very capable load tolerance, promising an ability to drive even difficult loudspeakers to high sound levels while maintaining quality.

Despite being set to 'low feedback' '0%' (in fact the factory setting as delivered) the output source impedance measured very well, dropping just 0.02V for a 1 Volt output with a 4ohm load suggesting a negligible output impedance of 0.082 Ohms and this was constant over frequency. This value will be still lower with those higher negative feedback settings. Channel balance was excellent, better than 0.05dB while the stability on complex load was admirable (See square wave response figure), as was the on-load frequency

Component Pricing

P1 Phono-stage	£25,300.00
(£26,900.00 as supplied with RIAA Columbia, Decca, etc. EQ board option)	
L1 Line-stage Preamplifier self powered	£28,000.00
X1 External Power Supply with additional X1 Regulated Output Board	£17,400
A1.5 Stereo Power Amplifier	£31,800
Chord Co. Set of Sarum T Cables	
3x 1m 13A to IEC	£1900.00 ea x 3 = £5700.00
1m 13A to 20A	£1900.00
Interconnects	
1.5m balanced XLR	£3650.00 pair
2m balanced XLR	£4300.00 pair
1.5m single-ended RCA	£2600.00 pair
Speaker Cables Sarum T	
1 pr 6.0m spade to spade (single wires)	£7,200.00
Total Cost of Sarum T Cables for review	£25,350.00
Total cost	£129,450 (noted supports extra)

response. Noise levels were very good, at around -120dB rel. full power, this silent background also being noted during the auditioning process. Noise measured at a 1W reference was very low at -87.2 dB unweighted, -90.3dBA weighted, and CCIR (2k) -90.5dB, while hum products were well buried in this very low noise floor.

There was no detectable RFI and/or microprocessor products greater than about -115dB relative to full power, here measured up to 1.5GHz, a fine result. The front panel meter is approximately peak reading with 2.2W 'peak' registered on the front panel screen for 1W RMS. The latter 'meter' has a huge dynamic range and is usefully informative both for setting up, and when monitoring in use. Before applying the user option for an input gain increase the standard input sensitivity is about 2.7Vrms for full power, this just before clipping.

The massive power transformer was extremely quiet, with no audible hum, and could hardly be heard even with an ear planted on the casework. The amplifier runs slightly warm, with an uniform case temperature overall, has internal ventilated heatsinks, and consumes a significant 130W when in idle and a little more with music drive, then rising to about 550W under continuous, full power, 2 channel laboratory sinewave drive 8ohms.

And on the subject of heat, the A1.5 sounds pretty good from cold but does improve a little over some 15 minutes from first switch on.

L1 Tech Story
(with brief lab report)

The L1 line preamplifier is very comprehensively specified and following this technical outline we include some test results simply to rain-check the performance and make sure it was in full order for the auditioning as full testing was not possible.

While it is possible with very limited technical resources to select line input sources and adjust volume for a preamp function, here CH has aimed for the state of the art with the L1 design and has taken no chances with any aspect. This runs from input conditioning and matching, including powerful DC offset control, to unbalanced and balanced discrete circuit pre-amplification/ buffering, not forgeting the 20bit-resolution, state of the art R2R 'ladder' volume/channel balance control. The latter employs selected metal film resistors with analogue switching, offering a massive 118dB control range in high precision 0.5dB steps, this leading to a high current fully balanced output amplifier.

All circuits are class A transistor, fully discrete, while the powerful low impedance output will drive long cables if required, for example allowing power amplifiers to be placed close to the speakers.

The operating condition for the preamplifier is set and monitored by a microprocessor which also allows for several upgrade configurations, lending credence to the CH claim for it to be 'state of the art' in this field. I could find no trace of stray microprocessor interference in the outputs, even though this control unit which also drives the electronic display, coordinates the volume and channel balance functions, engages safety muting, monitors DC, and liaises with the system network commands, defining those operational states including the use of multiple connected L1 units.

More than just a preamp

Thus, the L1 mainframe does not represent just a stereo line preamp, rather it is the basis for single, dual, three and four box solutions to line control of potentially increasing quality in keeping with the CH expansion philosophy. Minor DC offset present on a source signal will be corrected, and if excessive a large selected polypropylene capacitor may be switched in to address the offset by AC coupling. The loss here is very small, only just detectable, and did not give rise to doubt.

Out of the box, this self-powered, a stereo control unit is direct coupled throughout, with a standard complement of 8 inputs: 2x RCA/BNC, 4x XLR, and 4 outputs 2x XLR plus RCA and BNC. It may also be ordered with – or subsequently reset using programmed internal facilities to allow for. – true dual mono synchronised operation, with a second L1 for the other channel. This would allow for up to 16 source inputs – hardly to be imaginable – and ore of those X1 single and dual output option power supplies can also be invoked.

Clear control

The large high-resolution colour display shows the volume setting, both graphically and numerically, with-auto blanking during listening, while input labelling, selection and sensitivities may be customised to complete a given installation. As ever with CH, no stone is left unturned.

I was not inclined to question exacting CH claims for technical performance but did make some brief in-situ checks. CH claims a near DC to 1MHz bandwidth and I could confirm that it is better than 0.04dB down at 10Hz and less than 1dB down at 80kHz, while channel balance was better than 0.01dB, these at the limits of my portable analyser. At 2V output, mid band distortion was below -100dB with actual readings of -102dB second harmonic and -108dB of third with no others of significance. At 20kHz, 0.5V SE input, second harmonic read -100dB, third -80 dB, again first-class results and at the limit of this test set. Typical mid-level mid-frequency results suggest better than

0.003% distortion. It showed no limiting at 6V input voltage, and thus studio level balanced drive should be no problem. The L1 runs slightly warm drawing a significant 50W from the mains but only a negligible amount in standby. Full quality is obtained after few minutes of use from standby. Set to a gain of 1, CH claims an outstanding signal to noise of better than 136dB, and I am not inclined to doubt it. It would be hard to find a signal source that betters that value.

CH Precision P1-L1- X1-A1.5: Overall Conclusions

There is much to think about and much ground to cover in order to conclude to this CH review marathon. I confess some trepidation when the early planning was taking place, not least the logistics of so much costly and heavy equipment to be installed in my listening room during lockdown. The inclusion of a complete set of Chord Sarum T cables for all connections was also a concern as I had not tested any of these in isolation.

Reliable judgments require references and many comparisons, and these had to be done before properly engaging with the CH system. Fortunately, I had started a number of interconnect and speaker cable reviews as separate project and was able to throw in these new Chord Sarum T examples to help find a perspective. As it happened the Chords were fine, though I did include a few trusted alternatives including CH specified examples to investigate optimal matching issues.

First off, I found that these CH components were all of a kind, consistently neutral and highly transparent throughout, with no cumulative shift in timbre. All units worked just as claimed, every facility performed as the company name promised. You quickly learned to trust and then to rely on the system. Speaking as an engineer I found it to be precisely calibrated, much like advanced audio test gear and such accuracy inspired great confidence.

Complicated, but versatile

Certainly it is complicated, I think necessary to provide the extraordinary versatility which will appeal so greatly to an enthusiast, and the units do require significant familiarisation. They also deserve great care in planning and installing them. The operating and control interface on the Android tablet is an important feature for setting up, and on-the-fly optimisation, while the simple wand remote is handy for armchair loudness setting and mute.

At times I found system operation challenging, but familiarity improved matters: I was glad to have two months or so to get a good handle on all that it could do. Several times I had sought to complete the review and was drawn to go back and play one more track – this time Manu Katché's *Neighbourhood* – and ended up playing it right through, marvelling at the fantastic drumwork.

These audio components handsomely take their places in the ranks of the world's finest audio electronics, but distinguished from most others by their extraordinary accuracy and versatility, further enhanced by the ability to fine tune and upgrade every component concerned.

Without hesitation, HIFICRITIC Audio Excellence.

HIFICRITIC
AUDIO EXCELLENCE

L1 line preamplifier specifications

General

User control	Dual concentric rotary knob with push function (control knob) and CH Control Android app
Display	800 x 480 24bits RGB AMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby)	< 1W
Power consumption (Normal operation)	40W average, 100W maximum
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (W x D x H)	440mm x 440mm x 120mm (main body) 440mm x 492mm x 133mm (overall including connectors and feet)
Weight	20kg
Firmware update / Control	USB port for firmware update/ Ethernet based system control

Analog inputs

Balanced inputs	4x XLR connectors per board, 100kΩ or 600Ω load (user selectable)
Single-ended inputs	2x RCA connectors per board, 50kΩ or 300Ω load (user selectable) 2x BNC connectors per board, 50kΩ or 300Ω load (user selectable)
Maximum input level	16VRMS (balanced), 8VRMS (unbalanced)

Analog outputs

Balanced outputs	2x XLR connectors per board
Single-ended outputs	1x RCA connector per board, 1x BNC connector per board
Output level	Up to 16VRMS (balanced), Up to 8VRMS (unbalanced)
Frequency response (-3dB point)	DC to 1MHz
Signal to Noise Ratio (SNR)	130dB, unity gain and at maximum input level
Total Harmonic Distortion + Noise (THD+N)	< 0.001%, 1kHz, unity gain

Remote control

Remote control type	Infrared. Uses RC5 codes. Range: 10m (line of sight)
Remote control batteries	2x AAA type

P1 phono-stage specifications

General

User control	Five front panel push-buttons and CH Control Android App
Display	800 x 480 24bits RGB AMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby)	< 1W
Power consumption (Normal operation)	40W average, 100W maximum
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (W x D x H)	440mm x 440mm x 120mm (main body) 440mm x 480mm x 133mm (overall including connectors and feet)
Weight	20kg
Firmware update / Control	USB port for firmware update/ Ethernet based system control

Playback equalization filters

Standard equalization filters	RIAA, enhanced RIAA
Optional equalization filters	EMI, Columbia, Decca and Teldec
Equalization filters accuracy	±0.1dB

High Pass Filter (Bypassable)

Filter Order	3rd order (-18dB per octave)
Cut-off frequency	10Hz

Current inputs

Connections	1x RCA, x XLR per channel on each input
Input impedance	< 0.1Ω
Gain for a 1Ω internal resistance cartridge (at 1 kHz)	+70dB (P1 gain setting: I/V+0dB) +75dB (P1 gain setting: I/V+5dB) +80dB (P1 gain setting: I/V+10dB)
Gain for a 10Ω internal resistance cartridge (at 1 kHz)	+65dB (P1 gain setting: I/V+15dB) +70dB (P1 gain setting: I/V+20dB) +75dB (P1 gain setting: I/V+25dB)

Voltage input

Connections	1x RCA, 1x XLR per channel
Gains (at 1kHz)	+35dB, +40dB, +55dB, +60dB, +65dB, +70dB
Input impedance (cartridge load)	Variable from 100kΩ to 20Ω in over 500 steps

Analog outputs

Balanced outputs	1x XLR per channel
Single-ended outputs	1x RCA, 1x BNC per channel
Output level	Up to 8VRMS (balanced), Up to 4VRMS (unbalanced)

Performances

Frequency response (-3dB point)	> 400kHz (RIAA equalization filter disconnected), current input selected
Equivalent input noise (EIN)	Without the X1 External power supply connected to the P1: Current inputs: < -135dBu; 1Ω termination, gain +70dB, 22kHz BW Voltage input: < -130dBu; 1Ω termination, gain +70dB, 22kHz BW With the X1 External power supply connected to the P1: Current inputs: <-138dBu; 1Ω termination, gain +70dB, 22kHz BW Voltage input: <-135dBu; 1Ω termination, gain +70dB, 22kHz BW
Total Harmonic Distortion + Noise (THD+N)	< 0.01%, 1kHz, output level 3VRMS, 22kHz BW

A1.5 2-channel power amplifier specifications

General

User control	Five front panel push-buttons and CH Control Android App
Display	800 x 480 24bits RGB AMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby)	< 1W
Power consumption (Normal operation)	150W typical, 1200W maximum
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (W x D x H)	440mm x 440mm x 186mm (main body) 440mm x 492mm x 198mm (overall including connectors and feet)
Weight	47kg
Firmware update / Control	USB port for firmware update/ Ethernet based system control

Output power

Stereo, passive & active bi-amp modes	2x 150WRMS / 8Ω, 2x 275WRMS / 4Ω, 2x 450WRMS / 2Ω
Monaural 1 or 2 mode	1x 275WRMS / 4Ω, 1x 450WRMS / 2Ω, 1x 700WRMS / 1Ω
Bridge mode	1x 550WRMS / 8Ω, 1x 800WRMS / 4Ω, 1x 1200WRMS / 2Ω

Analog inputs (per Analog_In input board, two Analog_In input boards are required for Stereo & active bi-amp modes)

Single-ended	1x RCA + 1x BNC per input board (Zin = 47kΩ or 300Ω)
Balanced	1x XLR per input board (Zin = 94kΩ; pin1 = GND, pin2 = +, pin3 = -)

Amplification

Input stage	Ultra low noise, high slew rate, zero global feedback, full discrete class A design
Output stage	Ultra low noise, high slew rate, with adjustable feedback, full discrete class AB design
Feedback	Unique user programmable local/global feedback ratio of the amplification stage
Gain	24 dB range adjustable gain in 0.5 dB steps

Analog Audio outputs

Speaker terminals	2 pairs of custom Argento Audio binding posts
Total Harmonic Distortion + Noise (THD+N)	< 0.01% (1kHz signal, BW 20Hz-20kHz, 10WRMS under 8Œ©, all operating modes) with 100% global feedback
Signal to Noise Ratio (SNR)	115dB (Stereo Mode), 118dB (Bridge Mode)
Frequency response (-3dB point)	DC to 450kHz at 1WRMS

X1 external power supply specifications

General

CH Precision compatible devices (so far)	C1, D1, L1and P1
User control	Automatic on/standby functions remotely operated from connected device 2 push-buttons at the rear of the unit for configuration
Display	256 x 64 pixels blue-white PMOLED
Power supply	Selectable 100V, 115V or 230V AC, 47Hz to 63Hz
Power consumption (Standby mode)	< 1W
Power consumption (Normal operation)	40W/80W typical (1/2 devices powered), 400W maximum
Operating conditions	Temperature: +5C to +35C, humidity: 5% to 85% (no condensation)
Dimensions (W x D x H)	440mm x 440mm x 120mm (main body) 440mm x 480mm x 133mm (overall including connectors and feet)
Weight	25kg
Software update	USB port for firmware update

Output voltages

Analog supplies	+/-19V DC +/-8V DC +11V DC
Digital supplies	+3.4V DC +5.5V DC +/-8V DC +12V DC

Protections

Analog supplies	Over-voltage, under-voltage and over-current monitoring
Digital supplies	Over-voltage, under-voltage and over-current monitoring

Connections

Back panel	19-poles M23 connector compatible with C1, D1, L1and P1external PSU connector
Cable	2 meter cable with 19-poles M23 connectors (male & female)

The CH precision system in place in the Colloms listening room, driving the Magico S5 II loudspeakers

Behind the design: Florian Cossy

The experienced design team of Florian Cossy and Thierry Heeb – the C and H of the company name – established CH Precision near Lausanne, Switzerland, in May 2009, having earlier researched and developed audio products for the Goldmund line. Brimming with new ideas for a highly versatile range of highly coordinated prestige audio electronics, they have acquired quite a reputation over the past 11 years, an important step being their successful signing with noted high-end distributor Hideaki Nishikawa, who was also responsible for Goldmund in Japan.

The CH design team is undoubtedly skilled in high-end audio, also digital signal processing, in particular high precision digital convertors, but the members are also keen analogue enthusiasts, and have greatly expanded the CH line in this direction. HIFICRITIC asked Florian Cossy about CH Precision, its first product , its objectives and its product line.

'There was a 10 year gap between leaving Goldmund and the start of CH Precision, during which we worked as OEM contractor and consultant for the audio and metrology domains. Our first CH product was the D1 'digital drive,' a digital mainframe with a universal SACD/CD transport, including internal custom digital interfaces for minimised jitter, aided by mutliple clocks with a separate own board synchronisation section, certainly we are skilled in digital but also maintain a strong focus on analogue.'

What's your best seller?
'That would be the C1 DAC/digital preamp.'

And what about the Phono P1 ?
'Surprisingly, yes – initially the idea of a current input for a pickup cartridge seemed not to be understood by the market, but with the right cartridge match there are important advantages especially concerning dynamic range. Effectively our pickup input is a kind of short circuit, drawing all the signal power from the cartridge as current.'

Why so many boxes to make a full CH system?
'We take a modular approach, to optimise each

function and where standardised chassis and casing may be configured in a variety of ways. It requires very high precision and finish, costly to do in-house but less expensive in the end when typical reject rates are taken into account…

'Our primary objective is the best sound quality as we understand it and we use the finest ancillaries, cables, stands, turntables and loudspeakers to analyse our own sound quality.'

What loudspeakers do you use?
'We work with a number of brands, but are naturally associated with designs of similar quality to our electronics. Loudspeakers used for CH product benchmark testing include – amongst others – models from Magico, Stenheim and Goebel.'

Do you value some technical parameters above others,such as bandwidth, or distortion or perhaps phase?
'No, only the natural combinations of these parameters that arise when maximising sound quality.'

Is the P1 phono pre a significant market seller?
'Yes, surprisingly so, it is a fine seller after our L1 line stage. But our best seller remains the C1 Control-DAC'.

Revisiting the P1, and considering the unusual virtual earth 'current inputs' for a cartridge, where you use selected discrete transistor circuitry and not IC chips, will a moving coil cartridge be electromechanically damped by this loading ?
'Well, instead of the cartridge driving current through the preamp input resistor and then measuring the voltage, all the current from the cartridge flows directly into the virtual earth input, where this discrete transimpedance emitter-coupled stage offers maximum signal to noise ratio, potentially 80dB for the P1. But we also provide conventional voltage inputs, and with a huge range of loadings. The signal paths in all our products use entirely discrete components.'

How versatile is the P1?
'The P1 has an the automated calibration facility to optimise loading on the voltage input, plus a wizard that helps with choosing the right gain for all inputs. The P1 also has three inputs by definition – two in current-mode and one in voltage-mode. The only option is the non-RIAA EQ filters.'

When designing CH Precision products, what are your main objectives?
'Certainly low noise and low distortion, but not to excess: we consider that a wide linear bandwidth and also limiting design to moderate negative feedback levels are fundamental criteria…..no one parameter designed to excess, all held in optimal balance. But I want to point out that where appropriate to an audio system the user has a facility for safe and substantial control of negative feedback for our power amplifiers.

Amplifier negative feedback is a contentious subject and is usually more complex than it first appears. For example there may well be both loop and nested, or sub-loop feedback paths. Consensus views on feedback per se may not be applicable to our more complex designs.

'Nevertheless a CH owner may fine-tune the operating condition of our amplifiers in order to better match the cable and loudspeakers, and with only moderate changes in both the harmonic distortion spectrum and also the numeric distortion, which I feel is very low in any case.'

Your control app is Android, what about Apple?
'We are unlikely to add an Apple app, and feel that an inexpensive Android tablet is a convenient dedicated set up facility and also remote control for our quite complicated audio systems.

Android control tablets are essentially free issue when a customer orders a system, and our software provides both simple and advanced control menus.

'Even so, I admit that an initial installation requires significant owner attention, at least at first. The complex, deeply configurable nature of our components means that first set-up can be a daunting prospect, involving multiple stacked menus and myriad different parameters.
'With a little practice, I do consider that it becomes second nature, and so advise that owners should use an inexpensive Android pad with our app.'

Please tell us about your inbuilt anti-vibration stacking and suspension system?
'We greatly appreciate the importance of controlling unwanted vibration and have attended to this aspect of design from the inception of our product line. So we have included an inbuilt embedded pillar stacking system of high loading potential where the inside chassis are floated from the corner supports and the internals barely interact with each other.

'Our mains transformers are also separately floated within the cases so as not to affect the electronics. You could call it an integral stand system. Yet adding further external supports also helps lift sound quality.'

Between the digital audio units you have a custom digital interface, used between internal stages and for external connections?
'Yes, CH Link HD was designed to allow all formats and sampling rates to be transmitted between the source unit and the destination unit at their native format.. As with other companies including DCS, our D1 digital compact disc/SACD player may be augmented by several further external units such as high precision clocks, a control unit, and a DAC.

> *For the A1.5, the already large 1KVA power transformer of the A1 is nearly doubled in capacity to 1.7KW, and we consider such reserves substantially improve the sense of low frequency power and dynamic range*

The SACD transport is properly decoupled mechanically, much like a good turntable, while the microprocessor is also resident in the D1, for shorter clock signal paths. Here grounds are separated, with a primary digital ground to chassis reference, and with analogue ground floating, together with a strict grounding hierarchy. We put huge emphasis on low jitter, with our special low noise reference clock circuitry, and we have long used LVDS (low voltage differential signalling) data connection method throughout the unit.'

Would you explain some of the details of the A1.5?
'It is a substantially enlarged version of the A1, necessarily built in a larger case to contain the new mains transformer which now increased from the previous 1KW to 1.7KW, and as before, the transformer has its own isolation suspension within the casework.'

And what about the output stage, with its unusual user variable gain and negative feedback facility for fine tuning the interface to the loudspeaker and cable?
'Here we use five pairs of complementary silicon output transistors per channel with an option for zero local feedback: this compound output amplifier circuit is designed to be inherently linear, also with a natural 0.1 ohm inherent output impedance, even before even modest negative feedback is applied.

I note here that two solder joints alone are around 0.12 ohms: it is surprising how these oft-neglected small values accumulate and it puts the low 0.1ohms output impedance figure in perspective.

'Thermal tracking with power delivery is integral to the transistor die for highly stable bias operation, almost invariant with temperature with these 'five terminal' transistors. There is no thermal delay during powerful operation, while bias is very stable. It runs cool with only moderate output stage biasing, enough to minimise crossover distortion. We consider that an unusually consistent sound quality results, in this respect more like the special sound of low feedback class A tube amplifiers. '

What about output matching to the speaker and speaker cable?
'The power amplifier has two very small balanced air core output chokes for radio frequency suppression. The input stage filters marginally reduce the intrinsic bandwidth from 700kHz to a still wide 400kHz -3dB. The music bandwidth, say to 50kHz, fits in very well.

What have you improved over the A1 which we have reviewed?
'For the A1.5, already large 1KVA power transformer of the A1 is nearly doubled in capacity to 1.7KW, and we consider such reserves substantially improve the sense of low frequency power and dynamic range.'

What are the subjective effects of feedback and output impedance?
'We gather that our nominal 0.1 ohm output impedance (4ohm damping factor of 40) is a just audible but non-invasive effect, largely due to subtle interactions with the loudspeaker/crossover impedance. It's also debatable how much subtle changes heard with feedback settings are due to the loudspeaker – very probably – rather than from within the power amp, which is very stable.

'Negative feedback options can of course reduce distortion to very low level, e.g. second order products from a likely inaudible 0.1% to just 0.01%: it is your choice to try the settings and even remotely control them with an amplifier front panel readout and also on the tablet app.'

The L1 line control is new to HIFICRITIC, please tell us about it?
'The Line Control is most important, as it must not corrupt signals passing through, and in particular, control of volume needs great care in design. Here we have perfected an 'R-2R' ladder of selected resistors, in which programmed combinations of these deliver high precision steps of 0.5 dB over a very wide 99.5dB range, approaching 20 bit step resolution. Differential balanced buffers drive and receive the level-controlled audio and to avoid possible audible clicks from residual DC on input signals and any DC if present is corrected by ultra-low noise servos.

The line out audio signal to the power amplifier(s) is DC coupled, and I note here that any unwanted DC bias might be heard as a mild blurring of the low frequency definition. If present there is a blocking capacitor option (if required for a particular source, user switched) while any DC drift of the connected system which could occur is periodically corrected by an non-invasive servo with long a time constant of several seconds, which we consider I set way below audibility.

'CH designs are also wholly balanced for best signal to noise ratios and all products have balanced connections, but we take care to also provide for the SE single ended alternative to a high standard.

'One of our aims is that with the system set to 'loud', but with no music, the electronics should be silent 'even with an ear close to the loudspeakers'. (Note the range of inputs on the power amplifier, RCA, XLR and including a 50 Ohm BNC Dart compatible)'

Finally, a tip from Florian for optimal enjoyment: 'Listen in a darkened room with minimal distraction, aiming at a whole-body musical experience'.