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'.