

ZeroUno SE ULTRA DAC and Preamplifier

The SE ULTRA born to play in top performances systems and to compete with top DACs and preamplifiers of the market. It is a step ahead of the ZeroUno SE and PLUS, to play in top demanding system.

The SE combines exquisite craftsmanship with the power to exhilarate at a more dynamic listening experience. The SE captures the essence of ZeroUno SE, it elevates the level of music reproduction with enhanced comfort and wellbeing when you listen to your favourite music.

it is made for those who require listening experiences with unrivalled performance while maintaining natural listening.



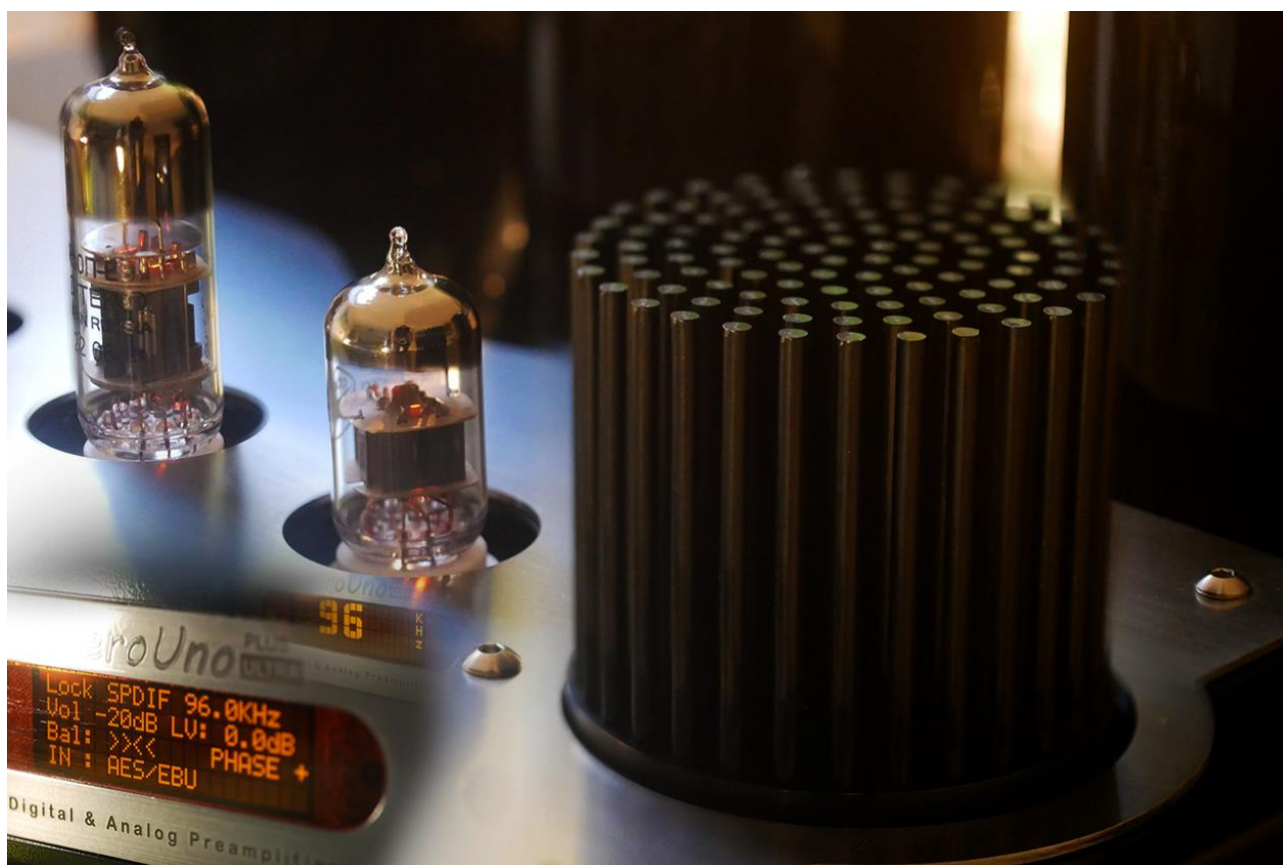
Fig. 1 The ZeroUno SE ULTRA

The ZeroUno family includes the ZeroUno SSD and ZeroUno PLUS, the first based on transistors, the second on tubes. Both based on the same DSD core working at 32-bits.

Both can work as DAC or preamplifier because they implement an analog board to accept analog inputs. Alternately, they can be ordered with just digital inputs.

Between the SSD and the PLUS the sound is different but a matter of feeling only and the final result depends on the whole chain from source to speakers.

The SE unites transistor and triode behaviours to appeal to almost everybody, transistors fans and triode fans. This is the genesis of the circuit and it clarifies better than any other explanation how it works.



The second fundamental mandate of the ULTRA project was to again avoid all capacitors in the signal path. The SSD already has no signal-path capacitors and is loved for its 'direct' and 'natural' sound. The LaScala and Olimpico power amplifiers too are DC coupled and their owners claim an easeful, natural and direct effect. With loudspeakers, it is well known that crossover capacitors significantly impact the sound and for the ultimate expensive capacitor brand there's always Duelund.

The ULTRA avoid coupling caps in the signal path and instead of caps the coupling is made by magnetics.

The DC-coupled concept of the ULTRA family really does manifest the desired 'no detours' directness to which the minimalist no-feedback signal path adds dynamic liveliness and saturated colourization.

The high-gain output stage, 24dB, complete the genesis of the project and this key point is introduced to preserve the timing, rhythmic integrity, tonal accuracy and dynamics, in general all facets that together make a master musician superior to a merely average performer.

There are three cowlings on deck to hide six power transformers which are mechanically isolate as much as possible. On top of the motherboard sit three more transformers so in total nine power transformers are used: that recalls the mantra of, you can't ever have too much power supply.

The power supplies are configured as constant current power sources so to tune the power supplies themselves as done in the Class A devices.

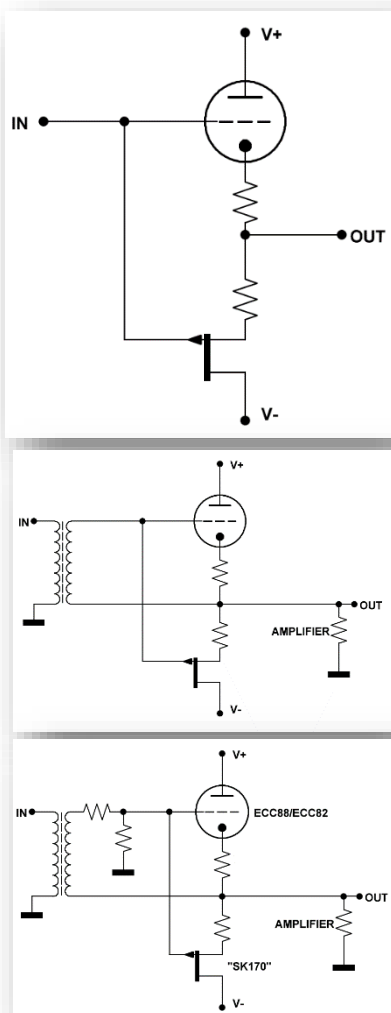
The basses are firm, well-defined, with massive attack. Together the gentle richness of detail at the medium high frequencies contribute to the preamplifier's ability to render the reproduction as natural as possible, with three-dimensional realism and instrumental placement ... what we call "natural listening", or "slow sound" to remember the "slow food" preside.

At the power-on there's a sophisticated self-diagnostic boot-up routine whereby the display shows what circuit segment is being checked before it goes live.

Both the ZeroUno SE, digital inputs only, and ZeroUno PLUS preamplifier, can be upgraded to the ULTRA version.

THE CIRCUIT IN BRIEF

The circuit is minimalist, simple, only seven components.



The triode in each channel works in parallel with the Jfet and their outputs sum. It's not push-pull as indeed the input for the two active devices is the same and not inverted.

Instead of input capacitors for source isolation, an input transformer is used as buffer not for any step-up gain.

Adding two resistors and working on the power supplies, V+ and V- and the value of the resistors, it was possible to avoid the capacitors.

... job done ... the preamp is all here.

With only seven parts the target is reached:

a preamplifier with a minimum number of parts in the signal path, which combines Fet + triode without capacitors yet creates voltage gain of 24dB.

The absence of DC at the output obviously relies on all parameters of these components being stable.

That's true only on paper due to power-supply variance and worse, tube aging.

Yet for a preamplifier output we need DC below 50mV, ideally below 10mV. So a DC servo is added that only works at the power-supply level.

To assist the DC servo there is a shunt regulator on the anode designed around the 6H30P.

Both tube and transistor supplies are served by a constant current source.

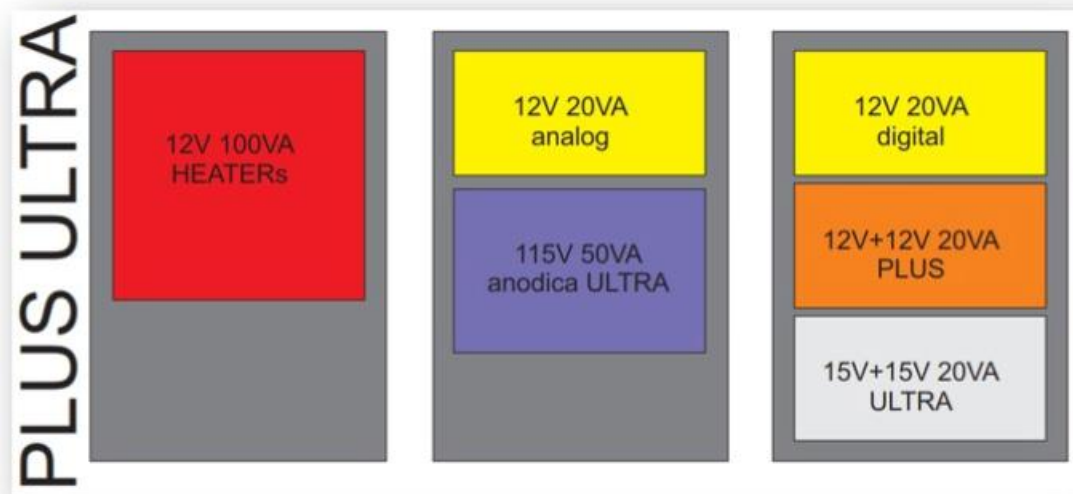
So the PSU is fundamental at letting the gain stage work as expected.

All our components are selected and matched, all are for audio use, the input transformer designed by us is custom and of 100kHz bandwidth and the overall layout was reached after developing 8 different boards searching for the best compromise.

The PCB are populated in house so to control all phases of the production process.

Below is the X-ray vision on the three cowlings on the top of the cabinet.

Inside there are 6 power transformers.



*Fig.2 X-Ray view of the 3 canisters on the top of the cabinet
6 toroidal transformers for maximum separation*

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Output impedance is 10Ω and the volume control in 1dB steps from -65dB to 0 is a top Cirrus-Logic CS3318 powered with an ultra-low-noise power supply.

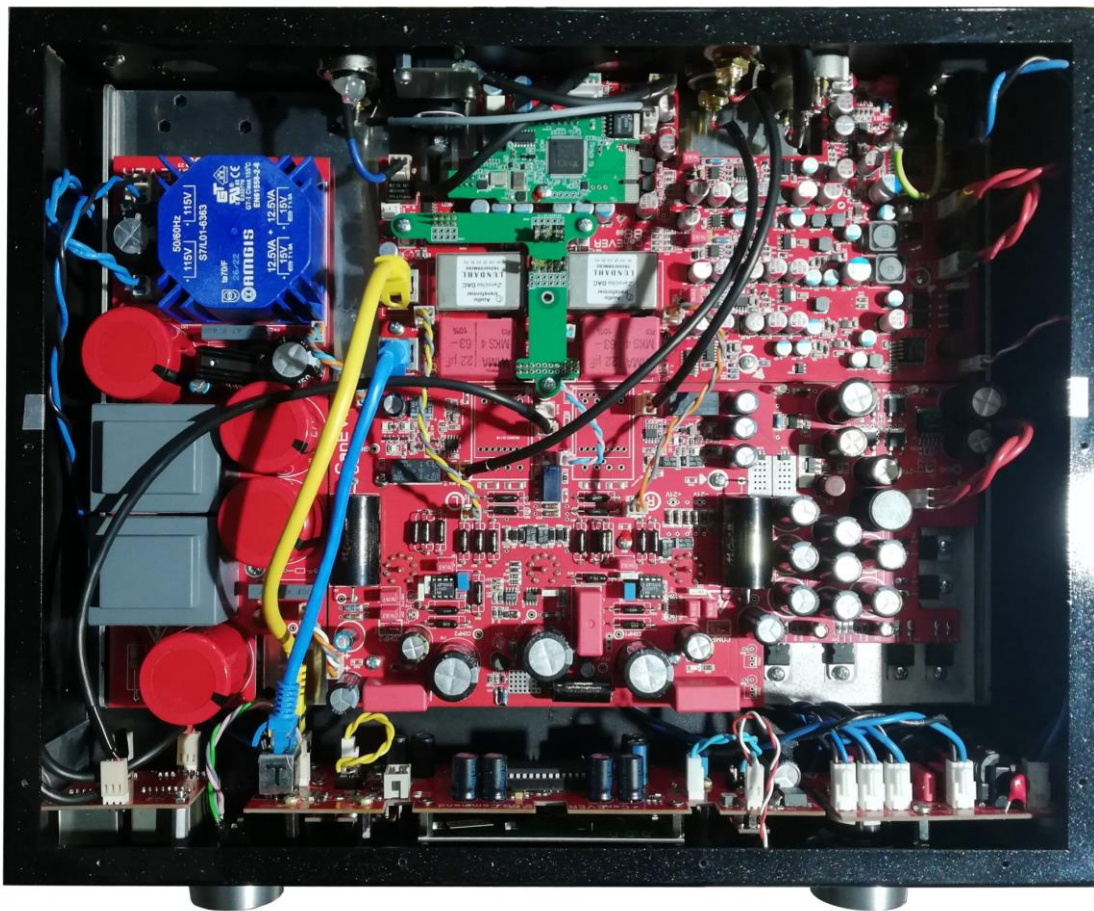


Fig. 3 Inner view of the ZeroUno PLUS ULTRA, the Printed Circuit Boards (PCB) on the first layer

From the inner view of the first layer of boards:

- the tube power supply on the left.
- Still on the left the BIAS power supply of the JFET.
- The DAC board on the top, a refined of the ZeroUno DAC board:
 1. 32-bit DSD core working at 100MHz,
 2. same power supplies philosophy,
 3. ultra-low phase noise clock with OCXO implementation,
 4. improved output amorphous transformers output,
 5. USB battery mode for source-DAC isolation.
- The output board on the bottom (PLUS version only)
- Command panel just above the two knobs.

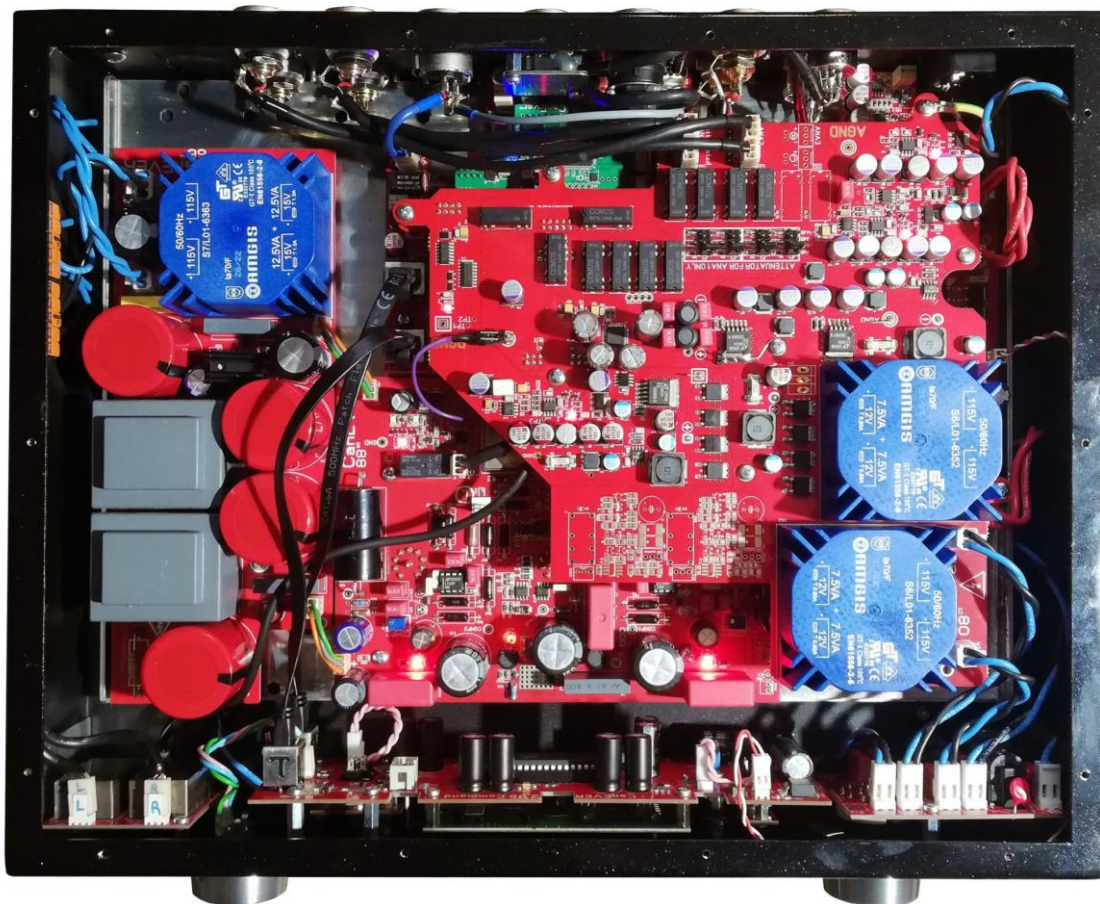


Fig. 4 Inner view of the ZeroUno PLUS ULTRA, the Printed Circuit Boards (PCB) added on the top to interface the analog inputs

Here comes the PLUS version with extra analog input board on the top with its toroids for the independent power supply.





About the tubes, in the middle there is a 6H30Pi/ 6П30П. It's the core of the anodic shunt regulator so not involved in signal amplification but power supply.

The small brother 6H6P/6N6П of the 6H30Pi/ 6П30П can also be used. With it the sound usually becomes a bit sweeter.

The shunt regulator for the anode voltage is one of CanEVER design's fixed bricks which forces the anode power supply to its maximum in a well-defined quiescent current.

Moreover this isn't in series with the signal which is always beneficial since anything in series leaves a finger print.

Because the power supply works at a fixed quiescent point, all components are optimized for the best sonic compromise ... with a bit of poetic license, we might say that this is the same philosophy as a class A amp which at any time works in a fixed quiescent point.

The signal-amplifying tubes are the ECC88/6DJ8/6922 or ECC82/12AU7 on either side.

These two voltage-gain triodes are OTK 6N23P-EB mil-spec NOS, so ECC88 equivalents, and work in parallel with a Jfet from Linear Technology's LSK170 family.

Hidden on the mother board are the JFet SK170 to complete the hybrid gain block.