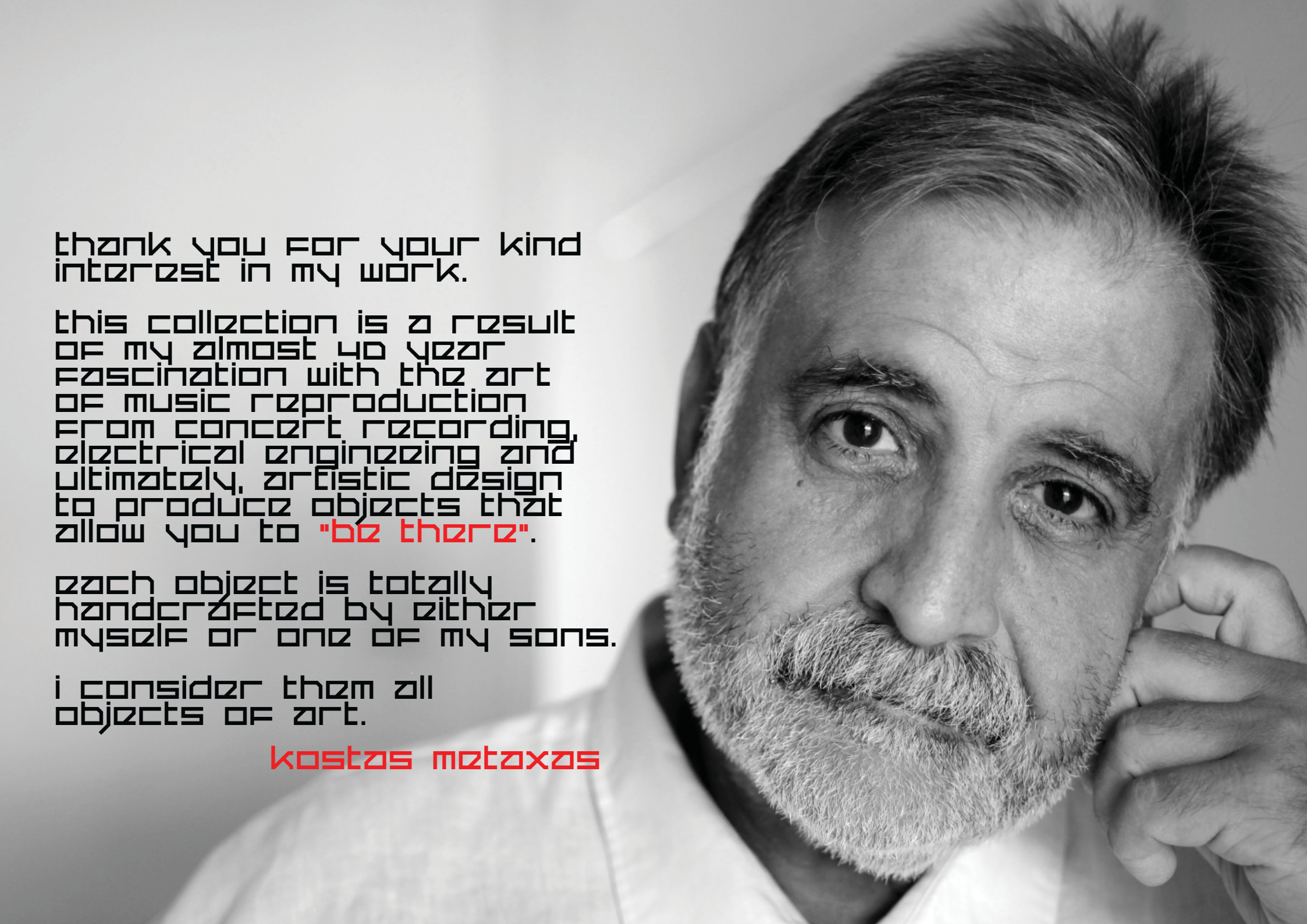
opus preamplifier

metaxas
&sins

since 1981



thank you for your kind interest in my work.

this collection is a result of my almost 40 year fascination with the art of music reproduction from concert recording, electrical engineering and ultimately, artistic design to produce objects that allow you to "be there".

each object is totally handcrafted by either myself or one of my sons.

i consider them all objects of art.

kostas metaxas

K-DESIGN AWARD'18

May 30, 2018

METAXAS

AWARD **WINNER**
TITLE **METAXAS STATEMENT**
COUNTRY **NETHERLANDS**
AFFILIATION **METAXAS & SINS**

This certificate of award is presented in recognition of submission of works with creativity and efforts to the K-DESIGN AWARD 2018.

PROFESSOR **KEN NAH**
PROFESSOR **ANDY LAW**
PROFESSOR **SHINGO ANDO**
PROFESSOR **SUNAH KIM**

2018 WINNERS
PRODUCT DESIGN

Presented to
Metaxas & Sins Bv

Design
Metaxas & Sins Statement
Amsterdam, Netherlands

Client
Metaxas & Sins

Lead Designer
Kostas Metaxas

Metaxas & Sins Statement has been identified as one of the leading product design by the professional jury of APDC*IDA. Kostas Metaxas is a winner of the APDC*IDA 2018 Design Excellence Awards.

*IDA APDC
Design Excellence Awards

Astrid Hebert
Vice President
International Design Awards (IDA)

Hossein Farmani
President
International Design Awards (IDA)

Jason Wang
Secretary-General
Asia Pacific Design Center (APDC)

GOOD DESIGN

GOOD DESIGN AWARD

2018

The Statement

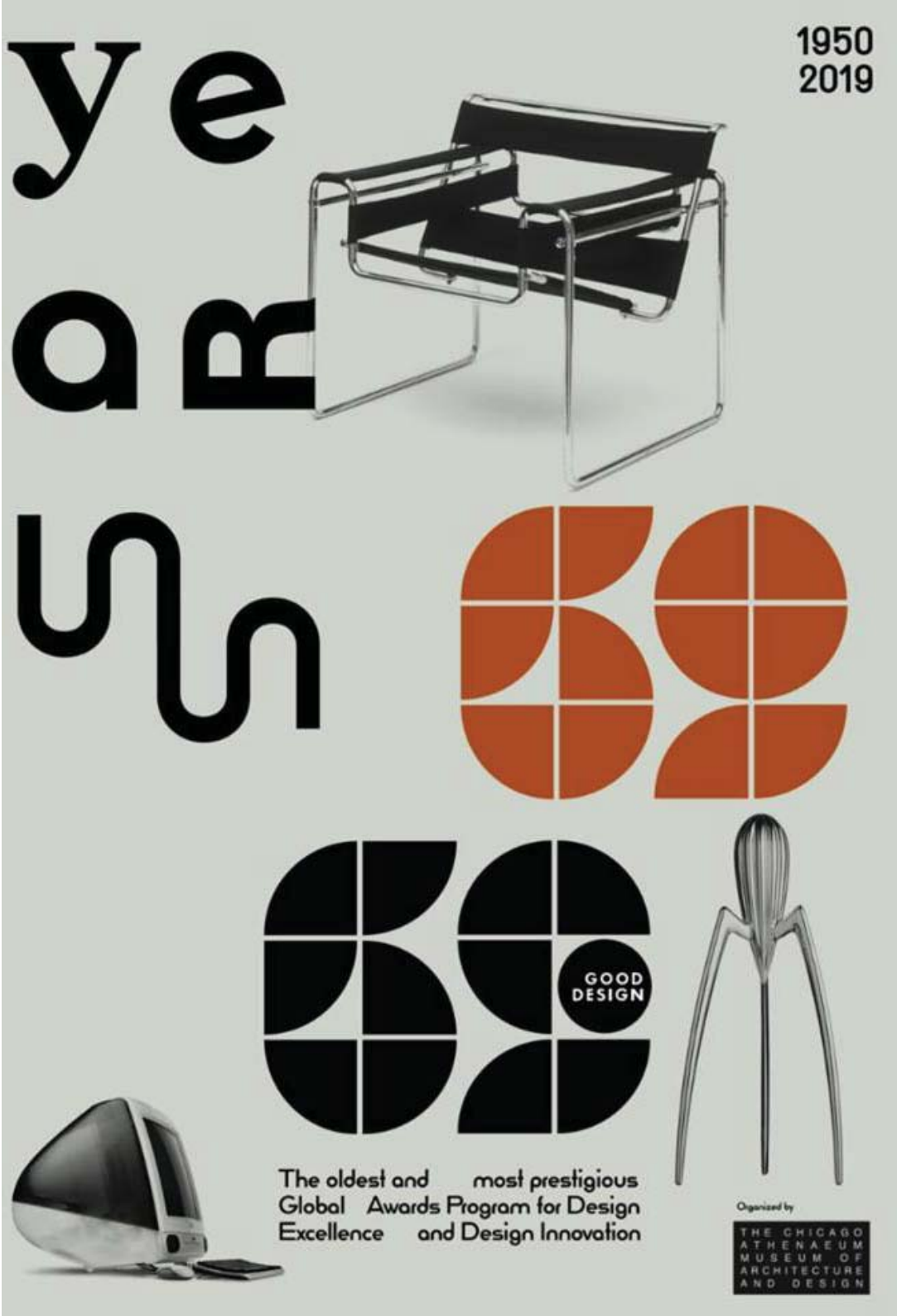
Designed by

Kostas, Andreas and Alessandros Metaxas

Manufacturer

Metaxas & Sins

THE CHICAGO ATHENAEUM
MUSEUM OF ARCHITECTURE AND DESIGN




ASIA DESIGN PRIZE 2019
CERTIFICATE OF APPRECIATION
JURY
KOSTAS METAXAS
FOREMAN OF A JURY
KARIM RASHID
Thank you for your efforts the judge Asia Design Prize 2019.
Officially, This certification certify for your activities as a jury.
29 March 2019, Seoul / Korea
PROFESSOR
HYUNSUN KIM
DIRECTOR
TETSUYA MATSUMOTO
PROFESSOR
BUMKYU KANG
ASIA
DESIG
PRIZE
2019

about

Kostas Metaxas is an articulate and forceful champion of audio without comprise. He is a connoisseur of fine music, a man for whom second best isn't good enough. In September of 1981, Kostas formed the company which bears his name. Known all over the world today simply by its initials, M&S, Metaxas & Sins was founded for several reasons.

The most immediate of these was to begin producing, his first product, the CP-1 preamplifier in commercial quantities. Whilst studying in Heidelberg, West Germany having transferred from the University of Melbourne, Kostas showed several of his prototype amplifiers to an important German Hi Fi Dealer. He was sufficiently impressed with what he heard to give him a little capital in the form of deposits to reserve the finished products. Thus M&S was born. And the rest as the saying goes, is audiophile history.

Back in Australia, new designs flowed from Kostas' workshop. The PP-1, a moving coil preamplifier appeared early in 1982. Reviewed by Klaus Renner in Das Ohr, the German audiophile publication, it was praised as the finest preamplifier available at the time. Accordingly, a flood of orders from the German audiophile who are known to purchase only the number 1 product in its class, firmly established M&S as a manufacturer of only the highest quality audio equipment.

In February 1988, the GERMAN 'Stereoplay' magazine rated the OPULENCE [Opus] PREAMPLIFIER its absolute reference against amplifiers from the US, Japan and Europe.

The OPUS preamplifier is a unique audio product. Apart from its outstanding musicality it combines the state-of-the-art in high-technology with an incredible array of options which would excite a Recording Engineer.

Kostas is also a familiar sight at local jazz and classical concerts with his prized Stellavox tape recorders in tow. Built with the exacting precision of a PATEK watch, these state-of-the-art models are indeed rarities and are normally the exclusive province of the professional recording studio. The recordings Kostas makes using Stellavox serve as reference for the design of future M&S systems.

M&S products embody not simply audio excellence but a stylistic design sense that would not be out of place in the Museum of Modern Art. M&S products are not meant to be hidden away like traditional sound systems. They are meant to be appreciated both stylistically as well as musically. Science approaches art for the sheer love of music and for that M&S make no apology.

Similarly, Kostas is unapologetic about the market he serves. He aims, quite simply, to provide the "finest objects money can buy." And what sort of people are M &S customers? Generally they view audio as a well-deserved indulgence. But no matter what their occupation, their preoccupation is to know and appreciate the difference between better and best , to listen with their heart and ears and blissfully "get lost in the music"..

Each amplifier is entirely handmade by the Master and his sons [sins] in a similar manner to the meticulous assembly of historic Bugatti automobiles.

To put it mildly, Metaxas & Sins is unlike any other audio business.

"Flagwaving? Why Not?" wrote Ralph Neill reviewing the MAS PP1 in Australian Hi-Fi in the early eighties. "Australia II proved in a big way that Australian technology can take on the world and win. M&S is doing just the same – on a smaller scale, to be sure, but it's doing it!"


chalkida atelier


the opus "zoho"

the opus "zoho"

An aesthetic engineering triumph, the OPUS preamplifier is the first example of "moulage" or draping with solid aluminium on an imaginary mannequin. The folds and drapes are impossibly sculpted using a 5 axis CNC machine. This organic, non-geometric form, allows a perfect evacuation of all chassis micro-vibrations.

Electrically, the OPUS is the direct result of an intense 35 years fascination with music recording and reproduction to perfect the most transparent, reference calibre "monitoring" preamplifier to complement both the finest domestic audio playback & professional recording systems in the world.

Using technology borrowed from Aerospace and Formula 1, the design also reflects the extraordinary advances that have been made over the last 15 years in modelling and simulation software.

In the early 2000's, Kostas Metaxas underwent extensive training to become one of the first designers who could conceive, model and prototype an entire amplifier on a component by component basis in 3D.

The PCB software he uses not only lays out the boards, but also allows schematic based simulations which can test [or verify] the PCB's signal integrity displaying Reflection and Crosstalk Analysis.

Not content with a strict engineering approach, Metaxas started working on creating the ultimate library of test recordings using three "metaxas-modified" portable Swiss Stellavox SM8 [10" reels @ 15ips] Analogue tape machines with Neumann [M150, TLM50 and TLM170] and B&K [4135 and 4133] microphones to record and film over 300 live acoustic concerts.

To house this cutting-edge technology, a striking "organic" case design was 5-axis CNC machined from a solid block of Aircraft Aluminium [or Copper or Titanium] to shield and mechanically ground the low-level signals.

All switches, attenuators and sockets/plugs [hardware] are of the highest possible quality, many meeting or exceeding millitary specifications.

This future-proof preamplifier offers the simplest, purest signal path. Additional "Plug-in modules' allow almost infinite possibilities for the addition of LP phono RIAA equalized playback, microphone preamplification or Digital recording [ADC] and Playback [DAC].

In its basic format it comes with a "Mainframe" and separate AC Mains Isolated Power Supply connected by two aerospace-grade umbilical cords.

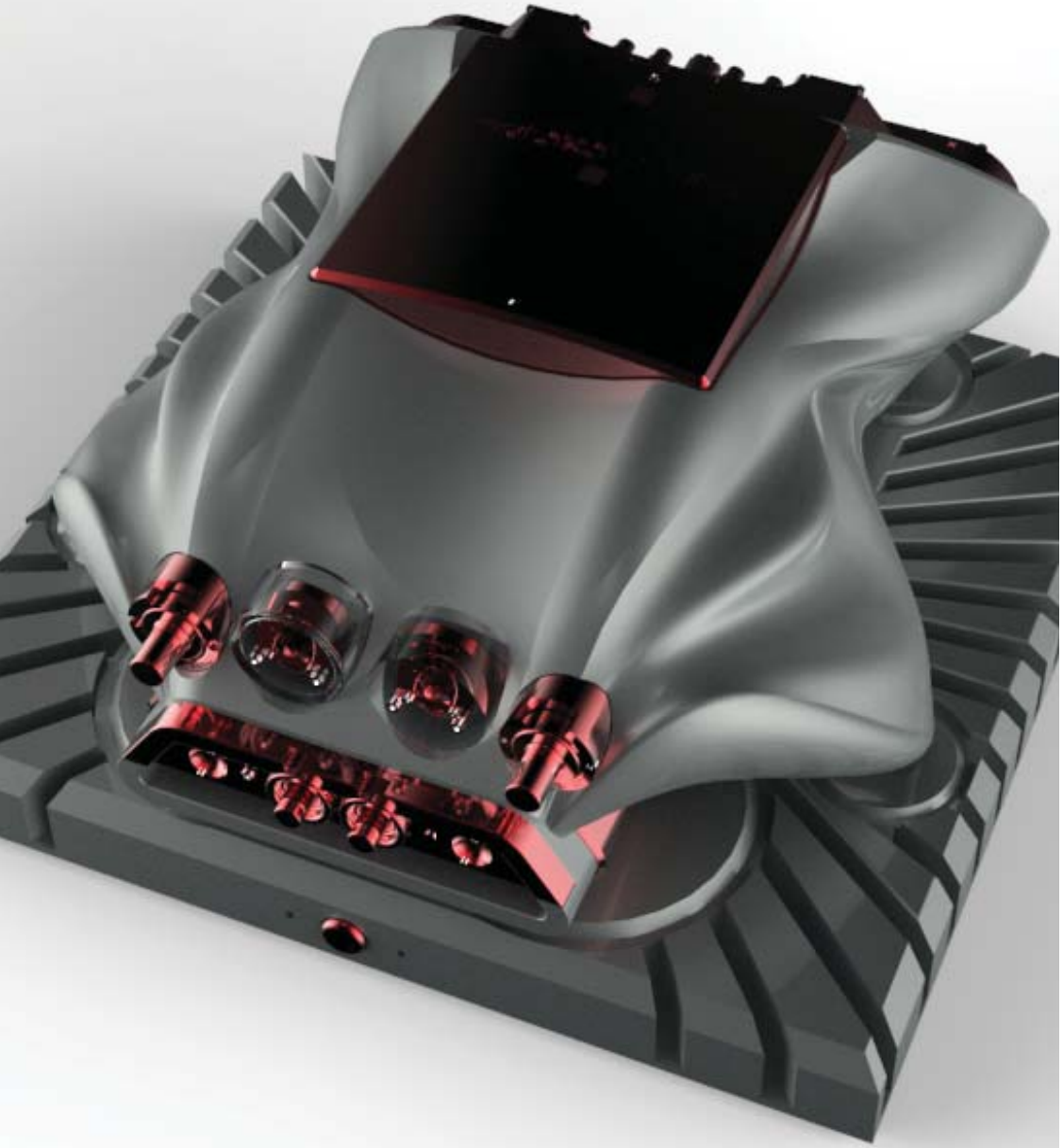
MAINFRAME

The "Mainframe" features all the switching and attenuator pots with internal sockets to accept the following modules:

Standard modules:

1. Master Out Line Stage Module [comes standard]
Single-ended output.

2. Professional VU meter drive circuits.



Optional Modules:

2. Phono RIAA Stage Module Plug-ins
3. Balanced [transformer input] Microphone Preamplifier Module Plug-ins
4. 384kHz/24bit Digital to Analogue or Analogue to Digital converters.

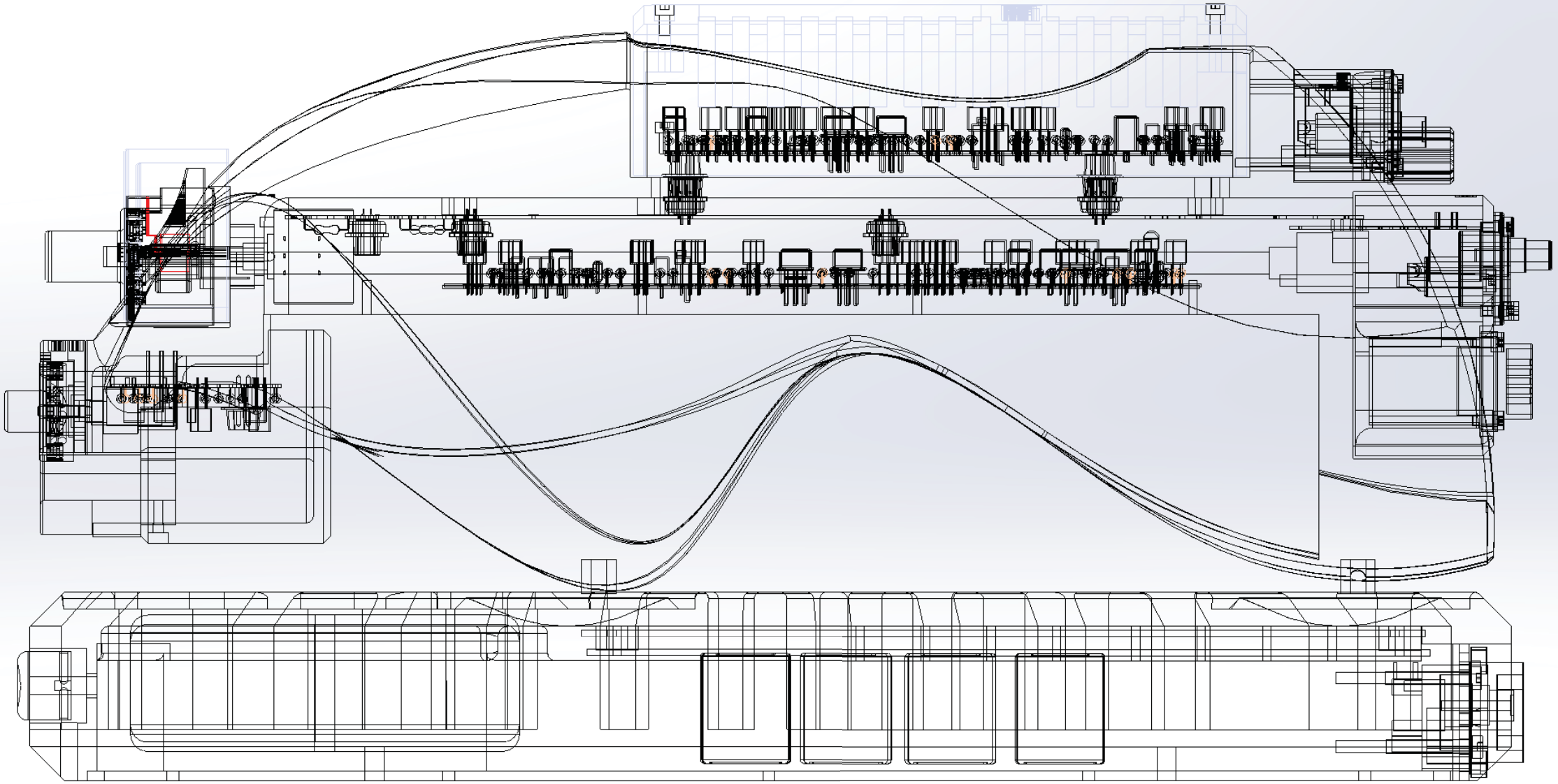
All modules feature their own discrete voltage regulators.

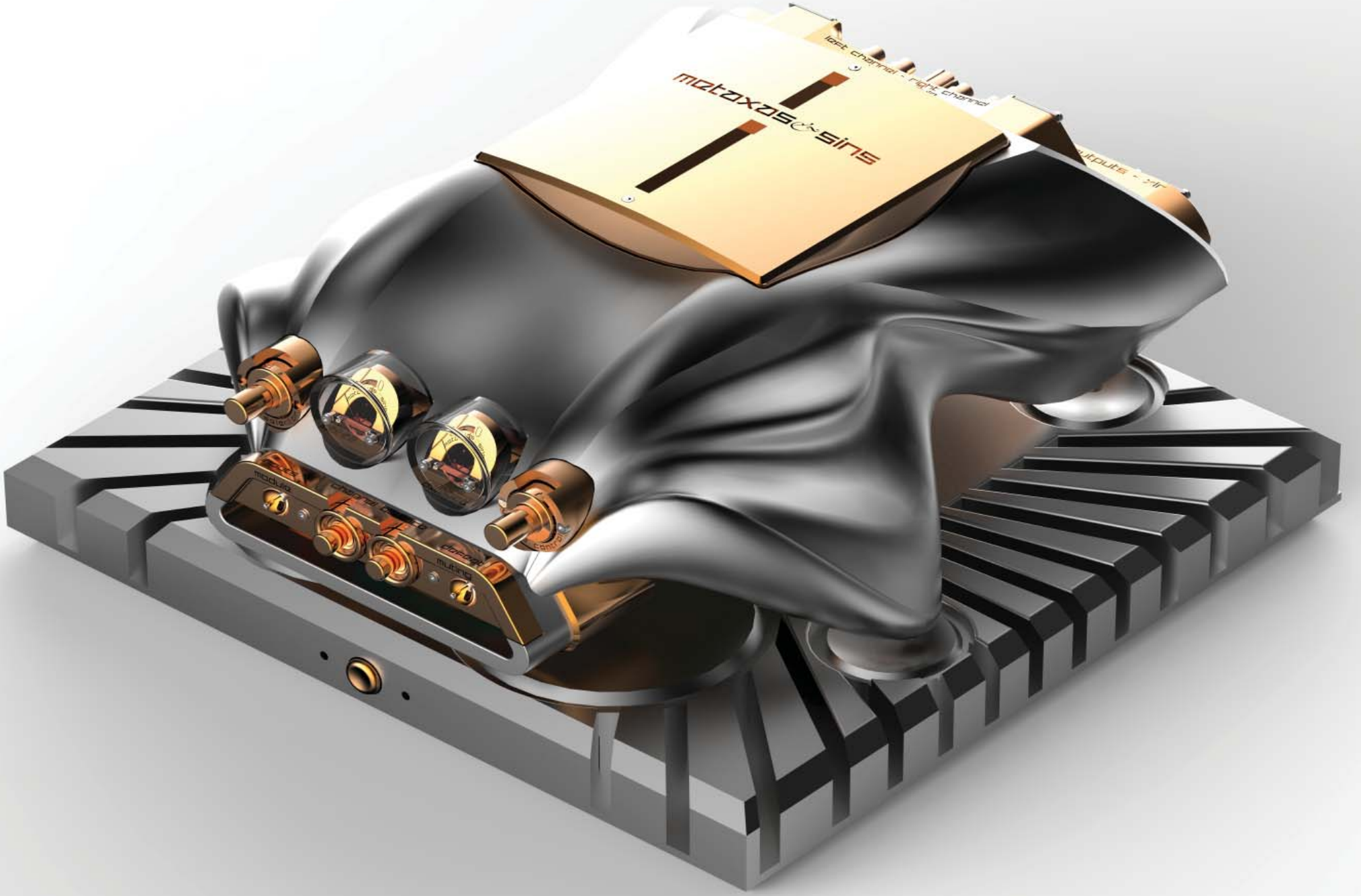
MAINS ISOLATED POWER SUPPLY

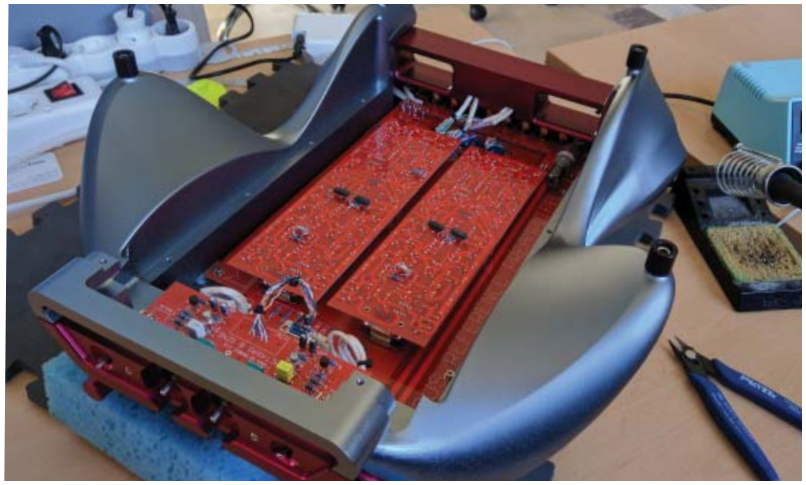
The MIPS is essentially one channel of an IKARUS power amplifier driven by an ultra-low-noise discrete sine wave oscillator at ~ 200Hz driving the primary of an output transformer. The secondary of this transformer generates the filtered +/-35V dual mono supply rail voltages for the discrete voltage regulators. This scheme totally isolates the AC mains from the amplifier circuits.

Specifications

FREQUENCYRESPONSE : DC - 10MHz (-3dB)
VOLTAGE OUTPUT: 15VRMS per channel into 50 Ohms with no more than 0.05% T.H.D.
SLEW RATE : Greater than 1000V/us small and large signal
T.H.D. : Less than 0.005% 20Hz-20KHz
I.M.D.(S.M.P.T.E.) : Less than 0.005%
SIGNAL/NOISE : -117DBV unweighed input shorted
SENSITIVITY [Line Stage]: 26dB
INPUT IMPEDANCE : 100kOhms in parallel with 11pF




left channel - right channel
matrixaudio
sins
outputs - xlr
mute



What the critics said in the past...

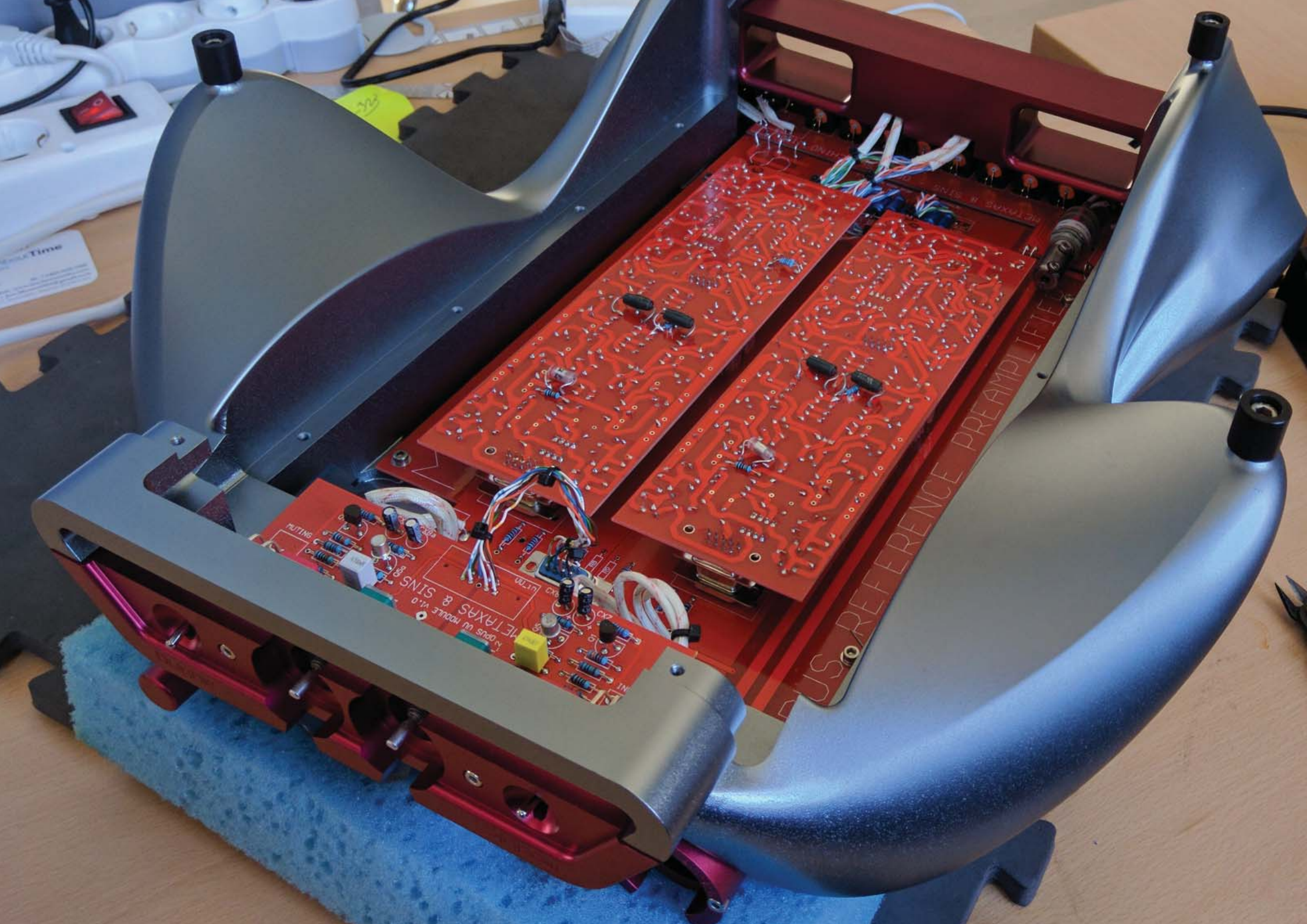
" The METAXAS OPUS stretches our acoustic expectiations.
At present, it defines the standard as to how far we can travel into the music ...
and it does so with style ..."
Martin de Wulf, BOUND FOR SOUND, USA

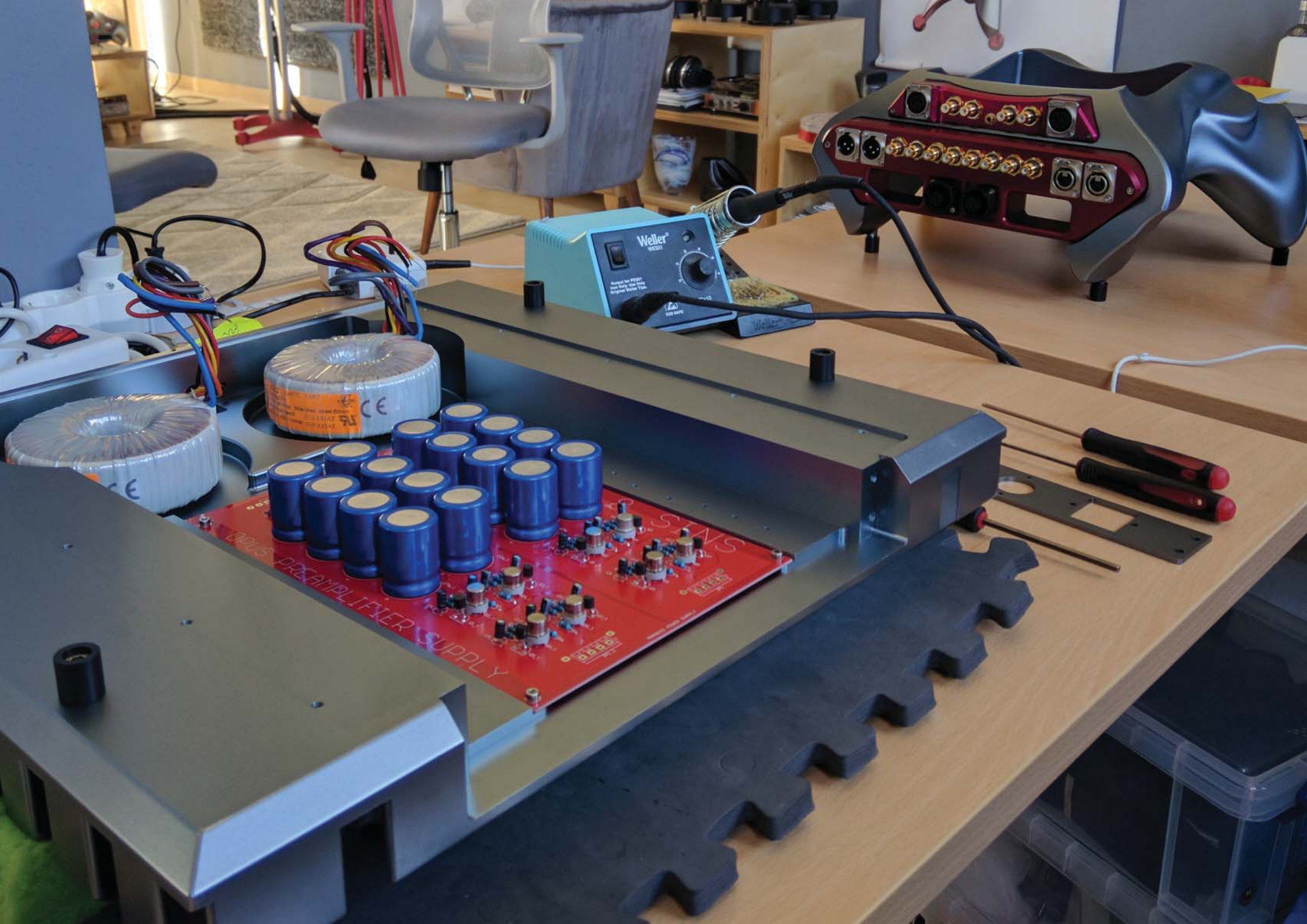
" So neutral though, is the Metaxas Opus/Soliloquy set up that I could have used just about any sources I liked once the interconnecting cables were sorted. All I'd be hearing were the individual characteristics of the source components. However neutral or 'naked' the sound, the MAS doesn't come off as 'transistory' or clinical ... it had a feather-light touch and a way with tiny details that suggest either a pedigreed 60W or 70W per channel tube amp of recent vintage ..."
Ken Kessler, HI FI NEWS& RECORD REVIEW, England.

" It would make a perfect tool to assess equipment by. If any component is not in the top league, the amps will betray the culprit with surprising honesty. Its other great strength is the speed of delivery. It can keep up with the fastes of guitar runs and tambla rolls with a speed normally associated with single-ended valve amplifiers".
Alan Sircom, HI FI CHOICE, England.

"From this moment on, "the miracle" from Metaxas brought out high frequency information with such clarity which was never before heard".
Rating: Absolute Spitzenclasse, REFERENCE.
STEREOPLAY MAGAZINE, Germany.


METAXAS 8 STA
OFF


MUTING
US REFERENCE PREAMPLIFIE


Weller
WESD1
PREAMPLIFIER SUPPLY

Design Philosophy

ULTRA-SHORT SIGNAL PATH : NO-WIRE DESIGN

A prominent audio designer once described an amplifier as "A straight piece of wire with gain". We take this further by featuring the ***shortest*** *possible signal path in a commercial amplifier.*

We do not use wire in any of our signal paths and every component is directly soldered to one large printed circuit board.

From input to output, the signal passes through no more than 150mm of P.C. track. The transformer is connected with only 40mm of wiring to the PC board. This is only possible with our unique construction which features the complete amplifier (including filtering capacitors) is assembled onto one single rectangular Printed Circuit Board where the four sides connect directly to the inputs and outputs, power transistors on their heat sinks and power transformer.

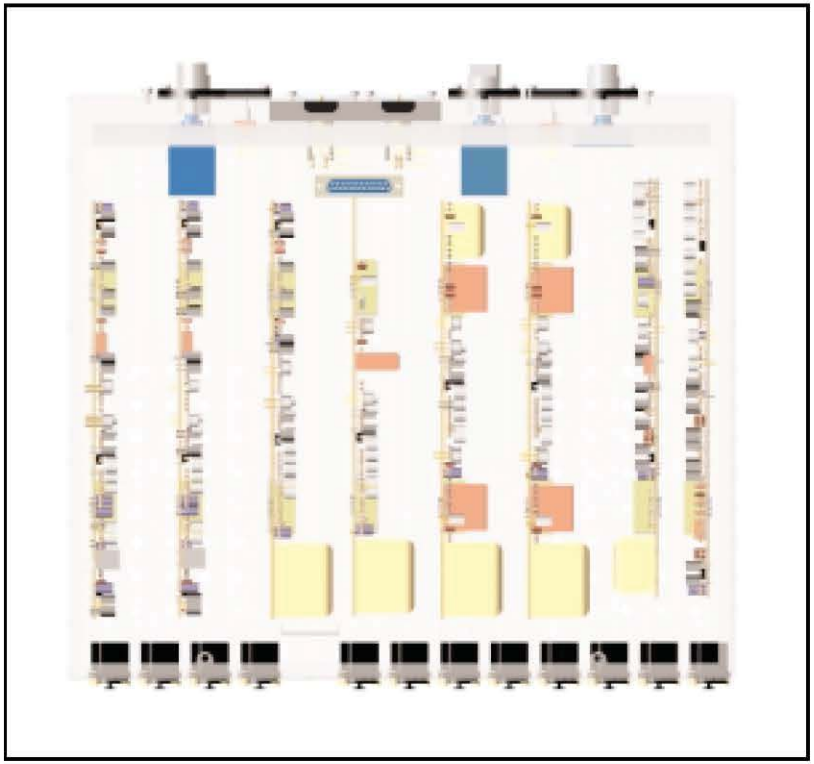
The audio signal passes through ONLY ONE TYPE OF WIRE which is the high speed, wave controlled oxygen free copper of our PC board.

HIGH SPEED POWER SUPPLIES

Every amplifier uses a large, high-current power transformer which feeds a 'high-current' bridge rectifier to convert the AC from the transformer into DC voltages which are then mains ripple filtered using massive, computer grade capacitors.

The rectifier bridge that is normally used is relatively large, handles high current and low voltage which slow switching speed because of its inherent high internal capacitance.

It has a response time measured in milliseconds which if converted to frequency would mean that it would have a frequency response from DC to around 100Hz .



Frequencies above 1 kHz would be unable to draw current from the power transformer directly and would need to rely on the charge stored in the power supply filtering capacitors.

We replace this slow DC rectifier with ultra high speed diodes wired in parallel with switching times in 'nanoseconds' which when converted to audio frequencies have a frequency response from DC-10 MegaHertz.

High and low frequency currents can be drawn from the power supply more effortlessly .

Design Philosophy

LOW NOISE, HIGH SPEED VOLTAGE REGULATOR DESIGN.

The most significant difference between VALVE and TRANSISTOR circuits is the amplifier/power supply interaction.

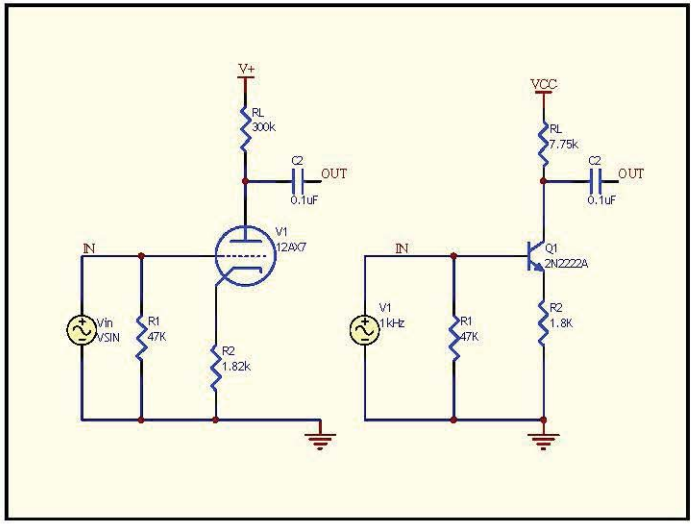
In VALVE amplifier, the high voltages (from 200-400 Volts DC) result in a 50,000 to 100,000 Ohms value for resistor R. The equivalent transistor amplifier using much lower voltages (from 12-30 Volts) would have a substantially lower value of R between 200 Ohms-100 Ohms. Therefore a normal power supply in a transistor amplifier is more likely to affect the transistor amplifier circuit compared to a Valve amplifier circuit.

If we assume that the regulator impedance at V+ is around 2 Ohms just for the purpose of this illustration, then let us study the amplitude of the 10 VOLT sine wave as it goes through R and returns back to the OUTPUT of the TRANSISTOR circuit and VALVE circuit.

In the VALVE circuit, when 10 VOLTS travels across the 50,000 Ohms R towards the power supply impedance of 2 Ohms , the 10V signal is attenuated 50,000/2 = 25,000 times. Therefore 10V/25,000 = 0.0004 Volts of 1,0kHz sine wave.

On its way back to the OUTPUT of the circuit it is attenuated by the impedance of the amplifier (say 100 Ohms): 0.0004 Volts/50,000/1,000 = 0.000008 Volts. Therefore, 0.000008 VOLTS of out of phase sine wave accompanies the 10 Volts sine wave as out-of-phase distortion in the VALVE CIRCUIT.

In a normal TRANSISTOR circuit, the 10 VOLTS going across the 200 Ohms resistor R would be attenuated only 10/200/2 = 0.1 VOLTS. On the way back to the output, the voltage is attenuated by: 0.1V/200/1000 = 0.05 VOLTS of out-of-phase sine wave added to the 10 VOLT output sine wave.



Design Philosophy

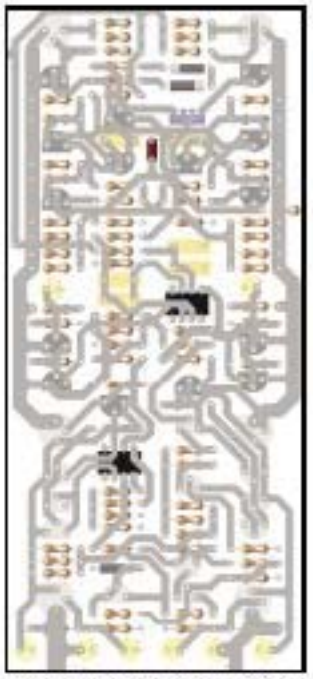
In a normal Transistor circuit, the 'phase distortion' is 0.5% as compared to 0.00006% for a normal VALVE circuit .

If we monitor the V+ point of the transistor circuit using an oscilloscope, we would notice this 0.1 Volts, 1.0 kHz signal. If we were to increase the frequency to 10,000 Hz and up to 1.0 MegaHertz the speed of dynamic behaviour of the power supply becomes critical. Using a normal I.C. regulator would result in the signal at V+ actually increasing in amplitude as the frequency increases to that at 1.0 MegaHertz the 1.0 Volt sine wave is now over 1.0 Volt!

To fully understand this interaction between the amplifier an power supply, it is necessary to understand how a voltage regulated power supply works. A voltage regulated power supply is essentially a D.C. amplifier (not unlike a normal power amplifier) which instead of having an audio signal at the input which is then amplified to become a larger audio signal at the output, has a fixed D.C. voltage reference at the input which is then amplified and becomes a larger DC voltage of at the output. The output impedance of the regulator, not unlike the output impedance (or 'Damping Factor') of a power amplifier is less than one ohm at D.C.

If we use a 2.0 Volt zener diode as our fixed DC voltage reference at the input of the D.C. amplifier which has a gain of 10, the resulting output voltage is 20 Volts D.C.

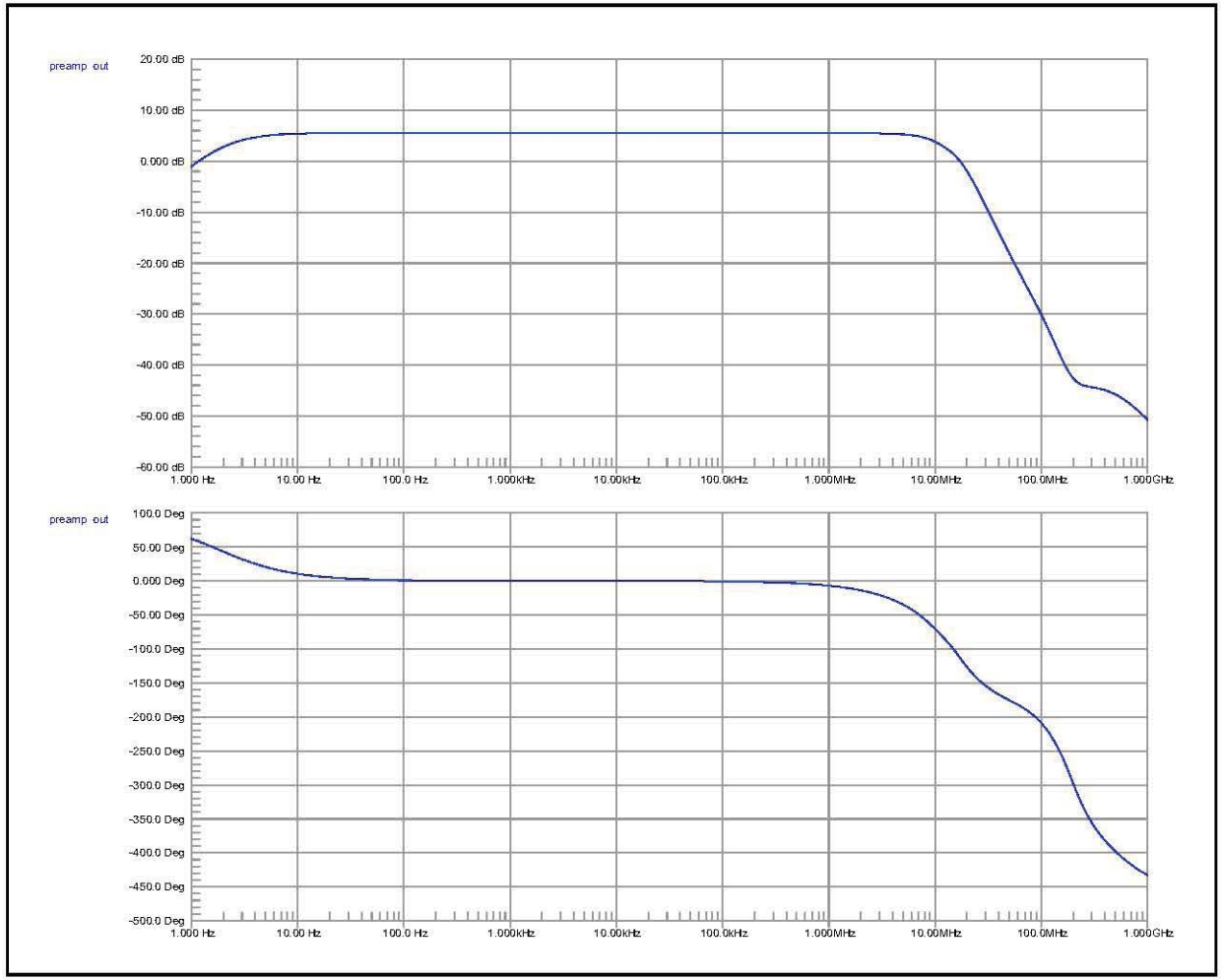
The negative feedback loop of the amplifier which fixes the gain of 10 times the 2.0 Volt zener reference is very important because it maintains the output voltage irrespective; of an increase or decrease in the power supply voltage to the amplifier as long as there is a minimum voltage for the regulator circuit to operate (for a 12 Volt regulator, the minimum voltage is 15 Volts).



Our "wholistic" approach to Line Stage/Regulator design

Design Philosophy

Frequency and Phase response to 1.0 GIGAHetrz



This is the STATIC performance of a voltage regulator which although important, does not affect the overall sound of the amplifier as much as the regulator's DYNAMIC performance which is influenced by the speed and 'open loop gain' of the regulator.

To understand why the Dynamic performance of a voltage regulator is so important, we need to go back to our basic amplifier circuit and investigate what happens to the 1.0 Hz, 10 Volt output signal as it goes across resistor R and encounters our voltage regulator.

To ensure an absolutely stable D.C. at V+ the residual of the 10 Volt sine wave at the OUTPUT is fed through the negative feedback loop of the regulator to force the amplifier to correct this error by applying an inverted signal identical to the residual sine wave to totally eliminate the residual sine wave at V+. A high speed regulator would therefore treat a signal 1.0 Mega Hertz in the same manner as a signal at 1.0kHz. The ultimate voltage regulator would effectively have a theoretical output impedance (or 'Damping Factor') at V+ of zero ohms at all frequencies as a result of its wide bandwidth before the addition of negative feedback.

In this way, the attenuation of the 10 Volts across the resistor R residual would be complete, and no attenuated component of the 10 VOLT sine wave could be deflected and return to the OUTPUT of the circuit and cause severe phase anomalies by adding to the new signal p;resented at the output - remember that it would take a few nanoseconds for the signal to go through the resistor and come back.

This extraneous out-of-phase information if allowed to adds to the new OUTPUT signal, would then destroys TIME/PHASE characteristics of the amplifier circuit.

In real world power supply circuits, the impedance of the power supply actually increases with frequency because the open loop gain rolls off at high frequencies .

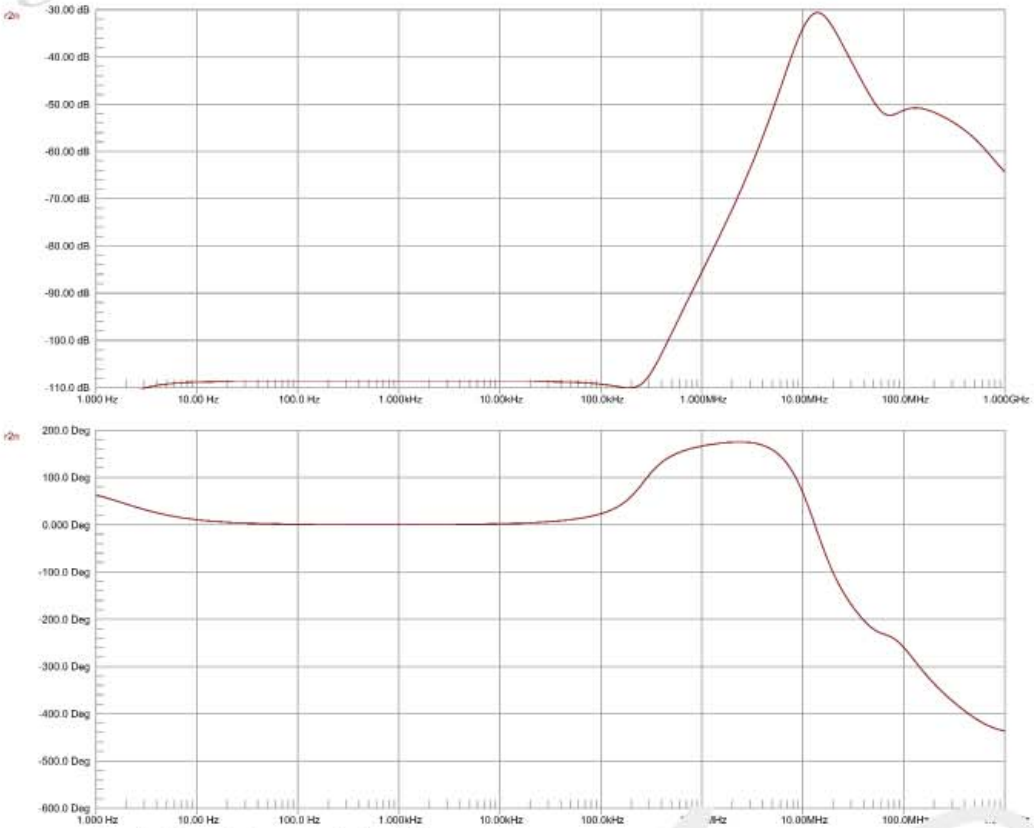
Design Philosophy

If we go back to our basic circuit and analysed the performance of an I.C. positive voltage regulator (say a LM78LXX from NATIONAL SEMICONDUCTORS) it would have an output impedance at the pin of its output lead of around 0.2 Ohms from DC to 10kHz, and then an increase to 0.4 Ohms at 20kHz, then 4.0 Ohms at 1 MEGAHERTZ which clearly illustrates the open loop frequency response has a turnover point around 10 kHz. When you add the normal distance between the regulator output and amplifier circuits which may be as little as 60mm to as much as 200mm in many circuits, the overall impedance in creases 5 to 10 times. Also, to stabilise the operation of this I.C. regulator, it is essential to use an output capacitor for stability.

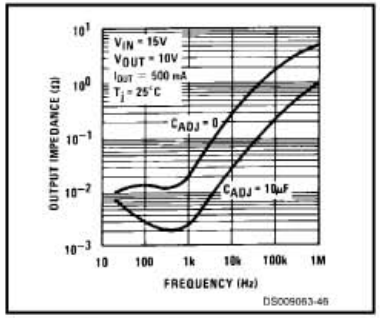
Clearly, this is not good enough for high performance, high speed transistor circuits. For this reason, we have approached the design of our regulators as PART of our amplifier circuits, rather than make the fastest amplifier circuit and add a slow I.C. voltage regulator with an output capacitor and call it a finished design. Our discrete voltage regulators are designed to have the absolute lowest noise, reject mains ripple, but more importantly to have a speed (1000 V/microsecond) which is a result of their wide bandwidth design (an open loop frequency response greater than 500kHz) and output impedance which is an order of magnitude better than any I.C. The regulator stability is achieved without ANY capacitors by varying the ratio between the local and overall feedback of each device.

We position the regulators within inches of the active circuits (in the case of the OPULENCE, the regulator is 3mm! from the active circuits) and the regulator impedance is flat from DC to beyond 5 MegaHertz at less than 0.05 Ohms.

Beyond this electrical design aspect, we listen to the sound of our regulators whilst developing each amplifier circuit to ensure that every component change or substitution produces an audible improvement from the selection of transistors to best biasing currents , choice of voltage references zeners and degree of local feedback.



Compare our discrete "capacitorless" regulator design [above] to the IC Regulator used in many designs today [below]



Steps for Connection

1. Ensure that the mainframe and power supply are connected before connecting the amplifier into your system and powering it up.

Note: For the best results, it is recommended that the unit is powered on for at least 15 minutes before critical listening is attempted.

DC Protection Circuits [except for Balanced Out Version]

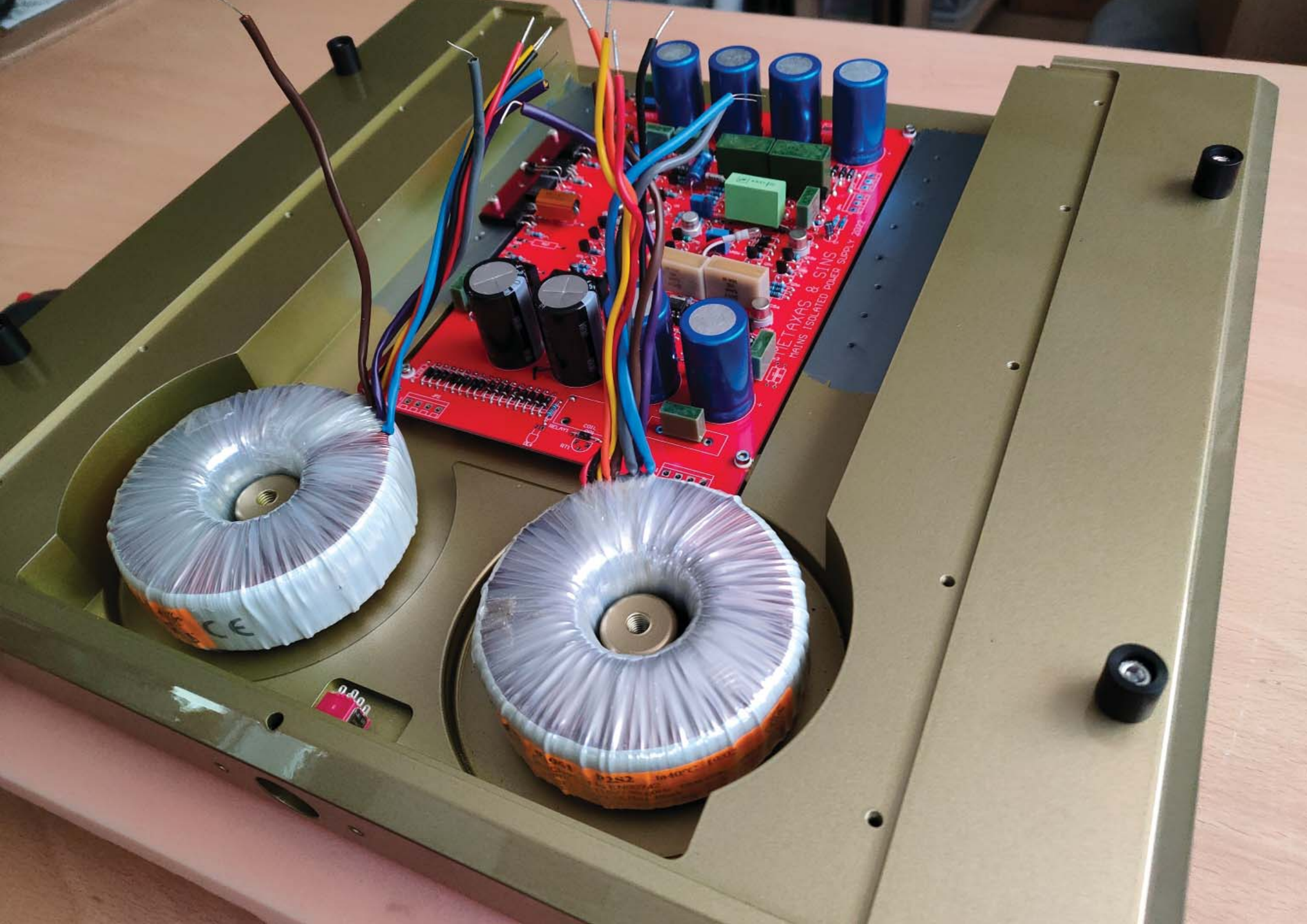
The output stage of the preamplifier is connected to a DC protection circuit which activates a relay if it senses any DC.

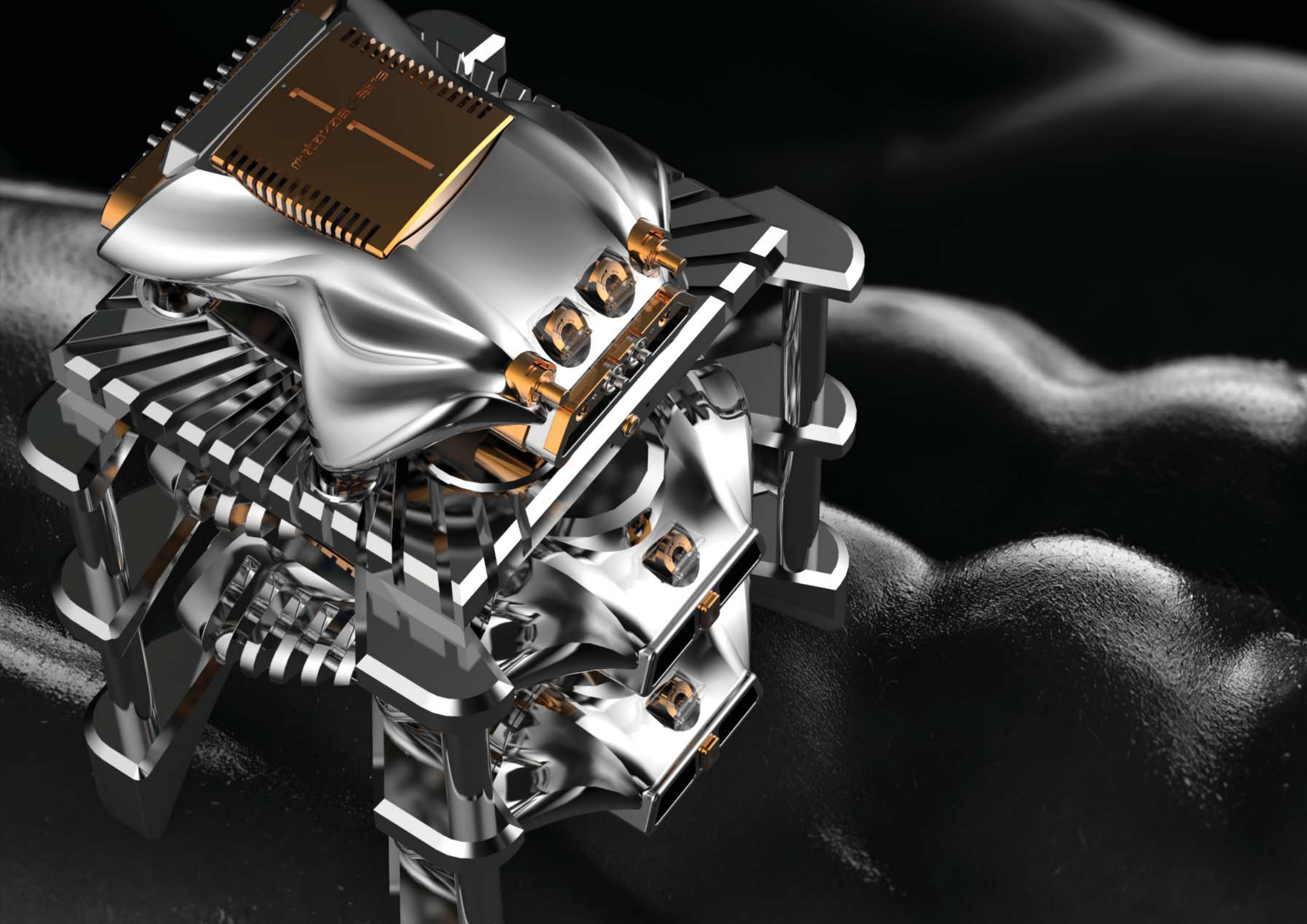
Mains Fuse

A 2AMP SLOW BLOW DA205 Type fuse is located on the AC MAINS SOCKET. If this blows, simply replace with the same rating fuse. If the fuse continues to blow,

Serviceability

The complete active circuitry of the amplifier including primary filtering capacitors are all mounted to the large single ground P.C.B. Easy access to the board is maintained by simply removing the base to gain access to the 'component side' for servicing.


METAXAS & SINS
MAINS ISOLATED POWER SUPPLY 2022




be there

recordings

With over 40 years of concert recording experience we are able to produce amplifiers with unparalleled transparency and effortless realism which enable you to be there.

Reference Recordings [with videos]:
http://metaxas.com/recordings.html

Seminal recordings [downloadable wavs]
http://metaxas.com/concerts.html

Munich Hi End in 2012 about recording concerts:
https://vimeo.com/144719554

www.metaxas.com