



# KAIVÄLYÄ

TRAFOMATIC AUDIO

**Reviewer:** Srajan Ebaen

**Financial Interests:** click [here](#)

**Source:** 1TB iMac (AIFF) via FireWire into Weiss DAC2iPod Classic 160GB (AIFF) via Peachtree Audio iDecco as DAC

**Preamplifier:** Esoteric C-03

**Amplifier:** FirstWatt F5 and J2, Yamamoto A-09S

**Loudspeakers:** ASI Tango R, Boenicke Audio SLS, Zu Audio Essence, *Voxativ Ampeggio* [on review]

**Cables:** ASI Liveline

**Stands:** 2 x ASI HeartSong 3-tier, 2 x ASI HeartSong amp stand

**Powerline conditioning:** 1 x Walker Audio Velocitor S, 1 x Furutech RTP6

**Sundry accessories:** Furutech RD-2 CD demagnetizer; Nanotech Nespa Pro; extensive use of Acoustic System Resonators, noise filters and phase inverters, Advanced Acoustics Orbis Wall & Corner units

**Room size:** The sound platform is 3 x 4.5m with a 2-story slanted ceiling above; four steps below continue into an 8m long combined open kitchen, dining room and office, an area which widens to 5.2m with a 2.8m ceiling; the sound platform space is open to a 2nd story landing and, via spiral stair case, to a 3rd-floor studio; concrete floor, concrete and brick walls from a converted barn with no parallel walls nor perfect right angles; short-wall setup with speaker backs facing the 8-meter expanse and 2nd-story landing.

**Review Component Retail:** €5.500/pr sold factory-direct only

It started out very simply. I'd always felt that the EL84/6BQ5/7189/6P14P-EV was the under-utilized and under-appreciated bastard child of the famous direct-heated triodes. Having visited Sasa Cokic of Trafomatic in Serbia and listened to and reviewed a few of his amps, I knew that he was the right man to prove the point. I'd commission him for an all-out statement amplifier to run EL84s. Commercial amps using this tube already existed of course. But given the valve's plebeian perception, nobody I knew had treated a project involving it as a bona fide SOTA proposition - one that you'd throw *everything* at just as you would for yet another \$20,000 300B or 62B amp.



Putting *a contract on your head* in the e-mail's subject header to get his attention, this went to Sasa: "I am commissioning an amp from you. I'm serious. Figure out an approximate price, let me know

what it is and we'll do it. Here's the rough sketch. EL84 monos. In pentode, not triode. Ca. 20 watts per side. Single-ended or push/pull I'm not sure. Perhaps ECC99 driver. Direct-coupled (IT). Perhaps input transformer. You're the boss, you know what sounds best. For the look, I like what you do now for Trafomatic. Except I've got a few changes.



"a/ no power LED, just one of your nice knobs for power in the front, nothing else.

b/ a single pane of glass that sits in two short slots cut into the top aluminum plate. The glass plate is as tall as the EL84s, no taller. Two (or four) yellow LEDs fire up into the glass from below the surface to light it up. If you want to get fancy, we could etch or sand-blast a design into the glass.

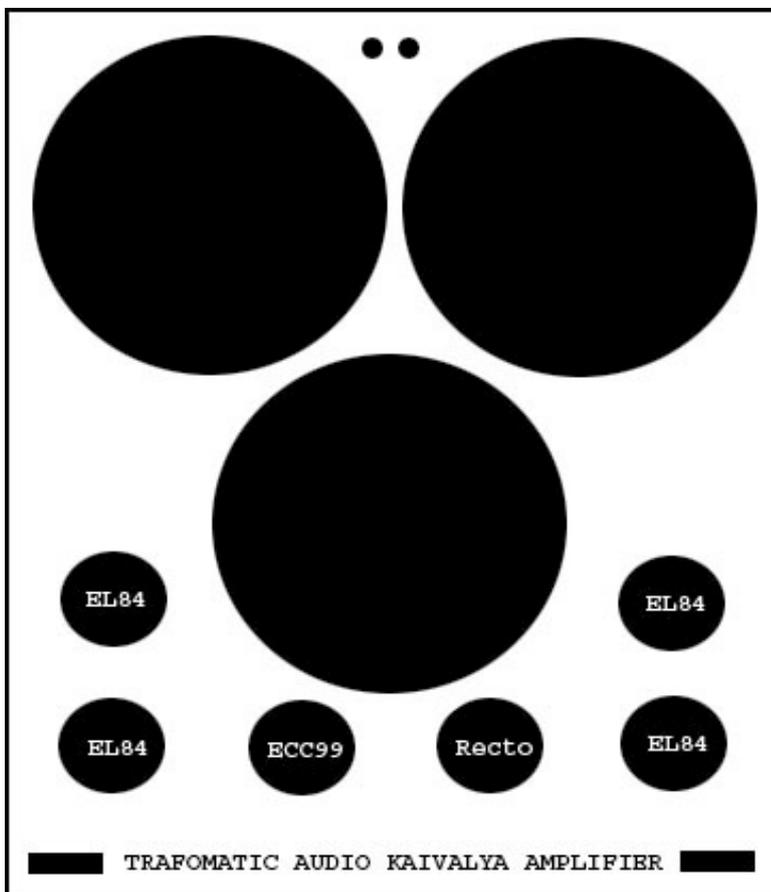
"The glass will have a little space to float so it only sits inside short slots for a few centimeters on either side and clears the deck in the middle by say a centimeter. It'll look *very* nice. The glass itself is straight, just sanded across the edges to not cut. Very simple, very elegant.

"Transformer covers in your usual textured black, same wood chassis as you do now. Perhaps a single tranny cover all across, perhaps individual. It might depend on how many transformers/chokes you put on deck. Negative feedback is okay if it does the job. I don't care about the circuit concept, 'audiophile purity' and religious concepts, just the sound. You're the maestro, you decide. The only thing I'm reasonably sure of is that I like the EL84 in pentode better. Perhaps parallel SEP could be the ticket. Or push/pull. I want really good bass control which perhaps favors p/p. And I like that bluesy 'bite' of pentode which separates better than triode and is more crystalline."

Sasa's reply took only a few hours. "Very interesting proposition. You actually thought of something I already had in mind, with four EL84s per channel. Would it be a power amp or integrated amp?"

"Power amp. I love my Esoteric C-03 preamp for tube amps and it's got huge gain (or none at all) to accommodate all scenarios. How much power would the amp make in p/p vs. paralleled SE with 4 x EL84?"

"Yes, power amp is always better for sound. In p/p UL mode, four EL84 can make 25-30 watts, PSE with four EL84 is not a good idea, maximally two are okay but more than two create other problems. Four in PSE triode give us 10 watts, perhaps a bit more. UL PSE is bad, I tried it and didn't like it but we could get about 18-20 watts. P/P UL mode is *very* nice. With separate windings and some transformer tricks, very little negative feedback directly in the output transformer, you can get a real winner of an amp. ECC99 or 6N30-type input tube (in single-ended mode) coupled by transformer to the four EL84 in p/p mode is the best way for sound and of course a tube rectifier - but not the usual 5U4G. About the look, the best way is if you make me some drawing when we meet in Norway at the Bergen show but except for the glass, the rest I will design how I think it best for the amp. Is that okay?"



*Of course.* If one wants a masterpiece and has identified the chosen maker, it's vital to give them as much freedom as possible. Nobody creatively brilliant enjoys working in a straight jacket. I already was fully convinced of Sasa's brilliance. All I wanted was to stimulate him to throw overboard the calculator in his head which he like everyone else must keep ticking whenever conceptualizing commercial amplifiers.

I wanted him to design the very best EL84-based circuit he knew how and forget about 'reasonable' when it came to parts. Sasa is no wide-eyed mystic who spends money on silly audiophile designer parts just because customers expect them. His focus is on transformer craft. Premium iron—be it input, output, interstage or power—costs money.

And, NOS glass can get costly. *That's* where I wanted him to feel unrestrained and go wild wherever performance warranted it. After all, the EL84 is no massive 833 transmitter beam tube that might see 1800 volts on the rail. Neither were we talking high power nor pushing a given set of valves to their short-lived limits. Relatively speaking, extreme in this context would be quite modest when compared to a single-ended circuit with exotic triodes of similar final output power.



For a name, I quickly settled on the Sanskrit term *Kaivalya* which connotes ultimate freedom or liberation. It'd have a nice double ring - freedom for the designer, liberation for the music. I wanted that name engraved on the top cover right underneath where the glass cover would float, i.e. in line with and between the two cut-outs where the glass would be anchored. I saw a yellow fill for the engraving, in the color of the ambient LEDs. I'm a slut for valve glow. Anything to enhance and support it should be done.

Without knowing how many rectifier tubes Sasa would use—his big 300B reference monos used two—nor how many transformers or chokes would have to go on deck, I mocked up the above drawing for just a rough notion. Dimensions, layout and specifics would remain his decision. Importantly, I wanted the industrial design to remain closely wedded to the existing Trafomatic Audio aesthetic. I did not want to complicate this project by going after some outré cosmetics. I wanted Sasa as comfortable as possible to focus on the sound-producing decisions. He had to feel assured that except for the simple protective glass cover, he'd not be challenged on the physical design beyond what he'd already done before. I also told him that I wanted to document this project for 6moons with quotes from our e-mail correspondence, sketches, revisions and such to report candidly on the process. It might encourage others to approach their designers of choice with similar requests and become small 'patrons to the arts' to stimulate advances.



One Dinos Theodorakopoulos had earlier contracted with Sasa for a pair of 2A3 monos using EML glass. He was clearly thrilled with how they performed over his Avantgarde horns: "The REF-1 monos are indeed the most natural and sentimentally *human* intensifiers of emotion which I have heard regardless of cost. Of course they need really sensitive hornspeakers to go to heaven. But after 27 years of daily avocation, this is my final system and this is how it shall remain."

Where Dinos had wanted direct-heated triodes and just 4 watts for his 107dB Avantgarde Trios, I wanted 25 watts for my 91dB Franck Tchang speakers. Already owning first-class 45 and 300B SETs and 130-watt KT88/6550 push-pull amps, it was time for the lowly EL84 to shine as brightly as she could.



Sasa's next email: "I have two ideas but am still thinking. I am making some 'harmonic analysis' between ECC99 and ECC81. The ratio between 2nd and 3rd harmonic favors the ECC81. This ratio directly influences the sound and is critical. It's about how the choice of driver tube for the output tubes influences the sound not just with its ability to *drive* via current, impedance and headroom but harmonic interactions." A week later, "the concept is coming along nicely but is challenging.

"Single-ended drive of ECC81 coupled by IT to four EL84s. Rectifier tube will probably be an indirect 5AR4 with 15-second delay of anode voltage, an EZ80 for the input tube and some perversions in the output transformer (I never before built something like this) but I hope that it will become the best-sounding EL84 amp in the world, no joke."

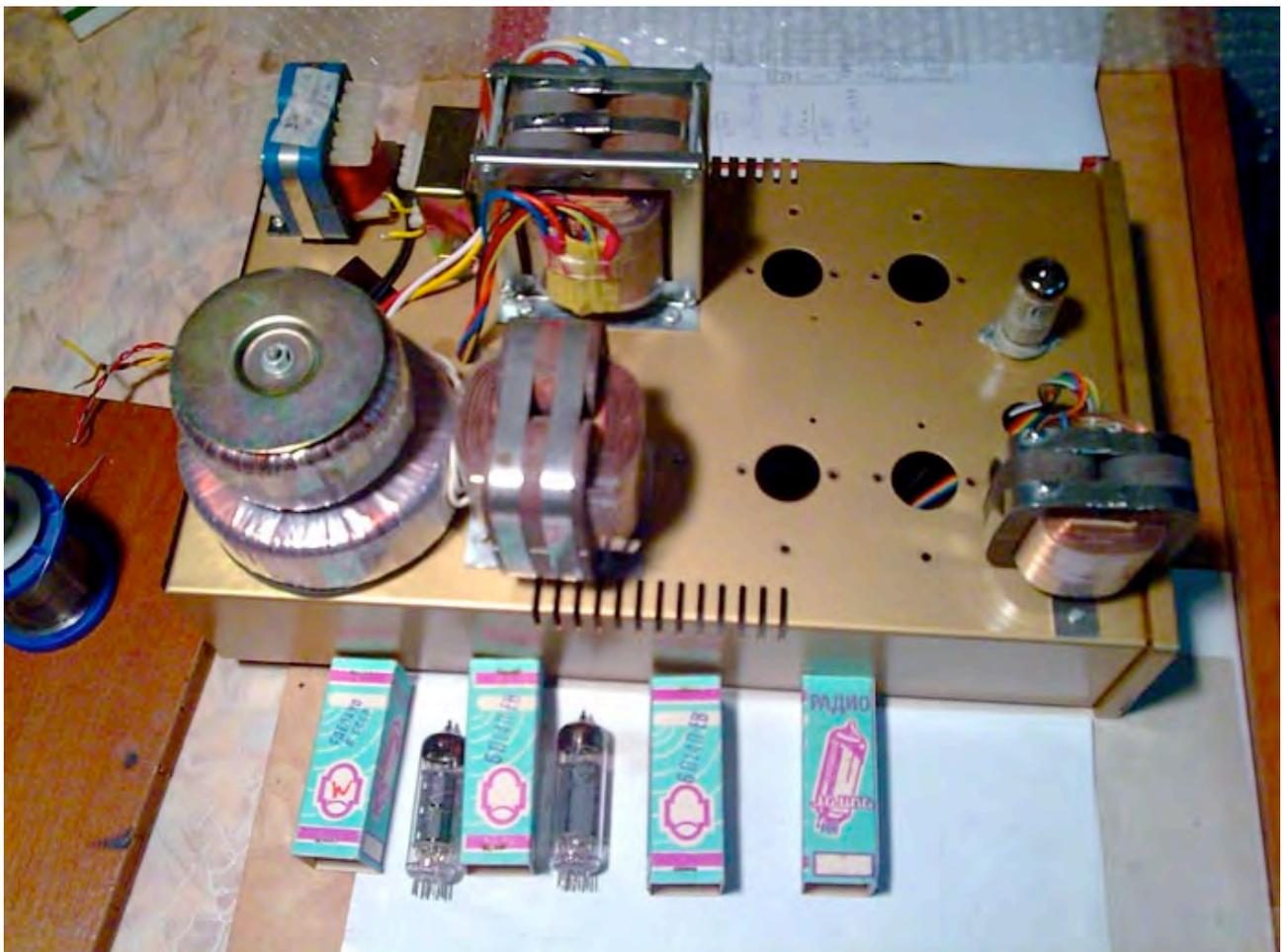
During our [visit](#) to Renaissance Audio in Bergen/Norway, I had opportunity to speak with Sasa in person. He explained a few of the planned transformer perversions which would require more than the customary number of windings on both the output and interstage iron. What those windings accomplish, exactly, shall remain a secret. Suffice to say that Sasa believes this has never been done before - and he isn't prone to exaggeration. (And yes, some questions as the one below which I simply *had* to insert as a photo caption are just too silly to be dignified by anything but silence.)



Sasa also presented me with a very attractive idea for a finish - white piano lacquer with a thick nickel plating for the metal parts. He was very excited about this. Remembering how well nickel wears versus chrome from my clarinet keys, I could see how this proposition would lend itself to an entirely new line of upscale Trafomatic models of which the Kaivalya monos would eventually end up simply having been the first. It only made sense to turn this project into formal production beyond a single commission pair. I loved the whole idea. Sasa also confirmed the basic layout of my earlier sketch. He simply would relocate the taller 5AR4 rectifier behind the three transformer cans close to the IEC power inlet. This would leave the ECC81 and EZ80 front row center and the two Russian military 6P14P-EV behind each other flanking the driver and small rectifier on either side. With all frontal valves being of similar height and girth, they'd also look good together.

The day after we returned from Bergen, a quick e-mail note from Mladenovac announced that Sasa and team were already working on the first prototype of the interstage transformer, with the equivalent output transformer proto due the next day. Besides impedance conversion and perfectly matched phase splitting to turn the single-ended driver stage into a push-pull feed for the output bottles, the IT would also be responsible for the harmonic matching between the ECC81 and 6P14Ps. How could transformer windings tweak THD parameters? Sasa explained it and how he'd do many iterative listening sessions while unwinding specific interstage sections in single turns. That's how critical he expected the tolerances would have to be to hit upon that magic spot.

Now our narrative takes a worthy [detour](#) for those so inclined. I learned of an American customer Sasa was collaborating with on a project involving *extreme* high-power SETs. The gentleman in question was one Jack Rock. He proved game to share his involvement with Sasa as a client of bespoke transformers. Back on the Kaivalya project, by December 5 Sasa reported that "I revised the power supply concept for the Kaivalya. I tried the amp with a tube rectifier but in the powerful sections of certain songs, I somehow got momentary compression as you'd expect from guitar amplifiers. That's because this is a push/pull amp. It wants a lower impedance supply than a single-ended circuit would. This is a really interesting game." Far from frustrated, Sasa sounded like a pioneer who explored novel country with a keen sense of adventure. One never knows what lies behind the next bend.

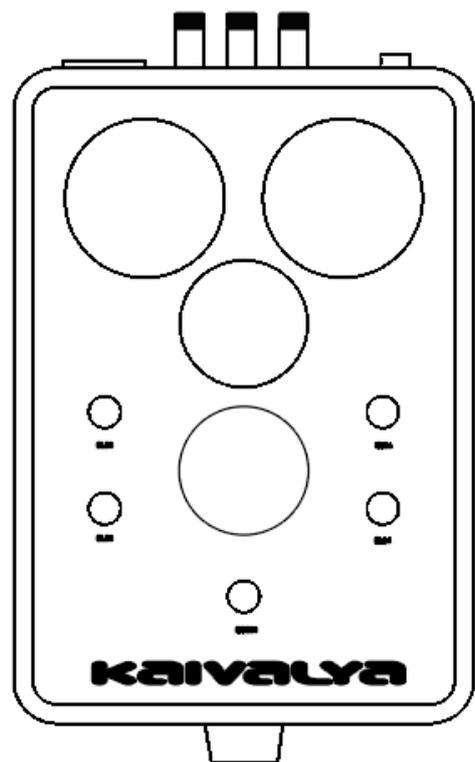




"This compression is a very interesting observation. I built guitar amps before and know this effect very well. It is good for guitars but not our cause. With solid-state rectification you can lower the impedance. Incidentally, this circuit working without negative feedback causes some other challenges but I'm using a 10H choke right now—usually designers use 2H or 3H for push/pull circuits especially for an EL84 amp—and some other tricks. I will try a small paper-in-oil capacitor of about 4-10mF in parallel with a big electrolytic in the power supply and create a very stable low impedance for the supply voltages. It is of course very important for the bass range but the vocal and treble bands perhaps need it even more. You cannot believe how directly this paper-in-oil capacitor influences the sound. I must find the right value and match it perfectly to the IT and OPT."

A few days later, these first photos arrived. "In the beginning it looks ugly, no? The final amp won't use toroidal mains transformers of course but double C-cores based on a similar principle as our Classic 500 conditioner. I have already listened but only to the output stage. I used my Experience Line One preamplifier with an added output transformer as phase splitter. The first step is to make a good and stable output stage with a superior output transformer. When I know the results from the output stage, I can very easily tailor the sound from the interstage transformer. That must remain the only and final variable 'X'. The IT will be the big mystery."

A few more days passed when Sasa started detailing cosmetics in his head: "What do you think if instead of nickel-plated transformer covers, we paint them white? I believe that we will end up with three separate covers, perhaps four. The wood frame will be white gloss lacquer, the transformer covers matte white and the rest will be aluminum - screw-less top plate, a small circular dress plate around the power knob as well as the knob itself."



This I didn't entirely agree with so we quickly settled on a pure two-tone scheme - the *same* white gloss lacquer for the chassis and transformer cans, nickel-plated aluminum for the top plate, circular dress plate on the front and the master knob. This would give us just two textures and colors, not two different whites and aluminum. The connectors would mount directly to the lacquered wooden chassis to eliminate a metal back plate. Sasa then forwarded this sketch of the general layout which captured my ideas perfectly. At this point, we were up to four transformer/choke casings on deck while the drawing indicated that both tube rectifiers had been eliminated. Apparently Sasa had also settled on the ECC81 driver over the ECC99.

"Yes, I eliminated the tube rectifiers from the design. For this push/pull amp, tube rectification ended up sounding far too vintage. Below deck will be three separate power supplies, one for the EL84s, one for the ECC81 and one for the G2 of the EL84s. There will be a total of 10 electrolytic capacitors, three chokes—one 20H and two 3H—and something more just for the power supply.

On first sonic impressions: "I'm building some WLM Minutas for Hannes right now and compared one to the Kaivalya prototype. I could be biased of course even though both are my creations but I think this new amp will easily be twice as good. The Minueta of course was very aggressively designed to hit the price Hannes wanted to pay. I would not be surprised if the Kaivalya ended up becoming the best amps I've ever built. The EL84 really is my favorite output tube.



"The trick I told you about for the interstage transformer works amazingly well. The effect it has on the sound is fantastic. And it's also a problem. Winding it this way makes it not symmetrical across the whole layer but it must be. So this is not the end of the research. This trick is a miracle and you cannot believe how it influences the sound. I will play more games with this, some more windings, some less. I actually never saw this done before anywhere else. I could be wrong but it'll be a very rare detail in any case."

The same day, this arrived: "Regarding the color scheme, I am in complete agreement but I am afraid the whole amp will become too sparkly with this nickel top plate. The second problem is that I can't engrave in a nickel finish. I think the amp will look beautiful but not glitzy with an aluminum top plate. Unlike WLM's

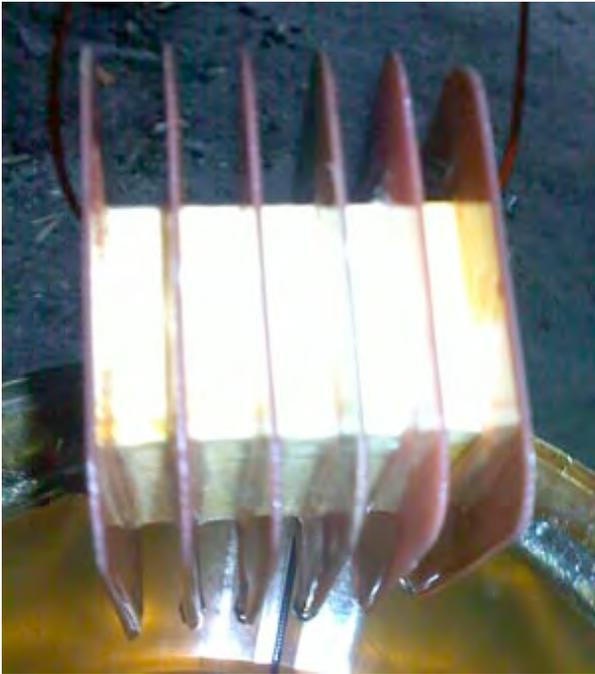
brushed finish, we'd go for very fine sand-blasting, then clear anodize. This will tone down the otherwise overly glossy effect. I apologize for my changes of ideas but that's R&D." Which is precisely why this reportage doesn't edit the process. Readers inspired to approach Sasa—or any other designer—for their own custom project should be cognizant of possible zigzags involved. I could of course have put my foot down on certain finish items but Sasa's mounting excitement had already clarified that this would become a production amplifier. Thus its cosmetics had to work broadly, not just appeal to one customer. They had to be something its maker could fully stand behind and which lent itself to future models in an expanding line.

A good week later, R&D had taken another zag. "By the way, some changes are coming - a new IT and ECC82 drive. It's a similar configuration to the first but the IT has grown by about 30% for extended bandwidth and because the ECC81 had too high an amplification factor, the ECC82 turned out to be more appropriate. Input sensitivity will be  $2V_{rms}$ , ideal for monos. In this assembly, the prototype already outperforms all of my OEM amplifiers and is similar to my own Reference 300B monos but I will see what more can be done. As you know, I went through eight iterations of the IT with the 300B monos. I hope I can hit this one after three."

Another week passed: "We're into our third IT now and very close to perfection but it must still ace a 10kHz square wave.

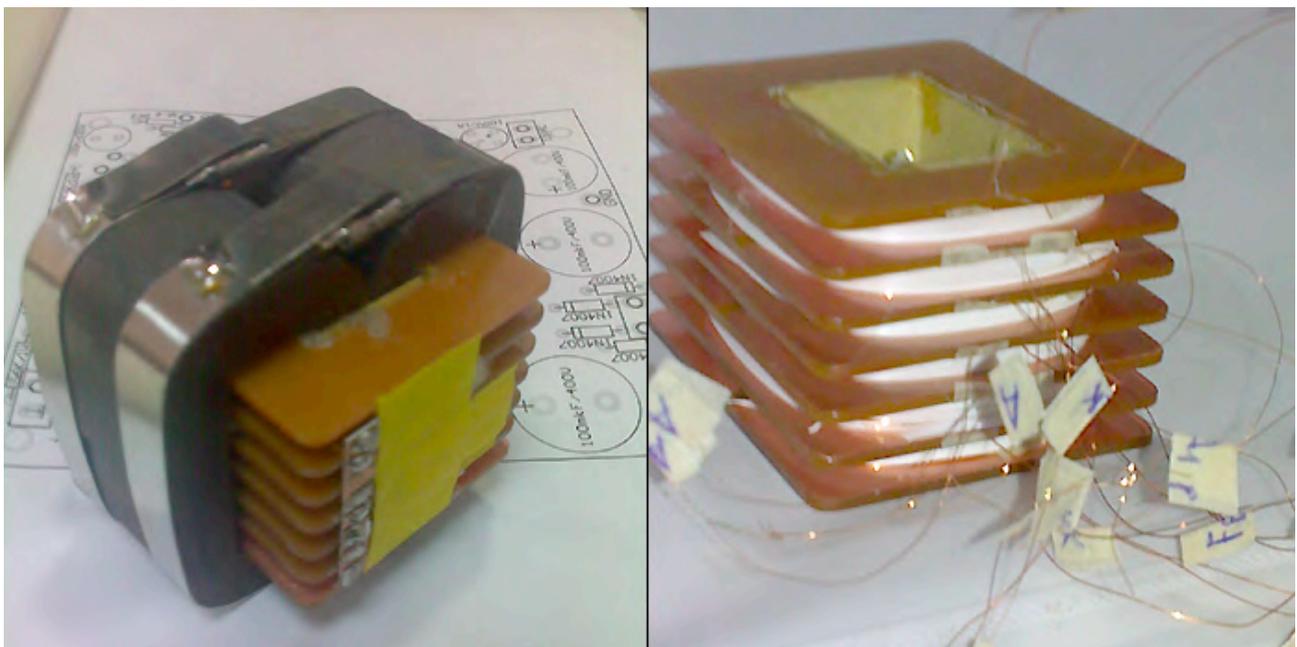
This IT is so different from the one in our 300B monos that the prior experience was no help at all." Next time I checked in, Sasa was on fifth base. "Yesterday I finished the 5th version, now I have

capriced to go to the end of all possibilities. The 4th one was excellent but I found that I could still improve it a bit with a slightly different geometry of the core that's changed over the first four. This was a nice opportunity to see what happens with different ways of winding an IT when you already have a superior OT. I conclude that the IT must be at minimum 30% better than the OT to predictably produce a superior sounding amplifier. This really maxes out the sound of the EL84. By now I like it more than any 300B/2A3 amplifier I've heard - and I listened to it CD direct without preamp. I'm surprised and you will be too I think."



By January 24, "I am just now drawing up a new type of IT which is actually a new approach to the problem - and hopefully even better if I can trust my mathematical predictions. The problem is in the ultrasonic band. Everything is fine up to 70kHz but beyond it I have 90° phase inversion between the left and right sides of the push/pull outputs of the transformer and 180° rotation at 100kHz. It's not a real concern since this is well out of band but now is a good chance to make this IT *perfect* since the market offers nothing that's good enough for my tastes."

Three days later Sasa sent this photo of a prototype 'body' on which to wind the latest iteration of the interstage transformer. "Leakage induction should be three times lower than with the earlier design." Then, "I *am* on the right track with the new winding system. I now have perfectly symmetrical halves of secondaries but a new problem, albeit smaller than the symmetry of secondaries. It's endless work but will be very good in the end." The final email on this topic: "Bingo! Finally we have got it right. In these photos you can see how it looks. The final one has 9 separate horizontal windings for 38 separate windings total (the one in these photos still only had six). The sound is *unbelievable* for an EL84 construction. I am happy."



If Sasa was happy, I was. It appeared that the project was approaching the first serious auditions.



On a snowy day which had his Trafomatic Audio van under a white crown, Sasa then copied me on an e-mail which the article had stirred up at this stage. *"I was very much intrigued by the various reviews written by Srajan of 6moons on Trafomatic products. In Singapore, there is no distributor for Trafomatic except for the Experience Head One which I had opportunity to audition and instantly fell in love with it. I'm deeply convinced that a great transformer properly built and voiced makes or breaks any tube design. Like Srajan, I'm excited about the Kaivalya. Your project spurred me to ask about the viability of another custom amp based on the almost forgotten PX25 tube. I've only heard the Art Audio PX-25 but given its almost decade-old circuit design and being built with circuit boards, I'd like to know whether you plan on a*

*future PX-25 SET to better what Art Audio has done 10 years ago? Otherwise, if I were to request a custom design, would it be possible to keep it essential SET but achieve between 10-15wpc instead of the rated 6wpc? My intention is to drive a pair of DeVore Nines rated at 91dB sensitivity with a Wyred4Sound STP-SE preamp."*

Jack Rock meanwhile had his bread-boarded 250TL hooked up to Sasa's transformers. "Note the off-angle on the 10K: 10 bifilar tranny as the best orientation for hum. Wait until I make the 450TL monsters and nicer photos. These sound amazing already."





By March, Sasa was ready to test deep engraving and decide on the size and spacing of the Kaivalya lettering. Because the router bit diameter would limit just how narrow the lines could be while preventing them from coming to a perfect point (all the ends would be round), Sasa strategically picked a font that lent itself perfectly to this application. The very first router pass into a scrap piece still had a spelling error Sasa caught after he'd already programmed and run the machine.



By now the elusive IT was locked in and a Russian Marlboro cigarette pack serves as a useful size reference.



The partially obscured handwritten chart hints at the complexity of windings hidden beneath the tape wraps. For all the complications involved in arriving at the final design, this part turned out very compact.







At left are the raw aluminum back panels with their engraved markings and holes for the ground post, input RCA, output terminals and IEC power inlet.

Below is Sasa's partner Mica in charge of mechanical assembly. Here he puts together an enclosure from dual-layer wood panels with an inner copper liner foil shield. Just like vintage furniture makers, Mica uses string clamping and hand-made corner pulls

during the gluing process of the mitered panels. A plywood base doubles as guide for perfect squaring.

The next photo shows the individual panels followed by the rear panel still on the router, then the IT bobbin parts during routing and finally assembled.







By May 11, the next batch of photos followed. Mica had prepped the enclosure and transformer cans with base coats. Without luxurious clean-room conditions, I expected that he was really sweating the final white glass layers in his vented paint booth. I'd reviewed the gloss-black 300B monos to know he was fully up to the task. But I still could appreciate the challenge involved.



The drying racks also held transformer covers in two different diameters. The smaller cans would be for the two frontal positions one behind the other, the bigger ones would anchor the rear side by side.



The prototype circuit boards were populated (finals would go to a domestic pro company)...





... the elusive interstage transformer had grown to *eleven* sections in the meantime but was wound and encased and the top plates cut. "A million and sundry things remain to be done but we *have* made progress." Sasa sounded nearly apologetic but I was in zero hurry. Considering that this custom commission had to rely on spare time whilst Trafomatic Audio ran its regular and WLM production to fulfill dealer and distributor orders in a timely manner, I was simply pleased to observe the gestation process from afar.





By May 25, Mica had five pairs of chassis ready. He mocked up a full assembly. Knob and top plate weren't yet attached, tube sockets not mounted so the valves simply sat in their holes. But watching this mere idea take form was exciting. 6moons too started as just a wild notion. The final result is more virtual than holding something concrete and weighty in your hands. It seemed I soon would have my hands full.

Sasa meanwhile was already off to the next project: "I have an idea for a smaller amp. It'll be the next in the White Range -

dual mono single chassis, with two EL84 per side and P/P UL configuration as a pure power amp. Price should be about €1750 with shipping in the EU, about €1850 worldwide. This idea came from a personal need in my living room.

"With my CD player's quality variable valve output, I only need an EL84 power amp. This one won't be IT-coupled but it shall use the same ECC82 driver and some great tricks which I learned during the Kaivalya project. It will include the dual C-core output transformer with separate anode and G2 windings, peak-current control transistors and minimal local feedback. I'm even considering a headphone output. It would have three or four different impedances like our Head One all run off dedicated transformer secondaries. That's a lot better than using the speaker outputs through load resistors. We'll see. The name of the amp will be *Homa*. It's half of homage because it's essentially half a Kaivalya and based on it. It also means fire ritual in Sanskrit. That too is fitting for a valve amp." (Below a solitary 'rushed' Homa on a Minueta chassis. Sasa whipped it up for a Dubai customer impatient to finalize a Zu Essence plus new Trafomatic Head One preamp system. The final Homa would of course get its own bespoke chassis. It simply hadn't been completed at this stage, hence one Homa would don WLM Minueta threads.)



If I had needed confirmation that the Kaivalya project *would* kick off an entire new Trafomatic Audio line, this was it. Sasa was quick to be specific. "The White Range will probably be limited to just three models - the Homa stereo amp, the Kaivalya monos and, in 2011, a matching preamplifier. I'll sell those models exclusively direct to give my customers the very best price. Because the gloss lacquer turned out so fantastic, I've already decided to accommodate requests. If someone wants a particular lacquer color, we'll do it, never mind the 'white' in range."

Then he made an interesting comment that boded incredibly well for the Kaivalyas. "I think I'm done now designing 300B amplifiers."



After returning from my visit to the folks of the Grande Castine hornspeaker in Southern France, I had this photo from Sasa in my Outlook Express by June 28. " I was merely waiting for professional PCBs. I had made three prototypes and finally nailed the perfect layout and trace routing with a very good S/N ratio. The configuration of trafos on the top plate is very nice but from an electromagnetic perspective very critical.

The IT picks up *everything* - from the PCB and outside. I use a very small separate transformer for the standby function. No matter where on the circuit board I placed that transformer, the IT would pick up noise. I finally had to take the standby transformer off the PCB altogether and mount it separately. It was a big struggle."

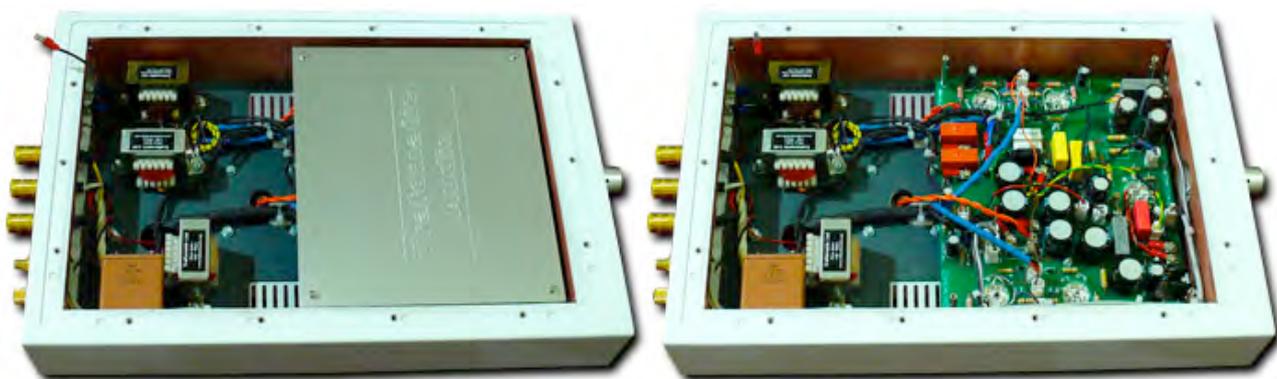


Because I'd specified white *or* orange LEDs for the acrylic backlighting firing up through the two mounting slots, Sasa had made an executive decision and used both - orange for standby, white for play. Without telling me, he'd also engraved Trafomatic Audio in the acrylic. Superb! The end result even in his informal shot taken quickly looked beautiful. Sasa was off to Belgrade the next day to have his photographer run a professional shoot. His—unprocessed!—photos looked *sensational*. What would the Kaivalyas sound like?



"The sound was my primary concern of course. Everything hinged on that IT. I never built anything like it before and I lost a lot of time on that part. What I think about the final sound matters less. In the end you are the reviewer and customer. You will tell me whether I was right or not. Still, I've never been wrong about the sound before. In any case, be assured that this is the best we can obtain from a push/pull EL84 design." By July 5th, my pair was with FedEx. By July 7th, it had arrived.

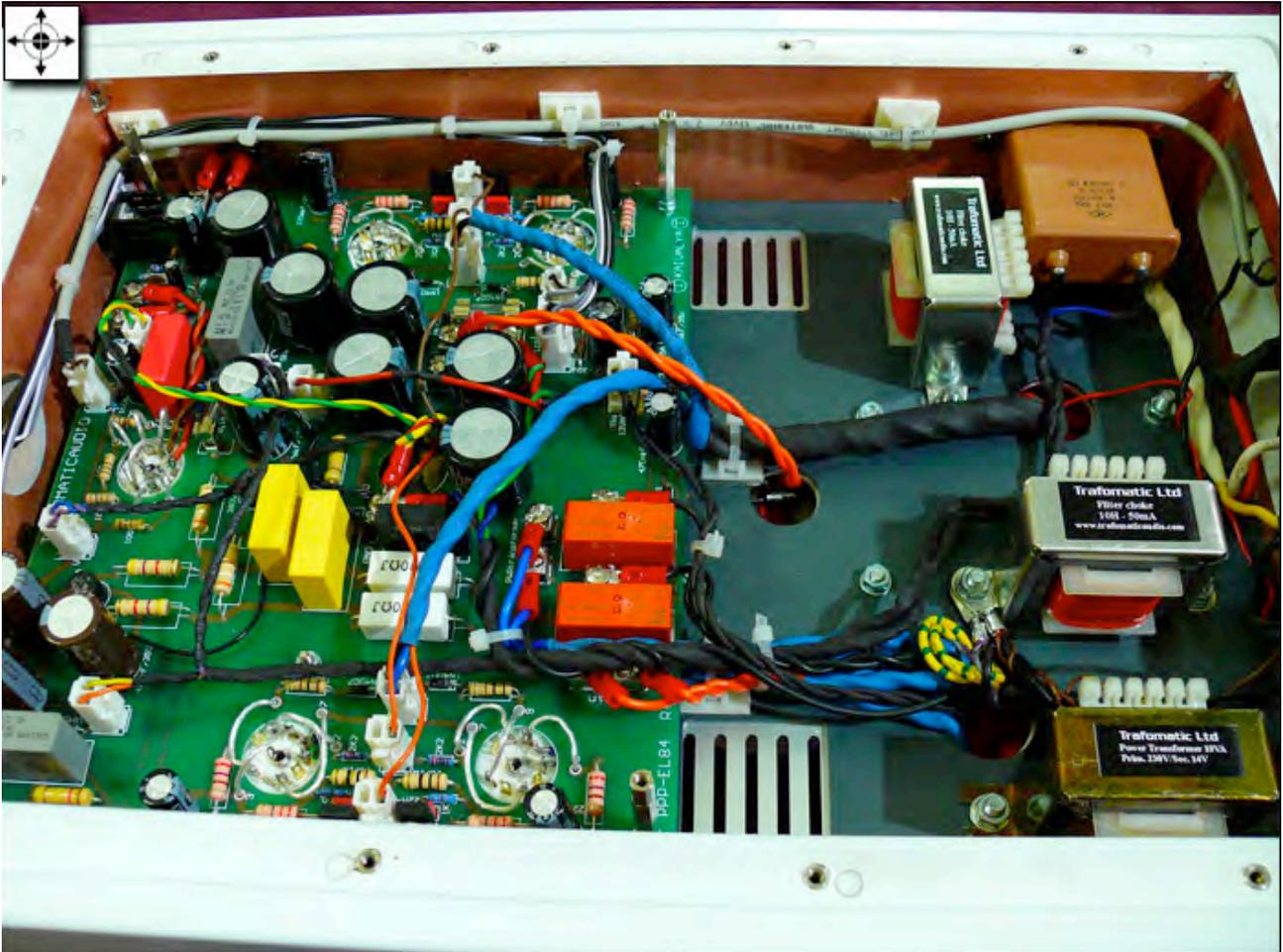
In the flesh, the Kaivalyas looked *exactly* as they had in the photos. Once before with a pair of French Triangle Magellan Cello Sw speakers, I'd admired white piano lacquer for its casual but strangely rare elegance. It's far easier maintained than gloss black. Becoming very unfriendly in no time at all, piano black reflects its environs *and* telegraphs finger prints and swirl marks from dusting like mad. Gloss white does neither. Hence white requires no special lighting tricks to photograph, no Photoshop post processing to eliminate flaws from a glossy center fold. What I received matched the professional photos to perfection. With the Kaivalyas, Trafomatic has not only produced the most handsome valve amps I've ever laid eyes on (that's just a besotted owner gushing of course) but the Serbian team has—and this is not debatable—also set new standards on fit, finish and internal execution for their company. Make no mistake, now they compete head-on against established boutique brands.



Taking off the bottom cover via 15 bolts with proper metal inserts (not wood screws), one admires a nicely engraved aluminum cover which shields the entire circuit board on stand-offs. In plain view are two 10H coils, the small standby transformer and one horizontally mounted Russian military-issue paper-in-oil capacitor.



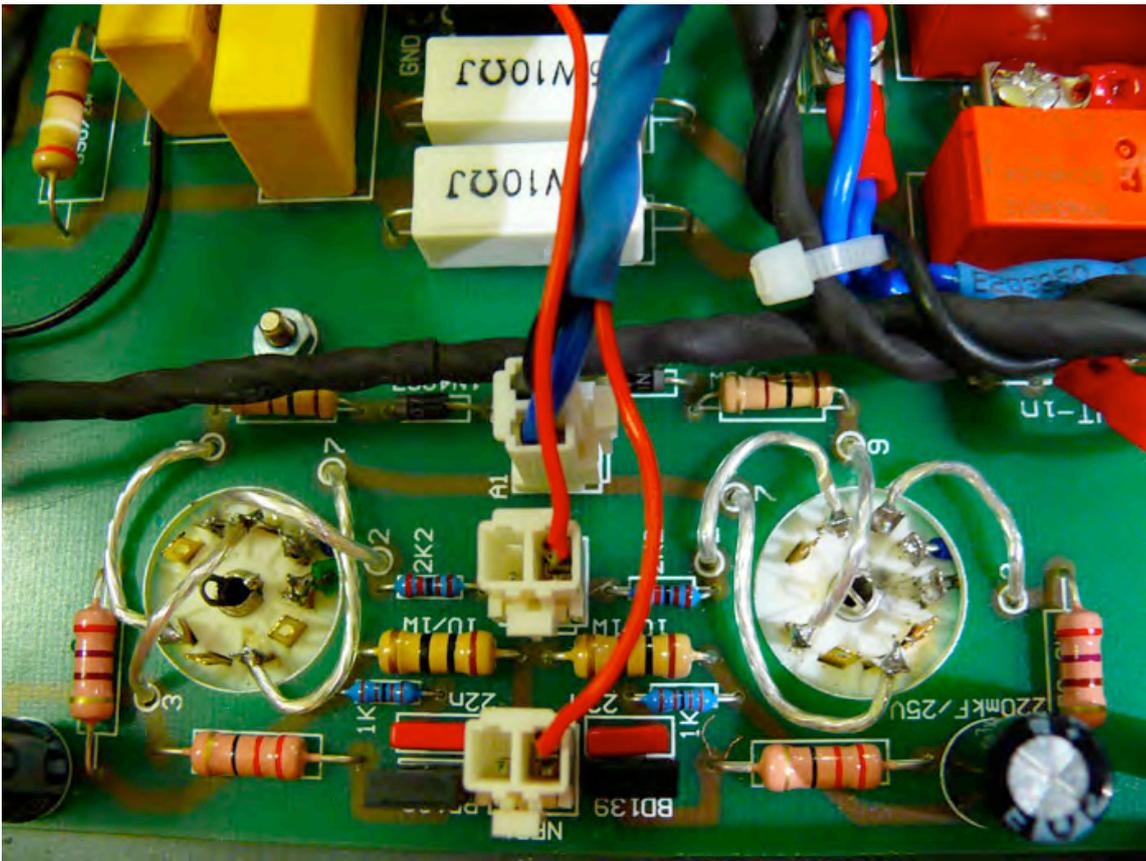
Once the cover shield is removed, one sees a combination of PCB mounting and flying leads tidily routed and tied off. Critical transformer leads finish off in metal eyes bolted firmly to terminal blocks on the board.



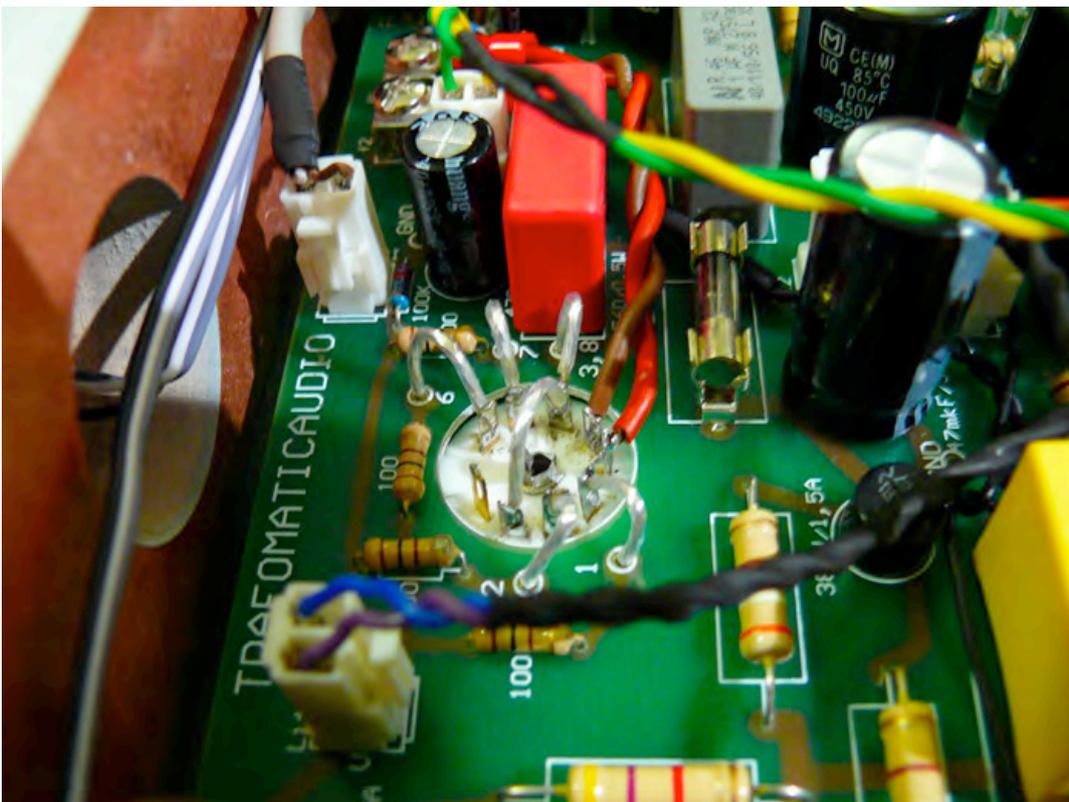
Tube sockets are high-quality ceramic units with gold-plated contacts. Resistors and caps are industrial grade rather than boutique issue. The 'real' artillery remains hidden from view inside the four potted transformer cans. Below are the orange relays for the standby feature. One relay switches on the main power transformer, the other releases the B+ high voltage from the mains tranny.



The wiring from the tube-socket contacts to the board is military-issue silver in Teflon.



In the BD139 positions beneath/between the EL84 sockets [above] are the current-limiting overload transistors.



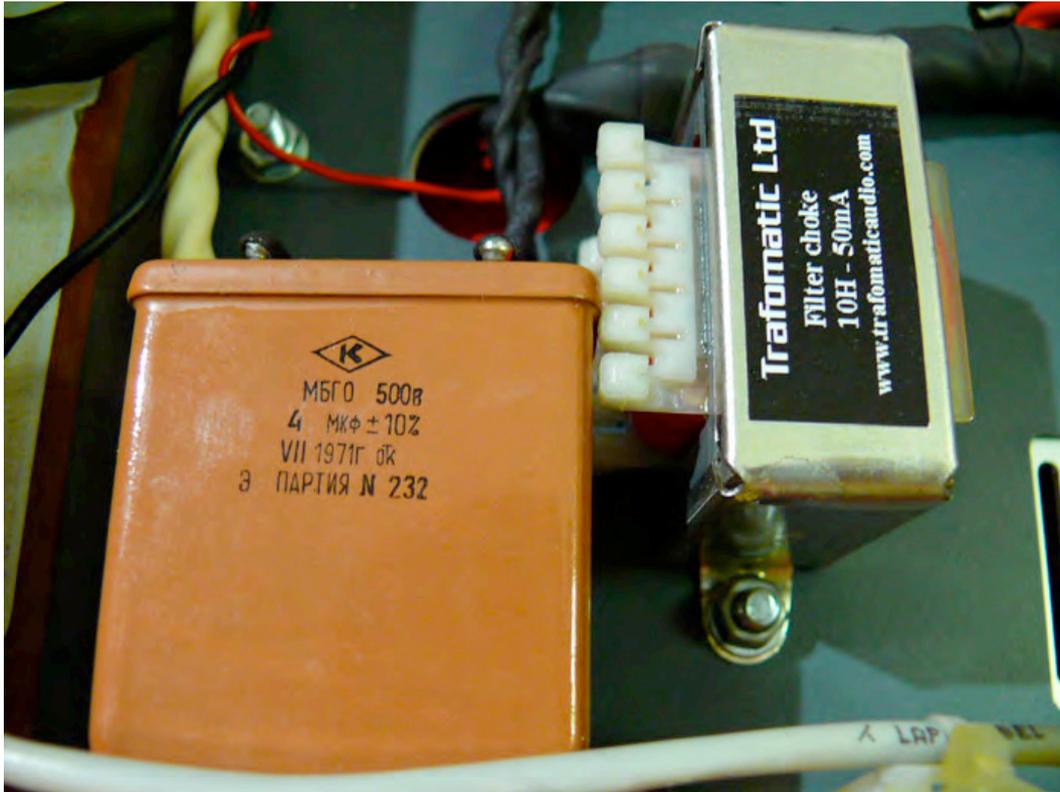
Next is the 10VA 230/14V transformer for the standby function. It is wound with a very small 0.6T induction value for reliable 24/7 operation.



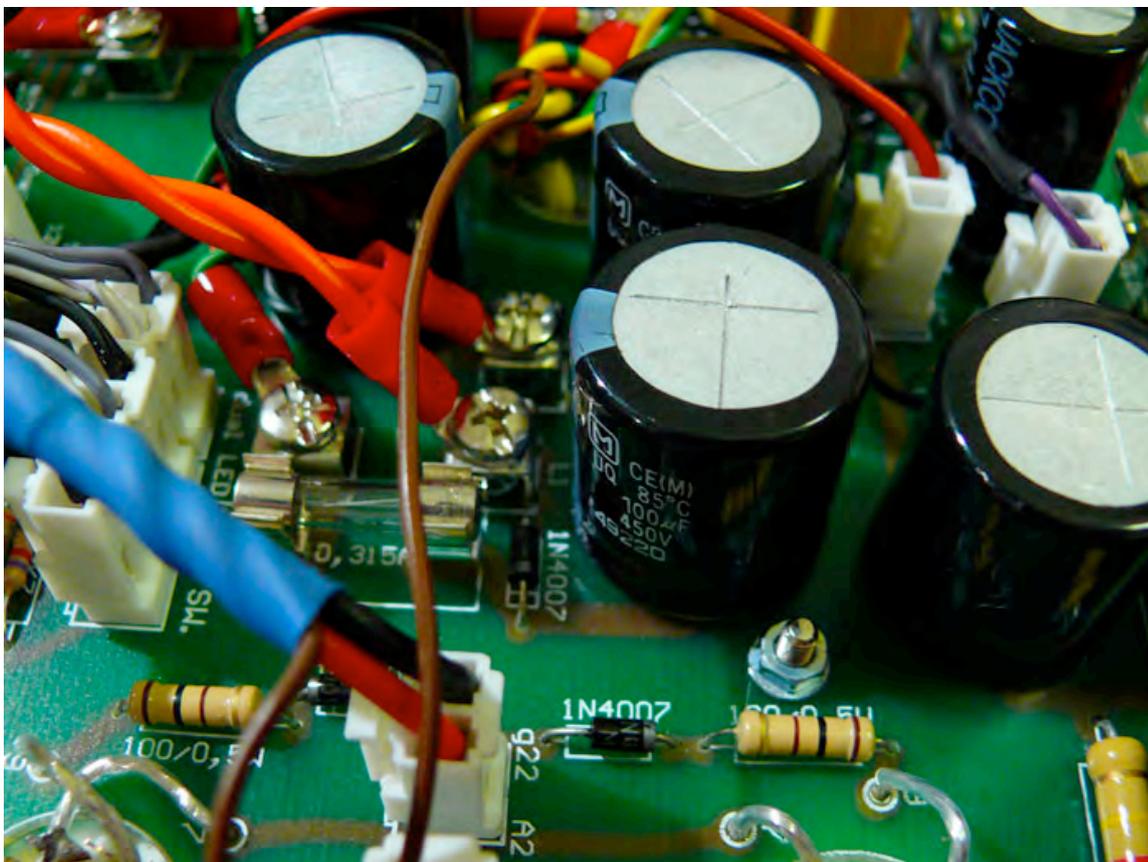
The two visible 10H/50mA chokes are for the G2 and ECC82 power supplies respectively. There is another 10H/400mA inductor inside one of the white top covers to smooth ripples in the high-voltage power supply.



This 4mF paper-in-oil capacitor with the Cyrillic writing is for the B+ power supply.



Here are more transformer leads with terminal-block board connections.



The gray block with the black writing below is a 1mF/400V bypass capacitor which parallels all power supply electrolytics *and* the sonically strategic paper-in-oil cap.



An LM317T voltage stabilizer for the ECC82 heater supply mounts to its own miniature heat sink in the corner.



The entire circuit board really is just the amp's power supply. The signal path is 'above board' on the top deck. It consists of the lone NOS EI ECC82 input/driver triode, the complicated interstage transformer, the four Russian military EL84s in class A push/pull configuration and the custom dual C-core output transformer.



The rear panel has 8/4-ohm tabs, one RCA input, a ground post and the power IEC. The i/o sockets are WBT.

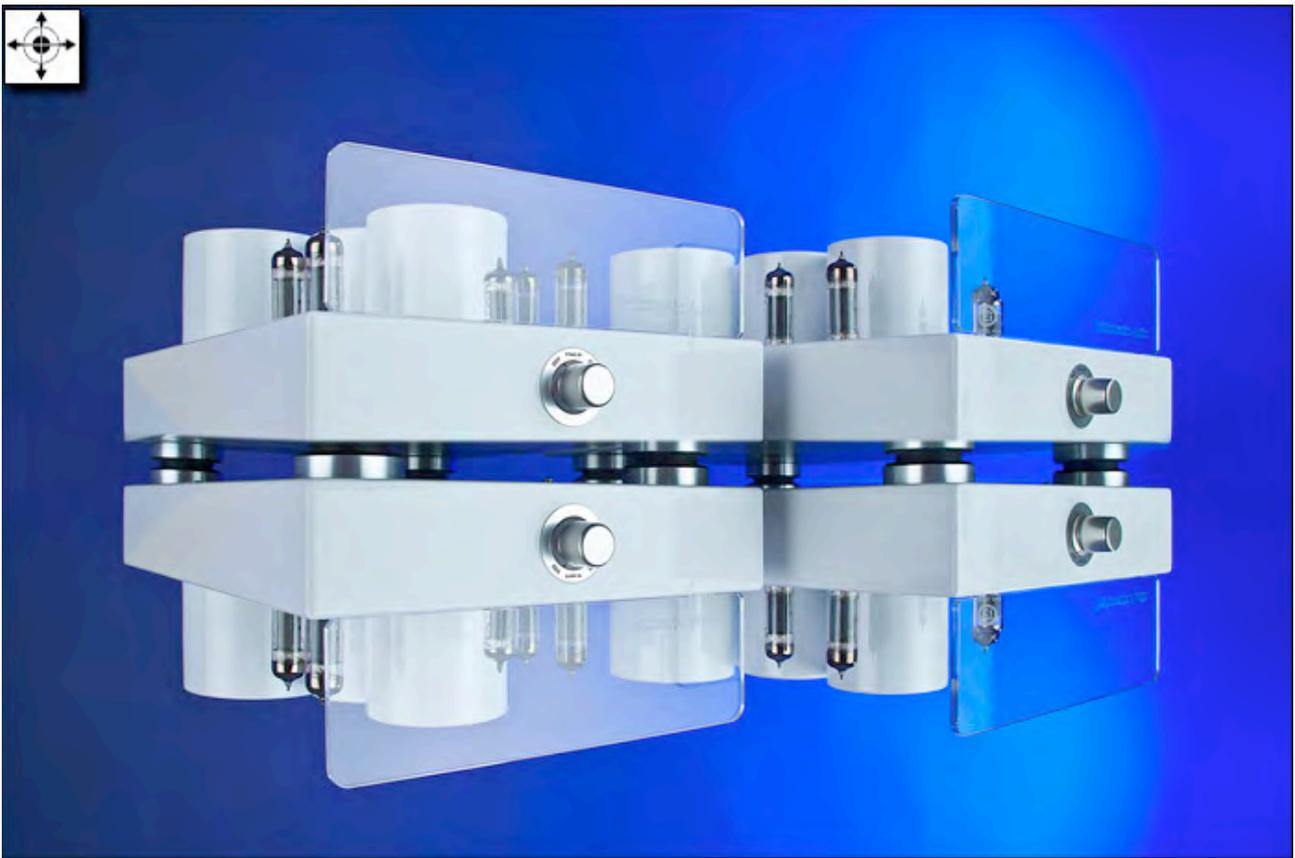


As delivered, the Kaivalyas perfectly embody my original vision. The simple fact is, they do it better than I'd dared imagine. The form factor and details Sasa Cokic and Milorad Despotovic cooked up are simple yet elegant for a timeless classic chic. It's a nearly cool Nordic vibe from the

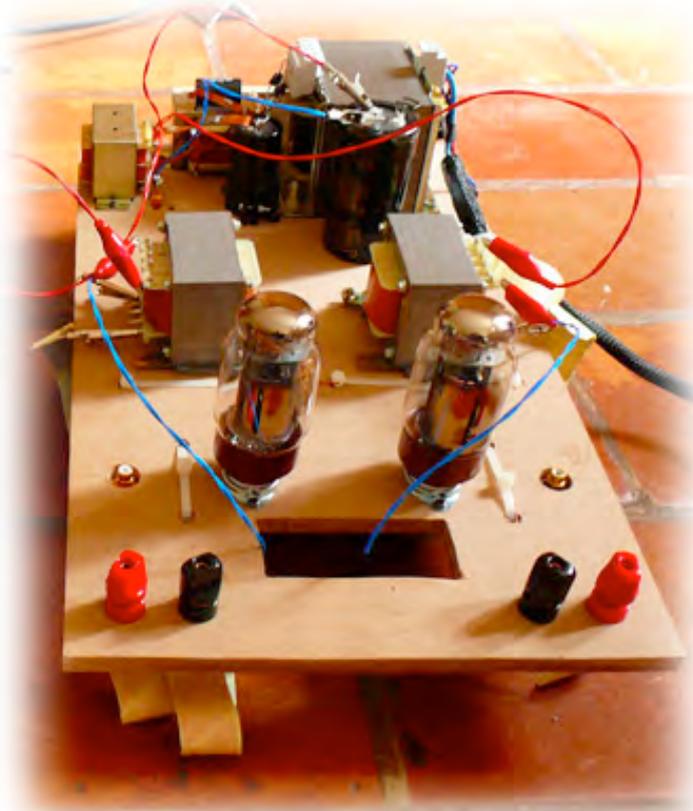
Scandinavian design school, albeit realized in the heart of Eastern Europe. My entirely personal question was, would my gradual emancipation from valves turn around? I'm first to admit that transistors still won't do certain things tubes do so very easily. My audio journey has simply landed me in a place where what tubes do right is far overshadowed by where and how they arrive second, third or later yet to masterfully implemented transistors.



Having owned a goodly number of valved machines over the years—and continuing to own select specimens for ongoing reference and reminders—my subjective yard stick is simply how much and for pleasure I listen to either the FirstWatt F5 or J2 versus any of my glow worms. If this were a serious tournament rather than one man's preference, none of my current valve amps (all of which are best-case scenarios after years of exploring the breed) even *make* it into my semi finals now.



Would the Kaivalyas have me play for the other side again?



***Spreading the luv interlude:*** During my visit with the three Grande Castine hornspeaker principals in Chateaubernard of France's Cognac region chronicled [here](#), I'd listened to a prototype EL-156 SET built by Dominique Mafrand, a high-end retailer who crafts custom low-power triode amps for his clients.

This amp omits the usual tube driver in favor of passive voltage gain. The entire signal path consists of a stepup transformer, one EL-156 per side strapped to triode and the output transformer.

I'd suggested to the gents that if their output transformer wasn't yet locked in, they might want to commission Sasa for a sample to compare to their current contestants.

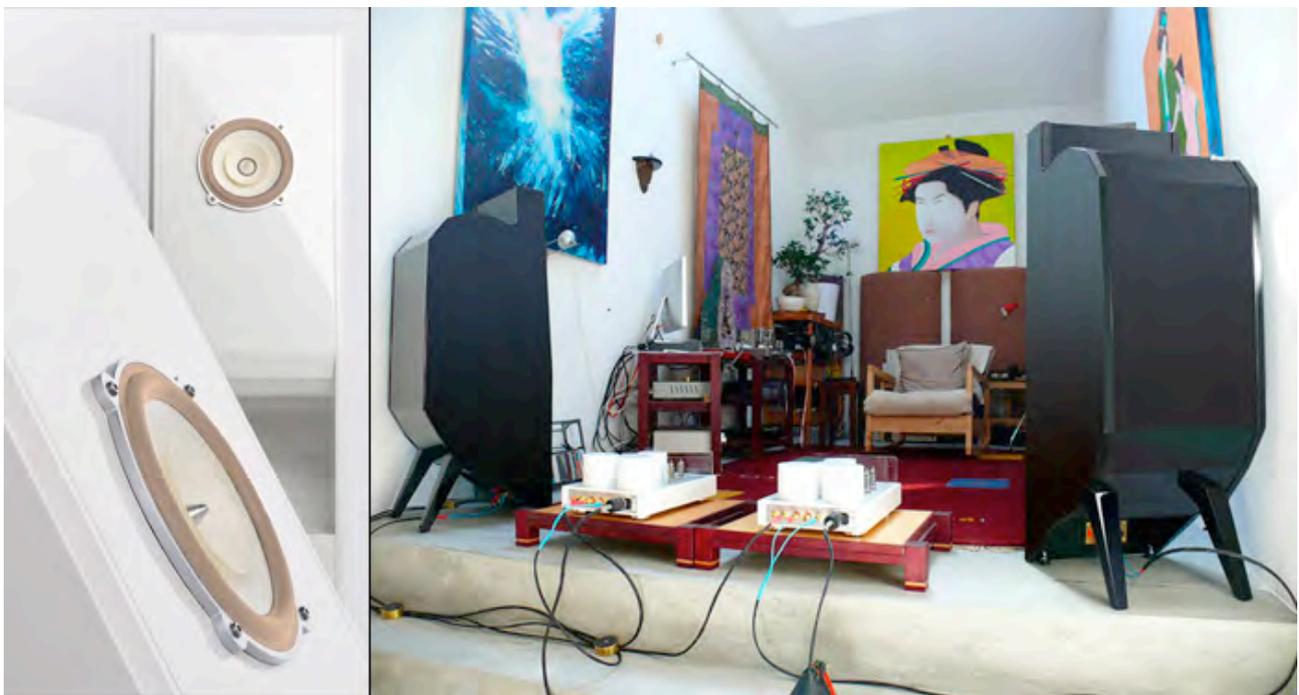
Dominique copied me on his email to Sasa a few weeks later: "Well, regarding your output transformers, we installed them, listened for 30 seconds and ... *adopted them!* Great sound, relaxed, detailed, full-bodied, airy - exactly what we were looking for.

Thanks for the great job.

We are now thinking about the amplifier enclosure and will be back at you for purchasing.

We keep in touch." Having discovered Sasa Cokic still prior to his reputation spreading outside Serbia, I now took pleasure seeing his transformer design talent acknowledged by other amp crafters.

It's recently even spread to South Korea. Now back to the Kaivalya.



**Positive feedback:** When Inès Adler dropped off her [Voxativ Ampeggio](#) to check out my setup and available amplifiers before committing to the assignment, I played her all FirstWatt amplifiers then on hand—F5, J2, M2—my Yamamoto A-09S SET with six different output bottles—EML 300B XLS, EAT, WE, Shuguang Black Treasure, TJ Full Music SE, Synergy Hifi—and the Kaivalyas.

We both agreed that the Serbians made for the ultimate combination with these 98dB single-driver widebanders.

That's how the majority of that review was conducted. Inès was so impressed with the white amps in fact that she immediately contacted Sasa to inquire about future cooperation potential between their two firms.

Whether anything comes of it I don't know but it was still a very gratifying early Kaivalya response from a visiting manufacturer.

Had my speaker loaners been in white piano lacquer, the cosmetics with the Kaivalyas would have been over the top.



**Negative feedback:** "One trick I haven't seen used or read about elsewhere is my *very* low local feedback loop between driver stage and the input of the output stage through the interstage transformer. I use just 0.3dB. It would appear to be entirely inconsequential. However, it very strategically eliminated 30% of predominantly 2nd-order THD from the 12AU7 driver. That's huge and sonically very decisive. The second local feedback loop is between the EL84s and speaker terminals through the OPT. That's 4dB. While the overall circuit is unconditionally stable without any feedback, this loop too controls THD for the intended final sound. I would never consider global overall feedback but for this project, the two nested loops became very important for the sound we were after." Sasa's explanation became perfectly predictive towards actual sonics. Compared to my Yamamoto which I and others think of as a spiritual heir to Western Electric's movie-house amplifier ideal, the Kaivalyas—take your pick—*exorcise* or *discipline* much of the THD fingerprint one associates with zero NFB triodes. What remains is still more/different than my FirstWatt transistors but far closer to them. I already said that living with the F5 and J2 had over time alienated me from enjoying the typical 2nd-order coagulation effects of the Yamamoto. Those compound with the more complex music I fancy. Hence I was thrilled by this textural thinning leading to energetic quickening.

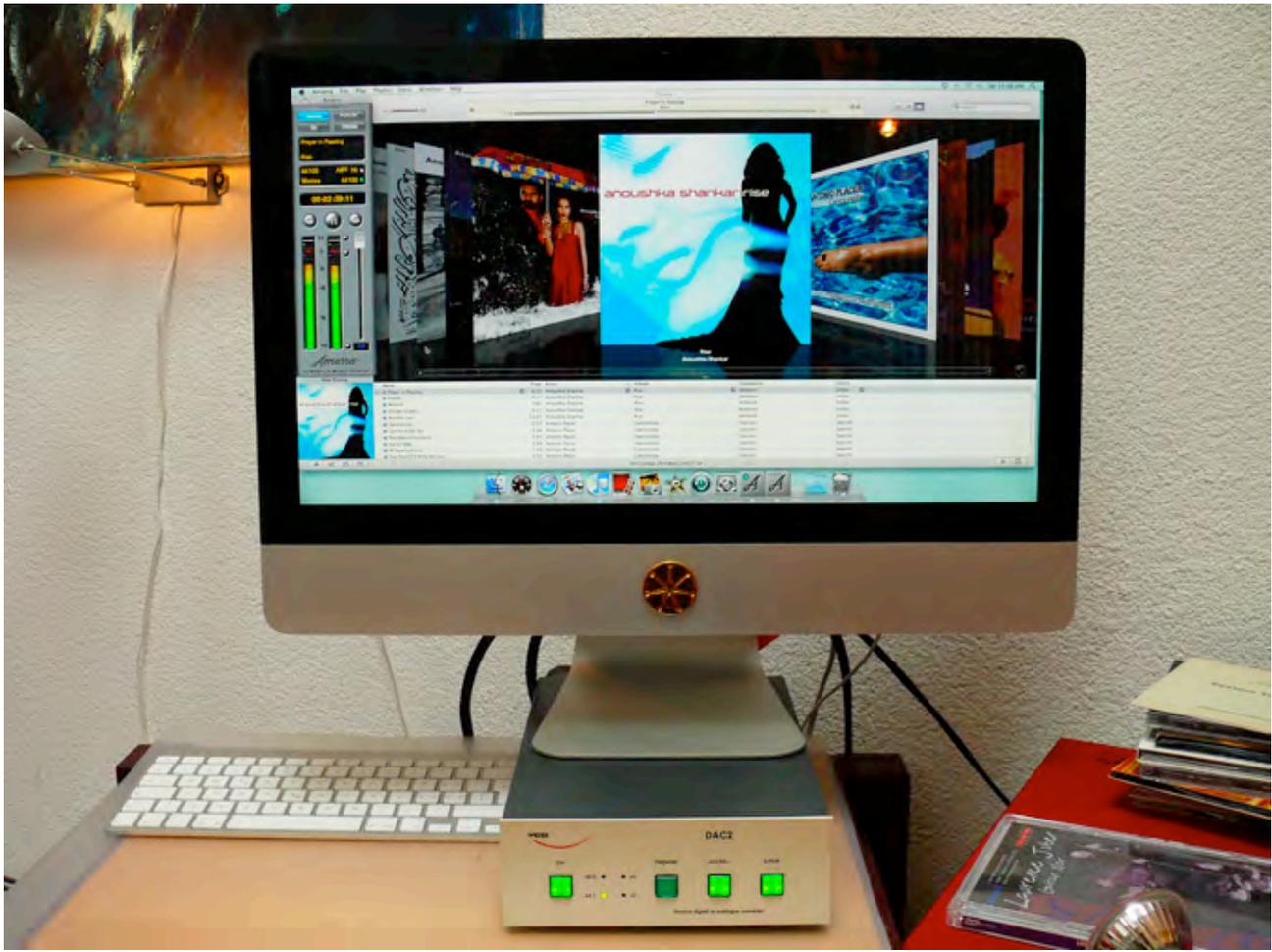


What had eventually turned tables back on the Yamamoto was its creator's dispatch of a [passive volume controller](#).

Caricatured as "lean, mean and straight to the bean" in my review, it had acted like a turbo boost, cobweb remover or blood thinner. It had also dissolved innate electronic tension.

This created a nearly limpid floating space on which tone colors could freely spread. While the passive did not wholesale eliminate specific SET limitations—very low-volume listening sessions and massive symphonic were still better served by the transistors—it quite resolutely shifted the balance in favor of the power triodes. I once again *loved* them for where they excel.

The Ampeggio encounter was sublime and a nearly idealized perfect match. As such I've signed on to review Voxativ's top-line model with field-coil motor when it launches (ideally in white lacquer to cosmetically *marry* the Kaivalyas).



What I own is no high-impedance 98dB widebander of course. It's a 91dB 5-driver 3-way with exceptional bass extension. Still, the passive+Yamamoto fling had reminded me. Such combos can work exceptionally well if one keeps the passive-to-amp interconnect short. I just *had* to try that on the Kaivalyas. During these experiments I eventually eliminated even the passive to drive the amps straight off my Weiss Firewire DAC2. Its output voltage can be resistively trimmed from 5.48 to 2.74, 1.78 or 1.35V. This analog provision adapts the DAC to an amp's input sensitivity (3V in this case). I set the Weiss to 2.74V, then trimmed the desired listening level in the digital domain by activating its variable mode. [Above - the two lit right controls become volume up/down.]

This teleported me right back into Yamamoto/Voxativ milieu. While tone colors weren't quite as intense and the gestalt less *billowy*, bass was more potent and extended, the power zone had clearly more kick and the uppermost harmonics were more Platinum. The extent to which lateral space lit up to illuminate everything as though clouds parted was quite uncanny. Eliminating first active preamp circuitry even in no-gain mode (Esoteric C-03), then a purist passive with short top-class Stealth Indra interconnects (Yamamoto AT-03-1A) to finally driving a 4-meter cable source direct (DAC2) became a progression in stages. It proceeded from relative laziness, thickness and opacity to tacit directness and luminosity. The 'no preamp is the best preamp' motto is far from universal. In this instance it simply applied. Whatever theoretical losses very mild digital attenuation incurred were *more* than offset by analog losses in resistive volume controls, active circuitry and additional cables.

This compelled me to reinvestigate passives. Wanting remote volume and balance control, the ability to drive long interconnects and no drive loss at very low levels, I contacted John Chapman of

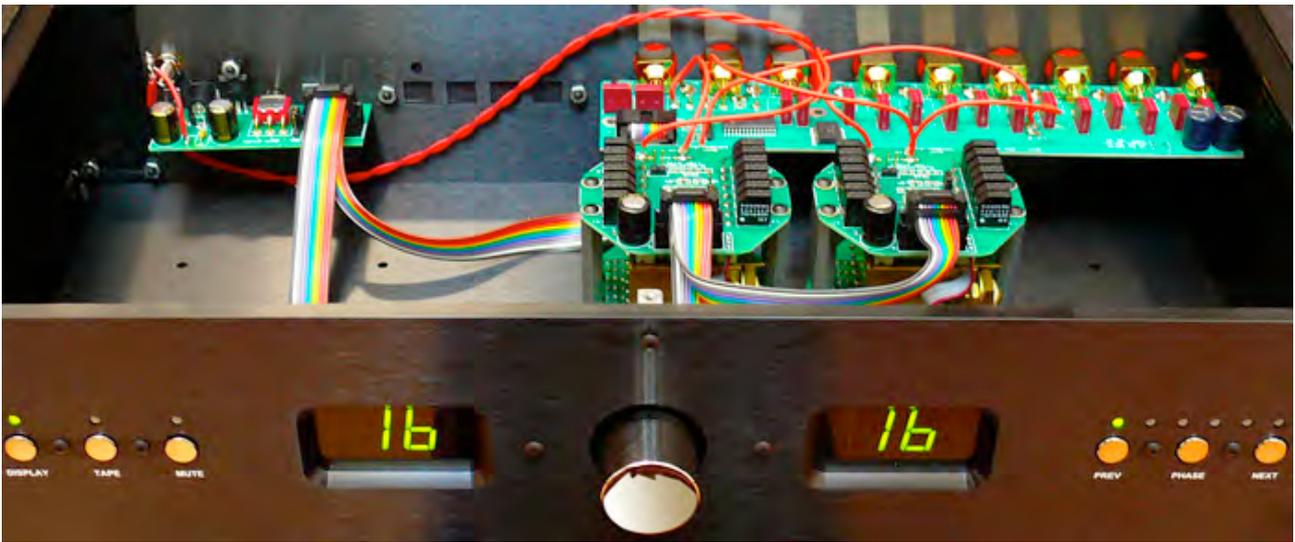
Bent Audio. He had sadly discontinued his Tap-X autoformer preamp to not compete with OEMs who source from him various resistor- or AVC-based attenuation modules with integral remote control. Luckily John had a trade-in unit. Until Sasa authored his own White Range preamp, I needed a *no-preamp preamp* to maximize my new monos.



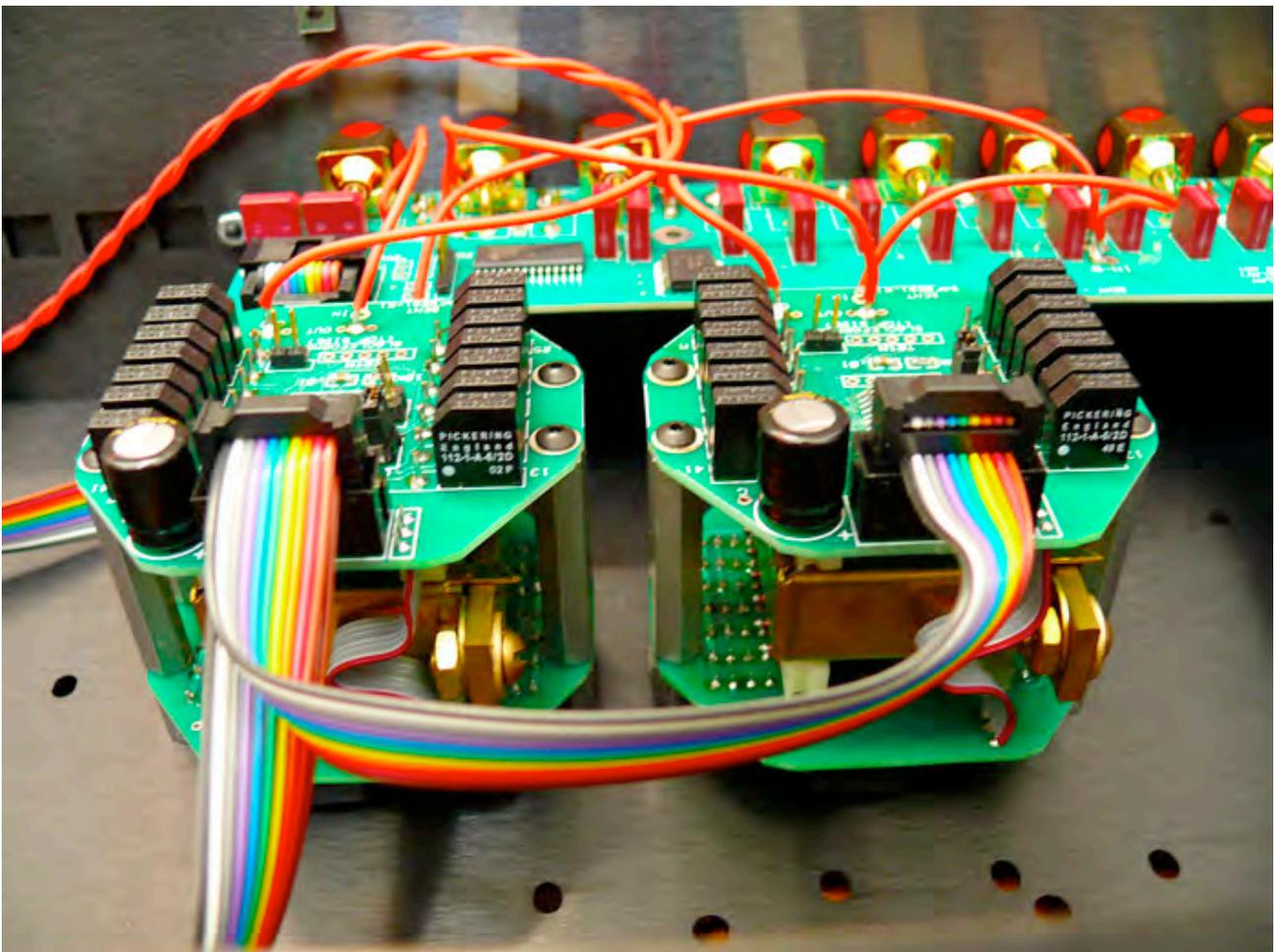
While the Tap-X has turned unobtainium—or green for envy—save for the second-hand market, its truly brilliant execution still merits brief commentary.

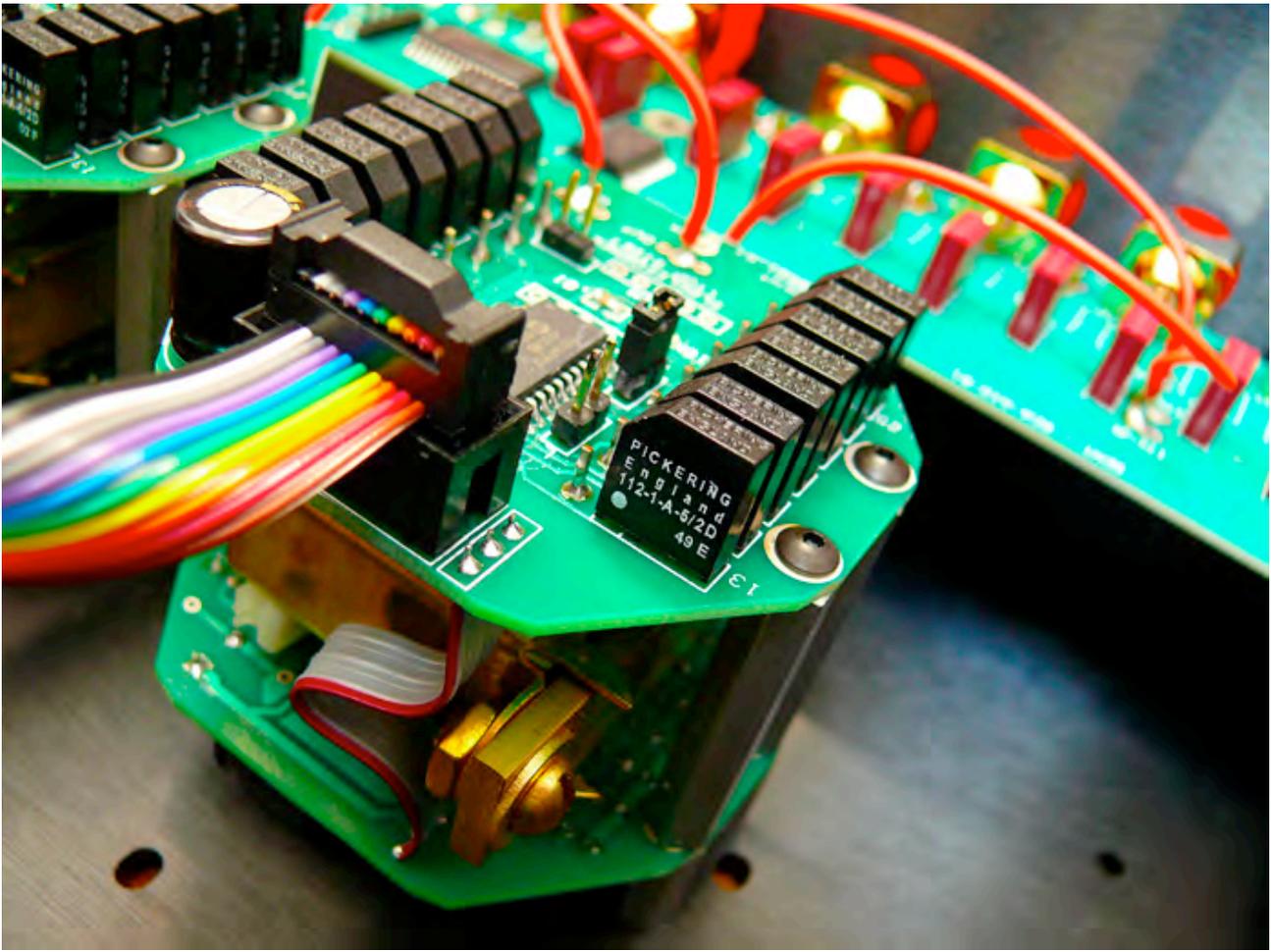


The remote control is a piece of art. Besides switching inputs, volume and balance, it also affords mute and display off.



The autoformers are very tidy to keep the actual signal path wiring short. The red flying leads handle input switching commands, the power board supplies the display and relay activation.





The switching units are top-quality hermetically sealed Pickering reed relays usually only seen in instrumentation and automated test equipment applications.



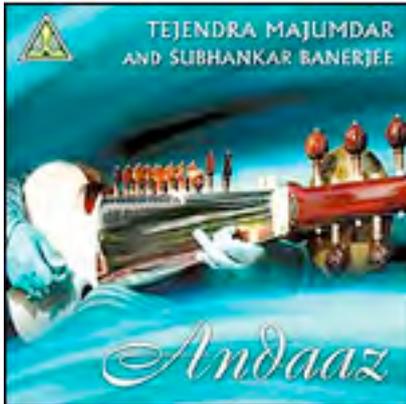
Compared to the CND \$8.499 Avtac Pasiphae with its Nixie tube display [left], the Tap-X trades an overbuilt chassis, XLR i/o paths and the Pasiphae's 24-step Stevens & Billington transformer modules for *61-step* Slagleformers in 1dB increments. At \$2.000 when new and available, the Tap-X most decidedly was one of the unsung overachievers and true values in this sector.

I'm thrilled to have secured a rare straggler after the fact as it were. The new Audience Wavemaster preamp seems based on the same Slagleformer modules albeit with custom wiring, then adds a proprietary buffer plus headphone output. If one disregards the small matter of the Wavemaster's anticipated \$12.000 sticker, not all is thus lost on this front.

**Verdict:** In broad parlance, I'd peg the Kaivalya more transistor than tube. Yet it retains enough valve-sourced fluidity and tone color to be distinctive and different from my solid-state amps. For context, think 5687-based preamp as opposed to a "big tone" 6SN7-based unit. The perhaps most shocking initial aspect in AVC mode was bass quality and quantity. For a change it actually *led* my admittedly low-power sand amps in wiriness on techno fare, redolence on acoustic stuff and power in general. All my ambient favorites like Mercan Dede, Burhan Ocal, Hector Zazou, Cheb y Sabbah, Bob Holroyd & Co. were fantastically fair game. That clearly wasn't the case with the 300Bs and Tango speakers. One could invoke push/pull and NFB's lower output impedance but in the end, explanations aren't essential. Enjoying the performance is.



Having in-between visited Living Voice/Definitive Audio for a [RoadTour](#) impression on their Vox Olympian 5-way hornspeakers—those were powered from a combination of exotic Kondo M-77 preamp and top-line p/p 300B Kondo Gakuoh monos whilst running from massive high-current regulated battery banks to be completely off the national grid—I immediately referenced the same music tracks I'd heard there when I returned. I noted very gratifying overlap (that system after all had been well past x 10 as costly) and of course also sobering differences.



To a rather more crystallized and distilled extent, the EL84 monos preceded by the Bent Audio preamp did retain some of the 'voluptuous ardor' or 'succulence' of the Kondo/Living Voice precedent. The crystallized aspect pertained to the inherently greater leanness and speed over how I believe Kevin Scott voices systems to conform to his taste. The Kaivalyas' minor opulence versus my transistor amps had to do with a deeper saturation of colors. Tone color *intensity* was stronger. Since I'd personally rather err on the side of more energy, motion and projection power than richness that turns cloying and humid, this particular weighting suited me perfectly. Naturally, nothing comes free. Using the quickening agent of the autoformer volume control, payment had to be made for tracks that veer into the overly lit up and glassy. The very same 'active elements' which on the white amps shift my other preamps into clearly thicker more opaque turf when good recordings warrant no soft focus were naturally absent as well to fill out, relax and generally mellow thin hard-edged stuff.

Surprising again was the very *adaptive* bass quality. On wiry plucked strings like Uzbek tanbur or Turkish oud and certain qanun, the Tap-X/Kaivalya combo carved out the metalized aspects of string action to unexpected degrees for real sinewy striations. Those are the feline qualities of purr, growl and snarl. On gently plucked upright accompaniment meanwhile, languorous sarod or better yet, the 130cm long surbahar—a bass sitar with a wonderfully rich lower register—the bass was redolent, buoyant and generously rolling. This discriminating intelligence on bass textures was a clear forté. Given that these weren't merely tube amps but some which use pinky-finger piccolo valves, this didn't fit preconceptions at all. It also went quite beyond comparable 300B amps.

Back on the precarious balance between incision and body, attack and bloom, the Serbian amps in my ideal marriage with the Bent Audio Tap-X leaned more forward than back but had sufficient harmonic elegance to be more pressurized from within than my transistors.

That's back to the 30:70 balance between tubes and semiconductors. As such the Kaivalyas might be more tube amps for diehard lovers of upscale transistors. They add a little but delectable something

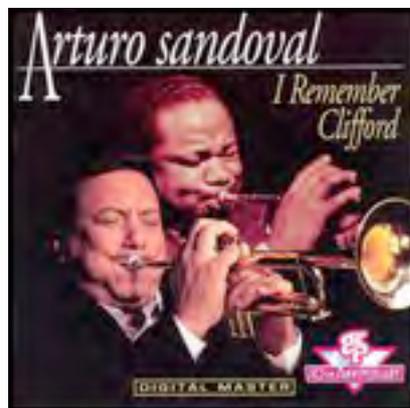


which on a whole such listeners won't have while really taking nothing away which reasonable speakers in a reasonable room would latch on to. Deep triode aficionados meanwhile might focus on what the white amps diminish compared to their mental references. Given my personal goals behind this commission—to revive my flagging jones for tubes—Sasa Cokic had hit the proverbial nail on its little head with a sledge hammer. Kondo fanatics and chocolate lovers might be less impressed. But then they frolic in rather more uptown neighbourhoods.

Another not entirely typical strength of the Serbians was the top end. Having converted to direct-coupled wide bandwidth transistors with 'endless' treble and plenty of upper harmonic illumination and *cleanliness*, I've soured somewhat on the dirtier less informative treble which the sort of valve amps I could afford tend to major in. They lack that extension and energized lively freshness with the occasional zing that I need to fully follow what acoustic instrumentalists are doing with deliberate tone modulations and timbre shifts. That's not about octave-doubled richness inserting shadow voices. That's about recorded *true* harmonics.

Here the pentode-connected EL84s lived up to their wide bandwidth reputation, being nearly as agile and lit up as my Power JFets and definitely no dirtier/fuzzier if a bit richer and weightier overall. Muted trumpet, small pan flute in its top register under full throttle, violin flageolet, triangle workouts and related treble acrobatics all lacked the veiling, shadowing and patina prettification I would usually expect from glowing bottles. Was that the lack of coupling capacitors between driver and output stage?

I wouldn't know. Regardless, percussive noises of all kinds benefited subjectively in the timing domain. That's because of how human hearing tracks transients by their harmonic contents. Rounded-over edges tend to soften rhythmic tension and articulation. Particularly at lower playback volumes this becomes a real liability when things mellow out too much and get downright limpid and mushy. As hoped when I'd honed in on the EL84 but couldn't be sure of until actually delivered, the Kaivalyas were blessedly free of this. Only at true midnight whisper levels were they still bested by the FirstWatt F5 and J2 amps. Those might ultimately be even more resolved due perhaps to lower noise floors (even though the Kaivalyas generated no audible noise with my ear right up to the Tango Esotar clones).





Had the white amps simply cloned the sound of my FirstWatts, this whole development exercise would have been for naught.

Ditto if they somehow copied the sonics of my Yamamoto A-09S. To my ears and with my ancillaries, they set up camp between either.

This occupies attractive middle ground. In a variation on Sasa's son who during our past visit to Mladenovac had cracked up the adults with his "maybe yes, maybe no" answers, the Kaivalyas are a bit of this, a bit of that\* - F amps with a Yamamoto injection perhaps.

One side effect of higher color temperature over transistors is that when things get loud, they do so seemingly faster or more massively.

Deeper tone creates greater intensity. With that, amplitude seems to increase as well even though it wouldn't show on a meter.

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*\* This is nicely embodied by the cover art of Hüsnü Senlendirici's latest album, a collaboration between a Turkish clarinetist and a Greek folk ensemble. With these two nations fierce old enemies, a black and green olive on the same branch say it all.*



My clarinet teacher Hans Deinzer at the Hannover Conservatory of Performing Arts used to instruct us students to practice tone intensity.

To describe the desired effect, he wanted a steadily held note to grow so potent in urgency that the listener might nearly feel assaulted, oppressed or drowned in it. This the Kaivalyas managed rather better than the solid-state amps when the volume was raised. At this juncture I should again stress that to come off as described relied on John Chapman's Tap-X autoformer passive. While my recent experiences in Derbyshire suggest that an active preamp of Kondo M-77 caliber might change my assessment, the active preamps at my disposal were *all* guilty—to some degree—of thickening the stew and robbing it of life. Just as you wouldn't want to dull the sparkle and deep luster of a finely cut decanter which maximally reflects the light to intensify the color of its contents, I wouldn't want to dull the Kaivalyas. With the Tap-X, I've hit upon all the necessary creature features I consider essential; finely variable steps with a numerical display vital for easy duplication; and the liberated reflexes to not pad down or buffer the amplifiers' sonics. Consider me perfectly satisfied.

**Tube rolling:** With a complete set of Create Audio/Synergy Hifi valves at hand—current Sino production manufactured by Shuguang with proprietary treated metal alloy structures supplied by Synergy—it was naturally mandatory to compare them to Sasa's set of NOS Russian and Serbian bottles. The ECC82 by EI would seem particularly sparse these days but even the military 6P14P-EV doesn't seem all that easy to find. A no-tears replacement with a currently abundant supply would be an unexpected bonus.



As I'd already concluded in an earlier assessment of Synergy's 300B, this Chinese set made no excuses or apologies either. Cheap but not so cheerful no longer is the necessary refrain when it comes to Sino glass. Admittedly these aren't exactly cheap.

But you definitely get what you pay for. On balance, I slightly *preferred* them for a dash of greater virility and pop. Unexpectedly, these differences were *far* less than I'm used to when comparing direct-heated triodes. I could have attempted hairsplitting but we'd both be bored. Suffice to say that the Chinese were perfectly interchangeable with the Russians. This seems to be saying a lot considering how fond Sasa is of the exact valves he selected for my amps.



**Conclusion:** I'm back on tubes. These days I can only stomach very small doses. I don't want to relinquish the low-level resolution, drive, bass control, speed and attack clarity of transistors nor their super-fine top end once transistors equate to the kind of Power JFets Nelson Pass uses these days. Pretty much the only area where for my tastes more remains possible is in the tone color intensity bracket. Yet I'd not tolerate gains there if they weighed down things with undue mass. For the glowing bits, that's a quite narrow window of opportunity or acceptance. Interstage transformer coupling to eliminate the blurriness and thickness of coupling capacitors plus class A pentode rather than triode drive in push/pull rather than single-ended mode and most carefully administered feedback seem to have done the desired business here.



It might not be enough for other tube lovers who wish to harvest more tube flavor richness. The EL84 could be too pedestrian for others. Fair enough. For what I wanted, it's absolutely perfect. Bull's eye. What more could one *possibly* hope for when entrusting such a very personal project to a faraway designer when means of communication are email and the occasional phone call? Sasa Cokic and team have delivered and made this punter very happy indeed. Thank you.

*Srajan Ebaen*

**Quality of packing:** Very good. Double-boxed with thick foam.

**Reusability of packing:** Many times.

**Ease of unpacking/repacking:** Easy.

**Condition of component received:** Flawless.

**Completeness of delivery:** Tubes, acrylic shield.

**Website comments:** Good. As a recent custom commission, the Kaivalya isn't on it yet but having since become a formal production item, should show in the near future.

**Human interactions:** Prompt, always upbeat, enthusiastic and blessed with unbelievable can-do stamina and a complete no-nonsense attitude - what the Americans call a straight shooter and self starter of great resourcefulness.

**Value:** Given performance, build and parts (especially transformer) quality, very high.

**Final comments & suggestions:** None which pertain to the product per se. That said, I'd encourage music lovers to follow suit and hire their favorite audio designer to design something especially for them. Not all will be able to accommodate custom requests but having now done this twice myself—a previous occasion involved Peter Daniel of Audio Sector and the first pair of Patek SE chip amps as well as two 240/120 step-down power transformer boxes—I can vouch for the multi-dimensional satisfaction it gives. If you treat fine hifi as an art form, it's only sensible to support your favorite artist/s with a clearly articulated project brief *and* the necessary freedom to let them be at the top of their game and surprise you. This Kaivalya project certainly came off superbly and even better than anticipated.