

Designing an audio device the engineer is invariably nagged by the thought that on a bigger budget he would've done a lot of things in a different way. See what happens if the budget is big enough and the engineer is a real master of his craft...





SA Lab Ligeia

Pre Amp

SA Lab Ligeia

Mono Power Amp

The Singing Miracle

Alexey GRUDININ
Artjom AVATINJAN





The Nereid amp

The amplifying trio of Ligeia comprising a pre amp and a pair of powerful mono blocks is created by Alexey Syomin, a Russian electronics designer. It's not for the first time that we write about SA Lab devices (recently – see AudioMagazine #103 – we offered our readers an article on Lilt mono blocks). The explanation lies not only in the uncommon nature of the combo itself but also in our natural interest in Ligeia system. It's difficult to imagine a sound connoisseur whose curiosity wouldn't be provoked by these devices. He would surely like to have a closer look at them, learn more about them and test them... The devices' size and weight is amazing. Alexey seemed to dislike being first of all asked how much it all weighs. It's quite easy to design a very massive unit (e.g. you can dress it in tank armor for the sake of, say, eliminating microphone effect and *hey presto!*). But it's much more difficult to find a *compelling* argument in favor of huge weight and size of the unit. Nevertheless Ligeia has a lot to say for itself. If you get to understand Ligeia ideology you'll find there was no other way but to make them the combo and heavy. You can say that each kilo of its weight is technically justified.

These parameters are not mentioned in Ligeia's specs. No, it's not difficult to measure its size but to weigh it one needs scales that is used for weighing freight trains. Anyway, we can say that units are about 80 cm high (only the 'tube box' is more than a metre high). Meanwhile each unit weighs approximately 200 kilos (system's total weight amounts to more than half a ton!).

The exclusive use of filamentary cathode tubes manufactured mostly in the first half of 20th century (namely in 1940s) in a single-stage Class A circuit is nothing but a virtual analogue of a time machine capable of moving listeners into the unique acoustic environment of yesteryear.

This amplifying combo calls for some pretentious title – Lord of the Tubes or

something like that, but its designer bestowed upon it a different – both mythological and musically sounding – name of Ligeia. It's a Nereid, a nymph with musical 'profession'. In Ancient Greek this word literally means 'a tuneful one'

One of the earliest references to Ligeia can be found in the works of Virgil (1st century B.C.). And here is a quote from E.A. Poe's *Al Aaraaf* poem: 'Ligeia! Wherever/Thy image may be, /No magic shall sever /Thy music from thee.'/Thou hast bound many eyes/In a dreamy sleep.

The words 'No magic shall sever /Thy music from thee' aptly summarize the sound of audio devices produces some 180 years after these verses were composed. But we'll discuss these matters later; now's the time to turn from poetry to prose.

Power supply is sufficient, but not dietary

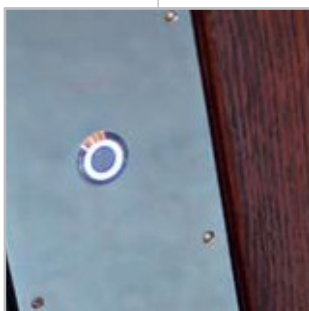
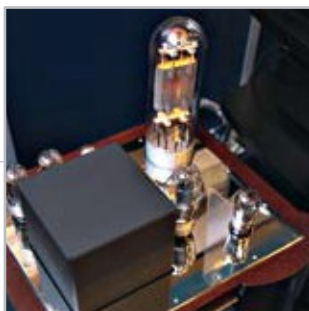
Power amp consists of three amplifying stages. The coupling between the first stage featuring RCA-112-A tube and the second one (a driver based on a 300B tube) is a capacitive one. It is realized by means of 1 μF Duelund silver foil capacitor. Between the second and the third stage a coupling transformer is installed.

The pre amp circuit has two stages with galvanic coupling; the input is built on the same RCA-112-A that is utilized by the power amp, and the output stage features RCA-45 tube terminated on a transformer with turn ratio of 0.1. All switching in the amps is conducted by



means of relays (pre amp has a selector working with four line inputs and Mute feature; power amp is equipped with speaker impedance switch). The output transformer installed in the power amplifier has 2500 VA of power. It's core section is 50 cm². It has five sections and two separate secondary windings. All in all one can put exclamation marks almost anywhere in this chapter of our review...

SA Lab Ligeia amplifying combo		(4 500 000 rbl.)
Technical specifications [according to manufacturer's data]		
Output (2V / 5V, 8Ω)	20W / 45W	
Output (2V / 5V, 4Ω)	35W / 65W	
Frequency response (-1dB)	10Hz—55kHz	
Output impedance (4Ω / 8Ω)	0,9Ω / 0,2Ω	
THD	less than 0.02%	
Consumption (power amp / pre amp)	820W / 340W	



When customer selects his speakers' impedance a powerful relay switches output transformer's windings either in series (for 8Ω speakers), or in parallel (for 4Ω speakers), the chosen mode being indicated by a blue LED on the upper part of the front panel.

Pre amp has two 350-W anode transformers (one in each channel) and six filament 70VA transformers (three in each channel). Moreover, these transformers' architecture is similar to the one of the output transformers: their windings are sectioned and voltages strictly symmetrized.

It's worth noting that to switch the windings in parallel they must be absolutely identical – the point surely taken into account by the engineer while designing the circuit. Volume control unit placed at the pre amp input features modified DACT CT2 potentiometer. Alexey Syomin replaced its original film resistors by tantalum Shinkoh devices.

[The Music]	
DISC 1	1. Albenis. «Iberia». Marc-Andre Hamelin (Hyperion, CDA67476/7)
DISC 2	2. Debussy. Kate Royal (EMI, 394419-2)
DISC 3	3. Ravel, Rachmaninov. Michelangeli (EMI, CDC7493262)
DISC 4	4. Bach. «Matthäus-Passion». Otto Klemperer (EMI, 5 67538 2)
DISC 5	5. Anthology of Russian Sacred Music (Melodya, MEL CD 1001659)
DISC 6	6. «Duke Ellington meets Coleman Hawkins» (Impulse! IMP 11622)

Inner wiring in the amps is conducted by point-to-point method using silver wire with silicone insulation.

Power supply usually features a single transformer with separate secondary windings for anode voltage and filament circuits feeding. But in this case each stage utilizes separate anode and filament transformers, as well as separate kenotrons for anode feeding rectification. Thus a pre amp has two 350-W anode transformers (one in each channel) and six filament 70VA transformers (three in each channel). To feed the output tube in the power amp a pair of 6AU4GTA kenotrons are installed. Moreover, these transformers' architecture is similar to the one of the output transformers: their windings are sectioned and voltages strictly symmetrized. Anode transformers of the input and the output stage are of the same size, but the former is divided into seven sections (the input transformer has five sections). To couple the driver stage featuring 300B tube with the output stage based on the rare 14D13 tube a substantial transformer with bifilar winding is used. Its core section is 25 cm²; it's this unit

designed and manufactured specifically for the unique Ligeia combo: the iron came from Germany and was machined in Italy. Beside separate power supplies the input stage feeding voltage in the pre amp is controlled by means of a pair of VR150 gas-filled stabilizer diodes.

Another substantial point indicating a profound approach to architecture and ideology as well as the level of amplifiers' construction lies in the fact that all decorative and structural elements are made from non-magnetic material – a 10-mm thick stainless steel sheet.

In the basis of each unit a passive mains filter is located (quite a 'grown-up' one, as Alexey Syomin describes it) with mains voltage indicator. Digital voltmeter has measurement error like any other device (for this particular one it amounts to 1%), that's why the reading on different units may differ by 1-2V as we saw during our listening test.

The Tubes

Concluding our description of this combo architecture we'd like to list all the tubes installed in Ligeia with brief comments on some of them.

Preliminary amplifier

The first stage features RCA CX-112A triode (1937). This marvelous tube comes from the first half of the 20th century having a record-breaking linearity of voltage-current characteristic. This tube is ideal for sound reproduction for it ensures high anode current while amplifying an impulse signal therefore guaranteeing a perfectly dynamic sound.

The second stage features RCA-45 tube (1941). Everything that is said about 300B tube (see below) can be attributed to RCA-45 as well. It's one of the most musical output tubes. Its only flaw is low output power (12W), but this point is immaterial when the tube used in a pre amp.

that is located at the upper panel of the amplifier. The rest of the transformers are mounted inside the cabinet made of 40-mm thick oak wood. All capacitors in the power supply unit are custom-made film ones manufactured by NWL (USA). Their total capacitance in the output stage power supply amounts to 750 μF. It goes without saying that all transformers were



It's a Cooled Radiation Triode featuring graphite anode as well as thorium covered tungsten filament, its peak voltage and plate dispersion being 3 kW and 300 W respectively! For this type of tubes its internal resistance is low (1.9 kΩ only), characteristics are quite linear and gain factor is as high as 16. Its major feature is seamless ('short-tailed') dispersion specter at max apertures whilst second harmonic prevails and the upper ones are completely absent. Thanks to graphite anode it withstands long-term power overloads. 14D13's size is 345 / 322 (with / without base) x 90 mm. A pair of 14D13s utilized in the power amps cost \$5000. We are not aware of this tube being featured in any modern or vintage audio which also proves Ligeia to be absolutely unique.

The first and second stages feature 5U4G kenotrons.

The output stage utilizes a pair of 6AU4GTA tubes manufactured by General Electric.

Musical coordinates

The sound of a Top End device is rather difficult to evaluate. Primarily because the attitude "An \$500 unit A for loses to \$1000 unit B which in its turn loses to \$5000 unit C" we use for evaluation of budget or business-class audio stops working altogether or works in a limited basis when we're dealing with devices belonging to the premium price segment. This situation can be explained first and fo-

remost by the fact that the sound (if we start digging deep into its nuances) is a subjective category. The second reason is the fact that in order to improve the sound of a premium device huge efforts are necessary and the higher the device's level is the bigger investments you have to make to achieve a tangible increase in its sound quality. Let me remind you that the first decimal places of pi were calculated in ancient times by means of ruler and calipers – but to find out the value of the fourth and further places the most advanced science was to be mobilized. The same can be said about sport: how much effort does it take to run a hundred yards one hundredth of a second faster or jump half an inch higher? The best Conservatory pupil for us is the one who passed his exams with the highest marks but what's the answer to the question whose music is better – Tchaikovsky's or Beethoven's? Art, i.e. the art of audio engineering brings to the fore some indispensable notions such as individuality and style. (We certainly don't take into account the cases when efforts failed and the result was deplorable.)

Style and individuality play a major role in Ligeia's sound. As we know, music has several dimensions: vertical (harmony), horizontal (melody), colorful (timbre) and scenic (musical space and its story). Melody aspects are represented by Ligeia with terrific expression. This feature (noted by us in connection with Lilt mono blocks) dominates in SA Lab

The first stage features 5Y3 double kenotron manufactured by RCA (its Russian analogue is 5C4S). VR-150 gas-filled stabilizer diodes (a pair).

The second stage utilizes 5U4G kenotron. Alexey Syomin remarked that it can be replaced by Russian 5C3S kenotrons but they must be produced before 1960.

Power amplifier.

The first stage utilizes RCA CX-112A tube. The second – driver – stage is based on 300B tube (2001, Saratov)

This legendary audiophile tube was introduced by Western Electric in 1947. It features marvelous voltage-current characteristic and linearity as well as low internal resistance and high power dissipation; its distortion specter is perfect for reproduction maximal sound levels. This is the only 'non-vintage' tube in the amp for Mr. Syomin couldn't find a NOS replacement for it.

The output 14D13 tube is the leader of Ligeia tube combo being a powerful filamentary triode of British manufacture.

[Test system]

- Michell Orbe SE turntable*
- SME 4 tonearm*
- Lyra Helikon cartridge*
- EAR 834 Deluxe Phono amp*
- McIntosh MCD500 CD/SACD Player*
- Tannoy Westminster Royal, Tannoy Kingdom Royal, Wilson Audio Sophia 3 Speakers*
- XLO Signature, SA Lab Interconnect interconnects*
- XLO Ultra+ Acoustic cable*
- Purist Audio Design Corvus Speaker cable*



sound signature. It doesn't mean that Ligeia is particularly successful in playing back vocals – this amp gives vocal expressiveness to any track. Listening to Ligeia you want to say to yourself not only 'bass sings mezzo soprano' but also 'violin, viola and trumpet sing' and even 'piano sings'. It is truly a Singing Miracle. As to color and scene then the music in Ligeia's interpretation is distinguished by its rich timber palette with intense succulent communication of 'color' and 'light' taking place in the spacious universe of art.

It is also necessary to point out that combo's potential wouldn't have been fully displayed without help from the other units of the test system, first and foremost the speakers, namely two flagship Tannoy models – Westminster Royal and Kingdom Royal, as well as Wilson Audio Sophia 3.

But where is the watershed between the lauded style, individuality – and verity?

Is there a danger of embellishment? These questions are always relevant in music e.g. in connection to the level of precision with which a musician interprets letter and spirit of author's ideas. In our case this problem can be summarized in one simple question: 'What about Hi-Fi?' Frankly speaking we had some reservations due to fear that in this respect Ligeia would give way to 'level-headed' transistor amps.

Nevertheless such fears vanished when the system represented complex academic recordings of grand piano accompanying a symphony orchestra, choir and soloists – with almost uncan-

ny precision and clarity. That's when we remembered that talking about distortions Alexey Syomin stated: "My spectrum analyzer from Bruel & Kjaer can't detect harmonics around the entire measuring range..."

Is it worth talking at length about Ligeia sound? You'd better listen to the amps yourself. But you have to hurry for the sample we're described (bearing #2) is already sold (but not dispatched to its owner yet), and according to Alexey the task of creating another Ligeia isn't an easy one for it's problematic to match the required tubes (i.e. 14D13) in conformity with all the necessary requirements. ■

[Verdict]

Ligeia is an amplifying combo of no-nonsense level with exclusive musical abilities. It demonstrates a credible and seamless unity of music style and music verity. The sound of Ligeia features signs often ascribed to old a.k.a. vintage audio: high sensual tone, exquisite musical implications where deep significance and feelings prevail over superficiality.

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