

# GRAMOPHONE DREAMS

BY HERB REICHERT

THIS ISSUE: Herb rekindles his love affair with 300B tubes.

## EleKit TU-8600R integrated amplifier kit

I will never forget.

In 1988 I had my first experience with Western Electric 300B tubes. It took place on a quiet, streetlights-and-snow night at my friend Ryoichi's apartment on Riverside Drive, in Manhattan.

I had never heard of Japanese amplifier designer Ken Shindo, of Shindo Laboratory. But that evening, Ryo's audio system was *all* Shindo: a hammertone gray Shindo-restored, grease-bearing Garrard 301 turntable sitting on a glossy-wood Shindo plinth, with a Shindo-modified Ortofon tonearm and SPU cartridge, a Shindo moving-coil step-up transformer, and a Shindo preamplifier with a moving-magnet phono stage. All of this, plus a pair of incredibly beautiful, single-ended Shindo amplifiers equipped with new-old-stock (NOS) Western Electric 274A and 300B tubes. Red cloth-covered NOS Western Electric wires connected the Shindo amps to a pair of Altec 604-B drivers in vintage Altec 612 cabinets.

Set against the Shindo-green monoblocks, the yellow lettering on the WE tubes looked like the finest industrial art. The gray-enameled Altec cabinets exuded pro-style coolosity. When Julie London began singing "Cry Me a River," from *Julie Is Her Name* (LP, Liberty LRP 3006), I smiled my oh-my-god smile and slumped into the sofa. The clarity of sound riveted my brain. No previous audio experience had prepared me for the liquid radiance or *breathy* human clarity of what I heard happening in front of me.

No Darth Vader speakers, no war-machine amps, no cables from the cartel: just Julie and me, practically kissing.

When she stopped, I realized that these power amplifiers had reproduced every moving molecule between London's mouth and the recording microphone. I already knew that directly heated triodes sounded more vivid and less mechanical than pentodes or transistors—I'd already hot-rodged a Dynaco Stereo 70 (the Ford Model A of tube amps) into a push-pull amplifier using Sylvania 6A3s. But these Shindo monos were far beyond my DIY rat rod. This was a gorgeous *single-ended* 300B amplifier! And I wanted one.



sion temperature. In contrast, 300Bs are *directly heated* tubes (DHTs) in which the tube's filament/heater and emitter/cathode are fused into a single element, the metallurgy of which is an important factor in determining the DHT's overall sound character. Typically, DHTs amplify signals with a liquid but also strict and überclean forthrightness. Contrary to popular myth, the WE 300B doesn't sound "sweet" or "romantic." I coined the descriptor "water-clear" to describe what I recognized as the WE 300B's dominant virtue.



### Western Electric 300B tube

Introduced by Bell Labs in 1933, Western Electric's 300A/B tube is arguably the most durable and linear audio-frequency amplifying device ever created. It had to be. Fortunes were invested to guarantee its ability to effectively communicate music and words to millions of moviegoers around the globe. Besides their unprecedented hi-tech lucidity, these tubes were engineered to *not* stop working.

The chief difference between an EL34 pentode tube, with its five active elements, and a three-element 300B triode is that EL34s have electron-emitting *cathodes* that are activated by separate *heaters* that warm them up to emis-

**2018:** DeVore Fidelity's Orangutan O/93 loudspeakers (\$8400/pair) have been in and out of my floor system for almost five years now. I love them because they've played effortlessly with every low-power amplifier I've tried. They make Birgit Nilsson, Lucinda Williams, and Julie London feel intimate and authentic. The O/93's sound is especially natural and vivacious with the single-ended Line Magnetic LM-518 IA integrated amplifier, and astoundingly information-dense with the First Watt SIT-3 amplifier. However . . .

When the EleKit TU-8600R single-ended 300B integrated amplifier arrived from Japan, I rushed to install

it. Unbelievably, it had been almost 20 years since I'd last heard a 300B amp in my home system. I was anxious to hear how a \$1785 amp *kit* would mate with the DeVore O/93s (10 ohm, 93dB/W/m).

Instead of Julie on LP, I put on Birgit Nilsson's *Songs* (24-bit/96kHz FLAC, BMG Sony Classical/Qobuz) via the Chord Qutest DAC (using its orange filter). Dang if I didn't smile broadly, let out my breath, and slump into the couch—once again. I was stunned. Then I remembered my night with Julie London and Ryo, and scrolled up a remastering of *Julie Is My Name* (24/96 FLAC, Liberty/RevOla/Qobuz). The levels of vividness, full bass power, and refinement pinned my pleasure meter. I never imagined a single-ended 300B amp could make bass like this.

If you already own loudspeakers with a benignly high impedance that never dips below 6 ohms—such as the DeVore O/93 or the Falcon Acoustics LS3/5a or Zu Audio's Soul Supreme—you may be ready to let a 21st-century single-ended 300B amplifier show you what I mean by "radiant" and "water-clear."

#### It's a kit!

- ♦ workbench with 10x magnifying lamp or kitchen table and headband magnifier
- ♦ temperature-adjustable soldering iron and roll of solid-cored 60/40 tin/lead solder
- ♦ digital multimeter
- ♦ desoldering pump
- ♦ assorted needle-nose pliers
- ♦ assorted high-quality screw, hex, and nut drivers
- ♦ mindfulness, patience, some comfort with high voltages

If you don't already have all of those, I suggest you stop reading and order the best-quality tools you can afford. Because if you have the right speakers, the right tools, and a satchelful of the final item listed above, you can build a world-class, four-star 300B tube amp that *should* cost \$20,000 but will cost *you* only about \$2000—because you've assembled it yourself.

#### Made in Japan

I met the personable Victor Kung, of importer-distributor VK Music, at AXPONA 2018, where he caught me fondling an amplifier kit he was

displaying. I told him it looked impressive. "And it's single-ended 300B too!" he replied.

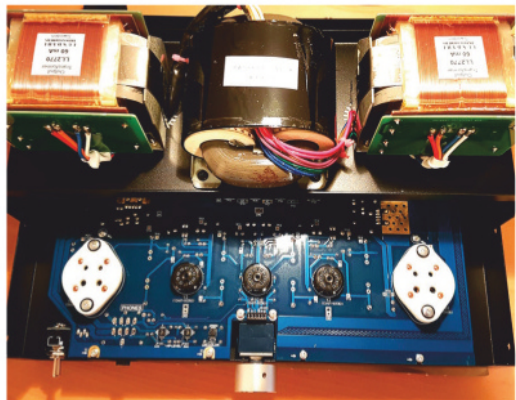
With this amp's tube cage and transformer cover off, I noticed the Swedish-made Lundahl transformers and an impressive array of other audiophile-grade parts. I asked the price. "The EleKit TU-8600R you are examining is the deluxe version—it costs \$1785," Kung replied. "A more basic kit, with the same chassis but less expensive parts, costs only \$1185." Moments later, I'd requested a review sample of the fancy version.

The EleKit TU-8600R puts out 9.2Wpc at 10% THD, and its design goes against every belief I hold and would follow were I designing a single-ended, directly heated triode amp. But! The sound quality I discovered suggests that the TU-8600R's designer, Yoshitsugu Fujita, knows a lot more than I do about how to make a single-ended 300B drive a wide range of speakers without losing any directly heated triode-tube magic.

My TU-8600 review sample cost \$1785 without tubes and included custom Swedish-made Lundahl LL2770 C-core output transformers designed

The advertisement features a black and white photograph of a tube amplifier with four glowing vacuum tubes. A red braided power cord is plugged into the front. To the right, a close-up of a bulldog's face is shown. The text "FULL POWER!" is written in large, white, serif capital letters at the top. At the bottom, the text "NO COMPROMISE!" is written in white, sans-serif capital letters, followed by "Allnic ZL 3000 Power Cords... from \$1400" in a red, serif font.





**Left:** An unfinished TU-8600R; note Lundahl output transformers straddling the mains transformer. **Right:** Farther along, with tubes in place.

specifically for this kit, an Alps R27 volume control (TKD's fine-sounding 2CP601 is an option), Takman 2% REX 50G Carbon resistors, and Mundorf Supreme Silver Gold coupling capacitors. My sample was assembled by the distributor using WBT silver solder. (I recommend tin-lead solder, which melts at a lower temperature than silver, and reduces the likelihood of cold-solder joints.)

My careful examination of EleKit's 32-page manual suggests that its authors did everything in their power to make each step of assembly simple

and easy to understand. The level of difficulty seems no greater than that of a Heath, Dynaco, or Hafler kit. Having built many kits, I suggest that, before doing *any* soldering, you stuff all parts on all boards, then triple-check the location of each part and its mechanical fastening.

Studying the schematic, I noticed that each channel of the 50k-ohm stereo volume control is connected to the grid of one section of a 12AX7 high-mu twin-triode voltage amplifier stage, this in turn resistor-capacitor-coupled to a paralleled-section 12AU7

medium-mu twin-triode driver stage. According to Yoshitsugu Fujita, said driver stage will swing 200V p-p—more than enough to drive the –65V grids of the 300B tube.<sup>1</sup> The 300B's plate voltage is set at a conservative 360V DC.

I was surprised to discover that the TU-8600R has no rectifier tube. In my experience, solid-state diodes make tube amplifiers sound like solid-state.

<sup>1</sup> For Victor Kung's explanation of why Fujita used 12AU7 X 2 and 12AX7 X1 tubes instead of 12AT7s, see [www.diyaudio.com/forums/elekit/309604-tu-8600-fujita-12au7-2-12ax7-x1-intead-12at7.html](http://www.diyaudio.com/forums/elekit/309604-tu-8600-fujita-12au7-2-12ax7-x1-intead-12at7.html).

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I was more surprised to find a slew of solid-state regulator chips in the power supply (!), and no choke—as well as an active automatic bias circuit that monitors the 300B's plate current and adjusts the grid voltage to keep the current constant. Speaking of chips, there's also a programmed two-stage warm-up cycle designed to extend tube life. And I was flat-out shocked to discover global feedback (!) and cathode feedback (?) on the 300B, taken from a third winding on the output transformer. The horror!

The TU-8600R is obviously not your father's—or Hiroyasu Kondo's, or Ken Shindo's—300B amplifier. When I realized this, I took a slow breath and remembered what all wise philosophers say—"condemnation without examination is prejudice"—and proceeded with my examination.

At least the TU-8600R's case and chassis are old-school. It measures 15.2" wide by 8.5" high by 12.8" deep and weighs 28.2 lb. Its black, crinkle-paint transformer cover and tube cage are *definitely* old-school. On the brushed-aluminum faceplate is a on/off toggle switch with a little blue On light, a ¼" jack that connects the plug of a pair of headphones directly to the secondary of the output transformer, and a large knob for that Alps volume pot. Nothing else.

On the rear panel are a single pair of RCA line-level inputs and two pairs of three-way speaker binding posts, one per channel, plus a switch that matches the transformer secondary to speakers of impedances of 4–6 or 8–16 ohms. All very nice, but . . .

What about the tubes?

### Tubes

The \$1785 price of the TU-8600R kit does not include tubes. VK Music offers two different tube sets, both Russian-made. The first, all Electro-Harmonix tubes, costs \$265 and includes matched pairs of EH Gold 300Bs and EH Gold ECC82/12AU7s, and a single EH Gold ECC83/12AX7. The second set costs \$400, and includes a matched pair of Genalex Gold Lion PX300Bs, two gold-pinned Gold Lion ECC82/12AU7s, and a single gold-pinned Gold Lion ECC83/12AX7.

I listened to the TU-8600R with both tube sets. Both produced clean, undistorted, irreproachable sound, and both sets were dead quiet—as was the TU-8600R amplifier. Which tubes did

I prefer? I liked them both the same.

### Electro-Harmonix Gold tubes

Mike Matthews's New Sensor Corp. is based in Long Island City, New York. His ExpoPul-Reflektor factory, in Saratov, Russia, manufactures vacuum tubes under the brand names Electro-Harmonix, Genalex, Mullard, Sovtek, Svetlana, and Tung-Sol.<sup>2</sup> Tubes from this factory are rugged and reliable, and sound clear and quiet—but nowhere near as seductive as some highly sought NOS tubes from American or European manufacturers.

The reliability and distinctive sound of Electro-Harmonix's EH 300B *might* stem from the fact that Matthews specifies only a "double carbonate" (calcium and barium) emissive layer on its cathode. Omitting a third layer (strontium) makes the cathode less emissive, but makes this tube model measure more consistently from sample to sample. Leaving out the strontium *may* also let the tube's sound character remain at a more even level throughout the tube's working life.

And if memory serves me, Western Electric's psychedelic 300A tube differed from WE's more analytical-sounding 300B in one crucial way: Like the EH 300B, the 300A's emitter had a double-carbonate cathode. When they added a layer of strontium, they changed the designation to 300B.

### Genalex Gold Lion tubes

Some claim that the Genalex Gold Lion PX300B is an enhanced, further ruggedized version of the Electro-Harmonix PX300B, which it resembles physically and sonically. Unfortunately, I can't verify that. But to my ears, both Russian-made 300Bs have the same tight bass and water-clarity of their WE 300A forebear, though not the WE's color-saturated midrange or relaxed high frequencies.

### Elrog 300B tubes

VK Music also offers a special TU-8600R package (\$2985) that includes premium German-made Elrog 300B tubes in place of the Genalex Gold Lions.

Elrog Elektronenröhren GmbH Co. KG went bankrupt in 2015. Fortunately, my smart amp-builder friend, Thomas Mayer, founded Deutsche Elektronenröhren Manufaktur GmbH and bought Elrog's brand name, as well

<sup>2</sup> See "Tube Supplies Under Siege," May 20, 2006: [www.stereophile.com/news/052206tubes](http://www.stereophile.com/news/052206tubes).

## ZERO Tech: Cables that Get Out of the Way



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The same TU-8600R, seen from the rear.

spoken, more transparent, and, yes... *breathy*. What killed me was how the bass seemed stronger and tighter. I was flummoxed.

#### EleKit TU-8600R vs Line Magnetic LM-518 IA

Everyone knows I love the Line Magnetic LM-

518 IA for how it pumps out spirited, transparent energy. It makes sopranos sound true of tone and forcefully poetic. Its 845 triode tubes give vivid light and natural life to every kind of music.

But when I removed the TU-8600R and connected the Line Magnetic to its all-time favorite speakers, DeVore's Orangutan O/93s, the LM-518 IA sounded clamorous and adolescent, less refined than I remembered. Naturally, its 845 tubes had their signature strut and iridescent highs—but the EleKit's 300Bs were clearly clearer, quieter, more transcendent.

#### EleKit TU-8600R with KEF LS50 loudspeakers

Not surprisingly, the Line Magnetic LM-518 IA outperformed the TU-8600R with KEF's LS50s. The single-ended 845s delivered more vigorous, more engaging sound, and pumped the woofers harder. Into the LS50s, the TU-8600R made music seem slower, darker, slightly reticent. Nevertheless, the EleKit's 300Bs did a perfectly clear and beautiful job of presenting Joni Mitchell "having fun," "being strong," and wrecking her stockings in that "jukebox dive" in "All I Want," from *Blue* (24/96 FLAC, Reprise/Tidal). The EleKit made the KEFs sound nice, but not special or *live*.

#### EleKit TU-8600R with Abyss AB-1266 and Audeze LCD-X headphones

With the EleKit's volume control all the way open (inputs not shorted) and with no music playing, I heard only silence through Audeze's sensitive (103dB/1mW) LCD-X headphones. That's quiet.

I wish you could have heard Wagner's *Die Walküre*—with Birgit Nilsson, Hans Hotter, and Christa Ludwig singing, Georg Solti conducting the Vienna Philharmonic, and John

as all of Elrog's remaining machinery, materials, and intellectual properties. His goal was to make the best-sounding, most durable directly heated triode tubes possible.

Mayer proceeded to overhaul all of Elrog's machines, improve quality control, and upgrade the quality of raw materials—especially the tungsten wire for the tubes' filaments, which now contains a higher proportion of thorium.

Every other tube in this survey has what's called a dull emitter, which uses an oxide-coated filament that heats up to about 1000°F and produces a warm, orange, fireplace-like glow. But the Elrog 300B's thoriated tungsten filament heats up to ~2500°F and emits a brilliant white light, hence the term *bright emitter*. Electrically, the Elrog 300B is a drop-in replacement for any amplifier designed to run on 300Bs—but its uniquely shaped glass envelope is too tall for the EleKit's tube cage.

Compared to the Russian 300Bs, the Elrogs produced a more volatile, ether-like transparency that reached more elegantly into the upper octaves, while generating a luminous harmonic spectrum unmatched by any of the dull emitters: scintillating yet understated. My personal favorite.

#### EleKit TU-8600R vs First Watt SIT-3 power amplifier

When the EleKit TU-8600R arrived, I was excited to try it right away but was still in the clutches of an ecstasy triggered by the First Watt SIT-3 solid-state power amp and the DeVore Fidelity Orangutan O/93 speakers. I was thinking it might be the best amp-speaker combo I'd heard since I was in diapers. However! When I swapped out the no-feedback SIT-3 for the TU-8600R with its feedback, I found myself reluctant to admit the obvious: The TU-8600R seemed more clearly

## Do You Know Your Amp Is Being Strangled?



Almost all speaker cables have a "characteristic impedance"—I don't mean impedance, or the more commonly referred to DC resistance (DCR), I mean the characteristic of the cable that is 75Ω for your cable connections and 300Ω for a twin-lead antenna.

The challenge in our beloved audio world is that output impedances and input impedances are never the same—and loudspeaker impedance is never uniform across the audio range (much less the full bandwidth required for good transient response).

There is only one way to eliminate the molasses-like effect of how **any speaker cable's characteristic impedance strangles an amplifier's ability to deliver current**—to have no characteristic impedance at all.

AudioQuest's new **ZERO Technology** speaker cables eliminate the interaction between positive and negative that define a cable's characteristic impedance—when there is no interaction, there is no characteristic impedance.

You might think that only a cable guy (due respect to Jim Carrey) could claim that my \$3K amplifier became a \$15K-class amplifier when I switched from an already superb AudioQuest cable to one of our new Mythical Creatures, ThunderBird ZERO, for half the price, but if you were there, I'm sure you would agree.

ZERO Tech cables use all the same great design ingredients as previous AudioQuest models: Dielectric-Biasing, Noise-Dissipation, Perfect-Surface metals, etc., but optimized as never before.

A note of caution before you rush out to listen for yourself: While DBS is as important a way to reduce distortion as ever, the new ZERO cable must be thought of as new, unformed and nowhere near ready for pleasure or for evaluation until they have had music running through them for at least a 24/7 week.

Happy listening when you do get a chance to truly hear your amplifier!

William E. Low

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Culshaw producing (5 LPs, London OSA 1509)—through my Abyss AB-1266 Phi headphones connected to the output of EleKit's TU-8600R SET 300B amplifier. The depth of space and accuracy of tone exceeded anything I could imagine hearing from loudspeakers. Inner detail? Information recovery felt like 100%. Tiny sounds really mattered. I heard no subtractive distortions. I wasn't looking at a puppet-theater opera between my speakers—I was *there* in Vienna's Sofiensaal in 1965, with all those bigger-than-life performers.

The TU-8600R's headphone output was the best I've heard from an integrated amplifier. In fact, if the EleKit TU-8600R were *only* a headphone amp, it would still be a great value for the money.

#### EleKit TU-8600R with Zu Audio Soul Supreme loudspeakers

Error correction and signal modification, whether in the form of negative feedback, degeneration, DSP, or some tangled mess of filters in a DAC or loudspeaker crossover, obfuscates the raw signal in myriad ways. I believe these obfuscations distance listeners from the *essence* of the recording. Zu Audio's Soul Supreme (\$4400/pair) is the only loudspeaker I have in which the voice-coil of a drive-unit is *directly* connected to the output terminals of the amplifier, with no intervening crossover. Which means that, with the right amplifier, the Soul Supreme's 10.3" full-range paper cone can dance extremely well. Not surprisingly, the

EleKit TU-8600R sounded like a right amplifier.

I used the EleKit's 8–16-ohm output tap with the 16-ohm Zus. This gave music a compellingly relaxed, almost glamorous-sounding presentation that was extremely effective at making me forget everything but the music. Say amen, people.

#### EleKit TU-8600R with Klipsch RP-600M loudspeakers

As much as I cherish the supreme musical pleasures generated by the DeVore Orangutan O/93s (\$8400/pair) driven by the First Watt SIT-3 (\$4000), I was overwhelmed by how precise and electrifyingly beautiful the EleKit TU-8600R sounded driving Klipsch's RP-600M loudspeakers (\$549/pair), which are reviewed elsewhere in this issue. I would never have predicted this.<sup>3</sup>

The combo of DeVores and First Watt costs \$12,800, plus cables. The EleKit and Klipsch RP-600Ms together cost only \$2600, but musically and sonically satisfied me as much as if they cost \$26,000. To my complete surprise, this pairing exceeded the Orangutan+SIT-3 combo in apparent speed, tightness of bass, and boogie PRaT fun factor. The TU-8600R powering the RP-600Ms, sourced by the Chord Qutest DAC (\$1895), created a complete under-\$6k system, including cables and stands, that I'd be hard-pressed to improve on.

This is what I call value for money.

#### Conclusions

The EleKit TU-8600R may look like a generic, old-school, single-ended 300B integrated amplifier, but its sonic character is clean, neutral, and precise in a distinctly 21st-century way. It doesn't sound at all warm or soft, but fast and vigorous, as transparent as any amplifier, and extremely captivating. My many months of auditioning it suggest that, with the right speakers, this humble amp kit could please discriminating listeners as much as any amplifier at any price. Bravo, Yoshitsugu Fujita. Thank you, Victor Kung. ■

*Herb Reichert (Stletters@stereophile.com) lets the music move him in his bunker in Brooklyn's hip Bedford-Stuyvesant 'hood.*

<sup>3</sup> As you can see from the measurements accompanying the review (p.109), while the Klipsch RP-600M is only a couple of dB more sensitive than average, its impedance rises from 3.5 ohms in the lower mid-range to an average of 16 ohms in the treble. With an amplifier with a high source impedance, like the EleKit, this will boost the high frequencies.—JA

## Is a Dirty Screen Door Blocking Your View?



For decades, I've used the analogy of looking through a screen door when describing the way Radio Frequency Interference (RFI) damages our 'view' into the music.

We don't hear RF noise – but we most certainly hear the confused and irritating result of the transient intermodulation caused in active circuits as they try to cope with high-bandwidth noise.

One 25-year-old way that AudioQuest has been working to reduce such noise and distortion is controlling conductor direction. When a cable, either with a shield attached at both ends, or no shield, is turned around, the difference in sound quality is the difference between more or less RF interference.

When copper or other metal is drawn down to a usable wire size, the surface develops a fish-scale like overlay of grains on the surface. The tiny impedance variation at RF frequencies caused by this non-symmetrical structure, combined with skin-effect (which keeps all the RF noise on the surface), allows us to direct the accumulated RFI energy in the direction where it will cause the least circuit misbehavior.

Going far beyond the clear-cut improvement from controlling conductor directionality, our patented Ground-Noise Dissipation (**GND Technology**) first appeared on the remarkable Storm Series of AC power cable, and has now been applied all the way down to the highly affordable NRG-Z model. GND Technology is also incorporated into our Niagara AC power products.

Now that GND Technology is included in the new BASS models of speaker cables, models designed to be used to BiWire in concert with our new ZERO Technology Full-Range or Treble models, **we have just upgraded your amplifier.**

GND Technology doesn't improve the sound of the cable, but my-oh-my did it improve the sound of all of my amplifiers by actually draining RF energy off the output of the amplifier.

Congratulations to those of you with BiWireable speakers who can take advantage of this amazing improvement – and condolences to those whose speakers don't allow this improvement. For you, the extraordinarily great consolation prize is being able to use the new ZERO Technology cables Full-Range.

Happy listening when you do get a chance to truly hear your amplifier!

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