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# The Nu:Tekt HA-K1 “Tube” Headphone Amplifier by Korg/NuTube

## Power, Psychology, and Distortion

By  
**Erik Owen**  
 (Gig Harbor Audio)



Erik Owen took home the Nu:Tekt HA-K1 headphone amplifier designed around the Korg NuTube 6P1—a miniature, low-power dual directly-heated triode that uses a one-pixel vacuum fluorescent display (VFD) device, emulating the properties of a driver tube. To design a portable device using the Nutube 6P1 is interesting enough, but to make things even more interesting, the HA-K1 is sold exclusively as a kit.



Photo 1: The NuTekt headphone amplifier kit by Korg

On the last day of the Rocky Mountain Audio Fest (RMAF) 2018 in Denver, CO, I bought a Nu:Tekt HA-K1 headphone amplifier for \$199 directly from the Korg Electronics/NuTube representative. It was not until I buckled into my seat on the flight back to Seattle that I realized the headphone amp was in the form of a kit: bags of capacitors, resistors, and soldering instructions (see **Photo 1**). So instead, I drank a noise-cancelling gin and tonic with my Bose QC35s plugged directly into my phone.

I have never really looked forward to listening to music through headphones, rather it just helps power through a flight. One of my goals in going to RMAF this year had been to finally find a pair of headphones I enjoyed enough to sell at Gig Harbor Audio (my own store in Washington, serving the local hi-fi community). I wanted something cool looking that produces warm detail like my dad’s Kenwood headphones from 1979.

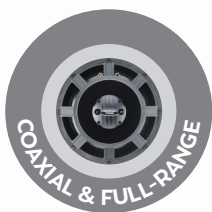
The reason I came away from RMAF with a headphone amp and no headphones is simple: other



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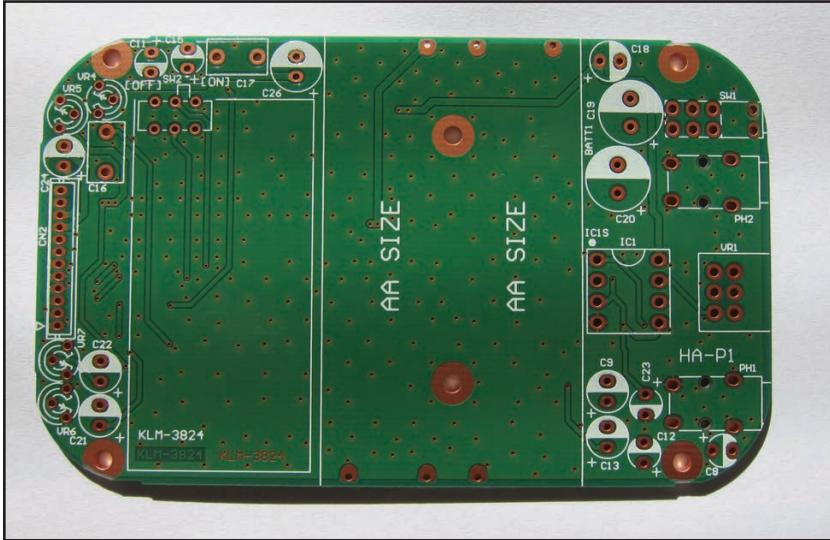


Photo 2: This is the board provided with the kit.

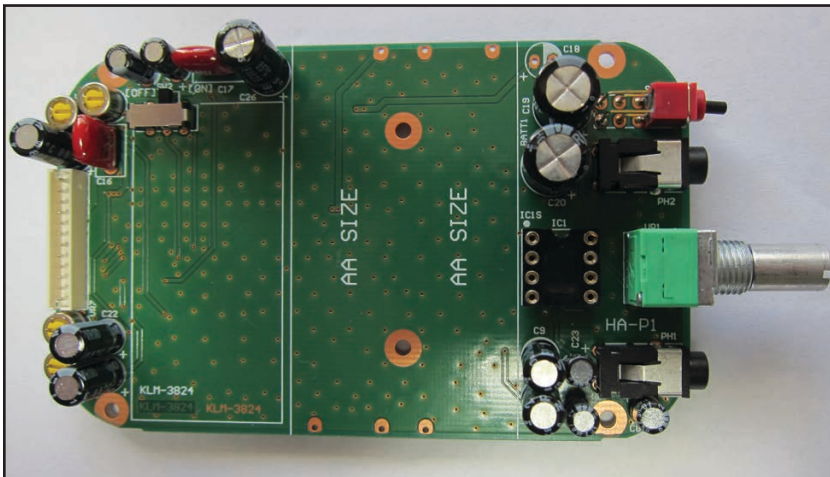


Photo 3: Once the soldering is done, it is time to connect the parts.

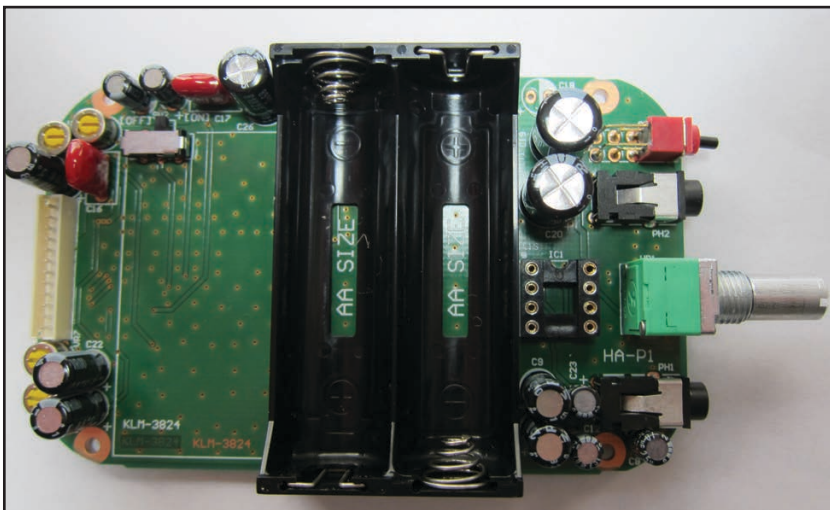


Photo 4: After everything is assembled, it is time to plug in the batteries.

people’s heads. Walking into the “Can-Jam” hall where an ocean of headphone companies displayed their products, I decided that I was not going to press two sponges to my ears that have rubbed up against 300 other heads. Seriously. A headphone is a personal item. I would rather shell out \$5,000 for a pair of Stax sealed in the box without even listening to them than try on a pair that someone else has used. This article is not about headphones, but they do turn out to be one of the keys to understanding a small piece of innovation that I purchased on a whim: a miniaturized vacuum tube amplifier that the company Korg has apparently begun to perfect.

## Assembling the Kit

Once I got back to Gig Harbor I gave the kit to my tech Vladimir Belov (my soldering skills are just okay and my skills at following instructions are worse). According to the instructions that came with this amp, it has a triode that is structured with an anode, a grid, and a filament in a vacuumed glass body. The “tube” looks like a couple of Listerine melt-away gels side-by-side between extremely thin glass. Korg says it uses 2% of the power required by conventional tubes and occupies 30% less volume, as well as offering up to 30,000 hours of operating life. According to Vladimir, the instructions were fairly clear except for one mistake in the sequence: 1. In the “Building the Main Circuit Board” section, the second part of #2 (volume VR1-29) should be the second part of #9. It would be difficult to build this kit, if not for correcting their instructions (see **Photos 2–4**). The amp is 26 V for the op-amps, 2-AA batteries, and lasts about 9 hours.

## The Sound

Let’s get into what it sounds like fully assembled. I used Sennheiser HD280 headphones. The source was my 13-year-old daughter’s Gen 2 iPad Mini playing downloads from Apple music. (I wanted a source that did not use the Lightning to 3.5 adapter.) The first track we played was “Problem” by Ariana Grande. I could not pick out much of a difference between plugging direct to the iPad or going through the NuTube amp. If anything, the bass seemed bigger running straight from the iPad. We listened to “Call Me, Maybe” by Carly Rae Jepsen, “Fancy” by Iggy Azalea, and “I Kissed a Girl” by Katy Perry. All the same results. The Korg did not seem better than the simple Apple iPad.

I took a break before listening to more. After lunch and black tea, I cued up... “Baby One More Time” by Britney Spears, a great track from my daughter’s folder as it was surprisingly rich and grainy for a collection of digital sounds. The vocals





Photo 5: This is how the Nu:Tekt amp should look when fully assembled.

were clear. The mid bass dynamic. Going from the iPad, then into the NuTube amp, after one play, I finally realized that I had been focusing on the sound incorrectly. Like a 3D poster I heard the difference pop. Instead of bass extension and loudness/gain, this Korg amp presented music more digestible, imaged, and what I consider as less fatiguing. Once I understood what to listen for, the Korg amp presented songs where I could see the whole extension of bass and the whole landscape of detail. I could see the image. Straight from the iPad the bass wasn't actually bigger, rather it had no limit, no beginning, and no decay. I could not see where it was stopping and coming back. Straight from the iPad, the music reflected like a row of mirrors with no ceiling or floor. The Korg amp presented a pleasant, medium-sized room with Britney singing a song, her DJ next to her with bass and textured synth coming out of Roland and Yamaha amps. I could see the DJ's quarter-inch patch cables on the floor. I certainly didn't feel like the amp made the music purer, perhaps the opposite. A full-sized integrated tube amplifier does not usually make music sound purer, rather it colors the music with its own flavor. When I look at a beautiful red sunset, it is not because the air quality is unusually pure, quite the opposite.

### About the Author

Erik Owen holds a Masters degree in English Literature/non-fiction from Western Washington University. From 1994 to 2010, he worked for various organizations internationally including USAID, the United Nations, the American Bar Association, and the Mercy Corps. He opened Gig Harbor Audio in 2012 in Washington state. Gig Harbor Audio focuses on musical two-channel tube and solid-state hi-fi as well as AV/home automation and hi-fi repair of turntables and amplifiers specializing in Marantz, Bang and Olufsen, Sansui, Krell, and any tube equipment.

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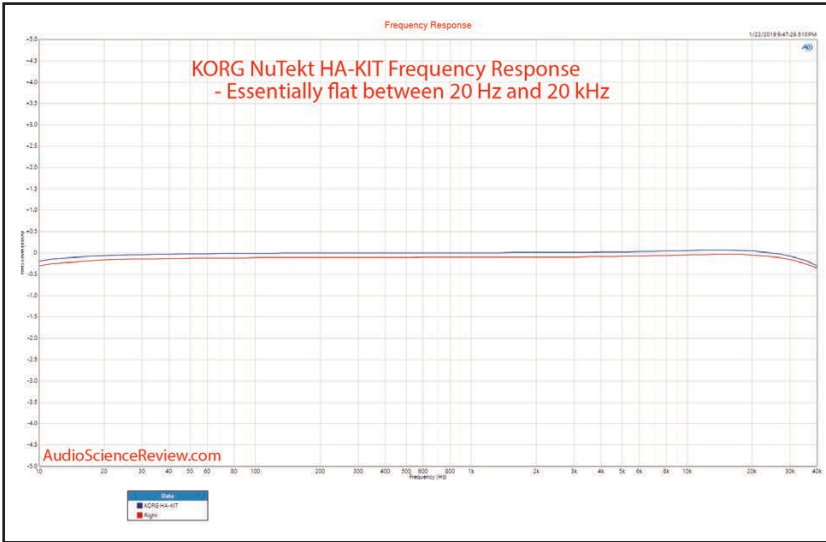


Figure 1: The frequency response of the Nu:Tekt amplifier. (Image courtesy of Amir Majidimehr)

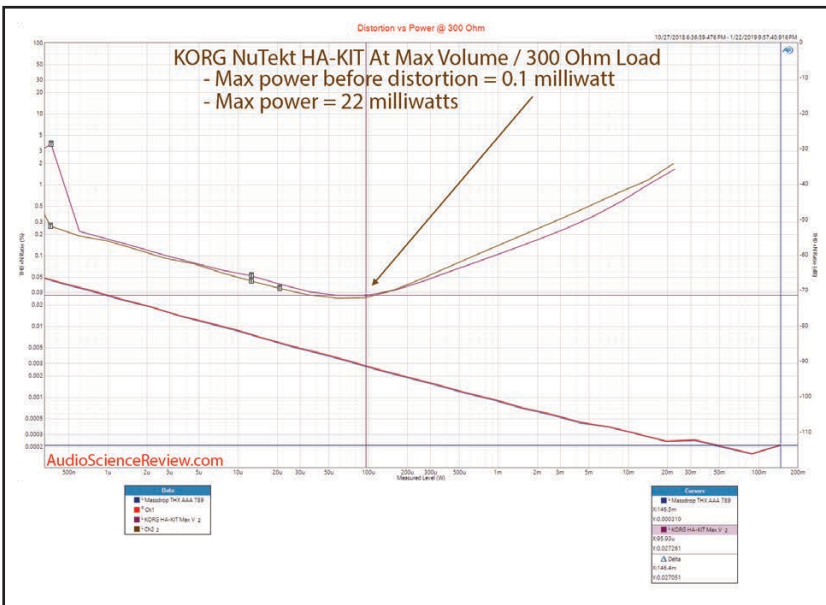


Figure 2: This graph shows the distortion vs. power. (Image courtesy of Amir Majidimehr)

Next, I had my daughter play the iPad alternating randomly into the headphones and through the Korg amp into the headphones. Each time my daughter triggered the beginning of “...Baby One More Time” by Britney Spears. Spoiler alert: I correctly identified the Korg amp 100% of the time. It was too easy as we went on with the experiment with the same song. We then played a new song twice through in its entirety: “K” by Cigarettes After Sex (streaming through Tidal). I listened to it all the way through on the headphones twice in a row. It was easy to differentiate once the second listening began. Listening to it the first time I was unclear as to which device was being used. After hearing the second play through I recognized it correctly as the Korg. In the first, the bass was uncontrolled and the simple acoustic guitar was too brilliant like a kaleidoscope. Through the Korg everything was in place in front of me, appearing like an image on a stage or a large platform. I could see the drums, the Virus TT synthesizer, and the beautiful feminine voice of Greg Gonzalez.

## A Scientific Approach

Let’s look at some reasons the Korg sounds better than straight from the iPad. My friend Amir Majidimehr has a website called Audio Science Review where he recently did a review on this very Korg headphone amp that we put together. Unlike my review, Amir does not go into the songs he uses to test, nor does he comment much about how music makes him feel. His reviews are refreshingly science-based. He uses an APx 555 (Audio Precision analyzer) and mainly checks for levels of distortion. His graphs and charts are transparent and a good baseline for any product. Amir’s review was, to say the least, not favorable toward the Korg/Nu:Tekt headphone amplifier. Through his charts, he shows the “frequency response is very flat, so anything you hear differently will be the result of distortion” (see **Figure 1**).

The Korg amplifier, according to Amir’s results, is not that powerful, so the more the volume is turned up, the more distortion is produced. That was clear in my own listening as well. With the iPad maxed at 100%, basically using the Korg as an attenuator, the best sound occurred at about three-quarters volume on the Korg. This was loud enough for me, but probably not very loud on a consumer level, especially with less efficient headphones. After seeing Amir’s results, it would appear that perhaps the actual distortion is what makes the sound seem more pleasant to me up to about 75% volume. It does reach a point above that where it seems to get a little crunchy. According to Wikipedia, (music) distortion is: “a change, twist, or exaggeration that

## Resources

P. Millett, “The Korg Nutube 6P1,” *audioXpress*, May 2017, [www.audioxpress.com/article/r-d-stories-the-korg-nutube-6p1](http://www.audioxpress.com/article/r-d-stories-the-korg-nutube-6p1)

Nu:Tekt, [www.nutekt.org](http://www.nutekt.org)

Amir Majidimehr, “Review and Measurements of KORG NuTube HA-KIT Headphone Amp,” *Audio Science Review*, January 2019, [www.audiosciencereview.com/forum/index.php?threads/review-and-measurements-of-korg-nutube-ha-kit-headphone-amp.6401](http://www.audiosciencereview.com/forum/index.php?threads/review-and-measurements-of-korg-nutube-ha-kit-headphone-amp.6401)



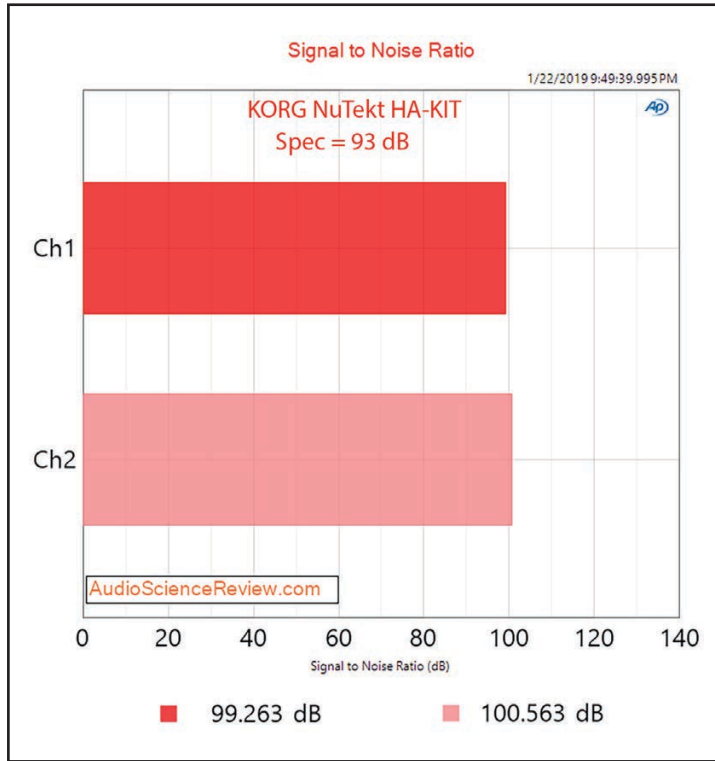


Figure 3: Here is the signal-to-noise ratio (SNR) shown right and left for this amp. (Image courtesy of Amir Majidimehr)

makes something appear different from the way it really is." I asked Amir if this distortion is like the "noise" that a guitar amp makes. He said kind-of, but not completely. The distortion or over-drive in a guitar amp is what makes it edgy and harsh, and fun. You don't want that in hi-fi. So, the "distortion" that he is talking about must be more on the side of "changing" or "altering" the sound instead of adding "noise" to the sound. I used to have a Casio CZ-1 synthesizer that had two different areas that you could change the sound: "noise" and "distortion." They were very different (see **Figure 2** and **Figure 3**). The distortion adjustments changed the flavor of the sound. The noise added static crunch like the guitar in a Nirvana song when Kurt Cobain stepped on that little box during the chorus.

Amir also did his listening tests differently. Instead of comparing a source like I did (the iPad) to the output from the Korg, Amir compared the Korg to a JDS Labs O2 battery-operated headphone amp by using a Y splitter from a single source. I decided I had better try that as well, so I ordered a JDS Labs amp online (\$149/ free shipping). One other thing that Amir noticed in his tests on the Korg was that the internal right/left adjustment pots were slightly off with the right side being about 2% higher than the left. He could only see this by using his analyzer and made the adjustment so they were equal. This did make me wonder why I would buy a kit like this if I need a \$30,000 sound analyzer to make sure the right and left sides are equal. Amir quite logically explained that this does make a big difference in the way the image is presented.

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## Additional Testing

I received the JDS Labs amp in the mail four days later and used three different pairs of headphones to compare the Korg amp to the JDS amp: 1. Audeze LCD-X headphones (with a 0.25" to 3.5" adapter), 2. Sony MDR-V6s, and 3. Sennheiser 280. This time I used a MacBook Pro with a downloaded WAV file of "Waiting Room" by Fugazi (see **Photo 6**). Starting with the Audeze phones, and going from amp to amp, just like Amir said, the sound seemed extremely similar, the main difference being that the JDS indeed was a bit stronger output/higher gain. I listened for a good hour also noticing what

Amir pointed out in his review that the Korg does give a slight thump when turning on whereas the JDS was stone quiet when pushing the on button (see **Photo 7**). Amir's phrase "...anything you hear differently will be the result of distortion" ran through my head during the listening. "Waiting Room" by Fugazi is a great song for comparison in that Ian KacKaye's vocals are super clear like he is in the room, the snare drum is sharp, and there is a dramatic silence right after the first 16 bars of which has a "noise floor" in the recording, likely from one of the guitar amps. The character of this noise floor (the sound of an amplifier being on) on the JDS amp sounded strong, full, and persistent. On the Korg, it sounded a bit softer, but more permeating, and more like noise from a guitar amp in a room.

It must be subjective that I like the Korg better. In talking with Amir, he said that when doing A/B listening tests he usually uses songs that are repetitive in their beat, techno tracks like DeadMau5. That made perfect sense to me. I tried it with "4Ware" from DeadMau5 and felt I was getting good listening material to chew on, but this track with its ethereal synth and driving 808 beats itself seemed to take over. I wanted to go back to four people in a room, to hear another test song without digital beats and processed layers. That is not the music I would usually listen to anyway. I wanted chalkiness and natural decay of real, forceful instruments. Angst and emotion, a good test, does not come through when click track triggered. When I hear drums, I want to hear the release of a person hitting a snare with a stick. Like Dave Grohl. Really hard. I had to get back deeper into the fundamentals, and one producer/artist who achieves that sound is Steve Albini. His recordings are unforgiving in the way they reveal. His music might not be the most pleasant for some people, but it is true. The song "Compliant" from Shellac's *Dude Incredible* LP is repetitive, droning, and perfect. The snare, high-hat, bass, and guitar have speed and decay showing a recording of people in a room. Before I go into what Shellac sounded like on both amps, let's talk about power in general.

One of my goals in hi-fi is making speakers (or headphones) "disappear" so I just hear the music. I have learned that more power is usually better, though not always. Making a speaker like a Focal, Harbeth, Bowers & Wilkins, Wilson, KEF, or Graham Audio disappear, the more power the better. Power is not necessarily for the purpose of playing it loud, but rather to be able to feel open-ness when the volume is down. On the other hand, Klipsch Corner horns, Belle's, Altec Voice of the Theaters, or Lowther full-range drivers prefer less power. The last time I



Photo 6: Here is the JDS Labs 02 battery-operated headphone amp that I tested using the song "Waiting Room" by Fugazi.



Photo 7: This is the Korg Nu:Tekt headphone amp that I tested using the same song "Waiting Room" by Fugazi.



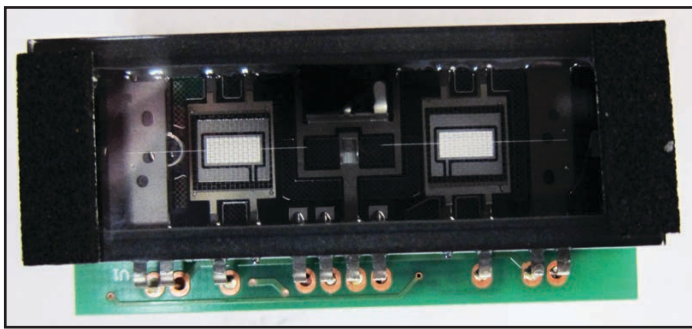


Photo 8: Korg Nu:Tekt's 6P1 mini tubes have ensured that this Nu:Tekt headphone amplifier will be in my carry-on bag (fully assembled) as I get on my next cross-Atlantic flight.

had Corner horns they sounded okay with an Exposure 3010 (100 wpc), better with a Heed Elixer (55 wpc) and better still with a Marantz 2245 (45 wpc). They started to really fall into place with a broken-in Dynaco ST70 (35 wpc on a good day). Then when I played them with a 3.5 WPC Hino tube amplifier they lit up with beauty and clarity. The bass felt like someone in the room playing a stand-up bass. Apparently, headphones react the same. Some like lots of power, some like less. Amir also pointed this out in that the Sony MCR-V6 headphones would be a good match with the Korg amp. He was right. I really found that a true A/B test between the Korg mini tube amp and the JDS solid state amp is impossible. They are different fruits. The Korg is not quite as strong, but there is something there that is pleasant.

Now, using the song "Compliant" by Shellac, it was clear as day that the efficient Sony MDR-V6s sounded awesome with the Korg amp. I could hear the tempered consistency in the Albini recording rather than the automation of the DeadMau5 in the snare hits, and I could feel the rawness of Albini's guitar over and over and over, changing, distorting, evolving. With the same song, the Sennheiser headphones came to life with the JDS amp. The Korg just didn't have enough kick or power for them. It did not make them disappear. The Audeze headphones were engaging with both, but did seem to favor the power of the JDS.

Not recognizing at first the differences in sound character reminds me of one of my favorite books *The Screwtape Letters* by C.S. Lewis where an elder devil gives advice to a younger demon on how to keep a human from seeing the light: "... aggravate his neglect of the obvious. You must bring him to a condition in which he can practice self-examination for an hour without discovering any of those facts about himself which are perfectly clear to anyone who has ever lived in the same house with him or worked in the same office...".

The perception and presentation of the two headphone amplifiers is important. Better is subjective. Better according to Audio Science Review is based on precise measurements of distortion. We need Amir's view. We need some base line control. But is having distortion always bad? Take for example a bottle of organic/gluten-free cabernet wine that is 6 months old. It might very well be extremely clean when tested. But a bottle of 2007 Chateauf-du-Pape, which is filled with sulfites and other toxins, is the bottle I would choose to open with a filet mignon. These sulfites and toxins distort the flavor of the wine, especially over time. Why would one listen to a tube-based amplifier in the first place? Isn't the whole point to have the tube in the middle of the signal path so it imparts its own character on the music? Tube amps seem to be often a little less power and a bit more character. Even my technician George Martin set aside his Krell 300 for a V1 Manley Stingray to power his Graham LS5/9s (yes, in a small room...).

### Conclusion

Two hundred bucks (\$249 retail) to carry around a device that makes my iPhone sound better, is a lot to ask. I also don't want something that will be antiquated in one year. In the late 1990s, I carried a flip-phone, a Canon ELPH camera, and a Texas Instruments pad with stylus. I did not consider cargo pants an innovative idea to accommodate all these devices. Combining the phone, the camera, and the note pad into one single device is innovation. This headphone amp feels not quite yet pret-a-porter. It is a flavor that does things that I like when paired with the right headphones, the right source, and the right Albini track. These tiny tubes (see **Photo 8**) that Korg came up with however, have ensured that this Nu:Tekt headphone amplifier will be in my carry-on bag (fully assembled) as I get on a Virgin Airlines flight to London. I'm looking forward to listening to some music with a gin and tonic. 🍸



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