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Sam Tellig

Sam Finds a New Solid-State Favorite

In 1981, John Beyer and Steve Keiser formed B&K Components, Ltd. If you're a longtime reader of this column, you may recall their first offering: the ST-140 power amp. It helped prove that a solid-state design could take on tubes and win in terms of musicality. However, for certain audiophiles (and reviewers), the ST-140 had one big drawback: at \$399, it didn't cost nearly enough to be taken seriously.

That didn't bother *Stereophile's* founder, J. Gordon Holt, who may have been the first reviewer to discover the ST-140. He reviewed it in August 1984, in Vol.7 No.4. In fact, Gordon liked the amp so much that he suggested that I review it, too, which I did in December 1985, in Vol.8 No.8. I was the Audio Cheapskate back then, and the ST-140 was perfect.

Back then, I owned Quad ESL-63 loudspeakers, which then sold for around \$3000/pair. That was considered expensive, and was nearly eight times the price of the ST-140. That didn't matter. The B&K drove the Quads like a champ. (Two decades on, I still own Quads—the current model, ESL-2805.)

Of course, there were drawbacks. The ST-140's bass response wasn't so great. Transparency stopped short of the state of the art. The ST-140 seemed to surround the music in a velvet fog that I called "MOSFET mist."

In terms of musicality, though, the amp was a winner: it hit the harmonics just right. It sounded more like tubes than tubes did, and was especially magical with my Quads.

So you can imagine my interest when Steve Keiser, who'd designed the ST-140, called to tell me that he's back in the hi-fi business. (No, he hasn't quit his day job. Steve quit B&K some time ago for a career in computers, and John Beyer has since directed B&K Components away from two-channel audio and into home theater. Savvy moves for both gentlemen, no doubt.)

"Sam, I've got the perfect amp for your Quads."

"As good as the ST-140?"

"Better. If you heard the ST-140 today, you would be well aware of its shortcomings."

At first, I thought Steve was saying he'd designed an amplifier specifically to drive Quads—a narrow niche indeed. Such is not the case. But Steve's new amp is not designed to drive every loudspeaker. If you're looking for a bone-crushing amp to deliver killer current into very-low-impedance speaker loads, this one's not it.

Steve is one of three principals of a new company called Luminance Audio, which has been up and running for about two years.¹ Their first, and so far only, product is this stereo amp, the KST-150. It retails for \$2995—not nearly enough for Paul Bolin or Mikey Framer. Or these days, maybe not even Art Dudley.

The *K* in *KST-150* is Steve Keiser. The *S* is Rick Schultz of Canadian cable company Virtual Dynamics, which distributes Luminance. *T* is Mike Tseng, a businessman who loves hi-fi and music. The KST-150 is made in the US, just outside Buffalo, New York.

The old B&K ST-140 was fine so long as your loudspeaker's impedance didn't fall much below 4 ohms. The amp couldn't hammer high current into very low loudspeaker impedances. Paradoxically, this was the ST-140's strength: in *not* having to bang out balls-to-the-wall current, with most loudspeakers it could achieve an agility, a degree of musicality, that was truly exceptional—especially at the price.

Once again, Steve Keiser has deliberately designed a somewhat spartan amplifier that won't hammer high current into low-impedance speaker loads. The KST-150 is more for sound than

for show. But I find it quite handsome, in an understated way. It's a plain black box—not a piece of hi-fi jewelry to impress your audiophile friends. Fit



The Luminance KST-150.

and finish are just fine. Would you like a fancier faceplate and a classier chassis? You'd be looking at \$5000 or more.

The KST-150 is rated to deliver 150Wpc into 8 ohms, 200Wpc into 4 ohms, or 220Wpc into 3 ohms. Below 3 ohms, it poops out (though Steve didn't phrase it that way). There are good reasons why an amplifier should *not* be designed to drive speakers of very low impedance—to the detriment of the vast majority of listeners, whose loudspeakers don't require such heroic amplification. I talked with Steve about this. More in a minute.

This is one cool amp. Our cat, Maxik, concurs—the KST-150 ran so cool that Maxik preferred my lap or shoulders to sitting atop the amp. Maxik is a good judge of sound, too. If he doesn't like what he hears, he goes to my wife, Marina, and watches Russian TV. The KST-150 ran quietly, both electrically and physically. There was almost no noise through the loudspeakers. No annoying transformer hum or buzz. The KST-150 just sat there and purred.

Steve told me the amp needed more run-in time, so I let it play with my Quads while I played with the cat. I didn't listen too hard, but I liked what I heard right out of the box. After the break-in period, the amp liked 30–40 minutes of warmup. After an hour, it was completely on song, as the Brits like to say. No need to leave it on all the time.

¹ Luminance Audio. Web: www.luminanceaudio.com. US distributor: Virtual Dynamics, Box 4494, 5103-51 Street, Barrhead, Alberta T7N 1A4, Canada. Tel: (780) 674-3374, (877) 347-4489. Fax: (780) 674-5638. Web: www.virtualdynamics.ca.

The KST-150 measures a standard 17" W by 5.5" H by 16.5" D. There are no hideous rack handles to put off female customers. Much of its 33-lb weight is accounted for by its 56,000 μ F power supply, distributed among six capacitors connected in parallel. BIG power supply. That's something the ST-140 didn't have. The heatsinks are on the back and, as they did on the ST-140, they crowd the single pair of binding posts.

I did what Steve suggested and hooked up the KST-150 to my Quad ESL-2805s. I used various digital sources, and this line-stage and that. For most of the time, I used Rega's new Saturn CD player into the Musical Fidelity X-10^{V3} buffer stage into a Purest Sound Systems Model 500 passive "preamp." Just before deadline, I received the new Superphon Revelation III preamp from Stan Warren. This was turning into an old-timer's night from the 1980s: Steve and Stan, legends from 20 years ago. Back then, many impoverished audiophiles used the original Superphon Revelation Basic preamp with the B&K ST-140.

Steve Keiser was right about this: the KST-150 latched on to the Quads as if they were made for one another, which they really weren't. If you own a pair of Quad electrostatic speakers—any model—you have to check out this amp. As Kal Rubinson would say, it's mandatory.

And as Yogi Berra once said, the KST-150 was déjà vu all over again—a B&K ST-140 for today. It hits the harmonics just right. The midrange was full-bodied, rich, natural, immediate. Call it tubelike—I just call it musical. This may be the magic of MOSFETs: a certain way with even-order harmonics. And never mind the MOSFET mist: it wasn't present. (MOSFET mist is now largely a thing of the past, although amplifiers that use MOSFETs in the output stage do tend toward a somewhat softer focus than amps that use bipolar output transistors.)

The name Luminance Audio proved apt: the KST-150 sounded as if illuminated from within, rather like a flea-powered single-ended-triode tube amp. But there isn't a single tube. The KST-150 is entirely solid-state.

Compared to the ST-140, the sound of the KST-150 has been cleaned up: a slightly soft focus (no hard edges), no MOSFET mist. No lack of definition and low-level detail. Yes, it costs seven-and-a-half times more than the ST-140 did. But adjust for inflation. Take into

account the bigger power supply. More power. (The original ST-140 was rated to deliver a modest 70W_{pc} from a single pair of MOSFET output transistors per side.) The KST-150 is as big a bargain today as the ST-140 was in its day. Just don't expect big-bucks reviewers to take it seriously. Hey, it's your money, not theirs.

Steve told me he could have made the KST-150 cheaper, but it would have been less of an amp. He's incorporated such features as a three-pole AC line filter. In other words, power-line conditioning is standard. Built in. Steve says he hasn't skimped on parts, either: polypropylene capacitors, high-quality resistors, etc.

I HAVE YET TO **HEAR** A DIGITAL AMPLIFIER I LIKE (THEY SOUND SO STERILE)—BUT **DIGITAL** AMPS DO TEND TO SOUND **FAST**.

So much for specs. I keep coming back to the sound.

The KST-150's transient response was nothing short of phenomenal. I heard it with triangles, cymbals, plucked strings. I heard it with good piano recordings: the attack and decay of the notes. Quad speakers are as quick as can be—one reason to own electrostatic speakers—and the KST-150 let me hear just how quick my Quad ESL-2805s are. The combination was breathtakingly fast.

This amp changed my listening habits! Ordinarily I listen mostly to classical music, but I have a good jazz collection, too. The KST-150's transient speed had me turning more and more to jazz. It also had me listening long into the night, much to Marina's annoyance.

"Do you know what time it is, Sam?"

Ah. 3:30am.

"Come to bed."

I'm not sure which solid-state amp last had me sitting up more than half the night. Maybe it was the B&K ST-140.

I asked Steve about this transient speed thing. According to him, the KST-150's performance has to do with slew rate and squarewaves. He claims the KST-150 has a slew rate of 250V per microsecond, which Steve describes as an industry first. Yes, some other amplifiers come close—digital

amps, in particular. But 100V/ μ s is usually considered fast, and 60V/ μ s is more the norm.

Steve pointed out that some digital amplifiers achieve slew rates as high as 220V/ μ s. But, according to him, they lack the "fullness of character" that the best analog solid-state amplifiers can achieve.

I'm very much in agreement here. I have yet to hear a digital amplifier I like (they sound so sterile)—but digital amps do tend to sound fast. The KST-150 achieved comparable speed—and then some—while being an analog amp. You can have the breathtaking speed of a digital amplifier and you can have your analog, too. Speed is what

set this amplifier apart from the rest of the pack. It was so quick with the Quads that I was sometimes startled.

The *Concise Oxford Dictionary, 10th Ed.*, defines the verb *slew* thusly: to "give a maximum response to a sudden large increase in input." A slew rate specifies how fast an amplifier's output voltage can change with respect to its input voltage—in other words, it describes an amplifier's ability to follow its input signal. Slew rate is expressed in V/ μ s. But there's more than just slew rate going on in the Luminance KST-150. Squarewave performance, for instance.

"I use a completely different set of objectives and engineering design criteria from other designers," Steve Keiser told me. "It comes down to one empirical test that's entirely visual. The test is squarewave response. Not at the output of the amplifier, but inside the circuit. At every internal point in the amplifier—every point that can be identified on a schematic—I have analyzed the squarewave performance of every transistor, every capacitor, every resistor.

"When I first started to design an amplifier circuit, I observed a severe amount of distortion and alteration of squarewave response. The first question was, is it significant and is it audible? The second question was, if I were to correct for the distortion, what would the result be?

"I proceeded to identify each of the

points where I could see a squarewave anomaly, and I corrected for it by adding appropriate networks and matching impedances—the usual kinds of things that electrical engineers do to optimize circuit performance. I tried to identify and eliminate as much of the squarewave aberration as possible.”

Steve was warming up, just like his amp.

“I have a marvelous computer program that is produced by a California company called Electronics Workbench. The program takes circuit elements and allows you to put all the components and all their dynamic characteristics into a computer. It’s as if you are working with test equipment, but you are doing it inside a computer. The software has allowed me to identify all points of squarewave aberration and to correct for them without doing anything in real space.”

According to Steve, squarewave performance matters at every stage.

“Twenty years ago, Julian Hirsch said something to the effect that every parameter of audio performance should be capable of being objectively quantified. I wasn’t so sure at the time, but now I think Julian was right. There is a great advantage to being able to quantify things instead of shooting in the dark. You don’t have to spend a lot of time experimenting. You can reduce development time and cost.”

So where do some other designers go astray?

“I think they approach things from a black-box perspective. They look at the input signal and they look at the output signal.”

But it matters what happens along the way.

“This was during my B&K years: I was sitting around one day. I had my oscilloscope on and my signal generator. It was generating a 10kHz squarewave. I just randomly took the oscilloscope probe and touched it to a place inside the circuit. I noticed that the squarewave response was really odd. Then I added a resistor in parallel with the compensation capacitor, and I noticed that the squarewave was dramatically improved. I heard the difference.”

I asked about the KST-150’s low-impedance limitation.

“The KST-150 has four MOSFET output devices per channel. MOSFETs are self-protecting. That is, they are self-limiting. As they become very warm, the gain goes down and their electrical characteristics become unfavorable.”

I CONFIRMED THE KST-150’S CHARACTER: OPEN, AIRY, TRANSPARENT, HARMONICALLY RIGHT...AND FAST.

What might make the MOSFETs become warm? Trying to drive very-low-impedance speaker loads, especially at low frequencies. The B&K ST-140 used just a single pair of MOSFET devices per channel. Had Steve given any thought to doing that with the KST-150 and reducing the amplifier power?

“I feel that two pair per channel is optimum, but no more. As you add to the number of output transistors, you slow down the output stage, because the driver stage has to contend with delivering more current. The output devices also have an associated capacitance, which has to be charged and discharged by the driver stage.

“I think it was you, Sam, who coined the term *MOSFET mist*. I found that this mist, or fog, is, in fact, their capacitive load. By minimizing the number of output devices, it’s possible to avoid the encouragement of MOSFET mist—transient distortion, if you will—due to the loading of the driver stage.

“But, yes, to answer your question, I did try a single pair of MOSFETs per channel. I found that when I added an extra pair, took the power up, and doubled the current delivery, I didn’t lose any sonic performance.

“When I went to six MOSFET devices per channel, that’s when the capacitive load and the current requirements of the output devices started to overtax the driver stage. If I try beefing up the driver stage, the additional components compromise the transparency of the circuit.”

So, yes, less is more. And some amplifiers are dragged down by their own weight, as it were—made slower, less transparent, less agile.

As for the KST-150’s ability to drive low-impedance loads, Steve had this to say: “It’s related to the self-limiting nature of MOSFETs and the fact that there are two pair of MOSFET output devices per channel.”

Does the amp crap out below 3 ohms?

“It doesn’t fail, if that’s what you mean. But performance does degrade.”

It’s a tradeoff: speed, transparency, and economy *vs* the ability to deal with loudspeaker loads that probably shouldn’t be foisted on the public in the first place.

I also asked Steve about balanced designs. According to him, a balanced design is the cat’s meow only if it truly is a fully symmetrical, mirror-imaged design. Unfortunately, such a design just about doubles the parts count and build cost. Many designs purported to be balanced ain’t, Steve pointed out. In any event, if you’re looking for a quiet amplifier, the KST-150 fills the bill. Which would you rather pay, \$5000 or \$3000?

How universal is the KST-150?

It’s not confined to Quads, that’s for sure. I whisked the KST-150 down to our living room, where the Triangle Comete Anniversaire and the new Verity Audio Rienze loudspeakers are set up. It was an easy schlep—the Luminance weighs only 33 lbs. It’s not some audiophile monstrosity that’s so heavy you can’t lift it.

I confirmed the KST-150’s character: open, airy, transparent, harmonically right...and fast. As for bone-crushing bass, not quite (hardly an issue with the minimonitor Triangles). One thing for sure: with the Rienzi speakers, the bass was tight, taut, fast. The Luminance just didn’t hammer out current from hell. If it had, it wouldn’t have sounded half as good.

A monoblock version of the KST-150, rated to deliver 400W into 8 ohms, should be ready by the time you read this. It’s a bridged version of the stereo amp: you could buy one KST-150 and add a second one later. The modification has to be done at the factory. A preamp is set to follow; but, as Steve Keiser well knows, a preamp is even more difficult to design than a power amp because you’re working with signals of much lower level.

Luminance dealers are few. Seek one out. Try to hear the KST-150. It pumps out more than enough power for most speakers, there are no expensive tubes to replace, and it costs \$3000. It deserves to be listed in Class A of “Recommended Components.” If the KST-150 sold for \$18k instead of \$3k, hosannas of praise would be raining down from all sides. ■