

Uncle Eric's Deluxe SE SV811 Amplifier Project

by Eric Barbour

1. The Sales

Everyone is entitled to their opinions. And most of you have strong ones, if you're reading this magazine. It seems that nothing creates a strong opinion quite as strongly as inferior products. A pity, isn't it, that crap seems to have commercial value? Advertising and promotion (and legal threats to publishers) have more sheer power than truth.

What does this have to do with building a single-ended amplifier? Well, it's a little problem with getting the right parts. To do this properly, we need tubes with inherent low distortion, an output transformer that has wide frequency response and low distortion with unbalanced DC in the primary, a basic power supply with low AC ripple, and not much else. Unfortunately, the important three things are often botched up by the manufacturers.

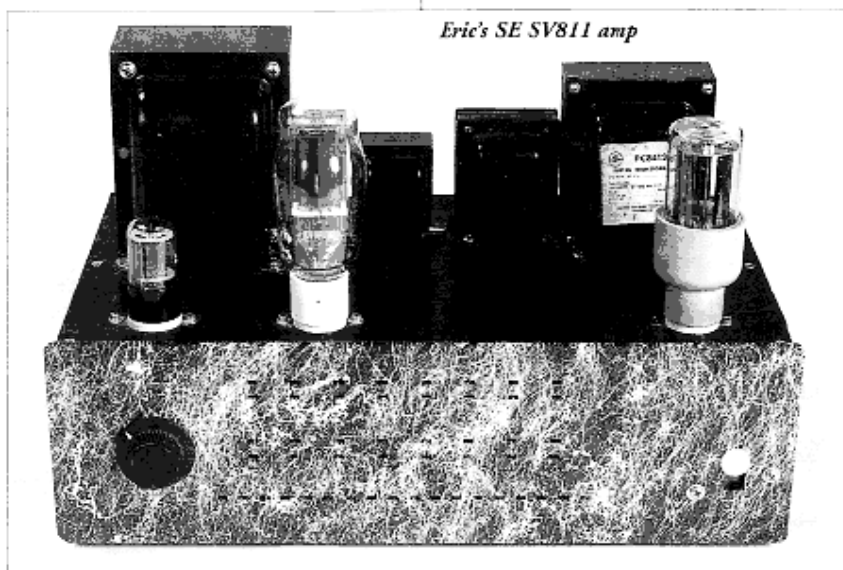
You, the consumers, are passive. So, anyone who makes bizarre or optimistic claims for their audio products will usually make some money if they are aggressive in promoting themselves. The most recent audio trend is single-ended amplifiers using a 300B tube, a mediocre driver stage and output transformers of varying quality. All these things were available a few years ago, but now they are legit-

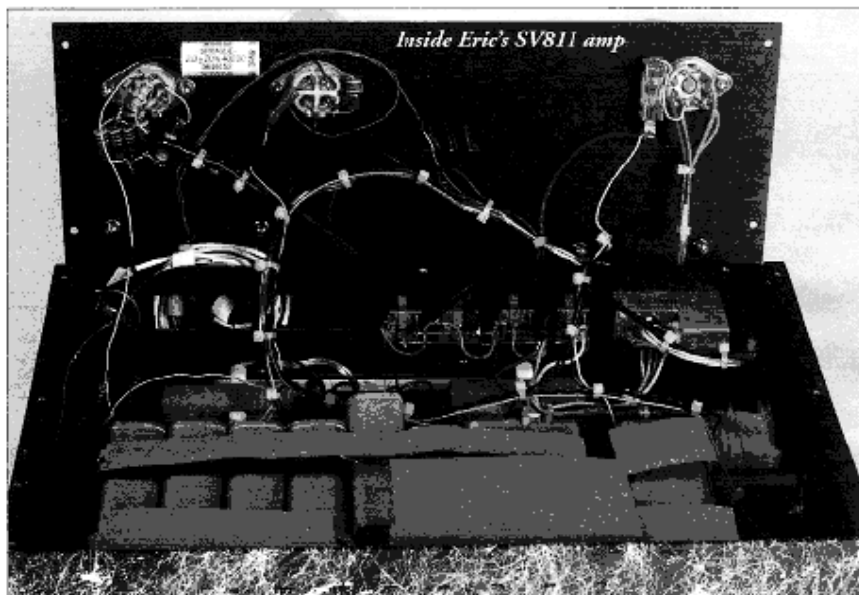
imized by advertising hype and specialty audio publications. And since most people are passive, some of them can be induced to buy these inferior gadgets at inflated prices.

First the 300B. It's a pretty good little triode, at least in the original Western Electric form (recent import versions are less than stellar). But it's delicate. You get 8 watts and no more. Distortion is low at 1-2 watts, but that's all you can expect. Yet the worshippers of the Church of 300B, technically unqualified as they are, assert the glory and holiness of it. Amazing, that some are willing to accept hype about this 1935 public-address amplifier tube. And woe betide you if you handle it roughly, or overdrive the grid, or put excess voltage or current into the plate. Thou shalt not exceed 450 volts, thou shalt not exceed 60 milliamperes, thou shalt not draw grid current by driving the grid positive.

It gets worse. Most of the driver stages I've seen are 1930s table radio ripoffs. The Church of 300B asserts the perfection of driving that dinky triode with the WE 310A pentode. It usually has fairly low distortion. It also isn't much of a driver. As far as I can tell, maybe one or two of these "boutique technicians" are actually qualified to design electronics, while the rest are eminently qualified to produce copycat or mediocre products.

And now we come to the output transformer, probably the most important item in the package. Aren't we lucky to have so many choices? I say hah. Some of them are actually suitable for SE





operation, and can produce good sound. This would include products by Audio Note, One Electron and Bartolucci. Some are OK but harsh-sounding. Other SE transformers bring to mind words like "flabby," "mushy," "lacking in treble" and "table-radio quality."

2. The Truth

Is it my turn yet? Good.

This article presents *MY* idea of a top-grade, 10-watt SE amplifier. This amp actually sounds good and is linear. It has the detail that audiophiles expect. It has

good speaker damping and clean bass, both difficult to get in SE without feedback. See the sidebar for our august publisher's take on the sound of this amp. This isn't the only way to build a good-sounding SE amp, but it's one of the simplest, and requires no obscure and high-priced tubes.

My circuit is an ultimate version of my SV811-10 amp in *Glass Audio* 3/96. In this case, I have carried it to the extreme. No parts list is given, for while the *GA* amp was intended as a beginner's project with reliability, this version is the ultimate clarity that you can get from an SV811-10, a tube that gets no respect because of its frequent misapplication.

If you want this, you are expected to be an expert builder, and a good scavenger after vintage parts. I am specifying old oil capacitors that are almost impossible to get. If you want them, you are on your own... nobody will sell them to you cheaply or easily. The same goes for the antique chokes in the power supply. All I can say is, hit the ham-radio flea markets and good luck. And also, substitute at your own risk.

3. Facts

300B? Thanks but no thanks. Because the SV811-10 is tougher, longer-lasting, can be operated with no bias circuitry at all, and gives distortion and sonic clarity which are the equal of the 300B. But you have to treat it right. Many have tried to use SV811 types, and have had problems with the need to drive the grid positive to get full power; the 4-amp filament; the plate resistance, which

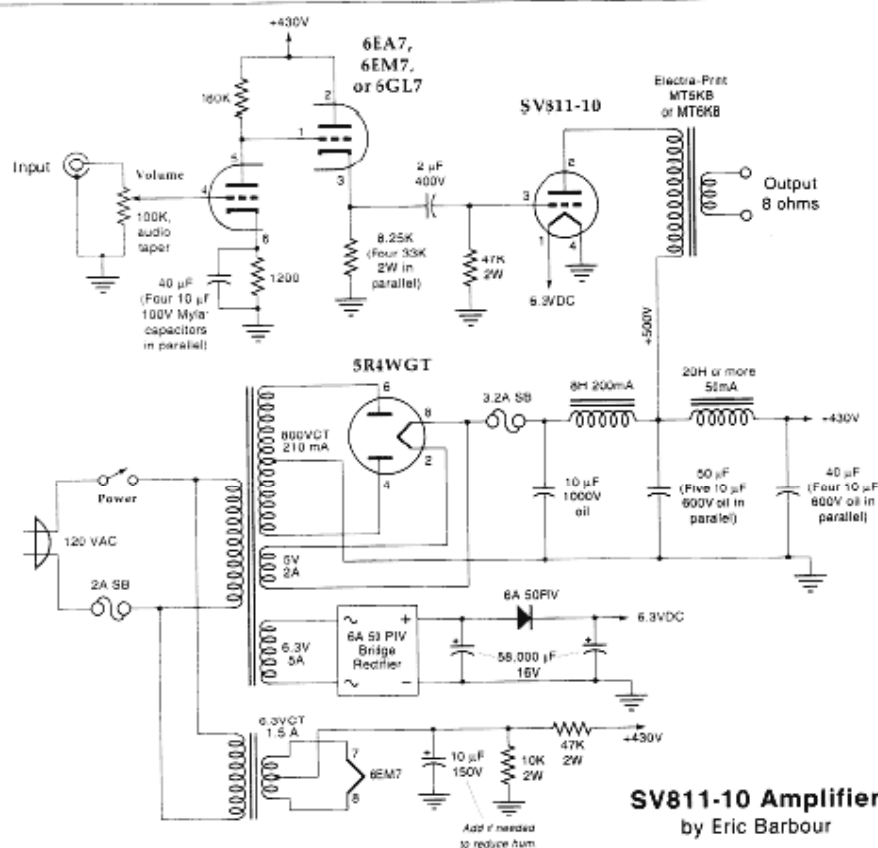
is admittedly three times that of the 300B.

One also gets tired of hearing them go on about the dangers of red spots on the plate of an SV811 type. Having been conditioned by small audio tubes failing due to bias trouble, they all seem to think that red on the plate is death. Sorry, the SV811s can run their full lifetime even with substantial red spots showing. As I said, the SV811-10 is tough. Drive is all-important for this tube. Since cathode followers seem to have an undeserved bad reputation, and they are also inexpensive to use, let's use them.

A perfect synergy for the SV811-10 is the 6EM7/EA7/GL7 dual triode. The first stage is a high- μ triode that is just like half a 6SL7, which is well-known to be a great-sounding tube. It provides most of the voltage gain. It is coupled directly to the other triode, which is a low- μ device somewhat like a 2A3 with a cathode. It provides a low output impedance to drive the SV811-10 grid properly. This tube's distortion is low, and cathode-follower operation gives degenerative feedback which yields even less distortion. The signal then passes through only one capacitor.

An interstage transformer would be even better, but really good ones (as good-sounding as the \$10 capacitor) are incredibly hard to find. I realize that a directly-coupled cathode follower is the best arrangement, but there have been quite a few embarrassing blowups in amps that use such drivers.





The capacitor-coupled design here is extremely reliable, and gives a full 10 watts peak with about 7 watts continuous with 2% distortion. In this circuit the SV811-10 is capable of 15 watts, so conservative ratings are being observed.

The SV811-10 has its grid at zero potential (actually a few volts below ground because of contact potential), so it draws about 100-120 mA on the plate. At this operating point, there is no color showing on the plate at all. Bias failure is not an issue, because the only thing that can go wrong is if the grid resistor or coupling capacitor goes totally bad. And that won't happen if parts selection is very conservative.

Then there is the output transformer. Having sampled some old types and many of the current "high end" products, I choose Electra-Print. The MT5KB or the MT6KB are clearly the way to go. It is my opinion that Electra-Print makes the best-sounding SE transformers in the world. They are *HUGE*, which equates to high saturation, which means great bass and low distortion. And treble is there in the right quantity. Even with 120 mA in its primary, the MT5KB is still just loafing. So that is what I used.

The One Electron UBT-2 used in the **GA** amp is very good, and gives fine sound on small 2-way speakers. But the high-priced ultimate is Electra-Print. End of discussion.

Keeping with the theme of synergistic simplicity, the power supply is micro-minimal and reliable. Oil-filled (or PCB-filled, possibly) filter capacitors are the norm. You need 10 of them. They are big, rectangular steel cans, so you will need a big, big box to hold them. Take my tip and don't use those oval jobs you find in surplus shops, they are meant for motor starting and don't sound as good as the rectangulars. Mine are old Cornell-Dubilier 121J series types, and I found a pile of NOS units at the notorious Black Hole in Los Alamos, NM. They may indeed be toxic waste, but *DAMN* they sound good. I used an ugly "potato-masher" 5R4WGB rectifier because it sounds good, is conservatively run here, and is far tougher than any other type.

For lowest hum, the 5V811-10 filament is run off a heavily-filtered DC supply. The 6EM7's filament is run off its own 6.3V transformer, which has its center-tap stood off ground about 100Vdc.

by the two resistors shown. This prevents the heater-cathode insulation from failing. There is no need to use DC on this tube, the hum is very low. The 6.3V windings are overrated for maximum lifetime, as are all of the components here.

4. Exit

You are entitled to think what you want about this. But the proof is in the listening. Having heard many SE transformers and quite a few SE amps, the editors of VTV feel that this homebrew black box is one of the best-sounding SEs that you will ever hear. If I have offended any of our readers, they are certainly welcome to write in (not phone) with their objections. Responsible and reasonable letters will be considered for publication.

Editor's Note

Mr. Barbour recently became Applications Engineer for Svetlana Electron Devices, marketer of the SV811-10. But he constructed this amp during the summer of 1995, long before Svetlana offered him employment. Similarly, this article was written before the employment offer, and has not been seen or approved by Svetlana management.

It is commonplace for audio publishers to print feature articles of this type, about designs the authors themselves manufacture and profit from.

Barbour is not profiting from the sales of transformers, nor does he sell copies of the amplifier described here. He simply is an employee of the company that imports and distributes one of the tubes used in the amp.

VTV listening impressions of Eric's SV811 amplifier.

By Charlie Kittleson

All of us at VTV have had the experience of listening to and evaluating various single-ended amplifiers, including those using 300Bs. We were very curious how the new Svetlana SV811-10 tube compared to the famous 300B using Eric's SE test amp and the Cary Audio SE-1 kit amp. Our listening group included Steve Parr, Don Petree, Terry Buddingh, John Atwood and myself. Speakers were either Klipsch Chorus 1s or B&W DM110s. Program material was CDs played on a modified Elite Electronics CD player plugged directly into the amp and not using a preamp.

We immediately noted that the SV811-10 was less colored than the 300B. Granted, the 300B has super mids, but the SV811-10 mids are every bit as good, especially on vocals. This is a well-balanced tube with musical highs and clean, powerful bass. The use of a thoriated tungsten filament emitting a bright yellow glow gives the SV811-10 that transmitting tube look and smooth, powerful sound. Also, there is lots of headroom with this tube, even when pushed. The 300B on the other hand, can sound mushy when pushed to equivalent volume levels.

Next we tried the Svetlana SV572-10, which is a direct plug in replacement for the SV811. It has a vintage transmitting tube look with a straight-sided glass envelope reminiscent of the early 1930s Sylvania and Taylor transmitting triodes. It sounded balanced and had tight bass. Overall sound was similar, but more refined than the SV811-10. The SV572 had a little better detail on the top-end.

Then we switched rectifiers. First trying the Chatham "Potato Masher" 5R4WGB, then a Chinese 5AR4 and finally a GE 5R4GA type. All of us agreed that the 5R4GA was cleaner, with better presence than the other rectifiers which seemed to be more rolled-off sounding.

These new Svetlana tubes seemed to do everything well if used in a properly designed circuit. They are a reliable and powerful alternative to other medium-sized audio triodes.