Svetlana

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How to Use Svetlana SV811 and SV572 Series Triodes

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The SV811 series and SV572 series triodes are powerful, reliable audio amplifiers, with very low distortion. They need to be applied in a different fashion from the typical audio triode, which this note will explain. Svetlana SV811/572 triodes are able to operate at higher plate dissipations than most audio triodes, and are able to operate in Class A2 or AB2 with no reliability problems or sonic penalties. These Svetlana triodes have high plate reisistances, requiring high-impedance output transformers for proper load matching. Their long-life thoriated filaments require more filament power than oxide-filament triodes such as 300B; and run hotter, thus requiring care in amplifier chassis layout for proper convection/radiation cooling. World-class performance can be obtained from SV811/572s, if certain design methodologies are followed.

1. Which triode should I use, and in what circuit?

For high-end audio amplifiers, any of the SV811 or SV572 series are suitable, depending on the design philosophy. In general, the SV811 series is suited to moderate-cost products, while the SV572 series is more expensive, can dissipate and deliver more power, and has lower distortion at low signal levels.

If a single-ended design is desired:

(A) for a high-end amplifier with minimal distortion and no negative feedback, the best course would involve using an SV811-3 with 800 volts plate voltage, or an SV572-3 with 1000V on the plate, in Class A1 operation. Figure 1 shows a driver circuit which is suitable for either triode in Class A1. This method of operation is very non-critical of its driver, and any driver circuit capable of

swinging at least 250 volts peak-to-peak will drive the triode to maximum Class A1 output.

(B) If moderate feedback is acceptable, the SV811-3, SV811-10, SV572-3 or SV572-10 may be used in the Class A2 circuit shown in Figure 2.

(C) For a very simple and reliable SE amplifier, the circuit in Figure 3 is suitable. Novice constructors are advised to try this circuit first, to develop skills, before attempting the other circuits.

For maximum power, push-pull operation is recommended as follows:

(A) If push-pull with low feedback is desired, the SV811-3, SV811-10, SV572-3 or SV572-10 are suitable. This would be Class AB2 operation. The SV811 types can be operated at Ep=800 volts maximum and will deliver about 75 watts, while the SV572 types can be operated at Ep=1000 volts and will give up to 150 watts.

(B) For pro-audio or industrial applications, the SV572-30 or SV572-160 can be used in Class AB2 or B. Typical circuit for this connection can be based on the Altec 1570 amplifier. The circuit may be used with Svetlana's 811A or 572B triodes; in which case the plate caps of the tubes need to be protected from users by a shield or cage.

2. If I want to design my own driver stage, are there some guidelines to follow?

For Class A1 operation of SV811-3s or SV572-3s, the circuit need only swing about 250V peak-to-peak with low distortion, as noted above; so the driver design is relatively simple. If Class A2 or AB2 operation is desired, a low-impedance cathode follower is recommended. Either direct coupling or capacitor coupling is acceptable, although the best possible drive will be had with a direct-coupled follower. The pentode in the Svetlana 6BM8 is suitable, as are low-mu triodes with indirect heating, such as 6AS7, 6CG7/6FQ7, 6SN7, 6BL7, 6BX7 or similar. Alternatively, an interstage driver transformer may be used. It needs to be high-fidelity grade, which limits the selection. The types intended for modulator drivers or antique-radio use are not recommended.

3. Which output transformer is suitable?

Table 1 gives a listing of single-ended transformers suitable for use with SV811 series or SV572 series triodes. Note the recommended types for each transformer. Since there is no hard-and-fast rule on the proper plate load for a triode, the recommendations given here are conservative, reasonable, and are known to give good performance. Also see Table 2 for loose recommendations on the plate loading for each triode type. Maximum power output is obtained when the load impedance is equal to the plate resistance of the tube, although at the cost of greater distortion. A good compromise between output power and distortion (and the typical one for older triode types) is had when the plate load is about 2 to 3 times the plate resistance. The figures in Table 2 are based on this rule, except for the high-mu tubes, which are typically operated with the loads shown, plus 20 dB or more of negative feedback. Ultimately, the choice of which transformer to use must be left to the circuit designer, which may require

experimentation and listening tests (especially for a high-end amplifier with little or no negative feedback). 4. How should the tubes be laid out on the chassis?

Because of the hotter filament and higher plate dissipation, the SV811/SV572 series triodes will run hotter than lower-power audio tubes. So it is recommended that they be spaced well away from heat-sensitive components, such as output transformers and filter capacitors (whether electrolytic, film or oil-filled). If electrolytic filters are used, it would be safest to install them underneath the chassis top deck to prevent any radiated heat from striking them. A study may have to be made to insure that components near the tubes are not being raised past their rated temperature rise. As a rough guide for the home constructor, keep the tubes at least 4" from any other components and from each other.

5. These tubes show orange color on their plates in operation. Is this acceptable?

Yes. The SV811 types can show small orange spots continuously without any loss in lifetime or danger of failure. The SV572 types have graphite plates, and are designed to run with their plates glowing dull orange all over. SV572s are extremely rugged and will not fail if operated at 25 degreesC ambient temperature within their rated plate dissipations. Their gettering REQUIRES that their plates show some color for full gas-absorbing effectiveness. Unlike receiving tubes, the Svetlana SV811 and SV572 series triodes are designed to run hot, and they work better when run hot.

Table 1: Single-Ended Output Transformers Suitable for SV811/SV572 Families

(listed in alphabetical order-unless specified, either the SV811 or SV572 triode with that mu rating may be used with the listed output transformer.)

Model	Plate Load	Best Application
Audio Electronic Supply OPT-126	8k ohms	one -3, -10 or SV572-30
Audio Electronic Supply OPT-127	12k ohms	one -3, -10 , -30 or SV572-160
Audio Note 5KPSE 75W	5k ohms	one -3 or -10
Audio Note 10KSE 30W	10k ohms	one -3, -10 or SV572-30
Audio Note 10KSE 50W	10k ohms	one -3, -10 or SV572-30
Bartolucci 7.8K 15W	7.8k ohms	one -3, -10 or SV572-30
Bartolucci 10K 30W	10k ohms	one -3, -10 or SV572-30
Electra-Print E18B	6.2k ohms	one -3 or -10
Electra-Print E48B	1.8k ohms	three or four -3 in parallel
Electra-Print MT5KB	5k ohms	one -3 or -10
Electra-Print MT6KB	6k ohms	one -3, -10 or SV572-30
Electra-Print FT4KB	4k ohms	one SV572-3

Hammond 1628SE	5k ohms	one -3 or -10
Hammond 1629SE	6.5k ohms	one -3, -10 or SV572-30
Hammond 1640S	1.25K ohms	three or four -3 in parallel
One Electron UBT-2	4.8k ohms	one -3 or -10
One Electron UBT-1	1650 ohms	three -3 in parallel
Tango FW-150-10SR	10k ohms	one -3, -10 or SV572-30

Table 2: Recommended Plate Loading for Svetlana Glass Triodes in Audio Service

(shown is for single-ended Class A--typical loading would be twice this ormore, plate-to-plate)

SV811-3	4.5k to 12k ohms
SV811-10	5k to 12k
SV572-3	4k to 12k
SV572-10	5k to 12k
SV572-30	6k to 20k (negative feedback recommended)
SV572-160	6k to 30k (negative feedback recommended)
811A	6k to 30k (negative feedback recommended)
572B	6k to 30k (negative feedback recommended)