

SV83

TECHNICAL BULLETIN

Using the SV83 in EL84 Amplifiers

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The Svetlana SV83 is a 12-watt power pentode which is well-suited for audio use, in either guitar amps or in high-fidelity equipment. Its original design, intended for high-accuracy video amplification, gives the SV83 high transconductance and very high linearity. The SV83 may be used in any EL84 or 6BQ5 circuit, provided that some changes are made as described below, in items 1 thru 4.



1. There is a small difference in the pinout of the SV83 versus the EL84. SV83s may not have their suppressor grid connected to the cathode internally. To insure the usability of all SV83s in an EL84 socket, do the following:

a) Insure that pins 1 and 6 of each SV83 socket are NOT connected to any circuitry, nor used as a tie point for components.

b) On each SV83 socket, connect pin 6 to pin 3, using a short wire jumper. Be sure the wire does not touch any other circuitry.

(Note: there is an issue with the pinout of SOME EL84s versus the SV83. See item 4 below.)

2. The SV83's screen grid (pin 9) is not able to accept an operating voltage of more than 200v DC. Because nearly all EL84 amps operate their screen grids at or near the plate voltage (in pentode, ultralinear or triode connection), the amplifier must be modified to provide a lower voltage to the SV83 screen grids. If triode connection is desired, the plate supply voltage must be limited to 200v DC. For higher plate voltages, any of the following circuits will work:

a) Figure 1 is probably the lowest-cost method of deriving a screen voltage. This works adequately for most guitar amps and some vintage hi-fi amps. The screen voltage can "sag" when full power is reached, although this may not be an issue, especially in a guitar amp. A major advantage of this scheme is that the resistive divider also acts to discharge the power-supply filter capacitors when power is turned off. This circuit may be used with a single SV83 or one pair of SV83s. It adds about 15-20 mA of current drain to the plate supply, which must be allowed for in the power transformer.

b) Figure 2 is the best solution for high-end audio design. The zener diodes are a low-cost option which offer good regulation and good stability. The types shown are rated for 1 watt dissipation and are operated conservatively here. A filter capacitor may be paralleled across them to assist regulation if desired. Using the 0A2 gas regulator tube is a possible all-tube technique to achieve the same result. Although 0A2s are out of production, they are long-lasting and readily available in bulk quantities as NOS. Gas tubes can NOT be used with a parallel capacitor larger than 0.1 uF, as zeners can. The choice of which regulation method to use is up to the designer. This circuit may be used with any number of SV83s up to a quad.

3. Bias adjustment may be necessary to obtain the same plate current with SV83s as with EL84s. Typically the SV83 will require about 1-5v less negative grid voltage than EL84s for the same idle point, due to the higher

transconductance and sensitivity of the SV83. If cathode bias is used in the amp, the cathode resistor may be decreased in value about 20%. The designer is urged to equip the amplifier with SV83 and try it without bias adjustments, as the resulting bias value may be acceptable. No modifications to driver circuits are required.

4. An amp which is modified to accept SV83s can be made back-compatible with EL84 types. First, a switch must be provided to DISCONNECT pin 6 from pin 3. (This is necessary because SOME EL84 and 7189 types have internal connections to pins 1 and/or 6. Many EL84s do not. This can cause some confusion.) Second, the idling plate current of the EL84 will be lower in the SV83-modified circuit. The switch above may use a second pole, which can be equipped to switch in different cathode-bias resistors. The switch can then be set to allow proper operation with SV83s or EL84s.

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[**Figure 1**](#)

[**Figure 2**](#)

** The information provided in this application note is intended for general design guidance only. The circuits have been tested and are known to function properly and sound good, except as noted. The user assumes all responsibility for the correct and safe operation of these circuits. Svetlana Electron Devices does not guarantee or certify that these circuit designs will satisfy the user's requirements.