12BY7A DRIVER TUBE

The short-lived final driver:

This discussion provided by Jim, K9AXN.

There is a story to be told about that tube not only in the SR-400 but any radio that uses it to drive the various finals i.e., 6146, 6HF5, 6KD6, 6DQ5, 8122, etc.

That 12BY7A is run hard and put away wet in most if not all of these radios. The data sheets will clearly suggest to the designer that a 4700-ohm screen resistor is appropriate and if all of the 12BY7A tubes were anywhere near alike, this would be so.

Problem is the data sheets are like speed limit signs SIMPLY ESTIMATES.
You can take 10 tubes from each vendor, insert them and measure the screen current with a 4700 ohm screen resistor and find the screen current to vary from 5 to 12 ma. I believe the absolute max is 6ma. Change that resistor to 6K and it will be ok. You won't lose a bit of drive or stability. If you leave the 4700 ohm resistor in place, you will have to hand select the 12BY7A.

Follow up discussion by Walt, WDØGOF

The screen current has always been an issue with the 12BY7A used as drivers in amateur radio transmitters. Hallicrafters bought the tubes in bulk to very tight specifications. Today we do not have that option. This condition is exasperated by the higher voltages delivered by power supplies driven by higher primary AC line voltages.
The cure for this problem in the SR series is simple.

***For the SR 150** measure the voltage drop across R108 and calculate the current flowing through it. Measure the voltage across R109 and calculate the current flowing through it. If you subtract the R109 current from the R108 current you are left with the screen current.*

***For the SR 160/500** measure the voltage drop across R93and calculate the current flowing through it. Measure the voltage across R91 and calculate the current flowing through it. If you subtract the R91 current from the R93 current you are left with the screen current.*

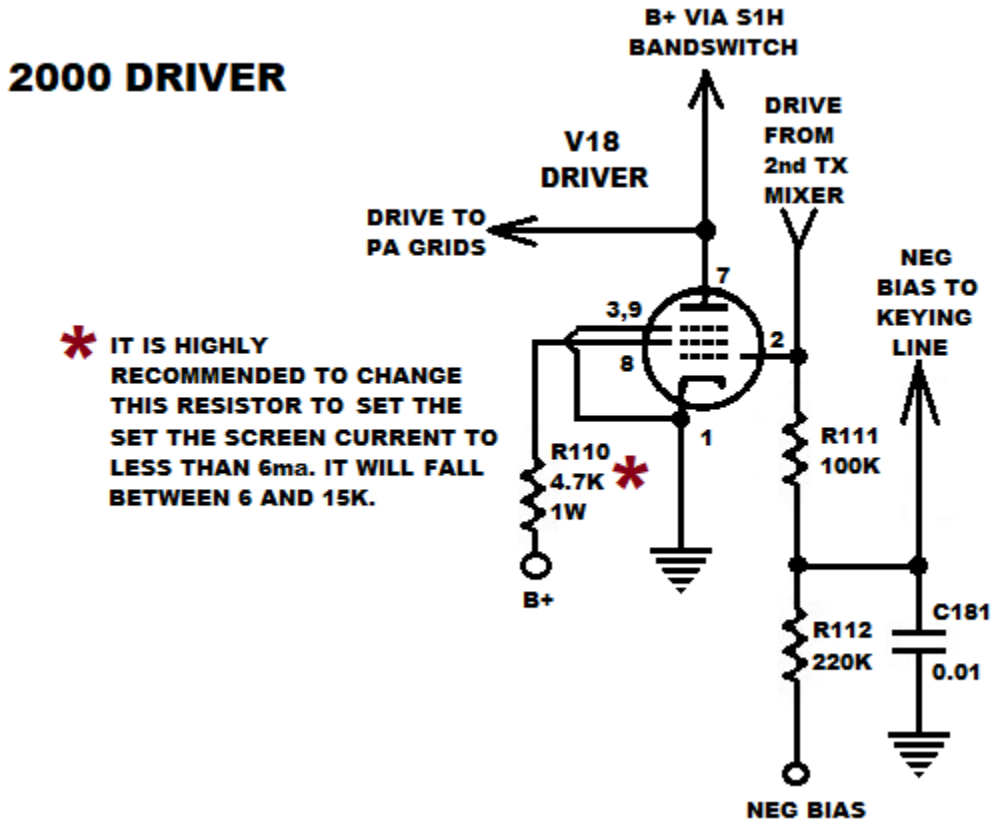
***For the SR-400 and SR-2000** measure the voltage drop across the screen resistor and calculate the screen current.*

***NOW**. If the screen current is less than 6 milliamps then you are good. In most cases the screen resistors needs to be increased to 6.2K. With the screen resistor (R93, R108, or R110) at 6.2k a majority of old used and NOS 12BY7A will functioned properly in the radio.*

***FINALLY**. The absolute max screen voltage is 190vdc. In some cases, with high AC line voltages the B+ will be greater than 300 vdc. In this case the screen resistor may need to be increased to as much as 15k to get the current below 6ma and the voltage below 190vdc.*

EXAMPLE USING THE SR-2000

Although this example uses the SR-2000, the process is the same no matter where the 12BY7A is used.



The goal, when adjusting the value of R110, the screen resistor is, to get the screen current below 6ma and the screen voltage below 190vdc. For first run calculations use 190vdc and 0.005ma. in the chart below. The calculation will get close, but differences in tube characteristics will cause variations. The B+ measurement is taken in transmit mode with the transmitter tuned to max power out.

V1 MEASURED B+	**V2** (**V1**) – (190vdc)	**R110** (**V2**)/(O.OO5)

In other systems like the SR-150 and the SR-500, where voltage dividers are used to set the screen voltage the calculation will be more complicated. However, the goal is the same; The screen voltage must be below 190 and the screen current must be below 6ma.