Tweaking the AGC Time Constant of the Kenwood TS-700A

by Chris Fagas, WB2VVV

The Kenwood TS-700A is a very high quality multi-mode two meter transceiver. It was made circa 1977, when much higher regard for mechanical design was apparent in rigs. In fact, the TS-700A is reminiscent of the mechanical qualities of the venerable Collins S-Line. It has a velvet smooth geared VFO and a flip-up top cover to access several internal adjustments.

Being a strictly analog receiver, the TS-700A has excellent Blocking Dynamic Range, Third Order IMD Dynamic Range, and very low oscillator phase noise. In contests, band openings, and other crowded band conditions, the TS-700A is about as crunch-proof a multi-mode transceiver as is available. It is the first transceiver to compare favorably with my personal favorite multi-mode transceiver, the Yaesu FT-726R, when it comes to the tough task of hearing a weak signal in between loud signals.

The sensitivity of the TS-700A is less than average, but since **all serious weak signal work should utilize an external low noise preamplifier** this is not an important point. To be sure, this low sensitivity might be considered a good point. Preferably, the external low noise preamplifier will be mast-mounted near the antenna for high performance with respect to system noise figure, and be also capable of operation well within its linear range at your location. If your location will present the low noise preamplifier with strong enough signals, then it might be driven beyond its linear range and into compression, where Intermodulation Products of

considerable amplitude will start to be generated, and will detract from system performance. Generally speaking, low noise preamplifiers with the most impressive noise figure performance (preamplifiers which barely degrade the signal to noise ratio of amplified signals by adding very little of their own noise) are not those with the highest compression points. As you would also expect, those with the most impressive strong signal handling performance (only driven into compression by extremely strong signals) are not those with the lowest noise figure. Therefore a tradeoff between lowest noise and strongest signal handling capability exists, and only you can determine what is the right compromise for your location. Additionally, some low noise preamplifiers incorporate substantial filtering which will reduce the level of out-of-band signals passed on to the receiver. In cases where strong out-of-band signals are at least part of the problem, this is an important consideration. The low sensitivity of the TS-700A is perfect for use behind a 20 or dB gain low noise preamplifier, so the TS-700A is actually less likely to be overloaded by the addition of the preamplifier than most more modern, and more sensitive, multi-mode transceivers.

In using the TS-700A to monitor USB signals in crowded band conditions I noticed that its AGC time constant was too slow. A short burst of noise from SSB splatter would reduce the receiver's gain long enough to obfuscate part of a transmission from a weak station. However, this was not a problem with the mode control set to CW. Apparently, the designers saw fit to set the SSB AGC time constant for casual SSB operation such as rag-chewing. This is clearly a problem for more demanding SSB operation in crowded band conditions. In order to have the best of both worlds, the following modification allows variable AGC time constant in SSB mode.

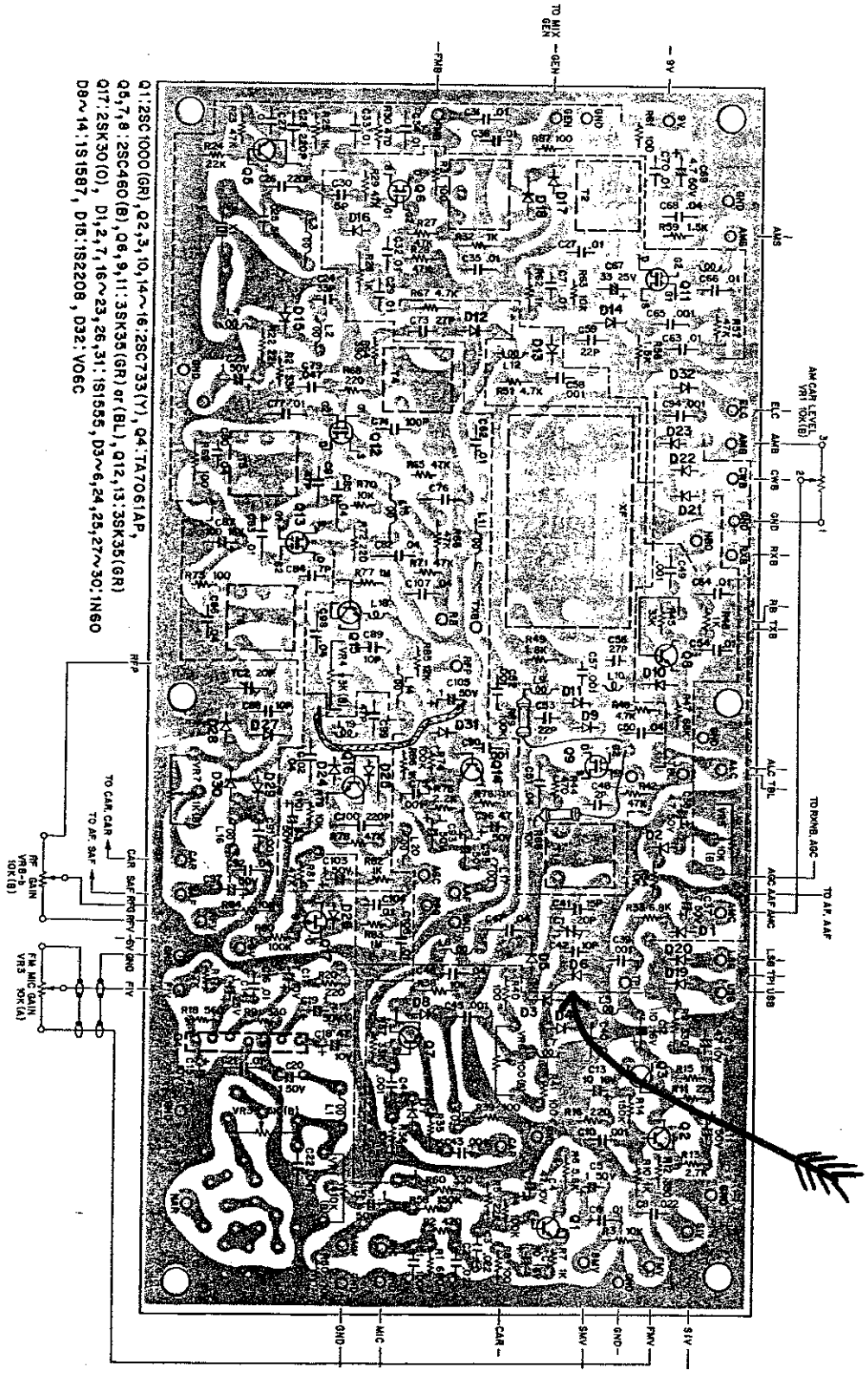
A 100 K ohm potentiometer installed on a small bracket under the flip-up top cover can be easily accessed for SSB AGC time constant adjustment, without making any new holes in this vintage transceiver's cabinet. A twisted pair of shielded wires should be soldered to both one end, and to the wiper of the potentiometer. The shield should be soldered to chassis ground near the potentiometer. I soldered the shield to the shell of the RCA connector for the internal speaker, and attached the potentiometer bracket to the rear of the VFO can with a self-stick foam adhesive square. Run the shielded pair of wires past the AF/RF Gain Control, through the space

between the various front panel controls and the chassis shield separation behind the front panel controls. Remove the bottom cover from the transceiver and route the shielded pair of wires back over the SSB Generator Board. As you look at the bottom of the transceiver with its front panel facing you, this is the board on the left with the large Blue and Silver SSB Crystal Filter. Find the orange jumper wire that runs from left to right, near D19 on the left, to near R81 on the right. Cut the jumper in the middle, and strip back ¼" of the insulation from each half. Slip a small piece of heat shrink tubing over each half of the jumper. Now solder one of the shielded pair of wires to each half of the jumper. Slip the heat shrink tubing back over the solder joint and gently apply heat to hold it in place. You have now inserted the 100 K ohm pot into this orange jumper, allowing you to place from zero to 100 K ohms into this line. Solder the shield to chassis ground on the SSB Generator Board. I soldered the shield to the "GND" post at the front left corner of the board (front panel facing you).

You can now adjust the SSB AGC time constant from as slow as it was before, to lightning fast, and anywhere in between! Good luck using this fine multi-mode transceiver, and enjoying the mechanical perfection of a bygone era.

PC BOARD

▼ GENERATOR unit (X52-1080-21)



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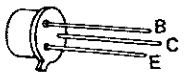

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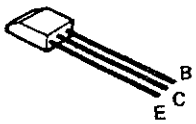

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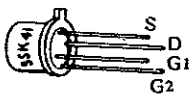

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KENWOOD TS-700A