

IC-7300 Antenna tuner range modification by SP9SOY

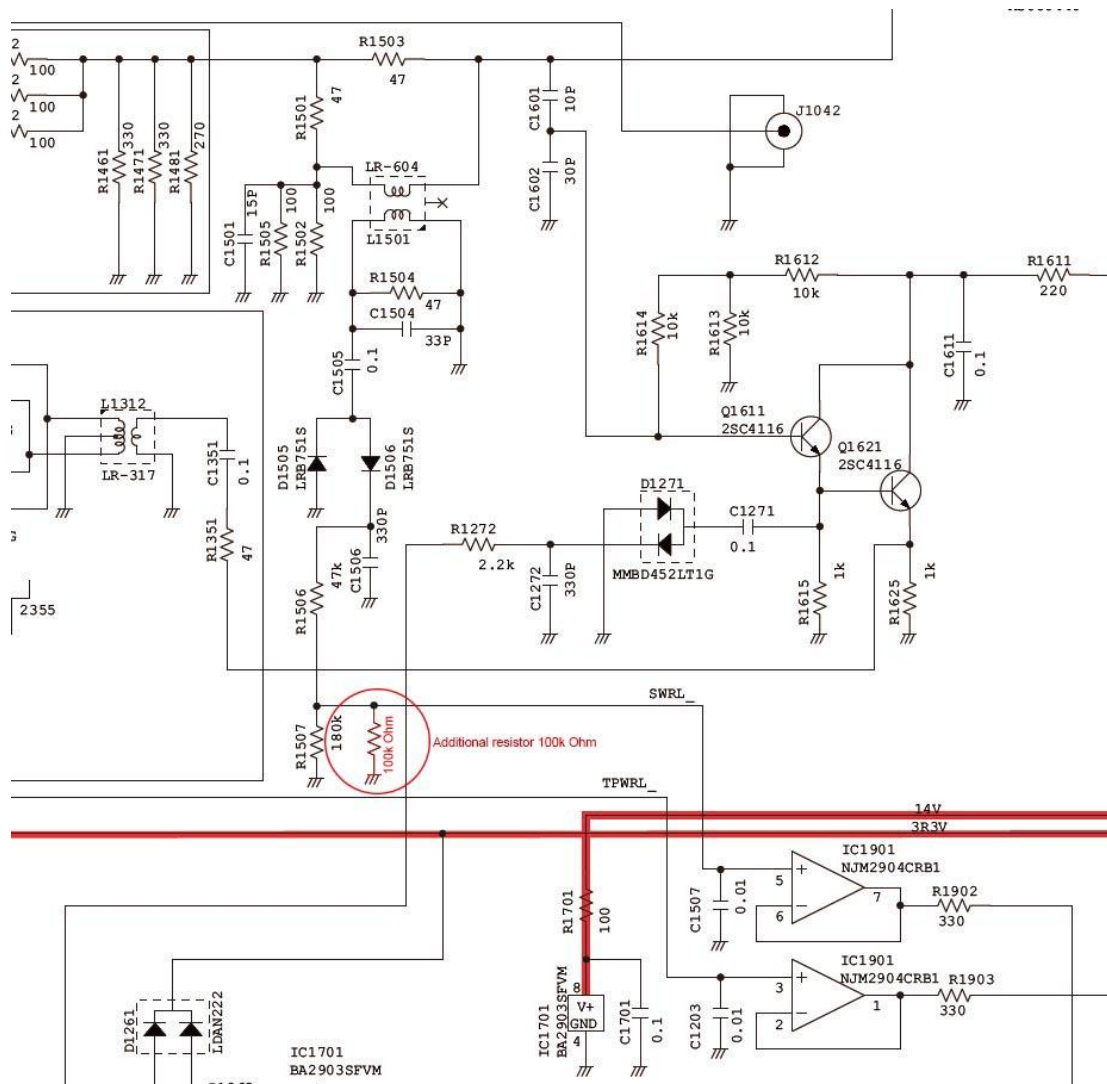
Icom's IC-7300 is an awesome rig, but unfortunately the impedance range that the built-in antenna tuner can match is rather narrow (comparing to other Icom radios).

Hopefully this is easy to change, i.e. make the tuner less restrictive regarding the antenna impedance.

This modification consists of making the SWR detection circuit in the TUNER UNIT slightly less sensible. This modification DOES NOT affect the main SWR detection circuit on the PA unit that is responsible for measuring the SWR, protecting the Mosfets, and displaying the SWR value on the screen. Thus, the SWR reading (SWR that the PA "sees" at its output) remains unchanged. The PA protection circuit also still obtains the true SWR values and controls the power when SWR (at the PA output) rises too high. **Only the secondary SWR detection circuit on the TUNER unit, used only for the antenna tuner operation, is being altered.**

After this mod the tuner range of operation is much more broader (many of non-resonant antennae can be easily matched), and full potential of the transceiver can be used. As said before, SWR reading on the IC-7300's screen remains correct and unchanged.

This modification consists of adding a 100k Ohm resistor along with the R1507 resistor on the TUNER unit. This can be a standard THT resistor or a smaller SMD version. One lead has to be soldered to the R1507's hot lead (or R1506's lead, as they are connected) and the other to a nearest ground point (remove a fragment of the solder mask to get the raw copper surface and solder down). Photos below show both options.



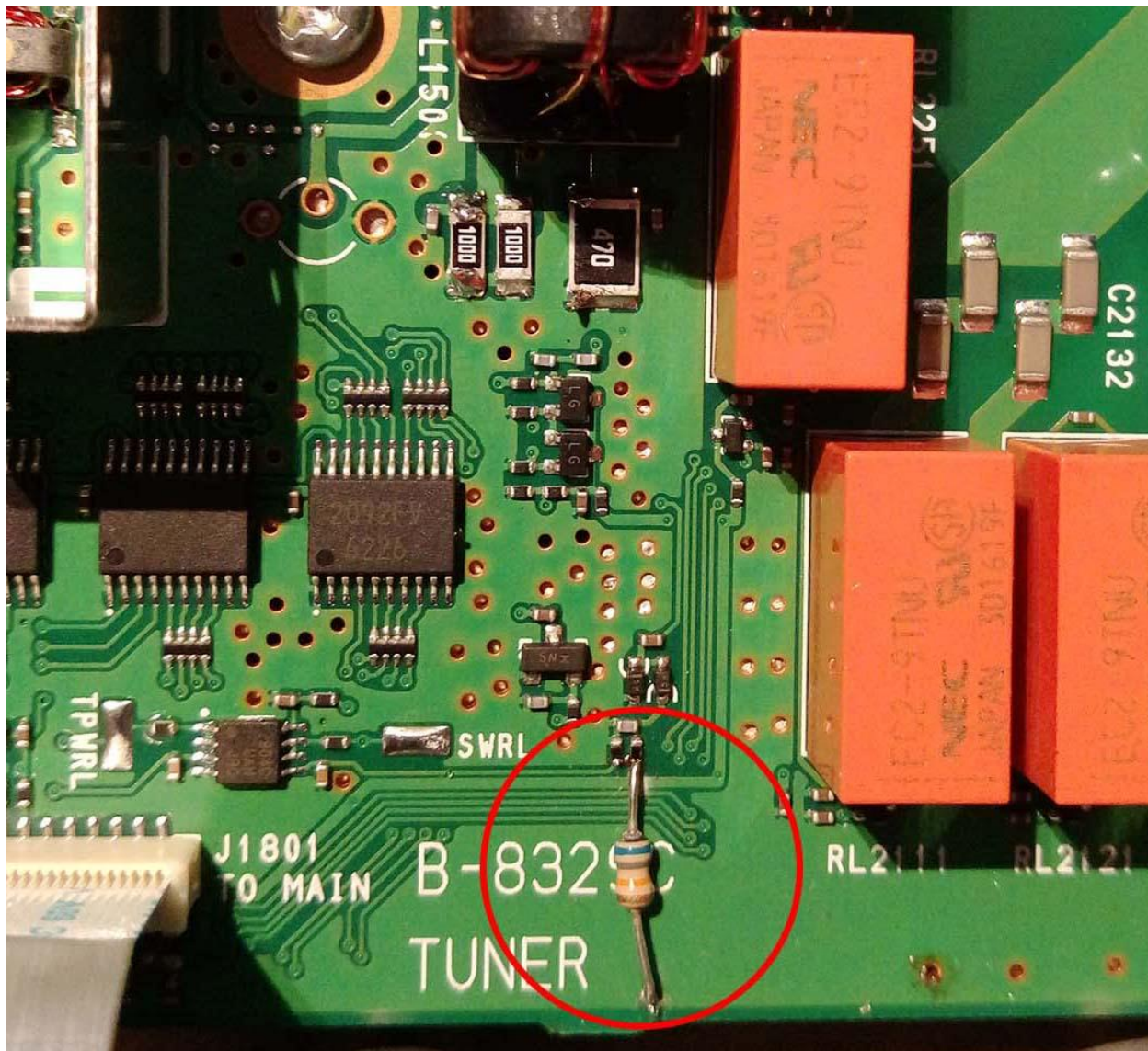
The best - experimentally found - value of the additional resistor is 100k Ohm. This value provides the practical matching range approx. SWR 1:6 (antenna impedance 8 to 300 ohm), that is much broader than originally.

More about the additional resistor's value: with a 68k Ohm (or 75k Ohm) resistor we get an even wider, huge matching range of approx. SWR 1:10 (antenna impedance 5 to 500 ohm) or more. But this is a less safe option because higher voltages can appear on the ATU's components. Mismatched antennae will be perfectly matched but we must reduce power to avoid fail of ATU's parts. Thus, using the tuner with an additional 68k Ohm resistor and mismatched antennae would be similar to using the "Emergency mode" offered by IC-7300 (wider matching range, reduced power). This option is useful for QRP work with random wire antennae.

Summarizing, adding a **100k Ohm** resistor is a more conservative and safe option, especially if you intend to work full power. **Therefore this is the recommended option.**

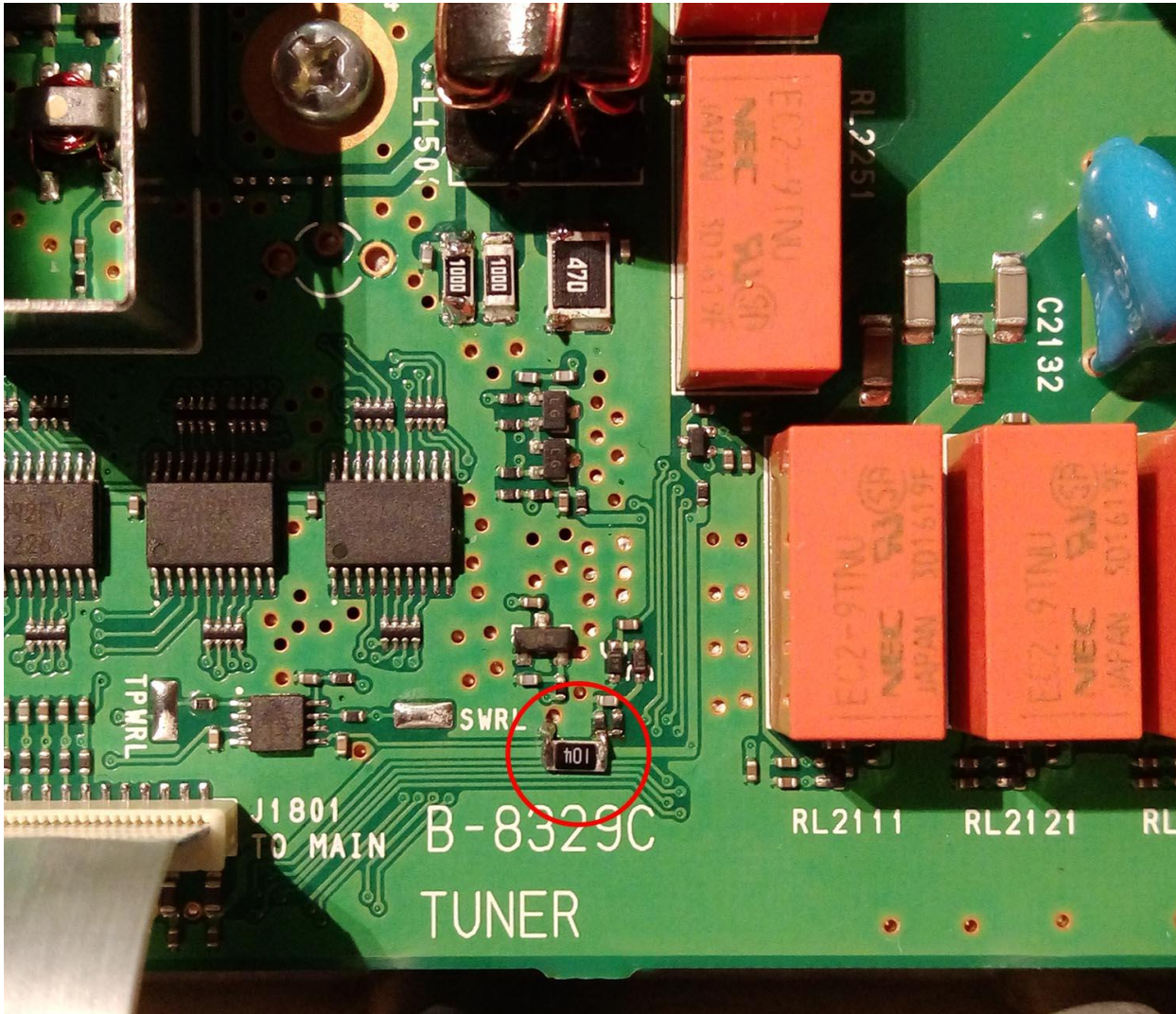
MODIFICATION USING A THT RESISTOR:

(here a 68k Ohm THT resistor shown)



MODIFICATION USING AN SMD RESISTOR

(100k Ohm SMD resistor - this is a larger 1206 type, but a 0806 would be even better):



To do this mod, you have to remove the bottom cover of the radio and locate the resistor R1507 on the TUNER UNIT. It is above the "TUNER" inscription in the middle of the PCB. A soldering iron for SMD parts with a fine tip is needed to solder precisely to the resistor's lead. Take all the safety and EMC protection measures during the SMD soldering.

Good luck and enjoy a more versatile operation of the antenna tuner!

73, Alex SP9SOY

Feedback welcome, e-mail: sp9soy@interia.pl

WARNING and DISCALIMER! I do not take any responsibility for the effects of this mod. It works perfectly in my radio, and several other modified, but remember you make it entirely on your own responsibility.