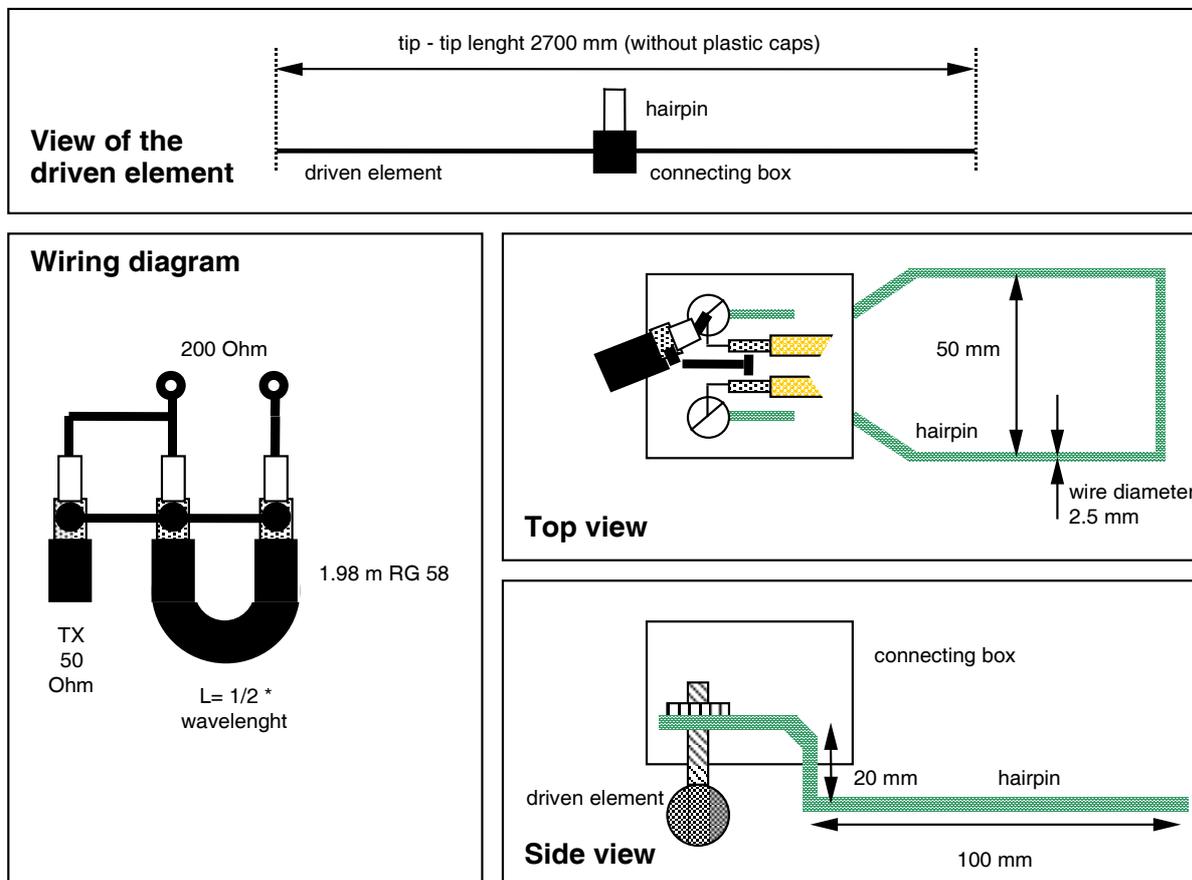


# Hairpin match for the 5 ele Tonna for 50 MHz

How to improve the gain of your 5 element Tonna yagi for 50 MHz with roughly **3 dB!**



## By PA2S (ex PA2HJS)

The original antenna uses a hairpin type of feed to match it to 50 Ohms. The (asymmetrical) coax is connected directly to the driven element, without any matching network to match the symmetrical dipole to the asymmetrical coax. The result is that the coax cable which feeds the antenna radiates a part of the energy instead of putting it into the aerial. Measurements showed that the gain of the original antenna was about 3 dB short of the computer calculated gain.

By changing the impedance of the driven element to 200 Ohms, it is possible to use a 1:4 halfwave balun to match the antenna properly and to make sure that the symmetry is also properly taken care of. A second measurement, taken after the modification, confirmed that there was a marked improvement and the gain is now in the magnitude of the calculated figure of 7 dB referred to a dipole (dBd). The hairpin feed was computer modelled for optimum performance (TNX PA2VST for the calculation).

The modified Tonna was used for HBo/PA3EUI (1991) and GU/PA2HJS (1992) and worked FB.

Here are the steps to take:

1. Remove the hairpin parallel to the driven element.
2. Drill holes in the bottom of the connecting box for the hairpin and the RG58 balun coax, at the side opposite to the one where the feeder coax comes in.
3. Make a hairpin from 2.5 mm thick copper wire with the dimensions as shown on the above drawing, leaving the ends straight to be able to pass them through the two holes. Bend the ends to a round shape to be able to mount the hairpin under the nuts where the feeder coax used to be fixed with.
4. Make a RG58 balun of 1.98 m length and fix it along the boom of the antenna. I soldered the inner conductors on the hairpin wires after they were fixed. Use a thick wire (the RG58 coax braid will do fine) to connect the coax grounds
5. Shorten the driven element to a length of about 2750 mm (tip-tip!)
6. Put the antenna on a pole, broom-stick or whatever convenient means and point it **upward** (to the sky) whilst keeping it roughly one or two metres from the ground to make sure that the reflector is not detuned. If you are able to mount the antenna at the final position in your mast and tune it there then do so (In most cases this is very time consuming).
7. After putting things together you should have a reasonable match. If not, check the complete system.
8. The antenna should be tuned by shortening the length of the driven element. With my aerial it tuned at the length of 2700 mm with a VSWR of 1:1 at 50.100 MHz. It matches well between 50.0 and 50.5 MHz.

If in doubt, do not hesitate to contact me.

73,

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