

Elecraft K2 - Low Power on 10m

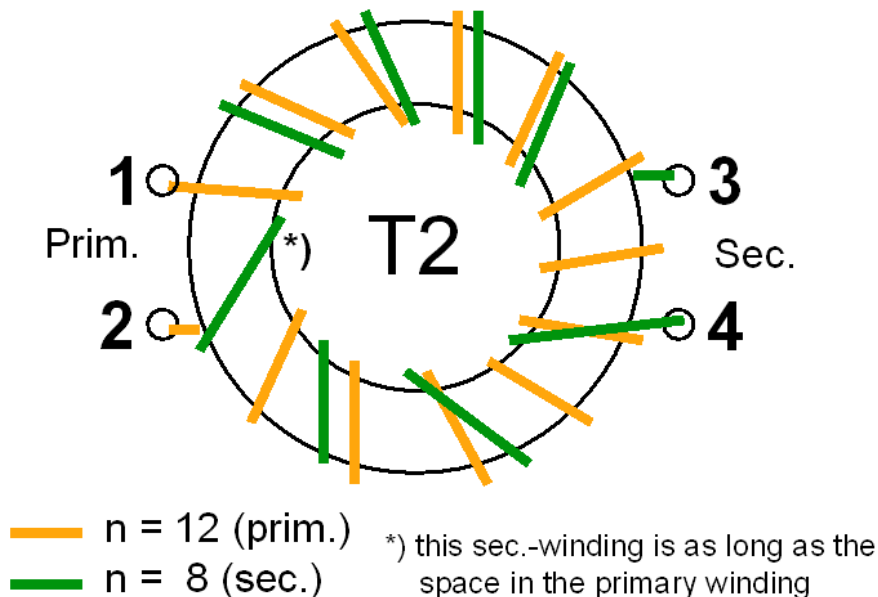
My K2 (S.-Nr.: 03191) had about only 5W to 6W on 10m.
Following measures helped me to get „full“ power (> 10W) on 10m.

All output-measurements have been made with an external wattmeter into 50 Ohms and the internal AT was automatically tuned. The K2 was operated with it's internal battery.

1. Transformers T2 and T1

I rewound the core as suggested by several hams and on the Elecraft Tech Notes site (pict. 1) on the original ring-core.

The only difference is, that I started and ended the secondary winding directly at pins 3/4 and added a longer winding in the middle of the secondary winding (see asterisk).



Picture 1: New Winding of T2

Additionally, I mounted T2 with a small space to the pcb by using two nylon-washers (pict.2) which are fixed with some glue.

With this modification, the 10m-output rose up to 8 Watts – not sufficient in my opinion. I tried several cores – also binocular cores – and different winding-techniques, but without further success. These 8 Watt seemed to be the limit.

So I decided also to rewind T1 and to mount it also with a small space to the pcb by using two nylon-washers (pict.2). But there was only a very small improvement, so i think the modification of T1 isn't useful.



Picture 2: T1 and T2 – modified

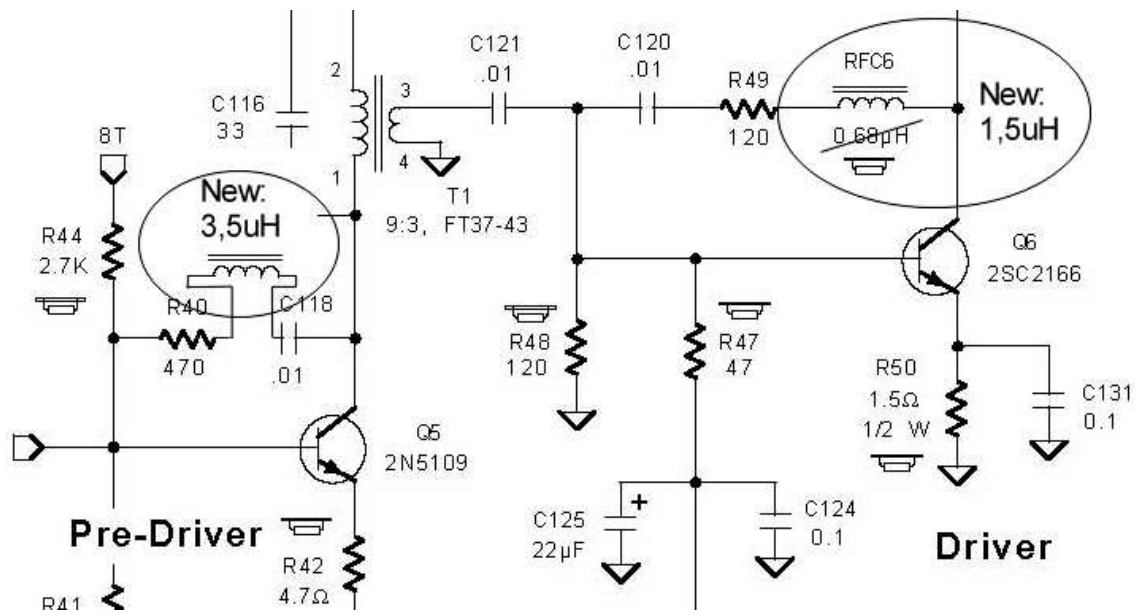
2. Driver & Predriver

With my Scope I measured the HF-voltage at the Collector of Q6 and found, that this driver was not sufficiently driven by the predriver Q5. Therefore the PA is also not sufficiently driven. (The voltage-swing at the collector of Q5 should be 24V peak-peak).

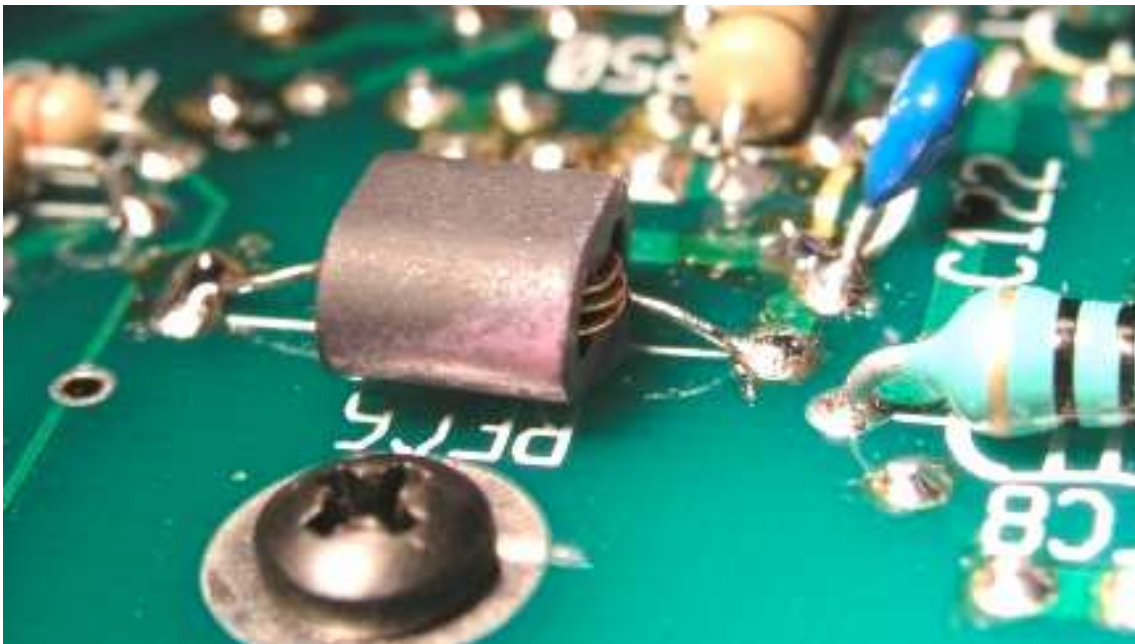
The solution was to increase the gain of Q5 and Q6 a little bit. (The way from 8W to 10W is only 1,25 in power or 1.12 in voltage - so I needed 12% more gain). This can easily be achieved by increasing the value of RFC6 from 0,68uH to app. 1.5uH and adding a new choke of app. 3.5uH in the feedback-path of Q5 (see pict.3). RFC6 can easily be replaced by a new choke (pict. 4). The additional choke at Q5 should be placed on the top of the pcb by lifting up R40 at one end and adding the new choke (pict. 5).

Note:

New choke RFC6 with 1.5uH was made with a binocular core with $AL=0,14\mu\text{H}$ and 3.5 turns.
 New choke with 3.5uH was made with a binocular core with $AL=0,14\mu\text{H}$ and 5 turns.
 I used an EPCOS-core type A7-X1, which can be used up to 250MHz.
 But of course you can use readily wound chokes, which can be purchased.



Picture 3: Increased gain of Q5 and Q6



Picture 4: New RFC6



Picture 5: Additional choke at R40

Result:

The output of my K2 on all bands including 10m is more than 10W on CW and SSB peak, when fed by the internal battery.

With an external supply, the output may further rise but take care for the final transistors!

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