

FT-817 final amplifier self-oscillation problem

# A simple cure that worked\*

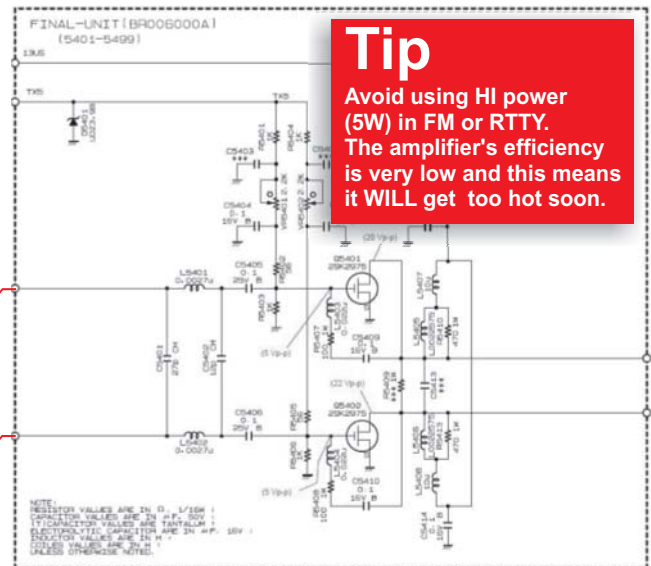
\*for me!

**A**fter replacing my FT-817's finals for the third time, I could take no more! So I set out to find what caused the problem. After several tests (which took two more sets of transistors...) I was convinced that the problem was self-oscillation of the final amplifier during transmission. This phenomenon occurred more when the rig was hot (after a few transmissions) and was very obvious on the screen of my spectrum analyser. Also, the HIGH SWR indicator flashed (the parasitic power appeared as reflected power to the rig) and the power indication showed fluctuation and instability, signs I had noticed on several occasions just before the amplifier blew. If I continued transmitting, after 10 - 15 seconds one of the MOSFETS (I had replaced the original 2SK2975s with RD07MVS1s) would develop a short from gate to source. Amplifier gone!

I tried several tricks to cure the self-oscillation, after reviewing a lot of technical literature. A very interesting paper on stabilising MOSFET power amplifiers can be found at [www.polyfet.com/mtt97.pdf](http://www.polyfet.com/mtt97.pdf).

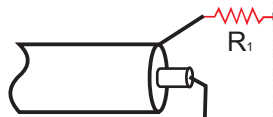
**This is what finally worked well, and is very simple to do:** A series resistance of a few ohms is placed in series with the coaxial cable's leads at the input of the amplifier. The photos and schematics explain the modification, which was performed in December 2007. The rig has performed flawlessly since, and I hope you get the same good results! (After the mod, I have severely "tortured" my 817 to make sure it's really rehabilitated! So far, so good! It seems to take abuse like high SWR or prolonged transmissions like it should.)

I soldered one end of each resistor on the PCB input pads of the amplifier (the resistors are soldered almost perpendicular to the PCB) and then soldered the coaxial cable's ends on the free edges of the resistors. I took care so that the cable wouldn't pull on the resistors, because that could easily break-off the metallisation (solder contact) of the resistors. There was a slight reduction in output power, which is normal (about 300 mW less on all bands at the 5W setting).



**Tip**  
 Avoid using HI power (5W) in FM or RTTY. The amplifier's efficiency is very low and this means it WILL get too hot soon.

input coaxial cable

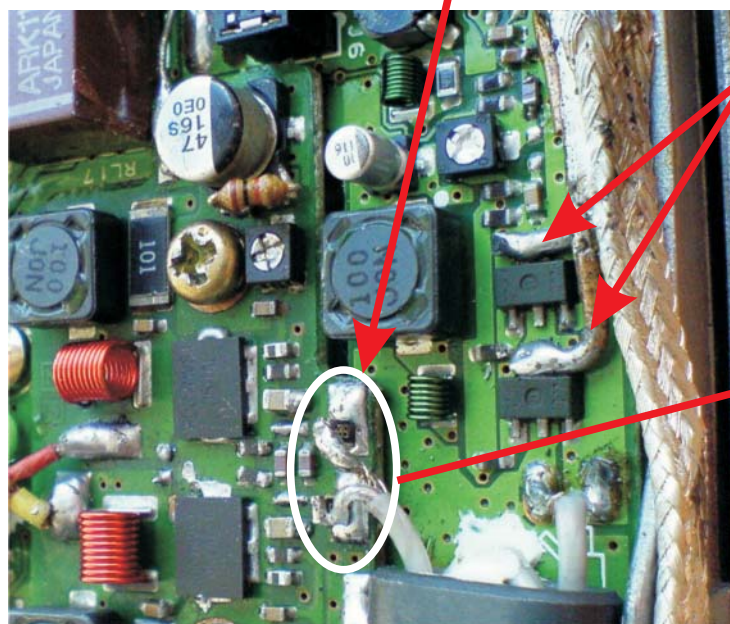
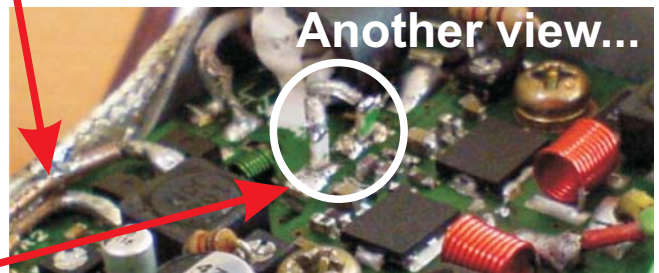


**This is the mod: Just add two chip (SMD) resistors!**

In stubborn cases, use higher values of resistance, until the oscillations stop. In my case, 6.8 Ω worked just fine.

**R1 = R2 =  
 = 6.8 ~ 22 ohm**

**Another proposed improvement:** Solid copper wire (Ø = 1.5mm) and silver plated braid soldered to the driver transistors' tabs to aid in heat sinking



**Disclaimer:** This mod requires delicate SMD soldering. Perform at your own risk. Although the mod is based on proven engineering techniques and worked perfectly for me, I am not in the position to know if it will work for you. The amplifier in the FT-817 may also fail due to other reasons, beyond those that this modification addresses. Also, it seems that most of the FT-817s don't have the problem!