

ICOM IC-7300 Over-volts Protection

By Neil VK5KA

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Early models of the IC-7300 do NOT have DC power over volts protection designed into it, so if it is connected to 19V or more it is very likely to fail and be VERY expensive to fix. (Very POOR design)

The 7300 that prompted me to write this paper had 28V applied to it from a failed 13.8V PSU. This over voltage condition took out a micro processor on the "Main" PCB which costs \$1100 plus postage to replace.

It would probably be better to get a new 7300 or a second-hand one from VK Classifieds.

This issue can even happen when the 7300 is switched off, as the battery rail goes to the main board and is powering a micro processor at all times. The 7300 draws about 10 - 15 mA when switched off.

The following information will show you how to fit over voltage protection to your 7300. I will show two versions of the same modification. One is fitted to the PA PCB that requires careful soldering of the SMD diode direct to the PCB.

The other is a small "add on" that you solder to some component pins on the PA PCB and this modification can easily be removed if you are worried about voiding your warranty.

This modification REQUIRES good soldering skills. Ask a friend who is competent in soldering to help if you are unsure.

This modification uses the same component in the same place on the circuit as a "Factory modification" that is now fitted to current production units. It is also the same as the IC-9700, so I am only showing you how to fit what should have always been there !!

The TVS Diode can be sourced from RS or Element 14 and here is a link.

<https://au.rs-online.com/web/p/tvs-diodes/1714380/?sra=pstk>

Or go to RS and search for 171-4380

You have to buy 10 at a time so it would be good if radio clubs got together and bought 100 plus at a time and then sold them on to you

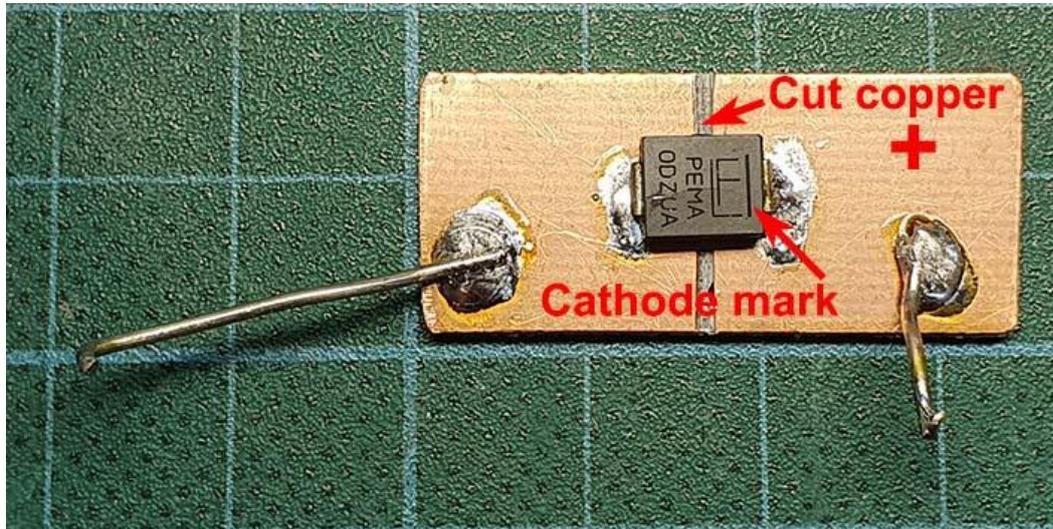
This modification protects all the circuitry past the 5A internal fuse. This blows when the over voltage condition occurs. The TVS Diode that you fitted also goes short circuit and will need to be replaced, so you may need a spare.

This modification does not protect the Tx final FETs but they are okay up to 30V

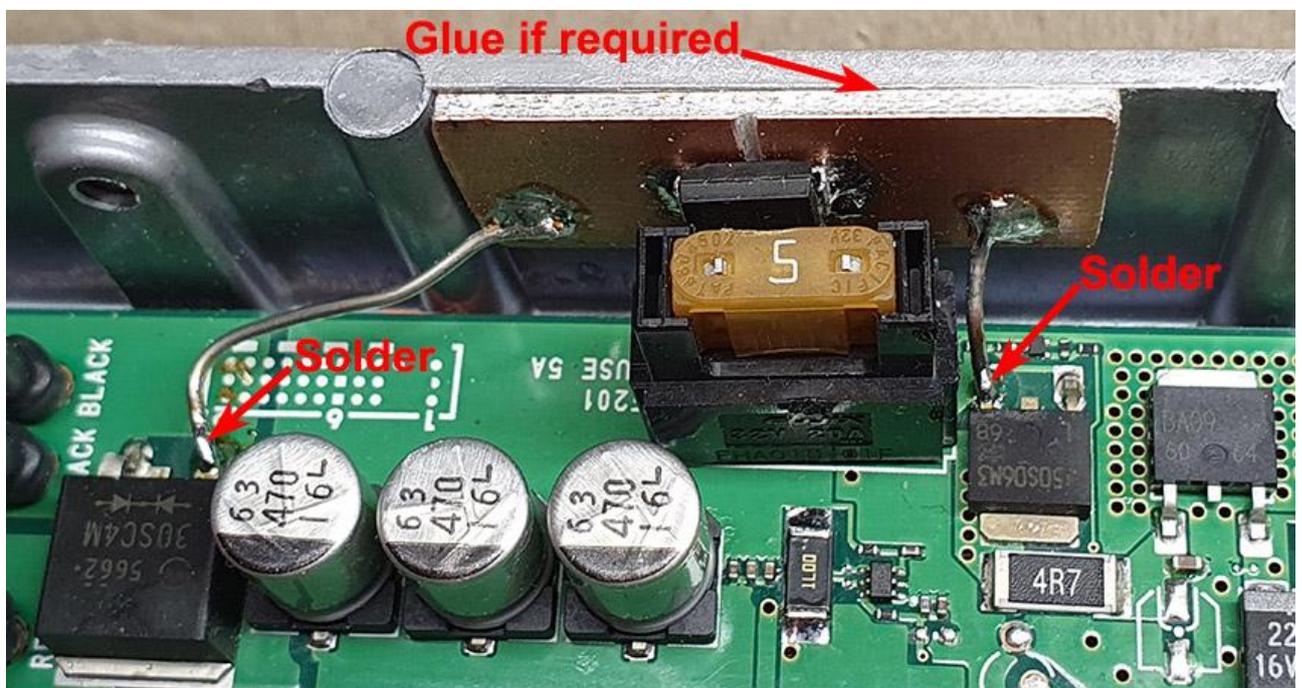
The factory added the TVS Diode in late 2016 at serial number 02009671 so any units earlier will need this modification to be safe. (Thanks go to Icom for the S/No info ...very useful)

It must be understood, that if you undertake this modification, you do so at your own risk.

Here is the modification that you can remove if required. Find a piece of blank PCB about 30mm x 10mm and then cut the copper as shown with a file edge to form two pads. Ensure there is no copper in the gap. Fit the TVS diode as shown with the cathode towards the + side and then solder on ~20 gauge tinned copper wire as shown. The left wire is about 30mm long and the right wire is about 10mm long.



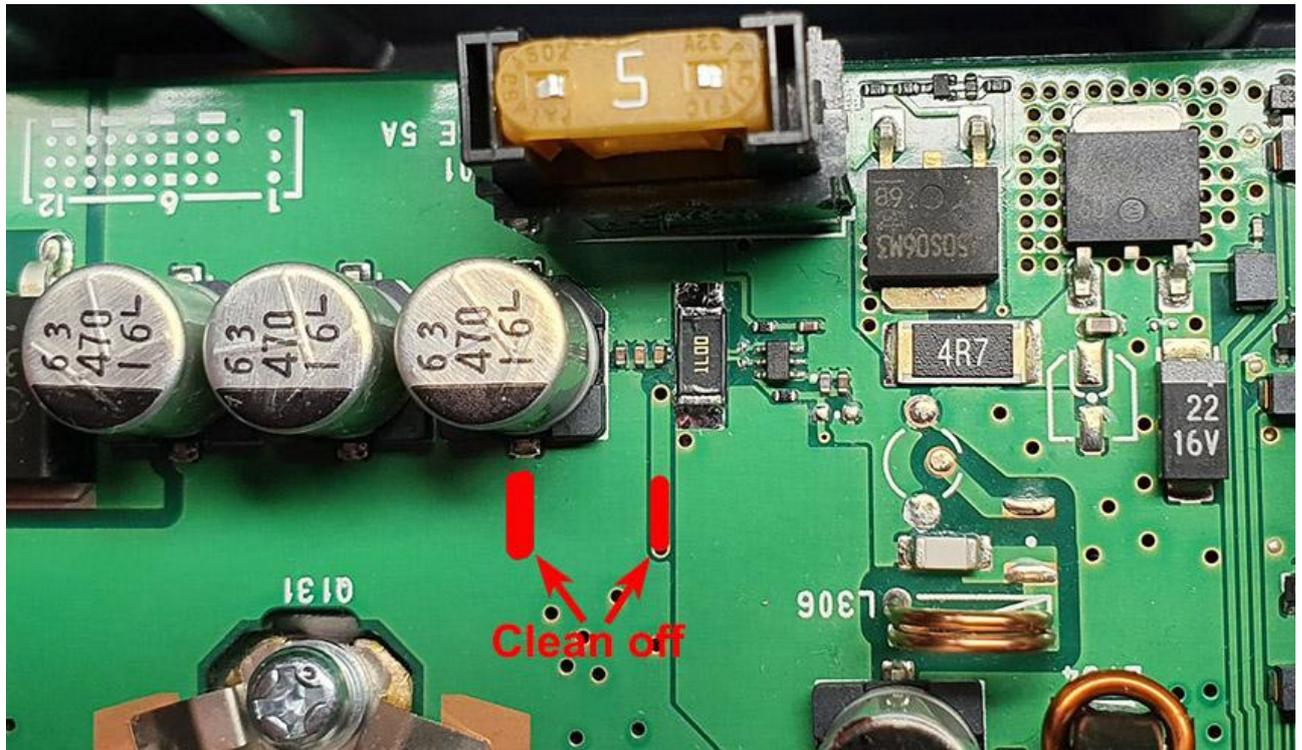
Place the small PCB in the 7300 as shown, then form and cut the two wires so they just touch the component legs they will be soldered to. Pre tin the ends of the wires and also CAREFULLY tin the component legs they will be soldered to. Then CAREFULLY fit the PCB and solder it in as shown. You can add some glue to the back of the PCB if in a mobile environment (vibration) however, remember you may have to replace the TVS diode so don't glue it too well. With no glue the 20 gauge wire holds the assembly satisfactorily in a fixed installation.



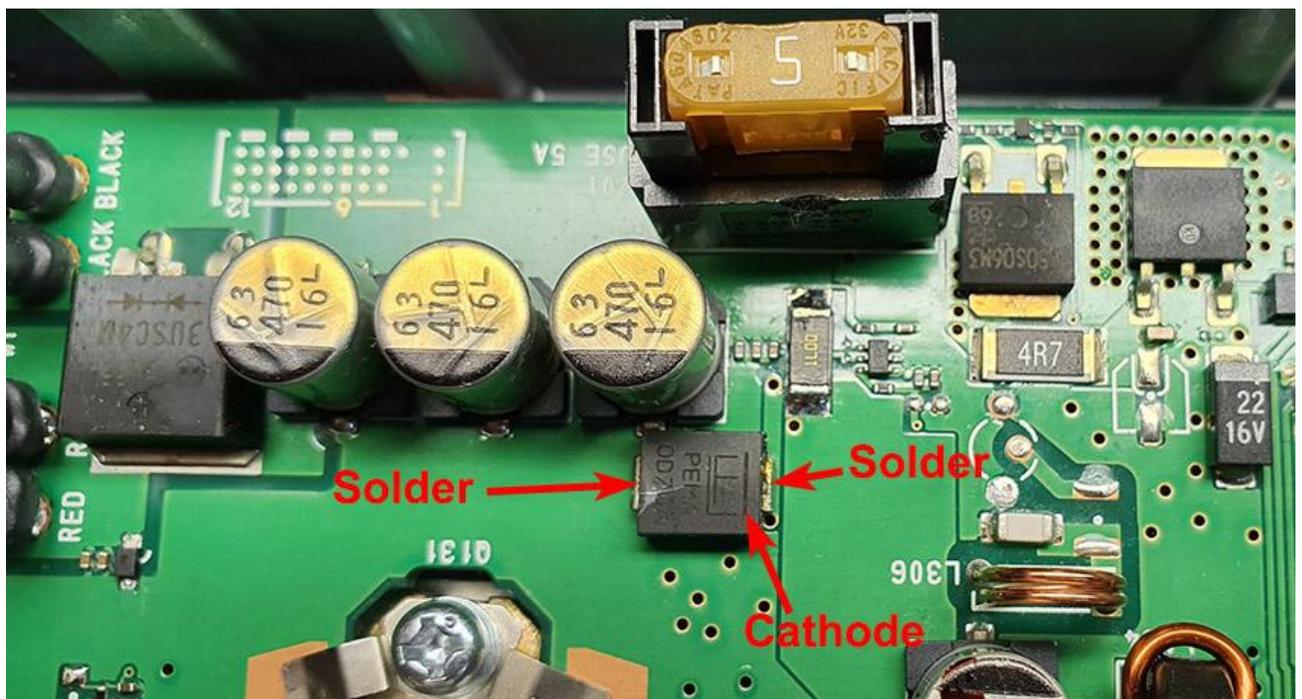
At this point, the modification is finished and all you need to do now is connect the 7300 to a current limited PSU, turn it on and make sure it still works on receive only. If all is okay, refit the 14 screws and hope you never have to get back inside to replace the TVS Diode and the 5A fuse that blows with over 17~18V.

This version of the modification is very similar to the factory modification ...just in an easier place to fit the TVS diode.

You have to scrape off the green mask from the PCB as shown and then tin (with solder) the cleaned areas so you can solder the TVS diode down. Take care not to scrape the lands either side of the small track.



Solder the cathode end first and check for shorts to the ground land with a multimeter.... then solder the ground end of the diode. Some Kapton tape under the diode may help with shorts.



Connect to a current limited PSU and make sure the 7300 turns on and works.

Refit the top cover and the 14 screws.