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If you are new to amateur radio, or perhaps you used to be active many years ago and have just come back, then you may not want to immediately purchase a new transceiver but make use of an old or second-hand radio. Here I give a first-hand account of the 'life and times' of my trusty IC-706 - an old but much loved and relied upon transceiver that is still going.

The IC-706 MkII G is a multi-mode, multi-band radio and despite being about 25 years old is still very popular. I brought mine new around 1999 and have used it constantly. It's great for the radio room at home, out in a car or even for backpack portable [1]. It measures only 17 x 6 x 20 cm and weighs about 2.5kg. The G model includes 70cm and it really is an amazing 'radio shack' in one box! I added extra narrow band IF filters for CW and SSB.

Sometime in 2018 I was on the WADARC Monday night net (Worthing and District radio club [2] 145.425MHz FM 7:30 pm local time) and found my signal just dropped away and no one could hear me anymore. The problem was the VHF-UHF output stage, which had developed a fault. I had a quick look inside but could not see anything obviously wrong so I sent it to Icom for repair and also for a long overdue overhaul. It came back quite quickly and worked like new.

I have contacted Icom Servicing department [3] several times over the years for help and advice and found them to be very helpful.

Service history of an IC-706 MkII G

Jonathan Hare G1EXG is determined to keep his IC-706 working (and succeeds).

In 2022 the radio was starting to show instability on the 18 and 21MHz bands on SSB. Icom suggested that before returning the radio, it might be worthwhile checking the earthing of the top and bottom covers. There are a number of metal springs that contact with the case, and these should be clean and well sprung to make good contact. They also asked me to check that all PCB screws were tight. I did this but I could not solve the issue so the rig went back again. They had the radio for several months and improved things considerably, but as they could not completely solve the problem, they returned the radio with no charge.

March 2025 I went portable to try and work a friend in Florida with my gear. The day before going out I had charged the battery and had sorted out all the gear I would need [1]. I backpacked my way up to the top of the local hill and set everything up – but the radio did not work. On powering up, the S-meter just went full scale, the red LED Tx light went on, but no RF was being produced, and the tuning was changing without me touching the dial.

There was obviously nothing I could do out on the hill, so I headed back down. My first thought was that perhaps this was the end of my lovely radio. It was 25 years old, I had used it extensively, and it had done great service but perhaps it was time for a new one?

Onreflection

The IC-706 is really ideal for my portable and home setup so I thought about getting another but Icom no longer make the radio. Even second-hand they still go for around £500. That's a lot of money for a 20 – 25 years old radio as you can currently get a brand new FT-710 for only £300 more than this, I was thinking of this option, but I didn't really have the money and the IC-706 was a much better size and weight.

After a bit of searching on the internet someone suggested that as each board in the IC-706 communicates control signals via thin ribbon cables between them, they might be worth changing. This would be especially so for my radio, as it had been serviced a few times.

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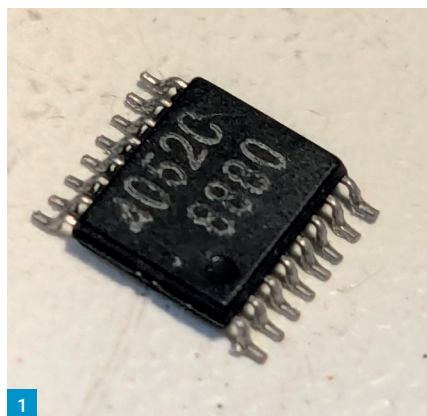


Fig. 1: The loose chip.

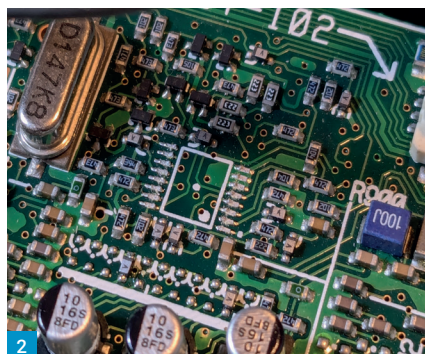


Fig. 2: The circuit board with an empty space!

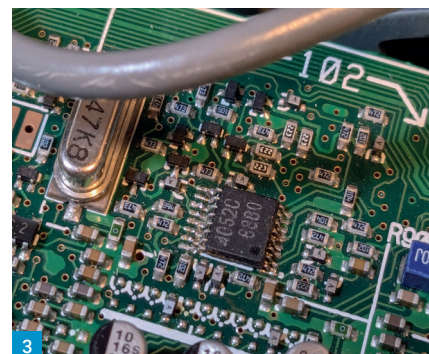


Fig. 3: The chip back in place.

Fig. 4: Ready to go /P.

Fig. 5: The /P setup in use.

I contacted Icom and they kindly sorted out a set of leads which I ordered. On opening up the radio, I dropped a small screw inside so I tipped the radio upside down to get it out and to my amazement a tiny 16-pin surface mount device (SMD) chip (4052C integrated circuit) fell out as well (see photo, Fig. 1)!

At first, I thought it must have got in there by accident while it had been serviced, but on looking around one of the boards I soon found where it had come from. These chips are very light (ca. 100mg each) and even if one pin is soldered on to the PCB it would be hard to dislodge it simply by shaking or knocking the radio. With 16 pins to secure the device it is extremely unlikely it would come off. Even if you dropped the radio off a ten-storey building, I doubt the impact would dislodge an SMD chip (although it would of course do a lot of other damage!).

How on earth did an SMD chip fall off a PCB? Your guess is as good as mine, but if you look at the photos, Figs 2 and 3, you can see that the solder left on the PCB is rather fragmented. Perhaps the SMD solder paste used was rather old and it simply fragmented over time.

A scientist colleague suggested an interesting, but probably unlikely possibility, that this story might be a case of 'tin pest' [4]. This is when changes in the crystal structure of tin-based products at low temperatures cause these products to fragment [4]. With the 2006 RoHS changes in the use of lead in solder the problems of tin-pest have returned. You can see, Figs 4 and 5, that I keep my radio on my backpack in a waterproof storage crate. Thinking it was safe from moisture, I had kept all the gear in my garage over winter and it would probably have been cold for weeks at a time. I am not sure if it was cold enough to produce this effect though. And if the chip did



fall off due to tin-pest, I would have thought that the heavier capacitors might have come off first.

Whatever the case the chip fell off ... but I found it!

Would the radio work if I put the chip back? Before I tried, I went over the solder paste with a small tip soldering iron to produce a good contact for the chip pins. I noticed that there was always a white marker on the PCB corresponding to the indentation on the chip (you can just about make it out on the photo). Following this layout, I orientated the rogue chip and carefully soldered it back onto the PCB as best as I could. To my amazement on powering up, the radio worked! A few days later, I returned to my portable hill site with my repaired IC-706 and even in fairly poor conditions, worked into Russia, Ukraine and China on the 10m band.

The moral

So, what is the moral of my story?

Well firstly it is worth taking a look inside a broken radio even if you feel you are 'out of



your depth', as the fault may be something quite simple. Second, don't give up on a radio just because it is old. It is true that some components such as electrolytic capacitors in many 1970-1980's radios dry up and can cause all sorts of problems. But these can be replaced to give new life to an old and much-loved radio and some faults are not as hard to rectify as you might think. The moral: don't give up before you have had a try.

Acknowledgments

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References and links

- [1] Backpacks for Radio Mountain Goats, J P Hare, RadCom, Journal of the Radio Society of Great Britain, March 2024.
- [2] www.wadarc.org.uk
- [3] <https://icomuk.co.uk/Icom-Repair>
- [4] https://en.wikipedia.org/wiki/Tin_pest

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