

TS130V - Omron relay removal/replacement

The **TS130V** is a superb low power transceiver with a very good front end. As with any of the more “mature” HF transceivers in service today, it is not exempt from having issues around the onboard send/receive relays. There are two relays of concern; one on the IF board and the other on the filter board at the back end of the rig. I am focusing on the IF board relay at this point in time.

Continuous use of these delicate mechanical devices for periods perhaps in excess of 25 plus years may well result in their failure or, more commonly, they may become intermittent. The end result is the same; a total loss of audio.

The specific relay installed on the IF board of the TS130V, is the Omron LZN4. It is also installed in the larger Kenwood rigs like the TS830S and the like. Eventually, it will after years of use, suffer from intermittent failure or worse, a total failure. This will result in no reception after a period of transmitting. Many of us who own one of these rigs end up tapping the casing in the hope that the relay contacts will unlatch to restore audio but the inevitable truth is, the relay needs to be replaced.

This becomes a frustration but, the good news is that a replacement relay is available, is fairly easily installed and the particular problem is gone for good.

The replacement relay is a like for like and is listed online as a MATSUSHITA NF4EB-12V

Below is a picture of what it looks like



These relays can be bought online; it's a case of searching for them. It is a direct one for one swop. The pinout is exactly the same as the Omron it is replacing.

In terms of performance, I think the replacement relay is slightly noisier but that's my own perception; maybe I am being picky !

What's involved in replacing the relay ?

Well, it is not a difficult job; it does require a degree of competency with regard to de-soldering the 15 pin relay on the IF Printed Circuit Board and similarly, soldering in the new relay. There needs to be a firm understanding too that the cabled looms have been in situ for a lot of years and as a result, may not like being moved or unplugged. I cannot emphasise too strongly the need to exercise great care when delving in to unplug socket heads etc.

CAUTION: All circuit boards used in the TS130V rigs use CMOS devices. When these rigs were produced, MOS devices did not have very good protection against electrostatic discharge. That is to say, common static charges which build up on people, tools etc. Please ensure you have taken sufficient precautions to counter the effects of static electricity discharge ! Many of the parts fitted in the TS130V have been out of production for decades and therefore you will have a heck of a task finding the right replacements.

Take appropriate precautions to ensure that your "grounding arrangements" are satisfactory. If you do not understand – read up on the subject prior to commencing any work.

How to go about it

Methodical preparation and photographs along with the right tools for the job are essential. If you have the right equipment, it's a straightforward job.

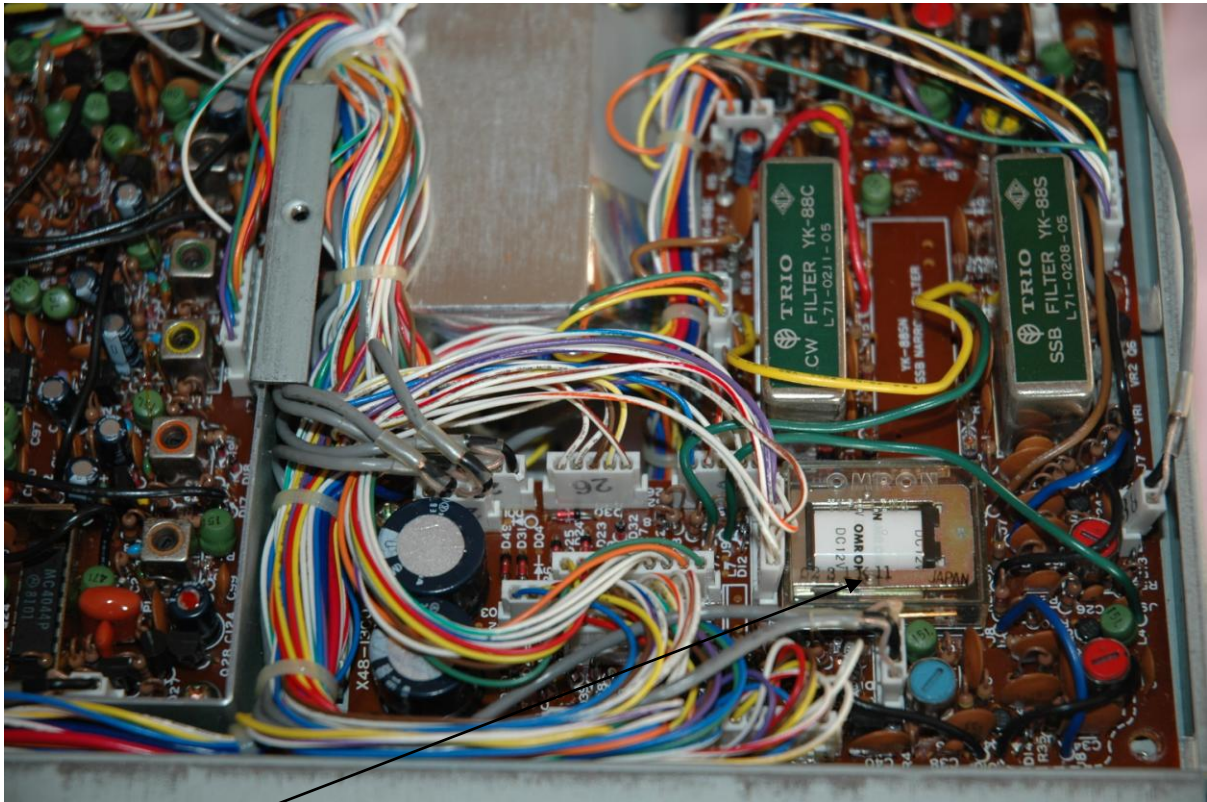
You will need the following:

1. Anti static matting with wrist band if possible
2. Plenty of good light
3. Quality philips head screwdriver
4. Solder station. Remember components are close together as are cables and so too much heat will cause unwanted and avoidable damage. Use a fine tip iron.
5. Good quality solder. Albeit, it is now illegal here in the UK and I guess internationally but quality leaded solder is best.
6. Long nose pliers
7. Patience and a steady hand

The board upon which the work is to be done is the IF Unit board marked X48-1300-00.

It is accessible when you take the **bottom cover** off; it is situated to the left hand side if you are looking from the front of the transceiver.

See the picture below

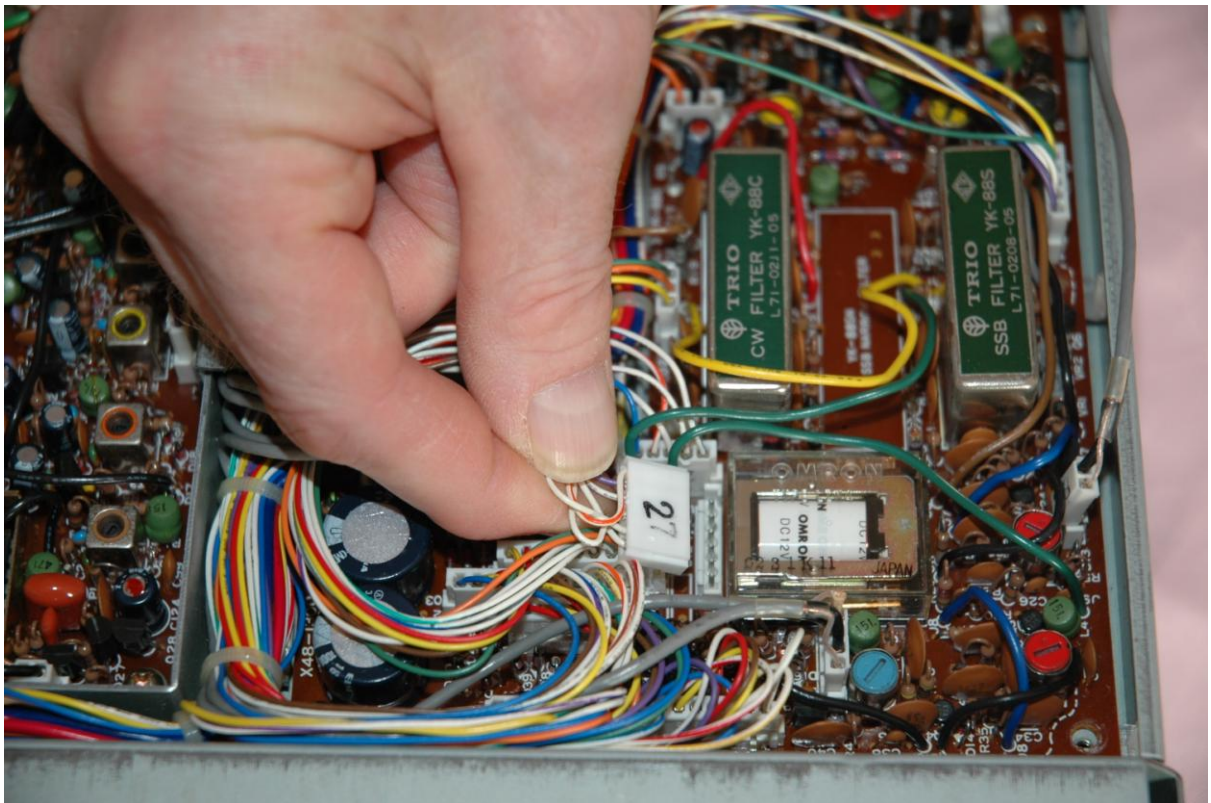
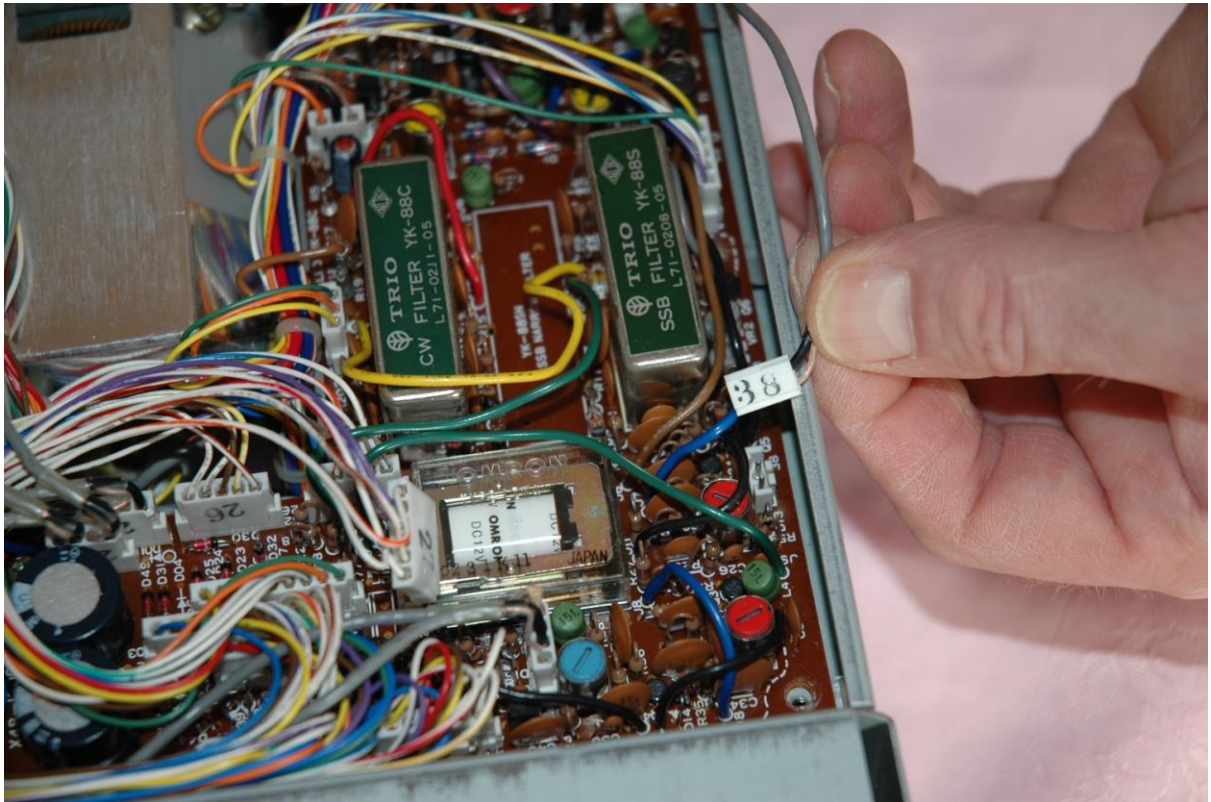


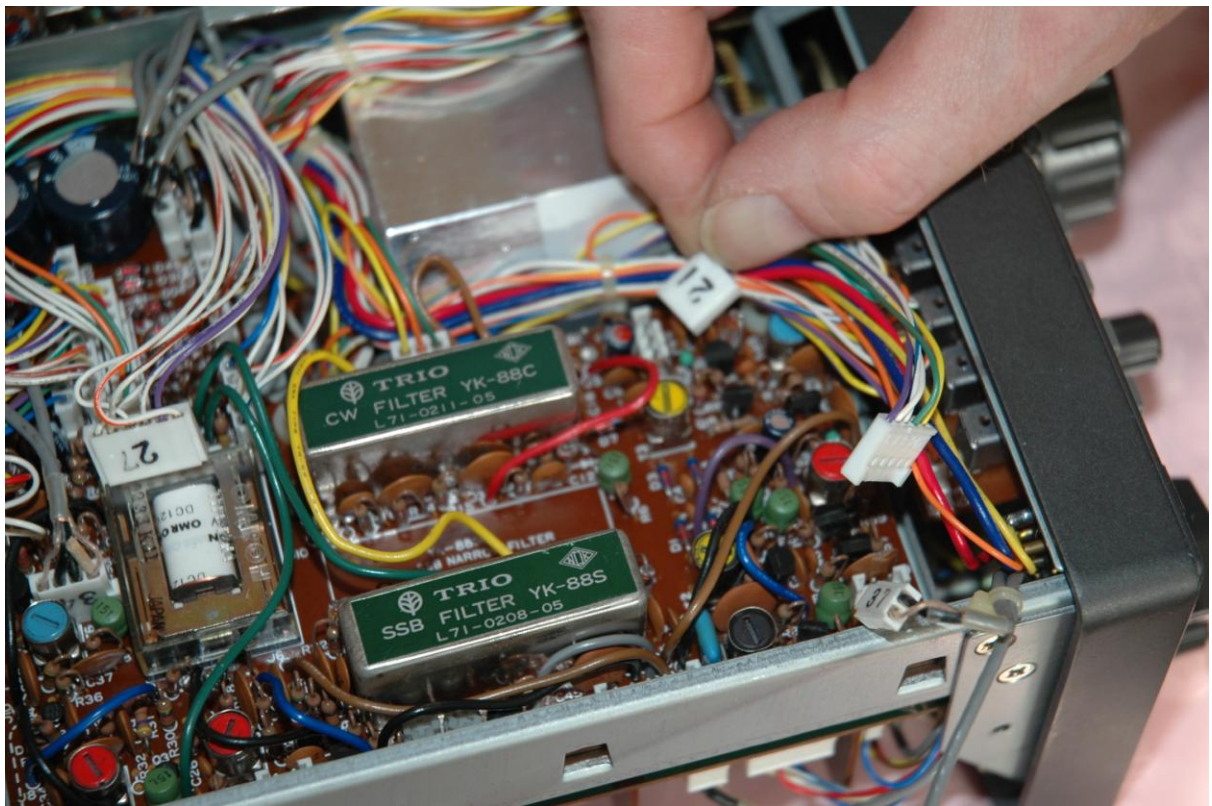
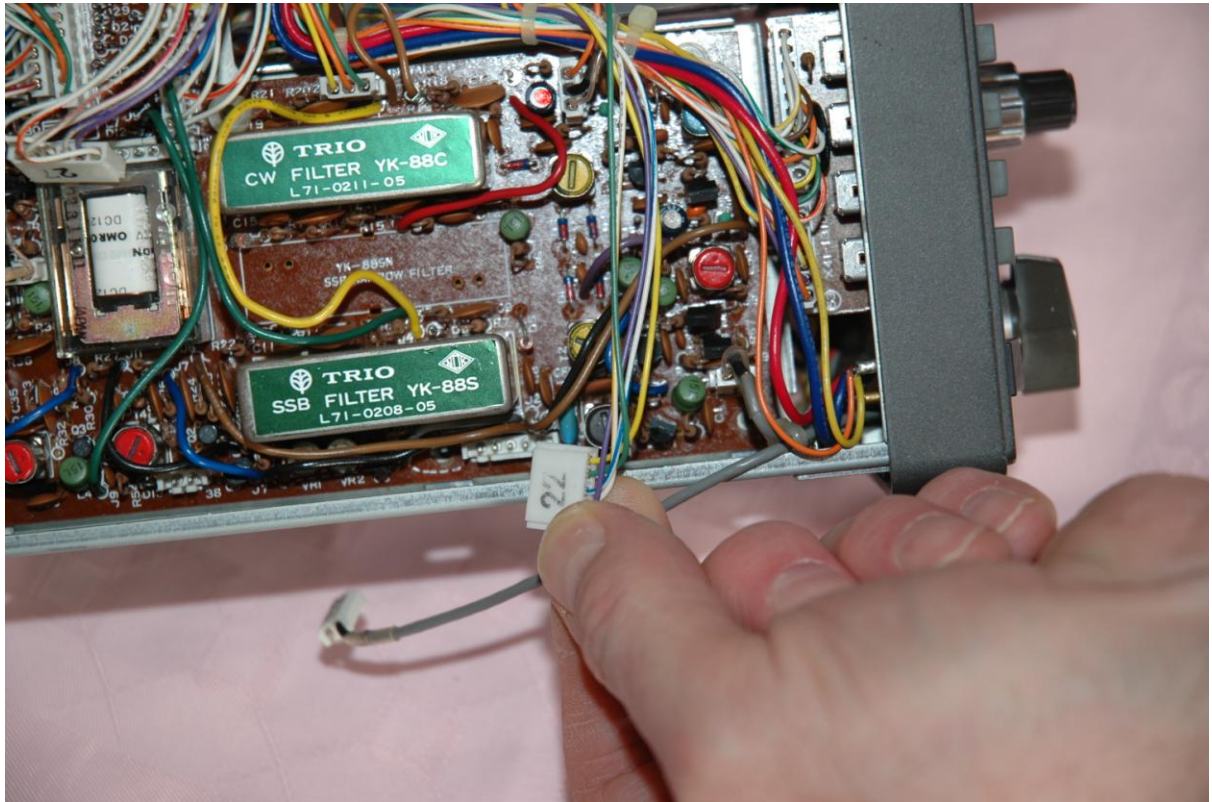
Relay on the IF board.

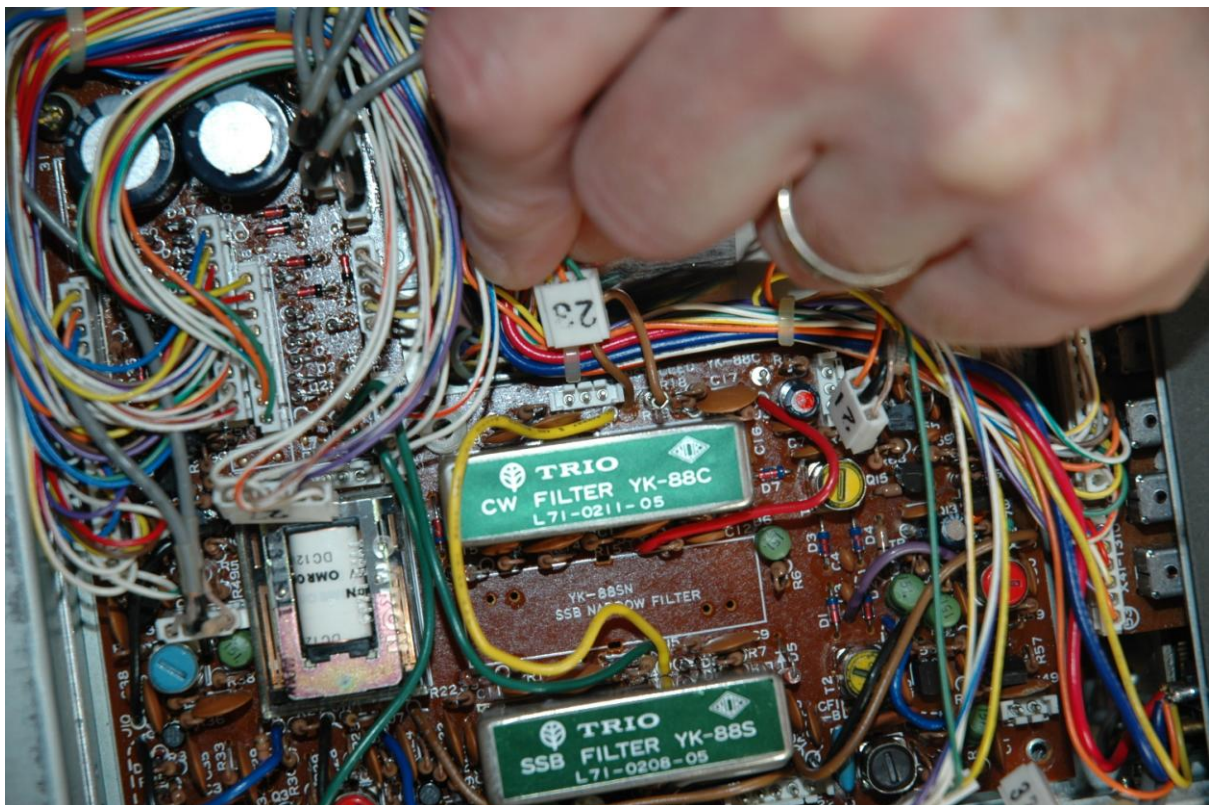
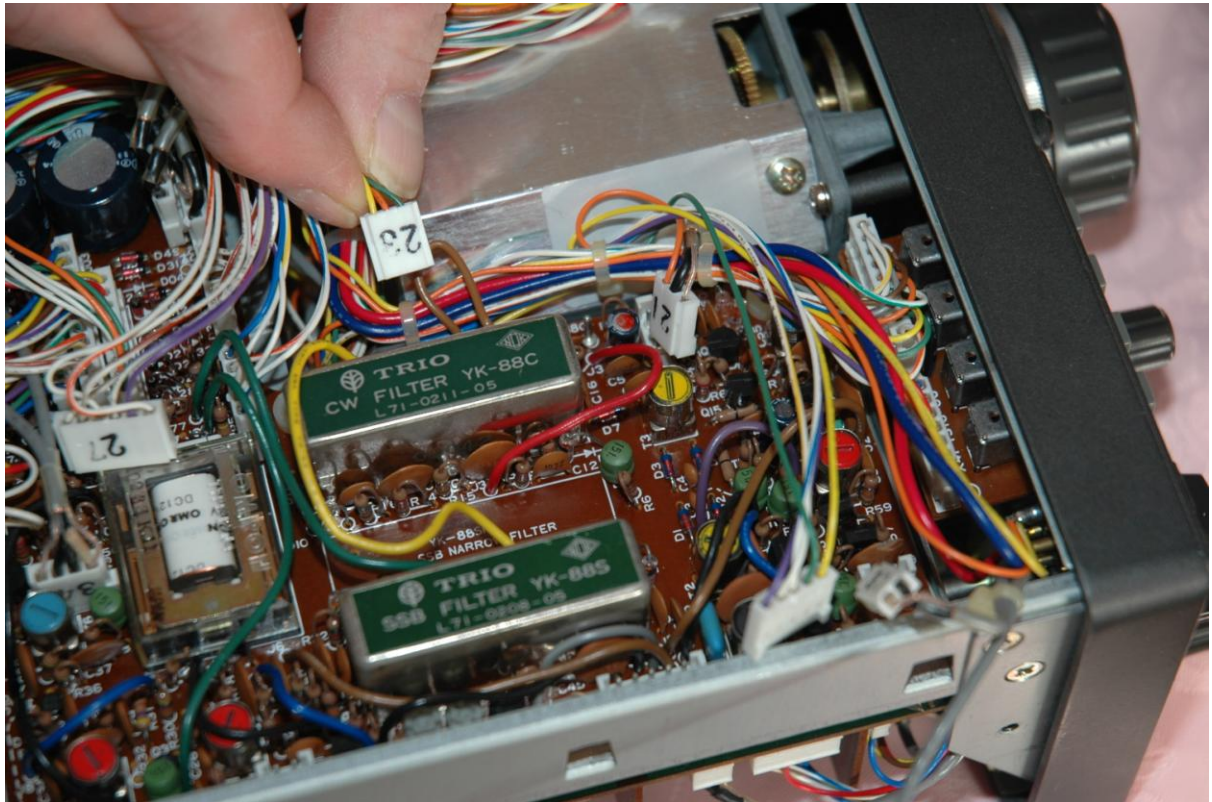
In the picture above, (taken from the rear of the rig) you will see the relay in the bottom right hand corner. It is very neatly set in there and it may initially cause some concern when you see how it is boxed in, but fear not.

Down to business:

- a. Remove both the top and bottom covers of the rig by unscrewing all the philips head screws. There are 4 screws in the middle of the top cover which you do not remove. These hold the speaker in place. Remember when you lift the top cover lid, the speaker is attached to the board below so be careful unplugging this.
- b. Ensure you keep all the screws together . I put all mine in an egg cup so as not to lose any.
- c. There are a number of cable looms and miniature coaxial cable fittings which I strongly advise you to identify prior to separating from the parent socket mounts. I ended up photographing them as shown below. You will see that the female socket heads on the various looms are numbered. Take note of these as this will help keep you right.
- d. There are a number of screws holding the IF board in situ and these need to be removed in order to free up the board.



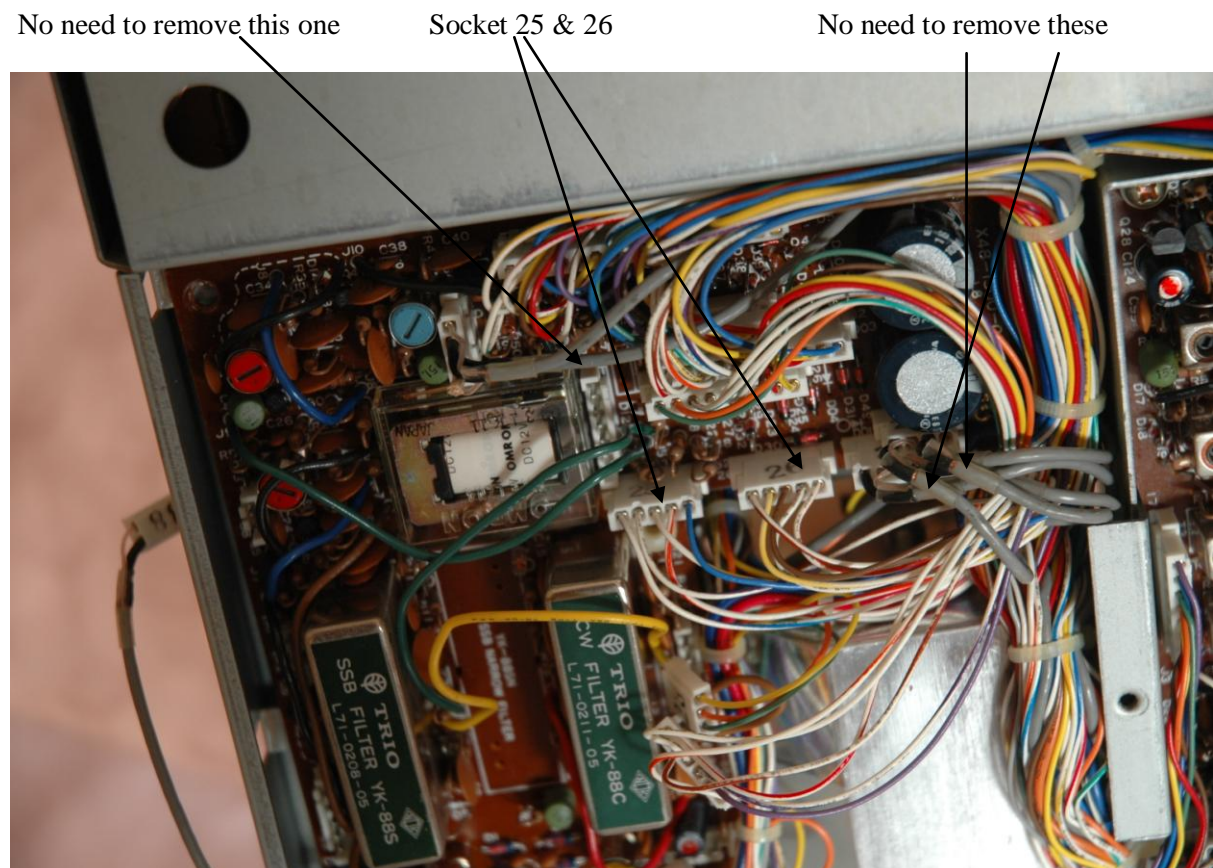




In the top part of the picture below you will see a number of arrows inserted. These coaxial sockets did not need unplugging prior to working on the board. The last two wiring looms I did have to remove were as shown in the picture below. They are marked 25 & 26. Just to the right of the relay.

Again, please exercise great care when removing/pulling these loom sockets out. They are delicate. If you damage it, you're in big trouble and resultantly, will have introduced a completely new problem.

Undo all the IF board screws carefully and store them safely. Note that some of the board screws vary in length so you will need to be sure you know which screw goes where with regard to replacement.



- e. Having identified the various looms and coaxial connections, unplug them and ease the IF board out of its mounting. Tilt it on its back. With the various looms released, it will easily flip over to allow you to identify the soldered relay pin points.
- f. May I once again say be very very careful unplugging sockets. As I said earlier and repeat, the rig is of a good age and therefore it will not take much to cause damage.
- g. Now comes the interesting part; there are 15 pins on the Omron relay and these will have to be desoldered. I recommend a solder sucker pump and desoldering wick to achieve the best results. The desoldering pump really does work very well. You will want to have all solder removed around every pin and then very gently, rock the relay and it will come away.

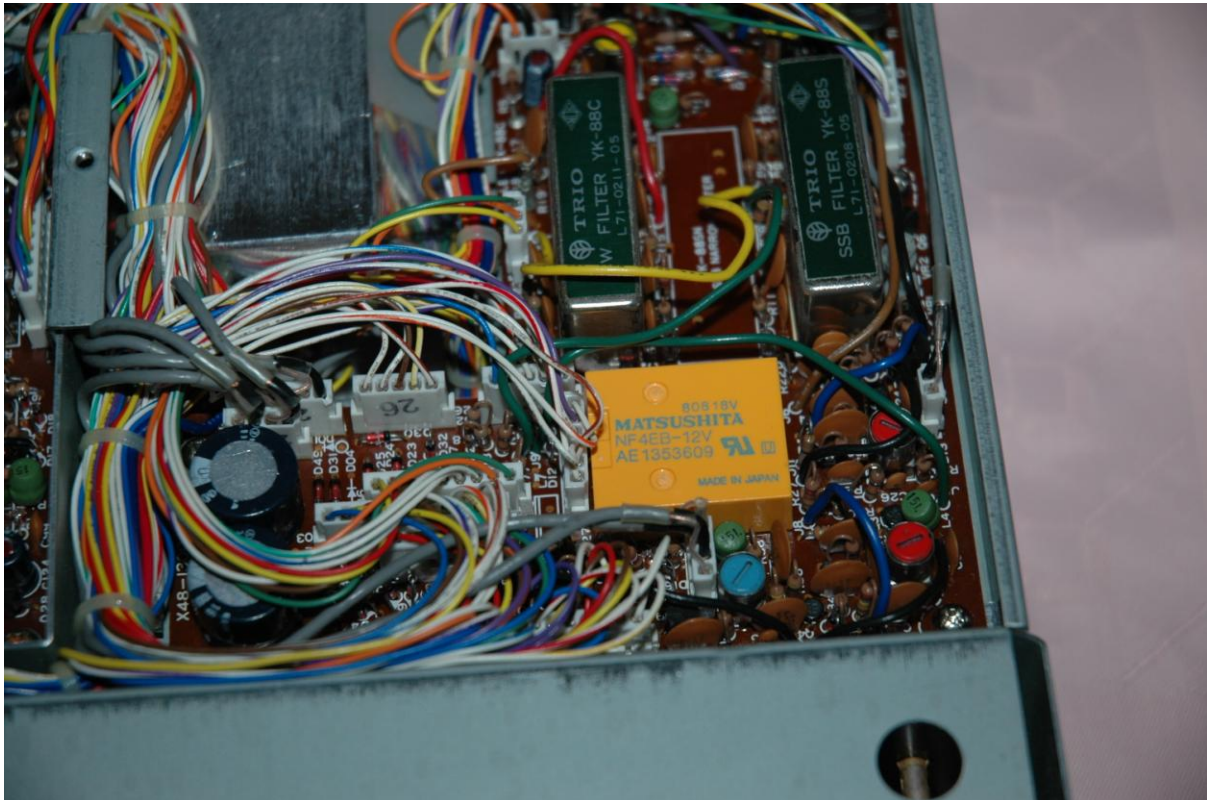
This is the relay underside.



- h. **Replacement;** ensure all the upright pinheads on the new relay are straight up and do not tilt to one side or are bent. The great news is that the relay will only fit in one way. That's a blessing. Drop it in and go to work achieving a good solder joint on each pad. Be careful not to drip solder on to other tracks or pads.
- i. Having soldered all 15 pins, check your work carefully.
- j. In the same way as you removed the various wired loom socket plugs, place them back in their respective sockets ensuring they are seated correctly. Likewise, Reinsert the mini coaxial plugs on to the board.

I would suggest at this point that you place one of the PCB screws back in to hold the IF board back in place and then go test the relay.

I am extremely pleased that I came across no issues whilst carrying out this work and the rig came to life without a hitch. The transmit/receive relay works perfectly.



Having confirmed that the relay is functional, ensure you insert and screw down all the PCB screws. Do not overtighten them as you risk fracturing the board and ultimately damaging tracks on it.

Replace the bottom cover and screws. Replace the top cover, remembering to reconnect the speaker lead. As before, ensure all screws are accounted for and inserted without undue force.

Job done.

My conclusions : This was not a difficult job; just a little awkward. An extra pair of hands works wonders and my mate Alan was at hand to help out. When you consider that there are 15 separate pins on the relay, it takes a little time and effort to effectively remove all solder in order to release “the brick”. Insertion and soldering the replacement was extremely easy and very straightforward.

There is another relay fitted at the back end of the rig on the filter board. Some might say that this should also be replaced. If it gives me trouble, I shall replace it but to date, this one relay replacement has served me well and the rig is now functioning correctly.

Good luck in your endeavoursWill / GM0HKS You may email me at wb48@blueyonder.co.uk for assistance or advice