

ICOM M710 FIX for PC-ALE USE

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Introduction

The ICOM M710 Marine HF Radio in stock configuration is not suitable for PC-ALE use.

It has a narrow 2.3 KHz SSB IF Filter and NO IF SHIFT control via front panel or remote command. When used with PC-ALE with the 2.3 kHz IF filter, the program will continuously pause upon each scan step and eventually cause uncontrolled soundings every few minutes.

I present three ways to correct this.

I had tested this with PC-ALE V3.2 full install and upgrades 3.3 and 3.4. And various sound card and computers in early attempts to correct the uncontrolled soundings. Eventually I ran this past Bonnie KQ6XA and she recommended looking at the spectral output of the audio.

Observing the output she declared that it was too narrow. So further testing was required to come up with a solution. The effect of a narrow bandwidth IF filter on PC-ALE was puzzling (builds up to uncontrolled soundings).

According to Steve N2CKH, when attempting to use a narrow IF filter, which is really not recommended, adjusting the IF shift may allow operation. See page 49 Radio Receiver Settings in the PC-ALE Quick Start Guide by Steve N2CKH Feb 14, 2009.

The M710 Specifications do not call out which IF filter is installed (wonderful), so determining what it is can either be done by opening up the radio and look, or searching through the service manual and deciphering the part number.

The stock SSB filter is an ICOM FL-30 2.3 kHz Filter at 9.0115 MHz. And again, there is No IF shift control.

The Test

After it was determined that the M710 stock narrow 2.3kHz filter and no IF shift control were a bad combination for PC-ALE use, I wanted to do some testing to further prove this and find a solution.

For Reference, the ALE tones are from 750Hz to 2500Hz with the center being 1625Hz. And ALE was designed to use a 3300Hz bandwidth, a 3kHz filter in military radios and a 2.8kHz filter in ham radios with no IF shift needed. See Steve's document and Bonnie's suggestions.

However narrower filters should be usable with introduction of IF shift with some sensitivity degradation.

Using a Kenwood TS-440S which has a 1.8 kHz optional narrow SSB filter, a stock 2.4 kHz SSB filter and a wide 6 kHz filter, I proved what was said by Steve and Bonnie and the effect I saw on PC-ALE.

The 1.8 kHz IF filter, not surprisingly, caused PC-ALE to continuously pause on each scan step, which will eventually cause the continuous sounding issue. IF shift did not help. Not usable.

The 2.4kHz IF filter worked quite a bit better with IF shift centered (random pausing) and ran without pausing with a bit of low IF shift. Not ideal but much better. (Recall the ICOM m710 has a 2.3 kHz filter)

The 6 kHz wide filter ran perfectly with center (no) IF shift. The soundings are controlled as they should be, and it's stable. Excellent.

So now we know we need a wider IF filter in the M170 to make it work with PC-ALE and not have to use IF shift, which the radio does not have.

Solutions

ICOM makes a FL-70 2.8 kHz IF filter which would be the ideal solution. I've seen them on eBay for about \$75 bux.

The installation and operation becomes an issue here because the optional filter slot in the M710 is for a narrow CW filter and there is no way to select it in any mode like ham radios have. This could have gone easy! Nope.

Solution 1: Unsolder the FL-30 IF filter and install the FL-70 filter. Now you have no narrower IF filter which might come in handy for HFL voice contacts, but PC-ALE will be very happy.

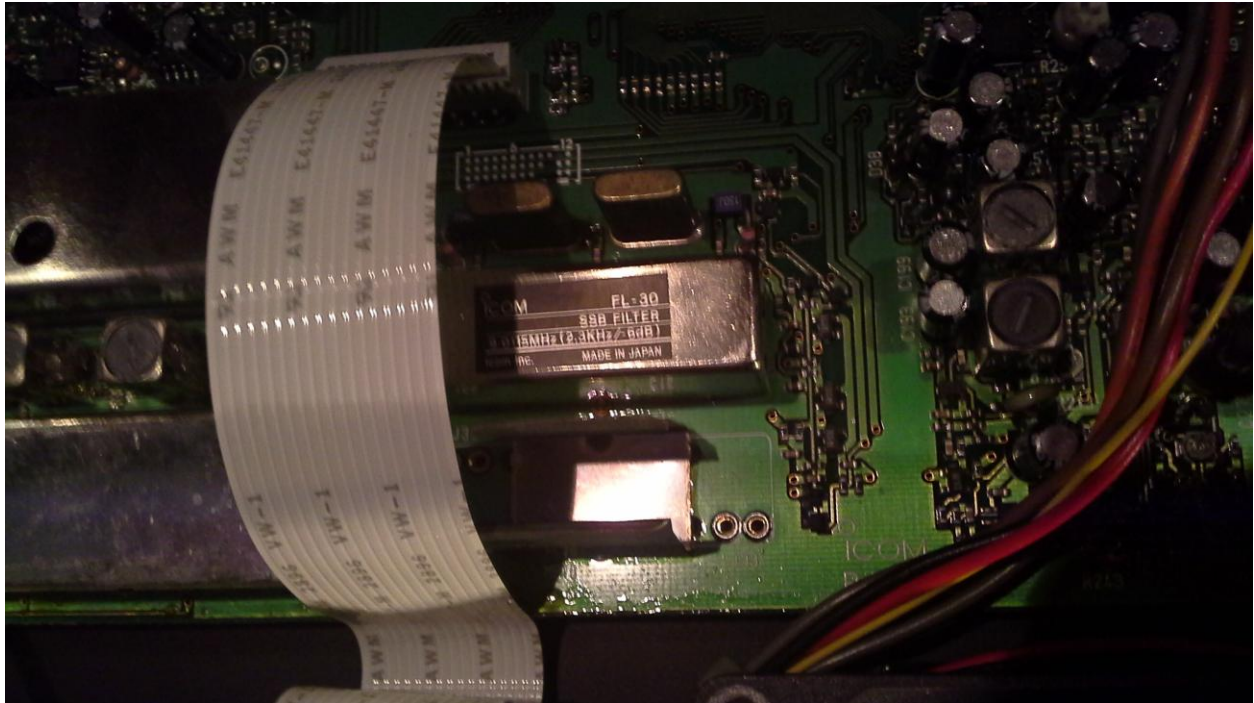
Solution 2: Install the FL-70 in the optional filter slot and use FSK mode for receive and USB mode for transmit. This can be done using the custom MMI files I share below. The radio will receive in FSK mode (optional filter, now 2.8 kHz) and transmit in USB mode. The optional filter is in play for Receive in FSK mode, which provided a path to a solution. When you use the Mic for HFL contacts the radio will be in USB mode for receive (using the stock 2.3 kHz filter) and transmit, and return to FSK (now 2.8 kHz filter) in receive when scan is reinitiated.

Solution 3: Zero cost option. Force the 6 kHz filters into play in receive and use USB mode in transmit. No additional FL-70 filter needed. I show below how to make a single pc board cut and add one jumper which will allow selecting of the empty optional filter slot (in Receive FSK mode using the custom MMI files) to enable the 6kHz IF filter. So now with the custom MMI files the radio will receive using the 6 kHz filters and transmit in USB mode. When you are using the Mic for HFL voice contacts, the radio will be in USB mode using the stock 2.3 kHz filter for receive and USB mode for transmit.

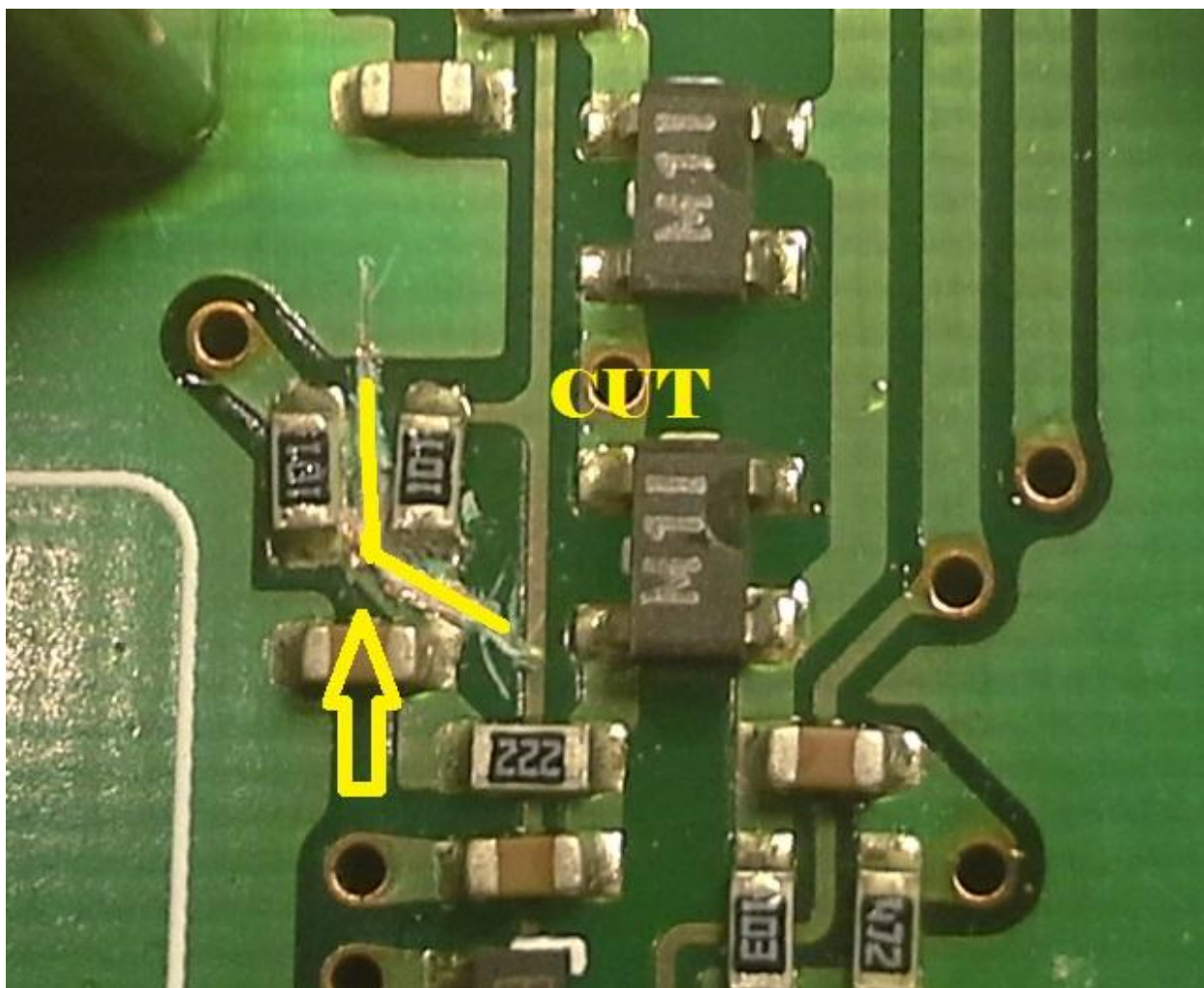
Wide Receive Filter Modification

Here is how to make the simple modification to allow the 6 kHz filters to be commanded into use in receive FSK mode and transmit in USB mode using the custom MMI files.

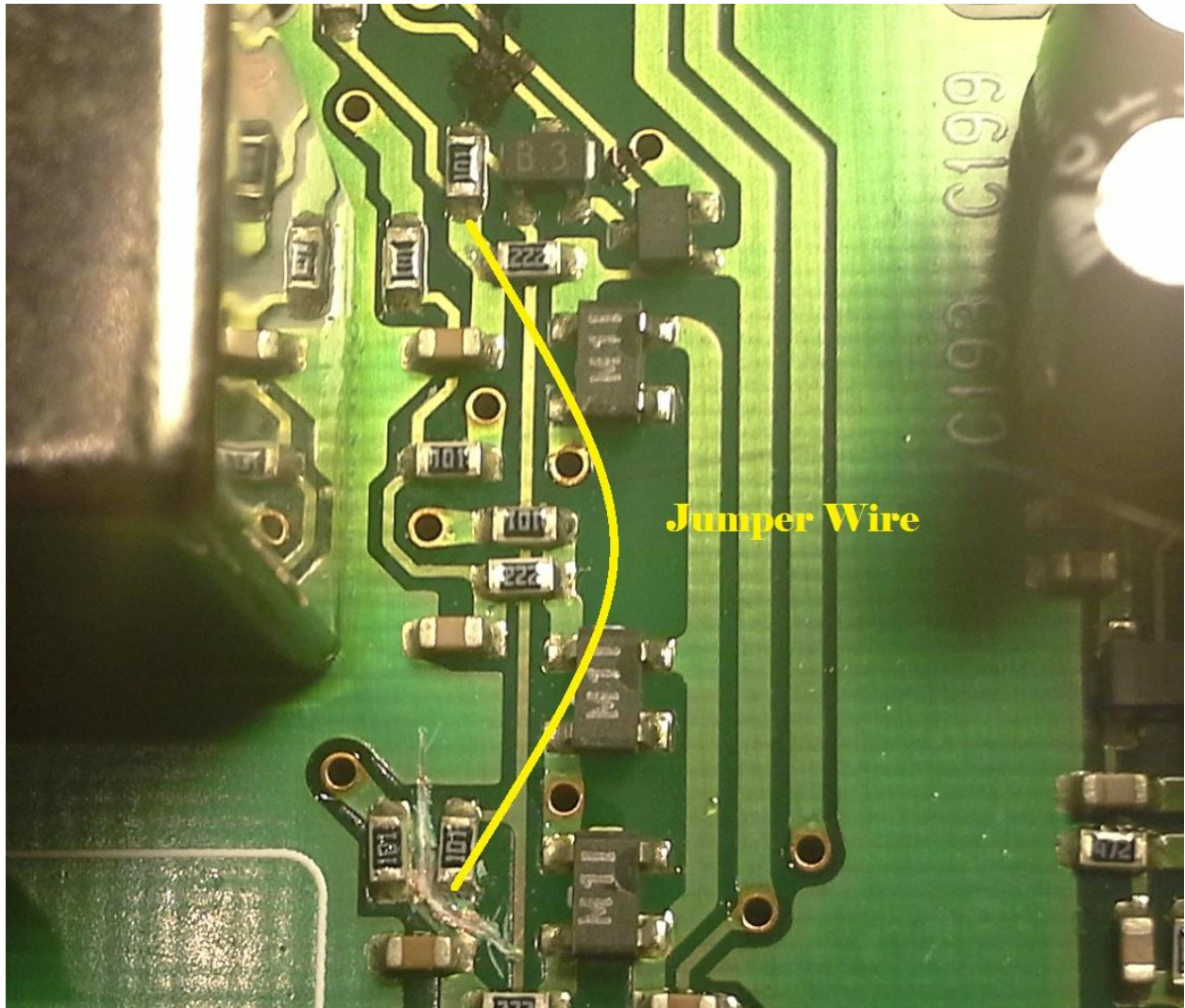
Open the radio and look at the bottom main board. There are the IF filters! Follow the pictures and diagrams to make the single cut and add the jumper. Remember to un-do this if you ever install an optional filter in the lower slot!



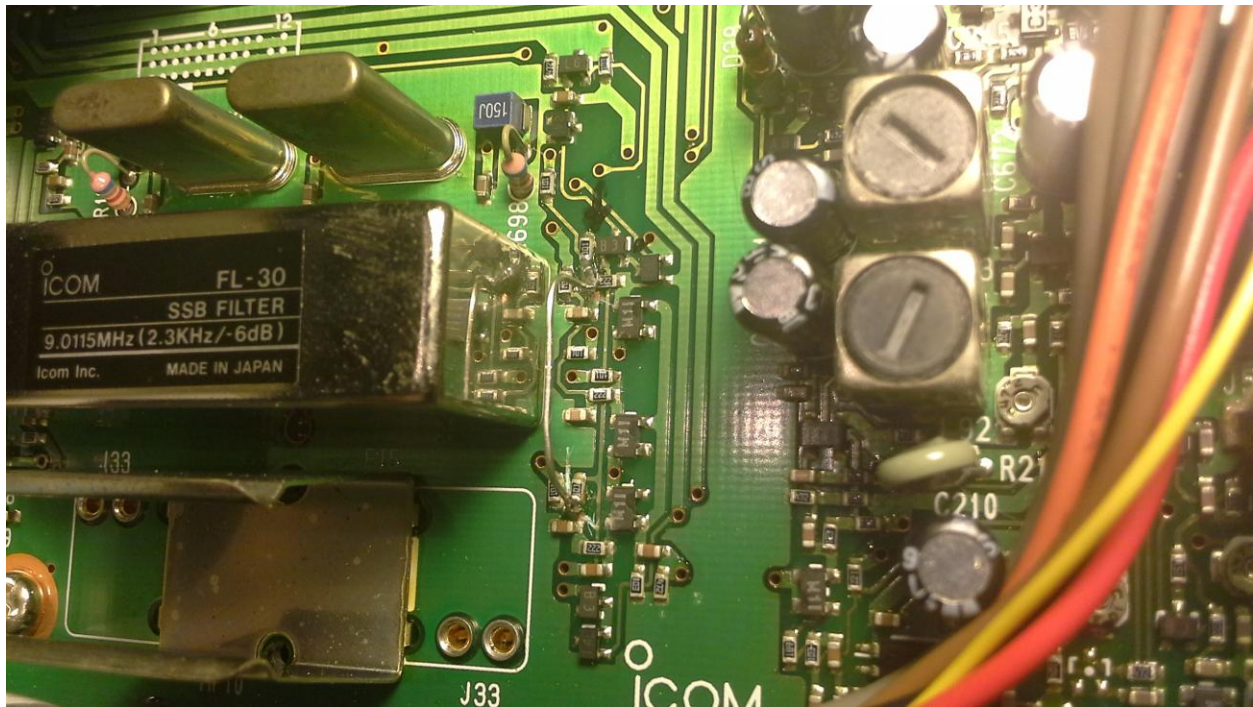
The IF filters are on the main board on the bottom of the radio. You can gently pull the ribbon cable out of the connector to make room to work.



Close up of the trace cut. Check this with your ohm meter to make sure the cut is good.



Here is where to install the jumper wire.



I used a lead from a resistor to make the jumper, hard to see.

When finished check your work and reinstall the ribbon cable and radio cover, be careful of the gasket alignment.

Now if you run the attached MMI files the radio will receive in FSK mode which will enable the 6 kHz filters and make PC-ALE happy, no un-needed pausing and soundings are controlled. Normal operation in USB mode is still available.

Custom MMI Files for ICOM M710

The custom MMI files for the ICOM M710 are available here:

PATH TO DROP BOX WILL GO HERE

Expand and place the MMI files in the PCALE/MMI directory and copy the LINKED.DAT and UNLINKED.DAT files into the PCALE directory. Then select Configuration / MIL-STD188-141 menu and select Radio Type MMI-Radio. Restart PC-ALE.

These custom MMI files do more than just select the optional filter in FSK mode in Receive.

Elsewhere in the HFLINK site I describe an earlier version of these MMI files which allow a modified ICOM AT-130 (or AT-140 or AH-3) to be commanded to bypass during ALE receive and tune when transmitting. I also explain how to modify an AT-130 to allow it to be commanded into Bypass Mode. Once the tuner memorizes each setting per frequency, it tunes within a half second and switches back and forth into bypass and tune conditions when sounding.

Edit the PTT_ON file to comment out the tuner commands and timing commands if you wish.

These custom MMI files also do the following:

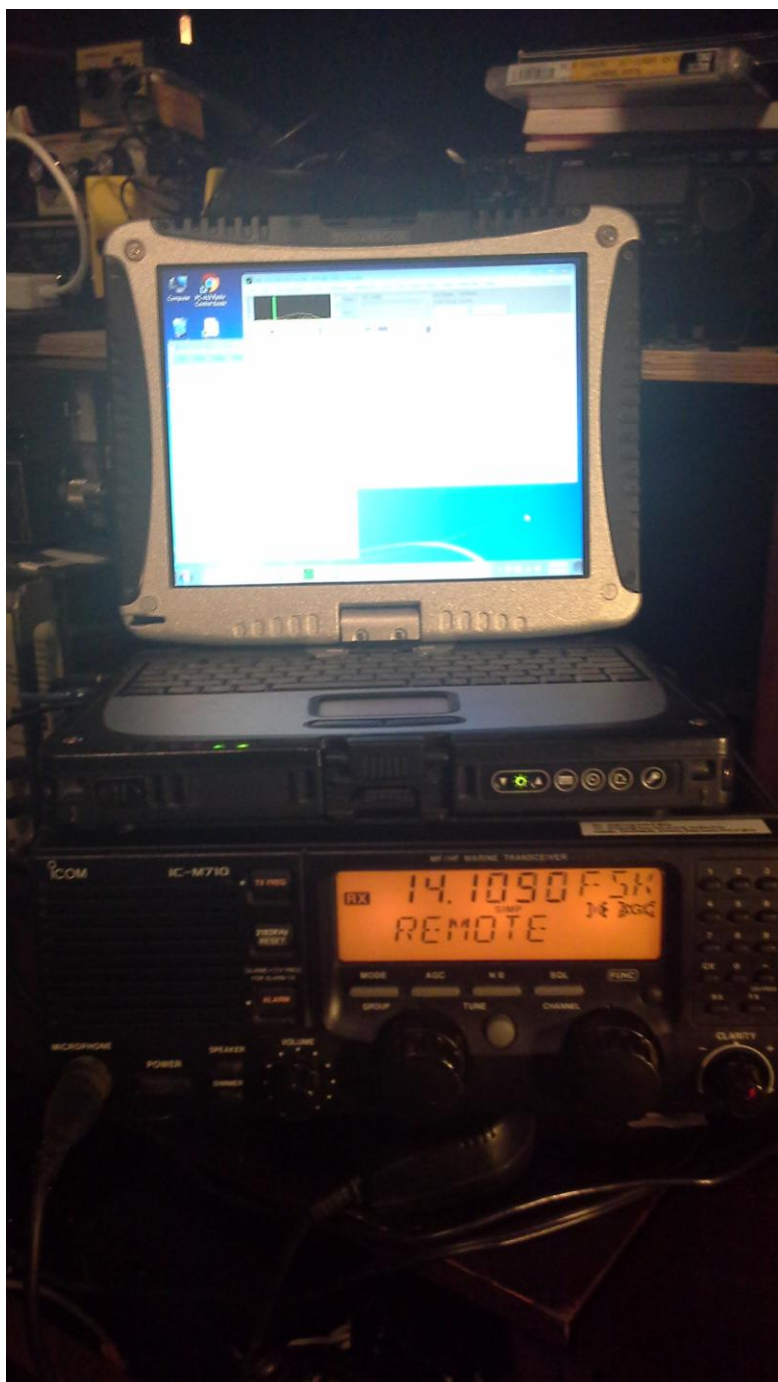
- Completely set up the radio parameters when started.
- Turn on the display back light when sounding.
- Turn on the display back light, un-mute the audio and bring it up to value 30 when a call is received, as a user alert.
- Turn the audio down to 0, but do not mute when call is complete so you can see that the mute icon is off, which means you have missed a call. Manually re-mute.
- Send tune and bypass signals to the antenna tuner.
- Times the tuning cycle of the radio before transmitting.
- Uses FSK mode in receive to enable either an Optional FL-70 2.8 kHz IF filter for PC-ALE, OR the internal 6 kHz IF filters.....uses USB mode in transmit.
- Sets proper radio parameters when manually set to scan, as in after a HFN or HFL call.



Here is the M710 using the custom MMI files in FSK mode in receive using the 6 kHz filters. Mute is ON, AGC is OFF, NB is OFF, SQL is OFF. High power selected.



Here is the M710 using the custom MMI files, in Transmit, USB mode.



M710 using an old CF-18 Toughbook, Win7, USB to serial converter and external USB audio puck. Using the DB-9 data remote control connection, data from computer to radio connected only. The radio has transformer coupled balanced audio in and out which is nice!