

Replacing the noisy cooling fan in ICOM IC-2KL by Bert Almemo, VE3OBU/SM7BUR

The following describes how to replace the cooling fan for a quieter one in the IC-2KL with as little effort as possible. The first part of this article deals with doing a straight replacement of the fan. The second part is a modification how to make the fan run at half speed all the time when the amp is switched on..

Unfortunately, some of the photos are a little out of focus and I didn't discover that until the amp was assembled. I hope you can still get the necessary information.

Before you start disassembling the amp find a suitable fan. It's a standard axial fan with a square housing – 4.7" x 4.7" x 1" (119 x 119 x 25 mm) - 12V DC brushless and sleeve bearing. See fig.1 photo "IC-2KL fan 1". Do not use a ball bearing fan. Ball bearing fans are usually noisy. The brand name of the fan I found in a surplus store in Toronto is NMB from Minebea Co. Ltd. I guess any fan with the same electrical parameters and airflow will do. Remember to run the fan before you install it to check the noise level and that it's working properly.

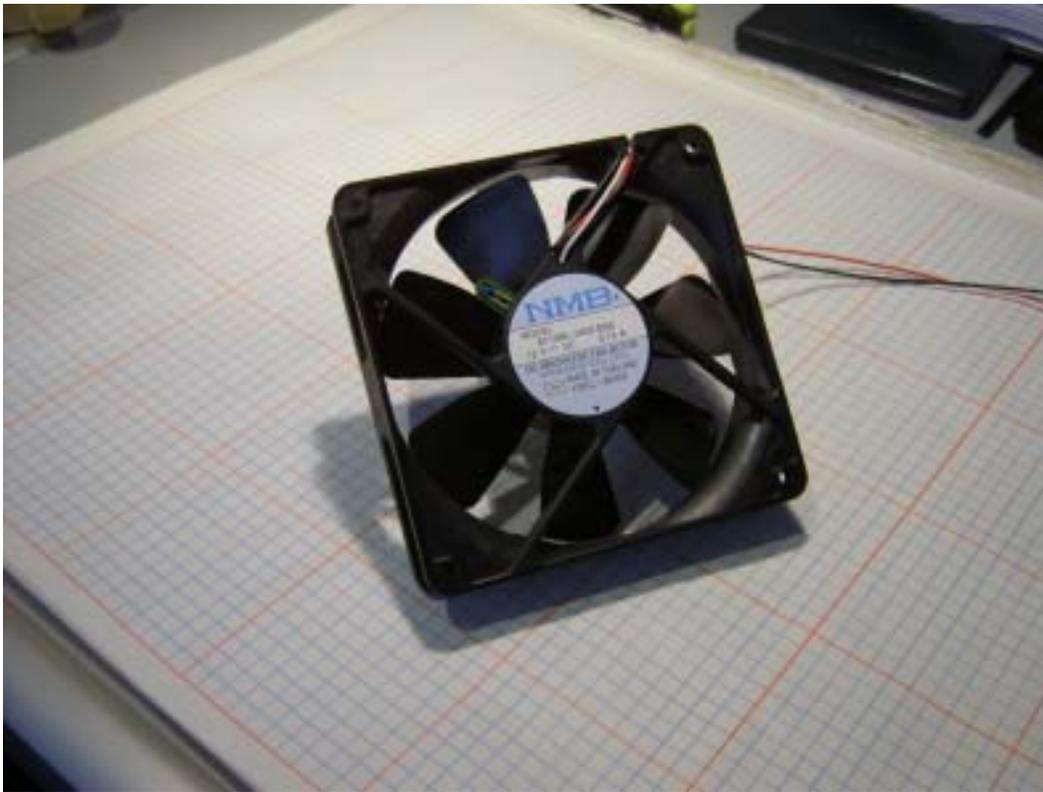


Fig.1. IC-2KL fan 1

Tools needed for the operation – soldering iron, Philips screw driver and side cutter.

All screws are M3 (metric) and they all have Philips heads.

To start the “operation” – remove the 8 screws that holds the top cover in place. Take off the top cover and turn the amp upside down.

Locate the 4 recessed screws holding the PA unit to the bottom cover. Remove the 4 screws and turn the amp around to make it rest on the bottom cover. Un-plug the two coax cables, phono plugs in the upper right hand corner of the Main board, connecting the PA unit to the Main board.

See fig. 2 photo “IC-2KL fan 2”. You may have to cut a couple of cable ties around the 2 coax cables to pull them through. Carefully fold the PA unit out of the bottom cover by lifting the end closest to the front panel. All wires connecting the PA unit to the rest of the amp is attached to the rear of the PA unit. See fig. 3 photo “IC-2KL fan 3”.

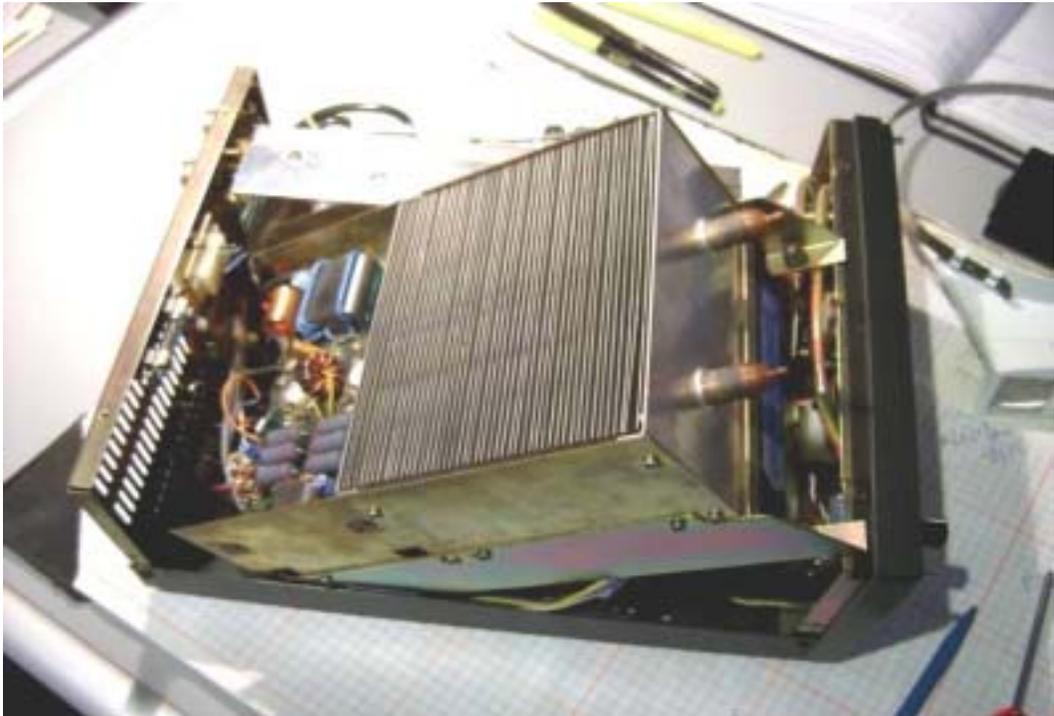
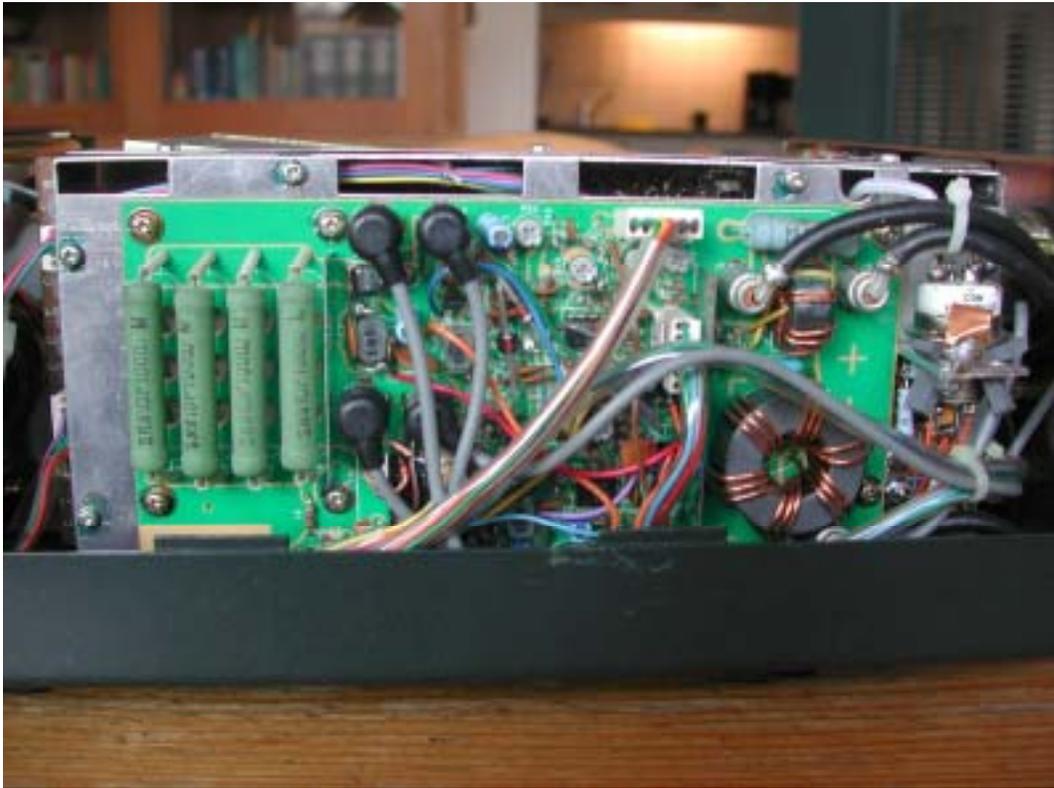


Fig. 2 and 3. IC-2KL fan 2 and 3

Make sure you carefully clear all wires that may obstruct removing the PA unit. When the PA unit is in a 90 degree angle or so to the bottom cover, rest the amp on the rear panel so the PA unit is lying on the table. See fig. 4 and 5 photos “IC-2KL fan 4 and 4A”.

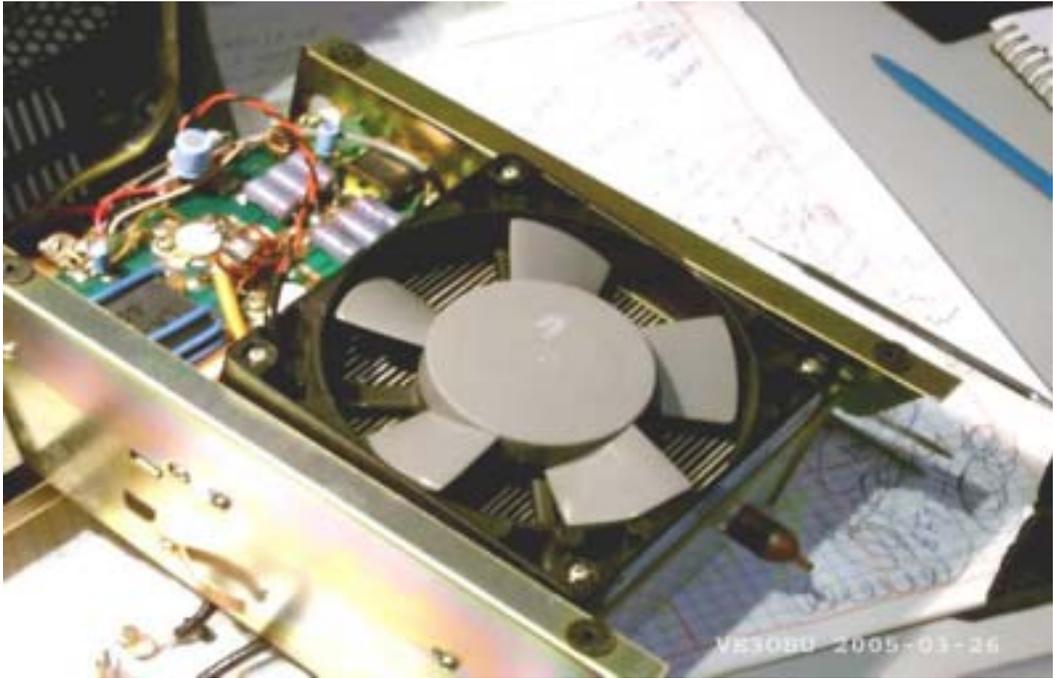


Fig.4. IC-2KL fan 4.



Fig.5. IC-2KL fan 4A.

Now the fan at the bottom of the PA unit is exposed and facing upwards. Make a note of which solder terminals the fan wires are attached to – note red and black. De-solder the red and black wires, remove the 4 screws holding the fan and remove the fan. Remember how the wires to the fan are routed in the chassis. The fan wires is the red and black twisted pair in the upper right hand corner of the photo. See fig. 6 photo “IC-2KL fan 5”.

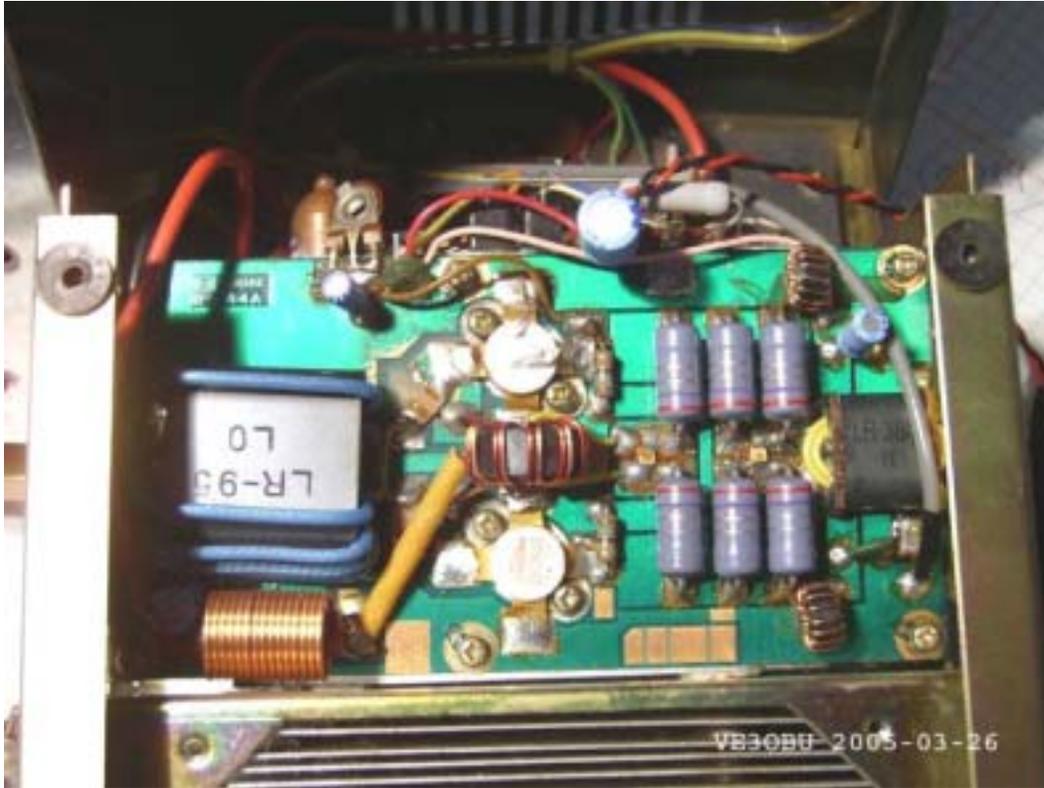


Fig.6. IC-2KL fan 5.

Before you install the new fan make sure you know the direction of the airflow. On the side of the fan housing there are usually two arrows – one indicating the airflow and the other the direction the blades are turning. If you can't see any arrows connect the fan to a 12 volt power supply and check it out. Make sure you connect red wire to + and black wire to – on the power supply. If you don't, you might have a surprise when you install the fan in the amp, discovering the blades turning in the wrong direction. The air shall blow through the heat sink/radiator, i.e. the airflow arrow should point toward the heat sink.

When you have the amp apart it's a good idea to do a little house cleaning, i.e. use a vacuum cleaner to gently remove the dust that's been collecting in the amp over the years. Use a small brush to loosen up some of the more stubborn dirt.

The clearance between the fan and the bottom cover/grid is very small so the 4 screw heads in the old fan were recessed to fit. See fig. 7 photo “IC-2KL fan 6”. If the new fan doesn't have the recessed holes in the housing you have to change the way you fasten the fan. You have to shorten the screws to be approximately 10 mm or approx. 3/8" long or to get new screws. Remember it's M3.



Fig.7. IC-2KL fan 6.

Instead of having longer screws going through the whole housing frame, approx. 1", you use shorter screws and using only one flange of the housing for installation. See fig. 8 photo IC-2KL fan 7.

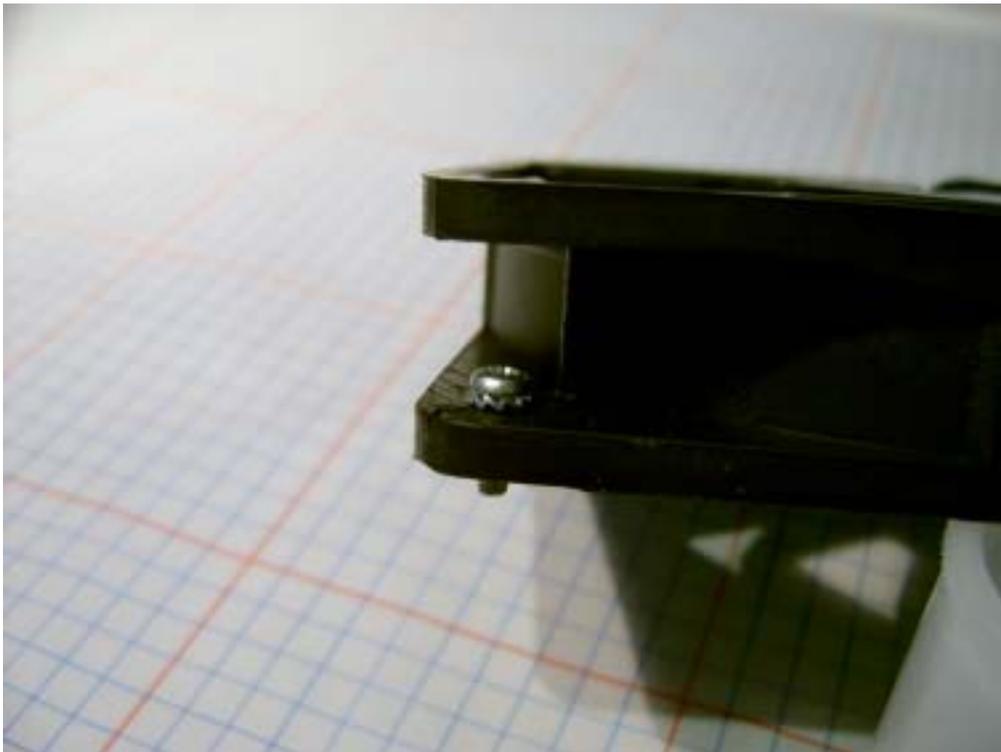


Fig. 8. IC-2KL fan 7.

In order to get the screws in place in the fan you can put them in before you gently drop the fan into place and then tighten one at a time. If you find that difficult you can increase the size of the holes in the opposite flange of the fan so the head of the screw can pass through. I don't have a photo of this but I'm sure you know how to do it.

If you are doing a straight replacement of the fan continue by taking the fan and slide the wires to the fan between the heat sink and the frame of the PA unit as they were before. Put the fan in place and install the screws as described above. Adjust the length of the wires and solder them to the terminals. That's it!

Assemble the amp and do a test run. Be careful plugging in the 2 coax cables to the Main board. The phono plugs are not made to accommodate RG-58 coax. Hopefully everything is working and you can enjoy a much quieter amp even during a long contest or rag chew.

Modification to have the fan run at half speed all the time

If you are interested in having the fan running at half speed all the time, not only when transmitting, the following mod is for you. It keeps the whole amp much cooler all the time.

In order to prepare the amp for this modification you follow the description above to the point where you are ready to solder the wires from the new fan to the terminals.

As the fan only gets 12 volts when transmitting, we have to "steal" +12 volts from a source where it's available all the time. The built-in DC-DC converter in the amp delivers +13.8 volts which is perfect for our application. The converter is the small aluminum box close to the front panel.

To get access to the box remove the 2 screws that hold the box to the bottom cover. Remove the screws and the lid to get inside the box. The RED wire is +13.8 volts. See the schematic called [Fig. 9 IC-2KL fan mod.](#) Strip a part of the insulation off the red wire and solder a suitable length of hook-up wire to that point. Push the hook-up wire through the hole in the box where the other wires are coming out. The wire from the converter should reach to the front of the PA unit where the solder terminal for the fan is. Put the lid back on the converter and put in the screws. Attach the converter to the bottom cover. If you can find another or better/easier point for +13.8V use that. This was the most convenient way for me.

You have to disconnect/cut the side of the fan that is connected to the "T13 line" marked with an X in the schematic. Connect the wire from the converter to the "hot" end of the fan and the capacitor. Solder a 30 ohm/3W resistor across the 50C thermo switch located close the solder terminal for the fan wires at the front of the PA unit.

With this mod the fan will run all the time at approx. half speed at a very low noise level. As soon as the temp in the heat sink reaches 50C the fan will switch to full speed, which still is a much lower noise level than the old fan. You can still hear the weak DX through the speaker.

Please let me know if you have any comments. Good luck!

