

MODIFICATION OF SANGEAN ATS909X



The Sangean ATS 909x is a great receiver but has some points to improve.

I did the following modifications and I am very satisfied with it.

- 1) removal of wheel spring detention
- 2) increased SSB volume
- 3) narrow/wide switch activates additional 1.6kHz low pass SSB filter in position „narrow“

I also considered to change the IF 450kHz filter „wide“ to a wider one for brighter AM and for „narrow“ an even narrower one for SSB. But the ceramic filters are difficult to obtain today (2017) and because of different pinning they don't fit easily in the printed circuit board. I decided to stay with the original filters. After all for me they are a good compromise between noise, brightness and muffled sound. For AM reception is always the possibility to tune 1kHz away. Because of the good stability and small steps it is also possible to use SSB for AM stations as „unsynchronized“ synchron detector which gives a brighter sound (and max. 40Hz false tone).

All modifications are made on a device with production date 2016/01 and software ver. P01.

Experience in soldering and electronic making is essential to have success.

ATS909X: REMOVAL OF WHEEL SPRING DETENTION

There is a quite good explanation already in the YAHOO group.

See „Detent remove mod.doc“ from g7jur, Mar 25, 2012

The most exciting thing for me was the pulling out of the rotating wheel in front of the receiver. I didn't believe there was so much force necessary to do this. I used 2 paper pieces put under the wheel and a thin knife to lift the wheel with enough force to „click“ it loose.

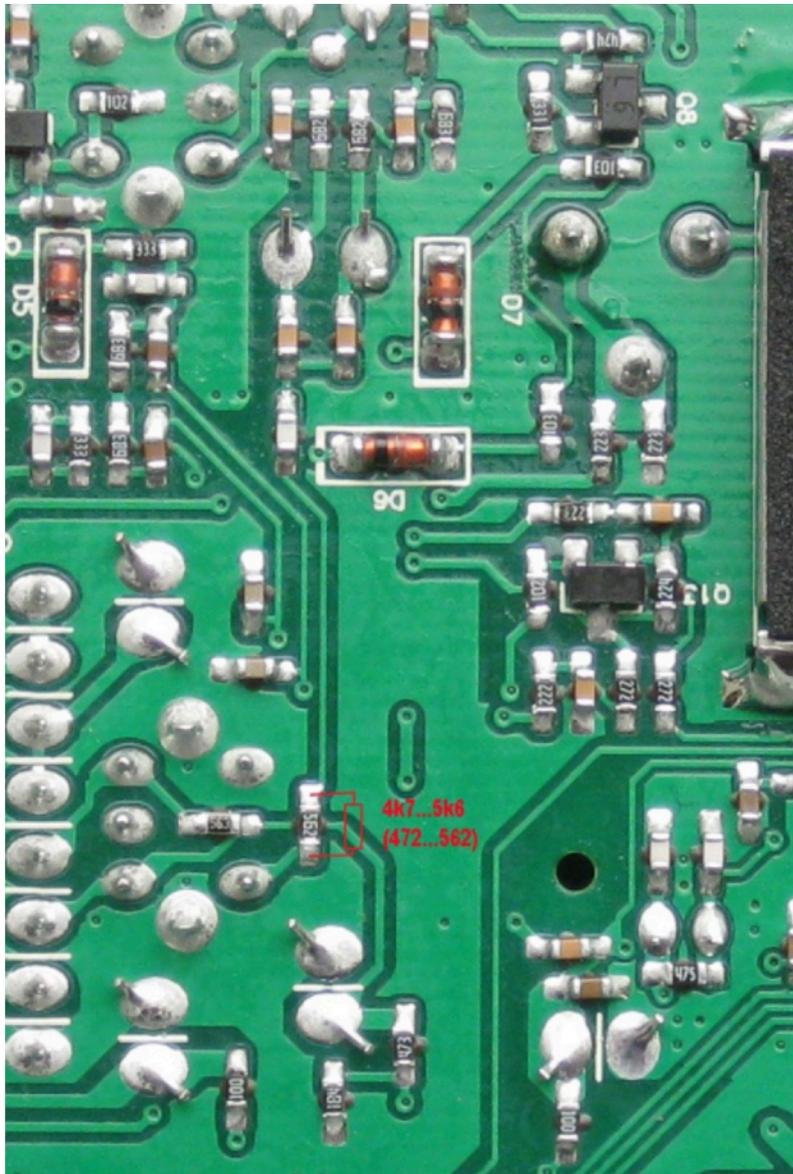


Good experience in unsoldering and the use of a vacuum pump to remove the incremental switch from the printed circuit board is essential. Some mechanical parts are made of plastic and overheating must be avoided. The opening of the rotating mechanism through very careful unbending of 4 metal stripes was more work as expected. But everything went well.

The result is astonishing. In „slow“ tuning mode the rotating wheel feels nearly like an analog tuning knob. No missing steps and no scratching. This modification is worth all the work.

ATS909X: INCREASE SSB VOLUME

See the original Russian solution on: www.ixbt.photo/?id=photo:693211



The decrease of the value of R1 (5k6) increases the SSB volume.

Don't try to disassemble R1, it is glued on the printed circuit board.

Don't push it too far. The decreasing of R1 influences the adjustment and filter curve of the LC-SSB output filter T1.

I used 5k6 parallel to the existing R1. It nearly doubles the SSB volume and this is quite a lot.

Additionally the SSB lowpass filter modification in the next chapter increases the SSB volume a little bit too.

ATS909X: SSB LOWPASS FILTER

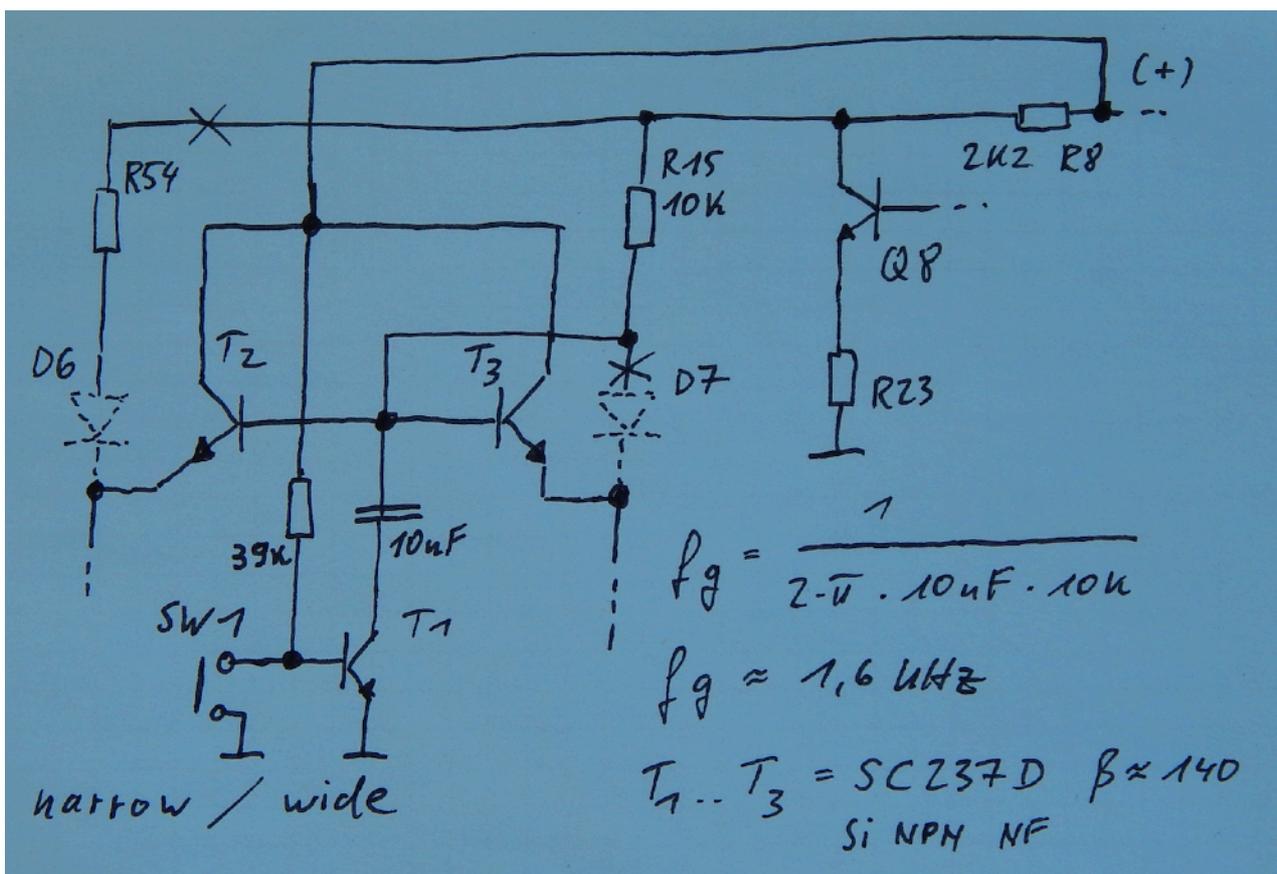
Why an additional lowpass filter for SSB?

It was boring for me to have no function on the bandwidth „narrow/wide“ switch in SSB mode. In SSB mode the narrow IF filter is used internally and independently of the position of the switch „narrow/wide“.

My idea is to give the „useless“ switch in SSB mode a function. Sometimes bright interferences are on the SSB sound. An additional lowpass filter is really helpful in some cases.

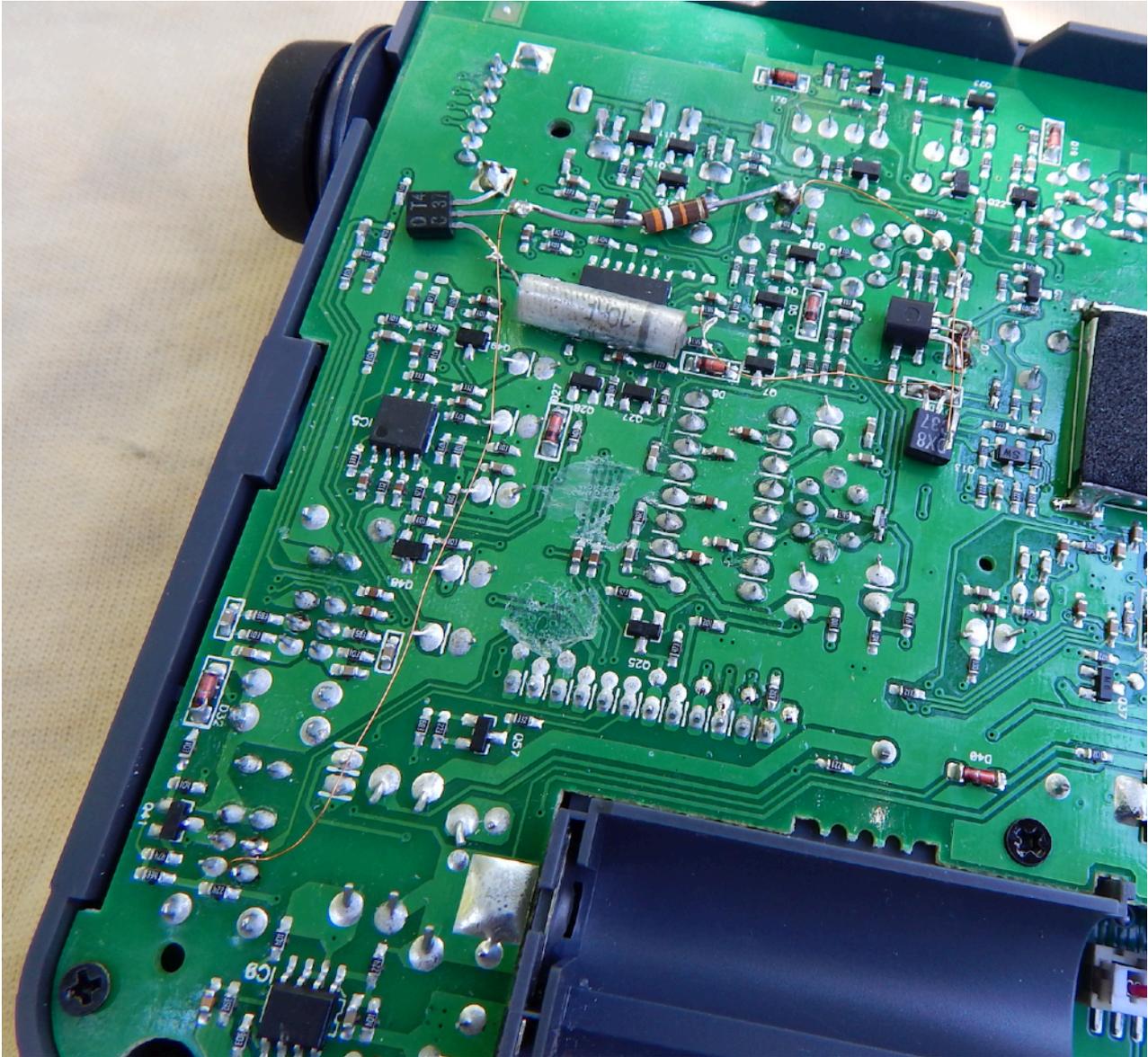
To increase the volume of SSB a little bit it was my idea to use 2 NPN silicon transistors (T2, T3) as current amplifier instead of the diodes D7 and D6. The volume loss of the 10k values of R15 and R54 would be neglected with the much smaller base current of these transistors. With the use of one of the remaining 10k resistors (R15) and a capacitor of 10nF it is possible to implement a passive lowpass filter with a corner frequency of about 1.6kHz. The capacitor has to be switched to ground via T1 in negative logic with the „narrow/wide“ switch in order to activate/deactivate the filter. An unused pin of SW1 switches the base of T1 to ground. The additional low pass filter is now active in the „narrow“ position of switch SW1.

Here is the schematic:



The silicon NPN transistors are types of „East Germany“, 30 years old but they do very well. Any other Si NPN types with current gain >100 will do also.

Components and wiring of the lowpass filter for SSB „narrow“ mode



Be careful while placing the parts. The backside plastic of the rear cover has 2 struts which press on the printed circuit board to fix it. Keep the place free of parts.

HINTS FOR DISASSEMBLING

Use 2 paper sheets and a narrow blade between to click off the plastic rotating wheel out of the front.

Pull the volume knob loose only with your fingers.

Use a good screwdriver to unscrew all 6 screws on the backside (one in the battery compartment)

Remove the frontside a bit. Leave the cables connected to the speaker and display. You can move the frontside up/down/left/right to reach the other internal screws one by one.

Remove the 7 black small screws on the printed circuit board inside.

Lift the printed circuit board a little bit to reach the battery thermal sensor. Remove the 2 silver screws and move the small sensor board aside.

Remove the 2 silver screws near the whip antenna mounting. Remove the black metal screw of the connector to the antenna.

Put the printed circuit board back in place without screws.

Remove the backside of the receiver.

Now the backside of the main receiver board is free and you can make and test the modifications.

You can supply the receiver with the external supply and test. Be careful to avoid short circuits with the speaker and loose cables.

For the unsoldering of the rotating knob mechanism the connectors between the parts have to be disconnected.

For assembling the steps are in reverse order.
