Cell Block Mod for AOR AR-3000a

Contact author: Shannon M. McMillen

This mod remove the Cell Block Unit that block for receiving frequency in the cellular area.

The Little PCB has 3 groups of pins on it....
CN1 = 2
CN2 = 3
CN4 = 11

On the PCB is = P-9205B and
CPU-UNIT CUB.PCB

It is soldered to the LCD CPU KEYPAD Board from stiff pins ,like a house on telephone poles so it wount get flooded when the river rises.

All you have to do is remove this PCB and youll get all frequencys.
This PCB is a watch dog curcirt for a band of frequencys (cell band).

AOR AR-3000 changing priority channel test time

I've got the 3000a version. To change the priority interval press:

2nd F then hold the [PRIO] key until you see P-int flashing. Now you can type the number of seconds (1..99).

Direct (unfiltered) FM discriminator out for the AR3000/A scanner

everal firmas offer this mod routinely, and it is not difficult.
AOR-UK gives instruction for doing it yourself. They reccommend to bring the signal to pin 1 of the backpanel DIN connector; I think that should be standard.

```
-> pinning of the din is:
     2
  4     5
 1   8   3
  6     7
```

The discriminator out is found on pin 9 of IC1 of the main/if/af board (the lowermost of the scanner). It carries an unfiltered output in N/WFM modes, I'm not sure if it gives still a (bandwidth limited) NFM when the scanner is in other receiving modes.
All the mod is to solder a piece of wire from that pin to the DIN8. For extra protection, I added a 0.2 uF capacitor inbetween.
The IC is easily identifiable once the board is unscrewed and turned upside down. There are few smd ics on that side of the board; IC1 is the only "3357" and is located more or less on the opposite side of C70 - L28 - L29 - X4 etc.
If you're too lazy to unscrew the board, as I was, the signal track is also available on the upper side. Here is how to find it:

the wire has to be soldered to the point #.

Enrico Segre, segre@naima.polito.it

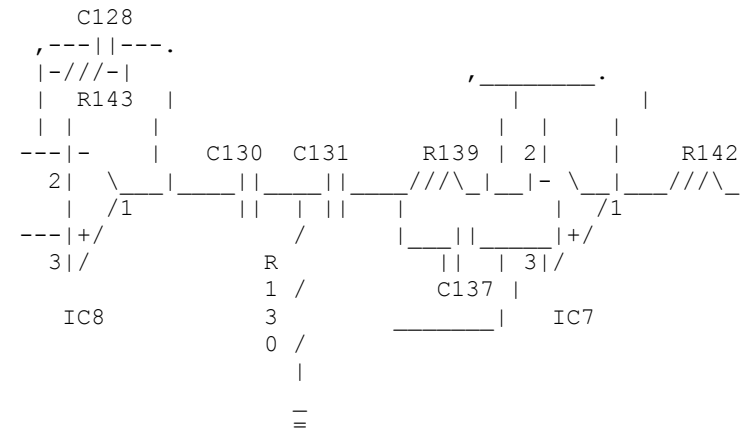
Improve the audio for AM/NFM/SSB/CW modes on AR-3000

This is a hack I have done on the AR3000 scanner. My one is a first series one, but I guess the 3000A has the very same motherboard, so it should apply to the new one too.

One defect I've found of this scanner is that its audio completely lacks basses in the AM/NFM/SSB/CW modes. I've gone to the service manual, and I've found that this is intentional. The audio line passes through a notch filter. This is stated to be 300-3000Hz. I do not believe much to the upper limit (the 5Khz whistle on shortwaves is quite strong), but I find the lower one annoying and unjustified. Therefore I removed that cutoff. After the intervention, I find a much improved audio quality, both in speech and in broadcast, and I haven't yet found a signal which makes me regret it. And if I even wanted, now I can add an external equalizer.

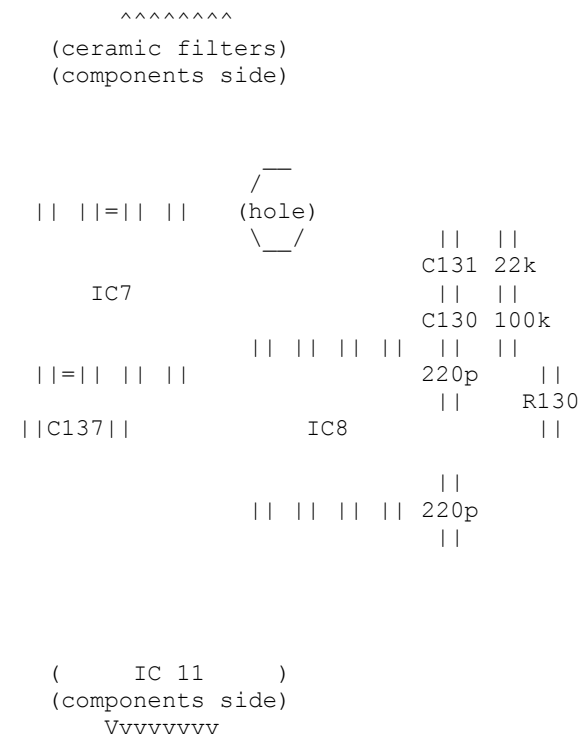
The mod itself is simple, but involves working on SMD, so it's quite DELICATE. Do it at your risk. I'd reccommend having a copy of the PC layouts and of the schematics from the service manual, in order to understand what you're doing. I found useful making a coloured xerox copy of the etch layouts on transparencies, so to overlay them.

Theory: the notch filter for AM/NFM/CW/SSB is built around the double op-amps in IC7-IC8 on the if/audio board. The lower cutoff is determined primarily by R130(10k), R139(4.7k), C130(22n), C131(22n), C137(22n) (I don't swear on the correctness of the identifiers since my schematic is borderline readable)



What I did was: to remove R130; to solder a 0.1uF condenser in parallel to C130+C131; to remove C137 and to shunt it with a jumper.

Operation: unscrew the cover and nake the receiver. Unplug the loudspeaker connector. The audio/if board is the lowest one, and has to be unscrewed and turned upside-down, so that the SMD side is accessible. To this extent, at least one of the coax connectors (J1,J10) has to be unplugged. Locate the components to be attacked (again I recommend having the etch layout; I try to sketch, but it's not as clear). The region is on the SMD side opposite to IC9 on the component side. IC9 is recognizable since is a voltage regulator, it has 3 pins and gets hot.



(Sorry but I can't draw any better)

I suggest to turn the radio on, and to try to shunt C130+C131 and C137 leaning a O.1uF condenser on the proper tin points, in order to locate them. The sound should get richer of basses in both cases.
Then unsolder R130 and C137. It requires a quick and firm hand since the components are ~4mm long, and glued to the board. Solder a short shunt in place of C137. Solder a 0.1uF condenser (or greater) on the extremes of C130+C131. A little ceramic one does it; even if it is not as neat as replacing with another SMD, there is plenty of room.
I did all the job with no other equipment than a cheap and thin tip soldering iron and a pair of pincers, but, again, entirely YOUR RESPONSIBILITY. Rescrew, close, enjoy... Of course the effect is much better with an external speaker.

I'd like to hear comments or to know if anyone has tried other hacks on the same box. Please email me. Once more, I take NO RESPONSIBILITY whatsoever... :) ... In my case it worked well, though. A final note: I'm indebted to Henry Laviers , who sent me a copy of the service manual two years ago.

Enrico Segre, segre@polito.it

AR3000A memory doubling

Contact author: Mark

The easiest mod I would like to share is the fact that one can double the memory channels from 400 to 800 without losing any functions.
Check IC-7 on the CPU/LCD UNIT schematic and see that pin 1 is tied to pin 28. Pin 1 is also known as A14 address bit. If you were to lift pin1 from the pc board and via a 330 K ohm resistor reconnect it to pin 28 and then ground pin 1 with a switch you can toggle pin 1 to either 5 volts or ground to access the "liberated" second bank of 400 channels.
Of course you also get more VFO's and search banks and stuff as a bonus. I have had this mod in my radio for 12 months now and it works great!

Upon discovering this I checked the schematic for the AR3000 and found that you can quadruple the memory cuz' there are 2 address lines that can be liberated.

ar3000/3000A mod FAQ

Some answer to frequent questions I receive since I started posting about mods to the AR3000:

- I'm not going to make photocopies of the schematics for every nudnik who asks me about across the net. I'm told it's easy to order schematics from aor-uk, and I guess also from other outlets.

- I don't have cracked control software. Besides, I don't even use windows.
  I only have some attemps of programs I've written for the ar3000 only for atari st with omikron basic (rather unfunctional) and for mac (chipmunk basic 3.5). Rather raw and unfinished, but if someone is interested I can forward the sources.

- Some firmas offer various mods for $$$. Among these aor-uk (ar3000plus), Bogerfunk, EEB, if I remember correctly. These include discriminator out wiring, IF filter replacement, wider-NFM for meteosat, 10.7Mhz tapping on the backpanel for external decoders and SDUs. Check with them for those; they all have websites. Just a couple of lines on two of them, as I'm often asked:

  The wider-NFM mod made by aor-uk involves adding a custom hibrid band-pass filter, and switching it manually when the radio is in WFM mode, for those interested. I also suspect that the easiest hack would just be to use the NFM mode, bypassing completely the 12khz IF ceramic filter. That way you would have an unprecise larger bandwith (whose edges depend on the tuned frequency), but in principle it should work.

  As for tapping 10.7Mhz: my guess is that the only possible pickup point for a 10.7 Mhz signal (present only when the receiver is set into WFM) would be somewhere around XF1-Q11-L26 on the main board. That is the lowermost board of the receiver, and the components are located by one of its corners. The spot is recognizable since L26, D9 and XF1 are marked in print. I would see, as best, a small capacitive coupling to the collector of Q11, or the primary of L26; it might even be that, if your external decoder is sensitive enough, an inductive pickup by L26 is sufficient. I think that you have to experiment a little. For easyness of wiring, though, the secundary of L26 is the only hot point accessible on the upper face of the pcb. The secundary of L26 is connected to the two extremities of the double diode D9 which lie closest to the coil L26; the other pins are accessible only on the other side of the board.

- I have no idea and no interest in how to bypass the cell-blocking of the ar3000a sold in the USA.

- The front end has a number of problems, it suffers from intermodulation and the band-pass filters have questionable intervention points (in particular, there is no image rejection in SHF), but I can't think any viable and easy improvement.

- Rather, I'd like to know if it is possible to reduce the audio hiss which is likely generated by the squelch section (at least on my radio).
  Does anybody have an idea?

Narrowing AM to 6kHz for AR-3000

This is a couple of hacks for the AOR AR3000 scanner. They tamper the IF section, (a) increasing the AM selectivity and (b) apparently solving a signal leakage problem.

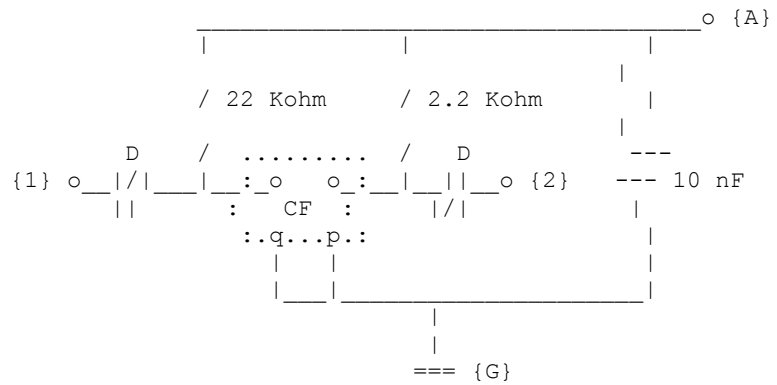
The point is that, by design, the IF bandwidth for the AM,CW,SSB and NFM modes is intentionally 30 KHz throughout the IF chain, down to the 2.4/12 Khz ceramic filters which just precede the decoders. While 12 Khz is acceptable for NFM and 2.4 for SSB, a bandwidth as large as 12 Khz for AM degrades much the unit performance in busy bands like SW. Moreover, probabily due to an impedance mismatch, (design error) there is a significant signal leaking across the filters. Strong offtuned signals interfere with the centered ones until some 25-30 Khz apart, even in the 2.4 Khz SSB mode. After these mods the dynamic selectivity would still not be termed superb (a little blocking persists), but at least comparisons with <200$ SW receivers will become definitely ridicolous. In effect, the AR3000 in SW cries out for an AM 6 Khz mode.

The mod (a) involves adding an additional 455 Khz/6 Khz width ceramic filter and patching a little around. The mod (b) just implies soldering a couple of condensers on the printed circuit board [pcb].

Most of the directions are common for the two mods, since the same section is involved. The mods are not difficult, but require a high confidence on working on SMD. I used no special tool but a cheap pencil soldering iron, pliers and screwdrivers, but I TAKE NO RESPONSIBILITY for how you may screw your scanner up, ok?

It would be strongly advisable to have the etch layouts from the service manual and the schematics of the unit available, in order to understand what you are doing. I would even reccommend to xerox the various layers of the layouts of the main board on colored transparencies, for handy reference. I try to sketch the most relevant points in ASCII, anyway.

For the mod (a), we will be adding the following external circuit



in parallel to the existing filters. This just duplicates the existing ones, with a new bandwidth. Then the AM steering signal has to be tweaked, so that the new filter is switched on in place of the 12 Khz one in AM, while the switching remains normal for the other modes. This reduces just to cutting one track and soldering one shunt on the pcb. Other options would be possible, in the sense that additional filters of any bandwidth between ~0 and 15 Khz could be added for any mode, but in my opinon the present choice is optimal. Personally, I didn't like the idea of having to select manually the bandwidth (an external switch is much less neat), and I even tried out the existing 2.4 Khz filter for AM too, but I didn't like the result (way too narrow for broadcast). Steering the SSB filter in AM too is perfectly possible, but due to the tracks layout, and the need of _not_ switching in the SSB decoder, involves a little more cutting and patching the pcb. I won't describe it here.

Perhaps an additional extra-narrow filter could be considered for CW, but I'd think that the higher size and cost would not be worth on an unit of this class.

In the above schematic, CF is a 455/6 khz ceramic filter (e.g., Murata CFS455H), D are any signal diodes, and values of the R and C are not even critical. BTW, the bandwidth @ 6dB codes for 455 khz filters are (letter after the figure 455):

A=35, B=30, C=25, D=20, E=15, F=12, G=9, H=6, I=4, J=2.9, K=2.4 .

The unit originally mounts a 455F and a 455K (the bigger, metallic shielded one). It might be a little difficult to find filters other than the most common consumer ones, which are the D and the E, and you might have to turn to surplus sources.

It is most practical to build the new circuit directly on the pins of the new filter, to lodge it into the unit glueing it to a corner of the pcb, and to connect it to the relevant points with 4 flying wires. It's strongly reccommendable that the signal wires which connect points {1} and {2} to the pcb are shielded and grounded only on the filter side.

Operation:

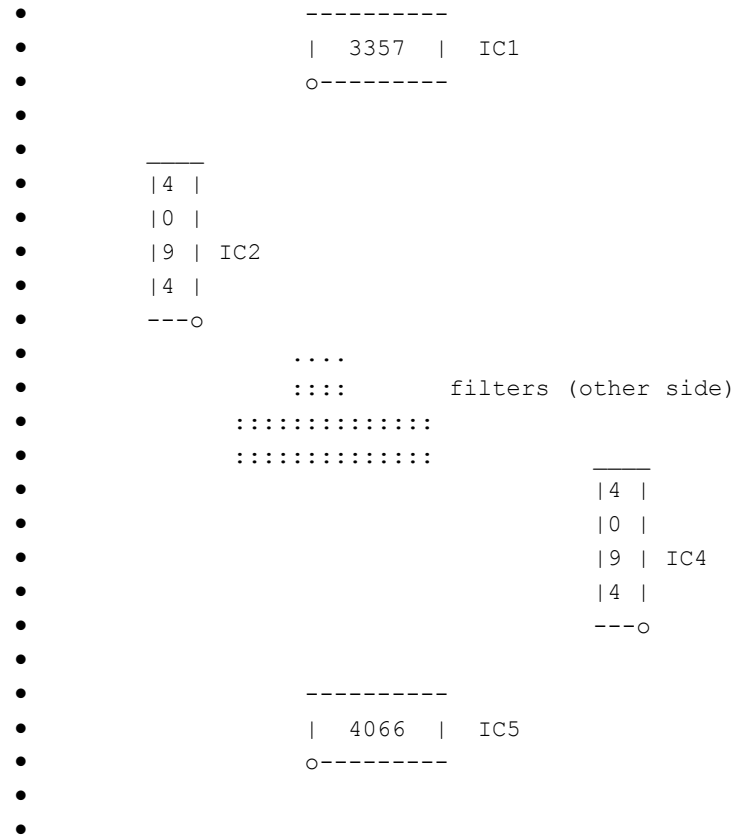
- disconnect the power cord! Turn the scanner uspide down. Unscrew the bottom cover (2 screws on the bottom and 2 on the backside) and remove it. Disconnect the loudspeaker connector.

- unscrew the lowermost board, which is the IF/audio/power supply board (6 screws). Locate the two ceramic filters (approximately on the center of the board) and L29, on the visible side. Identifiers are printed on the board. Disconnect gently the thin coax wire socketed to J1. Turn gently the board upside down to see the SMD component side. All interventions are on this side of the pcb.

For the mod (a):

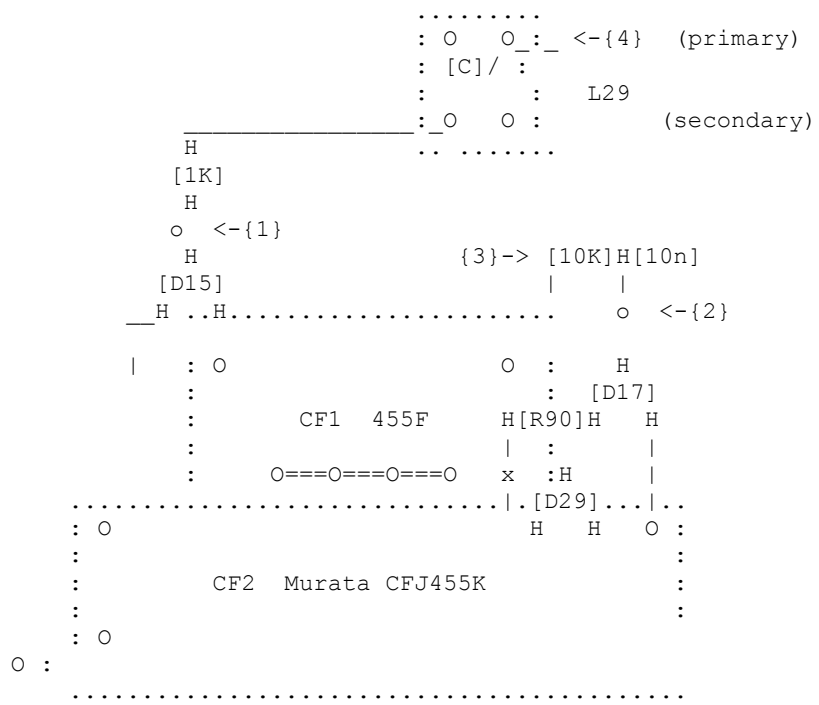
- locate the following section on the pcb:

  [[overview: reference to the integrated circuits - o indicates pin 1]]



-
-
-
- vvvvvvvvvvv
- fuse on this side

[[Enlargment of the filters section: (only the relevant components)]]



(in this drawing O represents a pin, H the soldered terminal of an SMD component, the outlines are dotted and lines are tracks. The double-diodes are recognizable for their rectangular 3-pinned case, and resistors should have their value printed on)

- Cut the track between R90 (1.5Kohm) and D29 in the point 'x'. This isolates the steering diodes of the 455F (half D15 and half D17).

- solder a shunt wire between the free side of R90 and pin 4 of IC4. (in alternative, the shunt can be soldered to the pin of D19 connected to the said pin 4 of IC4). This pin carries the command signal for NFM; this way the steering diodes of the 455F remain powered up in NFM.

- prepare the new filter, with connection wires of the exact lenght to reach the pcb. As said above, I think the best location for it is to glue it to the corner in which the fuse is.

- join the points {1} and {2} of the new filter with the corresponding points on the pcb. Be careful to trim and to tape the ends of the shielded wire, so that the shield cannot touch any track.

- solder the connection {A} to pin 6 of IC4, which carries the AM steering signal.

- solder the ground connection to any ground point. I'd reccommend the ground track on the edge of pcb in the vicinity of IC4.

And now for the mod (b).

I don't have a precise explanation of why the mod works, but it does, and well enough to reccommend it. Apparently, with the new components there is a much better impedance match between the output of IC1 and the ceramic filters, which prevents or accidentally

cancels the leakage.

solder a 10 nF capacitor (or greater) between points {1} and {4}, and a 68 pf one between points {2} and {3}. You might try slightly higher values for the latter, but these would result in an attenuation of the good signal together with the spurious. The new capacitors have just to be small in size, and to be soldered parallel to the board, since the available height is limited.

On the AR3000A, at least on Marc Gauw's unit, a similar patch was already applied by the factory. In that case, a shunt wire directly connects the primary of L29 with the common pin of D15, while two resistances and one capacitor attached to the secondary of L29 are missing, in contrast with the AR3000 and its schematic on the service manual. This tells us that AR itself became at some stage aware of the problem, and developed that hack solution. In any event, the bypass of L29 makes almost irrelevant its adjustment.

I have discovered the problem and the mod while communicating with Marc about replacement ceramic IF filters. In particular, I could check the leakage and its cancellation with both IF filters excluded.

remount the board, rescrew, reconnect connectors, close the unit and enjoy.

I'd like to hear comments or to know if anyone has tried other hacks on the same box. Please email me. Once more, I take NO RESPONSIBILITY whatsoever... :) ... In my case it worked well, though.

A final note: I'm indebted to Henry Laviers hl1@acpub.duke.edu, who forwarded me a copy of the service manual, two years ago, and to Marc Gauw with whom I developed this mods, for a lot of relevant email discussion and help. The filter my AR now mounts, btw, was kindly provided by Marc.

ps: check out also my hack for improving the audio bass fidelity...

Enrico Segre,

Non-invasive modify for AR3000 remote control

Contact author: Paul Lin / bv5oc

I had an AR3000 for more than 2 decades. Its remote control function just over there over this period, until one years ago, I try to use my desktop PC to operate my AR3000. But I find a switch added is needed to turn its operation to local panel or remote control. And I find all modifies are invasive to add a switch.

I use this RS232 cable as a Non-invasive modify for AR3000 to allow PC to control, this cable is built as followed:

1. Find a non molded RS232 cable(25PINs-9PINs).
2. Open the housing of 25 pins terminal.
3. Drill a hole on the cover to allow to add a slide switch (photo1, 2).
4. Pin1 and pin7 of RS232 to connect pins of slide switch center and any side pins (photo3)
5. You almost done it (photo4).
6. Close the cover of 25 pins housing (photo5, 6).
7. Use this cable to test (photo7).
8. Switch the slide switch, panel will show "send" (photo8)

Photo 1

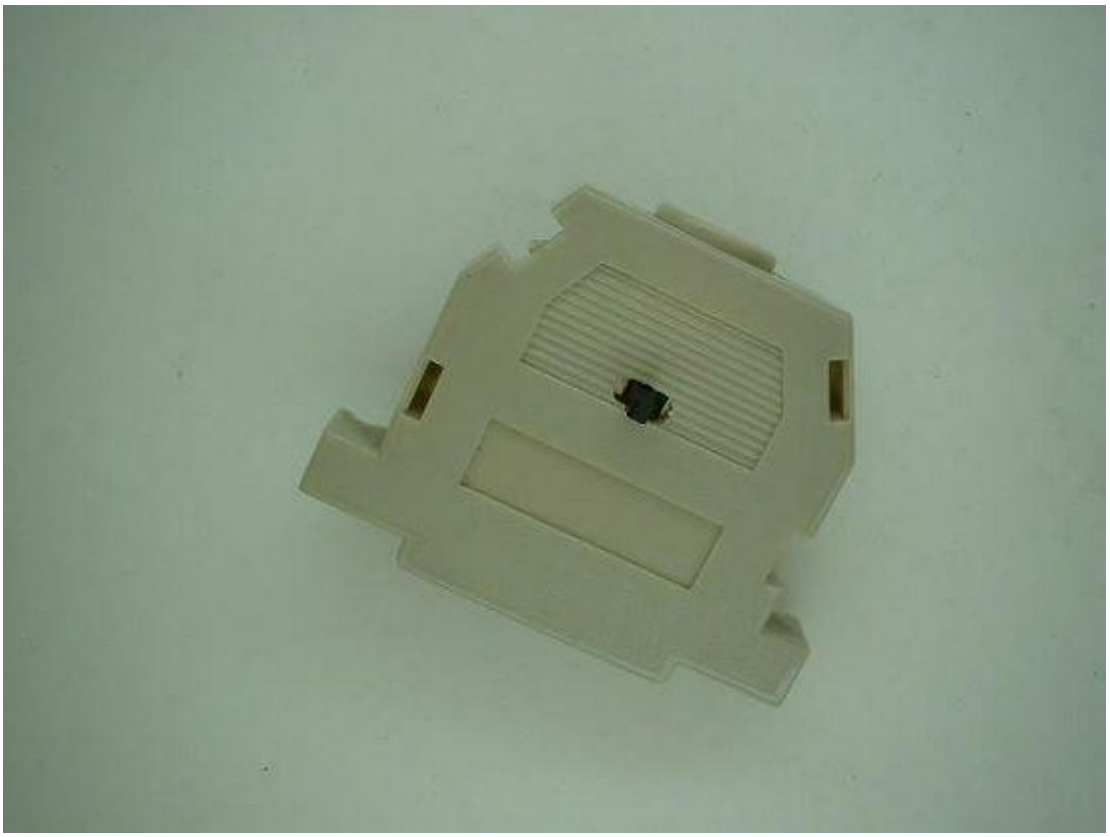


Photo 2

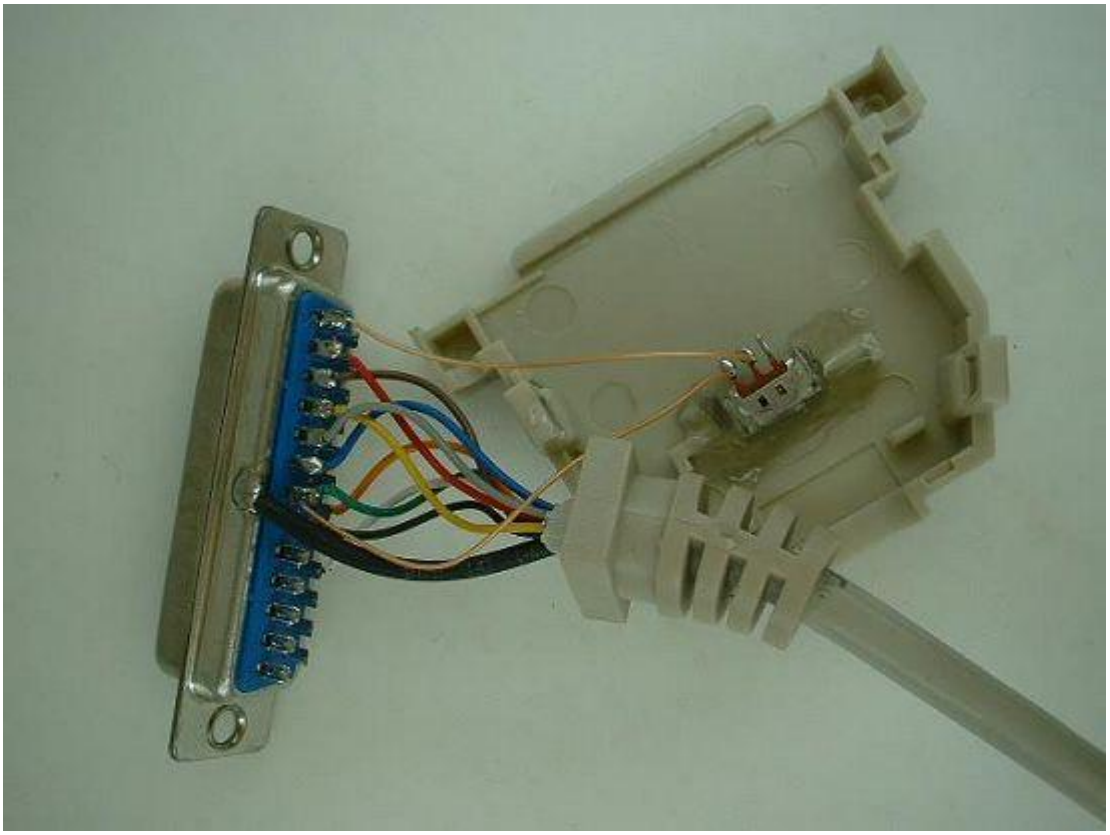


Photo 3

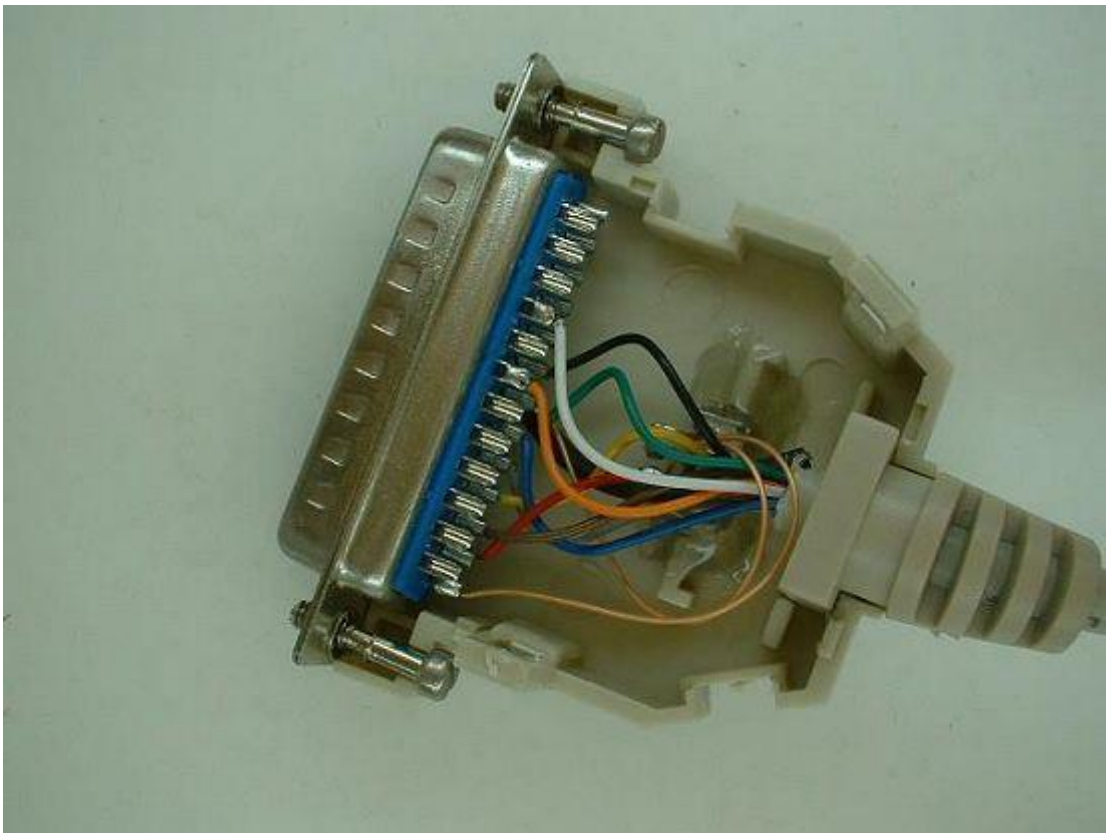


Photo 4

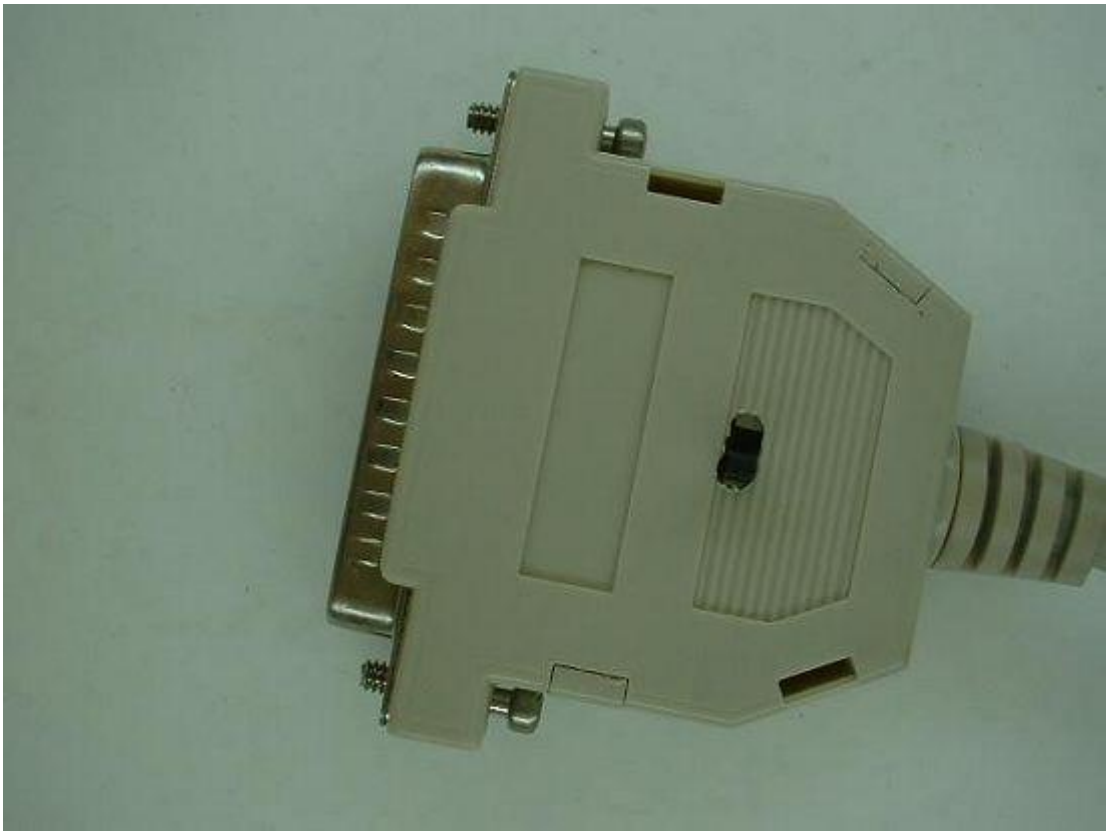


Photo 5

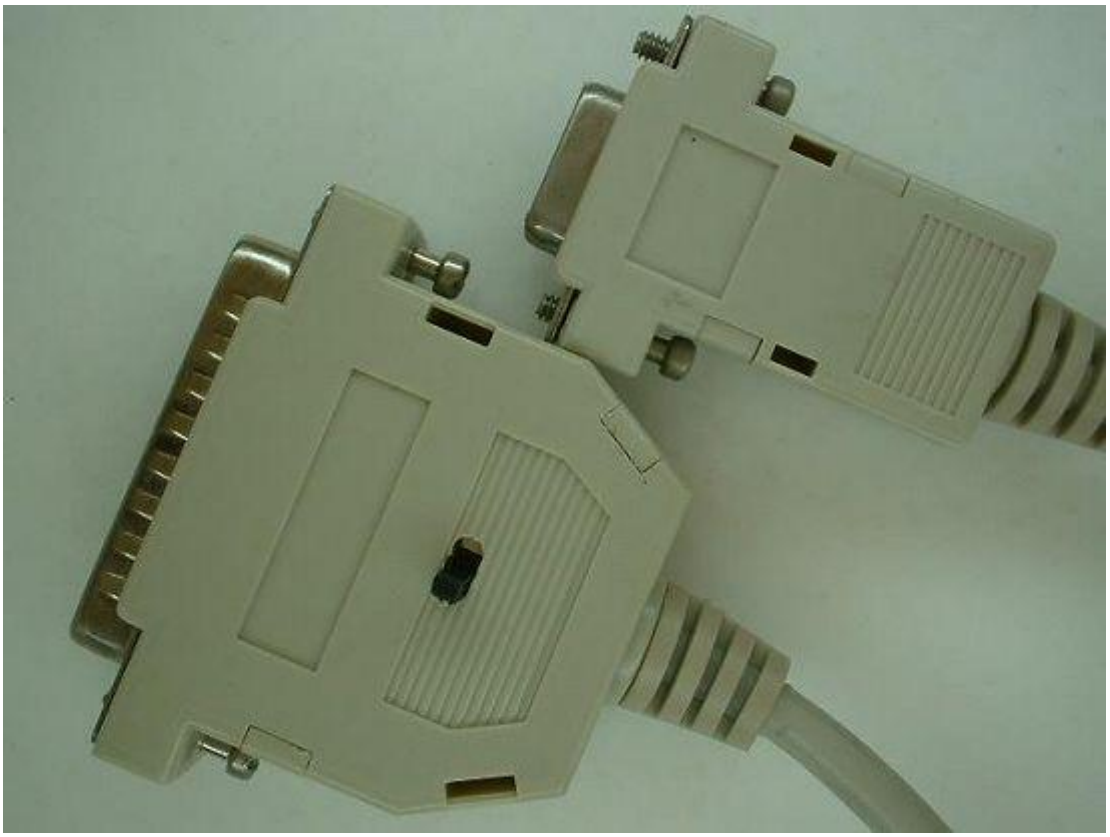


Photo 6

Photo 7

Photo 8

Remove the click whitch is heard throughout HF

This is another of my hacks (the fourth in a row...) for the AOR AR3000 scanner. This time I tampered with the front end board, in order to remove an annoying click which is heard throughout HF, and is due to crosstalk between digital command lines and signal input. This click is heard a) on the line audio output on the DIN-8 connector, which is unmuted, and b) on the loudspeaker, once my "demuting" mod is carried on (sorry for the self reference, but...). My mod does not eliminate the click completely, but almost. Before the mod, a click is heard whenever issuing a command (this includes turning the tuning knob), throughout the range 0.1-50 Mhz (remarkably strong below 10 Mhz); afterwards the click is almost cancelled above 1Mhz, and easily overwhelmed by signal above 0.5 Mhz. I didn't find a way to do, quickly, better than this. In this way, the tuning wheel may be spun giving "almost" the feel of an analogic vfo... You'll enjoy the whhhooshhh on the unsquelched output during free scan... Also, the click noise won't mask weak signals while scanning. The other limits of the front end of the AR3000 (intermodulation, blocking, birdies) will now be fully appreciated. One day I'll buy a real shortwave radio.

The click is due likely to leaking of the digital signal on the command board, and ultimately to the pcb tracks layout. Sometimes I have the impression that the AR3000 must have been conceived as a high end receiver, but projected in a rush with a lot of mistakes - check the superetherodine conversion pattern, for instance, and you'll find out that all the range 940-2036 Mhz is sent trough the same prescaler filter, despite that this implies NO image rejection on some frequencies and despite that steering signals for additional SHF filters exist on board...

What I've find to work is the following:

- one signal has to be routed via a shielded wire rather than via a long pcb track.
- two capacitors can be added between two digital lines and ground. True, you're not exactly supposed to short a CMOS output to ground with a 4.7nF capacitor, you'd rather make an RC filter to the next input... it works so don't bother.

What I'm describing here refers properly to my old 1989ish AR3000. I have also the schematics of the 1991ish 3000A: the circuit seems exactly the same, so I suppose the problem.

The mod is easy but tampers on SMD - shall I insist once more that I TAKE NO RESPONSIBILITY for how you may screw your scanner up?

Just a bit of theory: command signals for the front-end are fed _serially_ by the cpu, and parallelized by three 4094 shift registers (IC1-3) connected in cascade. When the cpu wants to change something on the front end, it sends a string of command bits, a clock for moving them across the registers, and then a strobe pulse to make the outputs active. We'll put a capacitor on the clock line, we'll route via shielded wire the overflow of IC1 which goes to the input of IC2, and we'll add a capacitor on that line too.

<u>Operation:</u>

- disconnect the power cord, unscrew the and remove the covers, and go to the front end, which is the upper board. You may want to unscrew it in order to solder the capacitors on the lower side, though you can do all the job on the upper side, without unscrewing. If you unscrew it, you'll have to plug off J1 (the antenna connector), J1 on the lowermost board (the front end output, which is soldered on the front end and called there J4). Labels are printed on the board. You'll also have to be gentle when turning upside down the board, and to be careful not to deform

the coils.

- the track to replace with a shielded wire is the one which connects pin 9 of IC1 with pin 2 of IC2. This track runs mostly on the upper side of the board. The upper part starts on the upper board just beside pin 4 of connector J5, and runs mostly parallel to the backpanel until past the central screw, close to the relais, where it sinks back to the lowest side (no drawings, please). This has to be cut in two places, as close as possible to the board crossing points. Scrap them with a sharp tip. Solder a shielded wire between the two points. The shield can be grounded practically anywhere, as the ground track covers most of the side. The wire can be fastened to the board with a drop of hot melt.

- Solder a 6.8nF capacitor between this track and ground. I found it easiest at the relais end. (it could be up to 33nF, more than that would prevent normal functioning).

- solder a 4.7nF capacitor (up to some 15nF) on the clock line, i.e. between pin 1 of J8 and ground. I found it more confortable on the SMD side, just at the pin of the connector, but the clock track is also available on the upper side. It sinks to the lower side just beside pin 9 of J8, between J8 and the electrolitic capacitor C80, and is surrounded by a convenient ground track.

- rescrew, reconnect connectors if you disconnected, close the unit and enjoy.

A final note: I'm indebted to Henry Laviers , who sent me a copy of the service manual two years ago, and to Marc Gauw who forwarded me the schematics of the 3000A (which should be available and orderable from aor-uk, just to prevent requests to us).

I'd like to very much hear comments or to know if anyone has tried other hacks on the same box. Please email me.

Enrico Segre, segre@polito.it

Replacing the cpu of the AR3000 with that of the AR3000a

The cpu board of the ar3000 can easily be replaced with that of the ar3000a, provided you know the little trick. I'm indebted to Vance Socci for discussion about, and to Doug Cam who provided me an ar3000a front part and the hint. The reasons for wanting to upgrade the ar3000 to the a model are in my opinion the following:

- the cpu of the 3000a supports both the smooth spinning tuning knob and the old clicking one. That was my main reason for the upgrade.

- the firmware is improved and much less buggy (well, how buggy depends on the rom revision - I had the D75308GF156 microprocessor) - in particular the cpu wont hang on setting the clock and on receiving badly timed data from the rs232.

- the scanning speed should increase from 20 cps to 50 cps (but see below)

On the other side, changing the cpu alone wont exactly transform an ar3000 into a 3000a: between the two models a number of other analogical details have been improved. These improvements are alltogether minor, but effective.
One of these regards the agc unlocking and the audio muting control logic. I'm not completely sure that the agc of the 3000 body responds fast enough to the new cpu to resume scanning at 50 cps after a signal found.
As for the rs232 board, btw, the old one will still do perfectly. The only difference between the old and the new is the grounding of pin 7 of the db-25 connector, which is provided by a "remote control" switch in the 3000a, and expected from the cable in the 3000.

The easiest is to replace the complete front panel of the 3000 with one from the 3000a. I've read on the net that some of them showed up at ham swap fairs in the states, and indeed the one I've got was bought in such circumstance and sent to me by this Doug Cam. This is better than just getting the cpu board and eventually the tuning encoder, since the key layout and the lcd size , as well as the encoder mounting hole, are slightly different in the two models. Getting the complete assembly, there will be no need of extra drilling and adapting. The sizes of the potentiometers and of the power switch are identical, and it is more convenient to rescrew the old ones in the new assembly; otherwise, their connecting wires have to be cut and resoldered.
A drawback of getting the cpu from a stray batch in the states may be that you get a cell-blocked cpu, as I did. The resulting coverage hole was not important to me (besides, the cell freqs are different in Europe and I still get them).

The only trick to do in order to have the new cpu working is to shunt the pins 3 and 9 of connector J1 of the cpu. If you don't, the radio will come up only after resetting the cpu, which would not be practical to do every time you turn on the radio, and would erase all the memories. The reason for that has to do with the differences in the logic lines of the 3000 and the 3000a models. It is most convenient to unscrew the new cpu board and to solder a short piece of wire on the cpu pcb behind the J1 connector. In that case, however, never try to connect the shunted board to a 3000a: on the new model that would ground a +5v supply line.

Still another remark, if you ever considered my other "declick2" mod: **DON'T** put the 4.7nF capacitor on the clock line on the RF board. There is no need for it with the new cpu, as the control signals are already damped and their duty cycle it's different; moreover this capacitor will prevent the radio from working properly. The rest of the "declick" & "declick2" mod I still found effective, though; anyway, after this experience I'm not sure whether they would really help in a true 3000a.

Btw, the following is an answer I've got from aor-uk in 1997, concerning a mere cpu chip upgrade:

```
>We can supply a replacement CPU UPD75308GF212/A46, you will see that the suffix
>has changed from 156 to 212... the last version was 212 before the change to
>AR3000A - it is not possible to upgrade to the "A" version.
>
>Price for the CPU is GBP 17.28 + P&P + VAT (total 26.18).
>
>The CPU is surface mounted and only an experienced SMD engineer should
>consider carrying out the replacement.
>
>Of course we would be happy to carry out repair work and I estimate the
>total cost at about GBP 83.00 including shipping to Italy using Euro48
>and VAT.  You would need to get the set back to the UK first!
```

I'll be happy to receive feedback and comments, and I take no moral responsibility whatsoever for your spoiled scanner.

Enrico Segre

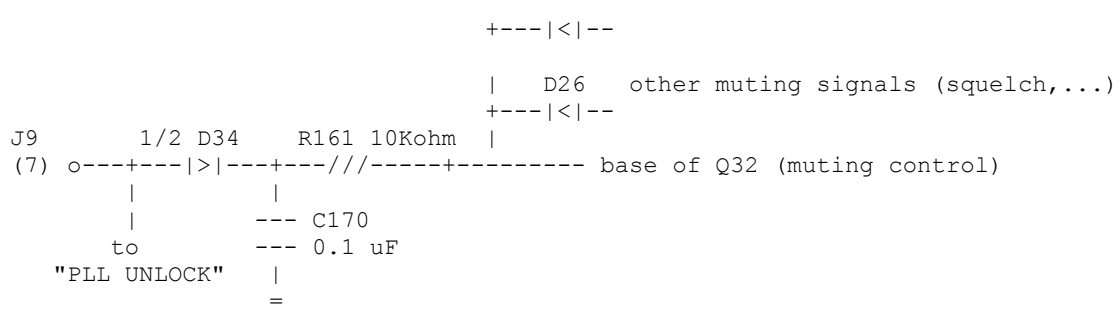
Removing the cpu muting

This is another of my hacks for the AOR AR3000 scanner. A really quick and dirty one ("un taglio e via"), but I liked it. What I'm describing here refers properly to the old AR3000. That section of the circuitry has been revised for the 3000A, and the hack may be unnecessary, though the 3000A has basically the same motherboard.

What annoyed me in this case was the fact that the audio output is muted by the cpu whenever the tuning is changed. Apparently, this is done in order to mask digital glitches which may occur during the adjustment. I found this muting time unnecessary long, and I didn't like the "tremolo" effect which results when the tuning knob is spun faster. I prefer little glitches but no trembling than the other way round.

To evaluate if you will like or not the mod, you can take advantage of the fact that the audio output on the rear panel DIN8 connector is unmuted and unsquelched (and also a little richer in basses). You can connect that to an audio amplifier, and hear the difference.

This is a sketch of the muting path:



The cpu sends muting pulses on pin 7 of J9. It sends ~1 msec pulses when the tuning is changed, and a little longer ones during scanning (the audio is also muted by the squelch, in that case). In the AR3000A revision, the capacitor C170 has been eliminated, and some of the surrounding muting circuitry has been simplified.

The dirty hack just consists in cutting the track between D34 and C176. This way the muting is drastically eliminated. An alternative would be to eliminate just C170, so to cut the decay of the pulse (as was done in the 3000A), but I'm happy ths way.

This unmuting reveals the glitches of the AR3000 - notably of two sorts:

- a short click which is heard also whenever a key is pressed, in the 0.1 - 29.9995 Mhz band. This is due to crosstalk between the digital command signals and the front end, and is masked by stronger signals. I hope to tack it with another mod someday...
- a "plop" which can be heard when 10Khz boundaries are crossed. This is due to the IF design of the AR3000, in which the IF has a huge bandwidth (and can suffer of blocking), and the fine tuning is achieved by adjusting the 2nd local oscillator on 10Khz spans. The plop is more marked in the vicinity of strong signals, due to IF saturation.

The mod is trivial - needs just a screwdriver and scraping off a single thin track - anyway, as usual, it's your business to know what you are doing, and I TAKE NO RESPONSIBILITY for how you may screw your scanner up.

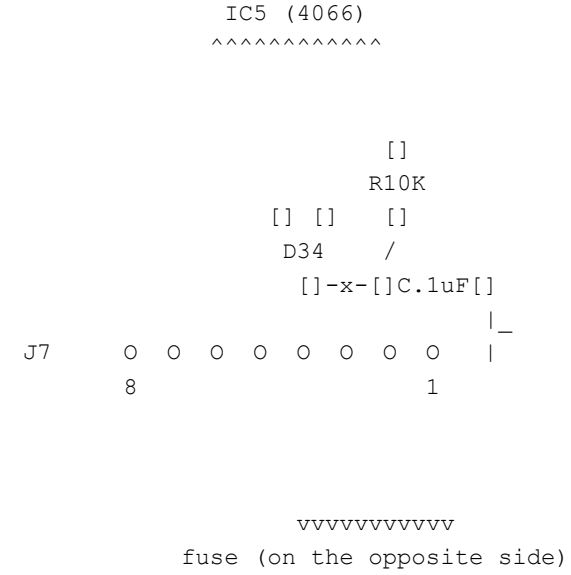
Operation:

- disconnect the power cord! Turn the scanner uspide down. Unscrew the bottom cover (2 screws on the bottom and 2 on the backside) and remove it. Disconnect the

loudspeaker connector.

- unscrew the lowermost board, which is the IF/audio/power-supply board (6 screws). Locate J_7_, which is an 8 pin connector. Labels are printed on the board. Disconnect gently the thin coax wire socketed to J1. Turn gently the board upside down to see the SMD components side.

- locate these components by the pins of J7, on the SMD side of the pcb - D34 is recognizable for its rectangular 3-pinned case, R161 and C170 should have the value printed on them:



(in the sketch O represents a pin, [] the soldered terminal of an SMD component)

- scrap away the track between C170 (O.1 uF) and D34, in the point x. (it should be clear what to do if instead you want to remove C170)

- remount the board, rescrew, reconnect connectors, close the unit and enjoy.

A final note: I'm indebted to Henry Laviers , who sent me a copy of the service manual two years ago, and to Marc Gauw who forwarded me the schematics of the 3000A (which should be available and orderable from aor-uk, just to prevent requests to us).

I'd like to very much hear comments or to know if anyone has tried other hacks on the same box. Please email me.

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