Modifications for the AOR

created 28-03-2002 from www.mods.dk

(AR-1000) eprogramming the AR1000 low frq. from 8 to 0.5 MHz English language
(AR-1000) Microprocessor reset (to include H.F. coverage) English language
(AR-1000) AR1000 Keypad English language
(AR-1000) AR1000 Power socket English language
(AR-1000) Unlocking Search and Scan Banks English language
(AR-1000) AR-1000 Frequency alignment English language
(AR-1000) Keypad Beep English language
(AR-1000) AR1000 Discriminator (detector) output English language
(AR-1500) Review: AOR AR-1500 handheld scanner English language
(AR-1500) IC7 (TA78L009AP) input regulator replacement English language
(AR-1500) AR-1500 Microprocessor reset English language
(AR-1500) Unlocking Search and Scan Banks English language
(AR-1500) AR1500 discriminator output English language
(AR-2000) AR2000 Keypad English language
(AR-2000) DC socket English language
(AR-2000) Microprocessor reset English language
(AR-2000) Unlocking Search & scan banks English language
(AR-2000) Keypad Beep English language
(AR-2000) AR2000 Discriminator (detector) output English language
(AR-2700) AR2700 Reset English language
(AR-2700) Opto Scout Modification English language
(AR-2700) Discriminator Output English language
(AR-3000) AOR AR-3000 changing priority channel test time English language
(AR-3000) Improve the audio for AM/NFM/SSB/CW modes on AR-3000 English language
(AR-3000) Narrowing AM to 6kHz for AR-3000 English language
(AR-3000) Removing the cpu muting English language
(AR-3000) Remove the click whitch is heard throughout HF English language
(AR-3000) Direct (unfiltered) FM discriminator out for the AR3000/A scanner English language
(AR-3000) Replacing the cpu of the AR3000 with that of the AR3000a English language
(AR-3000) ar3000/3000A mod FAQ English language
(AR-3000) AR3000A memory doubling English language
(AR-3000) Cell Block Mod for AOR AR-3000a English language
(AR-800) AOR BP800 replacement NiCad battery English language
(AR-800) AR800E - Intermittent or no NFM. English language

(AR-800) AR800E - Failure of input resistor. English language

(AR-8000) Review of AOR AR-8000 handheld scanner English language

(AR-8000) AR-8000 Filter Mod English language

(AR-8000) AOR AR-8000 Discriminator Mod English language

(AR-8200) Wider bandwidth IF filter for NFM for AR-8200 English language

(AR-900) AR900UK IC209 failure English language

(AR-900) AR900UK RESET English language

19-07-1998

(AR-1000) eprogramming the AR1000 low frq. from 8 to 0.5 MHz

Author: *Lionel ANCELET - 71641.1340@compuserve.com.MODIFICATION.NET*

There seems to be renewed interest in this, so I thought I'd post Lionel's article once more. After reading this I tried it on my older vintage AR1000 and successfully moved the low frequency limit from 8 to 0.5 mHz. Your mileage may vary. Anything which results from implementing the instructions below is AT YOUR OWN RISK.

Lionel copied these instructions from a factory set up sheet, sent to him by his dealer when the CPU locked up (a rare event), rendering his radio dead. It is also reproduced in the service manual, available from AOR Japan (no, I don't have the address).

AR-1000 Reset Procedure

What you need:

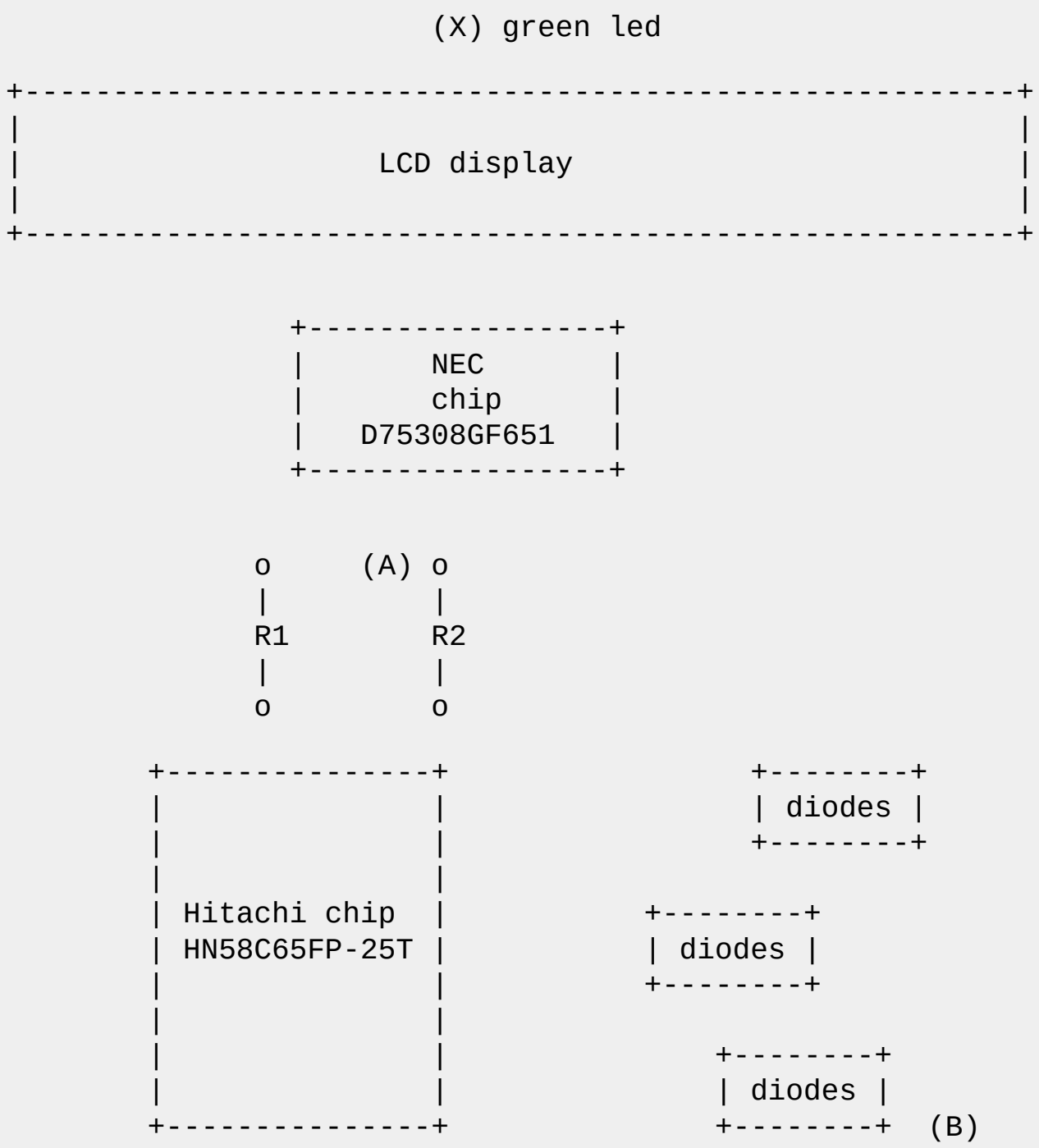
- A small Philips screwdriver
- A soldering iron (30 W max)

What to do:

- Remove the antenna
- Remove the batteries
- Remove the tuning, volume, and squelch buttons
- Remove the back cover (4 black screws), and disconnect it from the rest
- Lay the unit flat on the table, keyboard and display below, antenna connector away from you
- Unsolder the black wire from the lower right corner of the upper board
- Unsolder the brown wire from the upper left corner of the same board
- Remove the 3 screws that hold this board
- Pull GENTLY this board out of the upper panel (volume, squelch, and tune rods come with the board - not the antenna connector)
- Unsolder the black wire from the upper left corner of the middle board
- Unscrew the 3 copper columns that hold this board

- To get a better access on the lower board, you may wish to remove some of the connectors that link the upper and middle boards to the power supply board (the one that hides the speaker) --- don't forget to take note of which connector goes where !!!

- Now take a look at the lower board. It looks like this :



- Solder a piece of wire (wrapping wire is a good candidate) between points (A) and (B).
- Reconnect ALL wires (solder unsoldered wires and connect disconnected ones)
- Place batteries back
- Turn unit on : the display should be blank.
- Now type the following :

```
BANK
1 PROG    8 LIMIT  49.995 SEARCH 561.225 ENTER
2 PROG   50 LIMIT 107.995 SEARCH 561.225 ENTER
3 PROG  108 LIMIT 169.995 SEARCH 561.225 ENTER
4 PROG  170 LIMIT 296.995 SEARCH 561.225 ENTER
5 PROG  297 LIMIT 600     SEARCH 251.575 ENTER
6 PROG  805 LIMIT 1109995 [down arrow] 251.575 ENTER
7 PROG 1110 LIMIT 1300    [down arrow] 561.225 ENTER
```

- Turn unit off
- Unsolder the piece of wrapping wire
- Mount the unit back (wires, connectors, screws...)

- Turn unit on : it should be working !!!

My comments:

DO NOT TRY THIS BY YOURSELF IF YOU DON'T FEEL CONFIDENT ABOUT USING A SOLDERING IRON ON SUCH A MINIATURIZED DEVICE !!!

DON'T FORGET THAT, IF YOU FAIL, THE WARRANTY WILL BE VOID !!!

Now, let's relax. From the programming procedure, it is obvious that you enter 7 sub-bands in the unit:

```
   8 to   49.995 MHz
  50 to  107.995 MHz
 108 to  169.995 MHz
 170 to  296.995 MHz
 297 to  600.000 MHz
 805 to 1109.995 MHz
1110 to 1300.000 MHz
```

These are the values for the AR-1000 as sold in France. The values may be different for the units sold in Northern America (there may be other gaps, especially for cellular phone frequencies).

I don't know what the following parameters (561.225 and 251.575) mean. I guess they indicate which RF subcircuit, which step, and which modulation mode to use. Anyway, since the sub-bands limits appear so clearly, it might be fun to experiment. See what I mean ?

But, if we are to experiment, let's make things easier. Instead of dismounting-soldering-programming-unsoldering-mounting the unit each time, let's solder a 5" piece of wrapping wire to point (A), a 5" piece of wrapping wire to point (B). Now we have 2 free ends : let's solder a microswitch to them. We can glue the microswitch at the bottom end of the unit, near the power supply board. Resetting the AR-1000 is now much simpler : just open the unit (4 screws), flip the switch, turn the unit on, reprogram it, turn it off, flip the switch back, close the unit.

First of all, if you replace the first "8" with "0.5", you get an AR-1000 with coverage extended down to 500 kHz. This may not work on older units. My unit didn't let me program any frequency lower than 0.5 MHz, or higher than 1300 MHz. Anyway, my aim was to try to get rid of the 600-805 MHz gap. I tried the following sub-bands :

```
   0.5 -   29.995
  30.0 -  219.995
 220.0 -  409.995
 410.0 -  599.995
 600.0 -  904.995
 905.0 - 1209.995
1210.0 - 1300.000
```

To choose these values, I made the following assumptions : the original values never exceed a 190 MHz span for the "561.225" series, and never exceed a 304.995 MHz for the "251.575" series. I was careful not to exceed these ranges, because of the necessarily limited span of the internal VFO.

These values did seem to work, since I was able to hear some TV signals near 620 MHz, that is, in the previous gap ! However, when I programmed some search banks, it sometimes refused to search, even on "authorized" frequencies (around 450 MHz). And, since there is nothing but TV channels between 600 and 805 MHz (at least in France), I restored the original values (except for the 0.5 MHz lower limit).

Now, if you find something interesting, please keep me informed !

Lionel ANCELET

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top of page

13-05-2000

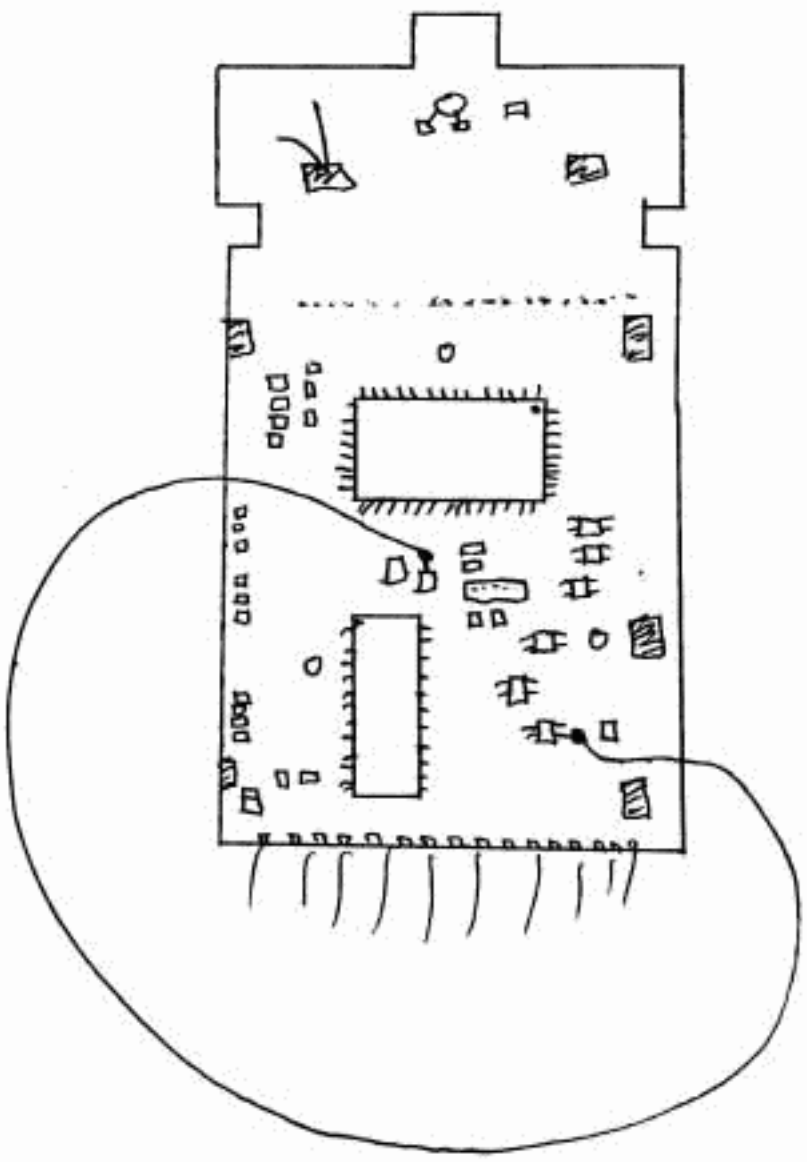
(AR-1000) Microprocessor reset (to include H.F. coverage)

Author: *AOR*

The AR1000 has no external RESET facility. In the case of a ‘hang’ or corruption, reset the microprocessor in the following manner. This will enable the coverage from 500kHz – 600MHz and 805MHz – 1300MHz (although performance drops off below 8MHz).

There are two methods, one involves connecting a diode between pin 13 and 51 on the microprocessor, this is tricky as track damage and short circuits are easy to create... we recommend the 'wire link' method shown below.

The best method is to add a wire link to the CPU board while the radio is switched off:



Switch the set on and PRESS the KEYS in the following order, the key presses should appear on the LCD as you enter detail... if it will not initiate, you may have to press BANK 1 several times until the number "1" appears:

BANK – 1 PROG – 0.5 – LIMIT – 49.995 – SEARCH – 561.225 – ENTER
2 – PROG – 50 – LIMIT – 107.995 – SEARCH – 561.225 – ENTER
3 – PROG – 108 – LIMIT – 169.995 – SEARCH – 561.225 – ENTER
4 – PROG – 170 – LIMIT – 296.995 – SEARCH – 561.225 – ENTER
5 – PROG – 297 – LIMIT – 600 – SEARCH – 251.575 – ENTER
6 – PROG – 805 – LIMIT – 1109995 – DOWN – 251.575 – ENTER
7 – PROG – 1110 – LIMIT – 1300 – DOWN – 561.225 – ENTER

Note: If line line five is altered as shown here, coverage without a gap will be achieved (but reception between the 600 - 805 MHz range is not guaranteed).

5 – PROG – 297 – LIMIT – 804.995 – SEARCH – 251.575 – ENTER

Switch off the set and disconnect the diode/wire. The microprocessor will now be reset and all memory banks empty. It is recommended that at least one frequency be keyed into each memory bank. Now reprogram each of the 10 search banks. i.e. SEARCH PROG (start frequency) LIMIT (stop frequency) ENTER (search step in kHz) ENTER (mode) ENTER (bank number) ENTER SEARCH

SEARCH–PROG–118–LIMIT–138–ENTER– 25–ENTER–AM–ENTER–1- SEARCH
SEARCH-PROG-225-LIMIT-399.9-ENTER-50-ENTER-AM-ENTER-2-ENTER-SEARCH
SEARCH-PROG-71-LIMIT-87-ENTER-12.5-ENTER-AM-ENTER-3-ENTER-SEARCH

SEARCH-PROG-165-LIMIT-174-ENTER-12.5-ENTER-FM-ENTER-4-ENTER-SEARCH
SEARCH-PROG-174.5-LIMIT-225-ENTER-12.5-ENTER-FM-ENTER-5-ENTER-SEARCH
SEARCH-PROG-156-LIMIT-163-ENTER-25-ENTER-FM-ENTER-6-ENTER-SEARCH
SEARCH-PROG-144-LIMIT-146-ENTER-12.5-ENTER-FM-ENTER-7-ENTER-SEARCH
SEARCH-PROG-433-LIMIT-435-ENTER-25-ENTER-FM-ENTER-8-ENTER-SEARCH
SEARCH-PROG-890-LIMIT-905-ENTER-12.5-ENTER-FM-ENTER-9-ENTER-SEARCH
SEARCH-PROG-935-LIMIT-LIMIT-950-ENTER-12.5-ENTER-FM-ENTER-0-SEARCH

The reset and reprogramming is now complete.

top of page

13-05-2001

(AR-1000) AR1000 Keypad

Author: *AOR*

A lot of these units are now quite a few years old and have experienced thousands of hours of use. One of items subject to wear is the keypad. Scan, search and manual buttons tend to wear first with operation becoming intermittent and eventually not responding at all. The keypad is an easy item to replace but requires the use of a soldering iron and a set of fine screwdrivers.

- Remove the battery cover and batteries.
- Remove the 4 screws holding the rear case and carefully lift this until the battery connection wire can be unplugged from the supply board.
- Unsolder the earth wires from the RF board now visible (2 on AR1000 and 1 on AR2000).
- Unscrew the 3 board screws (threaded), pull the board rearwards and hinge it to one side.
- Remove the pillars holding the next board in place and de-solder the earth wire if fitted. Again this board can be hinged slightly to one side.
- The keypad is now situated under the CPU board. This can now be removed by unscrewing the 3 pillars and 1 screw (self tapping), it may however be easier to remove the Supply board as well from the bottom of the set. This requires the removal of 2 screws (self tapping), 2 pillars and one earth wire. Note that the 2 small pillars on this are of a slightly different size to the 3 holding the CPU board.

The keypad can now be easily replaced but it is probably a good idea to clean the PCB contacts before the new item is fitted. A brief wipe over with alcohol, IPA etc should do.

Rebuilding is obviously the reverse of the above but make sure that the correct pillars and screws are fitted in their various places. Take special care not to trap any wires.

top of page

13-05-2001

(AR-1000) AR1000 Power socket

Author: *AOR*

The power socket on these units gets a lot of wear and can eventually fail or become intermittent (intermittent supply levels are the main cause of crashed microprocessors in these sets). The socket itself can fail or the solder joints to the board can fracture.

Either way, repair is simple, requiring removal of the rear case, 1 earth wire and lifting of the supply board.

Replace or re-solder the socket but, as a further preventative measure, a wire can be soldered directly to the rear of the socket and taken to the anode of D201 (situated next to the socket).

top of page

13-05-2001

(AR-1000) Unlocking Search and Scan Banks

Author: *AOR*

In cases were the set does not appear to operate correctly, first try these few ideas... it usually is simply "finger" trouble.

SCAN

1. Memory banks which contain no data will not be scanned, this sometimes happens when channels have been deleted by the customer (or following a microprocessor reset). Enter data into at least one channel of each bank and try scan again.

   i.e. MANUAL 1 3 3 . 7 ENTER

   PROG 000 PROG 100 PROG 200 PROG 300etc

2. Ensure that ALL banks are listed for scan. To reinstate all memory banks SCAN BANK PROG 0 LIMIT 9 ENTER

SEARCH

1. Ensure that all banks are listed for search. To reinstate all search banks SEARCH BANK PROG 0 LIMIT 9 ENTER

   (on the AR1500 SEARCH BANK PROG 0 LIMIT 8 ENTER as bank 9 is reserved for automatic memory store).

2. Ensure that data is correctly stored in the search parameters

   SEARCH PROG 150 LIMIT 160 ENTER 25 ENTER FM ENTER "X" ENTER SEARCH

Where "X" is the bank which you wish to reprogram (i.e. 1,2,3, etc).

3. Check that the first frequency of a search bank is not locked out, this is how the receiver of a search bank is not locked out, this is how the receiver decides whether the search bank is locked out.

   SEARCH BANK PROG LOCKOUT

The first locked out frequency will appear on the display, to release it press LOCKOUT or to move on to the next press ENTER

Hunt for the first frequency of each search bank to ensure that they are not locked out release them by pressing LOCKOUT

Alternatively simply unlock every frequency in the lockout list - but this may take some time as there could be as many as 1000.

When the last frequency is unlocked the receiver will start searching. Don't go too quickly or you may start LOCKING OUT new frequencies rather that UNLOCKING old ones... this may be the case if all the frequencies suddenly appear numeric!! If so just start point 3 again.

top of page

13-05-2001

(AR-1000) AR-1000 Frequency alignment

Author: *AOR*

The AR1000 does have a tendency to drift in frequency with age. Later sets do not suffer to the same degree (different xtal manufacturer used) and quite often an older set once re-aligned will stay reasonably stable.

The main culprit for the drift is the 154.825MHz oscillator but if the main PLL ref' osc' is not bang on 12.8MHz, aligning just the 154.825 osc' will cause misalignment in other ranges. At full operating temperature, align the 12,8MHz xtal with CV1 and CV2 (coarse and fine). Both are located on the top (RF) board at the bottom edge. CV2 is located on the solder side of the board next to PLL chip TC9181F and CV1 on the component side next to the 12.8MHz xtal. Both of these trimmers are usually near the end of their range.

The 12.8MHz frequency will have to be measured with an accurate frequency counter either sniffed directly from the xtal can or at the input to the PLL IC on pins 2 & 3. If using the latter method, take care not to shift the frequency by loading these points.

The radio can now be aligned by ear with a suitable signal (I tend to align the units on NFM on marine band or 2 metres ham band). With a suitable signal being listened to, align the 154.825MHz oscillator for best reception. The easiest way to check for correct alignment is by listening to a low level signal and tuning 5KHz either side of it to check if the alignment really is centred on the wanted frequency.
The 154.825MHz xtal can be aligned at CV3 (located on the solder side of the RF board opposite the 154.825 xtal). This will give a small adjustment but it is generally better to align transformer T10 located next to the xtal (green core fitted). In both cases, check that the xtal is not operating

on the edge of its range and that it starts up on switch on every time (i.e.; reception is obtained immediately on switch on).

After alignment, check that the set is on frequency throughout its frequency range.

This modification is read 853 times.

top of page

13-05-2001

(AR-1000) Keypad Beep

Author: *AOR*

Following a review in which a critical comment was made of the "BEEP" the facility has been removed at the factory. The "BEEP" is reported to be uncomfortable and annoying when using an earphone.

By addition of a single wire the facility can be restored.

Switch the receiver off and remove the batteries. Disconnect the receiver from the AC charger and remove the rear case. 4 screws secure the rear case half (2 x in rear case - 2 x in battery box). You will see 3 PCB layers once inside the case.

One end of the wire connects to the outer edge of CN7 on the top PCB. This is located at the base of the rotary tuning control. The original wire is usually GREY and the "tail" can sometimes be seen. If this is the case, solder a new length of wire to the tail. If no tail is visible, solder a new length of wire to the corresponding point on the PCB. Use the foil side (facing upward) of the PCB, this will save you "taking the set to bits"!

The other end of the wire connects to the bottom PCB (which carries the microprocessor). Follow the 3 existing wires from CN7 to the bottom board. With the base of the set facing you an unused "LAND" will be visible on the PCB to the left of the 3 existing wires. If you are lucky a tail will be connected.

If you are very careful and use a small soldering iron then there is no need to separate the PCB's. Solder the free end of the new wire to the "LAND or Tail".

Re-assemble the case and test. You will now have a KEYPAD BEEP.

Note: If you find it necessary to separate the PCB's, then the earth bonding wires will need de-soldering from the edge of each PCB. Make sure you reconnect them when you re-assemble the receiver.

This modification is read 785 times.

top of page

13-05-2001

(AR-1000) AR1000 Discriminator (detector) output

Author: *AOR*

Remove the rear cover (4 screws) taking care not to damage the battery wires while pulling the case apart. The battery wires will unplug from the power supply board if required.

The rear of the main PCB is now visible.

The discriminator output can be taken from IC5 pin9.

On the AR1000, this is fitted to the reverse side of the board (the solder side that is now visible).

IC5 is located about 2/3 of the way down the board (starting from the top) and about 1/2 way across.

It is labelled TA7761P although this may be difficult to read due to lacquer on the device.

Simply solder a wire to pin 9 of this IC to obtain the discriminator output.

Terminate the wire at a suitable socket and re-fit the case half (you may find that removing the side-panel case stopper provides an excellent location without the need to drill or burn a hole in the cabinet).

top of page

19-07-1998

(AR-1500) Review: AOR AR-1500 handheld scanner

PRODUCT REVIEW

AOR AR1500 continuous coverage handheld scanning receiver with SSB.

by Howard Bornstein Copyright 1/25/93

This is a review of the new AR1500 continuous coverage handheld scanner from AOR. Consider this review to be preliminary, since it was conducted on a unit I had available over a weekend and does not reflect long-term usage. In this review, I will be comparing the AR1500 to the AR1000 and the Radio Shack PRO-43, two other scanners I am very familiar with (I am the author of the Guide to the AR1000, and the upcoming Guide to the PRO-43).

VERSIONS

There are three versions of the AR1500 known at this time. The original AR1500 was released and available in Japan, the UK, and Europe in mid 1992 and was known simply as the AR1500. A later revision to this scanner appeared in late 1992, called the AR1500E. This model differs from the earlier model by including a cascade filter at 58.075 MHz IF to improve selectivity, a DC input protection diode to guard against reverse polarity connection, additional buffering in the microprocessor to protect against software crashes when scanning an empty bank, and a reset

switch in the battery compartment.

A new revision, called the AR1500EX, will be available on Feb. 9, 1993 only in the UK. It contains a substantial redesign of the PC boards and logic circuits. The RF board has been completely redone. In addition, the BNC connector has been reinforced. The unit is supposed to have better selectivity and better handling of strong signals.

This review was conducted on an AR1500E that was imported in the US from ACE Communications. My thanks go to Glenn Cohen of Scanner's Unlimited for the loan of this unit for testing.

FEATURES

The AR1500 is a very feature-laden scanning receiver. It's main features are:

- 900 general channels of non-volatile scan memory. (100 channels dedicated for search and store feature).
- 10 individual search banks. (Bank 9 dedicated to search and store)
- Reception in FM, wide FM, and AM modes.
- Contains a beat frequency oscillator (BFO) for reception of single side-band (SSB) and continuous wave (CW or Morse) signals. It can receive both upper side-band (USB) and lower side-band (LSB) transmissions.
- Continuous coverage from 500 KHz to 1300 MHz with no gaps.
- Searches and scans at 20 channels per second.
- Any channel can be the priority channel which is active in search, scan, or manual mode.
- Search increment is user-selectable in any steps of 5 KHz and 12.5 KHz up to 995 KHz.
- Tuning knob.
- Channels, scan banks, and search banks may be locked out. Also, individual frequencies during a search may be locked out.
- 10 db attenuation switch
- Automatic search and store function.
- Delay or Hold feature.

SIZE

The AR1500 is a fairly small scanner, much smaller than the AR1000 and about the same size as the PRO-43. It is about 1/2 inch taller than the AR900. Both the buttons and the display are smaller than the AR1000, as is the speaker.

There is a trend with current scanners to make them smaller, but there seems to be diminishing returns in this endeavor. The AR1500 is small enough to be a problem for some people. For someone with large hands, the small buttons may create difficulties in programming. There are also many controls crammed on the top of the scanner (see below). In particular, it is quite difficult to turn the unit on and off and adjust the volume because the On/Off/volume knob is crammed in between the BNC connector and the Squelch/BFO knob. This makes if very difficult to get your fingers around the On/Off knob to turn it.

Other negative side-effects of the small size are the smaller, lower-fidelity speaker, and the smaller battery pack, reducing operation time.

CONTROLS

The top of the unit contains a number of knobs and switches. You'll find the BNC connector, an On/Off/Volume knob, a ganged BFO/Squelch knob, a tuning knob, a BFO button, a 10 db attenuator button, and earphone jack, and a pushbutton switch for keylock.

The display and the keyboard are the same as the AR1000, although some of the keys are in different positions (e.g. BANK and INC are reversed on the AR1500 and INC is now called STEP).

Sound quality is good and the unit can be turned to full volume without distortion, but the speaker doesn't give the same high-fidelity sound as is found on the AR1000.

ACCESSORIES

The AR1500 in the US comes with its built-in nicad pack, a AAA battery holder, a rubber ducky antenna, a 5 meter wire antenna with a BNC connector on one end for HF reception, a cigarette lighter adapter, and AC charger, a soft case and a single ear earphone.

Note that the AC charger is not designed to operate the unit but to simply charge the batteries while the unit is turned off. If you want to use the scanner while plugged in (which you will, since the battery life is short), you will have to purchase a separate AC adaptor. The Radio Shack 12 VDC 500 mA adapter (CAT No. 273-1652B) works fine for this.

OPERATION

The AR1500 operates essentially the same as the AR1000. This is to say that it uses a somewhat cumbersome programming scheme. Users of the Uniden BearCat series of scanners and the Radio Shack/GRE PRO series of scanners will find the AR1500 operations to be tedious.

Of more concern is that the operation of the AR1500 was modified slightly-- in some cases to handle the new search and store feature and in others to simply "improve" the operations. However, many of the special tricks and shortcuts that were possible on the AR1000 (and described in the Guide to the AR1000) no longer work on the AR1500. While learning how to use the AR1500 is not all that difficult, it requires more time than most scanners and more consultation with the user documentation.

An interesting difference between the AR1500 and the AR1000 is that every keystroke you enter on the AR1500 generates an audible beep for feedback. This capability is also found on some of the Fairmate versions of the AR1000 (i.e. the HP100 and HP200). On the AR1000, there is no keystroke beep.

USER'S MANUAL

The AR1500, as supplied in the United States, comes with a 19 page user's manual. This manual briefly describes the keys, the controls, and the basic operations, but doesn't go into much detail about how to take advantage of the power of this scanner. In addition, there are some serious errors in the documentation, particularly in the examples. As stated above, the Guide to the AR1000, while covering all the basic operations of the AR1500 (minus the BFO and search and store feature), addresses many tricks and shortcuts that are not applicable to the AR1500. As a result, the Guide to the AR1000 is not primarily recommended to owners of the AR1500.

The user's manual for the AR1500 available in Australia and New Zealand is better and the manual produced by AOR Ltd. in the UK is the best.

PERFORMANCE

The following characteristics are based on my subjective analysis during usage and not on laboratory tests. They may be specific to my location (San Francisco Bay area).

SENSITIVITY

The AR1500 is a quite sensitive receiver. It proved to be more sensitive than the AR1000 but less sensitive than the PRO-43. It easily broke squelch on a signal that the AR1000 could only hear with the squelch opened manually. Both units were using identical DA900 rubber duckies.

Like the AR1000, the AR1500 can pick up SW and MW signals when attached to an appropriate long-wire antenna. While you wouldn't buy this unit as your primary shortwave receiver, it can pick up strong SW signals nicely (subject to signal fading) and the AR1500 can easily decode SSB signals.

INTERMODULATION

The AR1500 seems to have about the same intermod problems as the AR1000. My unit got periodic FM radio broadcast interference all across its frequency range. While it wasn't as bad as the Icom R1 is rumored to be, it was noticeable.

IMAGES

The AR1500 is supposed to be triple-converted, but I noticed images in the 800 MHz range. I picked up cellular phone conversations on the local government frequency of 812.2125 MHz. This was the only frequency I noticed images on. The AR1000 doesn't do this.

RF

The AR1500 puts out a fair amount of RFI. It stopped the PRO-43 from scanning at a distance of over 4 feet. If you are using this scanner near other scanners, you might have a problem.

BATTERY LIFE

The AR1500 comes with a custom 5 AA cell molded nicad pack. The pack is removable, but there is no way to charge the pack while out of the scanner. The scanner also comes with a battery holder that will take 4 AAA alkaline or nicad batteries. I wasn't able to do a battery test on this unit but the custom nicad pack battery life is said to be about 4 hours. The AAA battery pack life is supposed to only be about 2 hours. Any AR1500 users who have more accurate figures than this are encouraged to contact me and I will update this document to reflect these figures.

Charging time is approximately 15 hours and you are warned not to overcharge the nicad pack.

Battery life and maintenance seems to be the biggest problems with this unit. It will not be very useful in the field if you run out of juice in a few hours. And, unfortunately, you can't be charging one pack while you are using another.

SSB OPERATIONS

One of the more intriguing features of the AR1500 is the ability to decode SSB. The AR1500 includes a BFO that you can use to tune in upper or lower side-band signals. There are a number of limitations to this feature, however.

I had hoped that you could simply program in a number of utility stations and scan them in SSB. However there are a couple of things that make this impossible. First, the squelch control on the AR1500 is as squirrelly as it is on the AR1000. The squelch setting is different for different bands, and in the SW region it is practically useless. You cannot squelch out many frequencies, even if they don't appear to have an active signal or carrier. Therefore, you can't really scan these frequencies.

The second problem has to do with the resolution of the AR1500. The finest tuning increment you

can select is 5 KHz. You use the BFO to tune between the 5 KHz limitations. So, for example, if you wanted to pick up 8989 KHz, you would have to enter 8990 and then tune down to 8989 with the BFO. Of course, the setting on the BFO would be different for this station than it would for 7613 (you'd have to enter 7610 or 7615 and tune in between with the BFO). What this means is even if you could scan SW stations, the BFO would be set at a different location for each station.

While I didn't try this with CB, presumably you could enter all 40 CB channels, set the BFO to USB and scan all the USB CB channels. Then, just by turning the BFO a bit, you could scan all the LSB CB channels. If any AR1500 user can confirm this, please drop me email and I'll update this document with your comments.

The unit I tested also put out an extremely high-pitched whine while tuning in the SW bands.

SEARCH AND STORE

The search and store feature provides a way to automatically take active channels that you find during a search and plug them into scan channels. The search and store feature on the AR1500 is pretty limited in its capability and usefulness. This is somewhat frustrating, especially since all of the capabilities are built into the AR1500 to have made this a much more useful feature.

Whenever you search with search bank 9, every channel it stops on is automatically plugged into the next succeeding scan channel in scan bank 9. The first signal goes into channel 900, then 901, etc until you fill up all 100 channels in scan bank 9. When you reach channel 999, the unit starts over with channel 900 again.

The way you would use this is to start searching and then later simply scan, using scan bank 9. The problem with this feature in the AR1500 is that it stores anything it stops on during a search. It will store open carriers, data channels, static, and any other kind of signals. The biggest problem, however, is that it stores the same frequencies over and over again.

This could have been eliminated and the search and store feature could have been made to be much more useful had AOR simply combined the search frequency lockout feature with the search and store feature. This way, as soon as the scanner stopped on an active frequency during a search, the frequency would be stored in scan bank 9 and be locked out of search bank 9. Then, an active frequency would only be stored once. In addition, the scanner wouldn't have to needlessly stop on channels you have already stored, making it more likely that you could catch the elusive signals in the range you are searching. Then, when you scan bank 9, you'd get all the frequencies found during your search with no repetition. Alas, it wasn't implemented this way, so IMHO the search and store feature is quite a bit less useful.

In addition, the search and store feature only stores the mode as AM or FM. If you are searching in WFM mode, the channels get stored as FM mode, not WFM mode.

RECOMMENDATION

The AR1500 is an amazing piece of engineering, cramming incredible functionality into a very small package. Unfortunately, the small size itself may be more of a minus than a plus. It makes the unit harder to operate and gives it a considerably shorter battery life. In addition, the designers of the AR1500 didn't fix many of the idiosyncratic problems of the AR1000 when they designed this new scanner.

While the AR1500 is more sensitive than the AR1000, you lose 100 scan channels and one search bank to the dedicated function of the auto search and store--a feature which may not be of great value to most users.

You also get SSB reception, but this feature generally can't be used in scanning mode. This makes SSB reception a single station feature. Since the AR1500 isn't designed as a primary shortwave receiver, this feature should be considered a bonus, not a main selling point.

Unless you have a specific and demanding need for SSB reception, it seems hard to justify the additional expense of an AR1500 over an AR1000, especially considering its difficulty of operation due to its small size and its short battery life. However, if you are in the US and are buying the AR1500 from the UK, with the current exchange rate, you may get a price comparable to the US version of the AR1000. In this case, the trade-offs might make sense.

The AR1500 has the same intermod and squelch adjustment problems as the AR1000. In fact, the AR1500 manual from ACE carries this disclaimer in the warranty:

"We do not warrant that the operation of the unit will be uninterrupted or error free."

BOTTOM LINE:

If you want a continuous coverage scanner and don't have a pressing need for SSB reception, buy an AR1000.

Feel free to contact me with comments, confirmations, criticisms, or additional information (I'd appreciate holding off on the death threats if you don't mind!)

Howard Bornstein
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top of page

13-05-2001

(AR-1500) IC7 (TA78L009AP) input regulator replacement

Author: *AOR*

If any problem are experienced with the supply or battery circuit with an AR1500 or AR1500E, the chances are that IC7 has failed (78L009).

This can occur due to a fault within the charge circuit, reverse polarising the socket or under certain circumstances IC7 can receive a brief reverse current causing failure. IC7 is located close to the power socket and can be easily replaced. It is a 9V regulator but the correct device needs to be used (a 78L09 will not work correctly).

To prevent any further problems, fit a diode in line with the input to IC7 (between the charge socket and input leg). A PCB track will have to be broken to do this. Any diode capable of passing over 200mA current will do. Most later sets will already have this fitted (visible on solder side of PCB next to power socket connections).

All AR1500EX models have it fitted as standard - IC7 is re-labelled IC4 in the EX model.

top of page

13-05-2001

(AR-1500) AR-1500 Microprocessor reset

Author: *AOR*

The information stored in the memory channels (scan banks) and search bank is permanently held in a `chip component' called an EEPROM (Electrically Erasable Programmable Read Only Memory). No battery backup is required.

In the extremely unlikely event you should encounter problems with memory loss or corruption it may be possible for you to RESET the microprocessor. This scenario may occur due to static discharge from mobile operation, connection to an external aerial, shipping in plastic & polystyrene materials or from noise on the power feed to the receiver.

A small RESET slide switch is located in the battery compartment of most (BUT NOT ALL) AR1500 receivers. This switch is covered by a protective tape and is connect to a short length of wire. If you cannot locate the switch and are not comfortable with `lots of button pressing' please contact your dealer.

If a reset switch is not present, you will require further technical information!.

1. Switch the AR1500 Off and remove the battery cover and NiCad pack.
2. Remove the protective tape from the slide switch.
3. The switch has two positions, carefully slide the switch from the first to the second position.
4. Insert the NiCad pack and switch on the receiver.
5. The display should be blank at this time.
6. Carry out the following key strokes very carefully, take your time. If you make a mistake switch the receiver Off/On and start again. If the first sequence of [BANK] [PROG] has no effect repeat these key presses as required. The key strokes should appear on the LCD as you progress.
7. Execute exactly as shown! (ignore the " - "separator):

   When you switch the set on, PRESS the KEYS in the following order, the key presses should appear on the LCD as you enter detail... if it will not initiate, you may have to press BANK 1 several times until the number "1" appears:

   AR1500 & AR1500E
   BANK - 1 - PROG - 0.5 - LIMIT - 1.995 - SEARCH - 556.325 - ENTER
   2 - PROG - 2 - LIMIT - 299.995 - SEARCH - 556.325 - ENTER
   3 - PROG - 300 - LIMIT - 419.995 - SEARCH - 249.125 - ENTER
   4 - PROG - 420 - LIMIT - 606.995 - SEARCH - 249.125 - ENTER
   5 - PROG - 607 - LIMIT - 797.995 - SEARCH - 58.075 - ENTER
   6 - PROG - 798 - LIMIT - 1105995 - [DOWN KEY] - 249.125 - ENTER
   7 - PROG - 1106 - LIMIT - 1300 - [DOWN KEY] - 556.325 - ENTER

   AR1500EX (it's slightly shorter)

BANK - 1 - PROG - 0.5 - LIMIT - 95.995 - SEARCH - 556.325 - ENTER
2 - PROG - 96 - LIMIT - 299.995 - SEARCH - 556.325 - ENTER
3 - PROG - 300 - LIMIT - 512.995 - SEARCH - 249.125 - ENTER
4 - PROG - 513 - LIMIT - 797.995 - SEARCH - 58.075 - ENTER
5 - PROG - 798 - LIMIT - 1105995 - [DOWN KEY] - 249.125 - ENTER
6 - PROG - 1106 - LIMIT - 1300 - [DOWN KEY] - 556.325 - ENTER

8. Switch Off the receiver and remove the NiCad pack.

9. Carefully slide the switch into it's original position and replace the protective tape.

10. Insert the NiCad pack once again and switch On.

11. Test the receiver fully.

Notes: This procedure resets the microprocessor and clears the contents from the memory channels - they will now be blank! The search banks may differ from the defaults shown in this manual, in this case you will need to reprogram them.

You have instructed the operating system of the AR1500 to receive selected bands with selected Intermediate Frequencies (IF), if your keystrokes faithfully followed the above then you will have an unbroken coverage from 500 kHz to 1300 MHz without gaps. If you receiver a message, you have probably made a mistake - try again.

Note: To ensure the best microprocessor stability never delete ALL memory channels from a scan bank, it is a good idea to leave at least one active channel in each bank... i.e. 000, 100, 200 etc. Do not limit the scan range to a memory bank which is totally empty.

top of page

13-05-2001

(AR-1500) Unlocking Search and Scan Banks

Author: *AOR*

In cases were the set does not appear to operate correctly, first try these few ideas... it usually is simply "finger" trouble.

SCAN

1. Memory banks which contain no data will not be scanned, this sometimes happens when channels have been deleted by the customer (or following a microprocessor reset). Enter data into at least one channel of each bank and try scan again.

   i.e. MANUAL 1 3 3 . 7 ENTER

   PROG 000 PROG 100 PROG 200 PROG 300etc

2. Ensure that ALL banks are listed for scan. To reinstate all memory banks SCAN BANK PROG 0 LIMIT 9 ENTER

SEARCH

1. Ensure that all banks are listed for search. To reinstate all search banks SEARCH BANK PROG 0 LIMIT 8 ENTER

   (on the AR1500 SEARCH BANK PROG 0 LIMIT 8 ENTER is employed as bank 9 is reserved for automatic memory store).

2. Ensure that data is correctly stored in the search parameters

   SEARCH PROG 150 LIMIT 160 ENTER 25 ENTER FM ENTER "X" ENTER SEARCH
   Where "X" is the bank which you wish to reprogram (i.e. 1,2,3, etc).

3. Check that the first frequency of a search bank is not locked out, this is how the receiver of a search bank is not locked out, this is how the receiver decides whether the search bank is locked out.

   SEARCH BANK PROG LOCKOUT

   The first locked out frequency will appear on the display, to release it press LOCKOUT or to move on to the next press ENTER

   Hunt for the first frequency of each search bank to ensure that they are not locked out release them by pressing LOCKOUT

   Alternatively simply unlock every frequency in the lockout list - but this may take some time as there could be as many as 1000.

   When the last frequency is unlocked the receiver will start searching. Don't go too quickly or you may start LOCKING OUT new frequencies rather that UNLOCKING old ones... this may be the case if all the frequencies suddenly appear numeric!! If so just start point 3 again.

top of page

13-05-2001

(AR-1500) AR1500 discriminator output

Author: *AOR*

There is no standard discriminator output on the AR1500 /E/EX models. However it is possible to obtain discriminator (detector) output by wiring directly to the NFM discriminator chip, this is IC 3 MC3372 pin 9 located on the i.f. PCB (the larger SMD chip on the underside of the board, pin 1 is marked with a dot/circle - count pin numbers anti-clockwise).

A suitable ground may be taken from almost and point close to whatever socket you mount on the unit to provide a durable connection or use pin 15 on IC3 MC3372.

Depending upon the loading of your external circuit, you may need to buffed the connection to the discriminator with a capacitor, resistor or both (otherwise it may result in little or no audio output from the receiver).

top of page

13-05-2001

(AR-2000) AR2000 Keypad

Author: *AOR*

A lot of these units are now quite a few years old and have experienced thousands of hours of use.

One of items subject to wear is the keypad. Scan, search and manual buttons tend to wear first with operation becoming intermittent and eventually not responding at all.

The keypad is an easy item to replace but requires the use of a soldering iron and a set of fine screwdrivers.

- Remove the battery cover and batteries.
- Remove the 4 screws holding the rear case and carefully lift this until the battery connection wire can be unplugged from the supply board.
- Unsolder the earth wires from the RF board now visible (2 on AR1000 and 1 on AR2000).
- Unscrew the 3 board screws (threaded),pull the board rearwards and hinge it to one side.
- Remove the pillars holding the next board in place and de-solder the earth wire if fitted. Again this board can be hinged slightly to one side.

  The keypad is now situated under the CPU board. This can now be removed by unscrewing the 3 pillars and 1 screw (self tapping), it may however be easier to remove the Supply board as well from the bottom of the set. This requires the removal of 2 screws (self tapping), 2 pillars and one earth wire. **Note** that the 2 small pillars on this are of a slightly different size to the 3 holding the CPU board.

The keypad can now be easily replaced but it is probably a good idea to clean the PCB contacts before the new item is fitted. A brief wipe over with alcohol, IPA etc should do.

Rebuilding is obviously the reverse of the above but make sure that the correct pillars and screws are fitted in thier various places. Take special care not to trap any wires.

top of page

13-05-2001
(AR-2000) DC socket

Author: *AOR*

The power socket on these units gets a lot of wear and can eventually fail or become intermittent (intermittent supply levels are the main cause of crashed microprocessors in these sets). The socket itself can fail or the solder joints to the board can fracture.

Either way, repair is simple, requiring removal of the rear case, 1 earth wire and lifting of the supply board. Replace or resolder the socket but, as a further preventative measure, a wire can be soldered directly to the rear of the socket and taken to the anode of D201 (situated next to the socket).

top of page

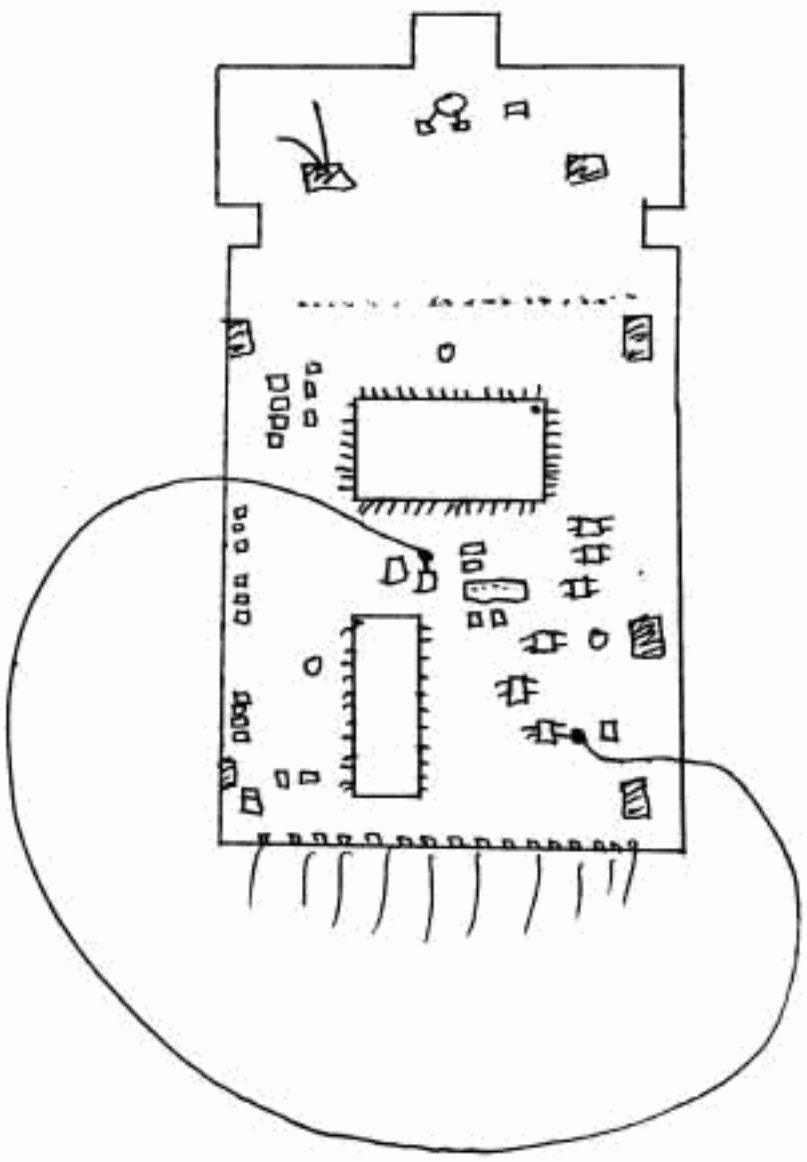
13-05-2001
(AR-2000) Microprocessor reset

Author: *AOR*

The AR2000 has no external RESET facility. In the case of a 'hang' or corruption, reset the microprocessor in the following manner.

There are two methods, one involves connecting a diode between pin 13 and 51 on the microprocessor, this is tricky as track damage and short circuits are easy to create... we recommend the 'wire link' method shown below.

The best method is to add a wire link to the CPU board while the radio is switched off:



Switch the set on and PRESS the KEYS in the following order, the key presses should appear on the LCD as you enter detail... if it will not initiate, you may have to press BANK 1 several times until the number "1" appears:

Switch the set on and PRESS THE KEYS in the following order:

BANK - 1 PROG - 0.5 - LIMIT - 49.995 - SEARCH - 556.325 - ENTER
2 - PROG - 50 LIMIT - 107.995 - SEARCH - 556.325 - ENTER
3 - PROG - 108 - LIMIT - 169.995 - SEARCH - 556.325 - ENTER
4 - PROG - 170 - LIMIT - 286.995 - SEARCH - 556.325 - ENTER
5 - PROG - 287 - LIMIT - 599.995 - SEARCH - 249.125 - ENTER
6 - PROG - 800 - LIMIT - 1109.995 - down - 249.125 - ENTER
7 - PROG 1110 - LIMIT - 1300 - down - 556.325 - ENTER
8 - PROG - 600 - LIMIT - 799.995 - SEARCH - 58.075 - ENTER

Switch off the set and disconnect the diode/link. The microprocessor will now be reset and all memory banks empty. It is recommended that at least one frequency be keyed into each memory bank. Now re-programme each of the 10 search banks.

i.e. SEARCH PROG (start frequency) LIMIT (stop frequency) ENTER (search step in kHz) ENTER (mode) ENTER (bank number) ENTER SEARCH

SEARCH-PROG-2-LIMIT-30-ENTER-5-ENTER-AM-ENTER-1-ENTER-SEARCH
SEARCH-PROG-88-LIMIT-108-ENTER-50-ENTER-WFM-ENTER-2-ENTER-SEARCH
SEARCH-PROG-108-LIMIT-138-ENTER-25-ENTER-AM-ENTER-3-ENTER-SEARCH

SEARCH-PROG-225-LIMIT-400-ENTER-50-ENTER-AM-ENTER-4-ENTER-SEARCH
SEARCH-PROG 144-LIMIT-146-ENTER-12.5-ENTER-FM-ENTER-5-ENTER-SEARCH
SEARCH-PROG-433-LIMIT-435-ENTER-25-ENTER-FM-ENTER-6-ENTER-SEARCH
SEARCH-PROG-156-LIMIT-163-ENTER-25-ENTER-FM-ENTER-7-ENTER-SEARCH
SEARCH-PROG-165-LIMIT-174-ENTER-12.5-ENTER-FM-ENTER-8-ENTER-SEARCH
SEARCH-PROG-890-LIMIT-905-ENTER-12.5-ENTER-FM-ENTER-9-ENTER-SEARCH
SEARCH-PROG-935-LIMIT-950-ENTER-12.5-ENTER-FM-ENTER-0-ENTER-SEARCH

The reset and reprogramming is now complete.

top of page

13-05-2001

(AR-2000) Unlocking Search & scan banks

Author: *AOR*

In cases were the set does not appear to operate correctly, first try these few ideas... it usually is simply "finger" trouble.

SCAN

1. Memory banks which contain no data will not be scanned, this sometimes happens when channels have been deleted by the customer (or following a microprocessor reset). Enter data into at least one channel of each bank and try scan again.

   i.e. MANUAL 1 3 3 . 7 ENTER

   PROG 000 PROG 100 PROG 200 PROG 300etc

2. Ensure that ALL banks are listed for scan. To reinstate all memory banks SCAN BANK PROG 0 LIMIT 9 ENTER

SEARCH

1. Ensure that all banks are listed for search. To reinstate all search banks SEARCH BANK PROG 0 LIMIT 9 ENTER

   (on the AR1500 SEARCH BANK PROG 0 LIMIT 8 ENTER as bank 9 is reserved for automatic memory store).

2. Ensure that data is correctly stored in the search parameters

   SEARCH PROG 150 LIMIT 160 ENTER 25 ENTER FM ENTER "X" ENTER SEARCH
   Where "X" is the bank which you wish to reprogram (i.e. 1,2,3, etc).

3. Check that the first frequency of a search bank is not locked out, this is how the receiver of a search bank is not locked out, this is how the receiver decides whether the search bank is locked out.

SEARCH BANK PROG LOCKOUT

The first locked out frequency will appear on the display, to release it press LOCKOUT or to move on to the next press ENTER

Hunt for the first frequency of each search bank to ensure that they are not locked out release them by pressing LOCKOUT

Alternatively simply unlock every frequency in the lockout list - but this may take some time as there could be as many as 1000.

When the last frequency is unlocked the receiver will start searching. Don't go too quickly or you may start LOCKING OUT new frequencies rather that UNLOCKING old ones... this may be the case if all the frequencies suddenly appear numeric!! If so just start point 3 again.

top of page

13-05-2001

(AR-2000) Keypad Beep

Author: *AOR*

Following a review in which a critical comment was made of the "BEEP" the facility has been removed at the factory. The "BEEP" is reported to be uncomfortable and annoying when using an earphone.

By addition of a single wire the facility can be restored.

Switch the receiver off and remove the batteries. Disconnect the receiver from the AC charger and remove the rear case. 4 screws secure the rear case half (2 x in rear case - 2 x in battery box). You will see 3 PCB layers once inside the case.

One end of the wire connects to the outer edge of CN7 on the top PCB. This is located at the base of the rotary tuning control. The original wire is usually GREY and the "tail" can sometimes be seen. If this is the case, solder a new length of wire to the tail. If no tail is visible, solder a new length of wire to the corresponding point on the PCB. Use the foil side (facing upward) of the PCB, this will save you "taking the set to bits"!

The other end of the wire connects to the bottom PCB (which carries the microprocessor). Follow the 3 existing wires from CN7 to the bottom board. With the base of the set facing you an unused "LAND" will be visible on the PCB to the left of the 3 existing wires. If you are lucky a tail will be connected.

If you are very careful and use a small soldering iron then there is no need to separate the PCB's. Solder the free end of the new wire to the "LAND or Tail".

Re-assemble the case and test. You will now have a KEYPAD BEEP.

Note: If you find it necessary to separate the PCB's, then the earth bonding wires will need de-soldering from the edge of each PCB. Make sure you reconnect them when you re-assemble the

receiver.

This modification is read 699 times.

top of page

13-05-2001

(AR-2000) AR2000 Discriminator (detector) output

Author: *AOR*

Remove the rear cover (4 screws) taking care not to damage the battery wires while pulling the case apart. The battery wires will unplug from the power supply board if required.

The rear of the main PCB is now visible.

The discriminator output can be taken from IC5 pin9.

IC5 is located on the visible side of the board but is situated about 1/2 way down the board but on the edge (same side as the power socket).

It is labelled TA7761P although this may be difficult to read due to lacquer on the device.

Simply solder a wire to pin 9 of this IC to obtain the discriminator output.

Terminate the wire at a suitable socket and re-fit the case half (you may find that removing the side-panel case stopper provides an excellent location without the need to drill or burn a hole in the cabinet).

This modification is read 737 times.

top of page

13-05-2001

(AR-2700) AR2700 Reset

Author: *AOR*

The AR2700 originally appeared with IF of 724.20 and 287.550MHz. In some areas of Europe, this lead to compromised immunity from which required the change of about three or four components plus reprogramming of the CPU.

To reprogramme the original defaults:

Press & hold the [0] key and power the set On... switch it off again.

Press and hold the [5] key and power the set on.

"b00" is displayed. Check that the frequency displayed is "70.00000", if not key it in an press [ENT]. If "70.00000" is displayed just press [ENT].

The display will change to "b00 / 1IF" and a frequency. Check that 749.25000 is displayed, if not key it in and press [ENT]. If 749.25000 is displayed just press [ENT].

"b01" is displayed. Check that the frequency displayed is "108".00000, if not key it in and press [ENT]. If "108.00000" is displayed just press [ENT].

The display will change to "b01 / 1IF" and a frequency. Check that 749.25000 is displayed, if not key it in and press [ENT]. If 749.2500 is displayed just press [ENT].

"b02" is displayed. Check that the frequency displayed is "165".00000, if not key it in and press [ENT]. If "165.00000" is displayed just press [ENT].

The display will change to "b02 / 1IF" and a frequency. Check that 749.25000 is displayed, if not key it in and press [ENT]. If 749.2500 is displayed just press [ENT].

"b03" is displayed. Check that the frequency displayed is "470".00000, if not key it in and press [ENT]. If "470.00000" is displayed just press [ENT].

The display will change to "b03 / 1IF" and a frequency. Check that 749.25000 is displayed, if not key it in and press [ENT]. If 749.2500 is displayed just press [ENT].

"b04" is displayed. Check that the frequency displayed is "1013".00000, if not key it in and press [ENT]. If "1013.00000" is displayed just press [ENT].

The display will change to "b04 / 1IF" and a frequency. Check that 287.5500 is displayed, if not key it in and press [ENT]. If 287.5500 is displayed just press [ENT].

"b05" is displayed. Check that the frequency displayed is "1300".00000, if not key it in and press [ENT]. If "1300.00000" is displayed just press [ENT].

The display will change to "b05 / 1IF" and a frequency. Check that -287.5500 is displayed, if not key it in (ignore the minus sign) and press [ENT]. If 287.5500 is displayed just press [ENT].

"b06" is displayed. Check no frequency is displayed and a row of lines is displayed "- - - -". Press [0] [ENT].

The CPU will soft reset, all LCD legends will be displayed and the receiver will go to the previously used frequency.

Notes: If you are SLOW in programming it will return to "b00". You can abort entry by switching the receiver Off using the [PWR] key.
A marginal improvement in sensitivity around 165MHz may be achieved by changing the frequency of "b02" from 165.00000 to 170.00000MHz.
If you use the wrong setting no damage will occur, it simply will not receive!

To reprogramme the later production defaults:

Press & hold the [0] key and power the set On... switch it off again.

Press and hold the [5] key and power the set on.

"b00" is displayed. Check that the frequency displayed is "70.00000", if not key it in an press [ENT]. If "70.00000" is displayed just press [ENT].

The display will change to "b00 / 1IF" and a frequency. Check that 748.57500 is displayed, if not key it in and press [ENT]. If 748.57500 is displayed just press [ENT].

"b01" is displayed. Check that the frequency displayed is 108.00000, if not key it in and press [ENT]. If "108.00000" is displayed just press [ENT].

The display will change to "b01 / 1IF" and a frequency. Check that 748.57500 is displayed, if not key it in and press [ENT]. If 748.57500 is displayed just press [ENT].

"b02" is displayed. Check that the frequency displayed is "165".00000, if not key it in and press [ENT]. If "165.00000" is displayed just press [ENT].

The display will change to "b02 / 1IF" and a frequency. Check that 748.57500 is displayed, if not key it in and press [ENT]. If 748.57500 is displayed just press [ENT].

"b03" is displayed. Check that the frequency displayed is "470".00000, if not key it in and press [ENT]. If "470.00000" is displayed just press [ENT].

The display will change to "b03 / 1IF" and a frequency. Check that 748.57500 is displayed, if not key it in and press [ENT]. If 748.57500 is displayed just press [ENT].

"b04" is displayed. Check that the frequency displayed is "1013".00000, if not key it in and press [ENT]. If "1013.00000" is displayed just press [ENT].

The display will change to "b04 / 1IF" and a frequency. Check that 288.2250 is displayed, if not key it in and press [ENT]. If 288.2250 is displayed just press [ENT].

"b05" is displayed. Check that the frequency displayed is "1300".00000, if not key it in and press [ENT]. If "1300.00000" is displayed just press [ENT].

The display will change to "b05 / 1IF" and a frequency. Check that -288.2250 is displayed, if not key it in (ignore the minus sign) and press [ENT]. If 288.2250 is displayed just press [ENT].

"b06" is displayed. Check no frequency is displayed and a row of lines is displayed "- - - -". Press [0] [ENT].

* Programming can be aborted by switching the unit off with the power key.

The CPU will soft reset, all LCD legends will be displayed and the receiver will go to the previously used frequency.

I.F. data

Receive frequency (MHz)	1st IF (MHz)	2nd Oscillator
0.1 - 70	+748.575	691.2

70 - 108	+748.575	691.2
108 - 165	+748.575	691.2
165 - 470	+748.575	691.2
470 - 1013	+288.225	345.8
1013 - 1300	-288.225	234.8

2nd I.F. 57.375

AM/NFM 3rd IF 455kHz, 3rd local oscillator 56.920MHz
WFM 3rd IF 10.7MHz 3rd local oscillator 46.675MHz

top of page

13-05-2001

(AR-2700) Opto Scout Modification

Author: *AOR*

The hardware modification includes adding a small jack to the radio to make it possible to connect the Scout™ with a flexible cable using 2.5mm phone jacks cables, and plugs. The modification described will permit easy connection from the Scout™ to the radio fro reaction tune operation. These modifications may however void the manufacture's warranty. Keep this in mind and make sure you are aware of the possibility. Opto Electronics will not make these modifications to a customers radio an will not assume any responsibility or liability for their effect on warranty service. Opto Electronics will not service or repair any AOR products.

Having been warned, it can be stated that the addition of the jack described here as easily done by a qualified electronics technician who is experience in working on two way radios and scanners. Careful soldering of the wires to locations shown is necessary. If you are not experienced at soldering or taking apart hand held radios you should seek assistance from a qualified technician.

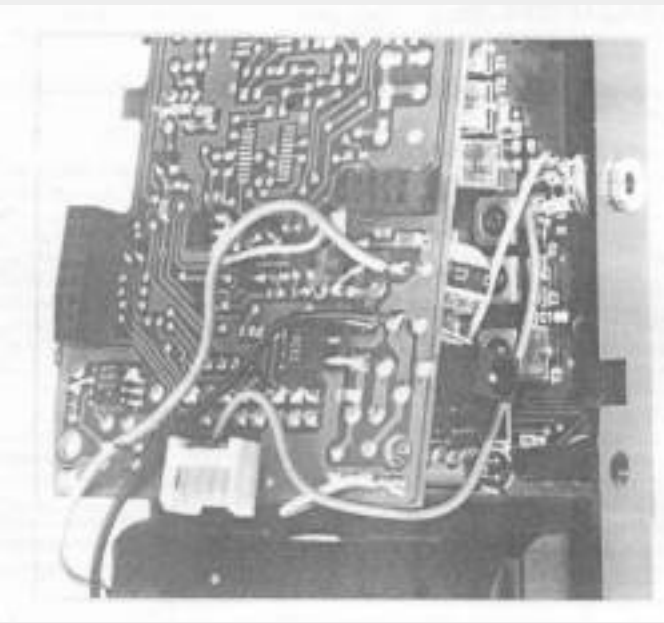
Disassemble the radio and check the jack location against the picture. Make sure all the batteries are removed and that the power adapter is disconnected. When modifying the AR2700 it is necessary to partially remove the centre PC board as shown in picture (Do Not attempt to completely remove it from the unit!)

The jack being installed is a 2.5mm (3/32") phone jack. The centre or tip connection from the Scout™ carries data tot he radio. The wires used are number 24 stranded. In the AR8000, the wire lengths are short, a little more than an inch. In the AR2700, use wires 4" long and custom cut to length when installing.

It is not necessary to drill a hole for the jack. locate the position of the hole relative tot he power jack as shown in the picture. Tale a few minutes to see that the jack location will not interfere with the PC boards when the radio is re-assembled. To create a hole in the plastic case, use an X-acto

knife and place the point in the centre of the desired location. Rotate the blade creating a hole in the soft plastic. Keep checking the hole size against the jack to make sure that you don't make it too large. It may be necessary to bevel the edge of the hole for the nut to fit on the jack. It is better to create the hole in this manner than to use a drill.

The ground connections can be made where ever it is convenient. The picture shown positions that work well. The data connection in the AR8000 is taken directly from a chip resistor (as shown). Solder carefully to prevent damage to the resistor. The Ar2700 connection is a little more difficult to see. The wire is soldered directly tot he second pin from the left on the white connector. Make sure the wire can not move and short any other pin. Check for continuity between the nut on the outside of the jack and the ground connection to the radio's PC Board using a tester. If this checks out and polarity is not reversed then re-assemble the radio.



top of page

13-05-2001

(AR-2700) Discriminator Output

Author: *AOR*

The discriminator output on the AR2700 is taken from pin 9 of IC 200.

This is a MC3372 device, and is the only device with this number in the set. This should make it easy to find !
The only other thing you require is an earth but this can be picked up at a convenient place else where in the set.

top of page

19-07-1998

(AR-3000) 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).

top of page

19-07-1998

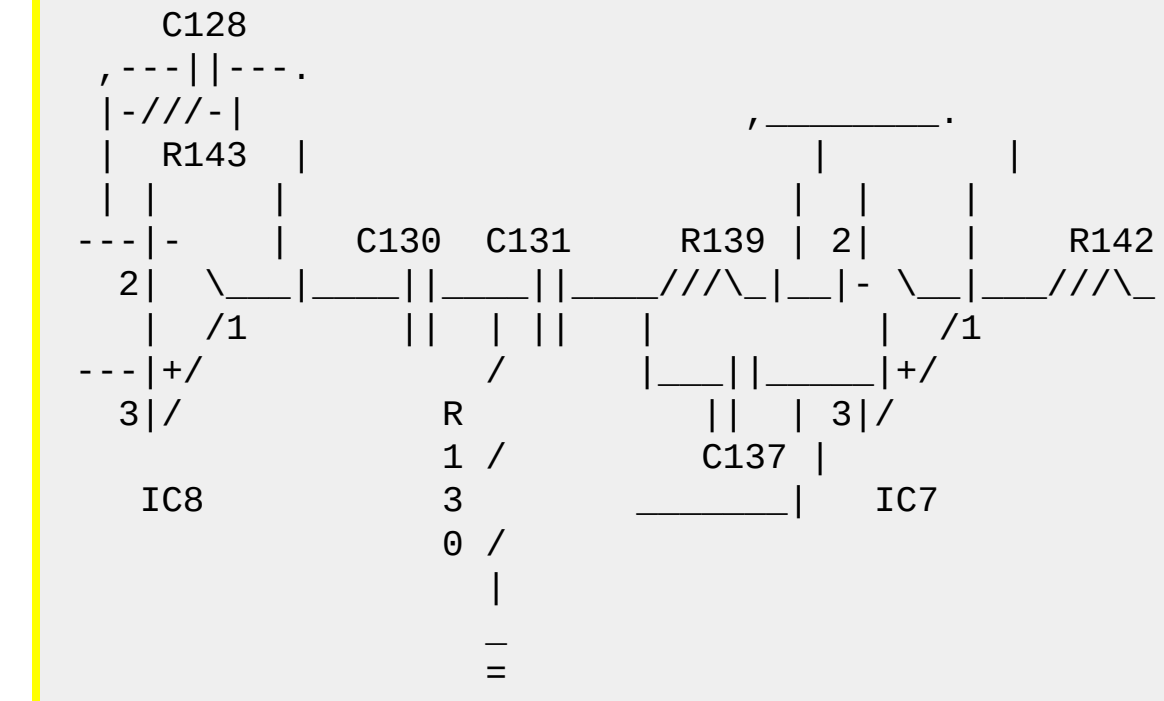
(AR-3000) Improve the audio for AM/NFM/SSB/CW modes on AR-3000

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.

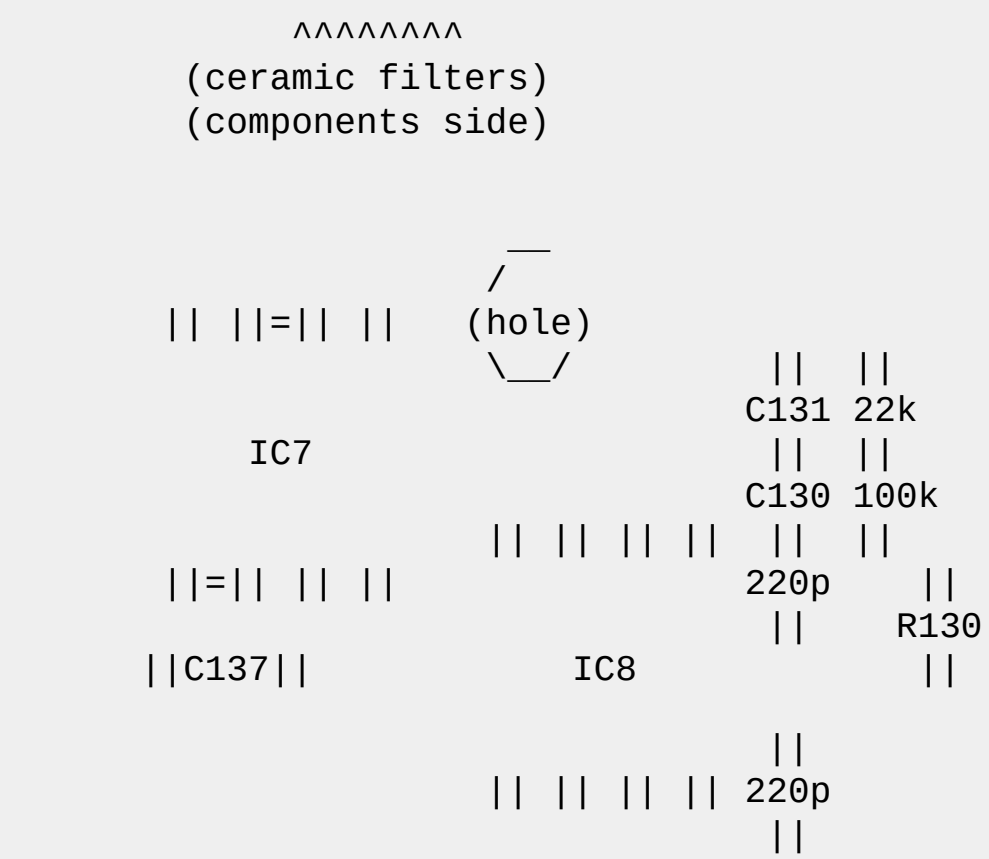
The mod itself is simple, but involves working on SMD, so it's quite DELICATE. Do it at your risk. I'd reccommend having a copy of the PC layouts and of the schematics from the service manual, in order to understand what you're doing. I found useful making a coloured xerox copy of the etch layouts on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

This modification is read 1317 times.

top of page

19-07-1998

(AR-3000) 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.

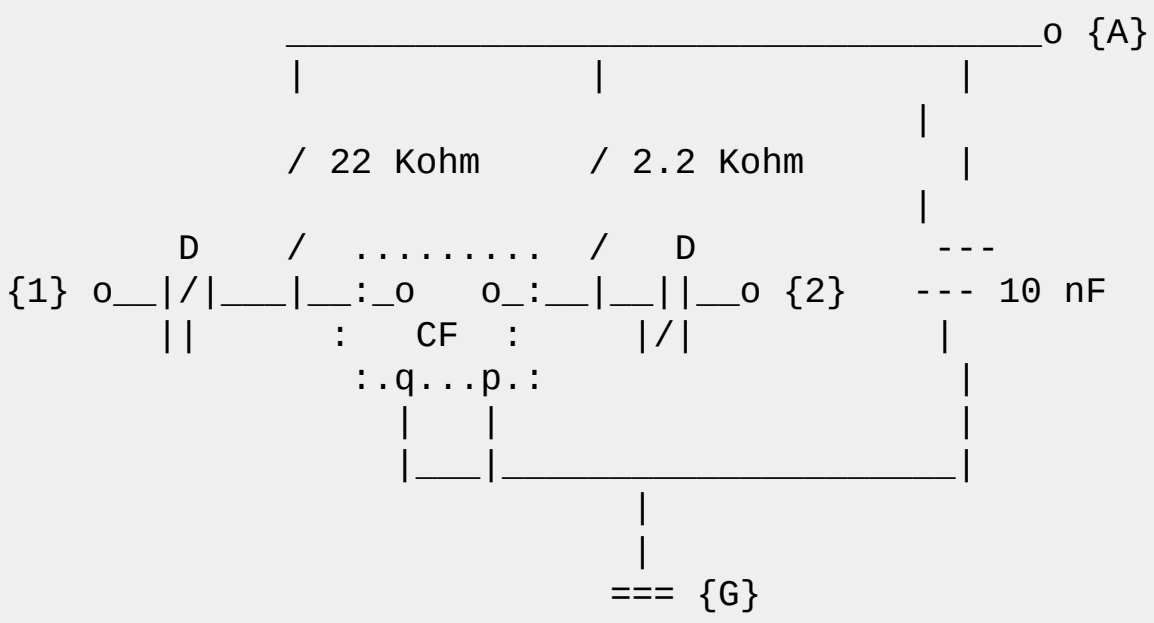
The point is that, by design, the IF bandwidth for the AM,CW,SSB and NFM modes is intentionally 30 KHz throughout the IF chain, down to the 2.4/12 Khz ceramic filters which just precede the decoders. While 12 Khz is acceptable for NFM and 2.4 for SSB, a bandwidth as large as 12 Khz for AM degrades much 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.

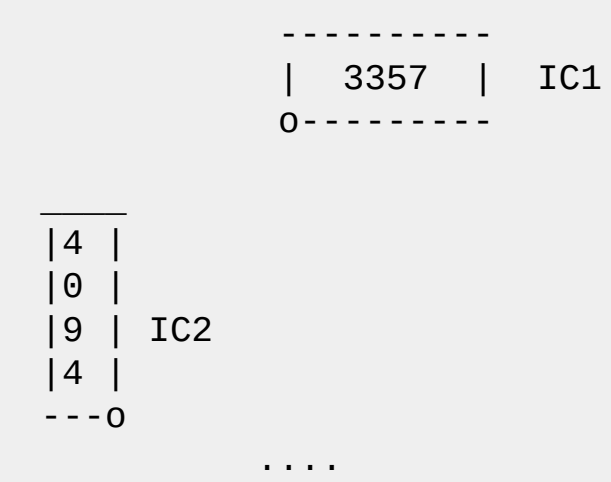
Operation:

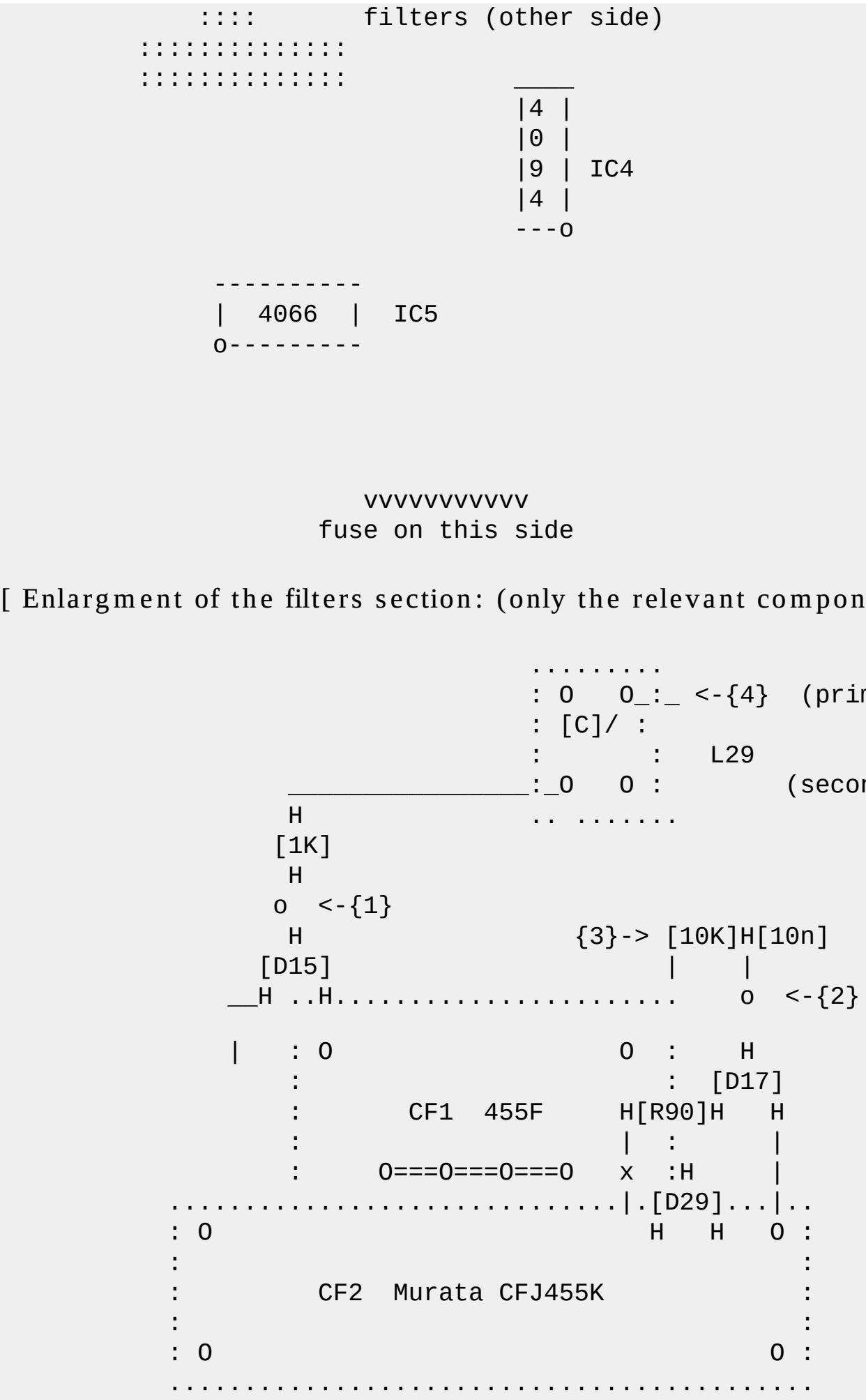
- disconnect the power cord! Turn the scanner uspide down. Unscrew the bottom cover (2 screws on the bottom and 2 on the backside) and remove it. Disconnect the loudspeaker connector.
- unscrew the lowermost board, which is the IF/audio/power supply board (6 screws). Locate the two ceramic filters (approximately 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]]





[[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,

top of page

19-07-1998

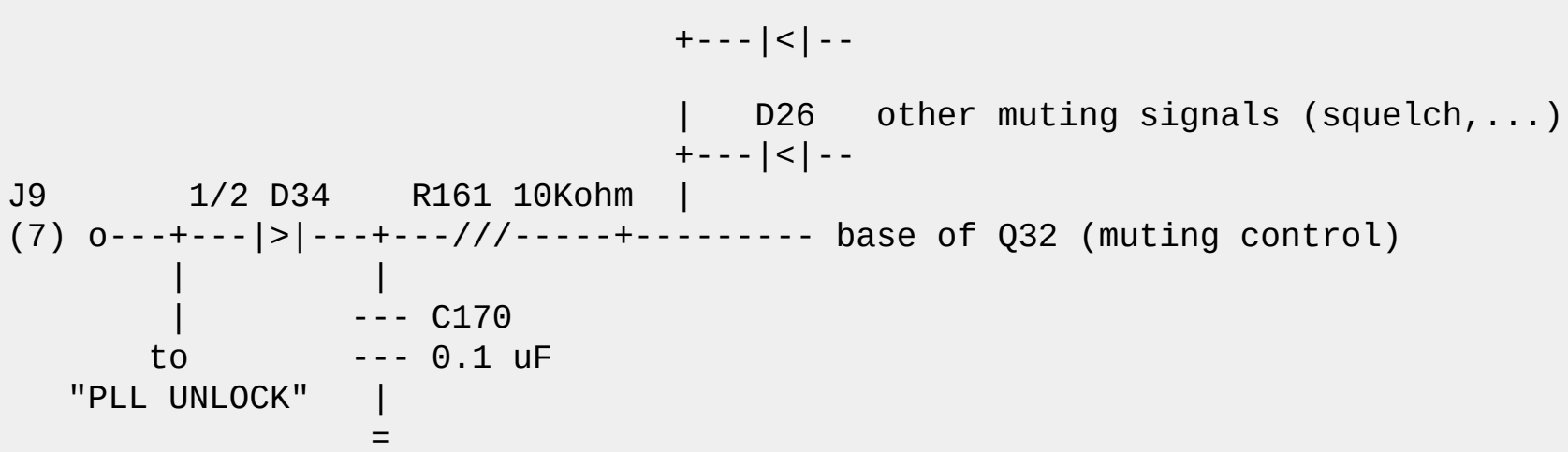
(AR-3000) Removing the cpu muting

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

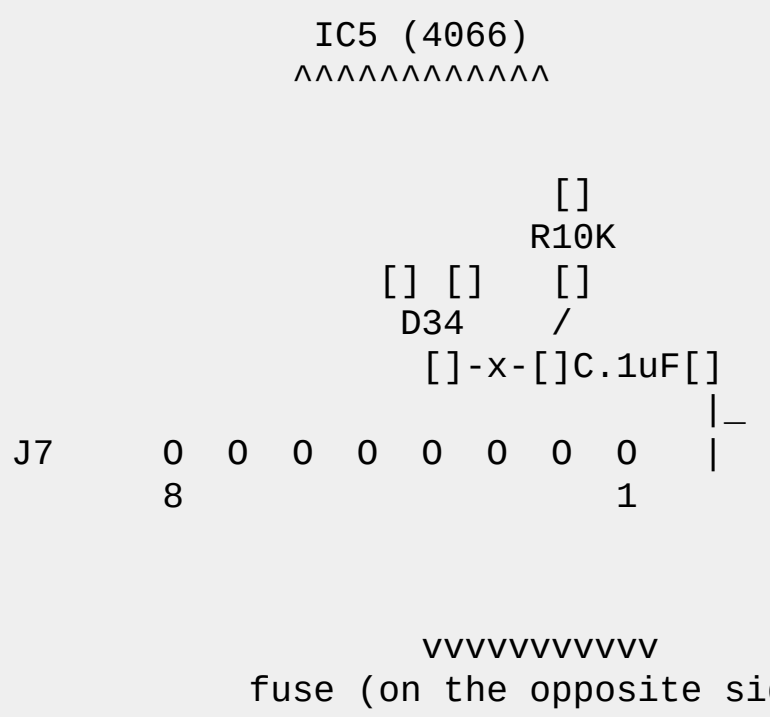
may screw your scanner up.

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.

Enrico Segre, segre@polito.it

top of page

19-07-1998

(AR-3000) 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.

Operation:

- 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

top of page

15-05-1999

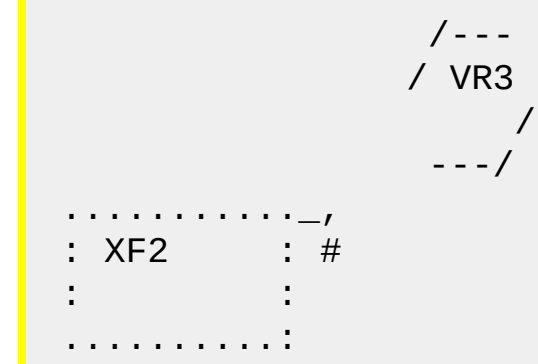
(AR-3000) Direct (unfiltered) FM discriminator out for the AR3000/A scanner

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

This modification is read 1287 times.

top of page

15-05-1999

(AR-3000) 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

top of page

15-05-1999

(AR-3000) 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?

top of page

19-01-2000

(AR-3000) AR3000A memory doubling

Author: *Mark - Mmpersson@aol.com.MODIFICATION.NET*

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.

Date: 01-03-2002 **User comment** **From:** peter vd. meijde

Subject: aor ar3000a

Pls. tell me if it is the 28 pins IC on the display/cpu cirquit board. And if you can sent me the scematic of the aor ar3000a. Many tnx.

top of page

28-03-2001

(AR-3000) Cell Block Mod for AOR AR-3000a

Author: *Shannon M. McMillen - smcmillen@dnc.net.MODIFICATION.NET*

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).

top of page

13-05-2001

(AR-800) AOR BP800 replacement NiCad battery

Author: *AOR*

Unfortunately demand for this replacement pack has dropped to a point whereby its continued manufacture has become uneconomic. NiCads do not last for ever if stored on the shelf awaiting sale, for this reason regular manufacture and rotation of stock is most important.

For your information, the BP800 was available until the end of January 1995 as a sales item, price was £17.50 including VAT with P&P being an additional £1.50

It may be possible to have batteries manufactured here in the UK by one of the replacement battery manufacturers, one such company commonly used was E.S.P. batteries in Leicester but they appear to have moved location or closed down (?)...

Perhaps it is worth contacting other independent companies, from an internet search one likely candidate may be:

Strikalite, Laurel Drive, Rugeley Road, Burntwood, Staffordshire WS7 9BL, UK
Tel / Fax: 01543 683122
http://strikalite.co.uk

We have made no approach to or had contact with this company, however we understand that they are the business of supplying replacement mobile phone batteries [January 2001].

top of page

13-05-2001

(AR-800) AR800E - Intermittent or no NFM.

Author: *AOR*

This is quite a common problem with the AR800E. It is usually caused by the failure of T201 (quadrature coil/transformer).
This component is positioned next to the battery pack and is prone to damage if the set is subject to any physical shock.

To replace T201: Remove the battery cover and battery pack. Remove the two screws holding the board resting inside the rear case. This PCB can now be worked on but it may be a good idea to also remove the further two screws and rear case to prevent damage to them.
Be careful not to break the wiring to this board.

T201 is the small metal transformer located on this board next to the battery pack slot and IC200 (MC3361). A small amount of adjustment for best quality receive may be necessary once the new transformer is fitted.

This modification is read 570 times.

top of page

13-05-2001

(AR-800) AR800E - Failure of input resistor.

Author: *AOR*

A 10ohm 0.25W resistor is fitted in-line with the charge socket on the AR800E to limit charge current into the battery pack. This can fail under any condition in which the charge current increases abnormally. Usual causes are trying to charge a faulty battery pack (s/c cells) or trying to charge the batteries from a 13.8V supply.

The common symptoms of its failure are lack of charge to battery pack or hot resistor smell. Although a simple fault, the resistor is quite difficult to replace due to its location between the charge socket and top panel controls.

To replace this resistor, remove the battery cover, battery and the two screws holding the rear PCB. Lift this board up to reveal the two further screws. Remove these and then the rear case The set should now be stripped far enough to see the failed resistor behind the top panel connected between the charge socket and power switch (it should be sleeved in plastic).
A failed component is usually accompanied by a slight melt mark in the plastic close to it. The set can be stripped further if necessary to replace the resistor depending on how steady you are with a soldering iron. Rebuild the set carefully. If the set now fails to receive, chances are, the mini coax wire between the two PCBs has become disconnected. Note that the shield to this wire is only connected at one end.

This modification is read 561 times.

top of page

19-07-1998

(AR-8000) Review of AOR AR-8000 handheld scanner

The AR-8000 is a wideband handheld scanner with a published coverage of 500 kHz - 1900 MHz for the UK (it can actually covers down to 100 kHz). Certain bands will be inhibited in other countries so that the radio complies with local regulations.

The full range of modes are provided: AM, NFM, WFM with the addition of USB, LSB and CW. The SSB modes do not rely on a manual BFO but use a dedicated carrier insertion oscillator like a quality shortwave radio. The frequency shown on the display is the true frequency (not offset).

Here is a run down of the specifications:

Frequency range:	500 kHz - 1900 MHz
Modes:	AM, NFM, WFM, USB, LSB, CW
Frequency step sizes:	50, 100, 200, 500 Hz, 1, 2, 5 6.25, 9, 10, 12.5, 20, 25, 30 50, 100, 200, 250, 500 kHz or any multiple of 50 Hz up to 999.995 kHz

Sensitivity:	
500 kHz - 2.0 MHz:	by field strength at internal ant.
2.0 MHz - 30 MHz:	SSB 1.0uV, AM 3.0uV, NFM 1.5uV
30 MHz - 1.3 GHz:	SSB 0.25uV, AM 1.0uV, NFM 0.35uV, WFM 1.0uV
1.0 GHz - 1.3 GHz:	NFM 1.0uV
1.3 GHz - 1.9 GHz:	NFM 3.0uV
Selectivity:	
SSB:	4 kHz (-6dB), 15 kHz (-50dB)
AM/NFM:	12 kHz (-6dB), 25 kHz (-60dB)
WFM:	180 kHz (-6dB), 800 kHz (-50dB)
Antenna impedance:	50 ohms
AF output (at 4.8V):	120mW (8 ohm) THD 10%
Power requirements:	4.6V Nicad 6.0V Manganese battery Ext 9.0 - 16V
Power Consumption:	160mA (nominal) 110mA (standby) 20mA (power save)
Memory channels:	50 channels x 20 banks = 1000 total
Pass channels:	50 channels x 20 banks = 1000 total
Priority channel:	1
Scan/search rate:	Approx. 30 channels per sec

Appearance and general use

The AR-8000 is neat and stylish in appearance and is distingushed from most other radios by the four row LCD alphanumeric display (more on this in the section below and throughout).

There are three rotary controls on the top of the radio: power/vol, squelch and tuning. The tuning knob is a click-stop type which duplicates the up/dn push buttons on the front panel when tuning. I liked the tuning knob because you can hold the radio in one hand and easily step up/dn the bands using the other.

Four sealed in push buttons are provided down the left side of the case. These allow the LCD back-light to be selected, secondary functions to be selected from front panel keys, the keypad to be locked, and (best feature) the squelch to be defeated so that it is forced open when a weak signal has been found.

The keypad itself comprises 20 rubber-like keys which have a positive feel.

You can power the set using internal batteries (nicads if preferred) or an external 12v dc supply.

A rubber duck antenna is provided and plugs into a high quality BNC connector. There is a 3.5mm "ear" socket next to the antenna BNC.

Selecting frequencies and modes is straight forward. You just type in the frequency and press ENT to change frequency. The mode is selected using the 2nd function key and "7", then the up/dn keys or the rotary knob on the top of the radio.

The minimum tuning step size is 50 Hz.

One nice feature is the auto mode where you can make the radio select the appropriate mode for the band you are on automatically.
This can be turned off if required.

When you first start using the radio, it operates in "new user" mode and some of the advanced functions are disabled. However, once you have got the hang of using the radio, you can select "expert user" mode and adjust some of the more complex parameters of the radio. Throughout this review I refer to "expert menus", these are only displayed when the radio is in expert mode.

The radio has a power save facility which lets you run the radio for long periods of time using the batteries as efficiently as possible.
When the power save feature is ON, the radio switches OFF then ON periodically to save power. Only the RF circuitry is powered OFF, the CPU and display remain ON. The expert mode lets you alter the delay time (the period of time before the radio switches off after a signal has gone) and the cycle time (the period of time the radio is toggles OFF then ON while there is not signal).

The expert mode also lets you alter factory presets such as the lock detect time (VCO and PLL stablisation time), squelch detect time, the audio squelch detect time and the audio level required to open the audio squelch.

Alphanumeric display

The alphanumeric display has a variety of functions and becomes the main focus for your attention when operating the radio. The display is a dot-matrix type and has wide viewing angle which is at its optimum when the radio is held in the hand during normal operation.

There are two VFOs, both of which are displayed together with the mode and s-meter level. You can swap between VFOs with a push of a button. I particularly liked this feature - long overdue in any scanner.

At least 14 different menus or displays can be shown. At times, the display operates like a small vdu giving you a menu type display. At other times it is a comprehensive status display.

There is an 11 element panoramic (or spectrum) display on the third line) that shows you activity on adjacent channels. This proved to be an effective way of finding active channels nearby.

Memories

One thousand memory channels are provided in 20 banks of 50 channels. The banks are designated "A" thru "J" and "a" thru "j". The lower case memory banks can be password protected. Each memory channel has an address like "A00" or "J23" or "b34".

When you store a frequency in a memory channel you can add a 7 character comment. The comment helps with identifying channels held in memory and is very useful. The process of adding a text comment is easy: you just use the tuning knob on the top of the radio to select a character and the step keys to move the cursor backwards and forwards on the alphanumeric display.

There are a variety of memory editing factilties including copying a channel, moving a channel, swapping channels and deleting channels or banks. A system of menus is used on the alphanumeric display to help you through the steps required.

The password protection involves you entering a 4-digit number rather like the PIN number used with a bank ATM card. You enter the password whenever you want to access protected functions. Operation with the password is optional.

RF and scanning performance

Several IF filters have been provided (see specification above).

AM bandwidth is a bit wide for HF use but after an evening's listening on shortwave, I found the performance was quite impressive.
This radio is best suited to listening to major broadcasters and has similar shortwave performance to a Sony SW-7600 or an AR-3000A (I have both radios available here). Performance can be improved by replacing the "rubber duck" antenna with a larger antenna tuned for HF reception and using the attenuator (if necessary) to prevent overload.

I talked to AOR (UK) about the choice of filters in the radio and was told that the radio was optimised for VHF use. Filters that are too narrow can cause signals to be missed if they are slightly off-tune. This seemed sensible to me since I have this problem with my Icom R-7100 which misses certain airband signals which are slightly off channel.

Most controversial is the choice of 4 kHz filter rather than the 2.4 kHz originally planned. I was told by AOR (UK) that the filters are standard parts and that different filters can be substituted with the minimum of effort. It should be possible to change the filter to whatever bandwidth you want.

Bearing in mind the filter, SSB performance is still quite good on HF allowing HF amateur radio and utility signals to be received clearly. Frequency stability is excellent through the use of true SSB.

The scanning speed is one of the most impressive features of this radio. Memory channel scans and search scans operate at 30 channels per second.

There are very few spurious signals from within the radio and strong signal handling is very good. I live 2 miles from a 1 kW FM broadcaster and amongst several strong radio pager signals. I did not get any breakthrough from these signals on nearby bands, even when tuned to the nearby VHF weather satellite band.

The scanning facilities offered from the keypad is extensive and the speed of scanning VERY impressive. It is possible to alter the timings used and the behavior of the radio when new signals are found. By default (from the factory) the radio stops on active channels and dwells for 2 seconds before resuming the scan, but you can alter it in the range 0 - 9 seconds.

The expert menu lets you change 5 scan parameters in all: scan delay before resuming; audio squelch detection (ON/OFF); dwell time on active channels; the S-meter level required to stop scanning; all modes or just the selected mode to be allowed.

Up to 100 memory channels can be "tagged" so that only the most interesting are included in the scan. Memory banks can be "linked" in or out so that the selection of memory channels to be included in scans is very flexible (you can select both individual channels and banks).

One thousand pass channels are provided so that you can exclude channels from scans if you want. The radio will prevent you from entering the same frequency twice by checking to see if the new frequency is within +/-10 kHz of any others already "passed".

A single priority channel (memory channel A00) is provided.

A total of 20 search banks allow you to enter two frequency limits, mode, step size and a 7-character comment. The search banks are designated in the same way as the memory banks: "A" thru "J" and "a" thru "j". The lower case search banks can be password protected.

You can link search banks together (so you could have A, C, H, c, e, i for example).

Once again the expert menu allows you to alter the parameters of the search. You can alter four parameters (in fact equivalents of the first four scan parameters, you don't need to select the mode).

Here is something exciting!!!, the auto store search mode. Auto store operates during a scan and automatically copies the first 50 memory channels that are active into bank "J". This is particularly useful for finding active channels while the radio is left unattended.

RS-232 computer control

The AR-8000 marks itself out yet again through the provision of RS-232 control. I think this must be unique for a handheld. Not only does this radio have RS-232, it has the most extensive range of commands I have seen. It exceeds those offered on the ICOM R-7100 by a long way.

In addition to the normal range of tuning and S-meter commands, a range of frequency scanning, memory scanning and pass frequency commands are provided. This means you can have computer controlled scans at the full speed of the radio.

There are about 40 different RS-232 commands relating to scanning operations. You can control frequency ranges, memory channels, the squelch level and mode, delay and free times. This is unheard of in most radios let alone a handheld - very impressive.

You need a CU-8232 interface unit to connect your computer to the AR-8000. A short ribbon cable is inserted into a slot in the battery compartment and connects the radio to the interface. You then connect your computer through a two-wire link to the 9 way D-type connector on the CU-8232. The interface unit is powered from the radio.

You can also use the interface unit to copy memory data from one radio into another. This is yet another unique feature.

Summary

You only have to look at the range of facilities I have described to see that this radio is a real winner. Time and time again, new and genuinely useful features have been provided. This radio is unique and is hard to beat for value.

Don't take my word for it though - go and see the radio for yourself at a dealer.

Notable features:

Excellent manual written directly in English (not translated).
Range of RS-232 control commands (the best available I have seen).
Alphanumeric display giving clear easy to read information.
Panoramic (or spectrum) display.
Dual VFOs
Password protecting memory channels.
New user and expert modes of operation.
Copying memory data between radios.
Inbuilt ferrite rod antenna for MF coverage

The AOR AR-8000 retails for 449 pounds in the UK and is available from AOR (UK) Ltd., Adam Bede High Tech Centre, Derby Road, Wirksworth, Derbyshire DE4 4BG ENGLAND Tel: 0629 825926, Fax: 0629 825927.

top of page

19-07-1998

(AR-8000) AR-8000 Filter Mod

Hello AR8000 owners,

To my knowledge no one has actually posted a filter mod, here is what I did. This is my approach and I only know it works well on my AR8000. Your results may vary. Others may have a different solution that works better or worse.

THE GOOD NEWS:
Is it worth the effort. In my opinion YES!
The search mode is vastly improved on the SW bands. Search stops on the primary frequency and not 1 or 2 times before and after. Readability of SW stations is vastly improved. In some receiving instances it reduces adjacent channel interference noticeably. On AM receive for aviation frequencies a pronounced improvement in audio quality is noted. You will be able to select WIDE or NARROW for AM, NFM, USB, LSB.

THE BAD NEWS:
This is a difficult mod to perform. I have been a ham for over 30 years and have extensive homebrew experience. It took all my skill and a magnifying glass to perform this mod without damaging the radio. IF YOU ARE NOT QUALIFIED DO NOT ATTEMPT THIS MOD! Find a qualified helper.

There is no way to adequately describe the locations on the circuit board to be cut and soldered too. You will have to buy or borrow a service manual.

Study the electrical mods described below and then using an ohm meter and the service manual find the locations to modify on the circuit board.

WHAT IS MODIFIED ELECTRICALLY:
The 4khz filter (F4) circuit is paralleled by a a jumper that is used to bypass the filter for WIDE reception. This selection process is accomplished by switching diodes on each end of the filter and bypass.

Find U2 pin 11 (AM, FM filter bypass) line. Trace this line to a 22K resistor that connects to the switching diodes (near the F4 filter). The voltage from pin 11 is used to bias these diodes into conduction. Cut through the circuit trace at a convenient location just before the 22K resistor.

Find U2 pin 4 (SSB, CW filter inline) line. Trace this line to TWO 22K resistors that connect to the switching diodes (near the F4 filter). The voltage from pin 4 is used to bias these diodes into conduction. Cut through the circuit trace at a convenient location just before the TWO 22K resistor junction.

Unfortunately there is no way for me to put a schematic in for this next part but if you draw it out on paper you should be ok. You are going to mount a small switch on the radio. This will be a SPST switch.

Connect a wire from the WIDE side of the switch to the single 22K point.

Connect a wire from the NARROW side of the switch to the dual 22K resistors point.

Connect TWO 1N914 style switching diodes together to the switch common. Connect them with the black band facing the switch.
Connect U2 pin 11 to the open end of one diode and U2 pin 4 to the open end of the other.

What you have done is to install a switch to reverse the normal filter selection of F4. The 1N914 diodes serve to prevent turning on the BFO in the AM mode and to prevent grounding when in the WIDE SSB mode.

I make no guarantees, your results could vary.
You might not have much fun performing this mod but you will enjoy the results.

73's
Bob
K8WX(WM8P)/GROL/GMDSS/M

top of page

17-03-2002

(AR-8000) AOR AR-8000 Discriminator Mod

Author: *KC8MZM & optoelectronics.com*

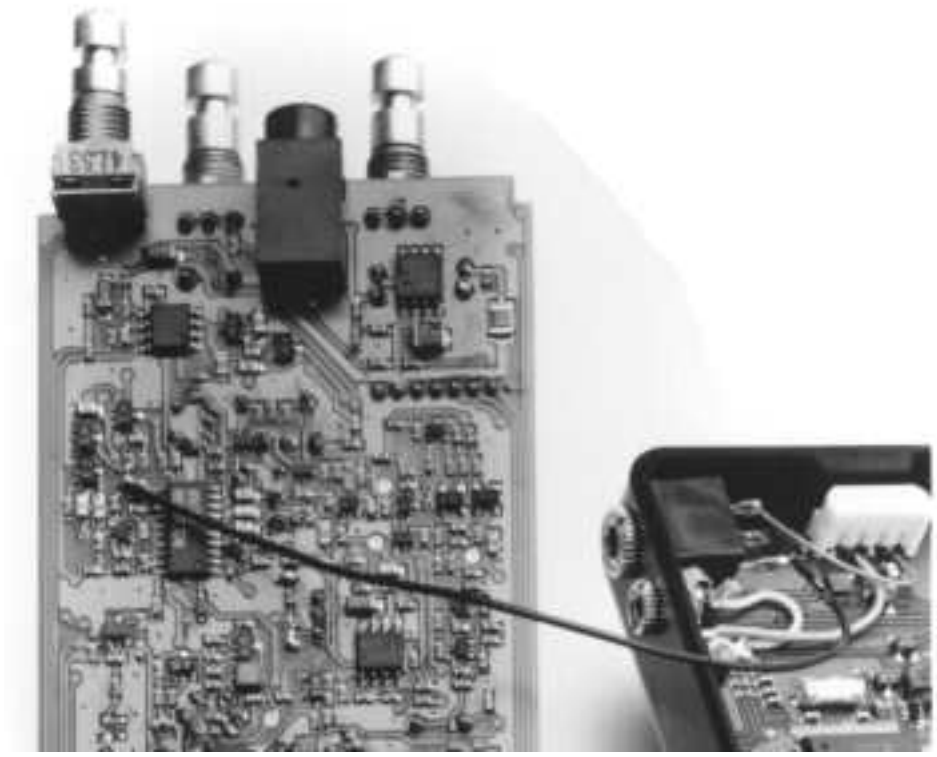
WARNING
This mod requires soldering to tiny, heat sensitive surface mount components You assume all risks involved with performing this modification I will not be held responsible if you destroy your scanner

---

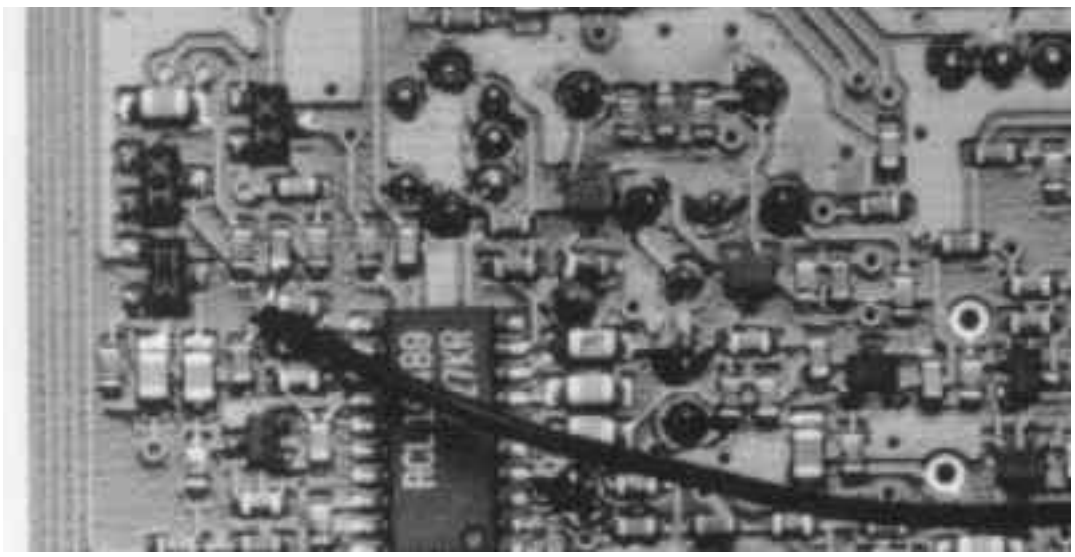
AOR AR8000 discriminator mod instructions

Below is the PC board for the AR8000 receiver showing the test points for discriminator modification.

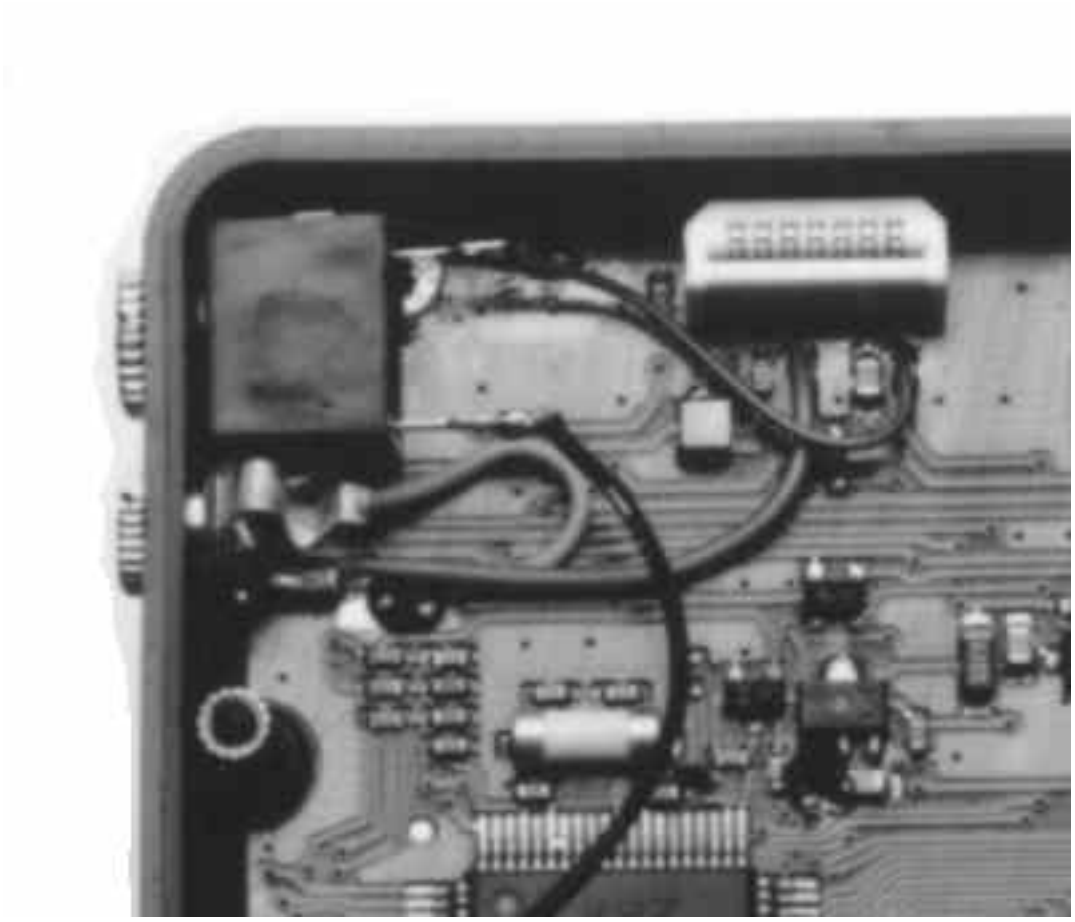
For additional and technical information contact us at sales@optoelectronics.com



Above: View of the Main PC board and the front cabinet with the modification made.



Above: Solder a wire to the chip resistor shown in the photo.



Above: The front cabinet shown upside down, Ignore the bottom jack in this photo.

The "AOR AR8000 discriminator mod instructions" can also be found on http://www.optoelectronics.com/ar8000_disc_mod.htm.

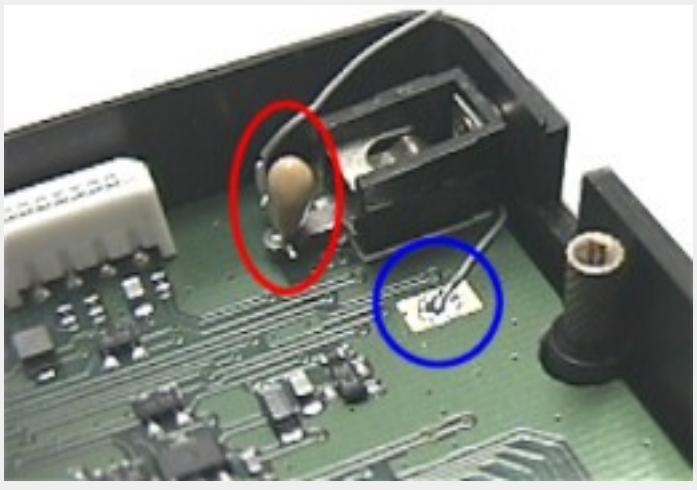
The red circles indicate the location of the exterior screws that need to be removed (the other tiny screw on the right side is not pictured)

The rubber knobs on top of my 8000 were very hard to remove. I found it was easier if I very carefully pried them off with a small jewelers screwdriver.

With the knobs removed you will see 3 nuts (highlighted in red) that need to be removed

With the exterior screws and knobs removed you need to ***very carefully*** pry the scanner case apart

The red circles indicate the location of interior screws that need to be removed. With these screws removed you need ***very carefully*** pry the PC board away from the scanner back. With the PC board removed flip it over so the earphone jack is on top, then refer to the detailed picture at the link above to locate the discriminator tap.



The red circle is a 1uf capacitor soldered inline between the tip portion of the jack and the wire from the discriminator tap (positive leg gets soldered to the discriminator wire). The blue circle

indicates the pad to which the ground from the jack is soldered

The completed discriminator tap routed from the middle PC board to the jack

The completed discriminator tap with the middle PC board reinstalled

This modification can also be found on http://www.qsl.net/kc8mzm/8000.htm.

top of page

07-06-2001

(AR-8200) Wider bandwidth IF filter for NFM for AR-8200

Author: - *ulcak@applet.cz.MODIFICATION.NET*

With this modification you got possibility of:

- Meteosat and other geostationary satellites weather pictures decoding
- NOAA and other polar orbiting satellites weather pictures decoding
- 9k6 amateur packet decoding
- Significantly better readability of Inmarsat voice transmissions
- Decoding other higher speed data transmissions as FAX etc.
- if you know of another let me know

Three types of narrowband IF (Intermediary Frequency) filters are used in AR8200:

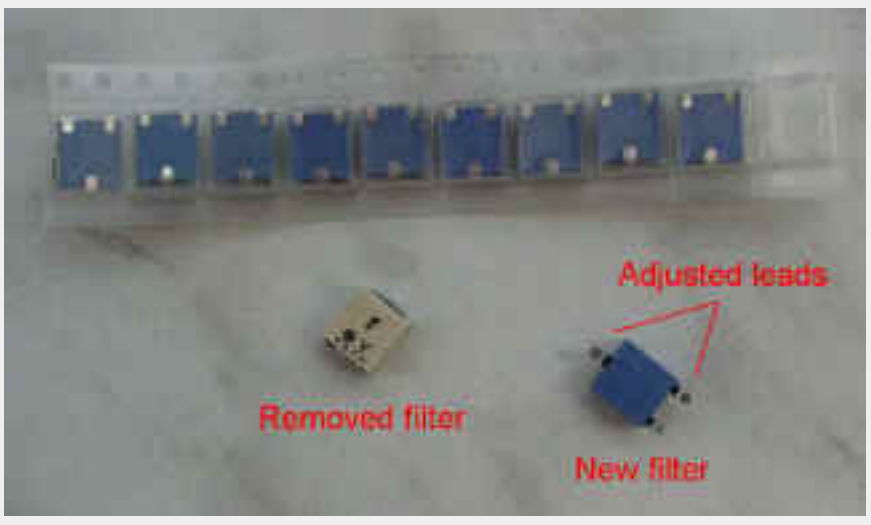
- 3 kHz for both SSB, CW and NAM
- 9 kHz AM and SFM
- 12 kHz for WAM and NFM

Widest is 12 kHz filter, but if you want to use AR8200 for decoding higher data speeds or other data transmissions requirig bandwidth at least 30 kHz, one of filters must be changed by wider type. You can change any of these three filter but the I recomending 12 kHz filter. Standard narrowband FM transmission you can receiving on SFM mode without significant difference between 9 kHz SFM and original 12 kHz NFM mode. Same thing for WAM and AM receiving mode, because NFM and WAM using one filter. Of course you can still clearly receiving for example amateur repeater on 30 kHz filter but if there is another transmission on channel 12.5kHz close you will hear it too.
After searching on Murata website I have found type for ideal replacement - SFGCG455BX. It have same package, bandwidth of 30 kHz (+/-15kHz) and SMD package same as Murata filters used in receiver. Other filter parameters as loss and impedance little vary but it is not problem. The problem is where to got new filter. I'm tried contact official distributors but they selling 500+ quantities. Other components distributors like RS-components, GME or GES don't have any of Murata filters in stock. My last try was searching by google search engine. And I was found one radioamateur components distributor here in Europe selling this filter by one piece. They are from Finland and name is EL-KAMA. For minimum order I got 20 filters. Super bargain. They also selling other hard to find components.

IF Board with original filter:

Desolder old filter located on IF board using desoldering braid:

Adjust new filter leads and solder on place:



This modfication is also available at http://www.applet.cz/~ulcak/

top of page

13-05-2001

(AR-900) AR900UK IC209 failure

Author: *AOR*

The AR900 has very few common faults. One of the few items that has been known to fail is IC209.

This is the main 5V regulator and will fail if there is a problem anywhere else in the set (failed IC or shorted track). It is a simple component to replace and is located roughly central on the middle PCB. The only problem with the item is that the correct device has to be used. This is a 2930L-05. A normal 5V regulator will not work satisfactorily.

top of page

13-05-2001

(AR-900) AR900UK RESET

Author: *AOR*

The AR900 doesn't generally suffer from crashing of any sort. There is no actual reset procedure. If problems are experienced, then the only course of action is to remove all sources of power. Re-connection should restore operation. If problems are experienced, then a genuine fault will be present requiring logical fault finding.

top of page