

Zusätzliche Informationen zum Sangean ATS909 / ATS909W

Wir haben hier interessante Informationen und Tipps zum Weltempfänger Sangean ATS-909 zusammengetragen. Viele Informationen sind in englischer Sprache.

An dieser Stelle herzlichen Dank an *Dave Moisan, N1KGH*, der eine sehr interessante Site zum Thema betreibt. Diese Seite ist unter:

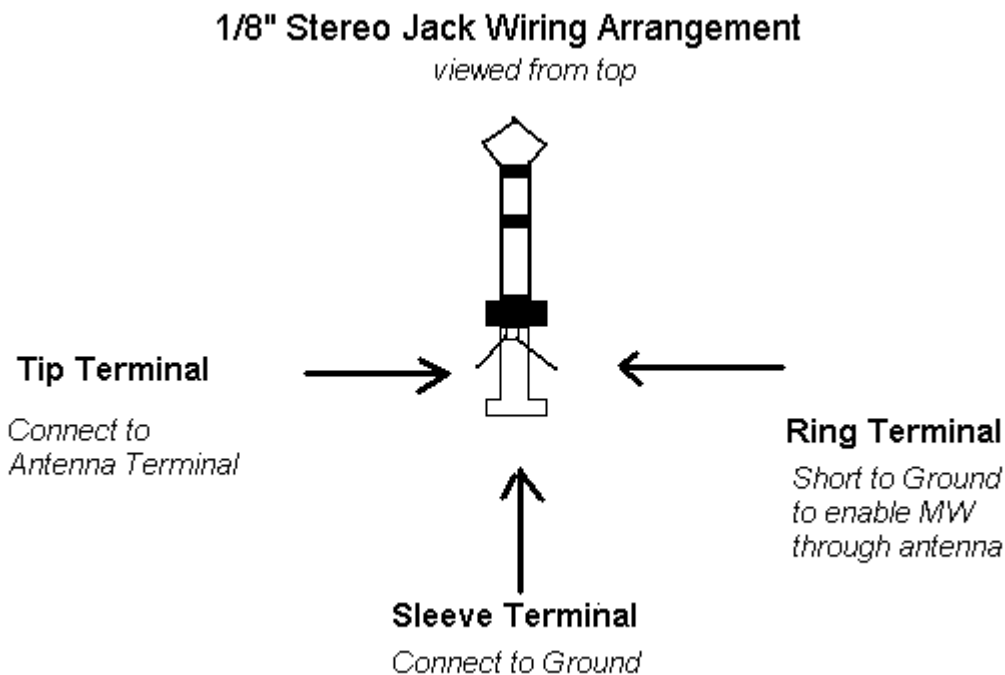
<http://mysite.verizon.net/vze20h45/radio/sangean/909tech.html>

zu erreichen und wird ständig erweitert.

Hier nun die „wichtigsten Tipps“. Achtung! Alle Modifikationen wurden nicht überprüft und getestet. Deshalb: Alles auf IHR ALLEINIGES RISIKO!!!

How do I hook up an external antenna to it?

The radio accepts a 1/8" stereo headphone jack for its external antenna. It's wired a little differently than you think.



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The tip goes to the antenna terminal and the sleeve goes to ground, just as you would expect in this unbalanced antenna input. Shortwave signals are routed from the external antenna jack when a connector is plugged in.

The ring--the terminal in the middle of the plug--has a special purpose. When you ground it, *medium wave* signals are also routed from the external jack instead of the radio's internal loopstick. This is why some people have reported poor MW reception when they use regular 1/8" mono patch cables to connect their antennas.

But for medium wave DXers, this is an opportunity to connect their favorite antennas to the radio; the lack of a *good* MW antenna connection has made some otherwise good radios less than desirable.

If you prefer to use the internal loopstick for MW, simply leave the ring of the plug unconnected.

How do I disable the internal MW antenna?

Using a 1/8" stereo connector, ground the ring terminal to the sleeve. Or else use a 1/8" mono connector. The FAQ author much prefers the former method as this can be controlled by a SPST switch to disable and reenable the internal antenna, thus saving the antenna jack inside the radio from wear.

Does the 909 have birdies (spurious signals)?

Yes. The 909 has two strong birdies at 27.022 MHz and 27.472 MHz, and several others at 17.865 and 18.165 MHz.

Are the station memories really permanent like the manual says?

No. The station memories can be changed.

- Pick the frequency you want to change.
- Enter the new frequency.
- Hit the M key.
- The display will say "MEMOFULL".
- **Hold down the M key.**

The new frequency should now be stored in memory.

How does the priority button work?

The priority function is not well explained in the manual, and it behaves differently depending on what band is involved. On MW, LW and FM, the priority button has its own memory location, so you can store a station to it like any other memory.

On SW, though, the priority button calls up an *already existing* station memory; it does not store a station itself, but only the reference to a station in the memory pages.

To set a priority station in MW, LW or FM bands:

Tune to the station you want. Hit the M key. Hit the PRIORITY key (that key that looks like a "1" and an arrow.) That's it. When you next hit the PRIORITY key, the station you stored will come up.

To set a priority station in the SW band:

First, the station you want to hear must already be stored. Find an empty page (usually page 29) or overwrite a memory location and store your station there. Then hit M and PRIORITY. As long as the station is stored in "regular" memory, the PRIORITY key will call it up.

My radio locked up! How do I fix it?

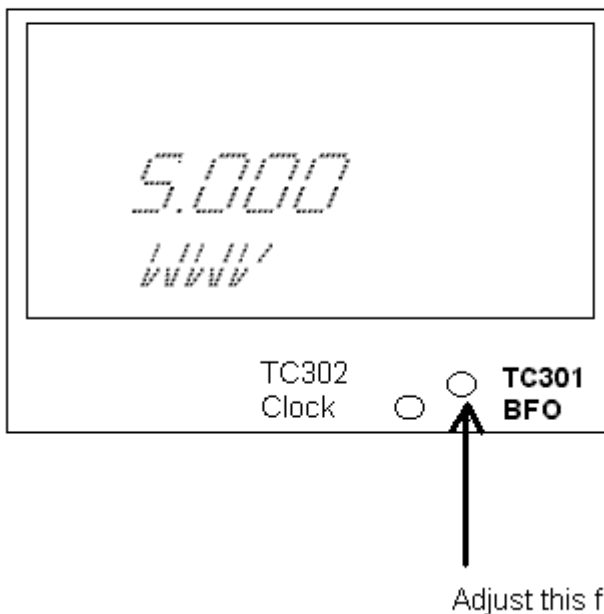
On the bottom edge of the radio, to the right of the keypad, there is a small panel with a hole marked "RESET"; insert a paperclip into the hole and release. The clock display should reappear--you might need to reset it--and you should be able to turn on the radio.

How do I adjust the LSB/USB offset?"

You should only need to adjust the BFO if it is noticeably out of adjustment.

The BFO can be adjusted as follows: *The radio should be at normal room temperature, not in the sun nor out in the cold. Let it sit there for about 30 minutes.*

ATS-909 BFO Adjustment Diagram



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1. Tune to WWV or an equivalent frequency standard. If none is available at your location, a local MW station will do.
2. Remove the plastic LCD cover with a thin metal or plastic object.
3. There are two adjustment pots under the display, they may be gray or orange. The pot to adjust is TC301, on the *right* side.
4. Switch from LSB to AM to USB and compare the beat note. If you don't notice a difference in the beat notes, don't bother changing it.
5. If the beat note is low on LSB, turn the pot **slightly** clockwise.
6. If the beat note is high on LSB, turn the pot **slightly** counterclockwise.
7. Repeat step #4 until the beat notes sound the same.

Note that TC302 adjusts the *clock*. If you find your SSB unchanged and your clock very fast (or slow), you adjusted the wrong pot!

This is at best only a rough adjustment. You'll need a frequency counter and the service manual if you want to do it right.

Restoring 76 MHz FM band

This modification extends the lower end of FM reception to 76 MHz.

PROS: Useful if you are planning a trip to Japan or if you want to pick up the audio of TV channels 5 and 6. Or if you just want to see what's down there.

CONS: There are many image signals below 88 MHz (this could be why the extended FM is not the factory default). Most of the image signals are from broadcasts 21.4 MHz higher. For example a broadcast at 100 MHz will also be picked up at at 78.6 MHz.

TOOLS: You will need a small phillips screwdriver, a soldering iron and solder wick (or a desoldering tool).

PARTS: One 1N4148 signal diode (a 1N914 should work as well).

Procedure:

Open up the case

Remove the five phillips head screws from the back of the unit (including the one hidden under the antenna) and pry the two halves of the case apart. See the previous section on disassembly for details and warnings. You don't need to remove the batteries if you can remove the front part of the case from the rest of the unit. Be careful of the speaker leads and the leads to the buzzer. You may want to mark these and remove them temporarily.

Remove the smaller Control printed circuit board

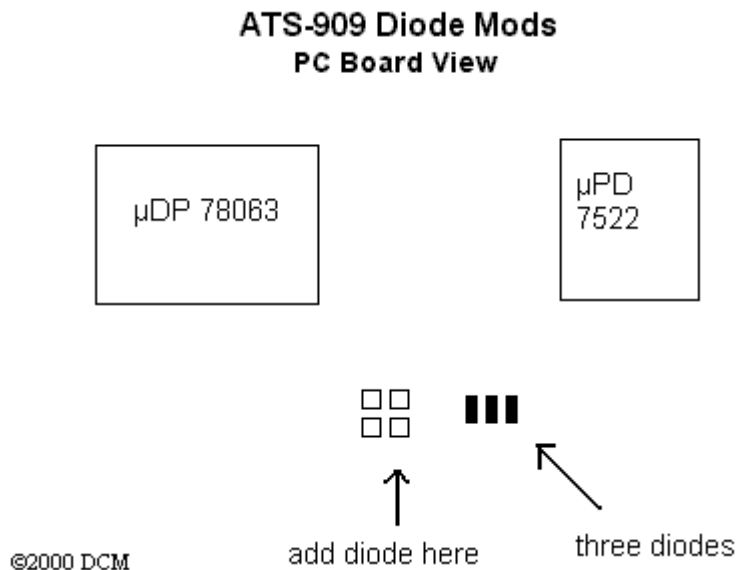
Remove the two small phillips head screws holding the board. Release the five plastic hooks at the top and bottom edges of the board. Lift the board out. I found it to be easiest to disconnect the the two coax wires via the connector at the main PCB. This allows the control PCB to "hinge" on the remaining wires and lie flat in front of the rest of the unit. With the back of the control PCB facing upward.

Remove the metal shield

Most of the back of the control PCB is covered by a metal shield. If the shield has a bunch of holes in it, you are on the wrong side. It is soldered to the PCB at about 10 locations spaced around its edges. Remove the tape that holds some wires to the shield. Unsolder all the connections on the edge of the shield. Make sure you don't melt any plastic or wires during this process, especially when working on the edge that is closest to the body of the unit. After the connections are unsoldered the shield lifts right out. There is no bending of metal needed.

Install the diode

The diode to install is called D310 but there are no markings on this side of the PCB. For orientation, the multi-wire connectors are at the bottom of the board, and the large uP chip is up near the top of the board. Look for three diodes lined up side by side halfway down the board, and then look for four empty solder pads just to the left of the diodes and down slightly:



Add the new diode as indicated. It should be mounted in the same direction and orientation as the three nearby diodes. It is a surface mount connection, but I had no trouble using a regular diode by making its leads short and bending them to fit the pads.

Test

Before closing up the unit you can hold the control PCB board vertically and reattach the connector that has the two coax wires going to the main PCB. Power the unit up and see if your FM range now goes down to 76 MHz.

Reassemble

Solder the shield back in place. Retape the coax wires to the shield.

Insert the control PCB back into the unit. Be sure that the wires between the two PCBs don't prevent the board from seating properly. Snap the five plastic hooks in place. Remember to put back the two small screws that hold the control PCB. Reattach the buzzer and speaker if you have disconnected them. Carefully put the two halves of the case together. Make sure all the slide switches are working properly. Put the five screws that hold the halves together back in.

Other Diode Mods

There are a total of six extra diodes that can be installed, according to a small note on the schematic.

D322 FM down heterodyne

D316 FM step 50 KHz

D310 FM 76-108 MHz

D314 FM 64-74, 87.5-108 MHz

D311 and D312 are used to control the AM coverage. The factory default is both diodes absent which gives the widest coverage:

LW MW SW

153-519 520-1710 1.711-29.999

The only other configuration that gives almost full AM coverage is adding diode D311 which changes this to:

LW MW SW

153-519 530-1602 1.603-29.999

So adding diode D311 will shift some freqs from MW into SW. And chop off the lowest 10 kHz of MW coverage. other diode configurations reduce the AM coverage even more.

Finer tuning for single sideband signals

This mod adds a much finer tuning resolution for the slow setting on sideband. I can pretty much zero beat every signal. You will lose the tuning range, but will gain a finer resolution.

Referring to the schematic, attach a 4.5K resistor across the left/bottom and the right solder posts on SVR5. SVR5 is the 48 Hz tuning for the sideband.

This modification does not work for all side band operation. If a signal is too far off zero-beat, the signal will drop off. If that happens, just switch to the fast setting.

Removing the beep

1. With the radio still disassembled, carefully pull the radio assembly out of the front half of the radio by pulling it up and out. There are no more tabs or screws in the top half. The speaker wires are red and white and only 3" long, so be careful when you lay the front section of the radio aside.
2. Now with a *small* Phillips screwdriver remove 2 small black screws from the display board. 1 screw is near the time set switch and the other is near the speaker cavity. Now, there are 3 tabs on the bottom under the keypad and 2 on top of the display board just above the LCD. Carefully pull the top and bottom tabs back one at a time, lifting the board with each tab gently until the board is free.
3. The wires to the "beep speaker" are a fine gauge red and black wire soldered to the display near the left side of the LCD. To disable the beep, disconnect the wires or remove the speaker completely, which is held by one small screw.

Removing the detent on the tuning knob

1. There are 6 solder pads on the tuning knob near the LCD display light at the left and just below the power button. Using solder wick or a desoldering tool, remove all the solder from the 4 inside pads first. Then remove all of the solder, from the 2 outside pads with the "ears", or ground of the tuning control. If the solder has been removed, then the control can now be removed from the board.
 2. With a fine flat blade screwdriver or knife blade, carefully lift the four tabs on the back of the tuning control. Use a pair of needle nose pliers to straighten them up. When taking the control apart, note how it's assembled.
 3. Carefully remove the plastic control housing and post from the metal shell at the same time. Inside the metal shell with "ears" is a copper ring. Remove the ring, after noting how it's assembled. The copper ring has 2 bends and a notch that sticks up on one side on the center of a bend. This, along with the plastic post is what causes the tuning knob to be *detented*, working in a clicking motion.
 4. Using needle nose pliers, gently flatten the notch that sticks up on one side of the ring without smashing the curves in the ring flat. Then re-assemble the control and try turning it in your fingers, holding the assembly together. Make any necessary adjustments to the control before you re-solder it back into the board. If you need to, check it with the tuning knob on the control first. The stiffness of the control is somewhat controlled by how the knob is pushed up to the surface of the radio.
 5. After the control has been put back together gently flatten the 4 tabs back into place using the needle nose pliers. Re-solder the control into place on the display board. Check your work and power up the radio to check the manual tuning. You should now be able to tune much easily, possibly with only one finger on the tuning knob. This mod works great!
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How do I use the timers?

First of all, timers 1 and 2 will turn off the radio after one hour and timer 3 will allow the radio to play until you turn it off.

Turn the radio on and tune to the station that you want the radio to come on to. You can use any frequency and mode on SW or any AM, FM or LW station. Let's say I want to wake up to KNX-1070 at 5:20am.

Now press the MEMO button and the word "MEMO" will flash on the display. Press the TIMER 1 button and the radio will beep. Press TIMER 1 again and the word "timer" will flash on the display. Use the AM MODE button to select radio (you should see the musical notes on the display).

Now use the numbers on the keypad to enter the turn on time. For my example I pushed 5, 2 and 0. Be sure to use 24-hour time. Now press ENTER and "TIMER 1" will show on the display. To check the status of the timer at any time just press the TIMER 1 button and you will see the time and frequency that the radio will turn on to. Press TIMER 1 to go back to regular radio operation. To delete the timer just press

the TIMER 1 and CLEAR. To turn the timer back on again just press TIMER 1 button and the "enter" button.

The timers also have a "snooze" function. When my timer 1 comes on at 5:20am and I want to get a little more sleep, just press TIMER 1 button when the radio comes on and it will turn off and turn on again in about 5 minutes. Timers 2 and 3 also have the "snooze" feature.

The ATS-909 Memory Circuit

The following is courtesy of Jim Bowlin:

As has been suggested in this group in the past, the "Data In" connections on the bottom of the DX-398/AT-909 are indeed connected to a nonvolatile memory chip that holds all the preset information.

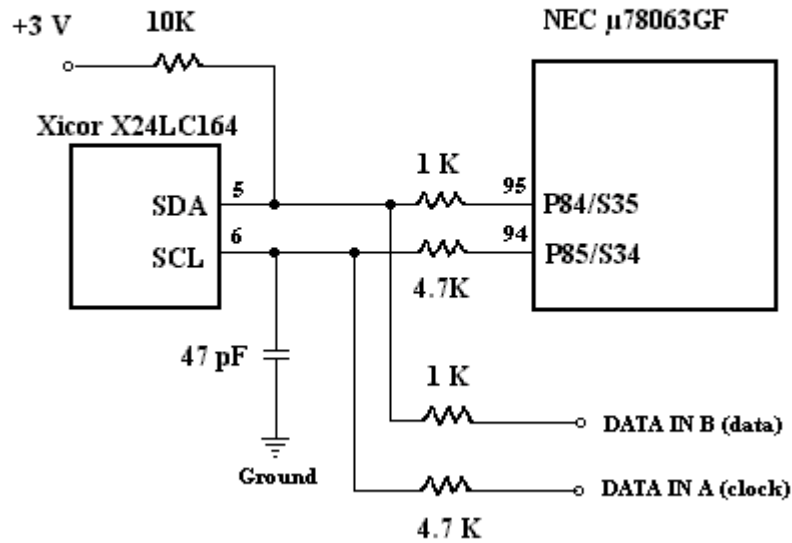
The diagram below shows the relevant circuit details. The X24164 is a 2048 x 8 serial EEPROM from Xicor. The uPD78063 is a microcontroller made by NEC. Both chips are powered by +3 volts. The two lines are used to both read and write data in the EEPROM.

It appears that if the NEC chip puts pins 94 and 95 into a high impedance state when they are not being used then it would be possible to read and write the preset information via the "Data In" connections on the bottom of the unit.

There are application notes on the Xicor site that explain how to interface their EEPROM chips to a PC via either an RS-232 port or the parallel printer port. Software source code is provided as well. Some modification to their interface circuit will be needed in order to connect to the radio without blowing it up.

I will be looking into this further. If anyone is successful in implementing a PC interface to these radios then all of presets could be stored and loaded from files on the PC. Also, these files could be shared and exchanged with others.

Partial Schematic of ATS-909 Memory Circuit and Data A/B Port



-- Jim Bowlin ©2000 DCM

About the I2C Bus

The I2C (for **I**nter-**I**C-**C**onnection) is a two-wire serial protocol for connecting IC's within a circuit, sort of like a miniature LAN. It can handle speeds up to 1-2 KBPS. I2C has come into very wide use in TVs, radios, communications receivers, cable boxes and many other devices. It's not surprising that the Sangean 909 would use this interface.

Special power-up key sequences

There are several special key sequences that put the radio in various modes to download memory, upload it or do self-tests. Most of these involve holding down the LIGHT key plus one of the band keys, though the display test requires the RESET button on the bottom of the radio.

RESET-LIGHT

Display test--all segments of the LCD light up.

FM-LIGHT

Select FM band. Press FM and LIGHT simultaneously; "DATA OUT" is displayed.

You have two seconds to hit ENTER.

Display flashes and then reads "VERIFY"

Display reads "FAILED" (without an interface connected)

It's assumed that the radio will read out memory from the EEPROM when the appropriate I2C commands are given from the external interface.

LW-LIGHT

"DATA IN" displayed;

Power on and set band to LW

Hit LW and LIGHT at the same time; radio displays "DATA IN"

You have two seconds to hit ENTER

display flashes, then displays "VERIFY"

then "OK"

then "ROM DUMP"

then "VERIFY"

then "ROM OK"

then radio powers down. Powering up the radio will show the memory defaults. Apparently, this is *the* method for programming the radios at the factory.

Default ROM presets for Europe/Asia

Here's a list of memory page descriptions that differ between the European/Asian models and the American.

Before	After
1.Australa	DW
2.Austria	SWF3
3.Canada	BR
4.China	DLF
5.Cst Rica	Rad. Ropa
6.Cuba	BBC --D--
7.Ecuador	BBC --UK--
8.England	RFI --D--
9.England	RFI
10.France	Radio NL
11.Germany	R. Vlaand
12.Holland	Schweden
13.Israel	Finnland
14.Japan	Roi Wien
15.Korea N	SRI Bern
16.Korea S	RAI Rom
17.N Zealnd	REE Madr
18.Norway	Vatikan
19.Russia	R Slowak
20.S Africa	R Polen
21.Sweeden	Budapest
22.Switzlnd	Russland
23.Taiwan	Russland
24.U.S.A.	R Kairo
25.U.S.A.	R China
26.U.S.A.	R Japan
27.U.S.A.	R Brasil
28.U.S.A.	Voice AM
29. (blank)	Voice AM
