

ATS-909 Modification and Alignment

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The ATS-909 / DX-398 is certainly one of the great portable shortwave receivers ever made. It performs reliably, has many fine features, and is widely available at a reasonable cost. Countless people use it as a source for news, information, and entertainment around the world. The radio performs better than many full-sized tabletop receivers of years past. It well outperforms my old DX-160, and does more than my Heathkit HR-1680. Despite this, there is room for improvement.

I will not repeat the numerous improvements to the ATS-909 that may be found on other modification websites, such as davemoison.org but will limit my comments to a few changes that mean the most in my shortwave listening experience with the receiver. I first obtained this dandy radio in 1995, and have taken a soldering iron to it numerous times. It is not a difficult radio to work on, but one must be careful with its surface-mount components. There are a few cables and delicate connectors that should be handled with care. Considering those factors, I suggest making changes described below.

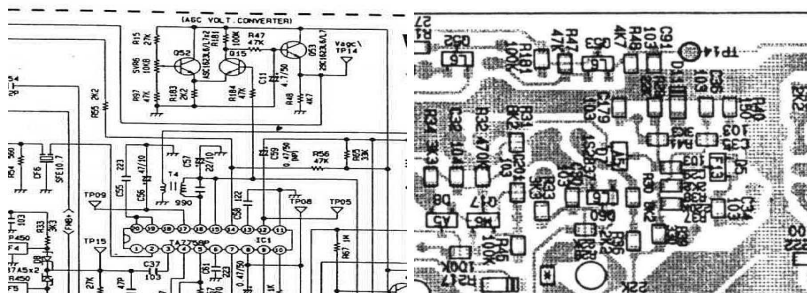
- Anti-Chuffing
- Beep Removal
- Finer SSB tuning (makes steps smaller, but you lose some ability to tune between 1 kHz increments); parallel SVR5 with a 4.7k resistor for 10 Hz steps
- Replace ceramic filter CF6 with a narrower one for better adjacent channel rejection on FM
- Restore segments of FM tuning range (diode change enables TV audio in the USA and some assisted listening devices). D310 on tuner board.
- Short resistor R7 to ground - allows gain reduction to zero
- AGC mods as described here; IF clipping mod not necessary
- Audio bandwidth enhancement

Improved AGC response:

1. Popular modification sites on the web have suggested reducing capacitor C57 (on Pin15 of IC1) to a value of 10 uF. I disagree, and have had better results leaving it at 22 uF.
2. Capacitor C11 should be verified to be 4.7 uF.
3. The radio does not exercise enough control over strong signals. Local amateur and utility signals frequently slam the S meter to full scale and distort badly. I have solved the problem by increasing R181 to 470K. This slows the rate at which C11 recharges and also allows a more effective control of IF circuit gain.

AGC Schematic:

AGC Parts Layout:



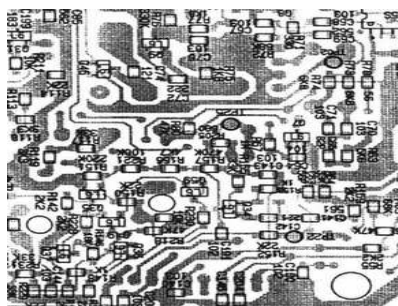
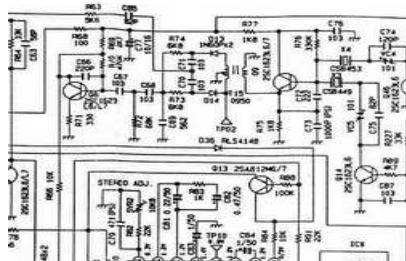
Audio Modifications for Better Bass Response:

To achieve a low end rolloff around 15Hz, coupling capacitors should be increased as indicated:

1. C67 and C68 (output from product detector) 4.7uF
2. C80 (AM / SSB audio into IC3)
3. C93 and C94 (input to audio amplifier IC6) 15uF@10v
4. C106 and C107
(input to the L and R power amplifiers IC4 and IC5) 10uF@10v
5. C116 and C117
(output of L and R power amplifiers IC4 and IC5) 1000uF@10v
6. C132 and C133
(output of audio amplifier IC6) 10uF@10v

Product Detector Schematic Product Detector Layout

World Band Receiver



For better oscillator frequency alignment without a counter, connect the audio to your computer sound card and follow this [ATS-909 alignment procedure](#) and refer to the [ATS-909 circuit board images and alignment pectograms.](#)

Tags: ATS-909, DX-398, receiver mods, radio hacks

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