

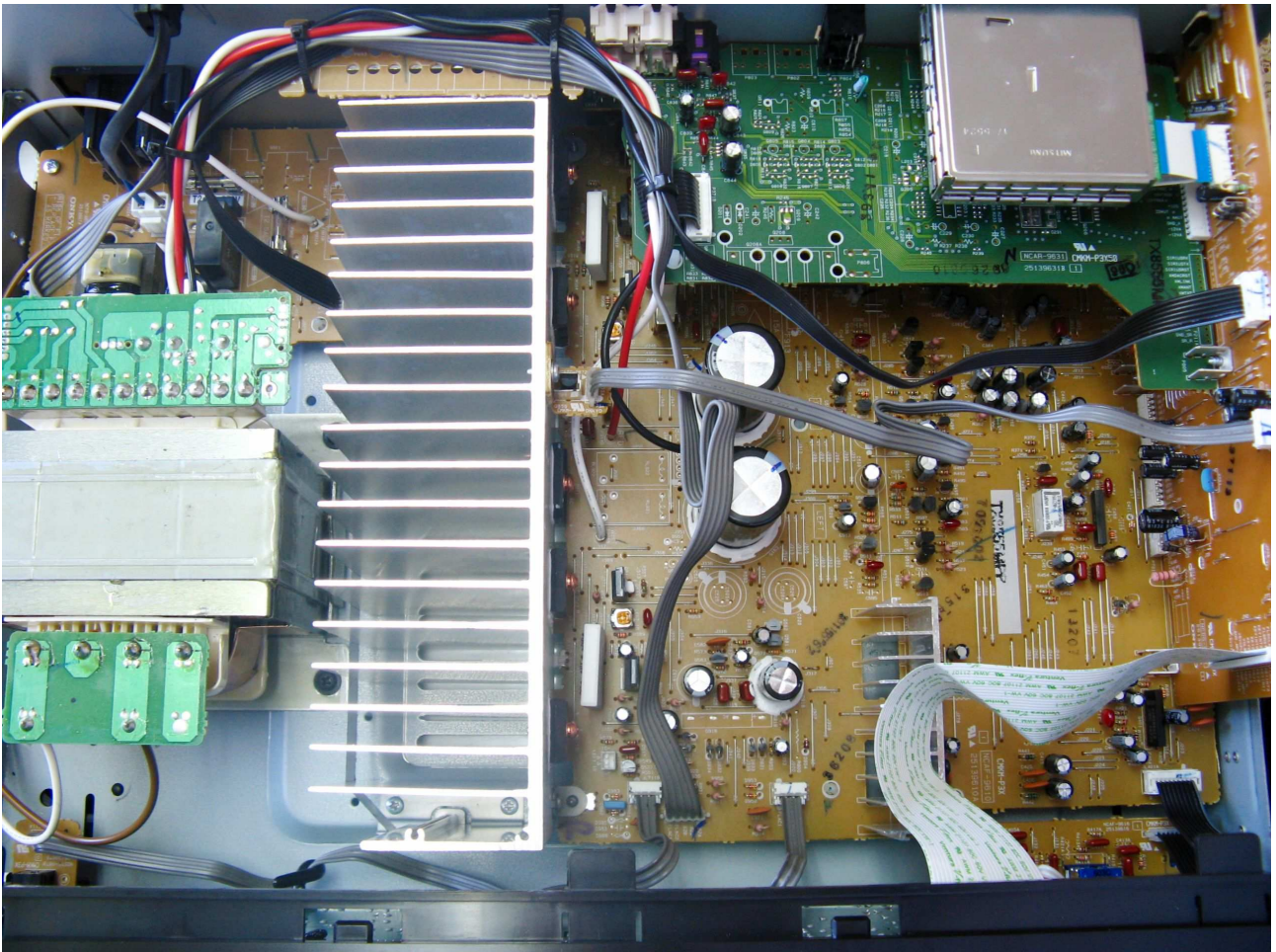
Audio Restoration Upgrade Project: Repair Onkyo TX-8555 Stereo Receiver

Many customers ask me "Yes, we see what you do to improve the exotic up-market machines, but what can be done to a regular receiver?" Today, the marketing hype drives sales of multi-channel AV receivers; however, there are still many consumers who are quite happy with the good-old original sound of stereo – I'm one of them!

For that reason, I chose this Onkyo TX-8555 Stereo receiver to upgrade. It is Onkyo's top-of the line Stereo-only machine, and appears in various guises with basically the same circuit boards – TX-8222, TX-8255, TX-8522, TX-8030, TX-8050, and others. This TX-8555 unit has the rear Subwoofer and PreAmp output.

In Europe, it sells for about €350, which is a popular consumer price-level.

Removing the cover, it showed a very mediocre level of component choices, however, that is appropriate for this price point. That's good, because it means that it's a superb platform for upgrading.



After close examination, I decided that the upgrade would take apply to 4 major areas:

1. Capacitor Upgrade
2. Resistor Upgrade
3. OpAmp Upgrade
4. Diode Upgrade

1. Capacitor Upgrade

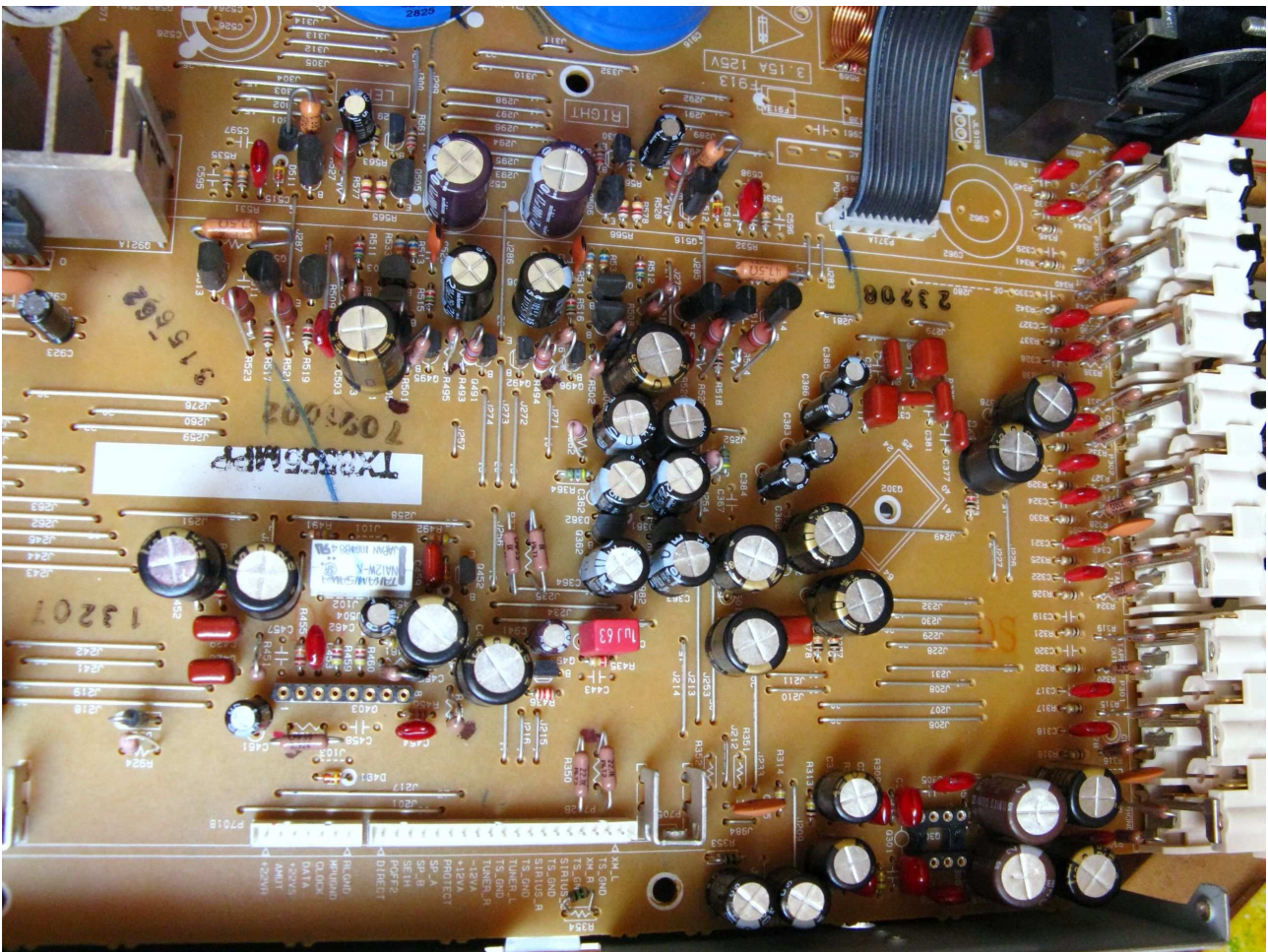
It was nice to see that the original power capacitors are all Nichicon, but they're the lower-grade 85°C units. I would upgrade these to high-grade Nichicon HE 105°C units.

The original Audio capacitors are an obscure TK brand, and I was very disappointed to note that Onkyo had placed these in some power circuits as well, which might sound nice, but is detrimental to reliability. If the machine has failed, there's no sound, no matter how good it was supposed to be.

No problem, the Audio path capacitors would be upgraded to top-grade Nichicon KZ, and Elna Silmic II.

The 2 big blue power capacitors are CDE 381LX, upgraded from 8,200uF 56V to 12,000uF 63V.

And of course, Wima MKS2 and MKP4 film capacitors, where they can really make a difference!



2. Resistor Upgrade

I noticed that all the signal path resistors were a mix of cheap Carbon Film and Metal Oxide resistors. Both of these types are acoustically very noisy, and completely undesirable if your objective is purity of sound.

In any amplifier circuit such as this, the ONLY resistors which need to be Metal Oxide, are the final-stage output resistors, which have typical values of 2.2 or 3.3 Ohms in most amplifiers. That's all.

ALL the other resistors should be Metal Film resistors, taking into account that in the PowerAmp section, they need to be up-rated to at least 2 watts or higher, because of the lesser ability of Metal Film to dissipate heat.

My favorite choice, as always, is Vishay Dale's CMF, RN, or RL series, which has a phenomenally low noise figure of -40dB. For the higher wattage requirements, I chose Vishay's CPF series.

The Bias-emitter potentiometers are notorious for burning out, so those were replaced with Bourns Cermet units.

There were a few solder-joints which were cracked; this is usually the most-common problem with modern amplifiers using unleaded solder. So, I resoldered all the solder joints on all the PCB's with old-fashioned fully-leaded solder. The new unleaded solder just doesn't have the ability to last without cracking, through years and years of constant cold-hot cycling on any PCB.



3. OpAmp Upgrade

Once again, it's quite obvious that cost was the overriding criteria in the selection of the OpAmps. Come on Onkyo – in your sales literature, you claim, and I quote "Throughout our company's 60-year history, superior sound and performance come first, all other issues are secondary"

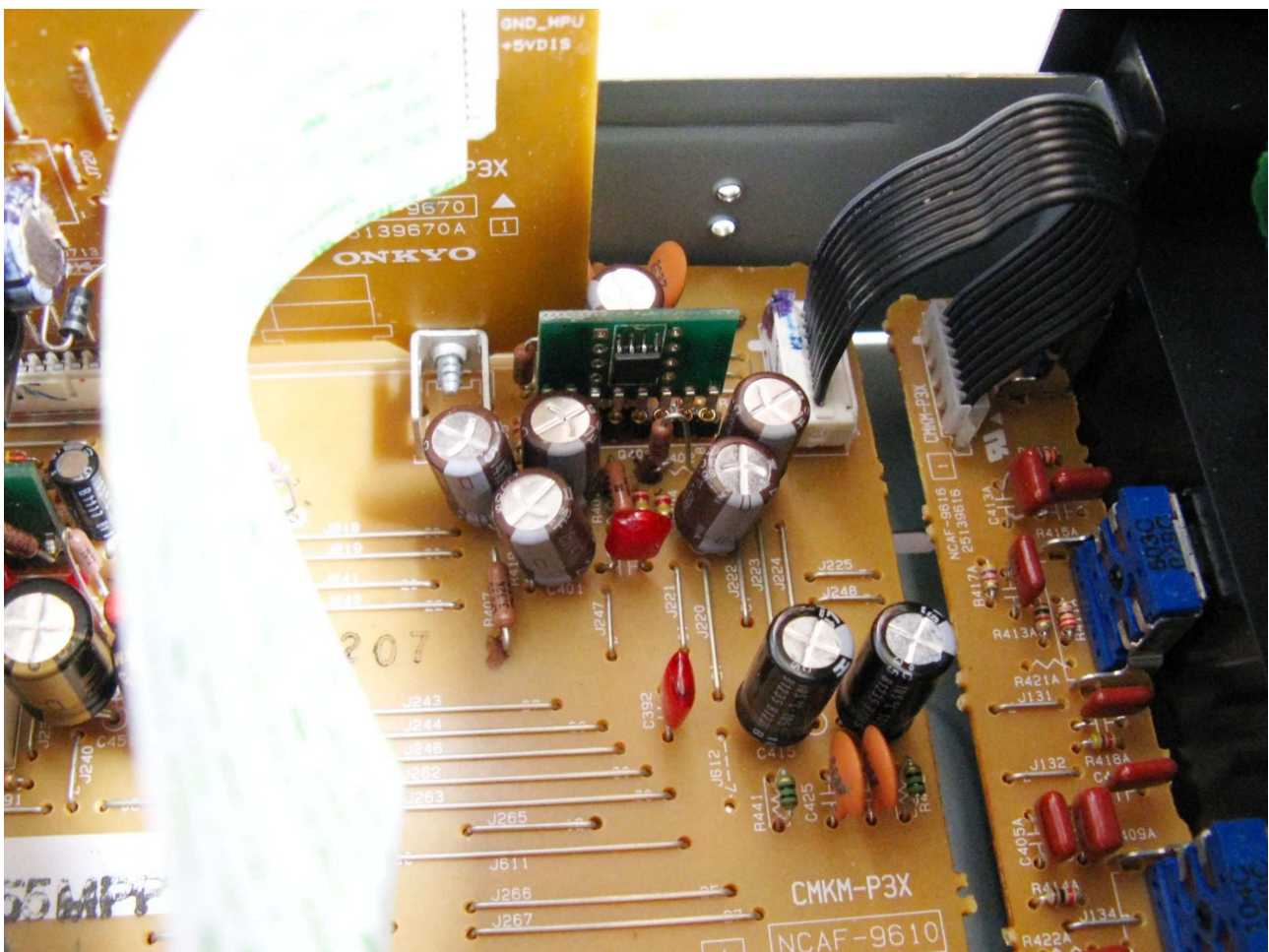
Well, it's hard for me to take that claim seriously, when I see that the RIAA OpAmp is a 4558, and the Tone and Direct-Sound OpAmps are middling 2068's. That's really scraping the bottom of the barrel.

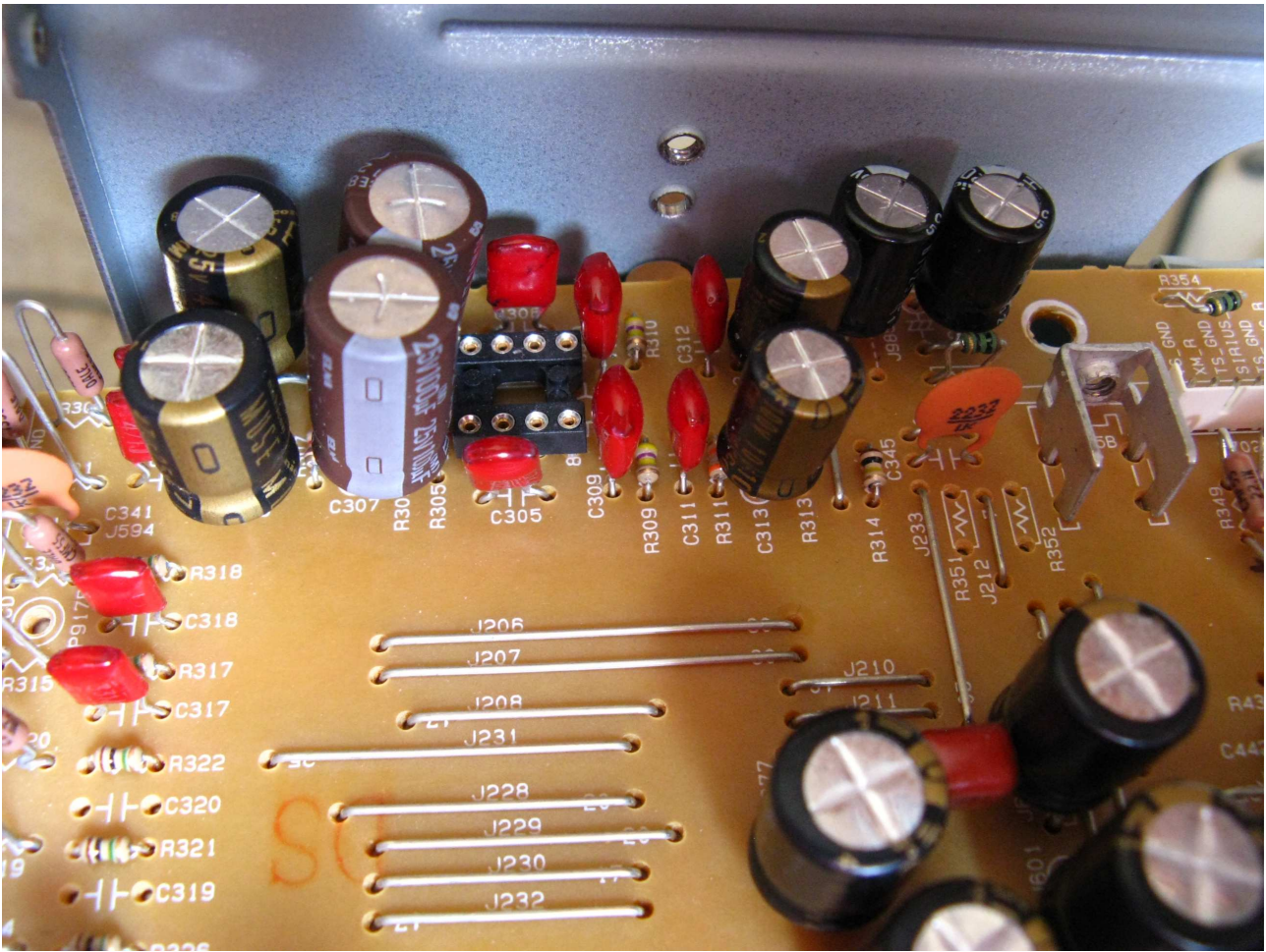
Not only that, but there is no decent decoupling of the OpAmps' power rails either.

I selected the LM4562 for the RIAA and Tone OpAmps, and the THS4032 for the Direct-Sound OpAmp. For the SIP-8 mounting, I used Brown Dog SIP-8 adapters.

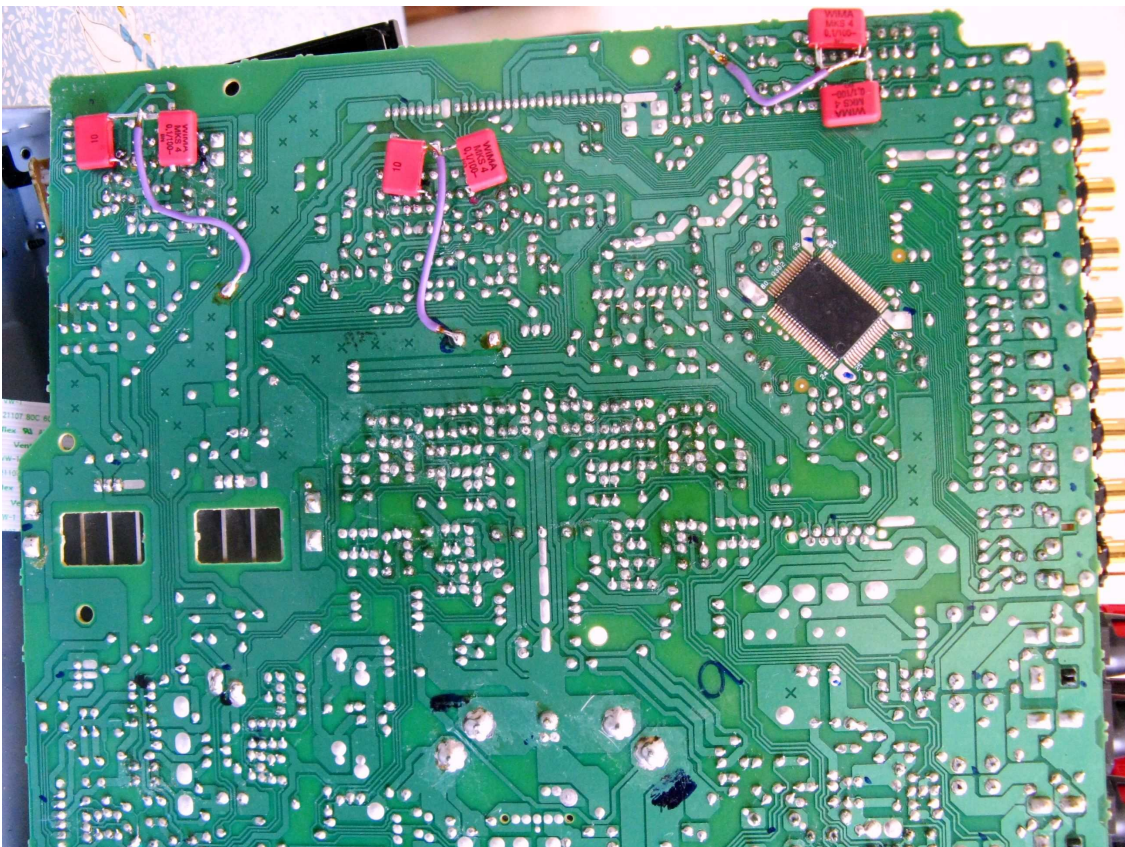
The LM4562 is a standard drop-in substitute, provided that the correct Decoupling modifications have been made on the power rails, but upgrading to the THS4032 is more complicated. It is NOT Unity-Gain stable, so it cannot drive a capacitive load without oscillating.

So I inserted 47-ohm resistors directly at the outputs of Pins 1 and 7. I also upgraded the THS4032's Decoupling capacitors from 220uF to 470uF.



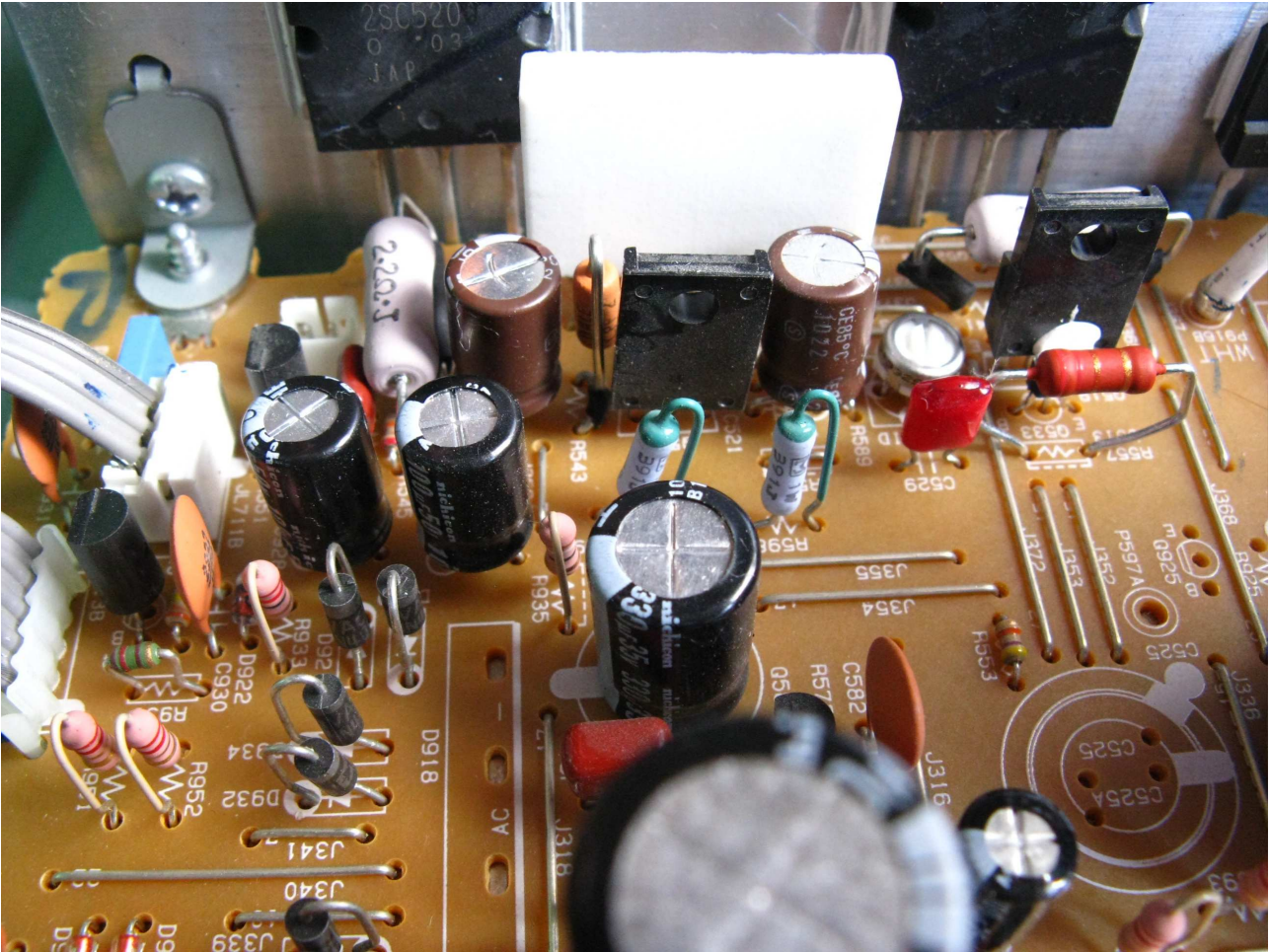


I installed additional 0.1uF Wima MKS4 decoupling capacitors on the OpAmps' +12V and -12V power rails. This preempts any possible instability issues.



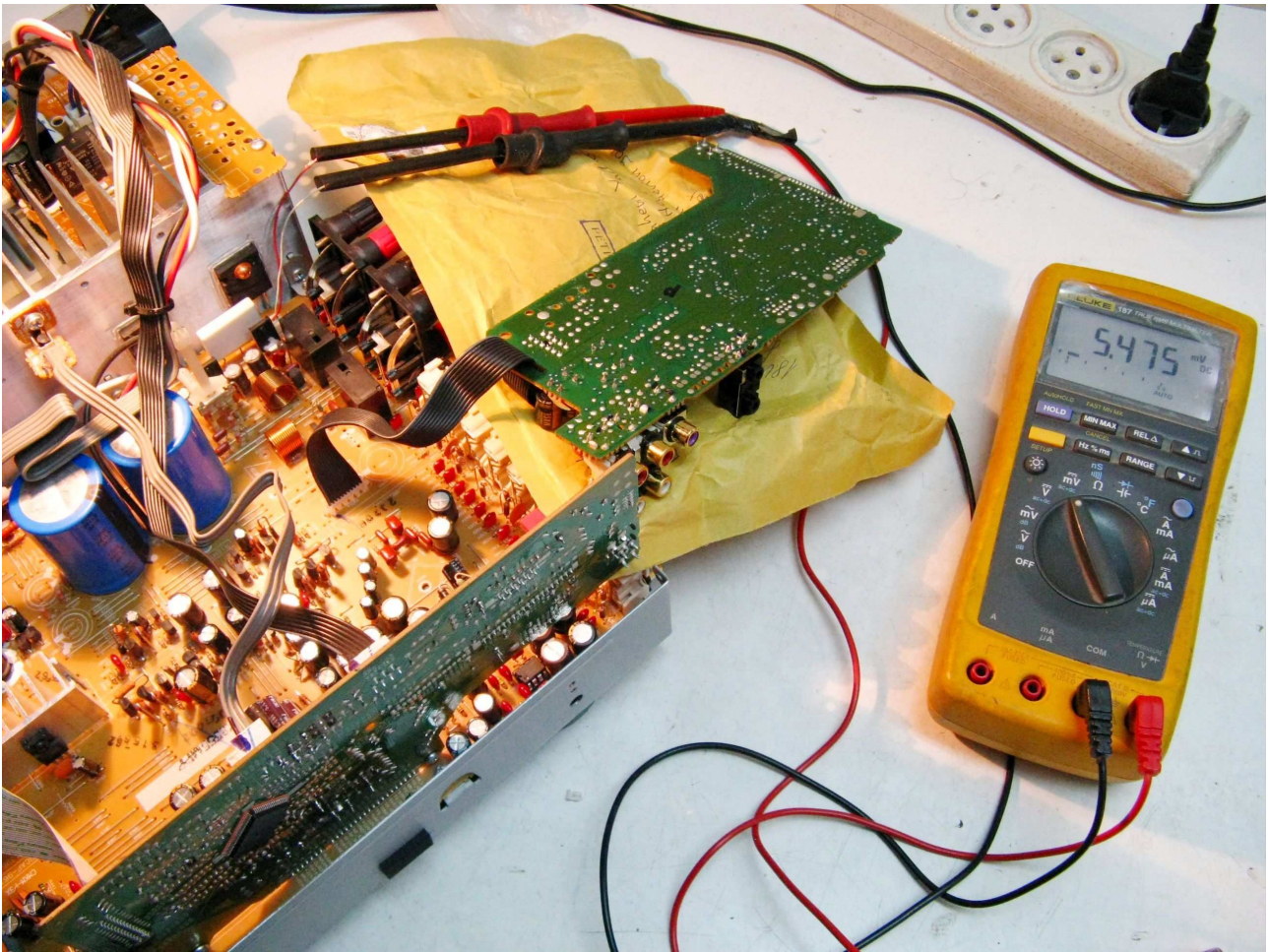
4. Diode Upgrade

The original rectifier diodes on the +12V and -12V circuits, which supply the OpAmps, and the switching IC's, were run-of-the-mill 1N4003's. I selected my standard Schottky 11DQ10's for the upgrade.



5. Calibration of the Bias Current

After replacing the original low-quality trimmer potentiometers with Bourns 3329 Cermet units, I re-calibrated the Bias Current to factory specifications. This ensures that the machine runs cool, and that the semiconductors last a LONG time.



6. ReAssembly and Burn-In

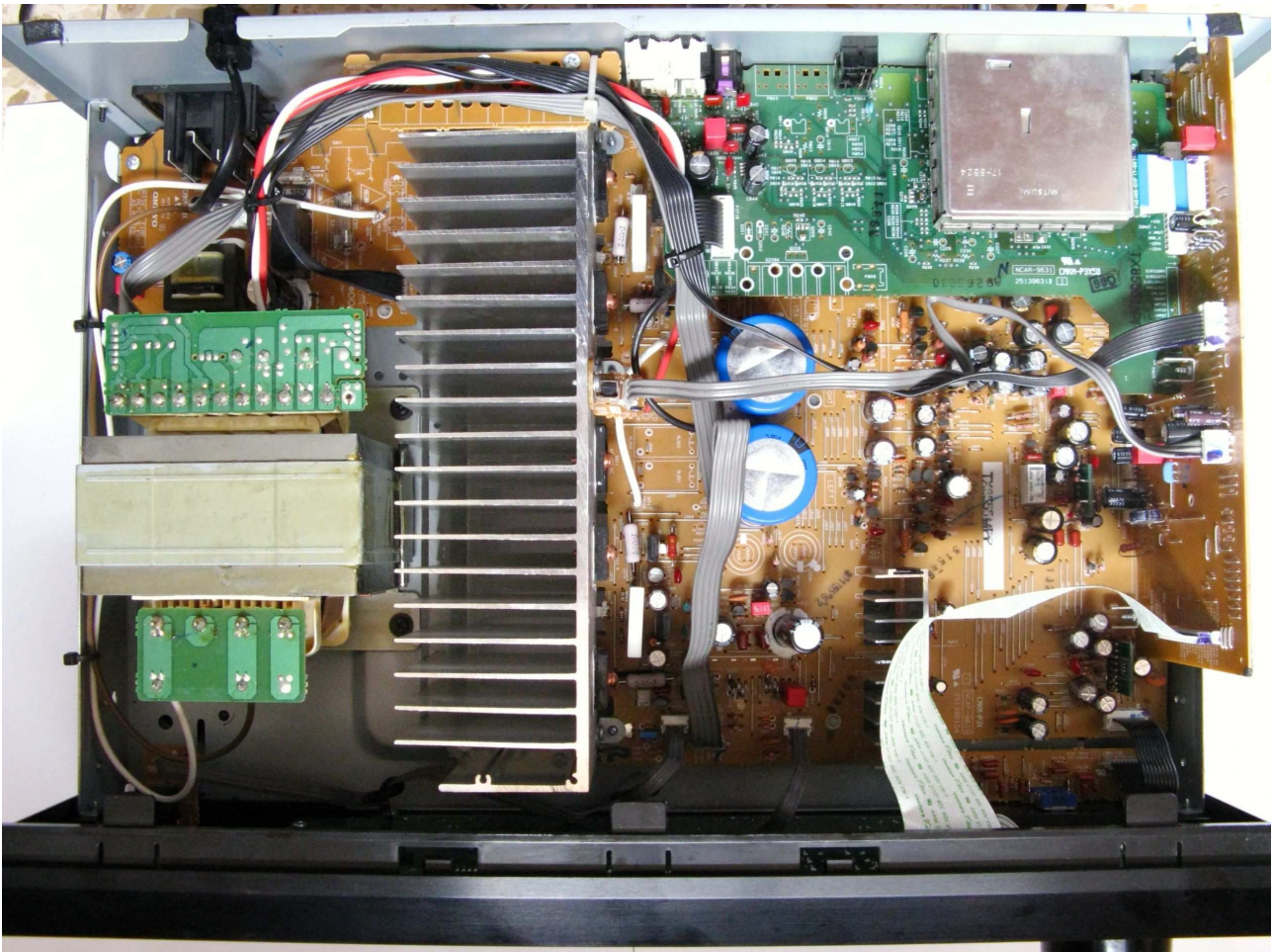
All repairs or upgrades endure a full 48-hour Burn-In before being returned to the customer, to ensure that everything is operating EXACTLY as it should. Not only that, but that's the time I get to enjoy the results of my work.

The sound improvement is stunning, exactly as I expected it to be.

Bass response is much more exact, and mid and treble frequencies open the sound-stage much more than previously.

All in all, a much more pleasurable listening experience.

The high-quality parts are all available in order to do the job correctly, and they're not that expensive when bought in production quantities – it's a pity that Onkyo didn't make the same choices which I made.



Parts for this restoration

Parts and advice are available for owners who wish to tackle this project by themselves.

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