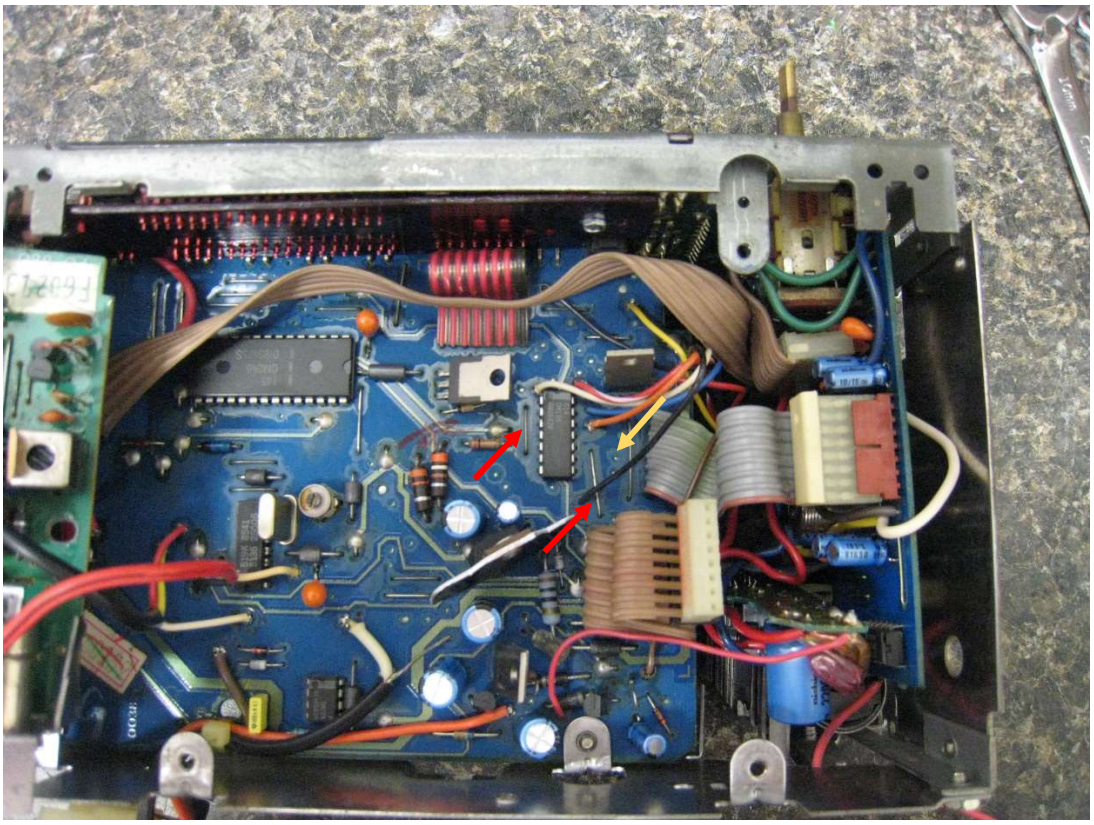
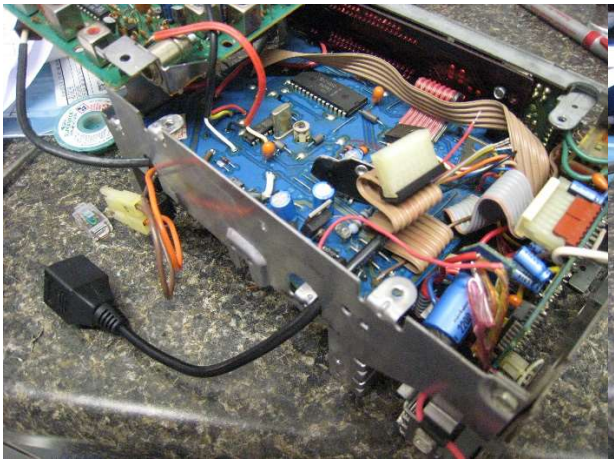
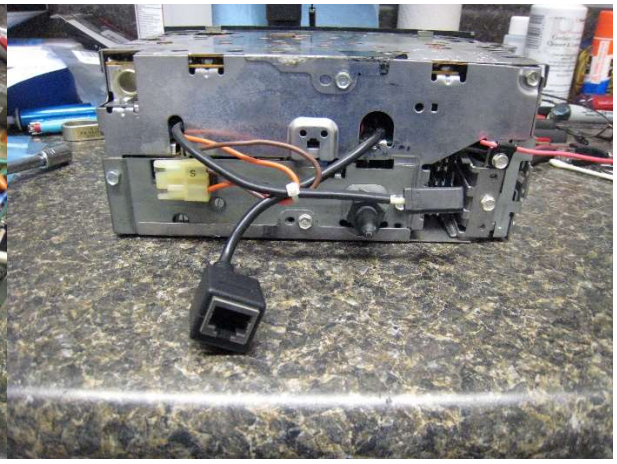


Using a diagonal cutter, cut the jumpers. Desolder and remove the jumpers and the solder plugged ground point from the logic board. Clean up the holes on the board using desoldering wick or your preferred method.

Insert one of the female cables into the radio body. I routed the cable through one of the openings at the rear and threaded it through the folds of the ribbon cable that connects the tuner board as shown in the image below and to the left. Routing through the ribbon cable will provide a small clamping force on the cable when the tuner board is installed, helping to keep it in place. The below right image shows a unit completely assembled.





Using the wiring diagram from Appendix Two, complete the cable installation by soldering the wires from the cable into the appropriate holes on the circuit board.

The radio side of the Aux jack is now complete!

At this point, I would suggest completing the assembly of the radio and testing it using the jumper you created. With the jumper plugged in to the end of the networking cable, the radio should function normally.

Wiring the Aux jack connector is a similar process. Be sure to consult the schematic of the connector you purchased to ensure you are using the correct terminals for the wires. Using the diagram from Appendix 2, connect the second female extension cable to the Aux jack connector. The three images below show my assembly.

Test the assembly by connecting the Aux jack and radio unit together with a network cable. With nothing in the auxiliary jack, the radio should function normally. If you plug a cable into the auxiliary jack, the radio should cut out and you should hear the sound from your connected device.

Mount the Aux connector in the location of your choice.

This is a great modification, and I think that adding the ability to use a much cleaner source (iPod or phone), really exemplifies just how good the sound quality these systems can produce when working well.

86-89 Delco/Bose Amp/Speaker Assembly

Introduction

Once the head unit is done deciding what input is playing, and has equalized the tone according to your bass/treble settings, the signal for each speaker is sent using the individual wires. Because the speakers contain the actual amplifiers, there are necessarily more wires that need to be run to each speaker. In addition to the low-level signal lines carrying the audio, their needs to be power lines to power the amplifiers.

It's this design that makes replacing the speakers and systems so hard in these cars. In a traditional car stereo system, the head unit completes all the processing and amplification and directly drives the speakers. In this system, the signal is more akin to a headphone signal, which means you can’t really replace just the head unit or the speakers without affecting the other.

To replace just the speakers, you would need to provide amplifiers along with the speakers in all four locations. To replace the head unit with a traditional head unit, you would need an adapter to turn the high powered speaker output into a low powered line-level signal (or utilize an low-level out if so equipped).

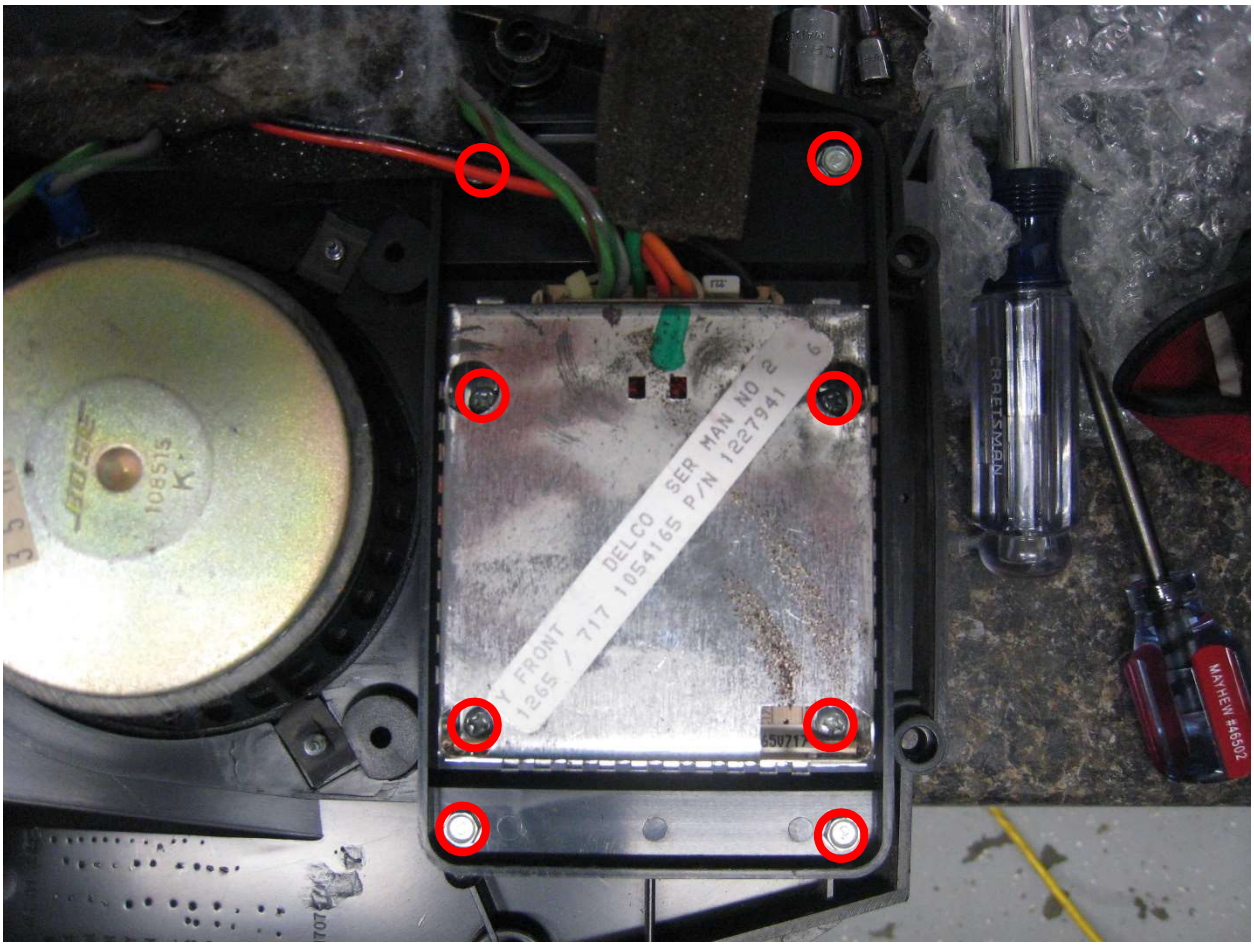
Bose is a company people either love or hate, but they really have a very good driver in these speakers. I believe (but have not confirmed) it is the same driver as used in the Bose 901 series of speaker, which is a classic in the home audio world.

Refurbishing the Speaker Amplifiers

Front Speaker Assemblies

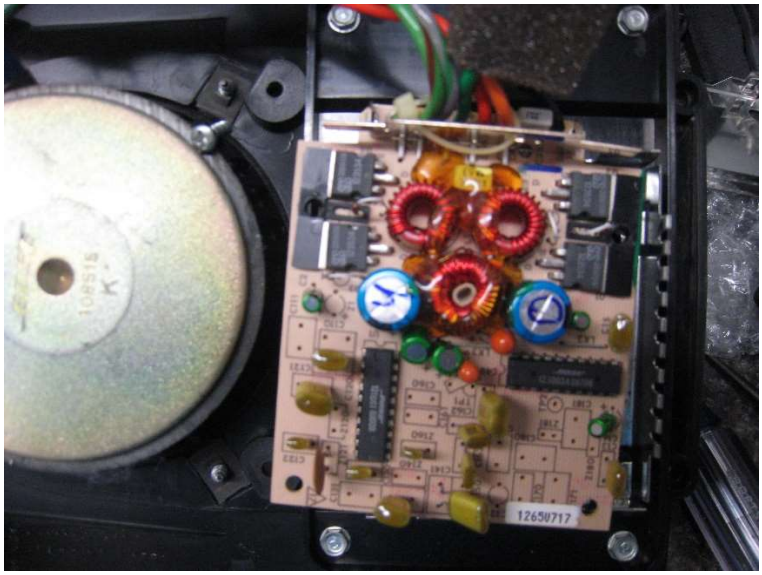
Replacing the capacitors on the Front speaker amplifiers is straightforward. After removing the speaker enclosures from your doors (good videos on YouTube for C4 door disassembly), open the case by removing the ¼ inch bolts that hold the two sides together. Carefully separate the case taking care to not damage the thin foam gasket that seals the two sides. Save the insulation that is in the case, it is there by design. Also, not the wire routing as you will need to install the wires in the same paths upon re-assembly.

Flip the front cover (the one with the speaker) over. It should look something like this:



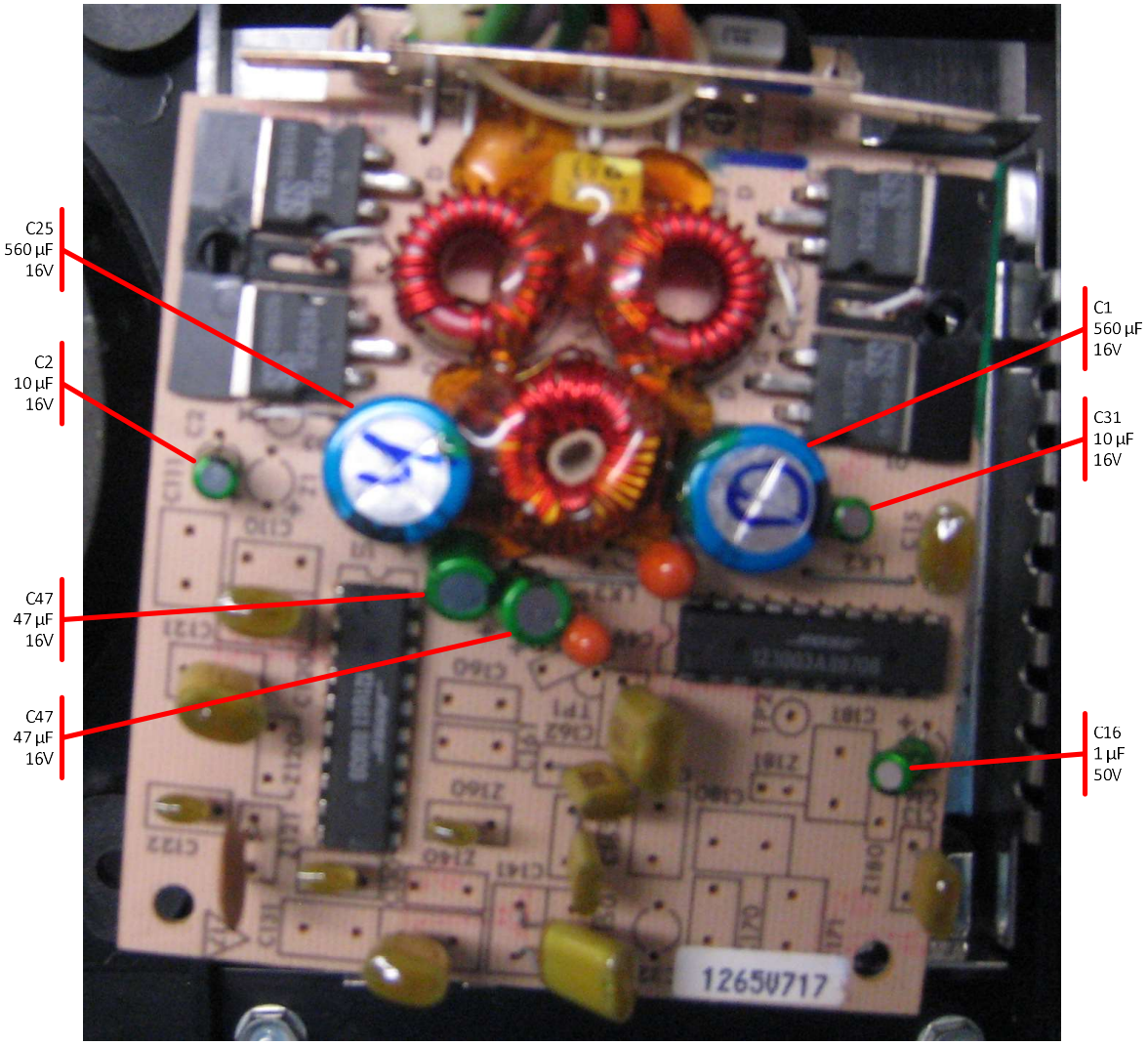
Remove the screws in the red circles to separate the amplifier module from the mounting board and speaker assembly. The amplifier case also provides electromagnetic shielding for the unit and is connected to the electrical ground on the circuit board. Note how the two halves are assembled with certain surfaces overlapping as you will need to get these correct when re-assembling. This is a good time to take a picture so you don't forget.

When you get the circuit board out of the case, it should look similar to the below.

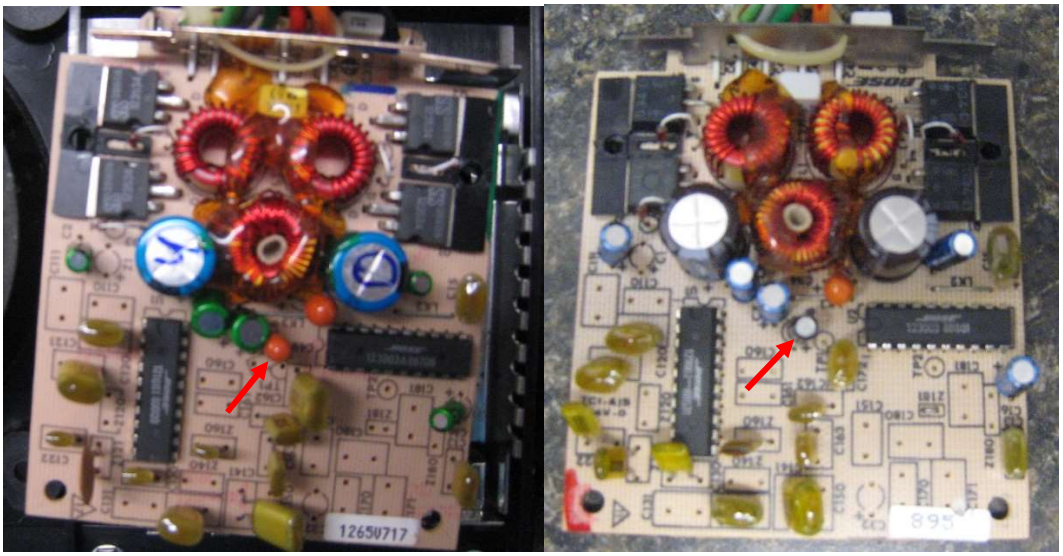


Looking at the component side of the board, you will notice an amber like hardened liquid spread across some of the components. This was applied during manufacture to help keep the components from vibrating and coming loose. You will need to remove the portions of this compound to get some of the capacitors out. As the application of this was different for each speaker, some people will need to remove more than others. I found that using an X-Acto hobby knife worked fairly well. Also, you will find that as the compound heats up it gets more pliable. So, if you wait and cut out the individual components during replacement, you can use the heat generated by the de-soldering process to soften it up and make it easier to remove.

The electrolytic capacitors we are going to replace are the small cylindrical cans. The diagram below shows a closeup of the amplifier board with all of the capacitors labeled.



Undoubtedly there are variations in the amplifiers used in these cars due to manufacturing changes. For example, if you compare the size of the rear convertible amplifier to the front amps, you will probably notice that the rear amp is exactly the size of the amp mounting plate for the front. This leads me to believe the earlier production versions had the larger style amp. I only had two sets to work with in my experience, but even with just those two, I found a difference.



The image above on the left is from the 87 coupe front speakers I bought on eBay, and the image on the right of the front speaker that I removed from my 86. They are almost identical, except that the one on the right has an additional electrolytic capacitor, while the one on the left has some other kind of capacitor in that same position. The point is, don't be surprised if you don't find exactly what you expect.

Below you will find a chart detailing the capacitor values and quantities in the amplifier. IMPORTANT: The chart represents the number of capacitors to refurbish ONE amplifier. Don't forget to multiply by the number of front speakers you are refurbishing. I would also suggest ordering an extra one of each type to give yourself some room for error. These things are very inexpensive.

1986-1989 Coupe/Convertible Bose Front Speaker(s) (Qty is for one speaker)

Position(s)	Capacitance	Qty	Digi-Key Part #	Nichicon Part#
C16	1µF 50V	1	493-15438-ND	UKT1H010MDD
C31, C2	10µF 16V	2	493-10631-1-ND	UKT1C100MDD1TD
C7,C34	47µF 16V	2	493-15428-ND	UKT1C470MDD
C1, C25	560µF 16V	2	493-11983-1-ND	UPJ1C561MHD6TO
Additional	4.7µF 35V	1	493-15456-ND	UKT1V4R7MDD

Once you have all your capacitors, it is time to get to work replacing them.

Prior to doing any work on the board, I would suggest cleaning the solder side of the board (bottom) with some alcohol and the toothbrush. Dip the toothbrush in the alcohol and scrub to remove any debris. Blow the board dry with compressed air when done.

Replace the capacitors using the procedure described in the One Method for Replacing Electrolytic Capacitors section, or however you like. Work at a comfortable, ensuring you are installing the capacitors with the correct polarity in each socket.

Once you have replaced the capacitors, I would suggest testing the speaker prior to re-assembly and installation by plugging it back into the harness and turning on the radio.

Hopefully, you have a clear sounding speaker at this point. If you do, Congrats!

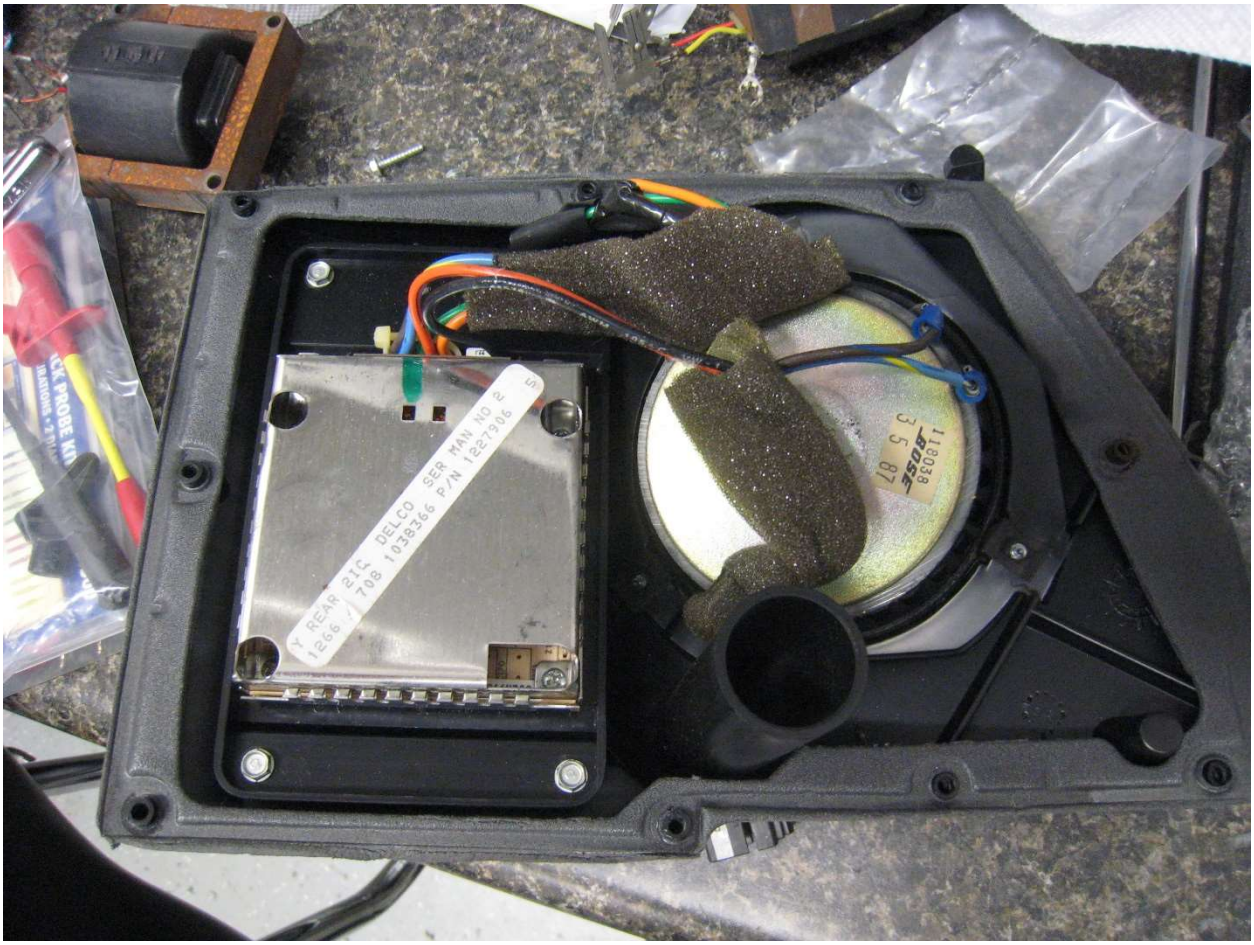
Re-assemble the amplifier case ensuring that it has the same contact points as it did when you started. Once complete, attach the amplifier to the mounting board and then attach the mounting board to the front of the speaker enclosure.

Re-assemble your front speaker cabinet, being careful to get the wire routing correct and ensuring the foam gasket sits nicely between the two halves of the case.

Rear Speaker Assemblies

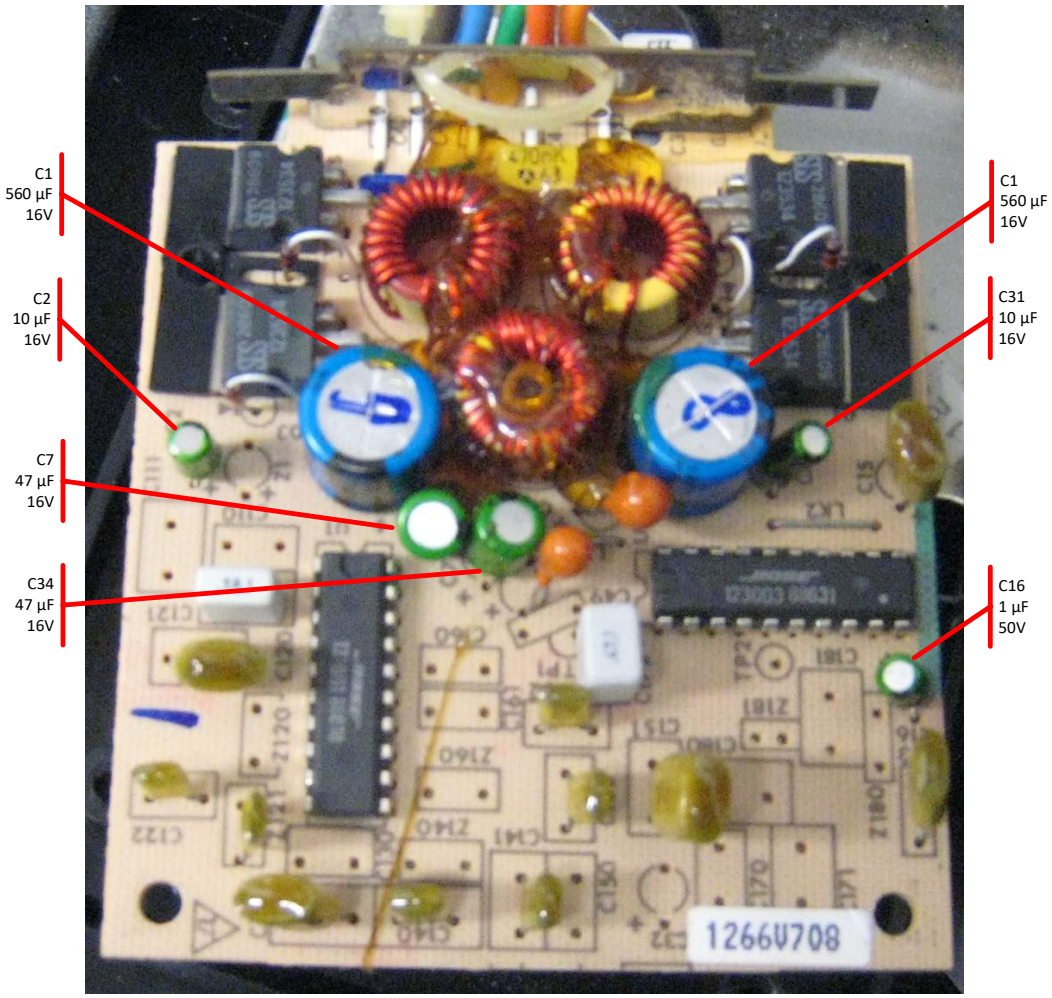
Coupe

After removing the rear speakers from your car, disassemble the case using the procedure described in the Front Speaker Assembly section. Once disassembled, the component side of the speaker should look like the following:



NOTE: The wiring of the speaker in the picture above is incorrect. I purchased these speakers off eBay and it appears that the prior owner didn't want to deal with the Bose system, so they cut the wiring within the speaker and rewired it to bypass the amplifier and connect directly to the speaker. This is a terrible practice! The drivers used in these speakers are very low impedance (about 1ohm from what I understand) and will not work well with regular car stereos. After correcting the wiring and replacing the capacitors, the speaker worked great!

Remove the amplifier and mounting board using the same process as for the Fronts. The rear amplifier board is shown below with the capacitors to be replaced labeled.



Below you will find a chart detailing the capacitor values and quantities in the amplifier. IMPORTANT: The chart represents the number of capacitors to refurbish ONE amplifier. Don't forget to multiply by the number of front speakers you are refurbishing.

1986-1989 Coupe Bose Rear Speaker(s) (Qty is for one speaker)

Position(s)	Capacitance	Qty	Digi-Key Part #	Nichicon Part#
C16	1µF 50V	1	493-15438-ND	UKT1H010MDD
C31, C2	10µF 16V	2	493-10631-1-ND	UKT1C100MDD1TD
C7,C34	47µF 16V	2	493-15428-ND	UKT1C470MDD
C1, C25	560µF 16V	2	493-11983-1-ND	UPJ1C561MHD6TO

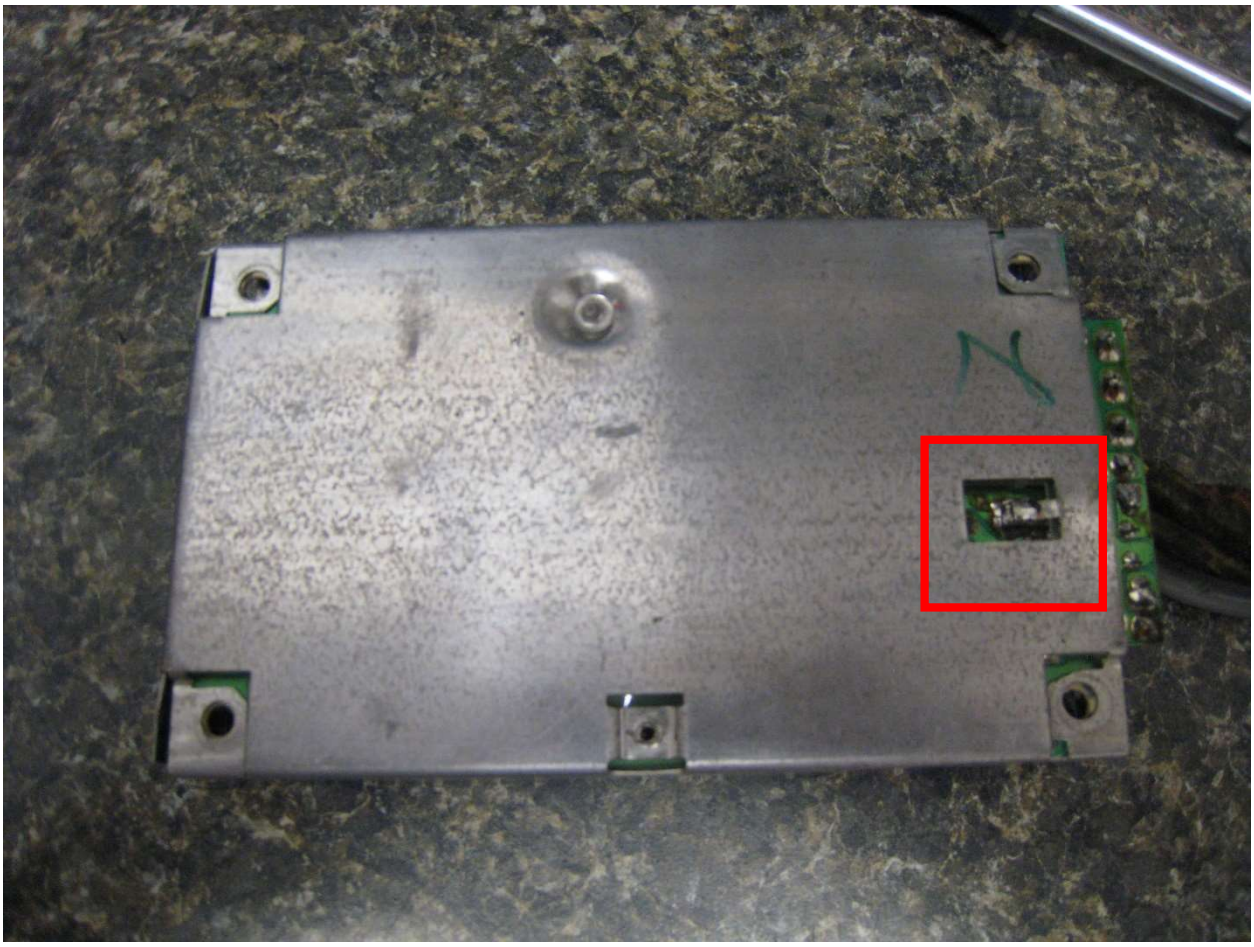
As with the front speakers, clean the solder side of the amplifier board with alcohol and the toothbrush before replacing the capacitors.

Replace the capacitors and test your amplifier/speaker. Reassemble the case.

Convertible

Refurbishing the amplifiers on the rear speakers of a convertible is essentially the same procedure as for the front and coupe rear speakers, with some minor exceptions. As you can see in the picture below, the convertible rear amp is larger than the front or coupe rear amp (physically). It is the same size as the mounting board in the front and coupe rear speakers. I am guessing that Bose found a way to be more efficient in the manufacture of the amplifiers and shrunk the higher volume amps, requiring the use of the adapter plate, but did not do so for the convertible. The sspeakers/amps in this section are out of my 86 convertible, which was the first year for convertibles, so your amp may look different if it is a later model.

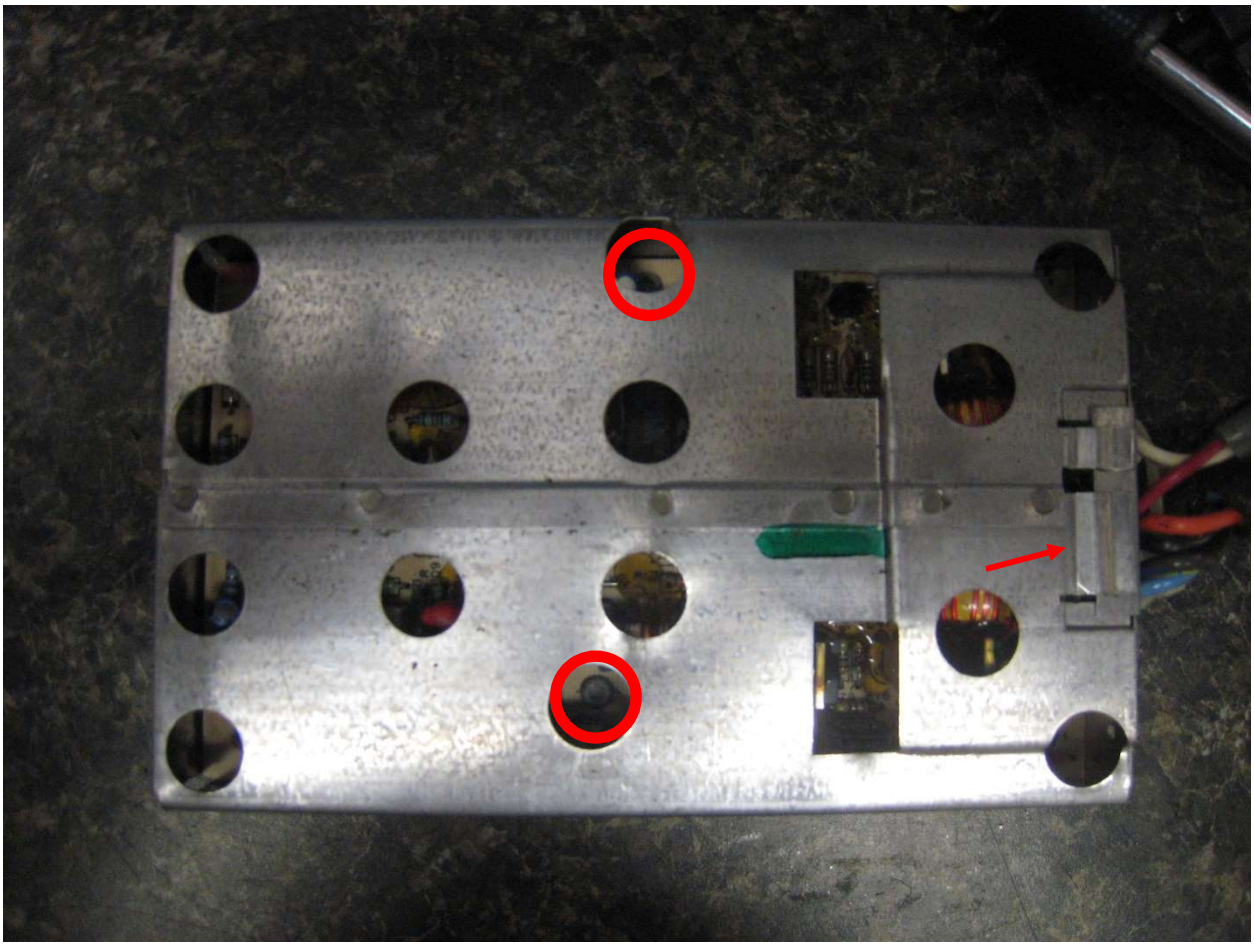
The image below shows the bottom of the rear convertible amplifier (already removed from the speaker enclosure.



Disassembling this amplifier case has a few more steps than the other units.

Within the red square in the picture above, you can see a tab with some solder residue on it. This tab acts to ground the case to the circuit board and is soldered to the board itself. To remove the amplifier from the case, you must first separate this tab by desoldering it. I found it easiest to use a solder sucker since there is a large amount of solder there. Once the solder amount is reduced, you can use a small screwdriver to bed the tab up while keeping the solder liquified with your iron.

Once the tab is free, turn the amplifier over. It should look like the below picture.

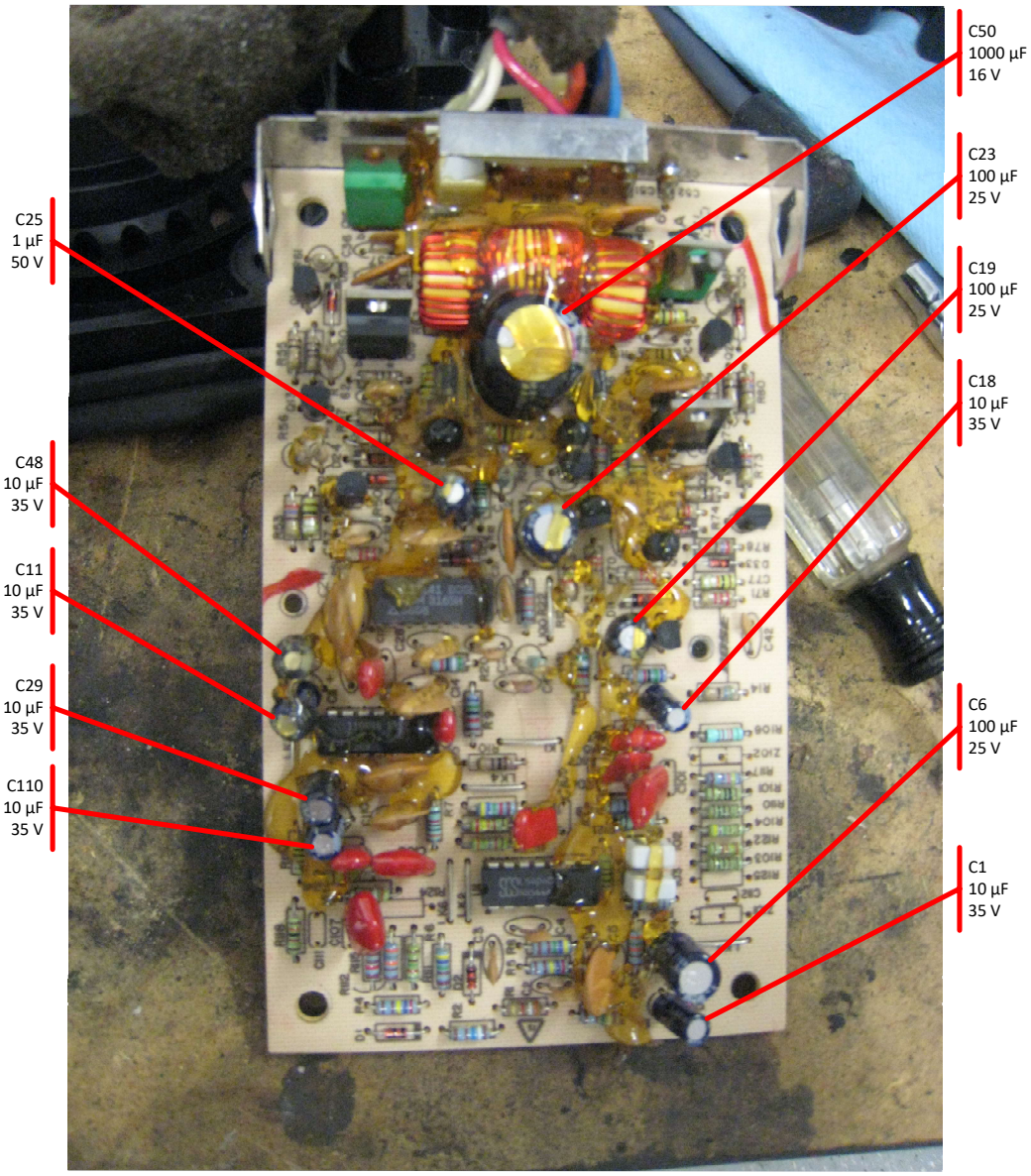


The circuit board is attached to the case by two torx T-10 screws. The screws are shown in the picture above within the red circles. Remove the screws.

Remember my advice on the tabs of the case? Note the way the circuit board interacts with the case at the red arrow to be sure your re-assembly is correct.

Once the screws are removed, the amplifier will slide out of the case. There is a insulative plastic sheet that is on the solder side of the amplifier board. Be sure to keep it safe and remember it when re-assembling, it keeps the circuit board from shorting out against the metal case.

The picture below shows the component side of the amplifier board with the capacitors labeled.



I'm not sure what day of the week this one was made on, but they certainly had plenty of goop!

As with the front speakers, clean the solder side of the amplifier board with alcohol and the toothbrush before replacing the capacitors.

Replace the capacitors and test your amplifier/speaker.

Re-assemble the amplifier circuit board into the case. Remember the plastic sheet on the solder side of the board. After screwing the board back in with the T-10 torx screws, re-attach the grounding pad from the case to the board.

Re-assemble the amplifier into the speaker enclosure.

1986-1989 Convertible Bose Rear Speaker (Qty is for one speaker)

Position(s)	Capacitance	Qty	Digi-Key Part #	Nichicon Part#

C1	1µF 50V	1	493-15438-ND	UKT1H010MDD
C48,C11,C29,C110,C18,C1	10µF 35V	6	493-16324-ND	UKT1V100MDD
C23,C19,C6	100µF 25V	3	493-4647-1-ND	UKA1E101MED1TD
C50	1000µF 16V	1	493-15120-ND	UFW1C102MPD

Appendices

Appendix A: Version History

Version Number	Date	Revision Notes	Author
DRAFT	TBD		SLVRSHRK

Appendix B: Aux Input Wiring Diagram

1986-89 Bose Radio Head Unit

Logic Board for Aux Input