Radiator Removal and Replacement

(This was accomplished on a 1993 SSE but with little modification should be applicable to 92-99 models.)

This article provides a step-by-step procedure to assist you in removing and replacing the radiator in your Bonneville. These exact procedure were accomplished on a *stock* 1993 SSE but should be applicable to all 92-99 models. There may be subtle differences between your car and this one, but the root procedure should be the same.

Liability Statement:
Perform this task at your own risk! Neither the author nor anyone associated with this article accept ANY liability if you damage your car, hurt yourself, or otherwise screw something up. This is a guideline designed to help you perform the task described herein, therefore the risk is yours and so is the responsibility.

Skill Level Required ~ **2.5**
On a scale of 1 to 5 where
1 = What's a wrench?
1.5 = I've *seen* a wrench before.
2 = Got me some tools!
2.5 = Got me some tools, and I know how ta use 'em.
3 = Decent mechanic, but some things scare me.
3.5 = Good mechanic – ain't skeert.
4 = Highly skilled in the mechanical arts.
4.5 = Mechanical wizard.
5 = Automotive god…don't try this at home.

Tools Needed:
Common Screwdriver
"Techie" Screwdriver (small common screwdriver like you might use on a computer)
10mm Socket
7mm Socket
13mm Socket
Ratchet
3" Extension
Jack
Jack Stand
Drain Pan
Pliers
"Channel Lock" Pliers
5/8" Open End Wrench
Flashlight or worklight
Small bag of cuss words, just in case you need one

NOTES:
A) Whenever right or left is mentioned, left refers to the driver's side of the vehicle.
B) If you're *replacing* your radiator, get the new radiator out before popping the hood of your car. There may be some handy plugs installed in it that you can use to help reduce the mess you're going to make on your garage floor. This is also a good time to visually check to see if your new radiator at least *resembles* the one installed in your car.
C) For cryin' out loud, DO NOT attempt this on a hot car.

D) TIP: When you're installing assemblies, like a fan for instance, it's a good idea to install all the fasteners loosely and get everything lined up before torquing things down. Don't forget to go back and tighten them all once you're happy and all the bolts are in.
E) So you know what you're up against, read the entire procedure before doing anything.
F) Changing the radiator on a Bonneville is orders of magnitude easier than on an 88 Honda Accord. I know. Ready?...

Removing the radiator:

1. Pull your new radiator out of the box and compare it to the old one. I got a cheapie made in China, cost me about $140. GM Direct has OEM listed for about $211. If you can afford OEM, consider getting OEM. The aftermarket one is OK, but it did have a minor problem I'll discuss later. Got the right radiator? Good. My new radiator came with rubber caps over the inlet, outlet, and cap hole. It also had a plug in the coolant level sensor fitting, and brass plugs in the transmission line fittings. These might come in handy to plug the corresponding holes in your old radiator and reduce your mess. I wish *I'd* have done this before yoinking my radiator out.
2. Raise the right side of car high enough to allow you to work comfortably under the front of the car. Install a jack stand. Don't raise the left side – the drain for the radiator is on the left side of the radiator and having the left side of the car lower than the right will prevent coolant from running all over the place. Note that you're not going to drain the coolant yet.
3. Grab a 10mm socket, ratchet, your light, and a techie screwdriver and crawl under the front of the car. Remove the splash panel under the right front of the car. It should have three 10mm bolts holding it in place. It probably isn't absolutely necessary to remove this panel, but I found it easier to see what's going on with this panel removed. I've adopted the philosophy that if something can be easily removed and it allows better access to what I'm really after, it comes off. Often it's easier to do this than try to work around the item.

Figure 1 – Under car, looking aft.

4. While you're lounging under the front of the car, remove the lower mounting bolt for the right fan. It's a 10mm bolt, and you happen to have a 10mm socket loaded on your ratchet. Using the techie screwdriver (refer to step 3 if you didn't bring one with you), carefully pry the lock tab up and disconnect the electrical connector to the fan. Pry up on the tab on the wire loom connector and the wire will be free. You're done under here for a while, so go topside.

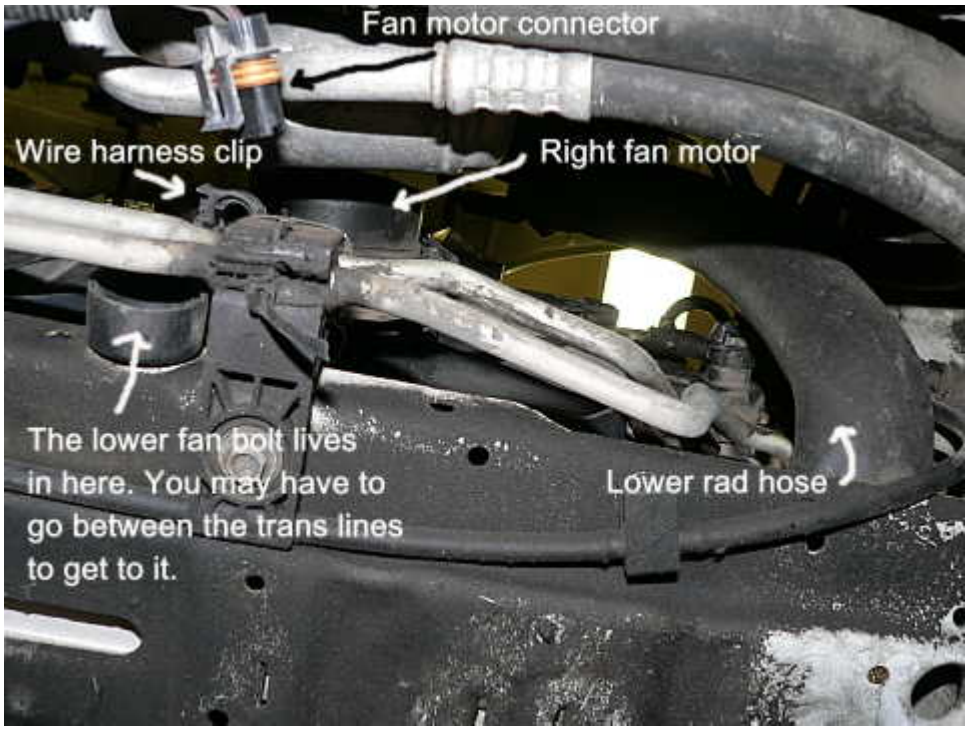

Figure 2 - Looking up from under the front of the car, right side.

5. Remove the top two 10mm bolts holding the right fan in place and pull the fan straight up and out. Trust me, completely removing this fan makes things a lot easier.
6. Fetch your 7mm socket and move to the left side of the car. Remove the 7mm screw holding the air cleaner intake duct in place. You could probably get away with moving to the next step, but I found it convenient to remove the entire air box. On my car, this allowed better access to one of the bolts securing the left fan. To do this, you need to remove the intake hose from the airbox to the throttle body (loosen the clamps with a common screwdriver). This will expose an electrical connection to the airbox which you will need to disconnect. Remove the 13mm bolt at the bottom of the air box and the thumb screw located between the headlight and the washer bottle. The air box should come right out.
7. Remove the top two 10mm bolts securing the left fan. You don't need to remove this fan, just the top two bolts.
8. Remove the four 10mm bolts holding the radiator retaining panel in place. Remove the panel.

Figure 3 – Getting close.

9. Remove the radiator cap and disconnect the surge tank hose.
10. Things are going to get messy now. Get a drain pan, locate the radiator drain plug (lower left corner of the radiator, toward the aft of the car), and drain the radiator. You may need some pliers to break the drain plug loose. NOTE: If the plastic drain plug breaks, or the rubber gasket spins and won't seal up, you can buy a replacement drain plug assembly.
11. While the radiator is making a mess of your garage floor, get your 5/8 wrench and disconnect the lower transmission cooler line. Get some tissue paper or paper towel and wad a piece up and stick it in the hole in the radiator to reduce ATF leakage. (Or, better yet, use the plugs pirated from your new radiator…). Don't worry about clogging your radiator, this is just temporary and you're going to clean this out when you can get the radiator over a drain pan. Cut a corner out of a sandwich baggie and fasten it over the end of the transmission line with one of those newspaper rubber bands you've been saving. This will help keep ATF off you, the car, and the floor.

Figure 4 - A baggie rubber-banded over the trans lines helps control the mess.

12. Remove the upper transmission line. Use the baggie trick here too. Shouldn't need to stuff a wad of paper towel in the radiator – you don't dribble too much ATF from this connection.
13. If you have an auxiliary transmission oil cooler, disconnect the rubber hose from the rigid transmission line near where the upper transmission line connects to the radiator. Use baggies here too.
14. If so equipped, disconnect the low coolant sensor lead. It's located about halfway between the upper an lower transmission lines.
15. Disconnect the upper radiator hose. Use a pair of channel locks if you have the spring-type hose clamp. Screwdriver for the screw-type.
16. Disconnect the lower radiator hose. Uh, make sure the radiator is completely drained and you've moved the drain pan under this connection. NOTE: You can rapidly drain the radiator by just disconnecting this hose with a full radiator. Be aware this has the potential of being incredibly messy!
17. The radiator should now pull up and out. Carefully.
18. If you're going to reinstall this radiator, now's probably a good time to set it over a drain pan and remove the wadded paper towel from the transmission cooling connections. If you got the paper towel shoved in there so far you can't get it with tweezers or a scribe, you can use a little air pressure. And I mean a LITTLE air pressure. Set your regulator so you're only putting out 3-4 psi. That should be more than enough to blow it out of there.

Radiator installation:

19. I'm going to assume your old radiator is toast and you're installing a new one like I did. My new radiator came with rubber caps over the inlet, outlet, and cap hole. It also had a plug in the coolant level sensor fitting, and brass plugs in the transmission line fittings. Remove the coolant level sensor plug, remove the coolant level sensor from your old radiator, and install it in your new radiator. To remove the plug and the sensor, pry up on the two locking arms while pulling out on the plug/sensor. Takes a little doing, but it'll come. Apply a little silicone grease to the o-ring on the sensor before installing it and it will slide right into place.

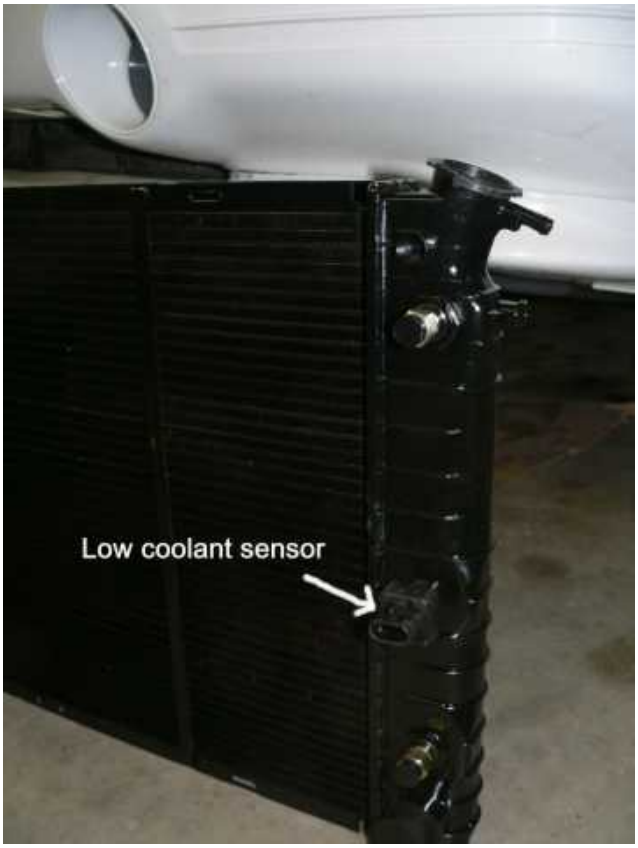

Figure 5 - New rad with coolant sensor installed. Note the rubber caps in the trans line fittings and on lower hose spout.

20. If you haven't done so already, remove all the rubber caps and the plugs from the transmission line couplings. I saved all this stuff 'cause it might come in handy if I ever have to remove the radiator for some reason – especially those transmission line plugs, they beat the heck out of a wad of paper towel. Speaking of the transmission line plugs, after you pull them out make sure you yank the o-ring out of there too. My new radiator had o-rings under the plug and they need to be removed.
21. I installed a piece of fuel line to the drain on my new radiator. This is, of course, optional. I'm sure I'll need to drain the radiator again someday and I'd like to avoid draining it on the frame structures when I open the drain plug. While you're in the area of the drain plug, this is a prime moment to make sure the drain is closed.
22. Slip the radiator into place, routing the drain hose (if you installed one) so there's no kinks in it and it runs into an accessible area under the car. There are two rubber pads down on the subframe that the radiator rests on. Make sure the radiator sits in them properly.
23. I found the following sequence to be optimal for me. I've had my radiator out a couple times and found that connecting some things before others allowed me better access to them. Install the lower transmission cooler line. Remember me telling you my Chinese radiator had a problem? Turns out the lower transmission line fitting on the radiator was slightly askew. Just enough that the nut on the transmission line would not line up properly to thread in. If you encounter a similar problem, plan on

Figure 6 – Optional hose on drain spout.

spending about ½ hour dinking with it. This would be a good time to pull a couple choice words out of the cuss bag. I wound up removing the radiator (so I could get some room to work) and carefully tweaking the transmission line so it would have a straighter shot into the radiator. Minor issue, but a PITA nonetheless.

24. Reconnect the auxiliary transmission cooler line.
25. Connect the upper transmission line.
26. Connect the lower radiator hose.
27. Connect the upper radiator hose.
28. Install the radiator retaining panel. This panel has 2 rubber pads just like the subframe has. Make sure the radiator rests properly in those pads and snug down the four 10mm bolts.
29. Install the two 10mm bolts in the top of the left fan bracket.
30. Before installing the airbox, check your air filter. If it needs replacing, now's a good time. Install the airbox. I found it easier to install the box as a complete assembly with the filter and lid in place.
31. Plug in the electrical connector that goes to the airbox lid. I like to use a little silicone dielectric grease on electrical connectors to help with weatherproofing.
32. Install the throttle body hose. A little silicone grease around the inside of the hose makes installation a breeze. Don't forget to tighten the hose clamps. If you forgot which end is which, there's a little arrow on the top of the hose – this points toward the airbox.
33. Dude, you're practically there! Time to connect the lead to the low coolant sensor. Remember where that is?
34. Install the right fan. It should slip right in. Install the top two bolts, then slide under the car and install the bottom one. Did you bring the dielectric grease? Go get it and wipe a little on the fan connector and install it. Don't forget to install the clamp on the wire loom.
35. Since you have your 10mm socket handy, go ahead and install the splash panel.
36. Connect the hose to the surge tank and follow these steps, developed by Bill Buttermore, to fill your cooling system and purge any trapped air:

This method was developed by trial and error and has been found to be effective to minimize the possibility of trapping air pockets in the L36 3800 engine cooling system. Trapped air could allow for increased temperatures around the hot EGR passage in the plastic upper intake manifold, leading to failure of the manifold, internal coolant leaks, and severe engine damage.

When refilling the engine and radiator with coolant after repair work, remove the radiator cap, then remove the thermostat and drill a small (1/16" - 3/32") bleed hole in the thermostat flange. Check the brass bleeder on the upper radiator hose fitting to make sure it can be opened and closed easily. With the thermostat out, begin filling the engine with coolant at the thermostat housing until the coolant reaches the lip where the thermostat seals. Do not install the thermostat or the upper hose yet. Fill the radiator slowly at the cap opening with coolant. You should see and hear air bubbles disturbing the surface of the coolant in the intake manifold at the thermostat housing as they are pushed up and out of the engine. The coolant level will eventually start to rise in the manifold as the coolant in the radiator gets high enough. Install the drilled thermostat, positioning the bleed hole at the 12 O'Clock position. With the thermostat and upper radiator hose installed, pour additional coolant into the radiator slowly, until it rises to the overflow hole in the radiator neck several times. Allow several minutes each time for the top hose to fill and for air to bleed past the small hole in the thermostat flange. Repeat slowly filling at the radiator until the level in the radiator remains steady for five minutes. Fill the overflow tank two or three inches above the "full hot" mark.

Start the engine and bring it to operating temperature. If possible, take the car for a drive. You will be able to tell when the thermostat opens when the top radiator hose gets hot. With the engine at temperature and idling, open and close the bleeder screw to expel any air. Even if only coolant is expelled when the bleeder is opened, wait a minute or two and try to bleed it a couple more times. Shut off the engine. If the cooling system has no leaks, the level of coolant in the recovery tank will drop as the system pulls in coolant to make up for displaced air and thermal contraction. Bring the level in the recovery tank back up to "full cold" if needed and observe the level daily until it stabilizes.