

# DUAL REMOTE OIL FILTER MODIFICATION

## 4<sup>TH</sup> GENERATION FIREBIRDS

*Written by Dave Dorey (lonetechie) Copyright FirebirdNation.com*

The following article details how I installed a dual remote oil filter system on my 2001 Formula Firebird. If you decide to tackle this project, keep in mind that you are messing with the life-blood of your engine. This is no place to cut corners. Take your time, work carefully and triple-check everything as you go and especially before you start your engine!

The main reason that I installed dual remote oil filters is that I live in an area of the country that is extremely hot and dusty. This modification will increase engine oil capacity by approximately one quart. The extra oil improves engine cooling and dilutes the effects of oil break down and contaminants that build up during the oil's service interval. Moving the oil filter off the engine block and away from the exhaust system helps cool the oil and makes it easier to access the filters during oil changes. Also, the increased filtration capacity keeps the oil cleaner during its service interval. The photo below shows the size difference between the stock filter and the new filters that replaced it.



One disadvantage of this modification is that oil changes will be more expensive since you will have to buy two filters and an extra quart of oil each time. Also, note that if you mount your filters horizontally as I did, you won't be able to fill the filters with oil before you install them. This means that it will take a second or two for your oil pressure to build at initial start up after an oil change. This isn't a major issue as the oil film retained between components is more than sufficient to protect the engine for these few seconds. Just don't rev the engine until your oil pressure reaches its normal range.

Following is a list of parts and supplies I used for my installation. The brand names and part numbers listed are not an endorsement for any specific products. You can substitute equivalent items as needed to meet your own preferences.

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I used a Trans-Dapt part number 1220 dual oil filter relocation kit for this project. The kit comes with a spin-on oil by-pass adapter and o-ring, dual filter mount, pipe plugs and nipples for the dual filter mount, 2 – 30 inch long rubber oil lines with fittings, mounting hardware and installation instructions.

The 30” long rubber oil lines that come with the kit were way too short to reach the dual filter mount where I located it. Trans-Dapt offers 48 inch long lines and the instructions in the kit tell how to obtain these. However, it is an extremely good idea to use steel braided lines rather than rubber ones like those that come with the kit. The oil lines have to be routed under the car and are vulnerable to abrasion and road hazards. Steel braided lines are good insurance against a catastrophic failure. Plus, my oil lines ended up being slightly longer than 48 inches.

I used the following Earl’s Performance parts to make the new oil lines:

- 1 – 9 ft. long piece of -8AN steel braided hose – part no. 400080ERL (9 ft. worked for my car. Since you may need to route your oil lines differently than I did, check carefully to determine how much you need for your application. This stuff isn’t cheap, so you’ll want to get this right!)
- 2 – Straight hose ends -8AN – part no. 800108ERL
- 2 – 90° hose ends -8AN – part no. 809108ERL
- 4 – Straight adapters -8AN to 1/2” NPT – part no. 981688

To install the dual filter mount, I replaced the hardware included in the Trans-Dapt kit with metric hardware as follows:

- 3 – M8-1.25 x 30mm long hex head screws
- 3 – M8-1.25 hex nuts
- 4 – M8-1.25 x 20mm long hex head screws
- 7 – M8 flat washers

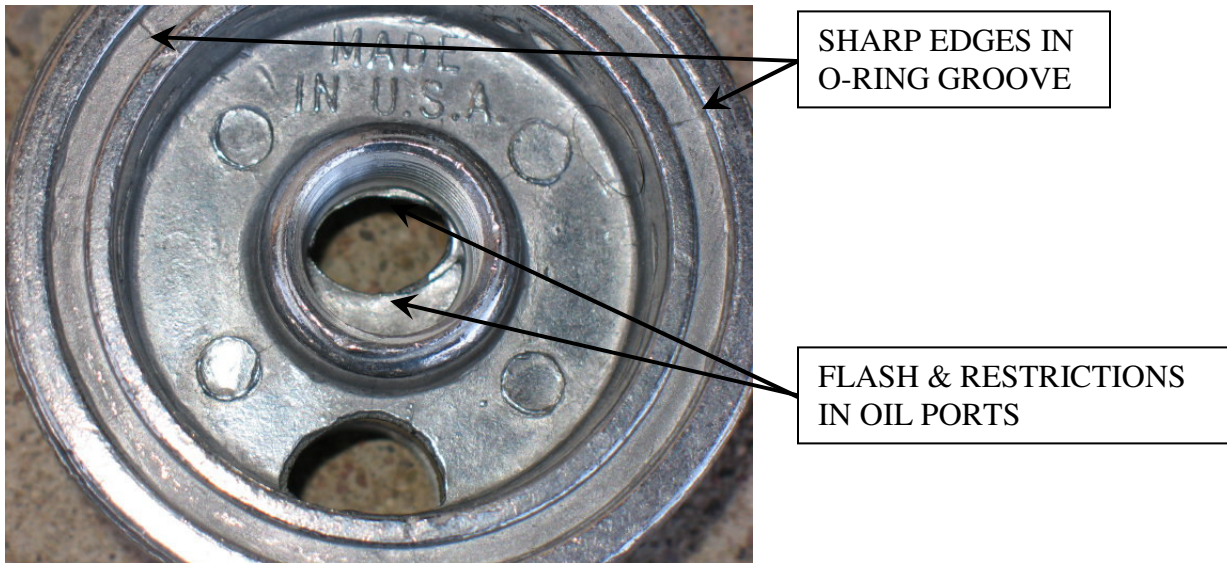
The following additional items were used during the installation.

- Loctite 567 PST Teflon pipe sealant
- NAPA 765-1351 Sil-Glyde silicon grease
- Loctite 242 medium strength thread locker (“blue” Loctite)
- 6-1/2 quarts engine oil
- 2 Oil filters – Fram part no. PH8A (the Trans-Dapt kit lists several different brands and sizes of filters that can be used)

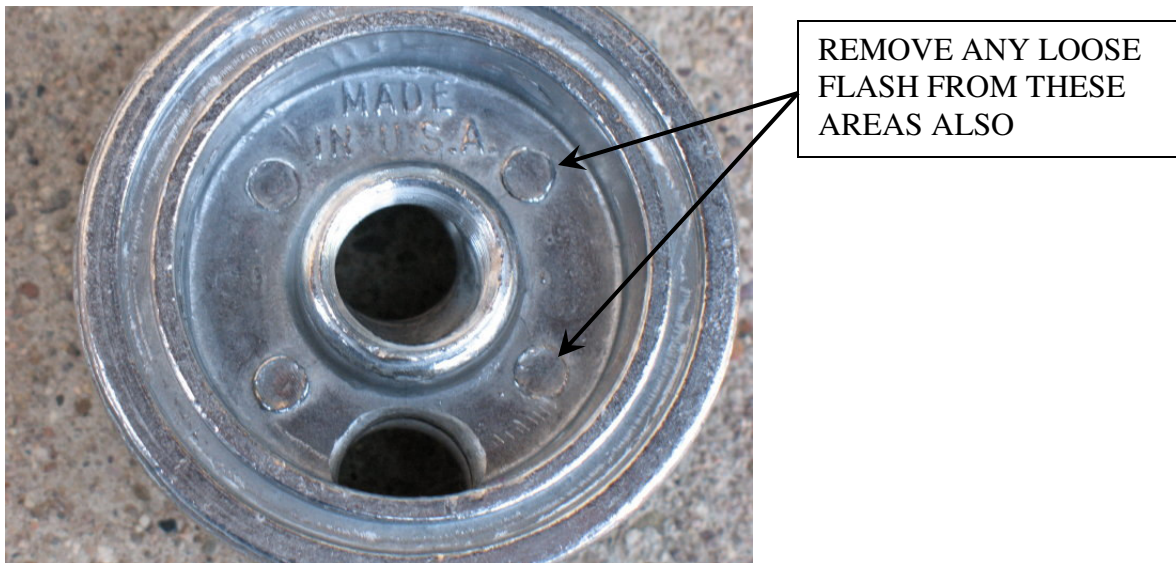
You will also need the resources to fabricate a bracket to attach the dual filter mount to your car.

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When I inspected the components in the oil filter relocation kit, I found that the by-pass adapter and dual oil filter mount had quite a bit of flash and restriction in the oil ports. There were also some sharp edges in the o-ring groove that could have damaged the o-ring. This photo of the by-pass adapter illustrates the issues.



Use a die grinder and clean up all the ports in both the by-pass adapter and the dual oil filter mount to reduce the restrictions and remove any loose flash. Be careful not to damage the threads. Also, examine the o-ring groove in the by-pass adapter for defects that could cut the o-ring and cause a leak. Clean the castings thoroughly when you are through grinding. When finished, all of the oil ports should look like the photo below.





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The next step is determining where to mount the oil filters. Choices are limited since the engine compartment is so crowded in 4<sup>th</sup> generation Firebirds. Since I couldn't find a good location to mount the filters vertically, I had to mount them horizontally off the bottom of the radiator core support.

I centered the dual oil filter mount under the right side fan shown below. In this location, the filters and oil lines can be raised up out of the way of road hazards, oil line routing is fairly direct and the filters are easy to get to for oil changes.



THE DUAL OIL FILTERS  
WERE CENTERED UNDER  
THIS FAN



IT WAS NECESSARY TO  
BEND THIS AC LINE TO  
MAKE ROOM FOR THE  
OIL FILTERS - THE  
ALUMINUM TUBING  
BENDS EASILY - BE  
CAREFUL NOT TO KINK  
OR BREAK IT!

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A sturdy bracket will be required to attach the dual filter mount to the radiator core support. The photo below shows the bracket I had made for this. It is fabricated from a 3/16" thick aluminum plate bent at a 10° angle and reinforced with two 1/4" wide ribs welded on the inside of the bend. The dual filter mount attaches to the opposite side of the plate on the end with the three holes. The two 3/8" x 1/2" bars have M8 threaded holes that correspond to the four slots on the other end of the bracket. These slip into the radiator core support through the open slots you can see in the photo above to attach the bracket to the core support. These bars are necessary because you won't be able to get a wrench into the core support to hold a nut. More importantly, they spread the load across a large area which will protect the sheet metal core support from fatigue cracks that might develop over time.



Once you have the mounting bracket parts fabricated, you will need to drill mounting holes into the bottom of the radiator core support.

**WARNING: EXTREME CAUTION MUST BE EXERCISED WHILE DRILLING THESE HOLES.**

**THE BOTTOM OF THE RADIATOR IS RIGHT ABOVE THE CORE SUPPORT.**

**IF YOU DRILL INTO THE RADIATOR, YOUR DAY WILL BE RUINED.**

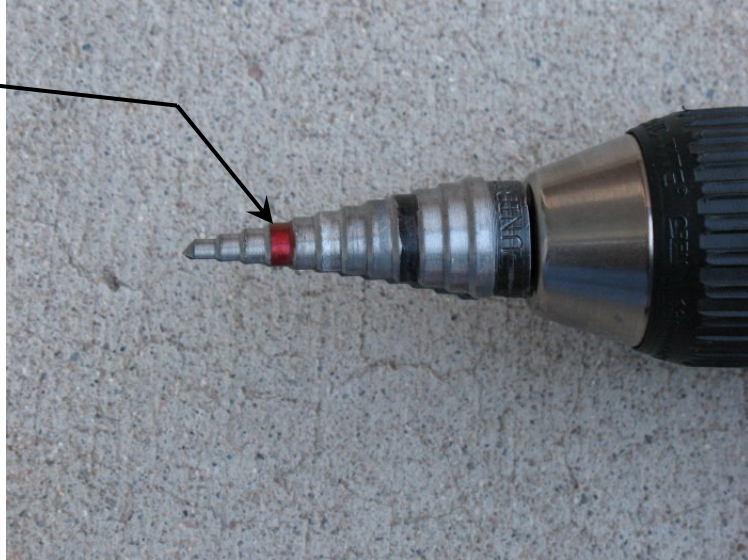
**NEITHER I NOR FIREBIRD NATION ARE RESPONSIBLE IF YOU RUIN YOUR RADIATOR!**

When drilling through sheet metal into a sensitive area, using a step drill like the one in the photo below is a good idea. This type of drill bit has a straight flute which doesn't catch and get pulled into the hole like a conventional spiral flute drill bit.

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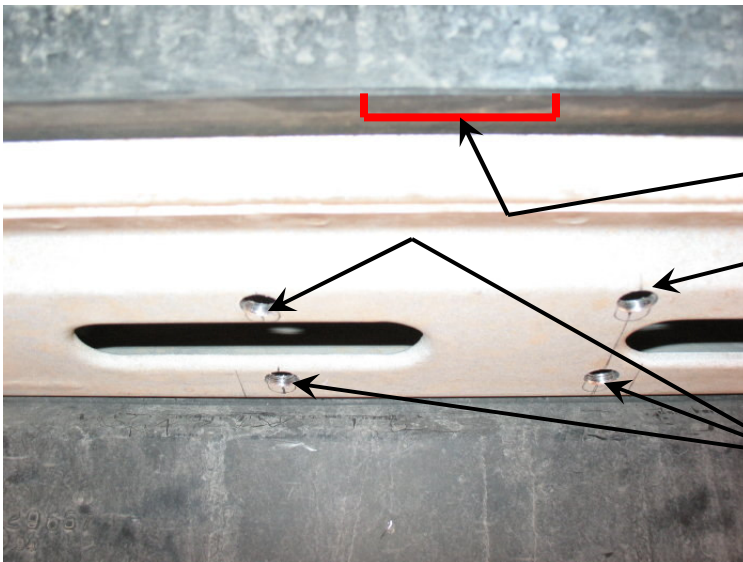
I checked and measured the amount of clearance between the core support and radiator on my car several times. Once I was sure I could safely drill to the depth necessary to make a 3/8" diameter hole with the step drill, I highlighted the appropriate step with a permanent marker as an indication of when the correct diameter was reached.

3/8" DIAMETER STEP  
HIGHLIGHTED WITH A  
RED PERMANENT  
MARKER



Using the bracket as a template, mark the mounting hole locations on the radiator core support and carefully drill four 3/8" diameter holes.

AGAIN, PAY VERY CLOSE ATTENTION TO WHAT YOU ARE DOING AND CHECK YOUR PROGRESS CONSTANTLY SO YOU DON'T DRILL INTO THE BOTTOM OF THE RADIATOR!



ALSO, CUT A 3" LONG  
NOTCH IN THE LIP OF THE  
PLASTIC FAN SHROUD  
CENTERED BETWEEN THE  
MOUNTING HOLES TO  
CLEAR THE TOP OF THE  
DUAL FILTER MOUNT

NEWLY DRILLED HOLES



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Once the holes are drilled, assemble the dual filter mount. First, screw the two threaded nipples included with the filter relocation kit into the dual filter mount and tighten them securely. Make sure to install the short end of the nipples into the mount. The long threaded ends are required to mount the oil filters. Be careful not to damage the threads on the long ends.

Next, using Teflon pipe sealant, install the two pipe plugs included in the filter relocation kit into the right side of the dual filter mount (see the photo below). Apply the pipe sealant a couple of threads from the end of the plugs to keep it from getting into the dual filter mount. Then install two -8AN to 1/2" NPT aluminum adapters into the left side also using Teflon pipe sealant applied a couple of threads from the end of the fittings.

Assemble the dual filter mount to the mounting bracket with three M8 x 30mm screws, flat washers and nuts. Use medium strength Loctite to secure the mounting hardware.

Slide the two threaded bars into position through the slots in the radiator core support and align all the holes. Position the bracket and attach it to the car with four M8 x 20mm screws threaded into the mounting bars in the core support. **MAKE SURE THAT THE THREADED BARS DON'T RUB ON THE BOTTOM OF THE RADIATOR. ALSO, MAKE SURE THAT THE MOUNTING SCREWS DO NOT HIT THE RADIATOR.** You can reach up inside with your fingers to check for clearance. Use medium strength Loctite on these screws also.

Lube the oil filter gaskets with clean engine oil and install the oil filters. Tighten the filters the same as you would when installing one on the engine block. The finished assembly should look like the photo below which was taken from the right side of the car.



PIPE PLUGS (ADAPTER FITTINGS ARE ON THE OPPOSITE END OF THE DUAL FILTER MOUNT)

(4) M8 X 20mm LONG SCREWS - FLAT WASHERS UNDER SCREW HEADS

(3) M8 X 30mm LONG SCREWS AND HEX NUTS - FLAT WASHERS UNDER SCREW HEADS

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The next step is to prepare the steel braided oil lines for installation. I used some old garden hose under the car to determine the best routing and the approximate length of each line before I purchased the steel braided hose. Then I cut the hose in half to make the two lines. To cut the steel braided hose, wrap it tightly with tape centered where you want to make the cut. Cut the hose in the middle of the tape with a fine tooth hacksaw, cable cutters or a cut-off wheel in a Dremel tool. Make sure to clean the hoses after cutting them.

**IMPORTANT:** Remove the tape after cutting the hose. Be careful not to fray the braid. If you don't remove the tape, it can interfere with fitting assembly and lead to a fitting blowing off under pressure. **NEVER LEAVE TAPE ON THE ENDS OF THE HOSE DURING ASSEMBLY.**

Assemble the oil lines. Each line needs to have a straight fitting on one end and a 90° fitting on the opposite end. The 90° fittings attach to the by-pass adapter on the engine. The straight fittings attach to the dual filter mount. Before installing the straight fittings on the hoses, I double-checked the hose length. To do this, I installed the 90° fittings on both lines, screwed them finger tight to the by-pass adapter and routed the hoses to the dual filter mount. In my case, I found that I had to shorten each of the lines approximately 3 inches. Then I removed the lines from the car, cleaned them and installed the straight fittings.

To assemble the fittings, proceed as follows:

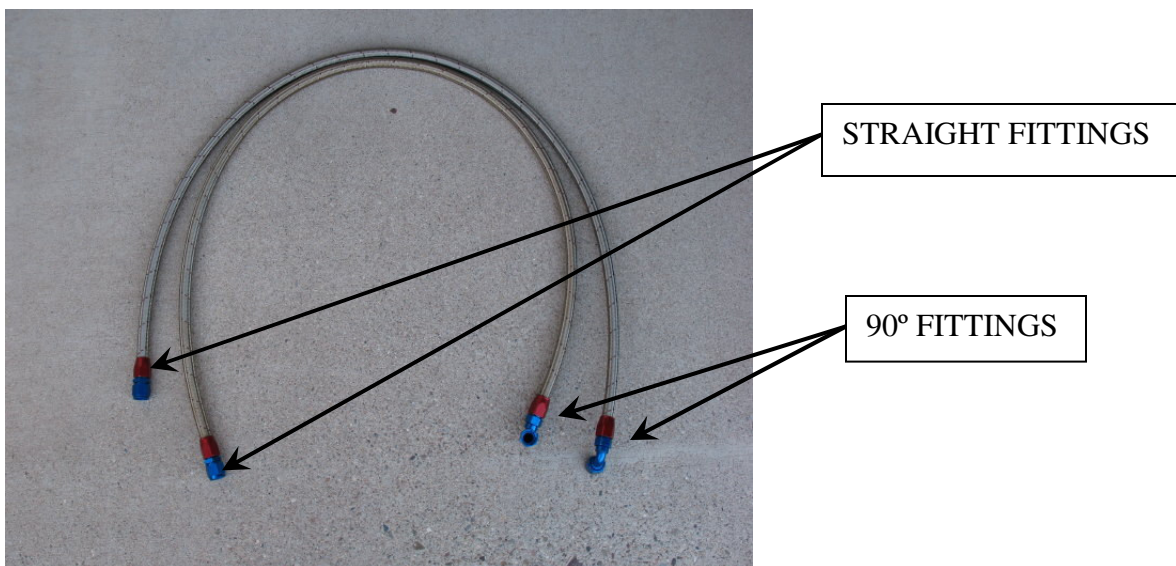
(Note: If you want illustrated assembly instructions, you can find these at [www.holley.com/TechService/Library.asp](http://www.holley.com/TechService/Library.asp) - scroll down to the "Plumbing" section and select "Hose and Hose Ends – Swivel-Seal Hose Assembly Instructions")

- 1.) Insert one end of the hose into a fitting socket until there is a 1/16" to 1/8" gap between the hose end and the bottom of the threads inside the socket. Be careful not to fray the braid while doing this.
- 2.) **IMPORTANT:** Mark the hose at the bottom of the socket with a pencil or marker. After assembly, this mark will indicate if the hose was pushed out of the socket.
- 3.) Liberally apply an anti-seize lubricant to the inside diameter of the hose end, socket threads and on the threads of the fitting nipple that is to be installed. I used silicon grease for this.
- 4.) Carefully clamp the nipple in a vise using a clean rag to protect the anodized finish. Be careful not to crush nipple, use just enough pressure to hold it while you push the hose onto it. Holding the hose and not the socket, push the assembly carefully onto the nipple with a twisting motion to engage the socket threads with the nipple. Continue tightening by hand as far as possible. Make sure the threads are properly engaged and that they are not cross threaded. Also check the mark



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- you made on the hose in step 2 to make sure it hasn't been pushed out of the socket.
- 5.) Finish tightening the fitting assembly with the appropriate size wrench. Use tape on the wrench flats to protect the fittings anodized finish. When the fitting is properly assembled, there should be a 1/16" gap between the socket and the shoulder of the nipple.
  - 6.) **IMPORTANT:** Check the mark made on the hose in step 2 for any evidence that the hose was pushed out of the collar during assembly. If the hose was pushed out more than 1/16", disassemble the fitting and correct the problem immediately. **IF THIS ISN'T CORRECTED, THE FITTING COULD BLOW OFF UNDER PRESSURE.**
  - 7.) Repeat the above steps for all of the fittings. The oil lines should look like the photo below when assembly is complete.



Next, drain the oil from the engine and remove the old oil filter. Install the remaining two -8AN to 1/2" NPT adapter fittings into the by-pass adapter with Teflon pipe sealant. Install the o-ring into the by-pass adapter and lightly lube it with clean engine oil.

Clean the oil filter mounting surface on the engine block and install the by-pass adapter on the engine. Be careful that the o-ring stays in place and doesn't get pinched or you will have a leak. Tighten the by-pass adapter the same way you would tighten the stock oil filter, approximately 3/4 turn after the o-ring contacts the block.

Now it's time to route the oil lines under the car and connect them. Do not use sealant on the swivel fittings when making the final connections. Use silicon grease on the threads to prevent galling that will damage the fittings. Use the appropriate size wrenches and use

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tape on the jaws to keep from damaging the anodized finish. Don't over-tighten the connections.

As you route the oil lines, make sure to keep them away from moving parts and hot surfaces. Use tie wraps as needed to secure the oil lines out of harm's way.

**NOTE: IT IS VERY IMPORTANT TO CONNECT THE OIL LINES TO THE CORRECT PORTS!** The photo below shows the connections at the by-pass adapter on the engine.



CENTER PORT – CLEAN OIL  
IN FROM THE DUAL

SIDE PORT – DIRTY OIL  
OUT TO THE DUAL FILTER

The photo below shows the connections at the dual filter mount. This photo was taken from the left side of the car.



CENTER PORT – CLEAN OIL  
OUT TO THE BY-PASS  
ADAPTER (MARKED “OUT”  
ON THE CASTING)

OUTSIDE PORT – DIRTY  
OIL IN FROM THE BY-PASS  
ADAPTER (MARKED “IN”  
ON THE CASTING)

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Once the oil lines are connected and secure, double-check everything and make sure you've put the drain plug back in the oil pan. Fill the engine with the oil of your choice. I put in six quarts, checked for leaks and then started the engine. As noted earlier, my oil pressure was zero at initial start up, but it rose to normal pressure within a second or two once the new lines and filters were filled with oil.

**NOTE: IF YOUR OIL PRESSURE REMAINS AT ZERO OR IS UNUSUALLY LOW, STOP THE ENGINE IMMEDIATELY!**

This condition indicates that the oil lines are connected wrong. Reverse the hose connections at the dual filter mount. Just remember that there is now oil in these lines when you disconnect them!

Restart the engine and watch your oil pressure. If it comes up to its normal range, run the engine for about five minutes, watch the oil pressure closely and check for leaks. **DON'T GET IN FRONT OF OR UNDER THE CAR WHILE THE ENGINE IS RUNNING.** You can see all the connections without getting under the car.

Shut the engine off, let the car sit for about five minutes and check the oil level again. Add oil as necessary to reach the full mark. Be careful not to put in too much oil. I had to add approximately 1/2 quart at this point, for a total of 6-1/2 quarts in the system.

Now that you are done, periodically check the dual filter mount, oil lines, connections and by-pass adapter for leaks or other issues. Closely inspect the system at every oil change. I've put nearly 1000 miles on my car since the install and have not had any problems. I've made the same modification to several 4X4 trucks that I've owned and have never had an issue. If done right, this is a worthwhile modification that offers additional protection for your engine.