

Leak Less

SWAPPING THE CENTERHEAD IN YOUR CORVETTE AND KEEPING LEAKS AT BAY
BY JOHN HINCKLEY



An intake manifold swap is a popular way to improve performance, especially if you stick with GM parts to avoid carburetor-to-air cleaner fit problems (different air horn diameters, choke housing interferences, etc.) and air cleaner-to-hood clearance issues.

The objective of this article is to walk you through an intake manifold swap and identify the tools, materials, and tips involved. You can do this in an afternoon, and no special tools are required. This particular swap was done to replace an incorrectly dated intake with an identical part with a correct date, but the basic principles are the same if you're upgrading to an optional-engine intake.

PREPARATION: Disconnect the negative battery cable, remove the radiator or supply tank cap, and drain the cooling system into a suitable container for proper disposal later. Make a note to buy two gallons of anti-freeze and two gallons of distilled water for refill when you're done.

Clamp the main fuel feed hose shut just upstream of the fuel pump; we'll remove the pump-to-carb line later, and the fuel tank will siphon and drain through the pump if that hose isn't clamped shut. Auto parts stores have great adjustable plastic clamps that won't damage the fuel hose.

Set up a table or box to put all the parts in that you'll be removing so you can find them all when you install the new intake. I like to use a service cart with drawer organizers in the top level to keep track of all the small parts.

You'll need an intake gasket set, a thermostat housing gasket, carb-to-manifold gaskets and baffles, some gasket adhesive, thread sealer, and a tube of Permatex Ultra-Copper RTV. You'll also need a sharp scraper to remove the old gasket material from the heads, some clean rags to cover the lifter valley, and some paper towels to stuff in the ports while you're scraping. Depending on the new manifold you're installing, you may need a thermostat housing or upper radiator hose, too.

PART REMOVAL: Remove the obvious stuff first – the air cleaner, upper ignition shield, crankcase vent pipe, accelerator linkage, temperature sender wire, thermostat housing, heater hose to the intake, and the PCV hose to the base of the carburetor.

Now you can remove the fuel line fitting at the carburetor inlet. Make sure you use a backup wrench on the large carb fitting while you use a line wrench to loosen the male fitting on the line, then remove the line at the fuel pump outlet.

Disconnect the choke thermostat rod and vacuum advance line from the carb, remove the four



1. Drain the cooling system first into a suitable container for proper disposal. Replace it later with a fresh anti-freeze and distilled water mix.



2. It's essential to clamp off the main fuel hose ahead of the pump. Plastic clamp pliers won't damage the hose.



3. With a little effort, you can set up an organized means of storing the removed parts so you have them all ready for reinstallation and don't lose anything.



4. Be sure to use a backup wrench on the carb fitting while you loosen and tighten the fuel line fitting; the fine threads on the carb side are easy to strip.



5. The distributor cap and wires are always in the way. Hold them up out of the path of the intake with a rubber band to the windshield wipers.



6. Don't use a pry bar to break the intake loose. A length of broomstick in the carb holes works fine when you rock it back and forth.



7. Here's what you'll want to see when the intake comes off — nice and clean inside, no sludge — a sign of good maintenance and regular oil changes. The "can" at the rear is the oil separator for the crankcase vent system.



8. Clean shop rags cover the lifter valley, and paper-towel "plugs" in all the ports keep gasket scrapings out of the engine. Note the piece of tape on the valve cover to align the vacuum advance nipple when reinstalling the distributor.



9. An assortment of really sharp-edged scrapers. It's essential to remove all the old gasket material and any other crud from the head and block surfaces.

nuts, and pull the carburetor. Keep it upright and level so you don't spill any fuel from the bowl vents. Remove the remote choke thermostat assembly from the intake with its sheet metal cover.

DISTRIBUTOR REMOVAL: Pull the cap off and tie it up on top of the cowl with a rubber band to one of the wiper blades to hold it out of the way. Mark the position of the rotor tip on the distributor housing with a piece of tape, and place a piece of tape on the passenger side valve cover that's aligned directly with the nipple on the vacuum advance diaphragm for the housing position. These two marks will make reinstallation of the distributor a simple drop-in later.

Remove the black distributor primary wire from the coil (-) terminal, remove the hold-down clamp and bolt, unscrew the tachometer cable connection, and pull the distributor straight up out of the engine. When you reinstall it, don't forget the new distributor base gasket that comes in the new gasket set.

INTAKE REMOVAL: Now you can remove the twelve bolts holding the manifold (along with the vacuum advance

pipe clip and accelerator spring bracket). Use compressed air or a brush to clean any debris from around the edges of the intake so it doesn't fall into the lifter valley when you pull the intake loose.

Don't use a metal pry tool to get the intake loose – castings break easily. I've always found that a length of broomstick inserted in the carb holes, used to rock the intake back and forth laterally, will pop it loose with no problem. Set the old intake aside and line the inside of the lifter valley with a couple of shop rags to catch any dirt, crud, or old gasket scrapings.

Use pieces of paper towel to make up plugs, and insert one into each of the intake and coolant ports in the cylinder heads to keep debris out of the ports. Also plug the distributor hole and the crankcase vent pipe hole so nothing finds its way inside the engine during cleanup.

HEAD AND BLOCK CLEANUP:

Use sharp scrapers to remove any old gasket material on the heads, and scrape the front and rear sealing surfaces of the block nice and clean as well. Finish this job with a thorough cleaning of the surfaces with lacquer thinner or brake cleaner (neither leaves any residue). It's also a good idea to use a 3/8-inch, 16 thread-chaser (not a cutting tap) in each of the manifold bolt holes in the heads to get them clean. Remove all the paper-towel plugs from the ports, distributor hole and crankcase vent hole, and the shop towels from the lifter valley.

GASKET/SEAL INSTALLATION:

Open the tube of Permatex Ultra-Copper RTV, install the tip, and run a small bead of RTV around the front and rear coolant ports on each head. Then use a few dabs of Permatex High-Tack or Edelbrock "Gasgacinch" adhesive on the head surfaces and install the side gaskets (blue Printoseal side up with Fel-Pro gaskets), aligning the bolt holes, and making sure the little tabs at each end are properly positioned at the joint where the heads meet the block. While the adhesive sets up, you can make sure the sides and end surfaces of the new intake are smooth and clean, with particular attention to cleaning the front and rear seal surfaces where we'll use RTV instead of the cork or rubber end seals that come in the gasket set.

FRONT AND REAR SEALS: Set the new manifold in place, snug up the

four corner bolts, and observe the size of the gap between the manifold and the block at the front and rear so you can judge the size of the RTV bead you'll need to seal the manifold to the block. Remove the intake, cut the tip for the Ultra-Copper so it will dispense the proper bead size (usually about 1/4" – 5/16"), and lay a bead across the front and rear seal surfaces on the block. Make sure you run the bead up past the head-to-block joints on each side to seal the corners. Let the RTV "skin" for about five minutes.

INSTALLING THE INTAKE:

It helps (especially with an iron intake) to have a device to guide the intake straight down into position so you don't have to reposition it once it's down, which can shift the gaskets or wipe off the RTV at the ends. A piece of 1/4-inch round dowel or a piece of 3/4" x 1" stock fits nicely into the distributor hole, and makes a great vertical guide tool to get the manifold positioned correctly the first time, with no "shifting" necessary to align the bolt holes after it's down. If you have an iron intake and are doing the job solo, use a couple of long bolts with large washers on them to provide a good pair of vertical "handles" to control the manifold as you lower it into place.

Install the four corner intake bolts snug to pull the intake down against the gaskets, and use your finger to "dress" the excess RTV off the front and rear seal areas (neatness counts). The Ultra-Copper RTV is almost the same color as the Chevy Orange engine paint, so it's not obvious once it's "dressed." You'll get dinged a point or two in NCRS judging for not having the original rubber end seals with the "tab" on them, but I prefer a leak-free engine to losing a couple of points. They won't like the Fel-Pro side gaskets either, but they seal perfectly. If judging is in your future, trim off the excess side gaskets along the contour of the new intake with a sharp X-Acto knife, paint the exposed edges, and don't worry about it.

Now you can install all 12 bolts and torque in the correct criss-cross pattern, starting at the middle, to 30 lb-ft. First, apply a non-hardening thread sealer (I use ARP) to all but the four extreme corner intake bolts. The ends of the other eight are open to the lifter valley, and hot oil vapor can migrate up the threads and create stains around the bolt heads if you don't use thread sealer. If "Bubba" has been there before you and you have

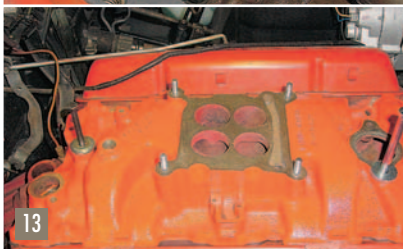
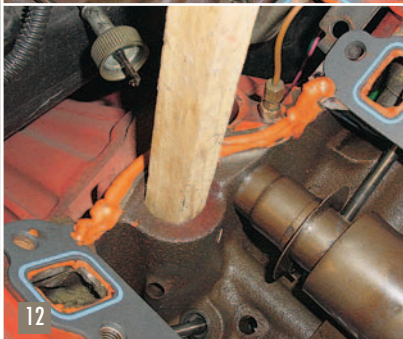
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10. The new side gaskets glued in place. Note the small bead of RTV around the front and rear coolant ports, under the gasket.

11. Here's the bead of RTV across the front of the block. Note how it's extended up onto the head surface at the corners to seal this troublesome joint.

12. The RTV bead across the back of the block. The piece of wood in the distributor hole will help guide the heavy intake manifold into its correct position.

13. The new intake in place, with the corners snugged down. Note the long bolts and large washers used as "handles." The valve covers will be painted later with the same paint used on the intake.

14. Be sure and use thread sealer on the intake bolts to keep hot oil from migrating up the threads and staining the intake under the bolt heads.

a "mix" of intake bolts, make sure none are longer than 1-1/8", as several of them can bind against a pushrod if excessively long bolts are used.

BUTTONING IT UP: Now go back to your removed parts and reinstall them in reverse sequence to the disassembly process. Don't forget to un-clamp the fuel hose after you install the pump-to-carb line and it's tight at both ends, and make sure the radiator drain cock is closed tight. Reinstall the distributor, using the mark on the housing as the final position for the rotor tip, and align the vacuum advance can nipple with the piece of tape on the valve cover, and your timing will be very close to correct – just touch it up with your timing light once you're done. Fill the cooling system through the thermostat opening first until the level comes up. Install the thermostat, gasket and housing, and complete the fill through the supply tank or radiator cap.

Won't crank or start? Remember, we disconnected the battery negative cable – connect it and you'll be in business. Now drive it and enjoy it! ■

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