

Removal of the DeLorean intake manifold can be quite an intimidating prospect. There are numerous jobs that either require removal of the manifold, or are significantly easier with the manifold out of the way. Most DeLorean owners will have to remove the intake manifold at least once during the course of their ownership of the car.

The aim of this document is to provide a means for a first time intake manifold remover to be able to perform the job without too much worry or hassle. DeLoreans will vary slightly from car to car, based on the VIN, as well as any modifications that previous owners have performed. Please keep this in mind as you perform the work to remove the intake.

Tools needed

- Torque wrench
- ¼” drive ratchet
- 3/8” drive ratchet
- ½” drive ratchet
- Scissors
- 5 mm Allen wrench – T-bar handle highly recommended
- Flat head screwdriver – a medium or large size will do
- 10 mm socket
- 11 mm socket
- 12 mm socket
- 17 mm socket
- 19 mm socket
- A variety of different length extensions
- Universal joints – I do not need to use any, you may
- A roll of paper towels

Recommended ancillary items

- Several large sandwich bags – put various parts, bolts, washers in these
- Workshop manual – the most important part of this for me are the torque specifications
- A large towel is good for putting the large parts on. No need to get anything dirty while you work
- A set of copper sealing washers - do not reuse washers when re-installing the fuel lines that you remove
- A full set of gaskets, seals and o-rings, if these have not been replaced in a few years. Every vendor offers a set specifically to be used when performing this procedure

- A full set of replacement bolts. If this is the first time the intake manifold will be removed from your DeLorean, please do not re-use the 25+ year old bolts. If they do not snap-off when you remove them this time, they just might next time you pull the manifold.
- An assistant – It is entirely possible to remove the intake manifold by yourself, but having a second person to help out with various tasks can make the job easier and/or more enjoyable.

Note:

Fuel injection components are particularly vulnerable to dirt, and they can become problematic if exposed to dirt. Additionally, DO NOT over torque the hollow fuel bolts during re-assembly. These bolts can break very easily.

It is possible that you may break off bolts during this process. The most likely bolts to snap are the bolts holding the coolant distribution pipe down. You will not be removing the pipe in the steps outlined in this document, but some jobs require that you do. Should you snap a bolt, your likely first reaction will be panic. This is okay, but calm down before you do anything else. Broken bolts can be scary, particularly the first time you encounter one, but they can be handled if you proceed carefully and with a cool head. There are multitudes of documents available on the Internet that describe how to handle this situation, so it will not be addressed in this document.

You will be removing and/or disconnecting a large number of vacuum and fuel hoses. It is imperative that they are all re-installed correctly for the car to run correctly.

Recommended documents

Fuel line routing diagram – recommended: <http://dmcnews.com/Techsection/fuelhoses.htm>

Vacuum hose routing diagram – your car should have a sticker of this on the inside of the engine cover. If not, one can be found at: <http://www.dmctalk.com/showthread.php?t=5132>

Skill level: Intermediate

Time to perform: This will vary widely. I can remove the manifold in approximately 45 minutes, and I can put everything back together in a little over an hour. If this is your first time, do not rush – take several hours both ways if you have to.

Before proceeding with this procedure, be sure to disconnect the battery. You are removing a significant portion of the components in the engine bay, and there will be gas fumes aplenty.

Additional Terminology:

VOD or Valley of Death: The VOD is the area of the engine that is beneath the intake manifold, sitting at the bottom of the “V” of the V6 engine, hence the valley of the engine. It gets its name from the damage that can occur to the engine if a coolant leak

goes unchecked in this location. Coolant is corrosive to aluminum over time and can eat through the engine block if not take care of.

Pipe of Agony: This the copper tube that runs from the idle speed motor to the lower housing of the fuel / air mixture manifold. It gets its name from the frustrations that can occur during reassembly, as this can become a primary source of a vacuum leak.

Don't Panic: What you should do whenever you feel like panicking during this procedure. The DeLorean community is very helpful. If you have any questions, feel free to ask. Odds are the problem or predicament has been encountered before. You are not alone!

Procedure

Step 1: Remove the air filter box

Tools:

- 10mm socket + ratchet

There are simply three bolts that hold on the air filter. Remove these, and then you can pull the air filter box apart from the air intake hose going into the pontoon.



Step 2: Free up hoses and wiring harness

Tools:

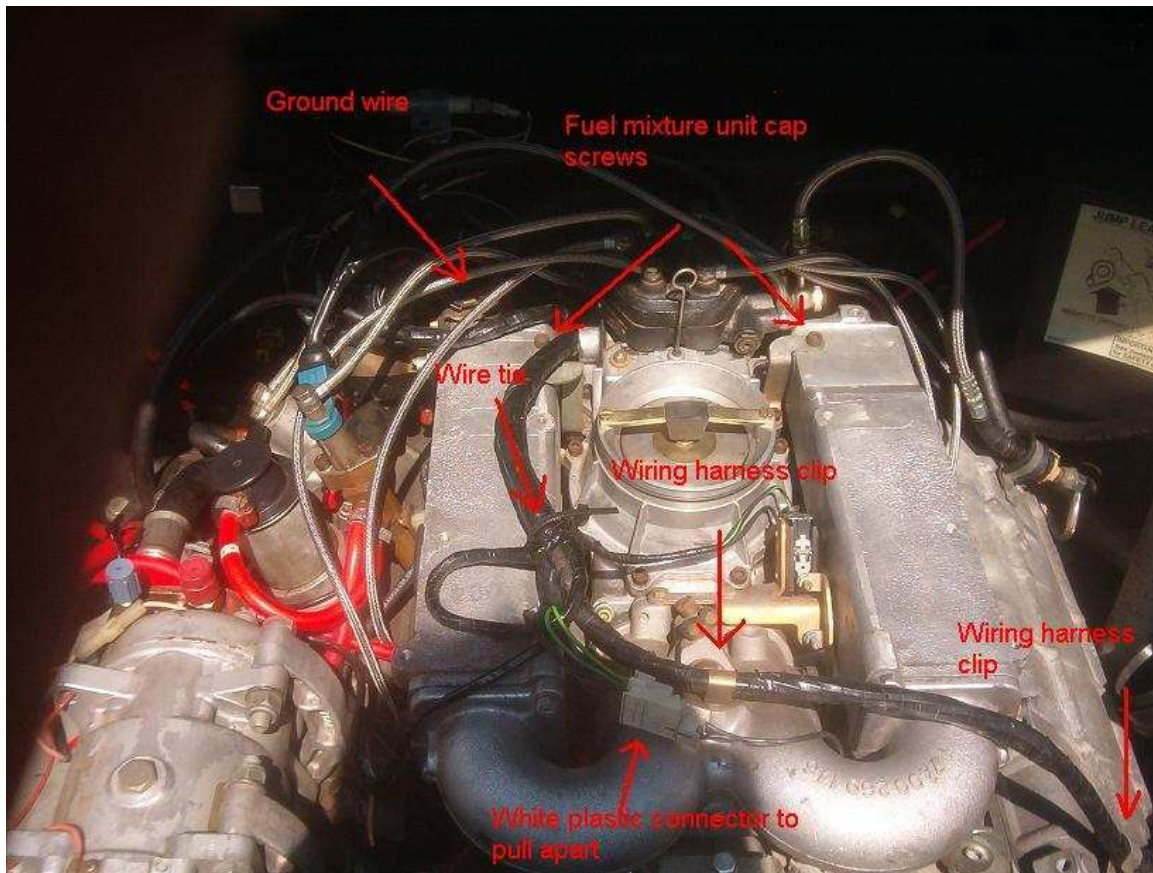
- Scissors

Cut the zip ties holding together the vacuum lines coming out of the left side of the pontoon. On my car, there were two sets of zip ties on these lines.

There is also a zip tie holding the main wiring harness together with the small wires that go to the idle speed micro-switch. Cut this as well.

Pull apart the white connector. If you have a manual, there will only be one connector here. I recommend making a mark across both sides with a marker to ensure you plug it back together correctly during re-assembly.

Now, if you have an earlier VIN with the wiring harness that drapes across the front of the intake manifold, you will need to loosen up the harness. There are two hooks that you will need to pull the harness out of. All of these items are marked in the following picture:



Step 3: Remove the idle speed motor

Tools:

- 5 mm Allen wrench
- flat head screw driver

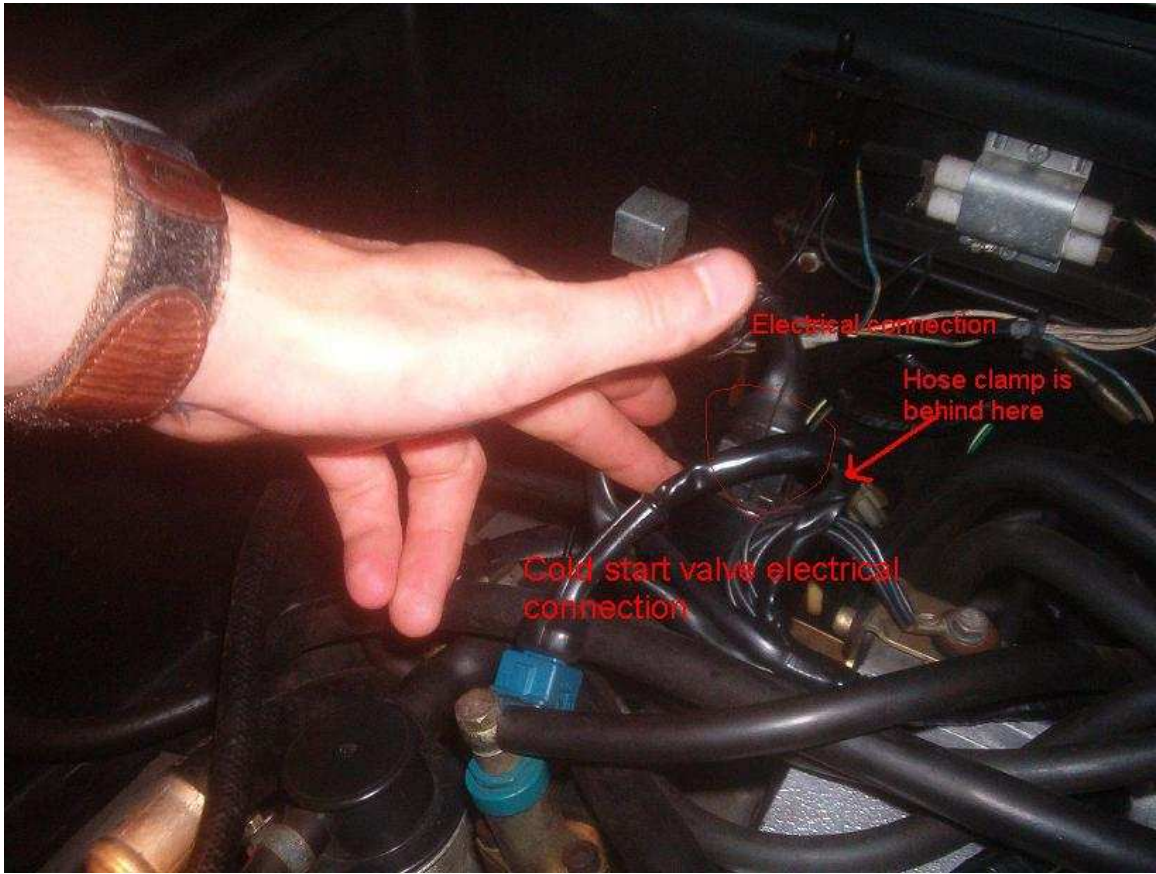
This portion of the removal is quite simple. However, re-installing the copper pipe (or “Pipe of Agony” as it is affectionately known in the community) during re-assembly can be quite difficult. Before you remove your idle speed motor, be sure to take a good look at how the pipe is routed, and how the idle speed motor is connected.

First, using your screw driver, loosen up the hose clamp holding the hose to the idle speed motor. You don’t need to loosen the hose clamp holding the hose to the copper tube.

Secondly, disconnect the electrical connection from the top of the idle speed motor.

Next, take the 5 mm Allen wrench and undo the two cap screws holding the bracket that the idle speed motor is mounted on to the intake. You do not need to remove the bracket that is attached to the intake manifold. Be careful when removing these cap screws. If you drop one, it can easily fall down into the valley of death beneath the intake manifold.

Once you have loosened the hose clamp, and removed the two cap screws, you can now rotate the idle speed motor towards the firewall to disconnect the idle speed motor from the cold start valve. Once this is accomplished, you can pull the unit from the car.



Step 4: Unplug electrical connections

Tools: no tools required.

Remove the electrical connections from the cold start valve. This can be seen in the picture above.

Remove the electrical connection from the control pressure regulator.



Step 5: Remove the W pipe

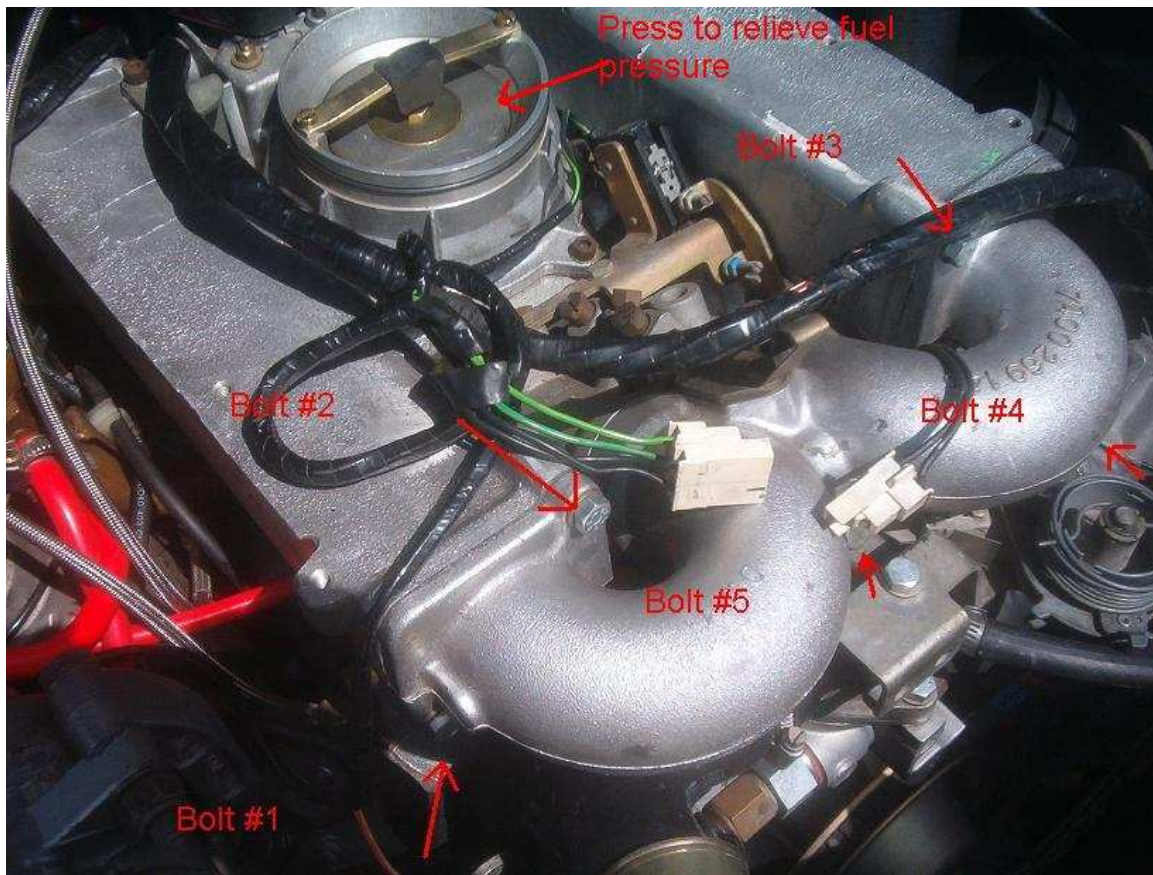
Tools:

- 11mm socket

There are 5 bolts holding the W pipe onto the intake manifold and the throttle assembly. Simply remove all 5 of these bolts, and you will be able to pull the W pipe away.

Be aware that there is a paper gasket between the intake manifold and the pipe on both sides. Also, note that between the W pipe and the throttle assembly that there are two plastic spacers, and two O-rings. Note that for re-assembly that the spacers go on to the W pipe first, and then the O-rings.

Once you have removed the W pipe, please be careful – you now have a pair of big openings into the engine. If you drop something into the holes you have now exposed, whatever you dropped is going to fall into your heads and likely ruin your day, if not worse.



Step 6: Disconnect the fuel hoses from the fuel distributor

Tools:

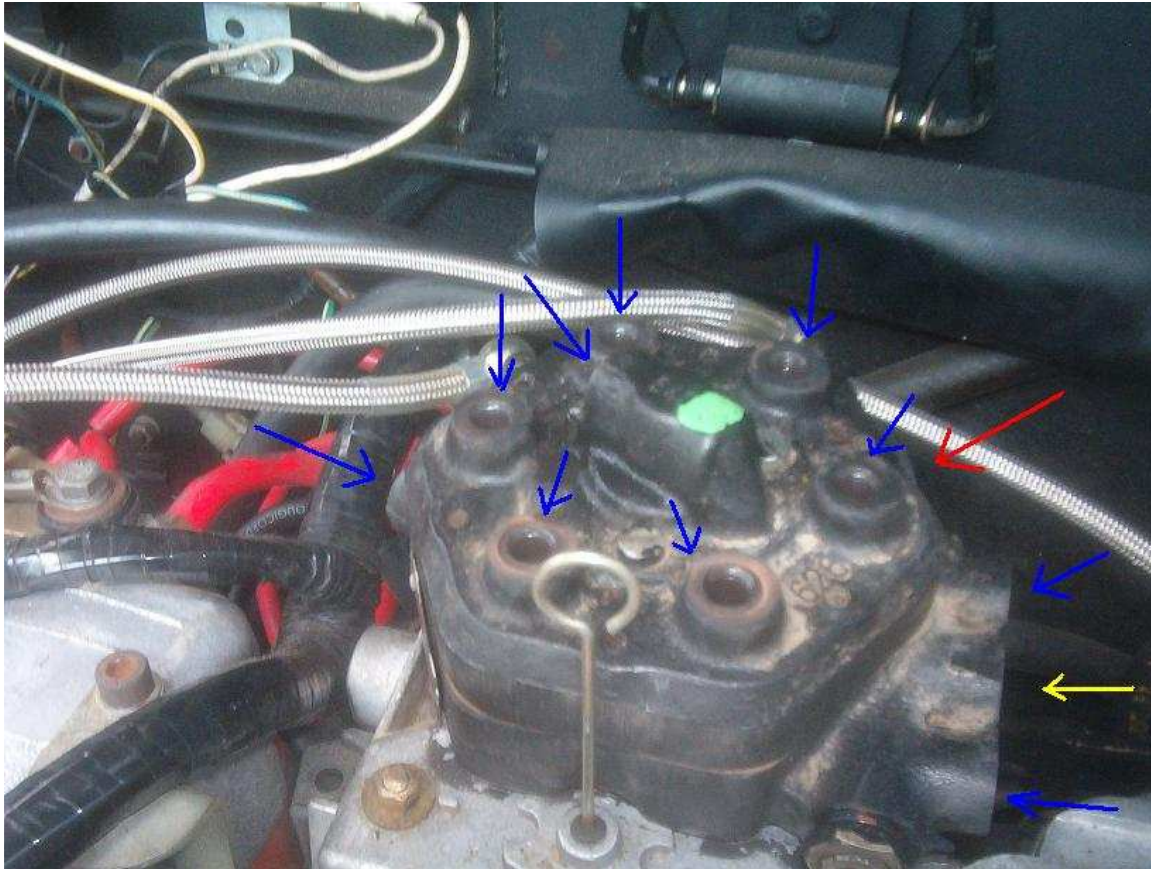
- 12 mm socket
- 17 mm socket
- 19 mm socket

You may wish to attach labels to each of the fuel hoses before you disconnect them from the fuel distributor. I personally prefer to use a fuel hose routing diagram when I am ready to re-attach them. Choose the method that you are more comfortable with.

Be careful when you loosen the bolts connecting the hoses to the fuel distributor. Unless your DeLorean has been sitting for quite a while, there will be pressure in the fuel system, and fuel might come spraying out when you loosen up the various bolts. You can relieve some of the pressure by pressing lightly down on the plate on the mix unit. I like to hold my ratchet steady with one hand and turn it with the other, so if I have a partner helping me, I will have him/her hold a paper towel on to the connection that I am loosening up in order to soak up any fuel that spills/sprays out.

The order in which you remove the fuel lines does not matter. You may find that some are easier to reach once others are out of the way. There are three different socket sizes you will need to use. Keep in mind that on twelve of the connections, there are two

copper washers – one between the bolt and the distributor, and one between the bolt and the line. The thirteenth has three washers. These are fairly easy to drop and lose track of, so be especially careful during re-assembly. In the below picture, the blue arrows point towards 12 mm fittings, the red arrow points to the 17 mm fitting, and the yellow arrow points toward the 19 mm fitting. Note for re-assembly that the 12 mm fittings torque to 7 ft/lbs, and the 17 & 19 mm fittings torque to 14 ft/lbs.



Step 7: Remove ancillary connections from fuel mixture unit

Tools:

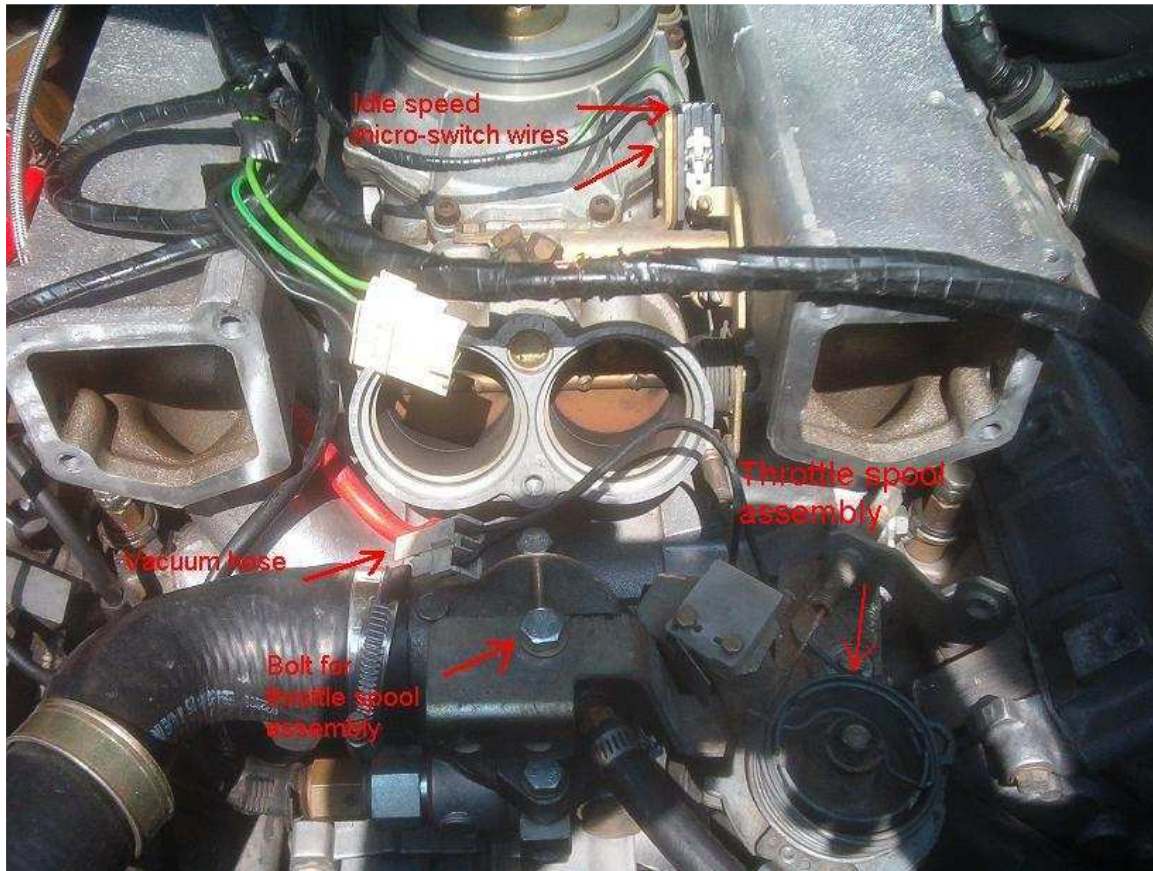
- 11 mm socket

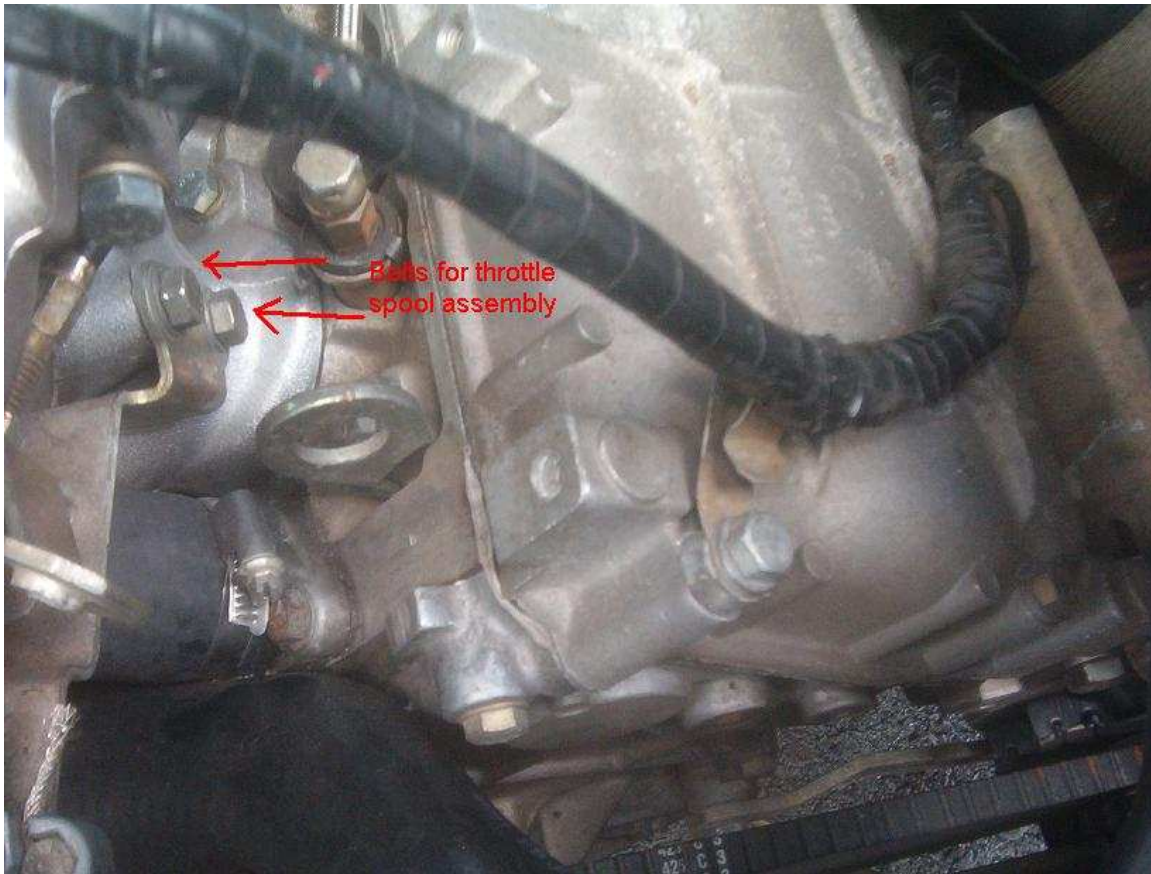
Only a few more connections remain before you can remove the fuel mixture unit from your DeLorean. Start with removing the wires from the idle micro-switch. There is a green/black wire on top, and a solid black wire below. Simply pull these gently off of the micro-switch.

Next, pull the vacuum line from the front lower housing of the mixture unit (usually hidden by the W pipe when the engine is assembled). Note that for re-assembly it will be easier to re-install this line before you bolt down the mixture unit.

The next step is to remove the throttle spool assembly. First, on the underside of the spool, remove the little clip that holds the throttle arm to the throttle spool. This is a very, very small clip – don't lose track of it. Once the clip has been pulled out, you can pull the arm off of the throttle spool. This might take a little bit of prying. Be gentle. Next, there are three bolts holding the assembly in place. There is one on the bracket that is above the thermostat housing, and then there are two on the side - this is a vertical bracket. The bottom one can be a little tight to reach – you may need to use a box end wrench on this one. Once all of these items have been taken care of, set the assembly gently aside. It can remain in the vehicle. For the purpose of removing the intake manifold, there is no need to remove the throttle cable to pull the assembly out of the engine bay.

Lastly, find the solenoid on the back of the mixture unit. This is behind the fuel distributor. You will need to pull off one electrical connector, and two vacuum lines. Unfortunately, I forgot to take a picture of this, but it is easy to identify.





Step 8: Remove the fuel mixture unit

Tools:

- 10 mm socket
- 5 mm Allen wrench

At this point, there are only two cap screws and a ground wire connection left to remove before you can pull the fuel mixture unit.

Start with removing the ground wire connection with your 10 mm socket. There is a washer on both sides of the connection, hang on to these for re-assembly.

Next, use your Allen wrench to remove both of the cap screws hold the mixture unit to the intake manifold.

You can now pull the fuel mixture unit out of the car. I like to hold it by the fuel distributor with one hand, and by the throttle assembly with the other, and then I remove it by pulling it straight up.

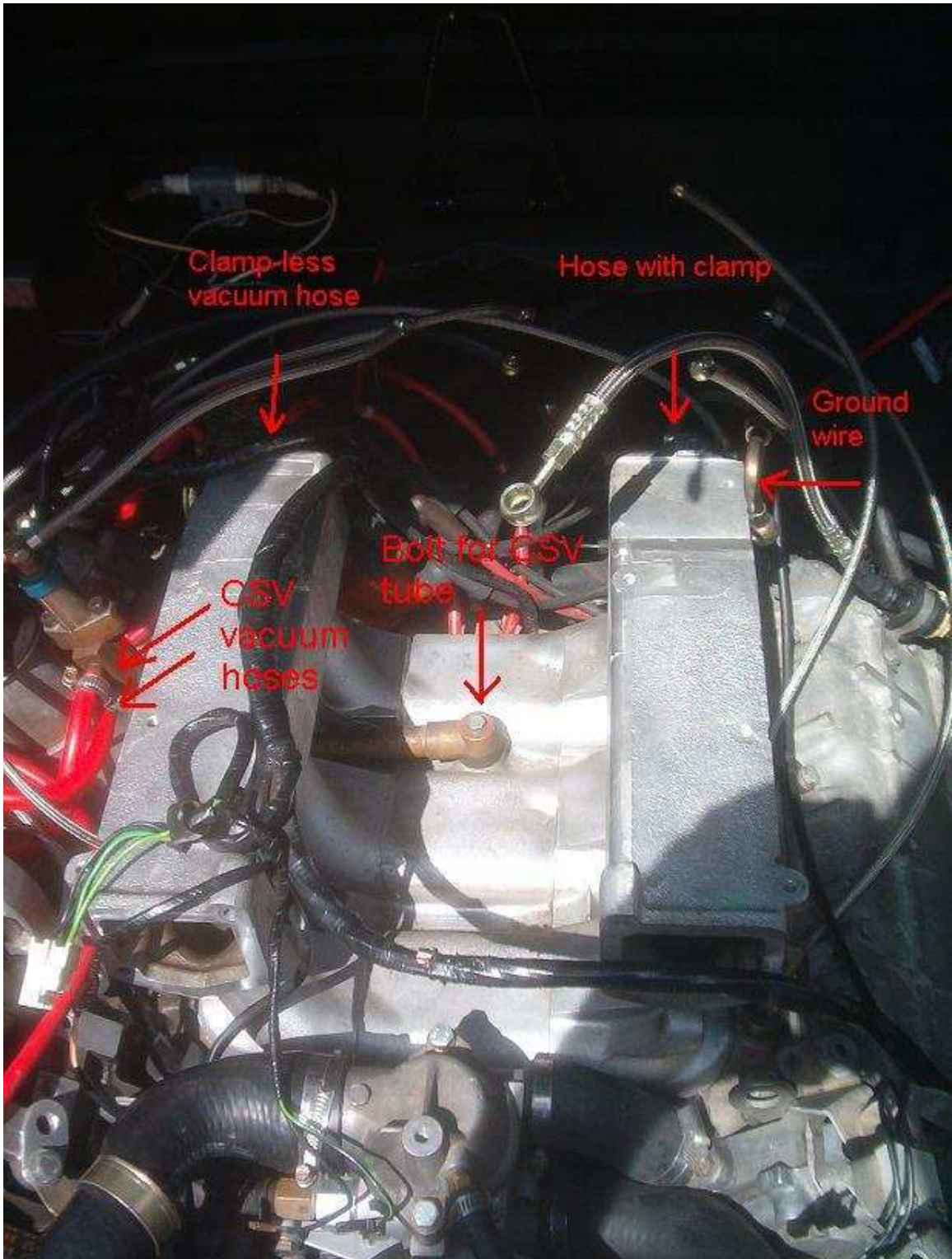
See the picture in step 2 of this guide for a visual reference.

Step 9: Remove the cold start valve

Tools:

- Flat head screw driver
- 10 mm socket

Loosen the hose clamps securing the two vacuum lines to the cold start valve. Next, remove the bolt holding the cold start valve to the intake manifold. Pull the two spark plug wires out of the plastic clip attached to the cold start valve pipe. Lastly, simply remove the cold start valve from the car. If you choose to not replace the o-ring that goes between the intake manifold and the tube, be sure not to lose it.



Step 10: Remove connections to intake manifold

Tools:

- Flat head screw driver

- 10 mm socket

Pull off the vacuum hose from the left rear of the intake manifold. There is no hose clamp on this connection.

On the right rear of the intake manifold, loosen the hose clamp attaching the large hose. Then, pull the hose off of the intake manifold.

Lastly, unbolt the ground wire from the right, rear side of the intake manifold.

For a visual reference, please see the picture in the above step.

Step 11: Remove the intake manifold

Tools:

- 11 mm socket

There are four bolts holding the intake manifold to the engine. Remove each of these, in any order that you please.

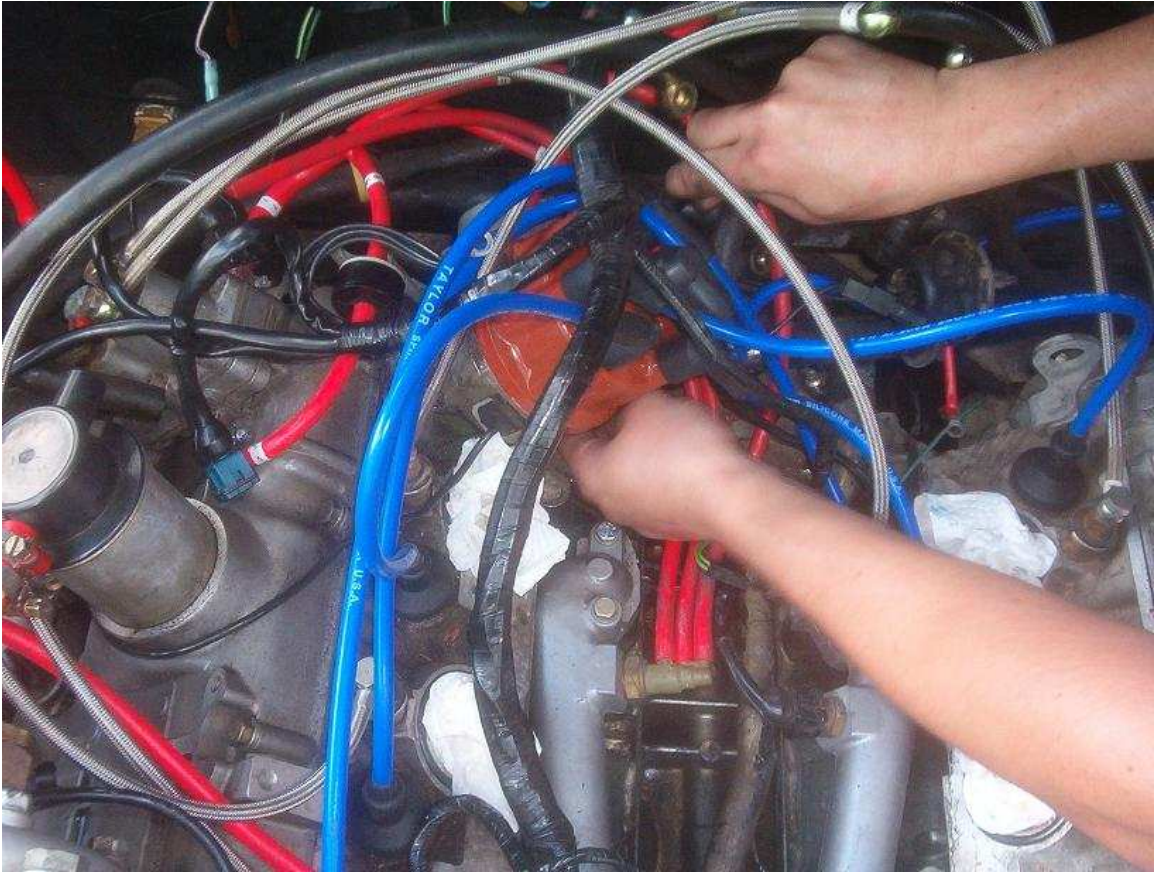
Once you have removed these four bolts, you can remove the intake manifold from the car. If you have a later car with the more smartly routed wiring harness, you should just be able to pull the manifold up and out of the car. If, like me, you have an earlier car with the wiring harness draped across the manifold, it is a little trickier. First, lift the manifold up slightly, and then tilt it to the right and pull it gingerly out of the car. Do this carefully, as it is easy to snag the manifold on the wiring harness. If you are working with a partner, have your partner hold the harness out of the way as necessary.

When you re-assemble everything that you have pulled out, you will need to snake the manifold back on in the same manner that you removed it. Be careful to not snag any of your spark plug wires, your wiring harness, or any of the other connections in the valley of death.

Now please be really careful – you have exposed all six of your DeLorean's cylinders. **BE REALLY CAREFUL TO NOT DROP ANYTHING INTO THEM!** Once you have removed the intake manifold, it would be wise to immediately plug the cylinder holes with wadded up paper towels, clean rags, towels, etc.

Once the manifold is removed, the engine will look down right scary. Keep a cool head; if you got this far, then you can re-assemble as well.

In the below picture, you will see how I have plugged up the cylinders with paper towels. You will also see me checking that all of my plug wires are attached securely to my distributor cap.



Congratulations!

You have now accomplished a DeLorean ownership rite of passage. There are many jobs you can do with the intake manifold off. They do not all require removal of the manifold, but they are all easier with the manifold removed. Some of these jobs are listed below:

1. Replace the water pump.
2. Replace the distributor cap, rotor, plug wires, and spark plugs.
3. Change the o-rings, gaskets, and seals removed during this job.
4. Clean the valley of death
 - a. I consider this mandatory if you have not ever cleaned it.
 - b. If you don't mind having your car apart for several days, I would recommend cleaning very thoroughly and applying an engine enamel to help prevent any possible corrosion. I recommend POR15.
5. Replace the clutch slave cylinder.
6. Replace the sensors in the coolant distribution pipe.

Once you have completed your work, you can re-assemble everything by following this document in reverse. Re-assembly typically takes longer than tear down. Be sure to double check all vacuum and fuel hose routing as you put things back together.

Once you have re-assembled the car and reconnected the battery, please note the following:

1. Turn the key to the second click, so that the fuel-pump primes, but do not start the car. Once you have done so, go back to the engine bay and check all of the fuel line connections to make sure you do not have any fuel leaks. This can happen if you do not properly torque down all of the lines, or if you damage any of the fuel lines.
2. Provided that no fuel leaks found, you can now go ahead and start the car. Bear in mind that the fuel system was de-pressurized, so it may take several cranks for the car to start. Each time that I have put my DeLorean back together, it took several cranks for the car to start, and then the car ran a bit rough for a few seconds before it returned to its normal, happy self.

Since you dismantled and then put together a significant portion of your DeLorean, I recommend a road test of a few miles. I prefer to keep to neighborhood streets, so that in case anything does go wrong, I do not break down in busy street traffic or on the highway.

During the shakedown road test, I observe the following:

1. The car's behavior during acceleration, both normal and hard acceleration.
2. When the car is first started, I watch the warm-up idle. Unless you had warm-up idle hunting before you did your job, then you should not have any now.
3. I observe how the car idles once warmed up.
4. I keep an eye on my voltage, temperature and oil pressure gauges.

Credits

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All pictures are of VIN #1049, taken during various repairs.