

**HOW TO REMOVE THE COMPLETE WIRING HARNESS
FROM YOUR SUBARU DONER CAR**
redistributed from <http://autos.groups.yahoo.com/group/subaruvanagon/>

RECORD THE VIN NUMBER AND ENGINE CODE AND KEEP IT IN A SAFE PLACE. (This will simplify ordering engine parts from a Subaru dealer later.) I usually write the VIN # .and the engine code (both found on the VIN plate under the hood) on the ECU with a Sharpie marker.

IMPORTANT !! BEFORE you disconnect anything, **LOCATE** all the **important plugs in the engine bay AND LABEL** with a marker and tape or tags. It's good education for newbie's and its easy while they're still hooked up where they belong in the engine bay . But things can get pretty confusing later on when you're looking at the whole wiring mess on the floor of your living room or garage. This will save you a few hours of confusion and "noodle time" later when you're stripping the harness of all the unnecessary plugs and wires.

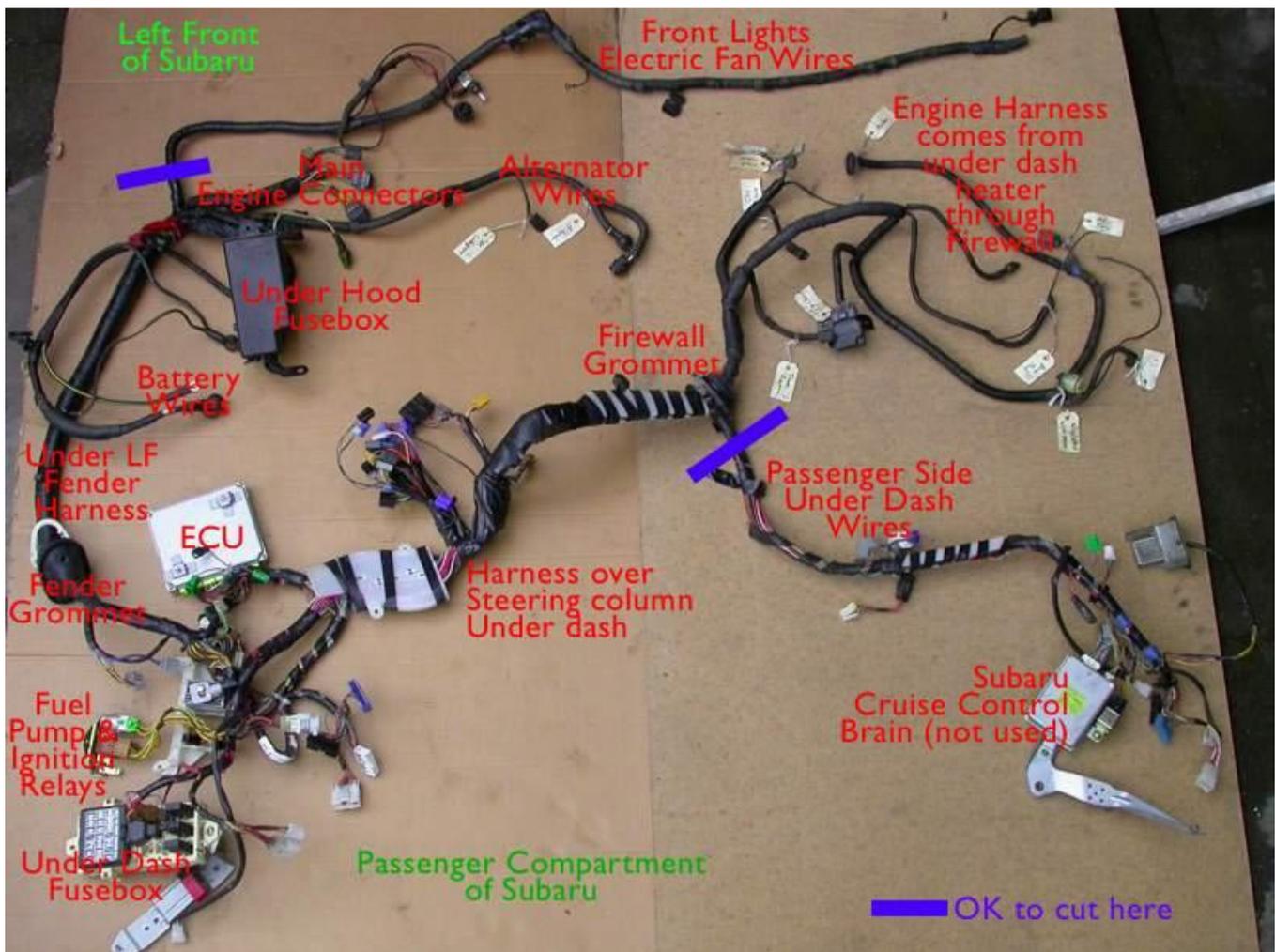
NOTE: Some wiring plugs release by mashing a lock on top of the plug and some release by inserting a screwdriver into the plug to lift the lock....You'll have to figure out which is which.

IMPORTANT PLUGS TO IDENTIFY: There are a lot of harness plugs in the engine bay, but **THE IMPORTANT ONES** for a 90-94 model engine that you want to label and be sure to get the sensors they connect to. are:

1. **MAIN ENGINE HARNESS PLUGS:** The two (92-94 engines) or three (90-91 engines) big grey plugs connected to the engine harness on the driver's side, right by the big fuse/relay box.
2. **IGNITOR:-** the square black thing in the middle of the firewall. Get it's mounting bracket also...you may want it, depending on where you decide to mount it in the Vanagon.
3. **CAM, CRANK AND KNOCK SENSORS:** Three single wires;. all located AT the rear of the engine, underneath the throttle body, attached to a little metal bracket connected to the block. Trace the wires to know which is which.....The plugs are a PITA to disconnect under the throttle body...be careful! Don't break the plugs.(like I've done sometimes)..a long thin flat screwdriver can help to get to the release tabs on the plugs.
4. **O2 SENSOR:-** follow the wire down to ..or up from... the exhaust system.
5. **AFM:-** Located right behind the air filter box with a wiring connector attached. It will be either black plastic or aluminum, depending on your Legacy Model . You can also get the filter box ...some people use it.
6. **ALTERNATOR WIRES:-** not part of the main harness...it's a separate wire run that goes from the alternator to the battery and starter....you will only use the alternator connectors and about a foot of the white wires connected to them....these will be spliced into the heavy duty red B+ wires on the Vanagon.

WIRING HARNESS SECTIONS:: For a 92-94 Legacy the complete wiring harness you will need for your conversion is made up of four sections:

1. **ENGINE HARNESS:** This part is attached to the engine itself and stays with the engine. It is attached to the rest of the harness through either two(92-94) or three (91-92) large GREY plugs on the driver's side.
2. **DRIVERS FENDER HARNESS:** This section, also attached to the ECU, goes through another rubber grommet on the driver's side fender wall and runs along the driver's fender and into the engine bay. The wires in this section go to the big fuse box under the hood and connect to the engine with the large grey plugs on the engine harness.
3. **DASHBOARD HARNESS:** Attached to the ECU in the driver's footwall, this section of the harness runs across the dashboard under the windshield and behind the heater/AC unit...it goes through a big rubber grommet in the firewall on the passenger side and connects to the igniter, cam, crank, knock and O2 sensors.
4. **ALTERNATOR HARNESS:** A separate discrete harness that runs from the alternator to the battery and the starter.



(photo courtesy of Paul Guzyk

REMOVING THE DRIVER'S SIDE FENDER WELL HARNESS

1. Either remove the hood or use a bungee cord to hold it open. I just remove it entirely.

2. Remove the row of 10mm bolts on top of the fender. Open the driver's door. There are two bolts in the doorframe, (if you're jammed in tight in a wrecking yard, and can't open the door all the way, the one located under the lower door hinge) can be a problem).
3. There's also a nasty little sheet metal screw that connects the plastic bumper cover to the fender. It screws upward and you have to pull back the plastic fender well cover inside the wheel well to get to it...another little PITA.
4. After the fender's off, there's a diagonal brace right in front of the door that blocks access to the grommet that goes into the foot well. Remove the two bolts and take that off for better access.
5. Now go inside the engine bay and disconnect the big grey engine plugs on the driver's side.
6. Remove the windshield washer reservoir and unbolt the big fuse block. Then disconnect all the plugs from the underside of the fuse block.

Now thread all the wires and plugs through the hole in the engine bay fender, one-by-one.

CAUTION: You can now cut the thick harness section that goes to the front lights (see Paul's photo)...the part that goes under where the radiator was....but be careful!don't cut the wrong wires.

NOTE: The grommet in the foot well area pushes out most easily from inside the foot well...(after you get the dashboard out), so leave the harness dangling outside the fender for now.

NOW GO INSIDE THE CAR TO START WORKING.

REMOVING THE DASHBOARD

Tip: (An electric screwdriver is a big time/wrist saver here.)

Note: Most of the screws and a few bolts that hold the dashboard are hidden under cover plates, dashboard switches, and vents. A factory manual or a Haynes manual has a good diagram of all the locations.... Try to get one of these diagrams, It will save you some time and frustration.

1. Remove the lower cover panel to the left of the steering column...4 screws.
2. Use a knife with a stiff blade or a thin screwdriver and start prying out all the little plastic covers. Then pry out all the switches and vent louvers on the dashboard

Here's the hidden places I can remember for now

Under the windshield

One at each door end of the dashboard.

One on each side of the center console tunnel in the foot well.

One under the AC vent on the left side of steering wheel

One under the center AC vent

One under a plastic cover on the right side (I think ??) of the steering wheel

One under a set of rocker switches near the steering wheel.(left side ???)

3. I also usually remove the center console, starting with the screws in the bottom of console storage bin...and work forward until I get the last two screws on each side of the console in the footwalls. Remove the whole console.
4. Then (I think) there are two (12mm ??) bolts that hold the dashboard frame to the transmission tunnel.
5. There is a 10mm bolt at each end of the dashboard at right angles the doors (under little plastic covers). I usually remove the radio..which is not really necessary..but I think it's easier to disconnect it if you take it out.. There are the usual screws at the radio's four corners but there are also two tricky ones located under the radio...they screw upwards...and require a Phillips bit in a 90 degree angle driver....or a short stubby screwdriver. Pull the radio out and disconnect the harness and antenna. NOTE: Cut the radio connector wires behind the connector and save the whole radio connector. One side of it is useful in making a harness to use with OBD-1 software allowing you access real time engine data with a laptop. (ALSO NOTE: The 90-91 versions of the Legacy radio have an auxiliary jack that allows you to plug in an IPOD or CD player directly into the face ..).
6. Remove the heater controls and disconnect the wire cable that goes to the heater box. Some find it easier to disconnect the wire at the heater box.
7. Disconnect all the many plugs that go to the steering column and the ignition circuit.
8. Lower the steering column to make getting at the instrument binnacle cover screws and to make it easier to get the dashboard out after everything is disconnected.
9. There are two 12mm bolts under the steering column that screw into a horizontal brace under the dashboard. Remove the instrument binnacle with the speedo, tach, etc. – 4 screws then disconnect the harness plug and speedo cable.
10. Disconnect the hood release cable from the lower left side of the dashboard...two 10mm sheet metal screws.

11. The dashboard should be free to come out except for a few ground wires which you can cut.

.....NOW THAT THE DASHBOARD IS OUT

- 12 .** Remove the steel brace that supports the steering column. The ECU is connected to it on a metal bracket. Disconnect all the yellow plugs to the ECU and remove it.
13. Remove the fuse box in the left foot well wall and disconnect all the plugs/wires to it.
- 14 Remove the little brass colored bracket that holds the green and brown relays for the ignition and fuel pump. Save the bracket.
- 15 Now push the rubber grommet through the fender well to the outsideor go outside and pull it through from the outside. (I've got scars from trying to push it through the other way.) then thread all the wires through the fender...inside to outside. You will have to cut a slit in the rubber grommet to remove the hood release cable.

Congratulations! the driver's fender harness is now free !! Don't you feel good!

REMOVING THE FIREWALL HARNESS

1. Now you have to get the heater/AC unit out to get at the harness behind it. Start by removing all the nuts that hold the unit in place to the firewall.
2. In the engine bay, be sure that the heater hoses are disconnected from the two metal heater tubes that pass through the firewall. These tubes pass through rubber grommets that usually hold them very tightly in place. It usually takes a lot of force, wiggling and pulling to free those tubes from the heater tube grommets in the firewall..and pull the heater box away from the firewall.(At this point, I've been known to get frustrated with this process and resort to "my special size 15 tool....my right foot" ...and just smash the whole unit to bits and pull out the pieces.) But you'll feel better about yourself afterward...and perhaps save yourself some cuts and bruises...if you use the finesse technique).
3. Now the wiring harness is revealed all across the firewall under the windshield. Unsnap it and cut the zip ties holding it to the firewall and then pull the harness to the inside behind the big rubber grommet through the firewall. The grommet usually pulls right out to the inside and then you thread all the wires inside the car from the engine bay through to the interior. Another person is useful here to guide the wires.

That should be it....you now have it all.....and, hopefully, no cuts or bruises.

A few OPTIONAL ITEMS to consider removing from the engine bay:...some of us have incorporated them into the conversion....although not usually on the first one...

1. .FUEL FILTER and its mounting bracket - the round black thing connected to the fuel lines on the driver's side fender well. Some have used the Suby filter instead of the hard to get to (...ridiculous to get to.. on a Syncro) Vanagon filter.
2. CHARCOAL CANISTER..The big round black canister, two small hoses, mounted just behind the radiator on the passenger side ... and it's bracket...which can also be incorporated into the Vanagon system in addition to.(or in place of).. the Vanagon unit.
3. Tom Shiel recommends saving the BIG FUSE BLOCK IN THE ENGINE BAY...and somehow uses them later, but I've never used one.
4. THROTTLE CABLE for possible use later...
5. CRUISE CONTROL SERVO AND CABLE .and it's mounting bracket (if the donor car ...and your van has CC). It's the round black plastic thing on the firewall with a throttle cable connected. It mounts handily in your van's engine bay and hooks right up to the Vanagon vacuum system...works perfectly...no muss ..no fuss.

> PARTS TO GET FROM THE SUBARU DONOR CAR

- >
- > 1. THE "COMPLETE" ENGINE: "Complete" meaning
 - > with the alternator, the power steering pump and
 - > hoses, the A/C compressor, all the intake plumbing from the throttle body to the air filter box.
- >
- > 2. Steps to remove the WIRING HARNESS from Subaru Legacy
 - > ... Remove front left fender - just a few bolts and off it comes.
 - > ... Remove and save the black fuse box in the
 - > engine bay - including the battery cable. The box
 - > has a number of plugs that you disconnect and
 - > there is a group of relays that come out as a
 - > complete assembly.
 - > ... With the dash out of the way split the large
 - > gray and white connectors by the steering column
 - > (when on the left). This makes it much easier to
 - > get out and handle afterwards.
 - > ... Also remove fuse box on left side and un plug
 - > all the connectors. Save this box and mounting
 - > hardware
 - > ... Unplug all connectors going to the ECU and dash.
 - > ... Only cut wires (but keep connectors for future
 - > use) of all wires that are clearly lights and
 - > other accessory type wires.
 - > ... Pull on the harness on the left side and the
 - > grommet should just pop out - this will allow you
 - > to feed all of the left side harness out through
 - > the hole where the grommet was. You will also be
 - > able to feed the wires and connectors from the
 - > engine bay out through a plastic grommet in the
 - > fender well. This should liberate 1/2 of the
 - > harness.
 - > ... Now take the nuts off the heater fan assembly,
 - > A/C evaporator and heater core (be sure A/C and
 - > heater hoses are removed in the engine bay). You
 - > should be able to just pull the fan assembly out
 - > easily, next comes the A/C evaporator and finally
 - > the heater core (sometimes it will take a bit of
 - > fiddling around to get the heater core assembly
 - > out).
 - > ... With these out of the way - push the centre
 - > engine bay grommet back into the passenger
 - > compartment and slowly poke all the connectors
 - > and loom through the fire wall into the passenger
 - > compartment (start by pushing the smallest
 - > connectors and wires first).
 - > ... now you just have to disconnect the harness in

- > the passenger compartment - including the
- > ignition and fuel pump relay bracket
- > ... The harness should be ready to remove.
- > ... Pull the harness out of the dash and save.
- >
- > 3. THE IGNITION RELAY AND THE FUEL PUMP RELAY,
- > one brown (about an inch square) and one green (round),mounted inside the car.
- > ALSO NEED/GET THE BRACKET these relays clip into.
- >
- > 4. WITH THE HARNESS ALSO BE SURE TO GET THE
- > IGNITOR which is black, about 2" square by 1/2"
- > thick, usually mounted in the engine bay on the
- > firewall.
- >
- > 5. MOTOR MOUNTS AND THE NUTS THAT GO ON THEM
- >
- > 6. THE COMPLETE BLACK PLASTIC AIR INTAKE SYSTEM
- > AND ALL HOSES ATTACHED FROM THE ENGINE THROTTLE
- > ALL THE WAY TO THE AIR CLEANER BOX.
- >
- > 7. THE POWER STEERING AND A/C HOSES
- >
- > 8. THE O2 SENSOR. - Don't need the headers or
- > exhaust pipes, just the O2 sensor and wiring.
- >
- > 9. THE THROTTLE CABLE AND THE CRUISE CONTROL VACCUUM SERVO ACTUATOR
- >
- > 10. GET THE RUBBER GROMMENTS WHERE WIRING PASSES THROUGH CAR BODY.
- >

 NOTE – FOR SUBARUS AFTER 1994

The above removal procedure also applies to the later model cars, EXCEPT that.

1. The ECU is located under a metal plate under the carpet in the passenger side foot well and a main section of the harness goes into the engine bay through the firewall on the far right passenger side.
2. There's is an important sensor that the earlier cars don't have...the atmospheric pressure sensor...which is mounted on the wall of the engine bay, passenger side.
3. The big grey engine plugs (3)are mounted on a bracket on the rear passenger side of the engine...right where the engine and tranny bell housing mate. One of these plugs now includes the cam angle, crank angle and knock sensor wires,which were all separate single wires in the 90-94 harness.
4. There are TWO oxygen sensors....one before...and one after the catalytic converter.
5. There's a harness run that goes to the gas tank where there are senders for fuel level, fuel temp, fuel tank pressure...plus a vapor pump under the passenger side rear fender....I tried to get this part of the harness one time but found that the harness is impossible to get out intact, unless the fuel tank is dropped...and I gave up.

These gas tank sensors are not critical to make the engine run properly, but their absence

will cause a CHK ENGINE light and an error code to appear in the OBD-2 system. (FYI: Smallcar sells a circuit board that simulates the signals the ECU looks for from these sensors and eliminates MOST of the codes....but not all.) California converters take special note.....

TOOLS REQUIRED FOR HARNESS REMOVAL

1. The usual set of 3/8 sockets, ratchets, and extensions....A long extension is helpful or two medium ones you can put together. 10, 12, 14mm sizes used
2. Usual set of :wrenches....ratcheting kind make things easier.
3. Phillips screwdrivers. An battery powered screwdriver or drill with a medium size extension, bit holder will make your life much easier here.
4. Flat screwdrivers, one with a very thin tip to use to pry out plastic cover plates....I also use a strong folding pocket knife for this. The long thin screwdriver is also useful to press the tabs on the wiring plugs which can sometimes be hard to release.
5. A medium size pry bar.
6. Vise grips or other good pliers.
7. Something to cut unneeded wires with. Wire cutters..or I find a set of garden pruning shears works well on the thick wires. A good sharp pocket knife or box cutter to cut a slit in the fender well rubber grommet.
8. A can or bucket to save bolts and nuts in. Sometimes I use zip lock bags and a marker for important bolts I want to use later.
9. Tape (or labels) and a Sharpie marker.
10. A cold six pack.