1997 TJ 5.2L swap

The coil-sprung Jeep TJ is one of the most rugged models that have been produced since 1947. Over the years many power plants have been put into the Jeep chassis. The V8 has been the favorite of many hard-core offroaders. Upon researching the newest incarnation of the Jeep Wrangler for possible V8 swaps, the information overwhelmingly points to a Daimler Chrysler based engine...

The 5.2L and 5.9L Magnum gasoline engines have good dependability ratings and are wired similar to the Jeep power plants. The best donor vehicles are 1996 and newer Ram 1500 – 3500 trucks, Dakota and Durango trucks. The California smog regulations mandate that the donor engine cannot be older than the chassis it is being swapped into. That locked us into finding a good low-mileage 1997 or newer wrecked truck. One that is hit in the rear is preferred.
The 1997 TJ we started with was equipped with a 2.5L 4 cylinder, AX5 manual, Atlas 4.3:1, 4:11 axle gears, 5” suspension lift, and 1” body lift. The AX5 transmission can be retained if doing a GM V8 swap, however we opted to use a manual NV3500 transmission from a full-size Dodge Ram 1500. This is an ideal transmission, as would be the Dodge automatics found behind 5.2L & 5.9L engines, largely because the factory transfer case adapter pattern and 23 spline output shaft are easily adapted to the NP231J found in the TJ.
We found a 2001 5.2L from a 1500 series, manually shifted truck with 28,000 miles. Be sure, as we did, to get all wiring from the donor truck. If your auto dismantler will not unplug the connectors for you, please offer to do it yourself. You will need many of the plugs and wiring from the donor truck. Hacked and cut wires are difficult to trace because the factory service manuals reference the plugs in the schematics. The emissions equipment, such as the charcoal canister, and leak detection pump are important to the computer when performing pre-startup diagnosis. Get all these parts now, because if you have to buy them later you will spend mega $$ from the dealership and the auto recycler may just “throw in” the parts you need. The stock “Y” pipe is also a good starting point to help route the exhaust. Catalytic converters are also expensive aftermarket pieces, so get them too. Get as much of the factory wiring and electronics as you can.
One quick note about ECMs (Engine Control Modules…aka Computer or Magic Box): If you are using a manual transmission, use a donor engine and ECM that was originally manual. Do not try to attempt to run the electronic overdrive transmission from the manual computer…it is more trouble than it's worth. Decide before you buy. If you wanted to use an old 727 Chrysler transmission with a manual ECM, that would be ok, because the only signal coming from the manual is the backup light switch. You will also need to bypass the clutch start switch (this procedure is covered in the TJ Owners manual). The VSS signal is taken from the transfer case speedo drive.
Removing the grille and fenders makes the conversion go much faster. Begin by removing the radiator, and fan shroud then go to the fuel system. Take care as not to damage the fuel fittings to the engine. They are fastened together with “spring locks” so a special tool is needed to remove them. The engine wiring will need to be removed. Begin by unplugging the Black and White 32-pin wiring connectors that go into the ECM. Label everything as to what plug went to what part. This practice will help when blending the wiring together. Some plugs have safety locks on them, so be careful not to destroy them. Remove heater and A/C hoses, keep in mind the A/C system may be under pressure, so exercise caution, or consult a technician.
Remove all external items to the engine and trans. This includes the driveshafts, power steering hoses, throttle cable, air box, and emissions equipment. Remove the slave cylinder from the bellhousing and leave it attached to the hydraulic hose. The NP231J transfer case is easily removed by detaching the shifter rod, vent tube and then by removing the six nuts that secure it to the transmission. Do not forget to unfasten the transmission mount before you remove the skid plate. Using a hoist, remove the 2.5L 4Cyl engine, and transmission. If your stock motor and trans are in good shape, you may be able to recover some of your conversion costs by selling them.
The factory motor mounts must be removed to install the new weld-in mounts. Use a grinder to trim the mounts from the frame and upper control arm mount. Take care not to damage the suspension mount point. The V8 mount position is determined by a pre-existing dowel hole in the frame. Remove the large factory rubber mounts from the V8, commonly found in Dodge truck applications, as they will not be used. The Advance Adapters mount # 713094 is used for this application. The two cast mounting tabs on the front of the block are now used as the new mount location. The upper block mounts must be secured with the provided bolts.
Since the factory truck engine-driven fan was bent in transportation, a 1998 Jeep Grand Cherokee 5.9L fan (#52027888) was used. This proved to be the best modification because a 6 cyl. TJ fan shroud fits nicely and cools well under extreme conditions. All Dodge 5.2L & 5.9L conversions should switch to this fan.
Check the clutch and pressure plate replace if signs of wear are present. Due to length differences in the transmissions, the four bolts holding the shifter top cover must be removed. A rag should be secured over the top of the transmission to keep the debris out. The transmission mount may need to be modified or moved. The NV3500 needed to have the two front mount holes drilled and tapped. A ¼” steel flat spacer plate with 6 holes in it was fabricated to move the stock TJ mount rearward. The front two holes on the mount were bolted through the rear hole locations on the NV3500. The rear mount holes were secured through the last set of holes in the plate. This modification allowed the use of the stock skidplate location. The stock rubber mount was tossed in favor of a polyurethane TJ style replacement from Daystar # KJ01006BK. The entire transmission moved 2” forward from the original AX5 location. Dodge used the same release bearing and fork in the NV3500 as Jeep did in the 1997 and newer AX5 and AX15. The rear adapter on the NV3500 must be redrilled to maintain a stock rotation on the transfer case. Once in the vehicle, the Wrangler slave cylinder will bolt directly up to the Dodge NV3550 bellhousing. Double check all clutch components and assemble the V8 engine and transmission.

The frame mounts are easily placed in the engine bay and welded. Be sure to have a qualified welder do this because the welds will be supporting about 500 lbs. Cleanup and painting should be done prior to lowering the V8 into the chassis. The rubber bushings will index into the upper mount and be secured with the 5/8” bolts into the lower mount. Reinstall the skid plate. While still on the hoist, trial fit the drivetrain assembly. Look at possible interferences with anything in the engine bay. It is best to install the transfer case now. Attach the linkage at the case. Adjustments and or modifications may be necessary for the movement of the transfer case. Advance Adapters # 715542 bracket may be needed if using the NP231J. The Atlas transfer case shifters are independent from the body, so they only needed to be adjusted for the different transmission length. Once the engine is secured, the wiring and plumbing can then be addressed.
The hardest part of the wiring is knowing where to start. Factory service manuals from Jeep and Dodge are the only way to determine wire schematics. Use the three ECM plugs as a starting point.
Follow each of the 32 wires and compare the two harnesses. The Gray Jeep plug runs into the engine compartment and over to the Power Distribution Center. Two wires were removed from the Dodge harness added to the Jeep Gray plug for the Leak Detection Pump. Be prepared to fabricate a bracket for the LDP and the second charcoal canister. The two smaller plugs (C103, & C104) in the Jeep “Gray” harness will be spliced in to replace the large, square White plug that goes into the PDC. The truck Gray plug must be carefully removed and the wires spliced into C103 & C104 from the Jeep.
The V8, Black and White plugs will need to be checked against the Jeep schematics. The large power wire from the Alternator will need to be spliced into the B+ terminal at the Power Distribution Center with a 150A fuse. Fuel pump, VSS, Reverse light, and 4WD light wiring will be used from the TJ and spliced into the truck harness. The end result is a harness and ECM that still thinks it is in a truck, but runs on the Jeep systems.
The Jeep and Dodge ECMs are identical in size, so they easily interchange on the firewall behind the battery. Trial fit the harness to make sure you have enough wire to meet all the components. This is not usually a problem since much of the “engine” part of the truck harness remains unchanged. Plugging it all together is the easy part. Some of the connectors have a safety lock, so wait until the engine has run, then go back and secure them.

Install the grille and conversion radiator AA# 716687. A stock TJ fan shroud (Jeep# 52027925) will bolt to the radiator with only slight modifications. The upper radiator hose Dayco# 70480, or NAPA# 7718 will need to be shortened at the radiator side. Always measure 3 times and only cut once. The lower hose is a combination of the stock dodge truck hose and a leftover section that was cut from the new upper hose. A 4” section of pipe was swedged and used to reduce the hose diameter down to the smaller radiator diameter. A hose from a 1987 to 2001 Cherokee 4.0L (NAPA #8333) will also work. Due to the close proximity of the upper hose to the AC pulley, a scrap piece of the Dodge upper hose must be cut, sleeved, and zip-tied over the new upper hose. The TJ overflow bottle will interfere with the power steering pump, so a custom bottle will need to be used. A 1990 Mazda RX7 donated the bottle for this conversion. Use whatever will fit in the space provided.

The power steering lines are easily adapted to the Jeep box. The pressure side will thread right in, however some careful bending will be required to clear the grille core support. A bracket can be fashioned using some 16-gauge sheet metal to incorporate the power steering cooler from the truck. The assembly then attaches to the front of the radiator. The hoses are easily routed around the radiator and to the low-pressure side of the pump and box. Be sure to address any possible interference problems between the hose and pump pulley, or steering joint.
The Dodge fuel line is easily routed into the TJ line on the frame. The spring locks are the same design so no modifications are necessary. Always install a new safety clip (Jeep # 52127788).

Now is the best time to install the braided stainless hydraulic hose and fittings. Advance Adapters part # 716130H, and two of # 716130TJ are required. First tighten the fittings into the new hose. Next, disconnect the hose from the salve. Let it drain the master cylinder. Be careful so as not to let any fluid leak out of, or push in on the slave cylinder. The fluid inside will assist in priming the system. Do not discard the roll pin, or the rubber seal washer; you will reuse them on the new fitting. Remove the roll pin from the master cylinder (do not do this with a hammer! You will damage it! Use a modified nail and some pliers to press it out.) Install the rubber seal washers on both ends of the hoses. With the 90-degree fitting at the master cylinder end, install the hose, and press the roll pin in. Repeat the procedure for the slave cylinder. Fill the master cylinder ¾ full of brake fluid, and press the piston in and out 3 or 4 times to prime the system. This works because the volume of fluid in the slave is greater than that of the hose. Any air will be pushed into the master cylinder reservoir. If this method does not work, gravity bleed the system using the hex head bolt on the bottom side of the slave.

Routing the heater hoses is easily done because the truck hoses are long enough to reach the Jeep heater core. Both truck hoses are 5/8”, so one will be stretched over the ¾” inlet of the TJ heater core.
The Dodge throttle cable snaps into the Jeep pedal, firewall, and of course the 5.2L.
Make measurements as to where the shift tower will come up through the body. As always measure 3 times and cut only once. A shifter extension is easily fabricated onto the top cover to move the stick back enough to fit through the stock boot. Replace the top cover on the tranny. Install the console and related parts. Final adjustments to the transfer case linkage affect the lever, so make them after the console is installed.

Left and right fenders need to be installed now. A good quality battery with a higher cranking amp rating will be used to turn the 5.2L over.

The evap and emissions equipment from the truck must be transplanted into the Jeep. Brackets for the round and square charcoal canisters are easily fabricated using some of the stock bracketry. The Leak Detection Pump will also need to be added to the bracketry. Plumb the emissions exactly like the diagram on the label on the donor truck.

A Dodge Durango air intake system is needed for hood clearance. The part #s needed are available form a Jeep or Dodge dealer. The following list is what we used:
4883598AA Bonnet, Throttle Body Air Inlet (x1)
4883599AA Hose, Air Cleaner to T/Body (x1)
53031572AB Bracket, Air Cleaner (x1)
6504488 Nut, 25-20 (x1)
By fabricating a reducer for the hose, the stock TJ airbox can be used. A 3” piece of PVC pipe epoxied over the stock air inlet seems to work. For the ultimate airflow, a K&N filter can be attached to the hose.

The trucks exhaust manifolds fit fine. The factory “Y” pipe will work with some modifications to the area around the front driveshaft. We also reused the Dodge catalytic converter and Oxygen sensors. The final exhaust used a 2 ½” Thrush muffler capped with a 3” tip.

Overall this is one of the cleanest swaps out on the market. It can be done in a driveway by a competent Do-it-Yourselfer or as a complete install by Atomic 4x4.