



Dominic Mastroianni from Huntington Station, New York acquired this 1965 Chevelle Malibu in 1986. It was purchased from the original owner, a school teacher from his home town of Glen Cove, Long Island. Over the next year the 283 and powerglide were replaced with a 350 engine / 350 transmission combination and used as a daily driver. In the early 90's Dominic's son modified the 350, added nitrous and roll bars and hit the drag strip. The car managed to run in the 10:30's. After a couple of years, the car was retired and placed in storage. In 2001 Dominic located a '98 LS1 and 4L60E transmission, during his research of what he would be required to install these into the Chevelle he spoke with Mark Campbell of Street & Performance in Mena, Arkansas. In 2003 he decided to go ahead with the project and contracted S&P to do the installation. He loaded his car on the trailer and headed to Mena, while touring the plant he was very impressed with Mark Campbells operation and workmanship. When he got behind the wheel of his '65 he was amazed how well it performed with today's technology. He has now decided to do a complete frame off restoration and hopes to be back on the road in the spring of 2005.



The front clip was removed to make the LS1 installation easier. We used a P-AYR LS1 plastic block to see how the real engine would fit into the engine compartment. The plastic block indicated that the oil pan would be a problem, but that the original motor stands would work.



The factory accessories are too low and wide to fit between the steering box and the frame rail.



S&P motor mount plates were bolted to the block. These plates move the Pioneer Part # 602142 rubber front motor mount, forward to the '66 factory engine stands.



To solve the oil pan clearance problem, S&P offers the modified oil pan pictured at the top to clear the cross member. The bottom pan shows the difference between the two pans.



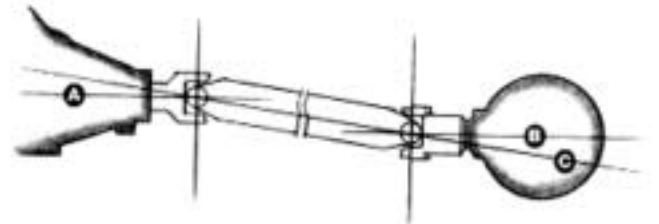
A modified oil pickup tube is also needed with this pan. With the tube installed, we can then bolt on the new pan. The pan and pickup tube is available from S&P outright or exchange.



Now with the pan on and the 4L60E transmission bolted up, we lowered the combination into the front mounts for a final check of the pan clearance and to check the transmission cross member.



We found that we needed to relocate the rear trans mount tab. We simply cut it off and repositioned it. A Pioneer rear trans mount #622378 was used for the final installation.



Drive shaft angle is important for strength and reliability. The transmission **MUST** be angled 1 to 5 degrees low on the yoke, but + or - 2 degrees is idea for performance applications. To check the drive line, hold the angle finder against the tail shaft and locate the transmission mount bracket to the cross member.



Shown above is the final installation of the 4L60E onto the original trans cross member.



Rock Valley supplied us with a stainless replacement tank with a LS1 fuel pump and replacement sending unit already installed. We added extension wires to the pump and sensor to make the connections to the wiring harness easier after the tank is raised into position.



With the tank in position, we checked for clearances and filler neck alignment before tightening the stainless straps that are supplied with the tank.



To filter the fuel a S&P stainless fuel filter kit was used. This kit uses a AC DELCO GF481 filter which provides the flow rates needed for injection systems and comes with a mounting bracket and two 16mm to AN6 fittings.



Dominick connects the nylon fuel line from the tank to the stainless hard line mounted to the frame forward of the differential. There are two fuel lines needed, one feed line and one return line.



At the forward end of the hard lines, the braided hose rear exit fuel line kit is attached. When making the connection on the fuel line, be sure to coat the threads of the fittings with oil to insure proper seal.



S&P chromex thermal coated headers (inside and out) were used to help keep the heat down under the hood. These headers also have a O2 bun on each collector for the heated oxygen sensors . Taylor custom LS1 spark plug wires were used to have clearance between the headers and the heads.



The drivers side header was custom designed by S&P to clear the steering shaft in its factory location. The coolant temp sensor is located on the drivers side, forward of the header. '97 and '98 engines used a part# 12551708.



The 12mm plug located at the rear of the passenger side head can be removed to provide a locating point to install a sending unit for your coolant gauge (VDO ECT.) The head can be drilled and tapped for a pipe thread or S&P can provide you with a bushing to go from 12mm to either female 1/4 or 3/8 pipe.

When installing the sensors, DO NOT use teflon tape on the threads. GM recommends using teflon pipe sealant, GM part# 12346004 which is ideal except for oxygen sensors.



The oil by pass plug that comes on all LS-1/LS-6 engines. You can remove this and drill and tap it to install the oil pressure tree from S&P to mount the oil pressure sending unit and move it away from the header.



Mark installs the chrome throttle body from S&P. S&P can chrome your throttle body or provide you with one on an exchange basis.



'97-'98 Vette / '98 IROC/TA LS1 engines came with a bolt on water pump pulley where '99 and later are press on. '97-'98 also had bolts on the outer edge of the valve cover and '99 up has four bolts through the center of the valve cover.



Mounting a S&P chrome billet Lokar throttle cable bracket. This bracket is custom designed to accept the Lokar braided stainless LS1 throttle cable. Note the chrome name plate above the bracket to block the smog pump port.



We installed the S&P engine/Trans harness. This harness plugs into the needed sensors on the engine and trans, then there are only four wires to connect, one for the key, one to the starter, one to the fuel pump and one to ground. NOTE: With any injection system, GROUNDS are very important, you must ground the battery to the engine or trans, engine to frame, and engine to the body.



Plugging in the injectors. Notice how the complete harness is shrink wrapped, cut to length and all connections are labeled. '97-'98 computers service numbers are 16238212 and the '99-'00 computers are 09354869 or 16263494. The '01 up computers service numbers are 52369718 and '02 computers are 12200411.



Now its time to mount the accessories, we started by mounting a type III pump to make sure that it would clear the gear box.



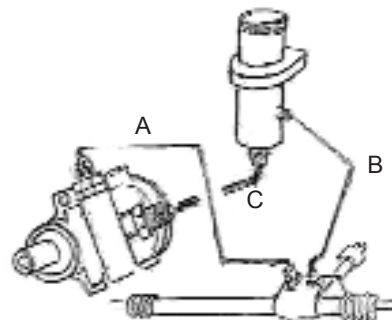
We then mounted the alternator/air brackets and idler kit. The factory water neck points toward the passenger side so we installed a S&P straight water neck with thermostat.



With all of the accessories in place, we found that a 112.5 inch belt is what was needed to drive them. At the same time we installed the LS1 air cleaner with the mass air flow.



The air cleaner incorporates the mass air flow into the back of housing. It also has a provision for an screw in type air temp sensor. The tube exiting the bottom of the throttle body is the steam line from the heads.



**A..#6 Pressure Line to Rack or Gear Box**  
**B..Return #6 or 3/8 from Rack or Gear Box to side of reservoir.**  
**C..#8 or 5/8 Return from reservoir to pump**

In order to plumb in the power steering lines, we used a 11/16 and 5/8 inverted flair to AN6 adapters which were provided by S&P along with the custom length Areo-quip braided hose kit.



To make the LS1 fit into tight spaces, S&P uses a GM power steering pump that has a remote reservoir. Shown is the mounting of the S&P chrome power steering reservoir. S&P provides custom Aero-Quip hose kits for your application. The return line from the reservoir to the pump, must be -8 or -10 and be rated for 24 to 27 inches of vacuum. S&P recommends the use of GM power steering fluid PT# 12345867.



The steam line that comes from the bottom of the throttle body is routed to this stainless radiator T in the upper radiator hose. The stainless radiator can be purchased from S&P. You also have the option of running the steam line to the water pump or to the radiator.



Using the straight water neck made for a easy hook up to the lower radiator connection. The LS1 placed the thermostat on the suction side of the water pump which is the lower passenger side of the water pump.



The transmission coolant lines are ran to the original trans cooler in the radiator which is better than using an external cooler. Running the lines to the radiator provides a constant temperature to the transmission.



B&M provided their Megashifter to select the 4L60E gears. This shifter and the performance of the LS1 will allow a little bit of this cars drag racing past to remain alive.



The LS1 will need the front two oxygen sensors. The S&P header collectors are equipped with O2 buns in each collector. To remove the rear O2 sensors, S&P will removed the rear O2 sensors while removing the anti theft, emissions and changing the gear ratio and tire rollout during the computer reprogramming.



We then delivered the car to the exhaust shop to have dual flow master mufflers with 2.5 inch exhaust installed.



After bending the tail pipes and attaching the hangers, the entire exhaust system will be removed and be thermal coated inside and out at S&P.



After reprogramming the computer, we mounted it on the passenger side inner fender panel and attached the wiring harness.



With everything installed and ready to start, we first performed a final check of all connections. We then turned the key on to let the fuel pump apply pressure to the system and checked it for leaks. We then checked the throttle linkage (from the pedal to the throttle body) for binding. (This will also be checked prior to driving after any interior work is performed.) The shifter and brakes are checked before the key is turned to the start position.



After our first start up, we scanned the engine and found that the injectors were lean on a couple of the cylinders. We removed all of the injectors and had S&P clean and flow match the entire set. Once this was done we then re-scanned the engine and checked for any error codes, with no codes present, it was time for our first test drive.



**S&P LS-1  
6 Speed harness**



96-Up 4L60E 6 Bolt to 4 Bolt Tail Housing Adapter For Manual Speedometer.  
Gear ratio and tire rollout is needed when ordering



**Harness for the 4L60E  
transmission.**



Made with stainless steel flanges, comes with bolts, gaskets, collectors with O2 bunnings. Available plain or coated inside and out.



All Passenger Side and Driver Side Fuel Line Kits inc. all connectors, aeroquip braided fuel line, AN6 ends and sufficient length to frame

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