



53-62 CORVETTE FRAME AND BODY MOUNTING ISSUES AND INSTRUCTIONS

These instructions with their tips and tricks we learned on building our own 1960 Corvette will hopefully help you along with your own Corvette project. Some or all of the information here will apply to your particular build and with a bit of luck, make this as straightforward and simple as a project of this magnitude can be.

Throughout the entire range of chassis, the single difference in frames between the 53-62 model years is the rear bumper mount. On the 61-62 the rear bumper mounts to the inside of the frame and on the 53-60 it mounts on top of the frame. Required body modifications are at a minimum as well. The only real cutting involved is trimming the area around the upper control arms on the front suspension. The best way to do this is lower the body over the chassis and remove only what is necessary. Be sure to allow clearance for upper control arm movement.

The transmission tunnel may need some modifications depending on which gearbox you use. Most of the normal automatics and 4-speeds will clear the stock tunnel but a Tremec T-56 will require some work in that area. The inside of the stock tunnel is 4 inches across and the yoke on a T-56 is also 4 inches across.

Rear tires: If a 245 or smaller section tire is going to be used on the rear modifying the inner wheel wells will not be necessary. If a larger tire, up to a 295 is used, the inner wheel wells will need to be modified. This is not a difficult job but one that requires a working knowledge of fiberglass. When building a larger inner fender-well be conscious of the height of the wheel tubs. Too high and there will not be enough room for the convertible top to set into. The wheel-wells can go as far in as the edge of the frame without interfering with the stock fuel tank. If the rest of the body is in good condition it is ready to mount on the chassis.

What if the body doesn't line up with the new frame? We have gone to great lengths to ensure that the frame you have purchased is straight and square, with all the body mounts, core support, bumper mounts, engine and transmission mounts in the proper location. Our tooling was designed around GM's drawings of the 53-62 Corvette. If the body does not line up with the frame there is a very good chance that somewhere in

the past 45 plus years the car you are dealing with may have been involved in a crash and improperly repaired or in some way stressed out OE tolerances.

One of the best ways to pick the body off the chassis is to use a two-post lift. The points for lifting the body up on a C-1 Corvette are the areas behind the front wheel opening and in front of the rear wheel well. Looking underneath you will see a section that is reinforced this is the best place to set the rubber pads to lift the body off the chassis.

After taking the stock frame out from under your car we strongly suggest trial fitting the new frame before paint or final assembly. This is the time to find any errors or misalignments in the original body. **If the body you are using is out of alignment, you may have to drill a new hole or enlarge the ones in your body to fit the frame.** Walk around the frame several times to make sure that everything is aligned and the fitment is correct, now the frame can be painted or powder coated and you can start assembling the chassis. **NOTE: DO NOT GRIND ANY WELDS ON THE CHASSIS!**

If the complete package was purchased, then it has been shipped pre-assembled. This means that upper and lower control arms are mounted and adjusted so the caster and camber are very close. The rack and pinion is bolted in place and the tie rod ends have all been adjusted for correct or very close settings for the toe-in. The rear end has also been aligned and squared with the chassis. When you disassemble the chassis for paint make sure to measure the length and mark the location of the links so everything can be reassembled in the correct location.

Setting up the steering: This applies if you are going to use the stock steering column and adapt it to the rack and pinion. To keep the VIN number in its stock location the original column will have to be used. About 3" from the firewall the VIN number is spot welded to the steering column. To start with remove the stock steering box and column. Now cut through the assembly near the steering box and pull out the 3/4" shaft. The finished length for the 3/4" shaft is 48" long and the column is 45". A collar needs to be machined that is 1.590 on the OD and 1.375 on the ID, and should be between .500 and .600 long. This can be welded or brazed into the end of the steering column tube. A shouldered bearing with a .750 ID and a 1.375 ID will press into that end of the column. The part number for the bearing is Heim RF122214PP. The machined end with the bearing goes to the engine compartment side of the steering column. The 3/4" shaft that runs through the column needs to have two flats .100 deep and 1 1/8" long machined on the engine compartment side to mount a double "D" U-joint. Either Flaming River or Borgeson U-joints will work. To support the column at the firewall we used a 1 3/4" Column Swivel Floor Mount from Flaming River and the stock mount at the dash. To complete the steering requires a 3/4 X 36-spline U-joint at the rack a section of 3/4" double "D" shaft and a 3/4" double "D" U-joint at the column. **Note:** You only have one steering shaft that has a splined and threaded end measure twice and cut once. If something happens to the shaft or the original is ruined the steering assembly out of a 53-54 Chev passenger car will work. They use the same steering shaft, turn indicator, and bell at the

top of the column. If this method will not work for your car Ididit or Flaming River makes a complete steering column for the early Corvette.

Preparing the 9" Ford housing for installation: Before painting or powder coating mask off the face of the housing and the bearing surfaces, this will save a fair amount of time in the next step. After the housing is painted or powder coated it needs a through cleaning. The best way to clean the housing is to use is to use plenty of hot, soapy water. Use a broom handle to push a wet soapy rag down each tube. After cleaning the bearing surfaces, the tubes and the inside of the carrier, rinse everything and dry with a clean rag or an air nozzle.

When the studs that anchor the third member are installed be sure and use anti-seize compound on the threads. **DO NOT USE AN IMPACT WRENCH TO INSTALL THESE STUDS.** The heat created from using an impact wrench can damage the threads and cause them to gall. Use the washers that are supplied with the installation kit and stack them up over the stud. Use a regular 1/2" drive ratchet and six point 9/16" socket to draw the studs into place. **Do not use a rattail file on these holes.** Powder coating in holes can cause enough interference that bolts will not go through. To take care of this problem use a small rattail file and carefully run it through any non threaded hole that a 3/4", 5/8", 1/2", or 3/8" fastener would go through. On threaded holes that were not masked by the powder coater a tap may be necessary. One last area to check is the outside end of the housing where the caliper mount attaches. Make sure the surface is clean and flat. If there are any small irregularities use a small flat file and dress the area. Now the housing is ready for installation in the chassis. It is also ready to accept the third-member, axles, brakes, shocks and sway bar.

Preparing the chassis for powder coating or paint and assembly: If the chassis is going to be powder coated instead of painted make sure that all fab work is completed prior to leaving your shop. Holes can be drilled after paint but welding brackets on becomes more difficult. **NOTE: DO NOT GRIND ANY WELDS ON THE CHASSIS!** Some powder coaters have body filler that will work in the oven when the paint is baked on and this could let you be a little creative in the way the chassis is finished.

When the frame comes back from being powder coated or painted the chassis needs to be prepared for assembly. Set the chassis up safely in an area where you will be able to work and get around with all the suspension pieces attached. Use jack stands or blocks under the chassis. In the rear they should go near the front attaching point of the 4-bar and in the front set a block under the front crossmember. Set the chassis close to level and it will make it easier to set up.

Now the real fun begins. Start by using a rat-tail file in all the holes that bolts have to pass through. On the front suspension it is always best to chase the threads with a tap to clean out any powder or paint that may have gotten inside the bore and on the threads. This is not the time to get a bolt stuck and have it strip the threads. Before installing the suspension, use anti-seize compound on the threads. The upper control arms use 3/8"

grade 8 bolts. The lower control arms use 14 mm bolts. The rack and pinion uses 5/8" grade 5 coarse threads.

The chassis is shipped pre-assembled with upper and lower control arms, uprights, front hubs, rack and pinion, front name plate and two spacers that set between the lower control arm and the name plate. The parts that are not installed are the coil overs and the sway bar. Note: The upper control arms are set up to use a 1 1/4" dia. X 3/8" thick aluminum spacer between the control arm and the mount on the chassis, this will set the camber angle at approximately eight-tenths of a degree. If the camber angle needs to be increased or decreased either add shims to this or pull the aluminum spacer out and install individual shims. This is also how the caster angle is increased or decreased by adding or taking away shims on the upper control arm.

Installing the rack and pinion: This is done by loading the rack from the top and tipping it so the right hand tie rod goes just under the frame on the passenger side feeding it through until the left tie rod will clear the rail on the drivers side and feed it back to the mounting holes. The bolts that attach the rack to the chassis have to go through the nameplate first and then through the rack to the chassis. The rack and nameplate need to rotate down in order to get clearance for the bolts to go through before it can be attached to the chassis. **Be sure to use anti-seize compound on the threads before installing the bolts.** In most cases the tie rod ends come lubricated but all you have to do to check is raise the boot, if it is full of grease it's done. We have preset the toe angle and if everything goes back together the same way it was shipped it will be very close.

Front sway bar: The sway bar mounts to the two vertical holes that are located in the bracket near the front of the chassis. Fit the poly bushings around the sway bar then with the steel bracket set over the bushings bolt the sway bar to the chassis with the legs pointing to the rear. Use the 3/8-16 bolts and flat washers to attach the sway bar to the chassis. The sway bar linkage can be assembled on the bar. Set up the sway bar linkage using the picture as a guide. With the long bolt through the washer, poly bushing, sway bar, one more poly bushing the next washer, sleeve, lock nut and 3/8" female rod end it is ready to install on the lower control arm. The 3/8" jam nut is to lock against the rod end to hold the assembly in place. The 3/8" long sleeve goes in the hole in the front of the control arm and will bush it down to attach the lower end of the sway bar. It will mount on the front side of the lower control arm using a 3/8" misalignment bushing on each side of the rod end and a flat washer on the inside. With the whole assembly in place the poly bushings should rotate easily with your fingers. **Over tightening can damage the rod ends, bend the bolts and cause severe binding.**

Front coilovers: The upper mount is straightforward, the coilover fits between the brackets and a 1/2" bolt goes through the hole. The C-6 control arm uses a separate kit to mount the lower end of the coil over. Instead of a poly bushing it uses a 1/2" high misalignment spherical bearing. The rest of the assembly includes a stainless steel stud that runs through the lower shock bearing with a 1/2" misalignment bushing and an external snap ring to hold everything in place. Two 5/16" bolts with nylon lock nuts mount the shock stud to the lower control arm.

Installing the 9" Ford housing in the chassis: Install the upper and lower links on the housing before moving it under the frame. Set jack stands up to support the housing approx 4" to 5" from the top of the housing to the frame. This will set everything up at close to the designed ride height. With the housing centered directly under the curve of the chassis the lower links can be installed. They come from the factory with the length preset and marked RH, LH. After the lower links are in place install the upper links.
Note: wait until everything is installed before tightening any nuts and bolts.

Rear sway bar: Using the picture as a guide slip the polyurethane bushings on the bar and the brackets on the bushings before installing in the housing. The bar can only mount one way, with the drop under the third member and the arms pointing forward. Once the bar and brackets are set in the housing the aluminum covers can be bolted in place. Use the 3/8-16 fasteners with a flat washer against the aluminum cover and the lock washer against the flat washer. With the sway bar in place the end links can be installed. The chassis mounting point for the sway bar is on the inside of the frame ahead of the notch. Start assembling the sway bar end link from the bottom. 3/8" long bolt, washer, polyurethane bushing, sway bar, poly bushing, washer, sleeve, washer, poly bushing, chassis mount, poly bushing, washer and nylon lock nut. With the rear end at ride height tighten the 3/8" lock nut so the poly bushings can still be turned with your fingers. **Over tightening can damage the rod ends, bend the bolts and cause severe binding.**

Rear coilovers: The lower coilover mount has to be attached to the housing. For normal ride height use the middle hole. This part attaches to the housing with a 1½" X ¾" grade 8 bolt and lock washer. The stud that the shock mounts to is ¾" in diameter and then steps down to ½"-20 thread. There are two washers one is ¾" and goes before the coilover and the other is ½". A nylon locknut holds the shock in place. After the shocks are mounted on the lower stud they can rotate to the upper mount.

Preparing the body for the frame: This is a list of things that may or may not have to be done before the body is lowered for the final time. Decide what is going to be done about clutch linkage either manual or hydraulic. Find a place to mount the master cylinder if you are going to use a hydraulic throw-out bearing. We have found that if you use a 7/8" master cylinder you will have enough line pressure without going to a power booster. If a T-56 6-speed transmission is going to be used a section of the tunnel needs to be modified. Any firewall modifications should take place while the body is off the chassis if for no other reason than everything is easy to get to.

Brake and clutch master cylinder: On the 1960 Corvette we built I decided to clean the firewall up and mount the master cylinders under the dash. We used Wilwood master cylinders, one for the front brakes, one for the rear brakes and one for the clutch. The front uses a 13/16" the rear is a 7/8" and the clutch uses a ¾". To make this system work I also used the Wilwood pedal kit that mounts the master cylinders on top and to the rear of the pedals. This is fairly labor intensive to mount and set up but really cleans up the firewall. The remote reservoirs are from Kugel Komponenten and also mount under the

dash. Once the brakes and clutch are bled the reservoirs can go under the dash and not be touched. **Note:** This is easier if the build is from the ground up. Doing this on a finished car would be very difficult.

Radiator: PRC (Performance Rod and Custom) makes an aluminum radiator that will replace the stock one. The lower outlet on the radiator is close to the sway bar but there is adequate clearance.

Fan Shroud: We used a 16" Flex-a-lite electric fan that pulls 3200 CFM of air through the radiator and only draws 17 amps. Brackets were welded to the end tanks of the radiator to mount the motor ½" from the core. Tabs welded to the radiator along with sheet metal screws will make the shroud removable. It was designed to fit very close to the fan blade to get the maximum flow of air through the radiator.

Fuel lines: If fuel injection is going to be used over a carburetor there will need to be a feed and return line. We went with fuel injection and had to find a place to run the two lines, feed was 3/8" and return was 5/16". The decision was made to run the lines through the crossmember that attaches the lower 4-bar tubes and along the inside of the right hand frame rail. The point where the center frame support ties in with the outside rail is where the next hole was made and the lines were bent to go through this section and then angle up. AN fittings were silver soldered on the ends of the hard lines and braided lines run from there to the fuel rails on the engine. On the rear where the lines run through the crossmember fittings were also silver soldered on and braided lines run from this point up to the tank. **Note:** A normal vented cap will not work because the return line pumping gas back to the tank builds up positive pressure and a normal vented cap does not allow the pressure to escape. The tank should have a true roll over valve or another method of releasing positive pressure without releasing fluid.

Exhaust system: We offer headers for both the small block and the LS series of engines. They come with a head pipe that will go through the first section of the frame support, from that point a system will have to be fabricated. On a '60 Corvette the exhaust runs through the bumper and it was a look that I wanted to keep. This is another place that can add a fair amount of time to a build, rebuilding the bumpers to accept 2 ½" exhaust and setting larger tubes in the rear of the body for the exhaust to go through. These are the dimensions on the Magnaflow mufflers we are using, the body measures 14" long by 9" wide and 4" deep, 2 ½" in and 2 ½" out both centered. The mufflers are set in the stock location, under the gas tank, one on each side of the driveline.

Bolting the body on the chassis is one of the most exciting times of the entire project because now the body and chassis are ready to come together for the final time. The body mount kit from Year One consists of fiber material and metal shims that need to be set over their respective holes. There are eleven mounts including the core support.

The body doesn't have to be any higher than to allow the chassis to roll under it without hitting or touching anything. The best way to align the body with the frame is to use a plumb bob and drop it from the rear body mount to the center of the hole in the chassis.

The same procedure can be repeated with the core support. Have someone watch while the body is being lowered for any unnecessary contact. If everything is lined up the body can be lowered down onto the chassis.

Now the pads of the lift can go under the chassis and raise the frame and body. If any of the body mount holes are off, a large amount a Phillips screwdriver does a good job of aligning them. With all the bolts set in place measure from the outside of the body to the frame at the center of the rear wheel well and check side-to-side dimensions. This is the time to make those small adjustments and get the body centered on the chassis. **NOTE:** With the body bolted up, you can now lower the car down to the ground on its tires and wheels and open and close the doors and trunk to make sure they are properly aligned. With the engine and transmission mounted the body will flex a small amount when the car is lifted in front of the rear wheels and behind the front wheels. Any adjustments need to be determined while the car is on all four wheels. If there is a problem with a door or trunk lid consult a body shop on what mount needs shimming to fix the problem.

Plumbing the power steering: The chassis comes with an AGR power rack and it is available in two ratios, a 15:1 and a 20:1. The 15:1 is what we recommend for a true high performance feel it is also what we used in the project car. It's a quick steering that is firm with a good feel of the road. The 20:1 is the slower ratio and is typically used for long-distance touring cars.

The power steering pump is also from AGR and because of space constraints, we decided on using a remote reservoir from Flaming River. The system hooks up relatively easy once you know where the lines go. On the bottom of the reservoir there are two tapped holes, one 1/2" pipe and one 1/4" pipe. The large line from the remote reservoir runs from the 1/2" pipe hole to the large line coming out of the side of the pump (AN-10). The small line (AN-6 return) runs from the reservoir to the fitting closest to the firewall on the rack and pinion. **This is important; the last line (AN-6) to hook up is the power line. It runs from the pump to the fitting that is closest to the radiator on the rack and pinion.**

Bleeding the rack and pinion and power steering pump: Fill the power steering reservoir with power steering fluid (do not use ATF) and with the cap off the reservoir and the front wheels off the ground turn the wheels all the way to the left then all the way to the right. Repeat this **twenty times**, the fluid will need to be checked constantly. This will bleed the air out of the rack and fill the system. Once this procedure is finished the engine can be started and the system can be checked for leaks. With the tires on the ground turn the wheels to the left and right three or four times and you are ready to go. Following these instructions will save you a lot of grief and ensure that the system works properly.

Venting the 9" Ford housing: In most cases there is the possibility that a light vapor or fine mist will come out of the vent and make a mess of the under carriage over a period of time. We used a small breather and mounted it under the body and ran a hose

from the housing to the breather. This will eliminate any vapor or mist that might coat the underside of the car and it should stay clean much longer.

Spring rates front and rear: We've found that using a 400# spring on the front and a 200# spring on the rear gives a true performance ride without jarring or banging at every bump. It will have approx the same ride as any late model high performance touring car. For a softer ride the front springs could be reduced to as low as 300# and the rears down to 150# to 175#.

Battery mounting: An Odyssey dry cell battery was used because of its size and power. The spare tire carrier was eliminated and a box was created to mount the battery under the floor in the trunk. **NOTE:** Remember you are working with a fiberglass car and grounding is a very important part of the system. We are using an American Auto Wire harness and grounding system. Using something like this ensures that the body, frame, engine and all the accessories are grounded properly.

Rotor seasoning and pad bedding: Included in the disc brake kit is a section on breaking in the brakes and it is very important reading. For best results follow the instructions in the kit and if they are missing give one of our techs a call and we will get you a copy. Not following these instructions will cause the pads to glaze over and the brakes will squeak and or just not work properly until you change the pads.

Things to check after the first 100 miles: Check all the main control arm fasteners front and rear. Make sure there is no fluid loss from the brake lines, radiator, fuel lines, power steering, transmission and rear end. Check the battery cables in the areas where they are close to the exhaust. Check the exhaust for any rattles or areas where it may contact the frame. Re-torque the wheels and check the springs for settling. Normally coilover springs will take a set and only have to be adjusted once but if the car is driven hard they may require more adjusting. A method for checking fasteners or the worry of missing one can be eliminated by placing a small piece of tape near every fastener that has to be checked and only removing it once the fastener is tight. If a Strange 3rd member is used the rear end oil needs to be changed after the first 250 to 500 miles. This is the break in time for the gear set. With a posi-traction never use synthetic gear oil, use quality 80-90wt gear oil along with a small container of posi-traction additive. For more information on the rear end please call our tech department.

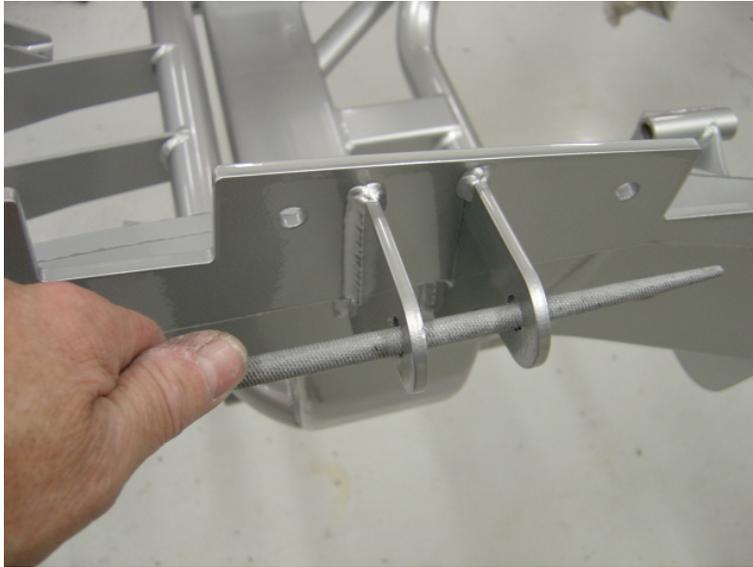
Here is a photographic guide on the assembly of the Art Morrison GT Sport Corvette chassis. Some of the things pictured are necessary and we think the best way to do certain parts of the project. There are other pictures that are just my idea of how something could be done and are intended to give you an idea on how a piece or part could be made.

This series will cover the chassis assembly:

- (1) Bare frame powder coated and ready for assembly.



- (2) Use a small rattail file to clean the powder coating out of the holes where a bolt will pass through.



- (3) The upper and lower control arms, uprights and hubs are bolted in place. The upper control arms use 3/8" aluminum spacers between the arm and the mount. This sets the camber angle at approx .8-degree negative camber. The hubs must be bolted onto the uprights before attaching to the lower control arm. **Note: The front bolt on the lower control arm does not need to be tightened yet.** (See #6)



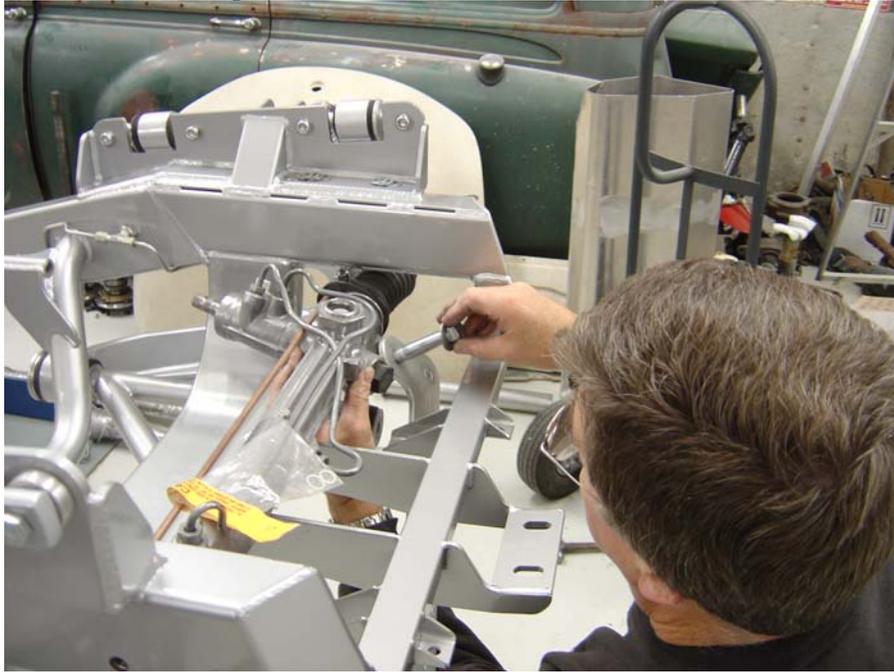
- (4) Use anti-seize on all fasteners that thread into the chassis.



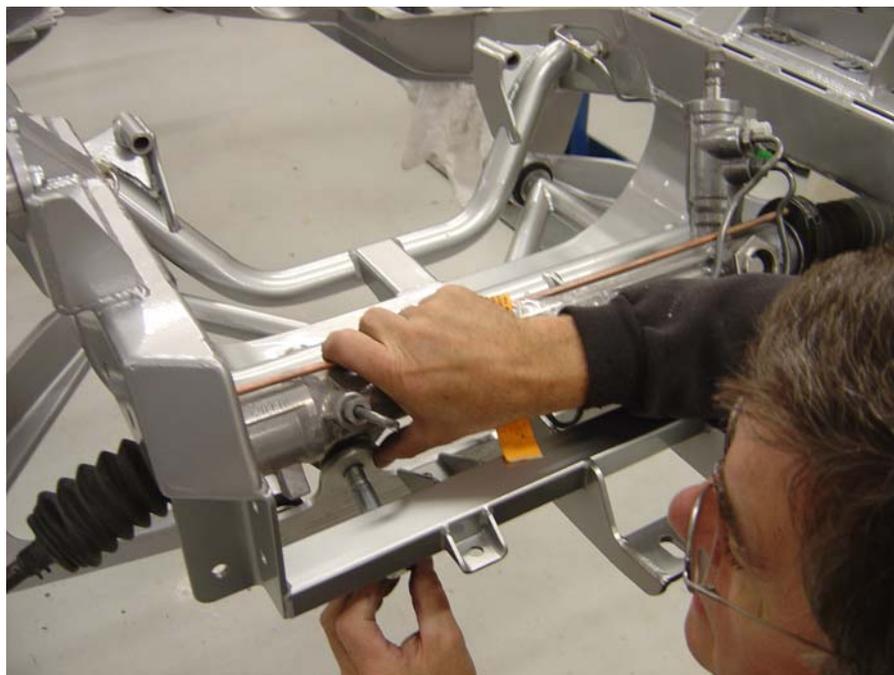
- (5) The rack and pinion must tip down through the passenger side then go under the rail on the driver's side before it will line up.



- (6) The plate that supports the lower control arm and the rack may require an extra pair of hands to ease installation. There is a 1/4" spacer that between the lower control arm and the plate.



- (7) Set the spacer in place between the lower control arm and the cover plate and finish mounting the rack.



- (8) Assemble the end links on the sway bar. Do not over tighten the bolt or the end link may bend or break.



- (9) Mount the sway bar to the chassis.



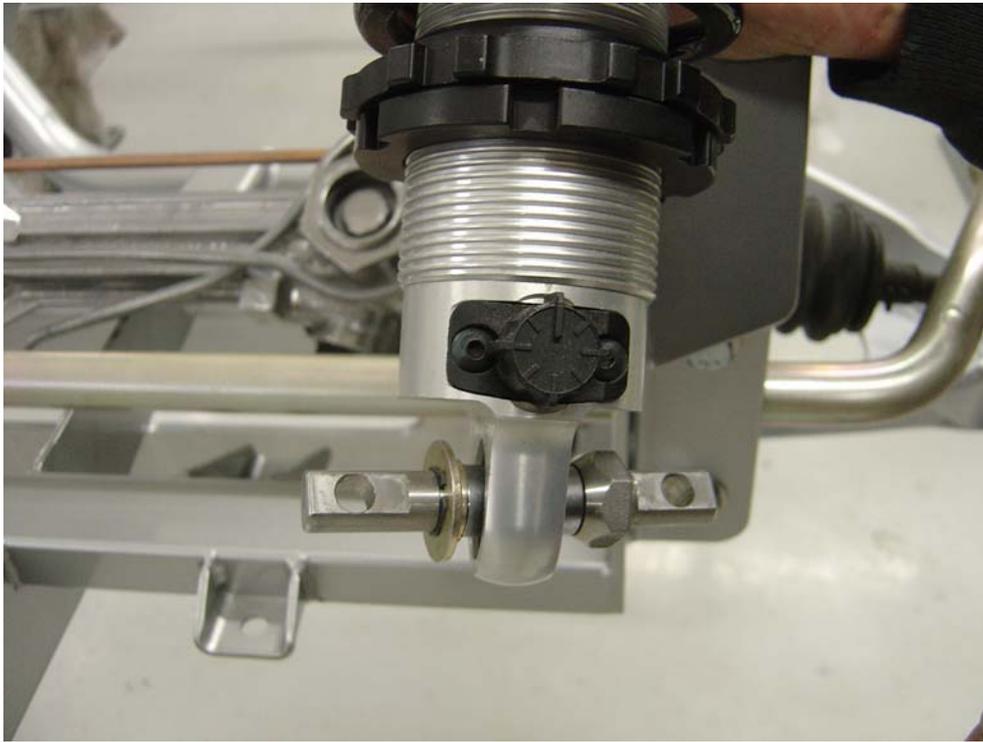
(10) The small bushing goes in the lower control arm; it sizes the hole down from 1/2" to 3/8".



(11) The lower sway bar mounts from the back side as pictured below.



(12) On the lower coil over mount, the hex goes to the rear and a snap ring holds the misalignment bushing in place.



(13) This is the assembled view of the coil over mounted to the lower control arm.



(14) Finished view of the front suspension.



(15) Mount the sway bar to the rear end housing.



(16) Assemble the sway bar linkage and attach the ends to chassis, making sure not to overtighten the links.



(17) The assembled steering column is mounted to the firewall using a swivel mount.



(18) To ensure a maximum level of security, safety wire must be used when assembling the rotors.



(19) The lines from left to right the lines are clutch, front brakes and rear brakes.



(20) This is the rear brake line running up the inside of the left frame rail to a bulkhead fitting that goes through the crossmember.



(21) This line runs from the 4-bar crossmember to the tube that mounts the coil over.



(22) This is an underside shot from the underside of the front crossmember showing the brake line that runs from left to right. It also shows the bulkhead fitting and "T" that are part of the brake line system.



(23) Before putting fluid in the system, blow the lines out, this will reduce the chance of any contamination in the system.



(24) Because of the transmission size, we needed to make some room.



(25) The cutout needs to be large enough for T-56 yoke and driveline.



(26) This mold was made out of .050" aluminum and tacked together. Tape was used to cover the seams on the inside before giving it a good coat of wax. Fiberglass

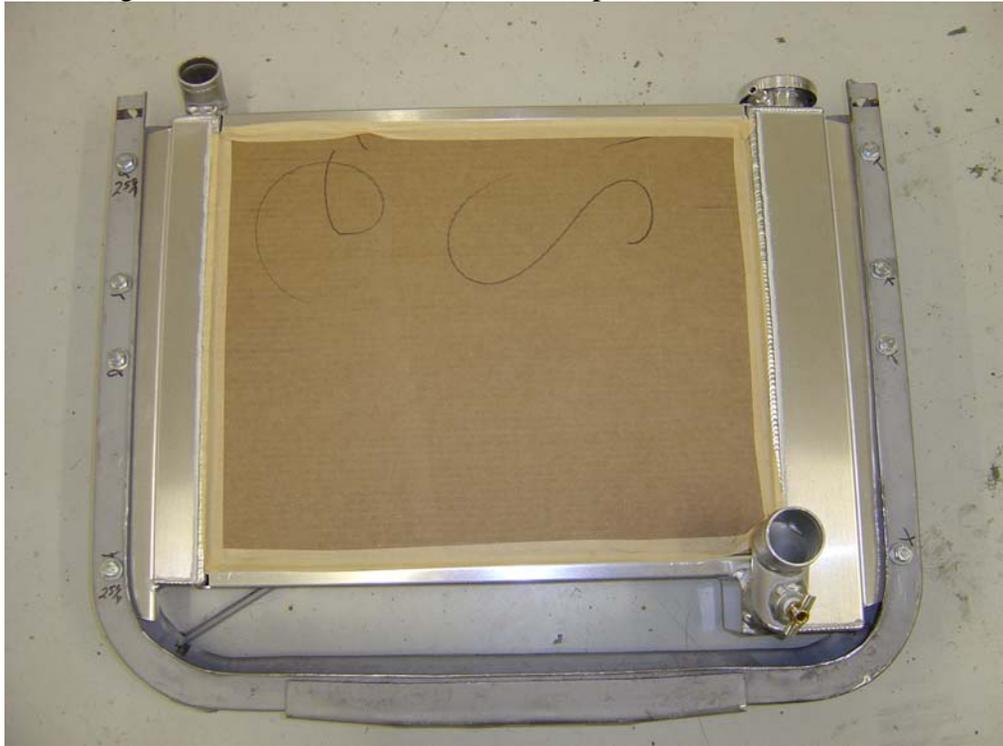
was used to do this because the floor loses too much strength if just an aluminum tunnel was used.



(27) The new tunnel in place and the floor is as strong or stronger than stock. Now the hole can be cut for the shifter.



(28) PRC radiator in stock core support. Note: While mounting the radiator and building the shroud cut cardboard out and tape to both sides of the core.



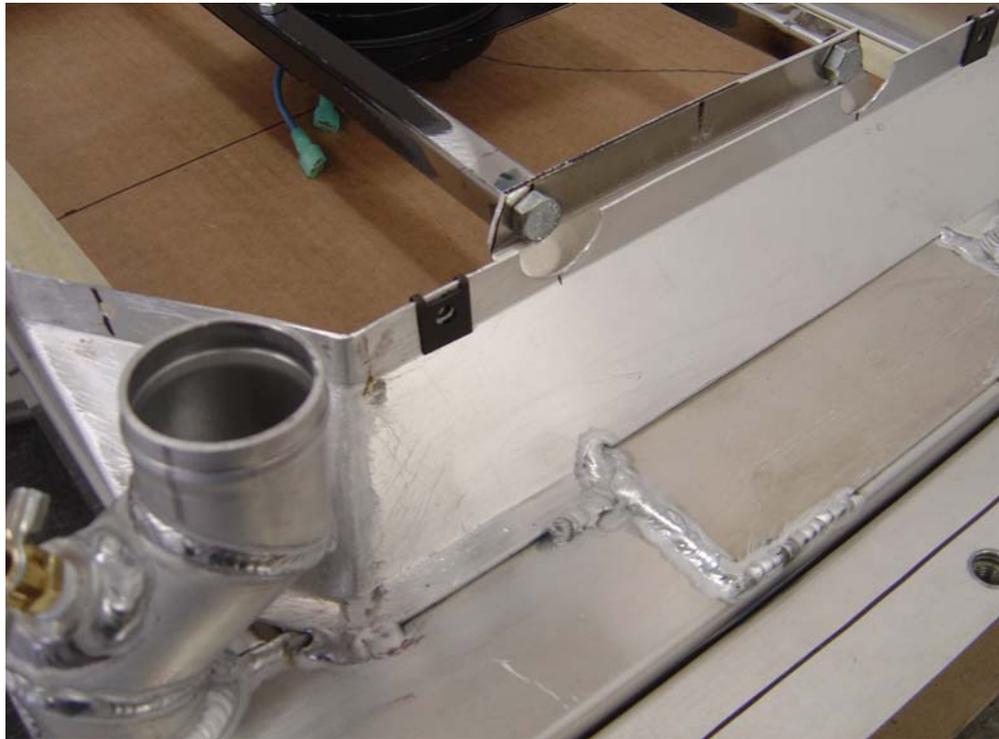
(29) The Flex-a-lite fan is set in place so mounting brackets can be fabricated.



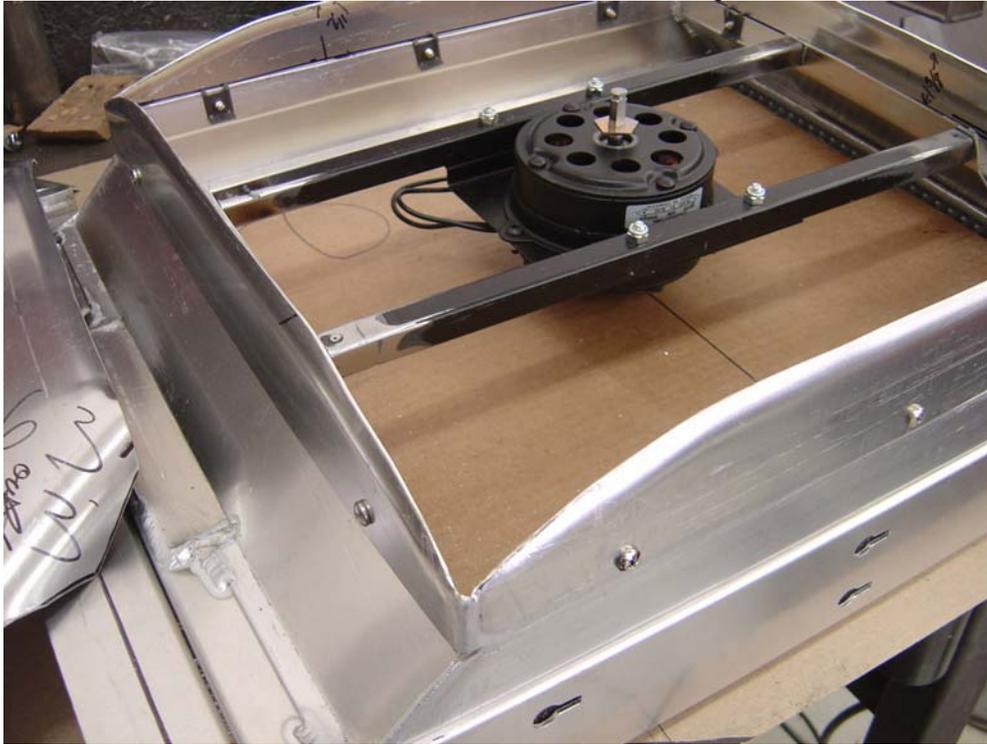
(30) The brackets are then welded to the radiator to fan.



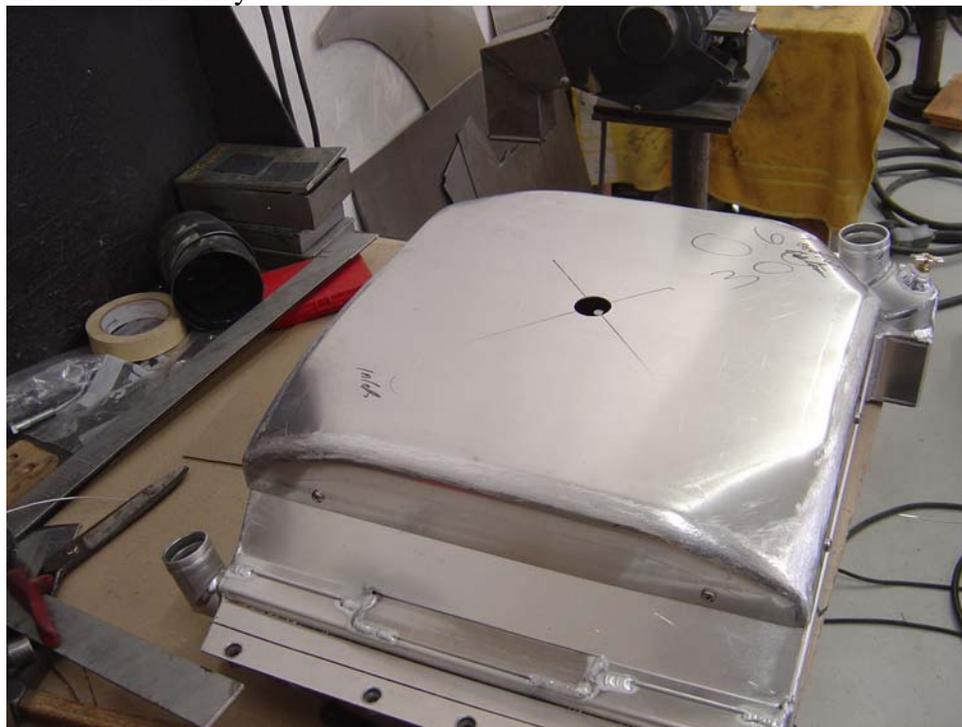
(31) A shroud base is built and mounted to the radiator. The top piece is made removable in order to service the fan.



(32) These are the sides of the removable fan shroud being fit for the final time.



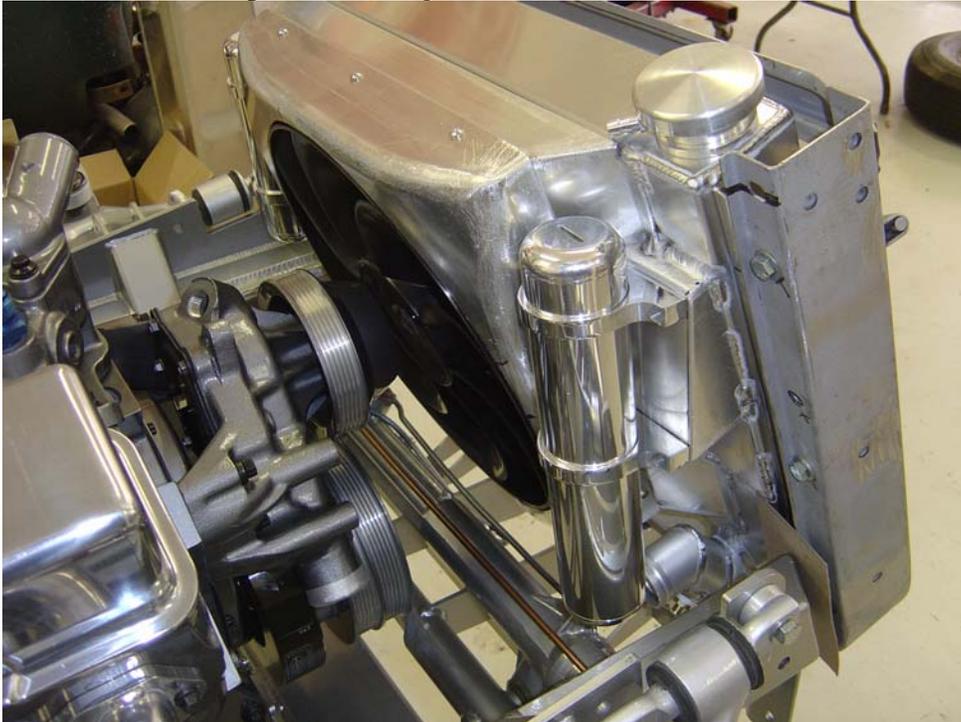
(33) The fan shroud cap is welded in place and the final step is to cut the hole for the fan. The hole should be made as tight as possible around the fan blades to increase efficiency.



(34) The finished product. The hole should be as close as possible to the outside diameter of the fan. This will give you the maximum amount of air flow through the radiator.



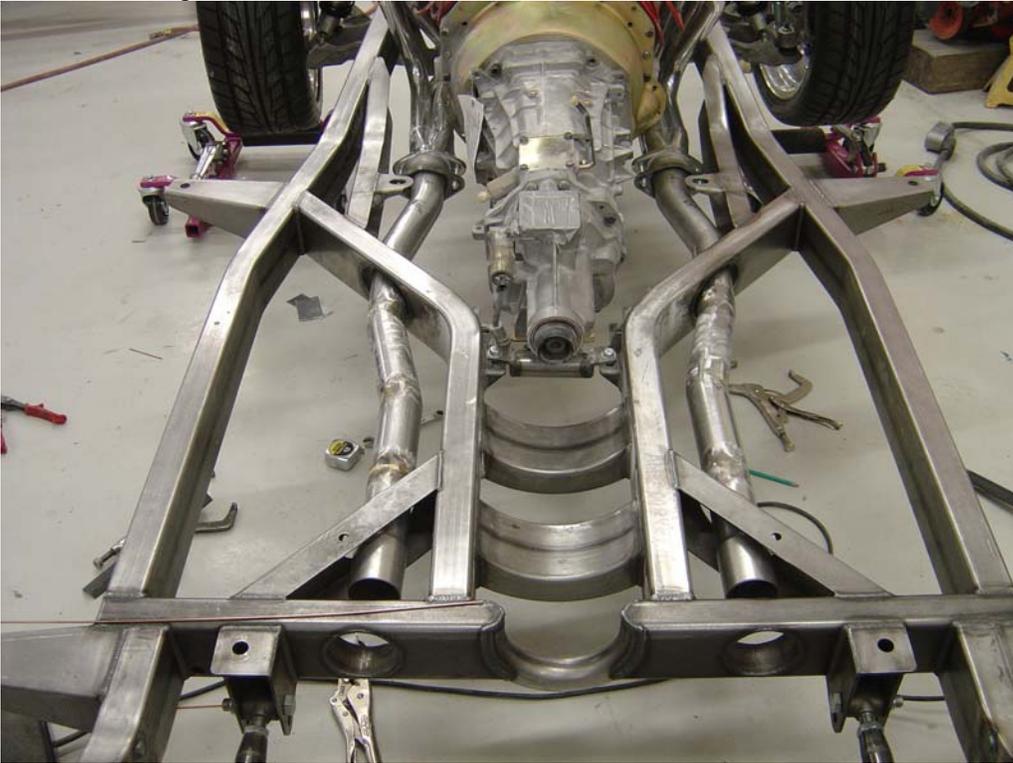
(35) The PRC radiator and custom shroud, Flex-a-lite fan and Flaming River overflow tank and power steering reservoir all mounted to the stock core support.



(36) The headers are bolted to the head pipes going through the front section of chassis.



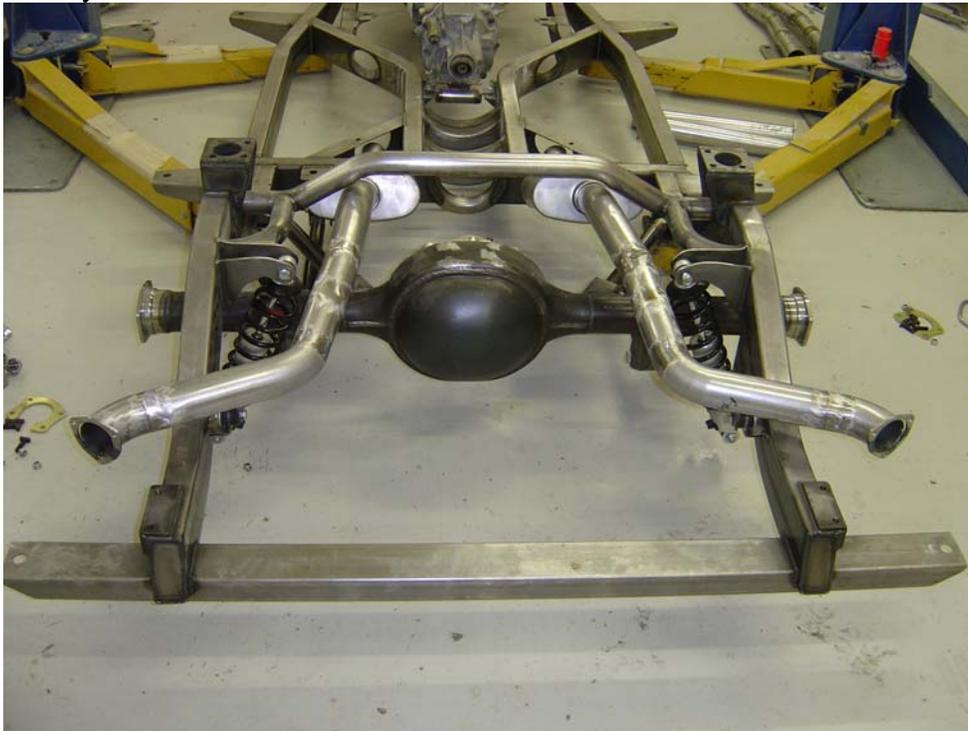
(37) Continuing the 2 1/2" exhaust towards the rear.



- (38) The Magnaflow mufflers are mounted in the stock location. Note the rubber isolated exhaust mounts.



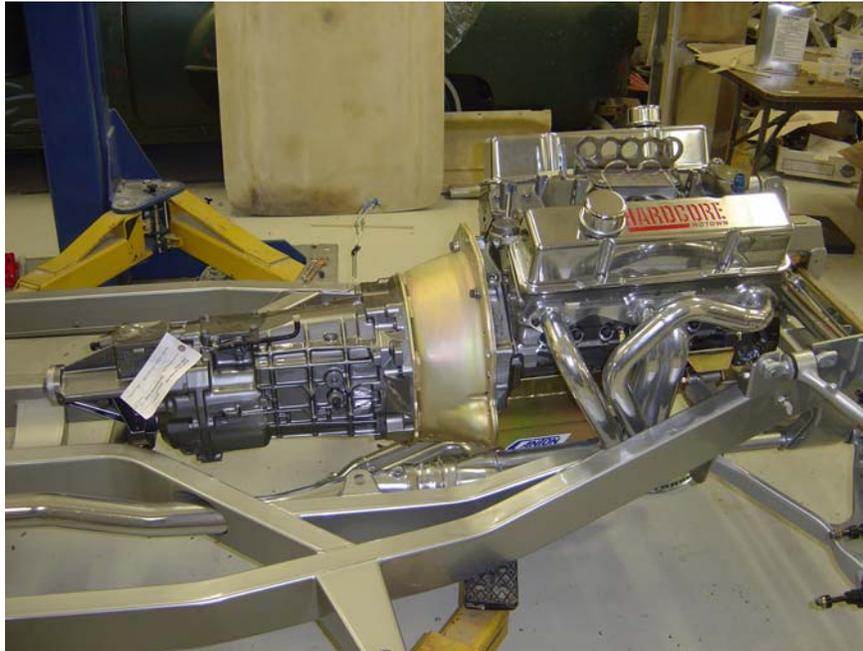
- (39) Flanges were fabricated to connect the exhaust to the tips before going through the body.



(40) After the exhaust system was ceramic coated it was installed for the final time along with the 3rd member and brake lines.

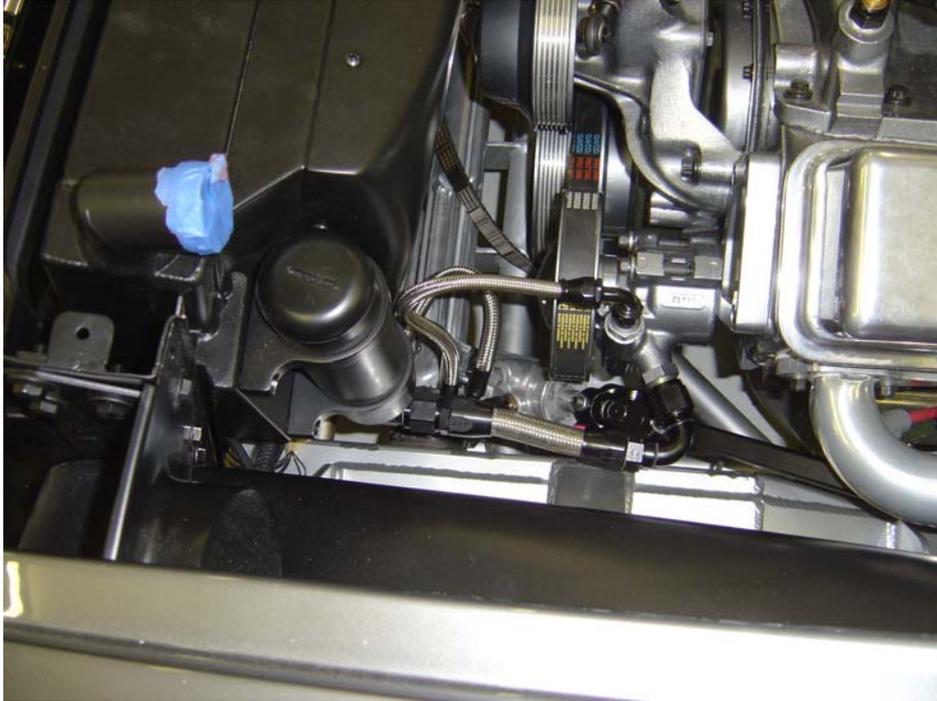


(41) An assembled shot of the engine, transmission, headers and exhaust all set in place.



(42) Plumbing the power steering using a remote reservoir. The AN-10 line runs from the pump to the bottom of the reservoir. The small or AN-6 line that comes

out of the top of the pump is the pressure line and it goes to the fitting that is closest to the radiator on the rack and pinion. The last line AN-6 goes from the reservoir to the fitting closest to the firewall on the rack and pinion. NOTE: Read the instructions on bleeding the system and only use power steering fluid.



(43) The final shot shows the fuel line running on the inside of the chassis which offers the maximum amount of protection from road hazards.

