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Forward

By David Smith
President Factory Five Racing, Inc.

If you are reading this, you are embarking on a mission to build your own car, or at least considering doing so. I wanted to share with you some of my experiences and lessons learned while working with literally thousands of people who have completed this undertaking with us. The lessons learned here are important and will hopefully help with your decisions as well as with the project and the completed car.

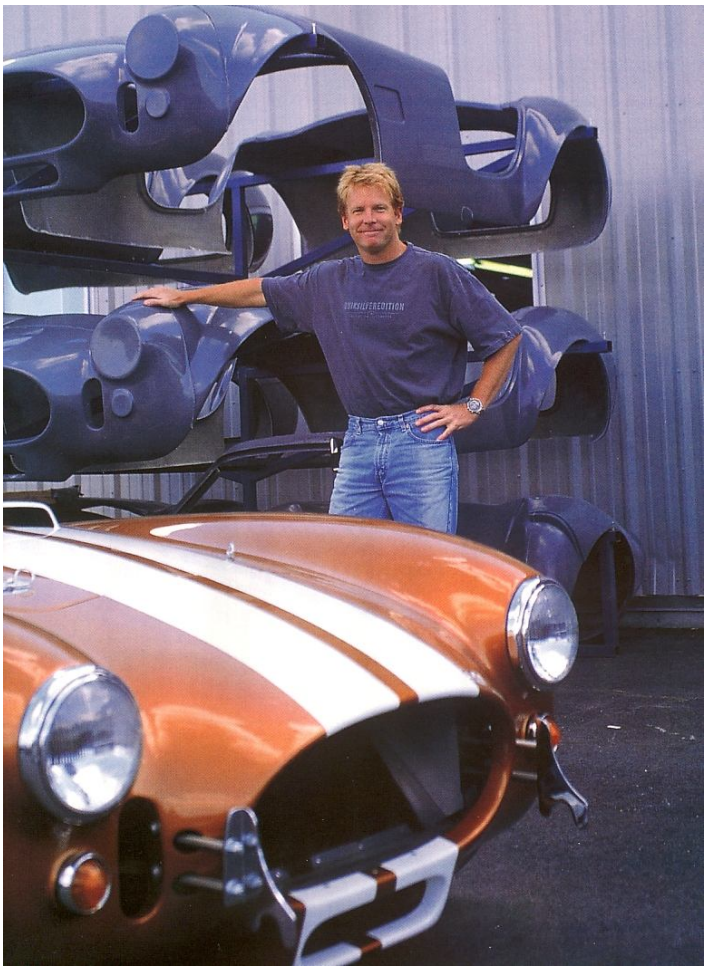


Figure 1: David Smith

First of all, the idea of building your own car is NOT for everyone. It is a serious endeavor that should be undertaken with care and consideration. The desire to build your own custom car goes way back. It is part of our uniquely American car-centric culture, and those who build their own cars are at the very center of this. Since the earliest days of Hot Rodding, literally tens of thousands of people have built their own cars. Even more have done restorations and major customizations to existing cars. As fun as this project is, a person should be candid about their abilities turning a wrench. This is not a place for novices. That is even more true in racing, where danger and risk are part of the very definition of always trying to go faster. The late Carroll Smith, wrote something I really loved that speaks to this point.

> "There is no magic! The one basic truth of successful racecar preparation bears repeating. There is no magic. There is only logic, common sense, forethought, vast amounts of hard work, and a fanatic dedication to the task at hand".
>
> Carroll Smith
> From his book, "Prepare to Win"

I can't think of anything more appropriate to say about the right way to approach the serious work of building your own car. Carroll passed away not too long ago, but his accomplishments behind the Ford LeMans victories and his contributions to the motorsports community continues in his writings that are all at the top of my list of recommended readings for the car builder or racer.

After being honest about the skills, responsibility, and dedication required to build a car, I feel the need to talk about the PROCESS of building a car in an equally candid manner.

The process of building a car is a lot like the process of having kids. As a matter of fact, it's absolutely the best analogy I can find (apologies in advance to all of you without kids, try and bear with me). Both things are easy to get started. With a car project you order a manual, talk to car guys, get all excited over glossy photos and perhaps order a kit from us. With the whole pregnancy thing, well for most folks that's even easier to get started…

When my wife was pregnant with our first daughter I was sure we would never have any more children. From the swollen ankles to the morning sickness, to the delivery room scene from the movie "Alien", the whole process was difficult, and while she didn't complain too much thru the nine months, it was obviously hard work. Another thing, she wouldn't have been the best salesman for others considering getting started on the baby thing.

When it comes to the car project, once the kit arrives and the process begins it is much the same as pregnancy. Frankly the degree to which a person breezes thru the project or languishes is commonly a factor of skill, but still, building a car for anyone is a tough job and there are inevitably issues. How many times have you gotten the wrong part at NAPA, gotten home to realize the alternator has a six ribbed pulley not five… You will meet challenges building this car and you will be frustrated at times. Thankfully there are internet discussion forums where you can vent your frustrations and complain about the idiots who designed this kit. We smile when reading these posts because we know that while the pregnant woman complains, the mother loves her children in an unreasonable and perhaps even undeserved way!

All the way thru the process, as you build your car, the seasoned guys at Factory Five in tech support will help you. The larger community of Factory Five customers will also be there for you, as the one thing that really sets us above the crowd of other companies is the size, competence and enthusiasm of our customer community.

When the baby arrives and when your car is done, there will still be more work. With babies, it's up all night, diapers, and strange maternity contraptions that men don't speak of in the light of day… With the car it will be other challenges. Registration and licensing can be frustrating and laws vary from state to state. A wrench dropped from 25 feet away will inexplicably shoot sideways into any freshly painted surface and my favorite was my own engineers who felt the need to test out how long an 8.8" rear diff can run on a track without gear oil (answer, about three laps before deciding to stop moving).

There will be highs and there will be lows, but in the end, there are few parents who don't treasure their children more than life itself, and there are few Factory Five owners whose lives remain unchanged by the experience and the artwork they have crafted.

It's one of the greatest experiences in the world to raise children. It's also one of the most rewarding things I know to build your own car. Even today at car shows, open houses, and events wherever Factory Five cars are found, I smile to hear the inevitable first words every guy says to me… "Let me show you what I've done".

The cars that we build are more than cars. They are a reflection of us. The badge of honor that comes with having built your own car is a special one indeed. You will join a community of others who have

earned their own… and THAT is the story of Factory Five Racing and that is what awaits you in this process.

David Smith
President

Statement of Non-Liability

While there are many things to love and be proud of in our country today there are a few things that we wish were different. With regret and a small amount of resentment we include the following warning and statement of non-liability at the advice of men with soft hands and necks the size of pencils.

Motorsports involves the operation of machines and materials near the limits of performance. Racing involves an inherent amount of risk. Any decision to proceed in the project of building one's own racecar must be made with the acceptance of personal responsibility. If, while building, driving or racing this Factory Five Racing kit, should you become injured or die, it will be the result of your own conscious decision and we at Factory Five Racing, Inc., disclaim any responsibility of any kind.

The procedures and recommendations contained in this book are to be used as a guide with the ultimate determination of safe construction and race-worthiness to be made by you. If you feel uneasy about whether you have the skills to build your own vehicle, DO NOT PROCEED. This project involves building a car from the bare frame all the way up to a finished vehicle. It is intended for individuals who have the skills and abilities commensurate with the scope of a project of this magnitude.

This kit is only a collection of parts designed for use primarily as a race car. Factory Five Racing does not build completed or partially completed vehicles. You are responsible for ensuring that the vehicle you build complies with all Federal, State and local laws regarding its use. Except as may be specified in writing, Factory Five makes no warranties, expressed or implied, on the products (parts, or kits) offered for sale. All implied warranties of merchantability and fitness for a particular purpose are expressly disclaimed by Factory Five.

While Factory Five products are thoroughly tested under actual race conditions, Factory Five cannot control the quality of the installation or application of these products. The products offered for sale are true race car components, the installment of which often requires considerable time and fabrication skill. Before attempting any installation or assembly, the purchaser should determine the suitability of the product for the intended use, the time, and level of skill necessary for correct installation or assembly.

Factory Five does not make any warranty, expressed or implied. Purchaser expressly ASSUMES THE RISK of all personal, property and economic injury, damage or loss, either direct or indirect, arising from the use, misuse, or failure to determine the appropriate use of any Factory Five product.

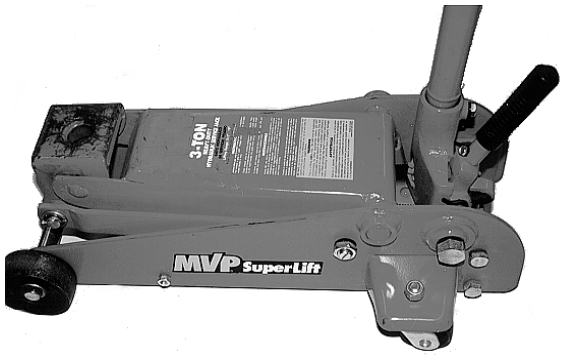
Safety Tips

- Read the manual. It is at least a good guide and place to start.
- Don't take short cuts.
- Before starting work, make sure you have the proper tools, the required parts, and sufficient space for the job. If you damage any parts, it will probably be because they were either not stored properly or, the wrong tool was used to install them.
- Don't work when you're too tired or upset. The car you will be building is capable of supercar levels of performance, and your life depends on the quality of your workmanship.
- Never work under a raised car unless it is well supported by stands intended for that purpose. Never work under a car supported by a jack.
- Always observe good safety practices such as the use of eye protection, protective clothing, and gloves.
- Keep the battery disconnected whenever you work on fuel or electrical systems and always keep a fire extinguisher handy.
- Don't allow children in the work area. Partially assembled cars attract a crowd. Keep garage doors closed or mark off work areas.
- Make sure that all electrical equipment is grounded. If working alone, have someone check on you periodically.
- When using an engine hoist, make sure that the working load rating is correct for the weight.
- Work in a well-ventilated and well-lighted area. Use portable safety lights for under-carriage work. Never use an exposed bulb type light.
- Be mindful of the environment. Avoid spills of solvents or engine fluids. If a spill occurs, clean up immediately and dispose of it in hazardous waste containers
- Never let a friend or someone else drive your car.
- Always wear your harnesses.

Tools and Supplies List

The following lists detail the tools and supplies that are needed to build your kit. The "helpful" items are not crucial to the assembly but make life easier. *Home Depot* HUSKY®, *Sears* CRAFTSMAN®, and *Snap-On*® tools are all guaranteed for life and we've found them to be reliable tools.

_____ Storage shelves for kit and running gear parts
_____ Body storage area (can be outside)
_____ SAE and metric socket set, a 52-piece set that includes an 18mm is a good choice
Deep sockets for some common sizes are helpful.
_____ SAE Combination wrench set ($^{3}/_{8}$" – $^{15}/_{16}$")
_____ Metric combination wrench set (10mm – 18mm)
_____ Full set of standard and Phillips head screwdrivers
_____ Standard Hex key set
_____ Long nose pliers, 4.5"
_____ Snap ring pliers
_____ Pop rivet tool with $^{1}/_{8}$" and $^{3}/_{16}$" heads
_____ Drill
_____ Drill bits ($^{3}/_{32}$", $^{1}/_{8}$", $^{9}/_{64}$", $^{3}/_{16}$", $^{7}/_{32}$", $^{5}/_{16}$", $^{7}/_{16}$", ½")
_____ Caulk gun
_____ 24 oz. Plastic Dead Blow hammer
_____ Razor knife
_____ Wire stripper/crimping tool
_____ ⅞", 1¼" and 2 ¼" hole saws (Body cut outs)
_____ Bench top vise
_____ Tape measure or straight edge ruler/T-square
_____ Hydraulic floor jack
_____ Engine hoist
_____ 6' $^{5}/_{16}$" chain (to lift engine)
_____ 4 Jack stands
_____ Hack saw (metal blade)
_____ ¼" & $^{5}/_{16}$"Fuel/brake line bender (hand held)
_____ Tube cutter
_____ Jig saw (Body cut outs)
_____ Torque wrench (Click style, ⅜" drive)
_____ Eye protection
_____ Gloves
_____ Spring compressor (Mustang disassembly only)
_____ Bucket
_____ The thing between your ears



Stick with name brand products like Eastwood®, 3M®, and Duplicolor®. The Eastwood brand coatings are great for bringing weathered and oxidized parts up to show quality. PPG brand and Dupont brand paints are excellent.

Required Supplies

_____ Engine degreaser
_____ Silicone Door and window sealant, GE Silicone II or equivalent - 4 tubes
_____ Coolant – 2 gallons of concentrate
_____ Engine oil, 5W-20 – 8 Qts.
_____ Gear oil, 80W-90 (for rear end) – 2 Qts.
_____ Transmission fluid, Mercon III Automatic Trans fluid – 4 Qts.
_____ Brake fluid, DOT 3
_____ Power steering fluid, Mercon III Automatic Trans fluid – 4 Qts.
_____ Oil filter
_____ Fuel filter
_____ Battery
_____ Spark plugs – Motorcraft AWSF-32PP (SOHC), Motorcraft AWSF-32PP (DOHC)
_____ 5 minute epoxy glue
_____ Black permanent marker
_____ Duct tape
_____ Electrical tape
_____ Bodywork supplies
_____ Rags
_____ Gojo® pumice hand cleaner
_____ Spray paint (for donor parts, pick a color)
_____ Acetone, carburetor cleaner, or other solvent
_____ Aluminum polish/cleaner
_____ 3M Super 77 spray adhesive – 1 large can

Helpful

_____ Cordless drill (w/clutch helpful, 14-18 volt units are best)
_____ #8 hex driver attachment for cordless drill
_____ Adapter for cordless to use ¼" socket driver
_____ Wire brush or wire wheel attachment for drill
_____ Flare nut wrenches ($^{3}/_{8}$" x $^{7}/_{16}$")
_____ Flat file and round file
_____ Scissors
_____ Aluminum snips
_____ Friends
_____ Pizza and beer for previous line item

Chapter 1 - Donor Parts and Parts Needed

This chapter deals with the donor parts needed in addition to the parts that we included with our kit. Many people choose to use parts from a single Mustang donor. If you are not going to use a donor car but choose to acquire parts separately, this section may still be useful. The complete list of parts required to build the FFR Roadster is included in Appendix B of this manual. For specifications on the different year cars, check out Appendix G.

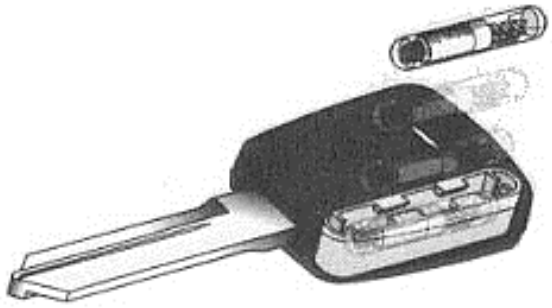
Donor Parts and the 4.6L Mustang

In 1996, the Mustang 302 5.0L engine was replaced with a 281 or 4.6L engine. There have been two different revisions to the Mustang between 1996 and 2003. The SN 95 Generation 1 (1996-1998) and Generation 2 (1999-2003). There are a few differences between the two different generations. See Appendix G for a detailed explanation of all of the differences.

Note: The 03-04 4.6L DOHC Cobra engine is not a direct bolt-in. The steering requires relocation and the hood may require modifications. The T-56 Should only be used with an IRS because the driveshaft becomes too short.

Fords Passive Anti-Theft System (PATS)

The keys for these vehicles have a tiny radio frequency transponder imbedded in the plastic Head.



When you attempt to start the vehicle, the computer sends out a RF signal that is picked up by the transponder in the key. The transponder then returns a unique RF signal to the vehicle's computer, giving it the ok for the vehicle to start and continue to run. The car will not work without the key.

1996-1997 PATS I System - This system requires at least one key in order to program another key.
1998-2002 PATS II System - This system requires at least two keys in order to program another key.

If you do not get a key with your donor, you will have to have new ones programmed by a Ford dealer or an Auto Lock specialist.

For the 1996-1998 computers, AEW has found a way to program the stock computer so that a PATS key is not necessary. The cost of the computer is $450 with exchange. Programming of the computer is extra. Contact Rob or Mark at AEW for more information (CA) 909-930-9852.

For the 1999-2004 Mustangs it is important to keep all of the boxes that are connected to the wiring harness and along with the gauge cluster. If you are not using the stock gauges, you will still need them to be connected behind the dash in order for the car to run.

Donor Part Selection Tips

Where to look

- Junkyards – If they do not have one on the lot, usually they go to auctions weekly and can get what you want.
- Newspaper classifieds.
- www.ebaymotors.com – search for wrecked mustang
- The following is a list of companies that will take all the parts needed, palletize it and ship it to you.

USA East Coast				
Connecticut Mustang	Bridgeport, CT	203 384 0525	Bob	ctmustang.com
Central Maine Must.	Pittsfield, ME	207 487 6066	Emery Pratt	centralmainemustang.com
Menard's Auto	Chester NH	603 887 4049	Rick Menard	
5.0 Pro Shop	Hollis, NH	603 579 9741		5oproshop.com
Engine Factory	Lebanon, NJ	908 236 9915	Christian Nelson	
Action Autoparts	Rochester, NY	716 424 1200	Terry Sullivan	actionautoparts.org
Fox's Auto	Dover, PA	717 292 2537	Bill Fox	
Adam Ant	Greg, VT	802 223 6070		
USA MidWest				
Body Doctor	Holland, OH	888 870 4217	Greg LaPointe	lapointeauto.com
USA South				
Mustang Parts Specialties	Atlanta, GA	770-867-2644	Greg or Ben	stangparts.com
USA West Coast				
All Mustang	Glendale, AZ	602 437 2727	Tommy Thompson	allmustang.com
A&H Motors	Los Angeles, CA	310 678 1617	Richard Gillespie	
Mustang Village	Fontana, CA	909 823 7915	Scott or Tom	
Cypress Auto	Berkley, CA	510 451 3034	Mike Percy	
Mustang Depot	Las Vegas, NV	702 281 4517		
Canada				
David Dekker	Ontario	705 741 0569		
Doug Monroe	Ontario	800 852 9757		

Price

Whether you're buying a complete salvage yard car or a bunch of parts, it's important to remember which parts are worth money to the salvage yard and which ones are of little or no value. The drive train, body panels and interior are of the most value. The other pieces such as the steering shaft, pedal box, and other miscellaneous pieces usually are very inexpensive for the yard to include. When negotiating the price from the parts yard, you might get a better deal if you let them have the parts you won't be using. Look at the donor parts list again and you'll see that the glass, body panels, interior parts, and doors are not needed. We believe it is usually better to take the parts off yourself, because you will inevitably do a better, more

careful job. If you are using parts that are already taken off, you gain the advantage of being able to cherry pick the best of those that are available. There is a wide range in prices for donor packages depending on the type of car (GT or Cobra) and mileage. Below are some rough price figures:

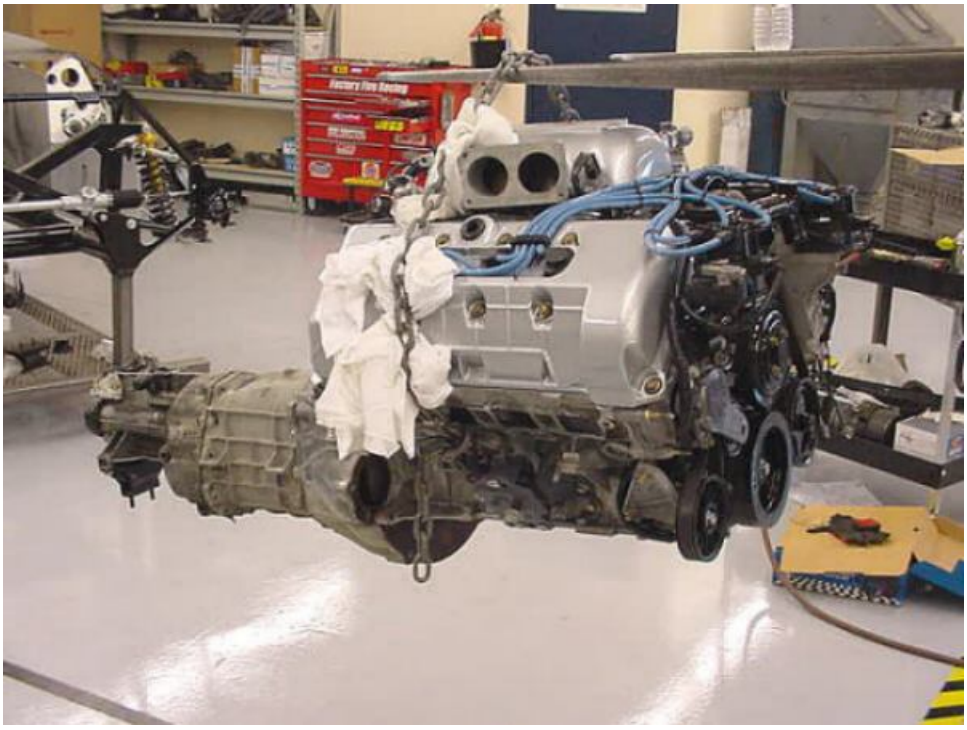
Model	Engine Type	Mileage	Price
1996-98 Mustang GT	SOHC 4.6L		$3,000
1999-04 Mustang GT	SOHC 4.6L	14,000	$4,000
96'-98' Mustang Cobra	DOHC 4.6L	70,000	$4,800
99'-02' Mustang Cobra	DOHC 4.6L	25,000	$6,500
01' Mustang Bullitt	SOHC 4.6L	40,000	$5,000
03'-04' Mustang Cobra	DOHC 4.6L Supercharged		$10,000
03'-04' Mustang Mach I	DOHC 4.6L	7,000	$7,500

Note: The 03-04 4.6L DOHC Cobra engine is not a direct bolt-in. The steering requires relocation and the hood may require modifications. The T-56 Should only be used with an IRS because the driveshaft becomes too short.

Running Gear

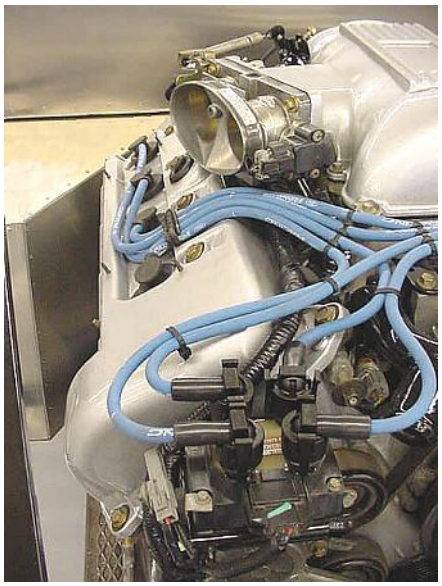
Make sure that the wiring harness, computer, sensors, ignition key and engine come from the same car. A Gen 1 harness/computer will not work with a Gen 2. In order to make a wise choice on running gear, there are several things to look for. First of all make sure that the VIN numbers on the transmission and engine are present and match the numbers on the vehicle title (if available). If the numbers don't match, (let's say the transmission was replaced) make sure the parts yard records the new numbers on their bill of sale. In the unfortunate event that these components were stolen, you need to have documentation on the origin and sale price. Check the numbers twice. The VIN numbers are located on the back of the engine block, on a flat spot between the heads and at the apex where the bell housing meets the block. Some solvent or WD-40 can usually clean this area off enough to see the numbers. The VIN numbers on the transmission are typically stamped on the side of the main transmission housing at the lower front edge of the passenger side, near the seam of the bell housing. Check these numbers against the codes listed in the Chilton's manual to find out the year of manufacture. Here are some tips to follow when checking out running gear:

- Examine the **engine mounts**. Some small splits in the rubber area of the mount are normal, but any serious splitting should be avoided.
- Check the steel sections of the engine mounts for damage since these are areas that can bend.



1997 4.6L DOHC Cobra Engine.

- The **rear end and quad shock assembly** should be free from oil leaks. Oil leaking out the sides of the 8.8" rear end near the brakes, or around the pinion snout (drive shaft connection area) is an indication that there may be more than 100K miles on the rear axle, or that it was abused. One way to check the rear end is to grab the rear wheel at the top and rock the car back and forth (by pushing and pulling in and out). This will give you an idea of free play in the axles. Some play (about 1mm) is OK. What you are looking for is a large amount of movement side to side within the housing. Avoid cars with bent axles (from rollovers or hard side hits). These are not too hard to fix but it's good to know up front when you're planning your budget.
- The easiest way to avoid engine work is to buy a donor car with an **engine that runs**. Everyone will tell you it runs, but it's best to hear for yourself. Bring a battery with you since it is usually the first thing that gets taken out. A battery also helps when some guy says, "Don't worry it runs great, but since I don't have the battery you'll have to trust me." The Mustang is computer controlled and should run well the first or second time it is turned over. If at all possible, put the car into the gear and drive it forward and backward. If you can't drive it, let it run for a moment, and then re-start it. Look for main bearing oil leaks (behind the harmonic balancer) or oil pan leaks. Leaks aren't common unless the car has high mileage.
- If the **block** has been **painted**, it is a good indication that the engine was re-manufactured since the Ford 4.6L block was never painted at the factory. Even brand new 4.6L SOHC blocks with relatively few miles on the odometer will have a surface dusting of corrosion. 4.6L DOHC blocks are aluminum up to 2002.
- Since our kit can use the original **drive shaft** (that gets shortened), the quality and condition of the slip yolk (transmission end) and the rear flange is important. The slip yolk must be smooth and clean without scores or gouges that can cause premature wear and develop leaks down the road. We recommend using only yokes



from manual transmission cars; the automatic cars have a weight that limits the universal joint movement.

- The **front spindles** should be clean, dry, and have decent rotors and calipers without much dirt or crud accumulation.
- Take a look into the **throttle body** of a low mileage car. There will be some black carbon immediately behind the plate when it is opened. A throttle body with 50,000 miles of use will have a film thickness equal to that of a piece of paper.

We have rarely seen serious problems with donor car parts. An occasional bent axle, bad steering rack, or mangled tie rod end are about all we've come across. The factory drive train is remarkably tough so try not to worry excessively about the donor parts.

Disassembly of a Mustang Donor for Parts

Ford Motor Company designs all of their cars for rapid and accurate assembly. These cars come apart quickly and easily if you remember to look at it from the assembly point of view. The rear vertical shock, for example, is not as much an individual part as it is a part of the entire rear end assembly. The engine and transmission are actually dropped in and fastened at four points (2 engine mounts, 1 transmission mount, and the drive shaft). Think of this job as a reverse assembly line and it will go faster. If you are getting ready to disassemble a Mustang, refer to the Appendix B (donor parts list). The Chilton's repair manual has good step-by-step disassembly instructions for each assembly. We have tried to be helpful here but the Chilton's manual or any other quality manual will make it that much easier. Many manuals licensed by Ford use excellent Ford drawings, schematics and diagrams.

When in doubt, don't throw it out. That one little OEM bolt could save you a trip to the auto parts store.

Radiator/Cooling System

ATTENTION: *Try to avoid spilling used coolant. Take care when handling the Mustang radiator. When removing the A/C system make sure that a service center evacuates the A/C system. Dispose of hazardous waste correctly.*

TOOLS: *¾" wrench, Metric sockets, extensions, large pliers, and waste container/bucket.*

PARTS: *Mustang radiator, hoses and fan shroud w/overflow reservoir. Refer to Appendix B.*

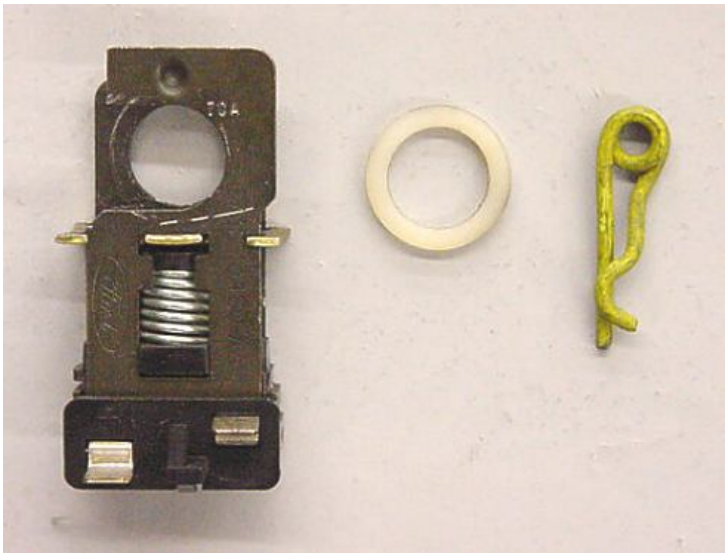
1. Place a bucket under the radiator drain petcock on the lower passenger side of the radiator
2. Loosen the radiator drain petcock with a ¾" wrench.
3. Collect all used coolant.
4. Close drain petcock and dispose of the coolant properly (local garage or parts store).
5. Loosen and remove the upper radiator hose clamp at engine block. There may be residual fluid in hoses so try to avoid spilling.
6. Loosen and remove the upper and lower hose clamps at the radiator. Save the clamps.
7. Remove the upper radiator hose.
8. Use duct tape over the inlet and outlet on the engine so that coolant will not spill as the engine is removed later.
9. Remove the coolant reservoir.
10. Loosen the brackets at the top of radiator.

11. Lift the radiator, shroud and the fan up and out of the engine bay. Keep all of the parts.
12. If the car was fitted with A/C, remove the condenser at this time. If you started with a good running car that has the A/C system intact it's your environmental responsibility to have the system purged and disposed of safely. Don't release this stuff into the ozone.
13. Disconnect the heater core hoses from the back of the engine to the firewall. Do not cut these as these will be needed.
14. Store radiator, fan shroud and overflow reservoir and all of the hose clamps in a safe place.

Brake Hydro-booster

TOOLS: *½" ratchet, Snap ring pliers, wrenches or box wrenches, tape, marker, bucket, rags.*
PARTS: *Mustang Hydro-booster, master cylinder, and power booster hoses.*

1. Remove the brake rod retainer clip from the top of the brake pedal.
2. Remember the order in which these washers and spring clips are removed so that you can reinstall them faster later.



Brake switch parts.

3. Place a bucket under the Hydro-booster.
4. Label all hoses that attach to the hydrobooster.
5. Disconnect the hoses draining them into the bucket.
6. Attach tape to the brake lines and mark their positions on the master cylinder and distribution block.
7. Remove the four bolts that connect the hydroboost mount and pedal box to the firewall
8. On the Hydro-booster, remove the snap ring in front of the retaining nut inside the car
9. Remove the nut that retains the hydrobooster to the firewall using the tool provided with the kit.
10. Remove the Hydro-booster/Master cylinder assembly from the car.
11. Thread the retaining nut back onto the booster and reattach the snap ring so they do not get lost.
12. Drain the power steering fluid from the pump.

1997 Hydro-booster, Master cylinder, Hydro-boost retaining nut and snap ring.

ABS Brakes

If power brakes are going to be used, an addition that is optional and not necessary but is very useful is the use of the ABS system from the Mustang. This does complicate the brake set-up but when driving the car the difference is noticeable. The brakeline fittings used on the controller and the Master cylinder are single flare. If ABS is going to be used label the location of the brake lines and remove all the brake lines in the front half of the car. This will minimize the number of flares needed. Remove the ABS controller and mounting bracket from the engine bay.

Steering Rack and Power Steering Cooler

TOOLS: *⅝" and 11/16" combination wrenches, Adjustable wrench, plastic deadblow hammer, long nose pliers, bucket, rags*

PARTS: *Mustang rack, rubber mounting bushings, power steering hoses/lines, power steering cooler.*

1. Disconnect the lower steering column by removing the bolt on the flexible collar in the area where the Pyramid shaped steering rack shaft begins.
2. Remove the inner clamps from the steering rack boots and pull them back.
3. Remove the steering rack inner tie rods from the rack.

4. If equipped, disconnect the power steering cooler lines from the cooler.
5. Remove the power steering cooler from the frame and save.
6. Remove the two bolts that secure the steering rack to the frame and lower the rack gently out of the car along with the power hoses.
7. Remove the cotter pins from the tie rod ends.
8. Remove the castle nuts from the tie rod ends.
9. Using the plastic deadblow hammer, hit the tie rod ends out of the spindles.
10. Throw the inner and outer tie rods away. New shorter ones are provided in the kit.
11. Keep the rack body and boots.

Engine Bay Sensors and Electrical Connections

ATTENTION: *Remember to identify both ends of every connector disassembled.*
TOOLS: *Socket set, combination wrenches, Phillips head screwdriver, slip joint pliers, tape, marker.*
PARTS: *EGR assembly, vacuum lines, starter solenoid, mass air meter, fuel line parts.*

1. Disconnect and remove the battery.
2. Disconnect and remove the Barometric Air Pressure sensor from the firewall behind the engine.
3. Disconnect and remove the mass air sensor and air filter housing. Store with the computer.

Mass Air Meter and Air Filter housing.

4. Disconnect the throttle cable from the throttle body on the engine.
5. Cut the heater core hoses from the firewall on the passenger's side making sure to leave the bends intact on the larger hose so it can be used to complete the coolant circuit loop.
6. Remove the braided ground strap from the rear driver's side of the engine.
7. Follow the fuel lines off the engine and cut the lines 4" after they turn into the hard plastic line after the pulse dampener (round disc in the fuel line).

8. Remove and discard the front driver's side plastic wheel well using a 7mm socket to loosen it from the body.
9. Disconnect and remove the horns. They are located just forward of the wheel well on the driver's side (accessed from the wheel well). Label and mark the connectors with tape.

Interior

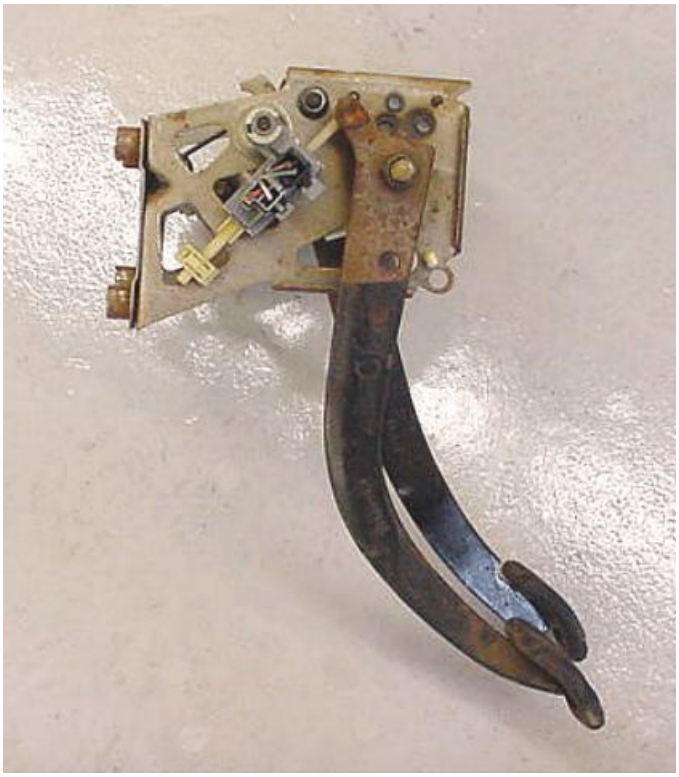
TOOLS: *Socket set*
PARTS: *None.*

1. Remove the seats from the car.
2. Remove the center consul cover.
3. Remove the carpet from the car.

Pedal Box, Accelerator Pedal and Clutch Cable

ATTENTION: *The pedal box comes unpainted from Ford. Even on newer cars there is a light coating of rust on this part. You can clean and paint this part. Take care to avoid painting any of the moving parts.*
TOOLS: *Socket set wrenches, Phillips and flat head Screwdrivers.*
PARTS: *Mustang pedal box, accelerator pedal and clutch cable.*

1. Remove the clutch cable from the pedal box by releasing the automatic tensioning cog from the toothed clutch pivot on the pedal box assembly. This is done by pushing on the round end of the mechanism while moving the cable wheel toward the firewall. The clutch cable can be easily released from the grooved wheel at this point.



Pedal box assembly

2. Unbolt and remove the pedal box.
3. Disconnect the accelerator cable from the accelerator pedal.
4. Unbolt and remove the accelerator pedal.

Computer

TOOLS: *Socket set*
PARTS: *Mustang Computer and OEM plastic cradle.*

EEC-V computer.

1. Remove the kick panel in the passenger footbox.

2. Disconnect the ground strap in the footbox next to the computer.
3. Remove the computer and its plastic holder from the passenger footbox area.

Gauge Cluster

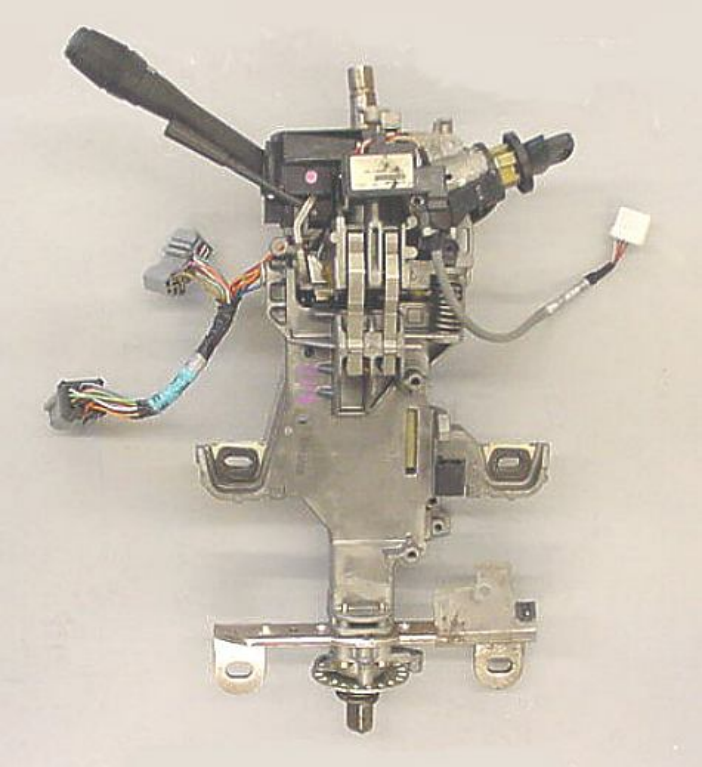
TOOLS: *Socket set, Phillips head screwdrivers, Needle-nose pliers.*
PARTS: *Mustang Gauges.*

Note: Due to the anti-theft wiring/programming, the 1999-04 Mustangs require the gauge cluster to be hooked up even if you are going to use aftermarket gauges.

1. Remove all visible screws from the dash gauge pod. You can reach the two screws above the instrument pod with a short Phillips head screwdriver. The two gauge wiring connectors are removed from the gauge cluster by squeezing the outside clips.
2. The two gauge wiring connectors are removed from the gauge cluster by squeezing the outside clips.

Turn Signal and Ignition Switches

TOOLS: *Socket set, extension, T-15 Torx Screwdriver, needle nose pliers.*
PARTS: *Mustang turn signal assembly and ignition parts.*



Steering column (with ignition, turn signal stalk, and under dash mounts).

1. Remove the steering column mounts located under the dash above the driver floor. Allow the column to fall down, once it is free of the dash and the wiring connectors have been removed from the turn

signal and ignition switches, pull it straight back. It may be difficult but it will come loose. The housing for the upper column comes with mounts for the turn signals and the ignition.

2. Remove the turn signal stalk from the column.

Note: The turn signal stalk also has the Hazard switch built into it.

Turn signal stalk.

3. Remove the ignition key and anti theft module from the column.

Key and anti-theft module

Dash Wiring Harness

PARTS: Dash wiring harness, Traction Control switch (If equipped)

Note: The wiring comes out in stages. Keep the sub-assemblies together as they are removed. Remember to identify both ends of every connector that you disassemble. The easy way to do this is to tape and number each side of the connector the same or use colored zip ties. The connectors will only work if they're mated to the other similar shaped connector. ***Almost*** *every connector is different in the car, so cross wiring is rare. Labeling will help speed up the job later.*

1. Remove the dash from the car.
2. Remove the wiring harness and all of the "black boxes" hooked into it from the dash. Mark all of the connectors to prevent any confusion later.
3. Disconnect the connectors from the headlights and engine harnesses marking each connector with what it connects to.
4. Remove the traction control switch from the car if it is so equipped. If you do not want to use the switch you can use a SPDT switch available at Radio shack or Home Depot.

Note: If the traction control switch is not plugged in, the computer by default will leave the traction control ON which will make the engine cut power ~5000 rpm under heavy acceleration (really annoying). It is a good safety precaution though if someone else will be driving the car that is not used to the performance levels capable from this kit.

Front Wiring Harness

TOOLS: *Socket set, extension, regular, Phillips head screwdrivers, needle nose pliers, hammer, and marker tape.*
PARTS: ***F****ront wiring harnesses.*

1. Remove the front harness from the engine bay wall working from the driver footbox area around the front to the passenger side connectors. Unscrew any ground wires and mark the connectors.
2. Pull the rubber bushing through the firewall with the wires into the engine bay.

Speedometer sending unit and Clutch Cable

TOOLS: *Socket set, duct tape.*
PARTS: *Speedometer sending unit, clutch cable.*

1. Remove the wiring harness plug from the sending unit.
2. Remove the speedometer sending unit bolt using an 11mm socket.
3. Pull the sending unit straight out.
4. Replace the screw in the transmission once the sending unit is removed.
5. Cover the speedometer drive hole with tape to prevent dust and dirt from entering.
6. Remove the clutch cable cover from the bell housing and push the cable out of the clutch fork.
7. Remove the cable sheath retainer clip. Pull the cable out and replace the clip on the cable. You may even want to tape it in place.

Clutch cable and retainer circlip.

Shifter and Shifter handle

ATTENTION: *The kit comes with new bolts for the shifter handle so you don't need the OEM bolts. Save them anyway according to rule #85 of the car guys' handbook which states "save any and all fasteners in rusty coffee cans" (This, of course, makes finding and using such fasteners in the future all but impossible but it makes us feel good). Depending on the transmission being used, it is possible to reuse the Mustang shifter handle if you so desire.*

TOOLS: *Socket set, Phillips head screwdriver, duct tape*

PARTS: *Shifter*

1. Remove the shifter knob from the handle.
2. Unscrew the plastic console that retains the boot.
3. Remove the shifter boot and unbolt the rubber boot below it.
4. Unbolt and remove the shifter and handle from the cockpit.
5. Duct tape over the handle hole and the output shaft opening.

Emergency Brake Handle

TOOLS: *Socket set, Philips head screwdriver.*

PARTS: *Mustang emergency brake handle and "T" cable.*

1. Hold the emergency brake handle button in and push the handle all the way down.
2. Under the car locate the "T" junction and short cable attached to the handle. This is where the two rear cables attach to the handle.
3. Pull on the "T" cable coming from the handle it should move a few of inches.
4. Carefully remove one brake cable from the "T" at a time.
5. Unbolt and remove the emergency brake handle.

Transmission Wiring Harness

1. The transmission harness must be removed along with the rubber plug. This runs along the driver's side of the transmission tunnel.
2. Store the rear harness and transmission harness.

Fuel Inertia cut-off switch

ATTENTION: *We recommend the use of a fuel inertia cut off switch in your car.*
TOOLS: *Socket set, nut driver, Phillips head screwdriver, wire cutters to cut plastic fasteners, marker pen, and tape.*
PARTS: *Fuel inertia cut-off switch.*

1. It is recommended that a fuel inertia cut-off switch be used in the car. In the Mustang, it is located driver's side next to the rear taillights.
2. From inside the trunk, unscrew the panel covering the driver side taillight.
3. The inertia cut-off switch is a small black box (about 2" x 3") with either a red or white button on top. Cut the inertia switch wires where they enter the rear harness.

Inertia cut-off switch.

Rear Wiring Harness

ATTENTION: *When handling a wiring harness, avoid cutting any leads without finding their source and final connection. Ford uses multiple grounds in circuits and cutting any line may interrupt a circuit. Keep any/all seemingly useless leads intact and handle the harness with care. If you decide to cut your harness down (remove all non-essential wires) follow a wiring schematic. A list of schematics is in chapter 3 in the reference material section.*
TOOLS: *Socket set, nut driver, Phillips head screwdriver, wire cutters to cut plastic fasteners, marker pen, and tape.*
PARTS: *Donor car rear wiring harness.*

1. Remove bulb bases from the rear light housings if they are still on your donor. Use tape and a marker to label the wires.
2. Remove the rubber body plug from the fuel harness exit point in the base of the trunk area and unplug the connector.
3. Follow the rear harness toward the front of the car pulling it away from the wall of the car as you go. It is helpful to remove the panels that cover the harness as it goes into the cockpit. This makes pulling the wire assembly through easier.
4. The rear harness ends at the front driver's side of the cockpit.

Exhaust

ATTENTION: *Handle the Mustang Catalytic Converters with care since the honeycomb inside breaks easily. Most parts yards will want these, since they get a recycling credit for each. They are not used.*

TOOLS: *Combination wrench set. $^{11}/_{16}$" socket, socket extension, adjustable wrench and hack saw.*

PARTS: *Mustang exhaust bushings (rubber), O_2 Sensors.*

1. The rear exhaust is removed from the H-pipe in the middle area of the car with four bolts.
2. Keep the rubber bushings that hold the rear exhaust up. You will use these small oval rubber pieces to hang the rear post on the side exhaust to the frame.
3. The H-Pipe is mounted to the headers using four nuts, and is mounted to the transmission cross-member with sliding ⅝" pins inside rubber sleeves.
4. The air tube is connected to the H-pipe and must be loosened or cut off.
5. Disconnect the O_2 sensors from the engine harness.
6. Remove the nuts connecting to the headers so that the H-pipe can be moved rearward sliding the pins out of the transmission cross-member sleeves.
7. Lower the H-pipe assembly and remove.
8. Remove the O_2 sensors from the H-pipe with an adjustable wrench. Do not touch the ends. Store in a safe place.

Engine Removal

ATTENTION: *Make sure to use an engine hoist that has sufficient load capacity for the job. Use extreme caution when moving engine assembly. Work on a clear and level surface.*

TOOLS: *Engine hoist, socket set, combination wrenches, floor jack, used tire or engine stand, rags.*

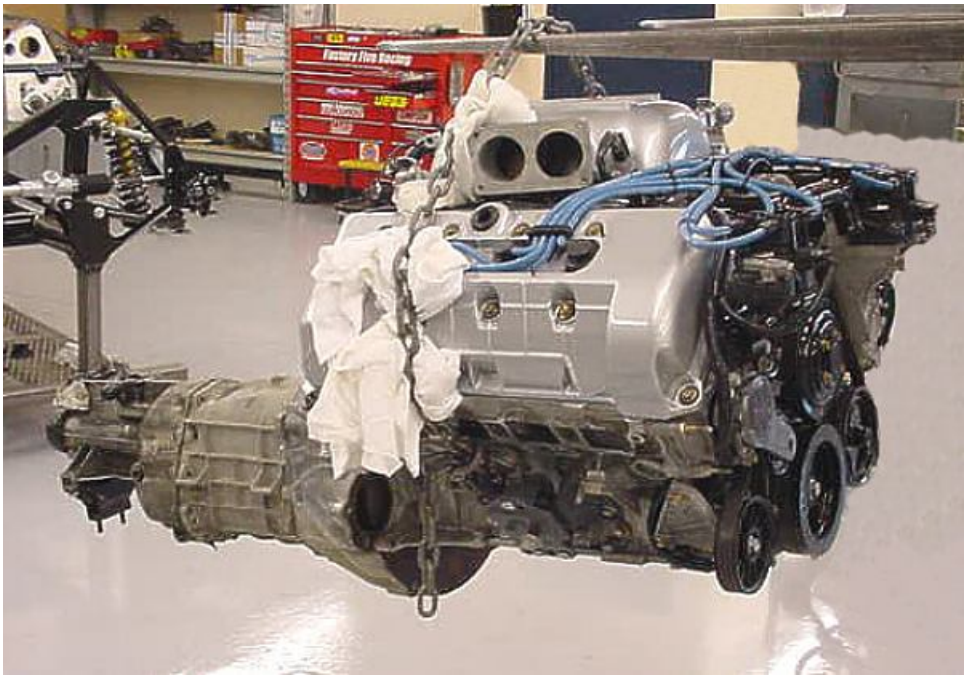
PARTS: *Mustang engine/transmission assembly, engine mounts, transmission mount, OEM fasteners.*

1. Remove the two large nuts that hold the engine mounts to the frame of the car. The driver's side bolt-hole is notched for ease of removal. The passenger's side engine mount has a single bolt hole.
2. Disconnect the drive shaft from the rear end pinion Using a 12-point 12mm wrench or socket.
3. Remove the drive shaft carefully. Do not damage the front snout. Thread the bolts back into the rear end so you do not lose them.
4. Drain the transmission fluid. This can be done on the passenger side of the transmission through the plug with the square socket on it. Use a ⅜" ratchet handle to undo it.
5. Tape over the rear of the transmission so that it doesn't leak or drip fluid.
6. Undo the transmission from the cross-member.

7. Loosen the cross-member attachment bolts.

ATTENTION: *Get help with the next few steps, as the parts involved are heavy*!

8. Wrap chains through the back of the engine mounts and bolt the chain together for lifting. This will give you a balanced lift point.
9. Attach an engine hoist to the chains.



1997 4.6L DOHC Engine and T-45 transmission on hoist

10. Take up the slack on the chain slowly. Check to make sure that no hoses or wires remain connected to the engine.
11. Remove the bolts from the transmission cross-member and remove the cross-member.
12. Check again to make sure that all wires and straps are removed.
13. With one person inside the car guiding the rear of the transmission, lift the engine off the engine mounts and guide it out of the engine bay. Watch your fingers!
14. Set the engine/transmission assembly on an old tire with no rim or on an engine stands.

2003 4.6L DOHC Engine and 3650 transmission

15. There is an exhaust H-pipe tube holder plate sandwiched between the transmission mount and the transmission that must be removed. All you need is the transmission mount with the two bolts sticking down.

Front Suspension

ATTENTION: *The front springs are compressed in their fitted positions even when the suspension pieces are lowered in their mounts! These springs will cause serious injury if you are not extremely careful.*

TOOLS: *Spring compression tool, socket set, combination wrenches, breaker bar, tubing cutter, floor jack, jack stands, chain, long nose pliers, rags, balljoint removal tool or plastic deadblow hammer.*

PARTS: *Brake calipers, rotors, spindle, front control arms.*

1. Loosen the lug nuts on the front wheels.
2. Raise the front of the car up with a floor jack, support with jack stands.
3. Remove the front wheels.
4. Disconnect the front sway bar and remove the mounts from the control arms.
5. Follow the flexible brake line from the front brakes to the mounting bracket on the body, cut the steel brake line 4" after the bracket.
6. Remove the bracket clip from the brake line body mount keeping them to use later.
7. Pull the brake line through the bracket. Put a rag or duct tape over the end to prevent brake fluid from dropping on the floor.
8. Put a jack underneath the ball joint on the lower control arm.
9. Chain the spring to the chassis or lower control arm.
10. Use a spring compression tool to compress the front springs.

11. Slowly lower the Jack, and the strut assembly will come out of the body mount (sometimes violently) and allow the lower control arm to go down.
12. Remove the springs with extreme caution!
13. Unchain the spring once it is removed from the car.
14. Uncompress the spring compression tool slowly.
15. Remove the two bolts that attach the strut to the top of the spindle and save.
16. Remove the cotter pin from the lower control arm castle nut.
17. Remove the castle nut
18. Use a balljoint separation tool or deadblow hammer the balljoint through the spindle.
19. Remove the spindle from the car.
20. Remove the large bolts and nuts from the lower control arm mounts. These bolts and nuts should not be heated, get a big wrench and breaker bar to remove them.
21. Remove the lower control arm from the car.

Fuel Tank

ATTENTION: *Extreme caution should be used when handling and storing used fuel tanks. Make sure to close off openings. Use the factory cap and seal off open fuel line ends. Keep the tank level. Avoid dropping the fuel tank as the baffles and fuel pump inside are subject to damage. For more information, refer to Chilton's or other repair manual for fuel system assemblies.*

TOOLS: *Socket set, combination wrenches, small regular head screwdriver, floor jack, jack stands, fuel line disconnect tool, goggles with side splash protection, rubber mallet.*

PARTS: *Donor car fuel tank w/integral plastic fuel tank lower cover, mounting straps, fuel cap, fuel filter, evaporative canister, and vapor line.*

1. Loosen the rear wheel lug nuts.
2. Raise the rear of the car and place on jack stands.
3. Open the gas cap to relieve any pressure built up in the tank.
4. Remove the screws that hold the upper fuel cap and flange to the body of the car.
5. Remove the set screw and metal ring collar retainer from the fuel neck where it meets the tank.
6. Remove the fuel neck from the upper fuel fill area and slide the lower fuel tube out of the rubber grommet on the side of the tank.
7. The fuel tank is held in place with two straps that go under the tank and bolt to the body in front.
8. Place a floor jack under fuel tank and loosen the strap bolts.
9. Remove the bolts and lower tank enough to reach the high-pressure fuel lines and return lines located on the top of the tank, on the passenger's side.
10. Use a fuel line disconnect tool or two small screwdrivers to remove the fuel line from the smaller low-pressure return line on the fuel pump.
11. Disconnect the fuel line at the fuel filter by removing the small white clip with a regular head screwdriver.
12. Pull the fuel vapor hose off the plastic fitting on top of the gas tank.
13. With the help of a friend, drop the gas tank and store on a level surface.
14. Re-install the fuel neck into the tank with the ring collar and screw that retain the fuel neck to the side of the tank.
15. Remove the rear strap retainer by removing a pin that is contained inside a sheet metal box mount. Use a small screwdriver or pushing tool to push on the pin from the side as you push upwards to align it to the exit hole. The pin is a very loose fit and you will see that this is not very difficult.

16. You should have the tank, plastic cover, straps. Store these items.

Rear End

ATTENTION:

- *The rear end assembly weighs 225 lbs. Use caution when removing this assembly. Use extreme caution when removing any compressed coil spring. Make sure not to damage, dent or crimp the brake lines mounted to the rear end. If using an independent rear suspension, you will still need to remove the quad shocks but you do not need the frame brackets.*

TOOLS: *Cordless drill, ¼" drill bit, socket set, combination wrenches, duct tape, tire iron, floor jack, and jack stands.*

PARTS: *8.8" rear-end assembly, complete with quad shocks and springs. Rear brake assembly w/lines. All rubber bushings and OEM fasteners.*

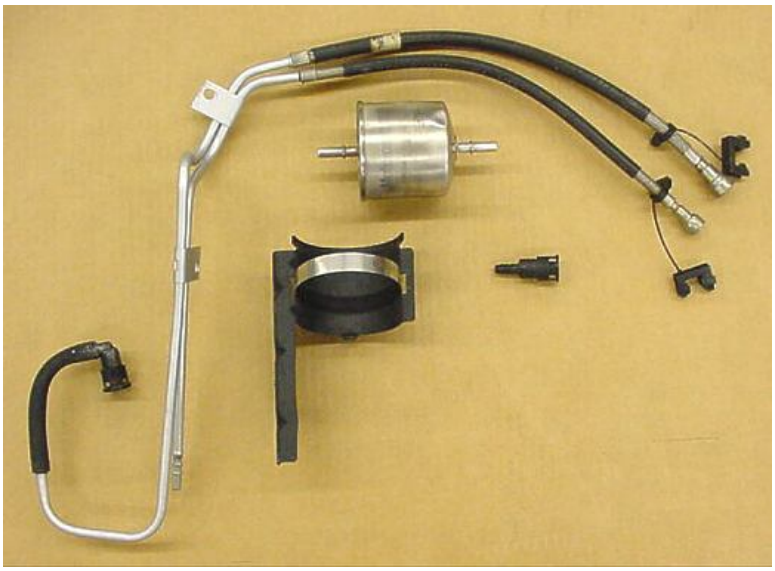
12. Remove the rear wheels.
22. Remove the flexible brake line from the body-mounted bracket.
32. The brake cable sheath is held onto the body on the left and the right sides at the point where the sheath ends. A 13mm, 12 point wrench will help push the pins in so that the cable will release from the socket. Slide the wrench over the cable to the bracket with the sleeve in it. Push the sleeve and wrench towards each other, then pull the sleeve out of the bracket.
42. Put a jack on the flat part of the middle of the rear axle.
52. In the trunk/hatch area of the car, undo the nuts on the top of the vertical shock absorbers.
62. On the axle, undo the bolt that secures the quad shock using a 15mm socket. Move the shock out of the bracket and replace the bolt so that it will not get lost.
72. Lower the jack slowly with the rear end so that they come down together.
82. When the rear end has dropped down low enough, you can easily remove the coil springs. Save the rubber bushings above and below the springs.
92. Remove the OEM bolts and nuts from the lower rear Mustang control arm, where the arms are mounted to the body/chassis.
102. Remove the OEM bolts and nuts from the upper Mustang control arm, where the arms are mounted to the body/chassis.
112. All of the arms should remain attached to the rear end assembly. Once off, place the OEM bolts back into the arms and attach nuts so they do not get lost.
122. Remove the rear end from under the car.
132. Remove the brackets that secure the quad shocks to the frame. Make sure you get the complete bracket and not just the shock.
142. The sway bar is located under the lower control arm and remains there. It can be used on our car but we do not recommend it. The sway bar does not improve the handling of the car.
152. Use a drill with a ¼" bit to drill out the rivets on the brake bracket, which retain it to the body above the differential. Keep this bracket for use later.

Fuel filter and lines

TOOLS: *Socket set, small flat head screwdriver.*

PARTS: *Rear fuel lines and fuel filter mount.*

1. Remove the fuel filter and fuel filter mount from the frame.
2. Disconnect the rear fuel lines going from the tank to the filter and the return line to the tank from the frame and store these parts.



96-98 Donor fuel system parts.

Donor Part Preparation

Rear Coil Springs

Rear coil spring.

1. Remove the rubber spacer from inside the coil.
2. Cut one full coil from the top of the spring for correct ride height setting.

3. Cut the upper rubber spring seat so that during assembly of the kit, it will conform to the spring mount on the frame. This is done with one cut across the part. Do not replace these bushings with aftermarket silicone pieces, as these will allow the springs to slide since they contain a slippery release agent in them.

Rear End

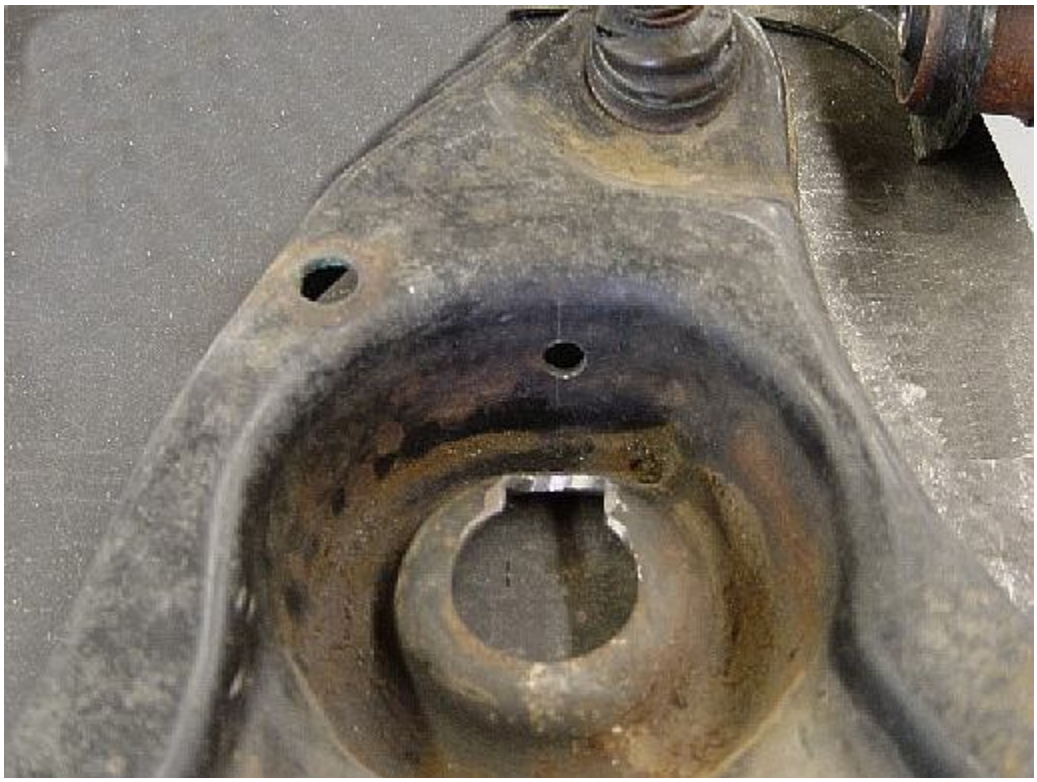
1. Change the rear end oil. See Appendix H for specifications and capacities. It is easier to do out of the car and probably hasn't been done for a while if at all. RTV is good to use to seal the cover.
2. Remove the shock mounts from the axle. These will be used on the front control arms for the coil-over shocks.
3. Drill the lower control arm mount holes with a 9/16" drill bit.
4. Swap the left and right flexible brake line mounts left to right so that the junction block is on the driver side. (unless you are going to use the ABS system).

Front Lower Control Arms

Note: The area, near the center of the spring mount, needs to be bent or removed to prevent damage to the coil-over unit thru any contact whatsoever. Check clearance with the new shock and the new mount. These parts must move freely without contacting the control arm surface.

Stock front lower.

1. If using the stock front loser control arms, drill a ½" hole in the spring seat area shown in the picture below using the rear end shock mount as a guide for height. If the hole is drilled too low, you will have to clearance the middle of the spring area so the shock will not hit when installed.



Drilled and modified front lower control arm.

2 Attach the rear shock mount to the control arm through the hole in the spring seat with the small leg sticking up.

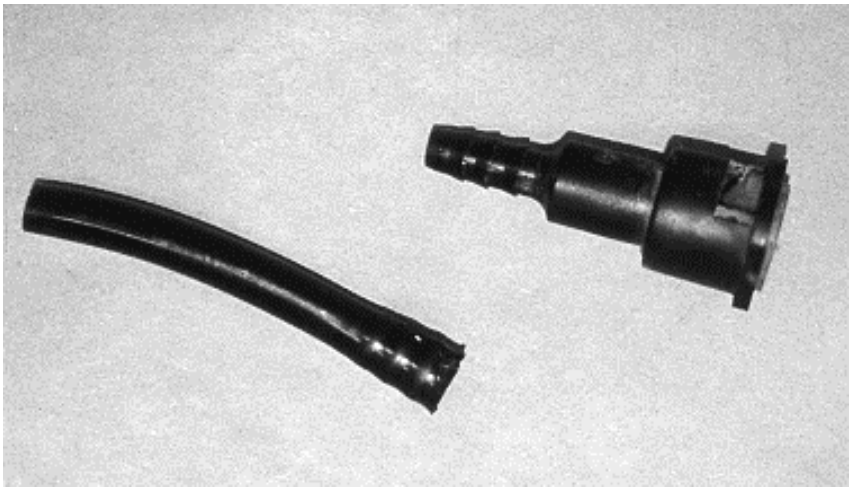
3 Check clearance with the new shock and the new mount. These parts must move freely without contacting the control arm surface.

Fuel Line Fittings

TOOLS: *Razor knife*

PARTS: *Donor plastic fuel line fittings from fuel filter to body hard line and from the body hard lines to the engine.*

1. Cut the hard plastic off both the metal return line fitting on the engine and the plastic barbs.



Barbed fitting removed from plastic hose.

2. Cut the metal fuel line off the Fuel Pulse Dampener (disc shaped object in the fuel send line) on the inlet side.

Fuel Tank

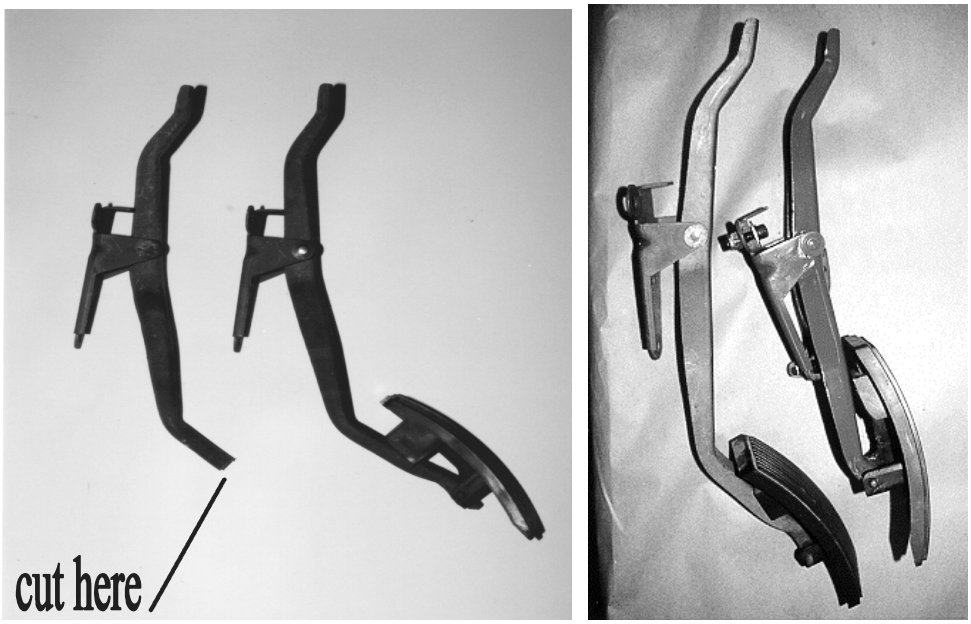
TOOLS: *Pliers*
PARTS: ***Fuel Tank***

1. At the locations on the tank where the tank staps come near the tank, use a pair of pliers and bend the bent parts flat.

Pedal Box and Accelerator Pedal

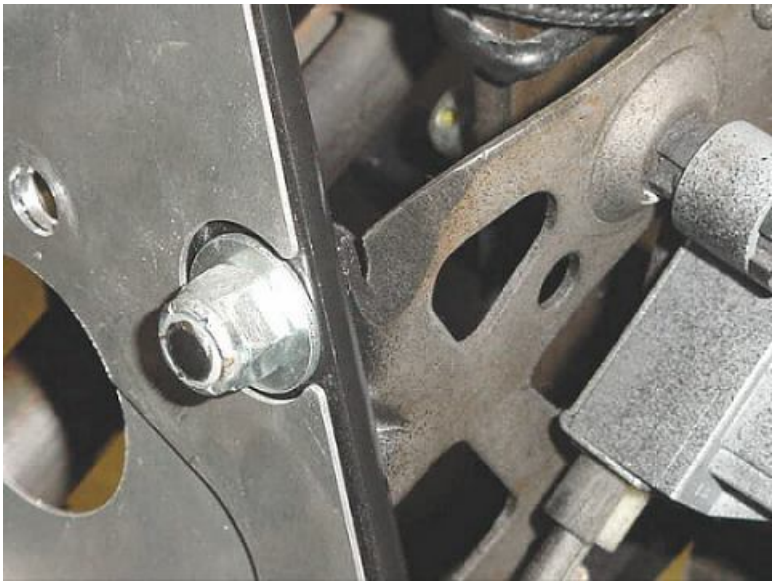
TOOLS: *Hack saw, Drill, Drill bits, pliers,*

1. Remove the plastic part of accelerator pedal by pushing out the pin.
2. Trim the accelerator pedal as shown, just above the plastic pedal support pad. It is possible to mount the original plastic pedal piece onto the shortened pedal if desired. This can be accomplished by squeezing the bottom of the trimmed pedal and drilling a hole for the stock pin.



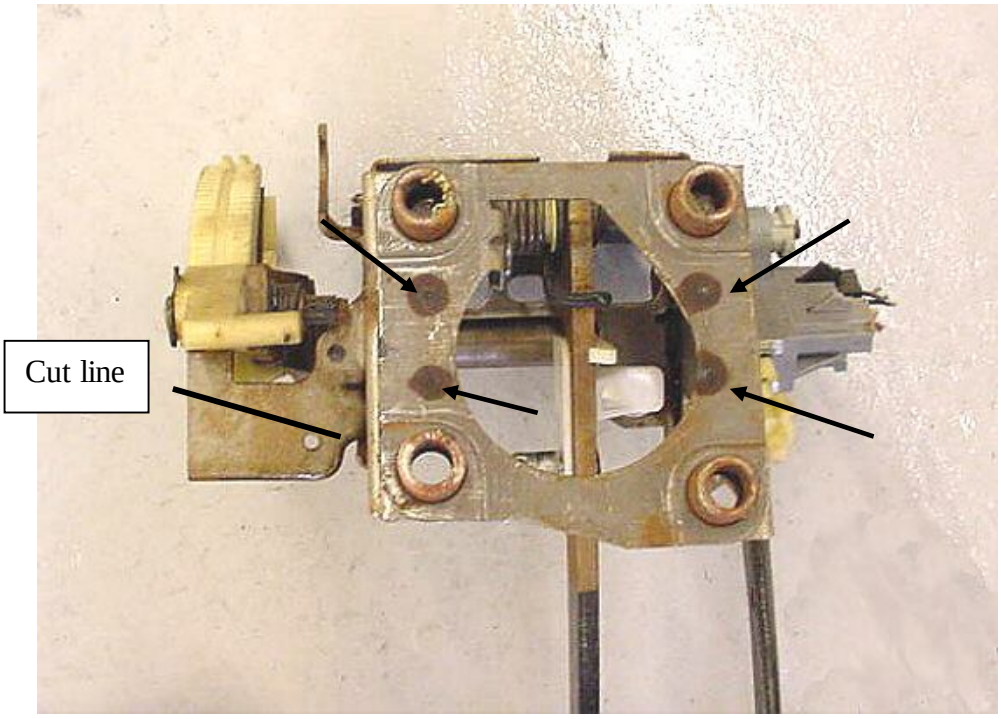
Accelerator pedal modified.

3. Cut the corner off the outside top of the pedal box.



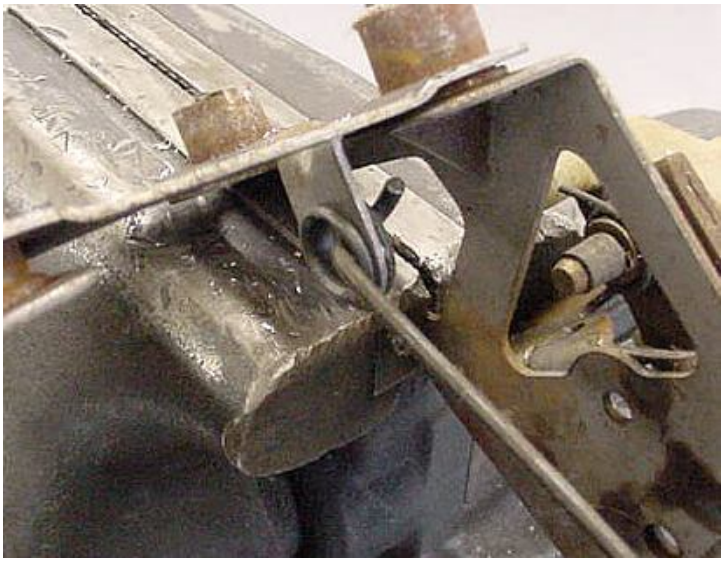
Top outside of pedal box.

4. Remove the cruise control switch located under the plastic clutch quadrant on the right side of the pedal box.
5. Drill out the four spot welds on the front face of the pedalbox shown below. Remove the plate and spacers and throw them away.
6. Cut off the corner of clutch quadrant stop shown in the picture below for accelerator pedal clearance.

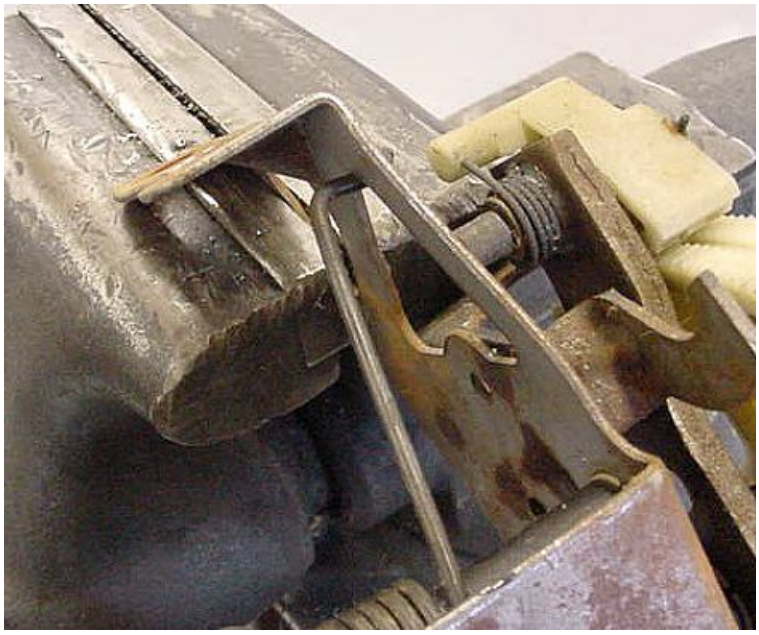


Locations of spot welds and area to remove on clutch quadrant stop.

7. Remove the brake pedal spring from its mount hole and remove the plate on the front of the pedal box along with the round spacers.


Brake pedal spring in mount hole and plate/spacers on pedal box front.

8. Relocate brake pedal spring to pedal box triangular opening.



Brake pedal spring in triangular opening.

Note: If you are not using the hydro-boost/power brakes and you are using manual brakes, it is necessary to modify the brake pedal to put more pressure on the master cylinder. There are two ways to change the brake pedal.

Cut the existing pedal.

1. Unbolt the brake pedal from the pedal box
2. On the pedal box, measure down 1.5" from the stock location and mark the pedal box on both sides.
3. Drill a new mounting hole through both sides of the pedal box.
4. Cut the brake pedal between the bolt and the master cylinder push rod attachment. Remove 1.5" from the middle and MIG weld the pedal back together. Make sure the top piece where the bolt is located is oriented correctly, as the spacer on each side of the pedal are different.

Note: By keeping the master cylinder push rod in the same place and lowering the brake pedal bolt, more pressure is put on the master cylinder when the pedal is pressed.

Wiring Harness

Many people choose to cut down the wiring harness to use only the wires and leads that are needed. You can save about 20 lbs. by doing this. Be sure to follow the schematics and avoid cutting circuits you need. Some suggested parts to remove are:

1. Speaker wires
2. Radio wiring
3. Rear defrost wires
4. Heater wires
5. Air bag blue boxes and wires
6. Power seat and window controls.
7. Remote trunk release wires

Not only does this take weight out of the car, it gives additional room behind the dash. Look at the plugs and compare them to a Chilton's manual to make sure you are cutting the correct plug before actually cutting.

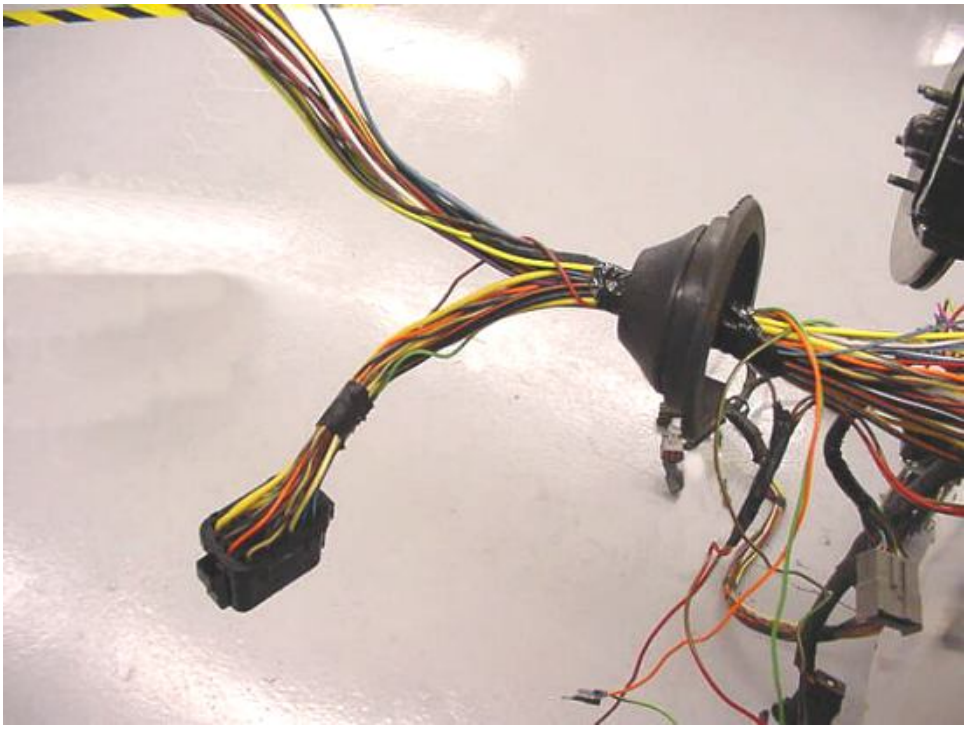
TOOLS: Razor knife, electrical tape.

Note: The following 2 steps can be done two ways, cut and move the firewall grommet or cut a hole in the top outside panel of the footbox (near the front) for the connector to attach through. This would allow the grommet not to be cut.

1. Cut the front wiring harness firewall grommet so that it can be taken off the harness.

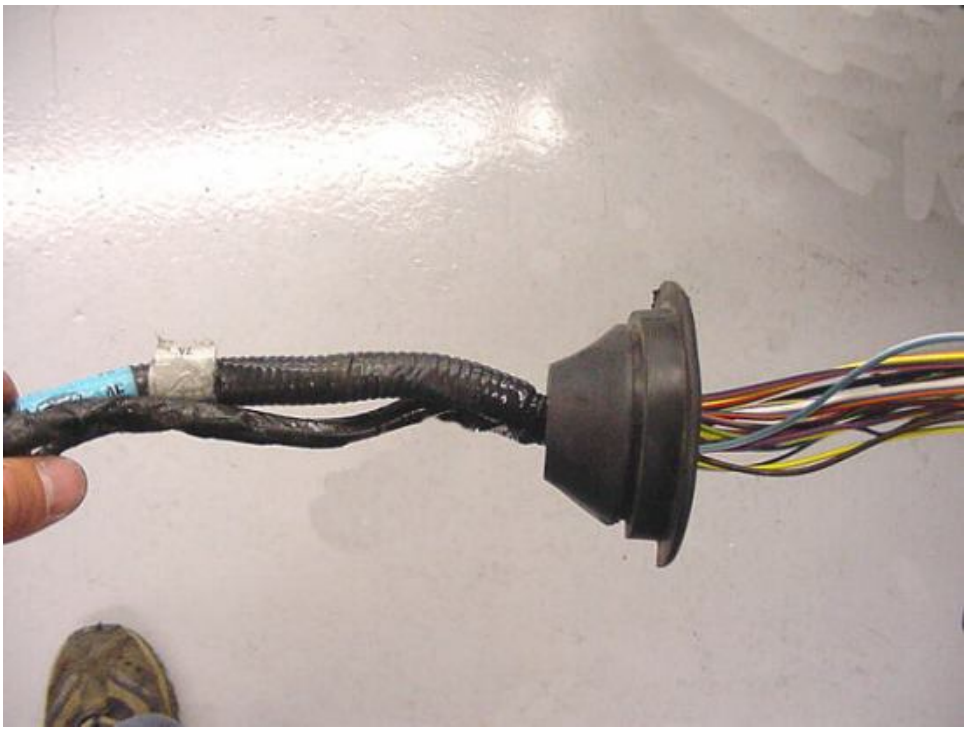
Front harness grommet cut.

2. Move the harness grommet backwards on the harness behind the short wiring "branch with the large rectangular plug on it. All of the remaining plugs should be pulled back behind the firewall plug.



Grommet relocated.

3. Rewrap the harness with electrical tape from where the grommet was back to the new grommet location.



Harness rewrapped and covered.

Driveshaft

Shortening a driveshaft is not for the "Do-it-yourselfer". Take the driveshaft to a professional shop to have it shortened. If you don't know of one, ask a local auto parts store or search the yellow pages. See Appendix A for the driveshaft diagram to provide the shop with instructions. Make sure your shop puts new U-joints on your shortened driveshaft and balances it (a pro does this anyway). You should expect to pay about $100.

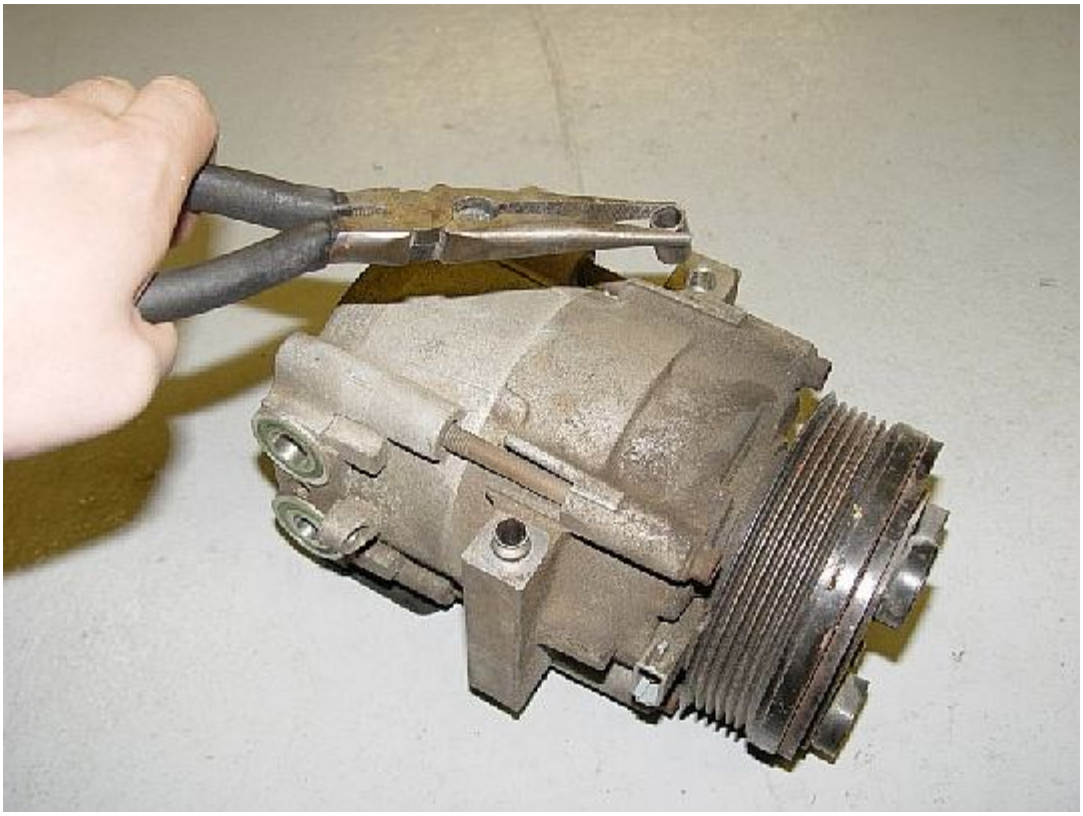
Engine Preparation

TOOLS: *$^{3}/_{8}$", ¾", $^{7}/_{16}$" sockets, $^{5}/_{16}$" hex keys, regular screwdriver, Teflon tape, tube bender, $^{9}/_{16}$" deep socket, ½", $^{9}/_{16}$" combination wrenches, $^{5}/_{16}$" drill bit, drill.*

1. If you are using a Lakewood bell housing, trim the area around the starter so that is flush with the inspection cover.
2. On the engine coolant bypass hose (located in the middle of the engine going to the thermostat housing), cut the last four inches off the bottom curved end.

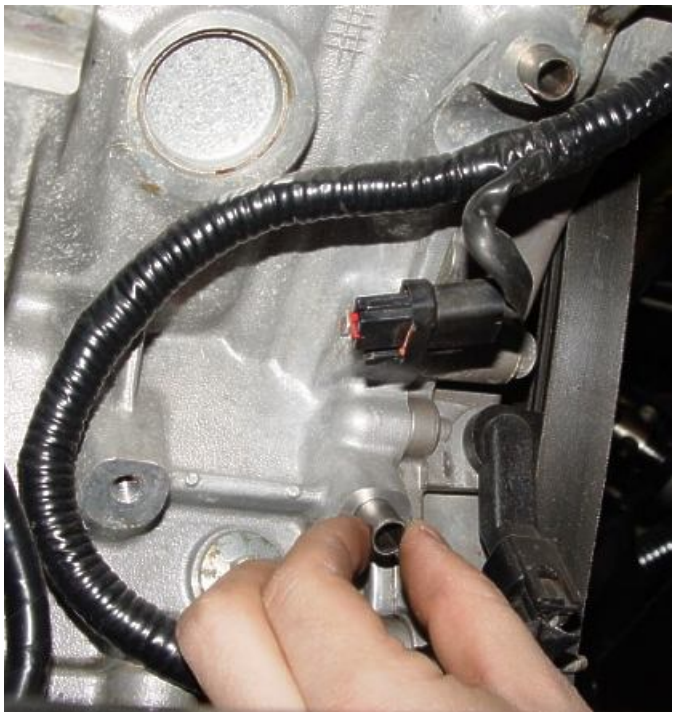
Coolant bypass hose.

3. Remove the A/C compressor from the engine. Remove the spring pins from the A/C bracket.



Removing Spring Pins from Compressor bracket.

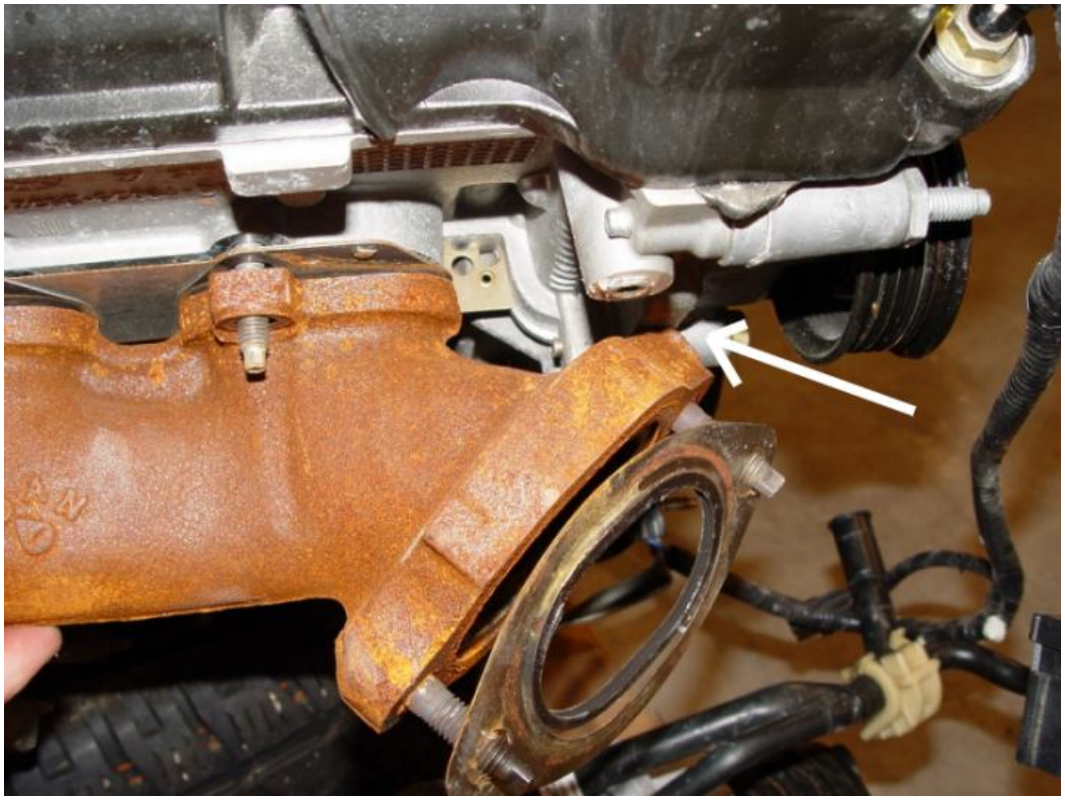
4. Insert the spring pins back into the two front holes on the block. It may be helpful to put a dab of silicone to hold the pins in place until the bolts are installed.



Inserting spring pins into block.

5. If you are not running emissions equipment, the only engine controls that need vacuum are the PCV valve in the valve cover and the fuel pressure regulator. The EGR can be left unhooked. Make sure to close off any extra vacuum ports.
6. If you are not running emissions equipment, the hoses, mounts and solenoids can be removed.
7. If using shorty headers, mount them to the engine upside down. The header stays on its' original side, it just gets turned over so that it points forward. The passenger side may need to be filed or ground slightly to clear the engine block.

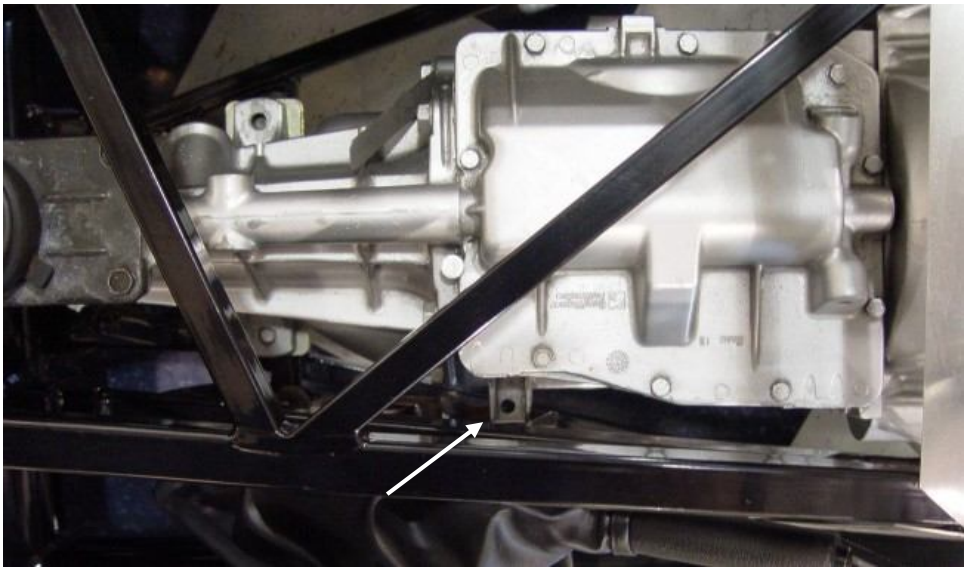
Driver side manifold.



Passenger side manifold. Note the casting touches the block.

Transmission

1. If you are running a T-5 Transmission, remove the casting tab with the hole in it that is sticking out on the passenger side with a hack saw.



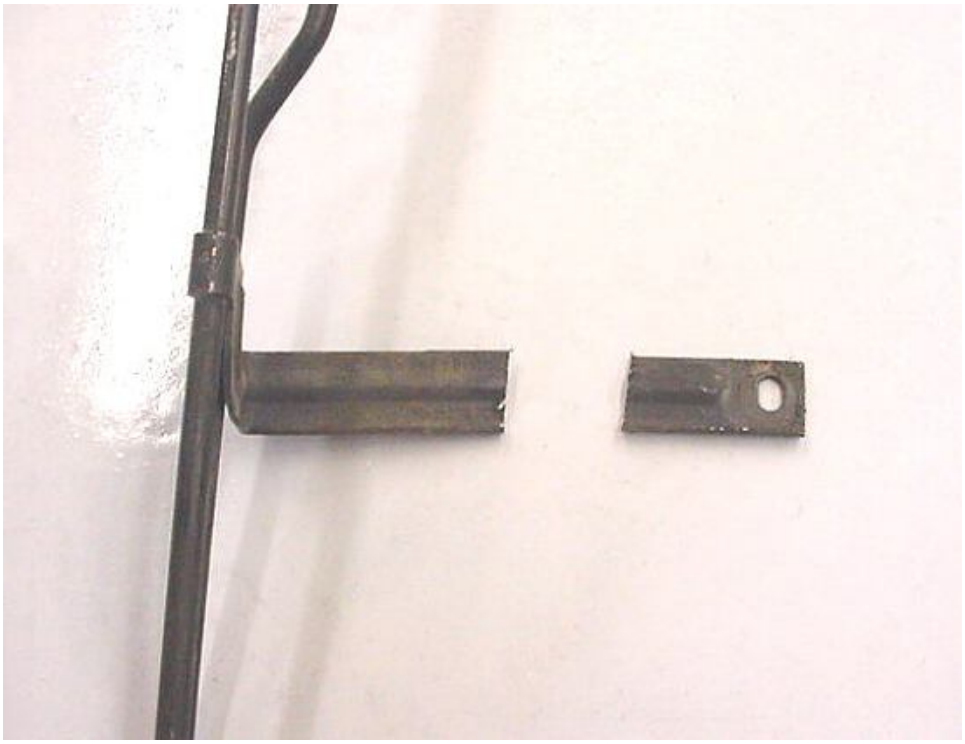
T-5 mounted in frame. Note the tab to be removed.

Power steering Cooler (If Equipped)

Note: Ford changed the design of the steering cooler in 2000 to one that has radiator like fins on it. This type supercedes the earlier plain tubular version.

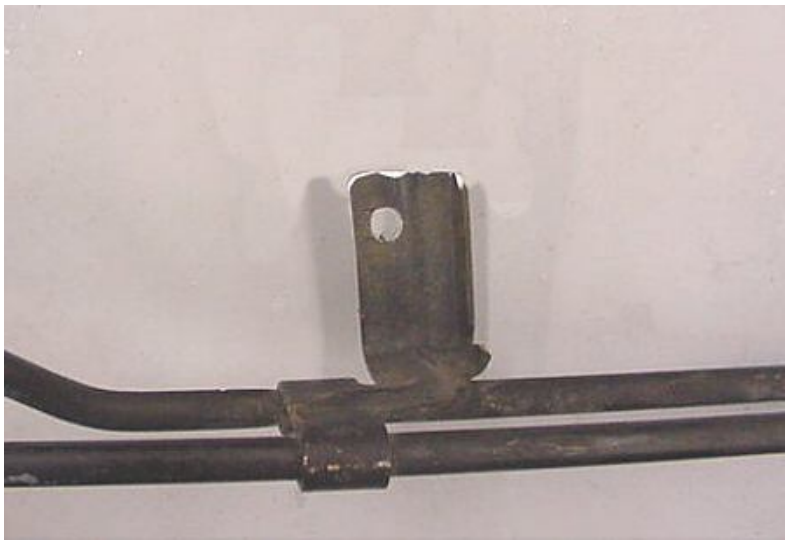
Old style:

1. Cut half of the passenger side power steering mount off.



Passenger side mount cut.

2. Drill a mounting hole in the bracket using a $^{3}/_{16}$" drill bit.



Passenger side mount drilled.

Intake Tube

Note: The year and type of engine may give a different style intake tube. Similar modifications can be done to different styles. We have shown two different tubes.

Uncut 1997 DOHC Cobra intake hose

1. Cut the intake hose in the crease on the intake side of the bellow section marked in the picture. Make sure not to cut the large bellow section.

Air Filter Housing

1. Unclamp the air filter housing from the Mass Air Meter.

Air filter housing removed

2. Mark the housing around the base of the dome.

Air filter housing marked

3. Cut the flange off the housing. Keep in mind, the flange is the part you want to keep.

Air filter housing cut.

4. Re-assemble the air filter and cut flange clamping them together with the stock clamp.

Air Filter housing with stock filter.

Cleaning and Detailing

Before you start assembling your car, cleaning is the best way to assess what needs to be done to the donor parts. Based on your close-up inspection you may choose to re-build or replace some of the parts that you have just removed.

Oil leaks should be clearly visible so look for them. Areas to inspect include transmission tail shaft side to side free play, pinion oil seal on the rear end, valve cover gaskets, distributor cap for excessive build-up deposits, and clutch wear. There are quite a few aluminum parts on the engine that can be polished and shined. Common cleaning methods include, wire wheel followed by clear coat paint, bead blasting, or aluminum polish. The following is a good procedure:

1. Steam clean or use a strong detergent such as Gunk™ engine cleaner. When using engine degreaser, collect the waste solvents and dispose of properly. Brush everything except the harness and the electrical pieces. If the parts are really dirty, you can take the parts and assemblies to a do-it-yourself car wash. They usually have an engine degreaser as an option and most places run very high water temperature that helps loosen debris and grease. If doing this, tape over the engine intake holes, engine wiring connectors, and coolant openings. Be sure to clean the bay after you clean your stuff. Let the parts dry completely before removing the tape.
2. A wire wheel on a drill can bring even the most oxidized aluminum up to a nice finish. Be sure to wear gloves and safety goggles. This can be done on the bell housing, transmission, alternator, valve covers, steering rack, engine intake, water-pump, and engine accessory brackets. Always apply clear coat paint so the parts will not oxidize.

3. Wire brush and paint the rear end. The factory doesn't coat these rear ends so almost all of them have some rust. We pay extra attention to the rear cover. Avoid rubber bushings and quad-shock travel shafts (shiny areas).
4. Wait until the wiring harness is installed and the car is running before you cover the harness up with a nice wrapping of electrical tape. If it's dirty or dusty, wipe it off gently with a moist (not wet) rag. Use caution when handling the computer. Use common sense when cleaning these parts; don't use a wire wheel on a drill close to any wires or lines. Keep solvents away from rubber lines/hoses.
5. When repainting parts, a consistent color scheme works best and looks the nicest.
6. After cleaning the engine, replace the spark plugs. When removing the plugs, look for oil on them or if they look burned. If you have any doubts, ask a mechanic or a good auto parts store what the condition of the spark plug reveals about the engine's performance. When replacing the spark plugs, make sure you gap them before installing them.

Not using a donor

Many people will build this car without using a donor car. That is, they'll want to use a combination of new and used parts from a variety of sources. Use your best judgment when buying new parts. Some of these parts, such as the pedal box do not get a lot of wear and are quite expensive when purchased new. These can be easily sourced from a salvage yard.

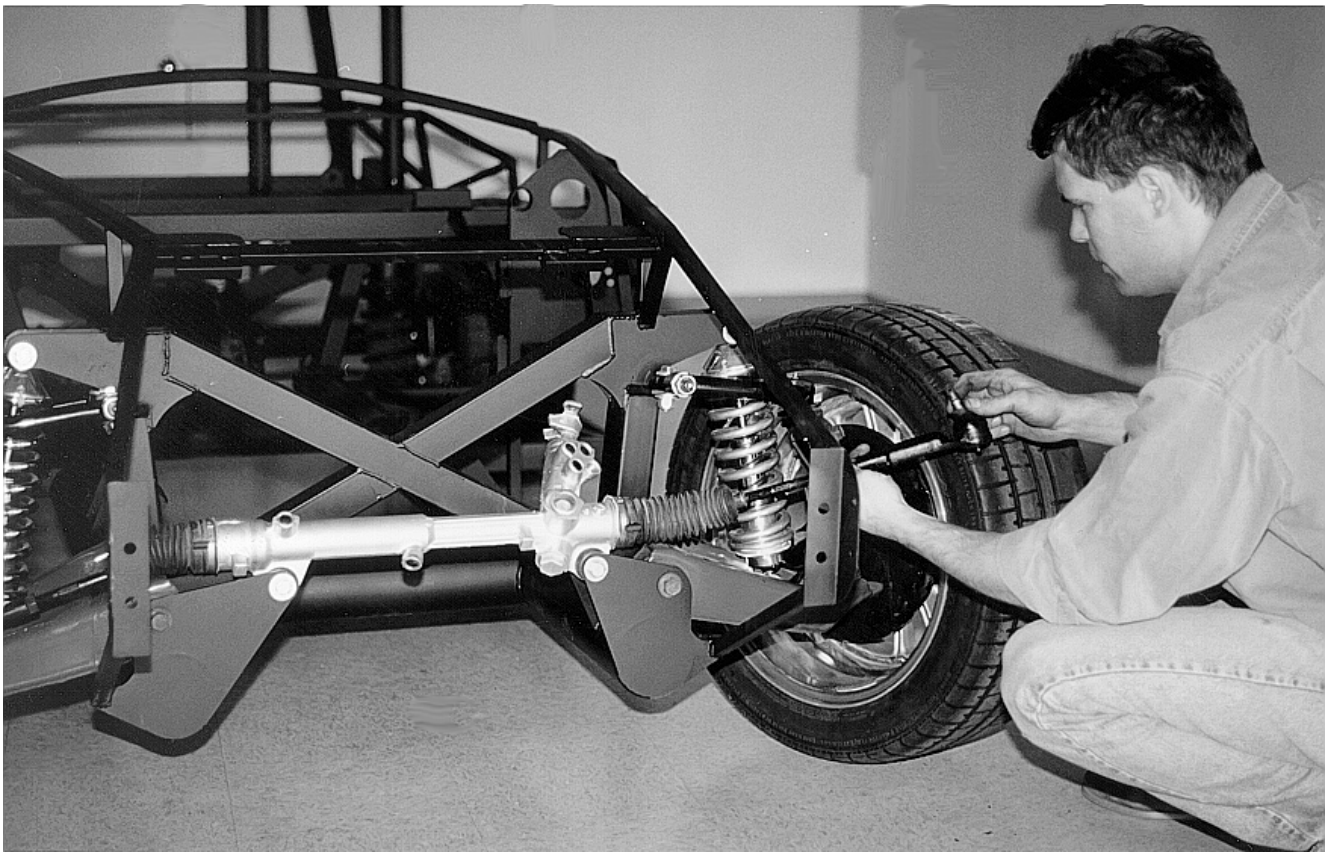
Read chapter 3 and Appendix B carefully to determine what you'll need to procure. Here are some tips on where to get started.

Spindles/brakes - High Performance	Baer Racing Stainless Steel Brakes www.discbrakesrus.com
Spindles/brakes – Stock	Ford Dealer
Engine	Ford Racing Performance Parts – Diversified Products
Transmission – Heavy duty T-5	Ford Racing Performance Parts – Diversified Products
Tremec TKO	Forte's Parts
Bellhousing – Blow-proof	Lakewood or McCleod
Blowproof bellhousing blanket	Deist
Drive shaft	Local drive shaft shop
EFI Wiring Harness	Painless Wiring www.thedetailzone.com Ford Racing Performance Parts – Diversified Products
All new parts	Breeze Automotive – www.breezeautomotive.com

ATTENTION: *If you are using a Lakewood Bell-housing, trim the area around the starter so that it becomes flush with the inspection cover.*

The Internet has changed this part of the business forever. Parts are now much easier to find on-line. Check out a number of customer and enthusiast based forums for help and advice.

Chapter 2 - Step By Step Chassis Build-up



Unpacking Your Replica Kit

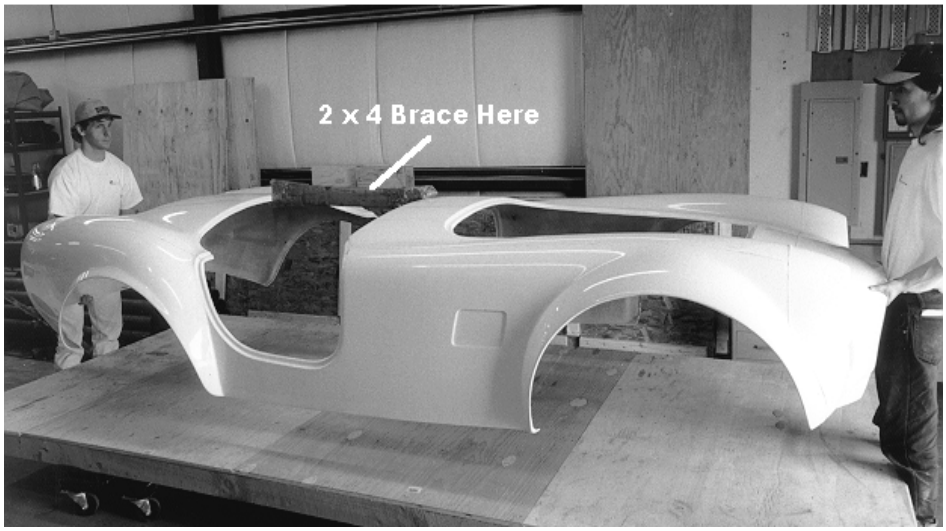
Please note that your boxes are numbered, when you read your packing list you will see that next to each assembly there is a number circled. This is the box number that the assembly was packaged in. The kit is packaged in the order that you will be using the parts.
After everything is safely in your garage, take the time to open each box and do a physical inventory of all the parts. It is a good idea to work one box at a time and replace all the contents before going on to the next box.

Removal of Body & Aluminum

ATTENTION: *Mark all aluminum panels with a marker for easier installation. Acetone will remove even permanent markers as well as any ink that is on the aluminum.*

TOOLS: *½", 9/16", 5/8" sockets, "vise-grip" pliers or slip joint pliers, hex key set, ½", 5/8" wrenches, marker, 2"x 4"x 34.25" brace, 2"x 4"x 24" (for body support), duct tape, #8 hex driver.*

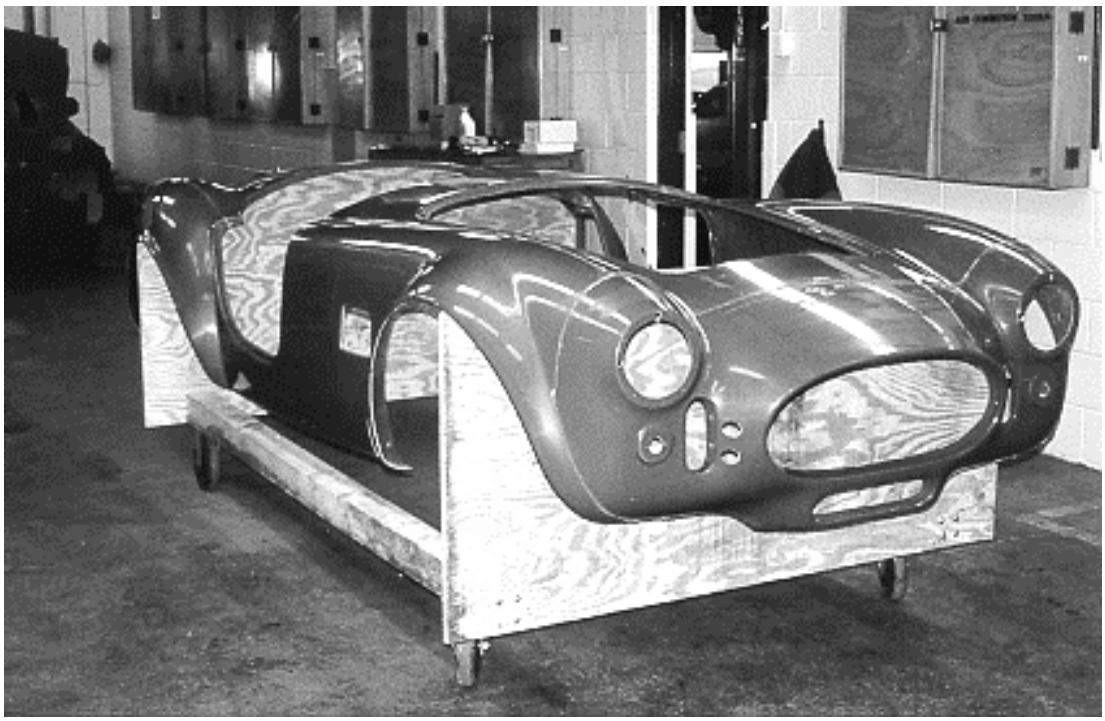
1. Four strong people can lift and move the body/frame assembly into the work area. Lift by the quick jacks in the back and the radiator/nose hole and wheel wells in the front.
2. Remove the doors by either unbolting them from the hinges with a 9/16" socket or unbolting the hinge from the frame.
3. The body is shipped bolted to the frame in six places. The inner side of the front nose (use a hex wrench and ½" socket), one bolt on each side (use a hex wrench and ½" wrench), and the rear quick jack bumpers (5/8" wrench and socket).
4. The best way to remove the body is with four people, one per wheel well. Each person should watch to not stress the narrow body section under the door area. If you only have two people you can remove the body like we do here with one person at each end lifting in the nose and under the back. Remove the body by lifting the rear end up over the trunk aluminum first and then sliding the nose slightly forward past the quick jack supports, then up and away. Notice the dash hoop support to clear is tapered so as you go up it gets wider. *Removing the body should be done very carefully*.



When lifting the composite body shell use a cockpit brace as shown.

5. When you store the body on the ground (unsupported) for long periods of time you may get slight distortion (bowing) around the walls forward of the doors. In order to avoid the chance of this

happening, we recommend putting two short 2”x 4” braces (24” long) under the windshield holes (running vertically to support the hood cowl area just forward of the doors under the windshield holes). Use these 2”x 4” ’s whenever the body is on the ground, otherwise make a body buck to support it. A body buck diagram is in the appendix. The dimensions do not have to be exact. A rough shape is all that is needed to hold the body.

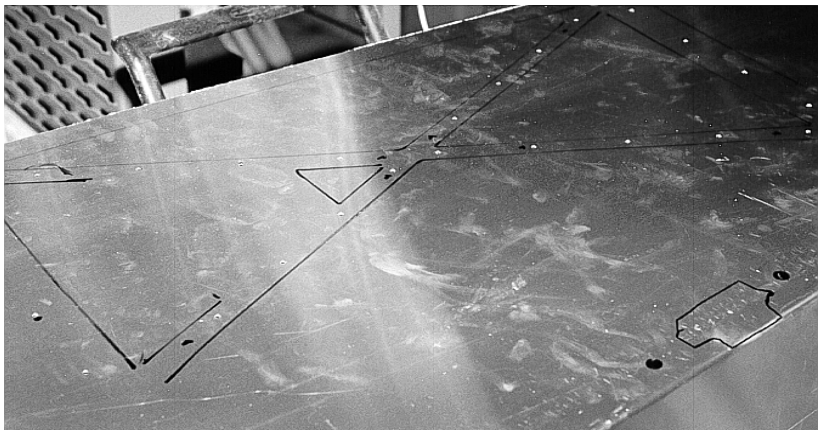


Body buck

Aluminum Removal and Preparation

ATTENTION: *The spacing of the rivets is a personal preference. The kit includes enough rivets to space them every 3” except in the foot boxes where spacing can be every 2”.*

1. Mark each panel and take pictures of how the panels fit together (i.e. which is on top).
2. Mark the floors, trunk walls and floor, and cockpit rear wall panels for the rivets before removal. To get straight and evenly spaced rivets, draw on the underside of the aluminum panel around the frame members with a black permanent marker.



Trace around the frame members, and then use a ruler to mark rivet locations.

3. Remove any screws holding the panel to the frame and remove the aluminum panels. Keep the #8 screws to help with aluminum positioning later during build-up.
4. Using a ruler and marker, mark every 3 inches along the centerline of the pen outline that you made on the aluminum.
5. Drill the marks with ⅛" drill bit.
6. Position your frame in your workspace with plenty of room to move things around. Use jack-stands or 4" blocks to put the frame 4" above the ground. This is close to ride height, making the suspension easier to position.

Having disassembled the donor or obtained the individual parts and prepared and modified them, you are now ready to begin assembly of your car. We will begin with the chassis and address each assembly in a sequential fashion.

Engine Bay Aluminum

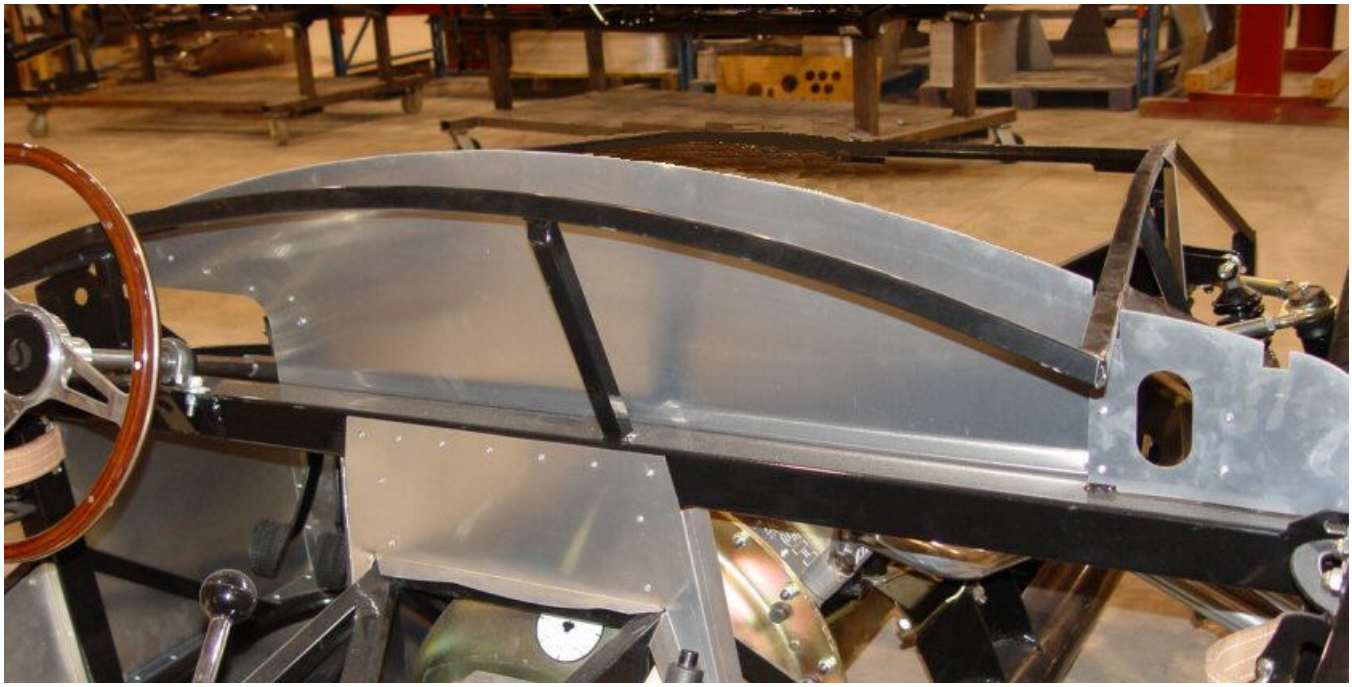
TOOLS: *Eye protection, drill w/#8 hex nut driver, ⅛" drill bits, drill, rivet tool, silicone, caulk gun, #8 self tapping screws.*

PARTS: *Engine bay aluminum (FFR# 10892).*

1. Before you install the front suspension, you need to position and install your left and right engine bay aluminum pieces and aluminum firewall. The engine bay panels look like big letter "F's." Secure the panel in the original position as received from factory using positioning screws. Note where the aluminum touches.
2. Using a ruler and marker, mark every 3 inches along the centerline of the pen outline that you made on the aluminum. The middle of the "F" will need to be pushed into the frame in order to fasten it to the ¾" tubing.
3. Drill the marks with ⅛" drill bit.
4. Remove the panel and clean off the drill shavings.
5. Apply silicone to ¾" tubular steel frame where aluminum will touch.
6. Attach the panel with sheet metal screws then rivet the panel in place.
7. Position the large firewall using the sheet metal holes as a guide to see where to apply silicone.
8. Remove the firewall.

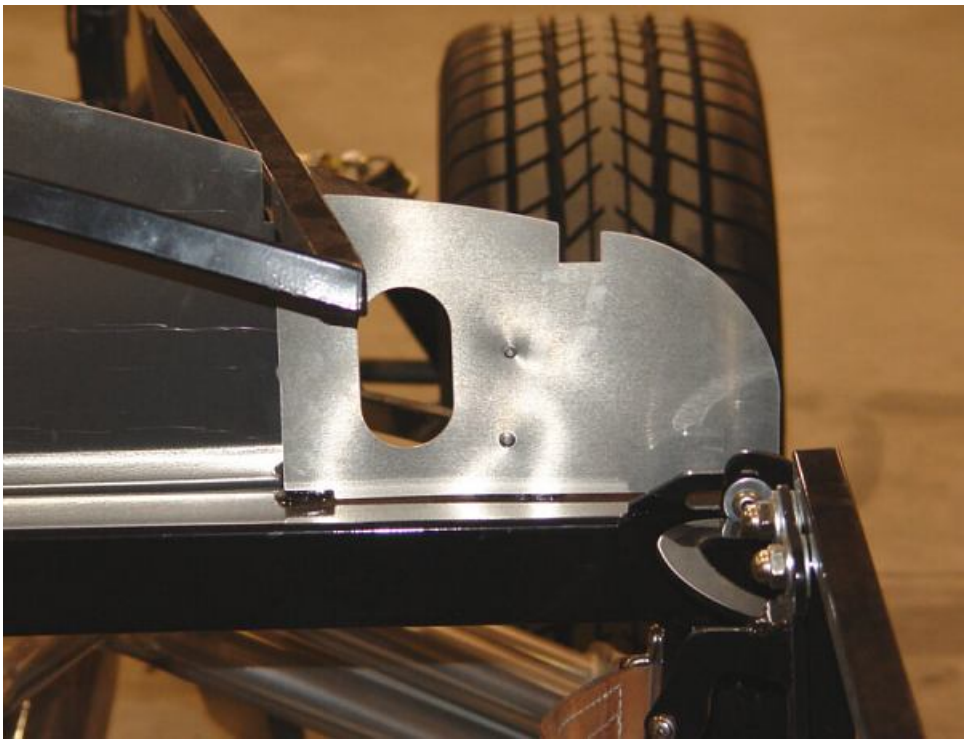
Note: If installing a heater/defroster, it is easier to make the necessary holes now before the firewall is installed. See the instructions included with the heater for hole size and location.

9. Run a silicone bead along the front of the horizontal 2"x 2" between the ¾" upright on the passenger side and the ¾" angled tubes in the driver foot box area.
10. Attach the firewall with sheet metal screws then drill and rivet the panel in place.



Firewall and Pass firewall extension installed.

11. Attach the passenger side firewall extension with sheet metal screws for now. It will be removed later to install the windshield.



Passenger side firewall extension in place.

Front Suspension Installation

TOOLS: *Combination wrenches, coil-over adjusting tool (FFR# 10961), ⅜", ⅝", ¾", 11/16", 13/16", ⅞", 15/16", 1⅛", 18mm sockets. Rubber mallet, eye protection, drill w/#8 hex nut driver, ⅛", ½" drill bits,*

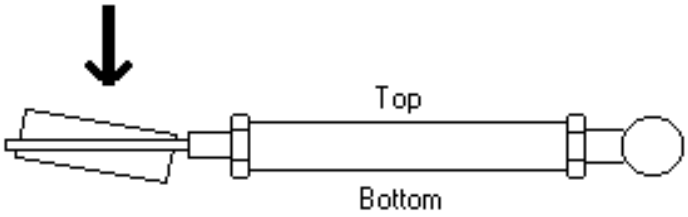
drill, rivet tool, torque wrench, silicone, caulk gun, #8 self tapping screws.

PARTS: *Mustang lower control arm, spindle adapter brackets (FFR# 13819), IFS components (FFR# 11074), ⅛" rivets (FFR# 10782).*

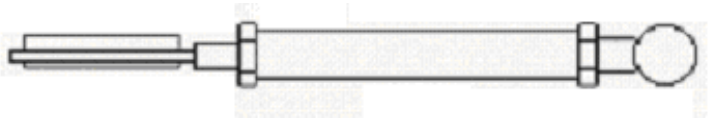
Front Upper A-Arms

1. Install ball joints into the control arms making sure to **orient the arm according to the drawing below**. The ball joint bolts into the control arm with the grease fitting at the top. To screw in the joint, clamp the ball joint into a vice, and screw the arm onto the clamped ball joint. The same arm is used for both sides of the car.

Note: Not all upper control arms appear the same as below, some may not have the angled collar, in which case the collar will be perpendicular to the base. The angle of this collar has no effect on suspension geometry.

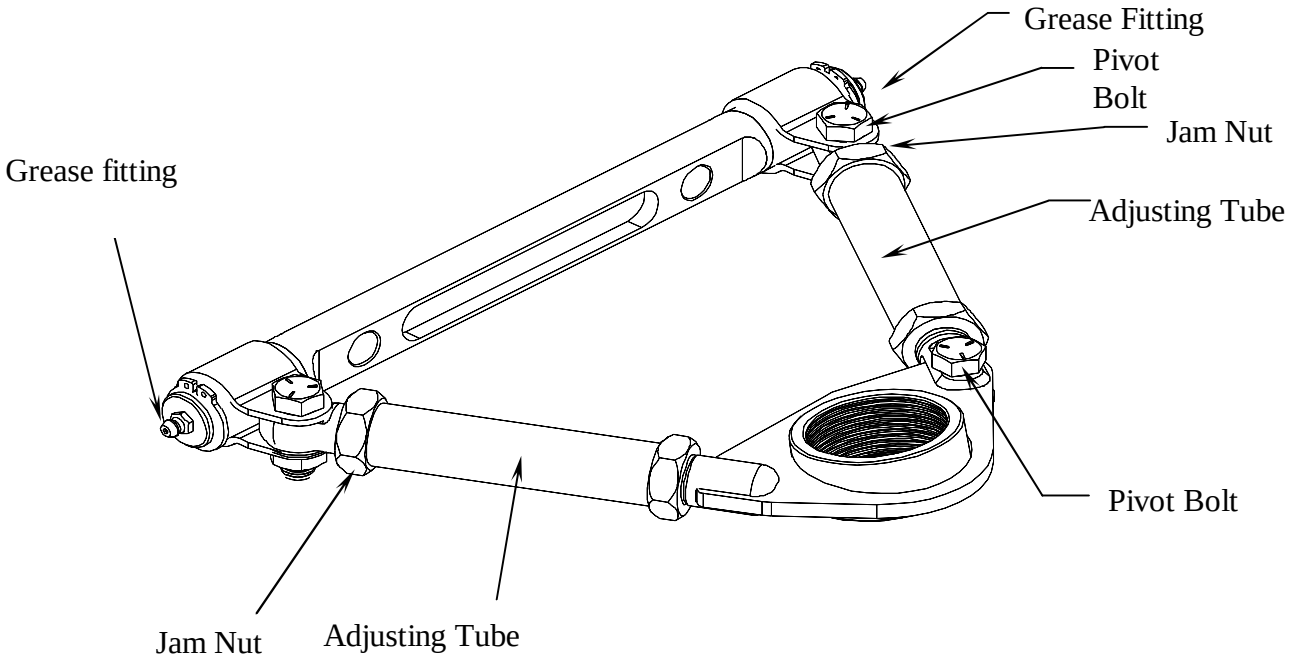


Or you may have



2. Attach the control arms to the frame. Torque the two bolts that hold the arm to the frame to **135-149Nm (100-110 lbft).**

Adjusting the Arm - Use the diagram below for reference.

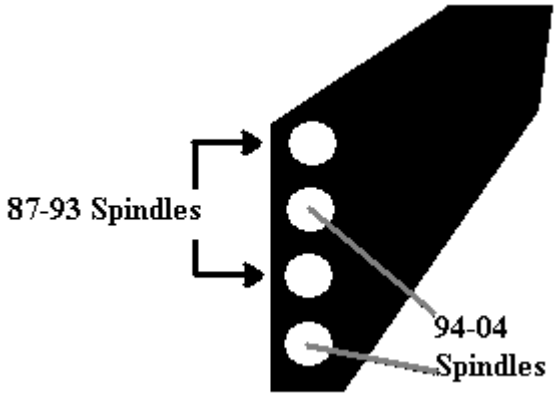


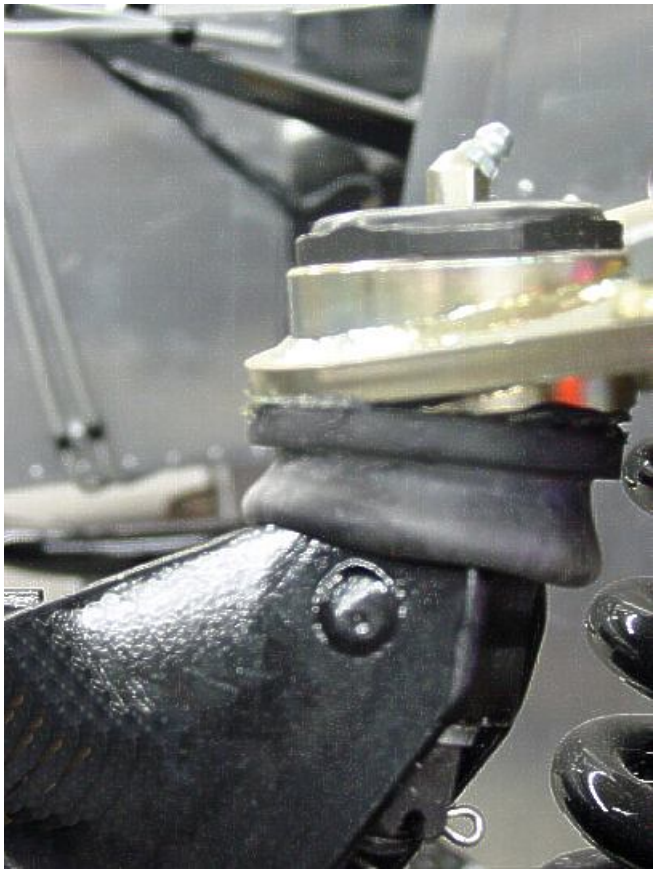
3. Slightly loosen the three pivot bolts using a ⅝" and $^{11}/_{16}$" wrench.
4. Loosen the jam nuts on both ends of each adjusting tubes using a 1⅛" wrench. Turn the adjusting tubes to lengthen or shorten the arm. **After** you have adjusted the arm to the desired length, tighten down the jam nuts against the adjusting tubes, and then tighten each of the three pivot bolts. Torque the pivot bolts to 42 lbft. There should never be more than 1" of thread showing past the tightened down jam nuts on either end of both adjusting tubes. Grease both ends using chassis grease frequently to insure smooth, trouble free operation.

Note: The Pivot Bolts need to be loosened while the car is aligned and retightened afterwards.

5. Holding the dust boot in place, insert the ball joint into the Spindle adapter bracket (FFR# 13819). This bracket replaces the Mustang strut. Be sure to use the cotter pins included with the ball joint. Torque the balljoint to **95-122Nm (70-90 lbft).** If the top of the crown nut goes past the hole in the ball joint, use the spacer that comes with the ball joint.
6. Attach the Spindle Adapter bracket/Upper A-arm assembly to the spindle using the factory strut bolts and Ford **Torque spec 190-271Nm (140-200 lb. ft).**

Note: Using a 94-04 Spindles, attach the bracket using the bottom and third hole up so that the ball joint is further away from the spindle.

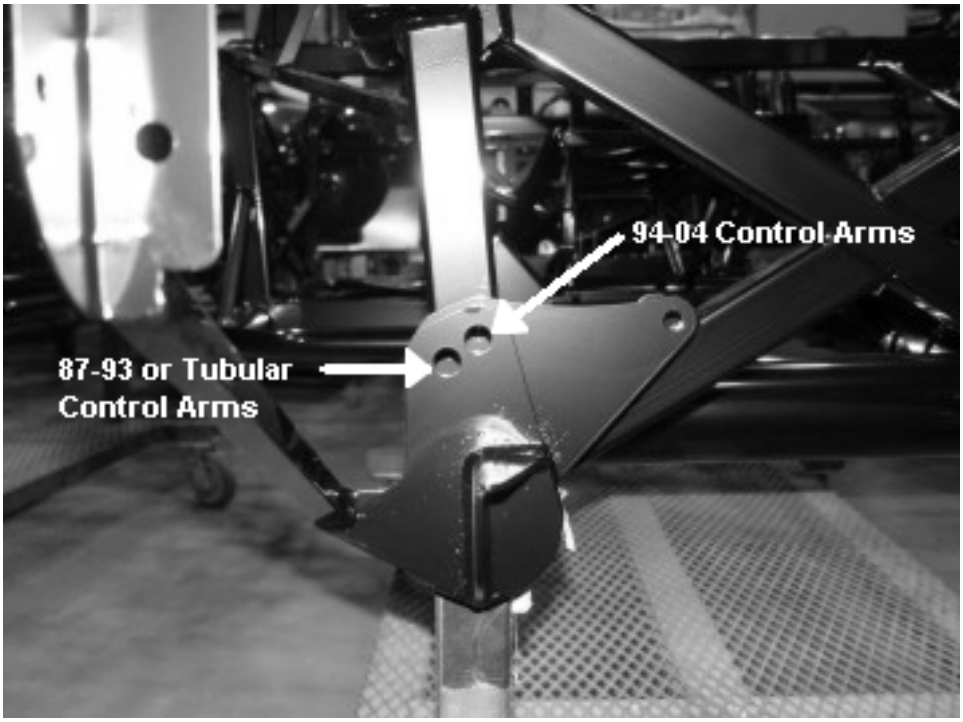




Ball Joint in IFS Bracket.

Note: The front lower control arm bolts may need to be trimed or use a washer under the head for the front bolts due to the manufacturing process of the bolt.

7. Install the front lower control arms on the frame. If you are using the 94-04 stock lower control arms, use the inner set of bolt holes. If using FFR tubular control arms, use the outer mounting holes.



Control Arm Mounts

8. While holding the lower arm parallel to the ground, torque the bolts to **135-149Nm (100-110 lbft).**
9. Attach the spindle assembly to the lower control arm on the frame. Removal of the brake caliper and disc along with the brake shield may be necessary. **Use the Mustang crown nut and Torque specs 106-149Nm (80-110 lbft).**
10. The upper ball joint boot will look crushed and out of shape when the car is in the air, this is OK. The boot will seat when the car is on the ground. It is only a dust boot and the grease will not leak.

Koni Front Coil-Over Shock Assembly

TOOLS: *Snap ring pliers, ¾" wrench, ¾" socket, ratchet.*

ATTENTION: *The front shocks are pre-valved at the factory in compression and rebound for good street use. The shocks can be adjusted in rebound as per Koni's instructions if so desired. The front springs are 500lb. Other springs are available for different ride characteristics.*

Note: Retro-fit coil-over kits work with all FFR Coupe, and Roadster kits using the new Factory Five front lower control arms or stock Mustang arms. These do not fit the old Factory Five front lower control arms (pre-August 2003).

WARNING! Incorrect assembly and maintenance of this part can cause serious injury or death.

1. If retro fitting the Koni shocks, place the car on jack stands and remove the old shocks and springs. Save all of the fasteners and spacers, they will be reused.
2. Double check the jam nut under the rod end and bump stop to make sure that it is tight.
3. Screw the spring seat down on the sleeve so it is closer to the unthreaded end.
4. Slide the coil sleeve over the body of the damper beginning at the end which has the rubber bump stop. The unthreaded end of the sleeve goes first so that it will sit on the snap ring on the shock body.

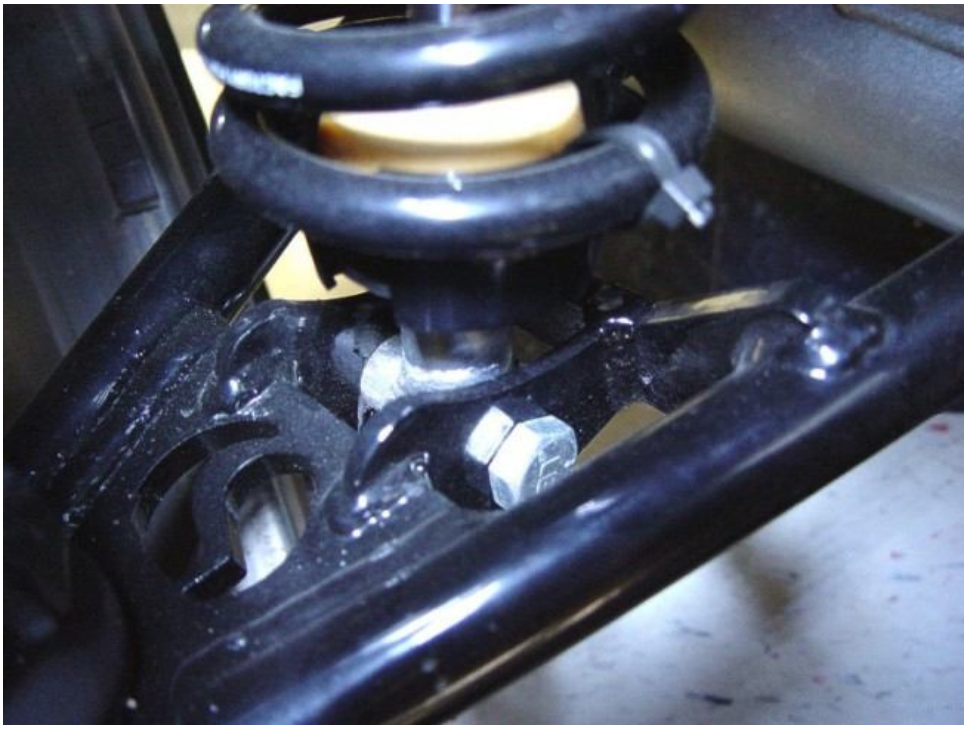
5. The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

6. Slide the rubber bumper about two inches down on the shaft.

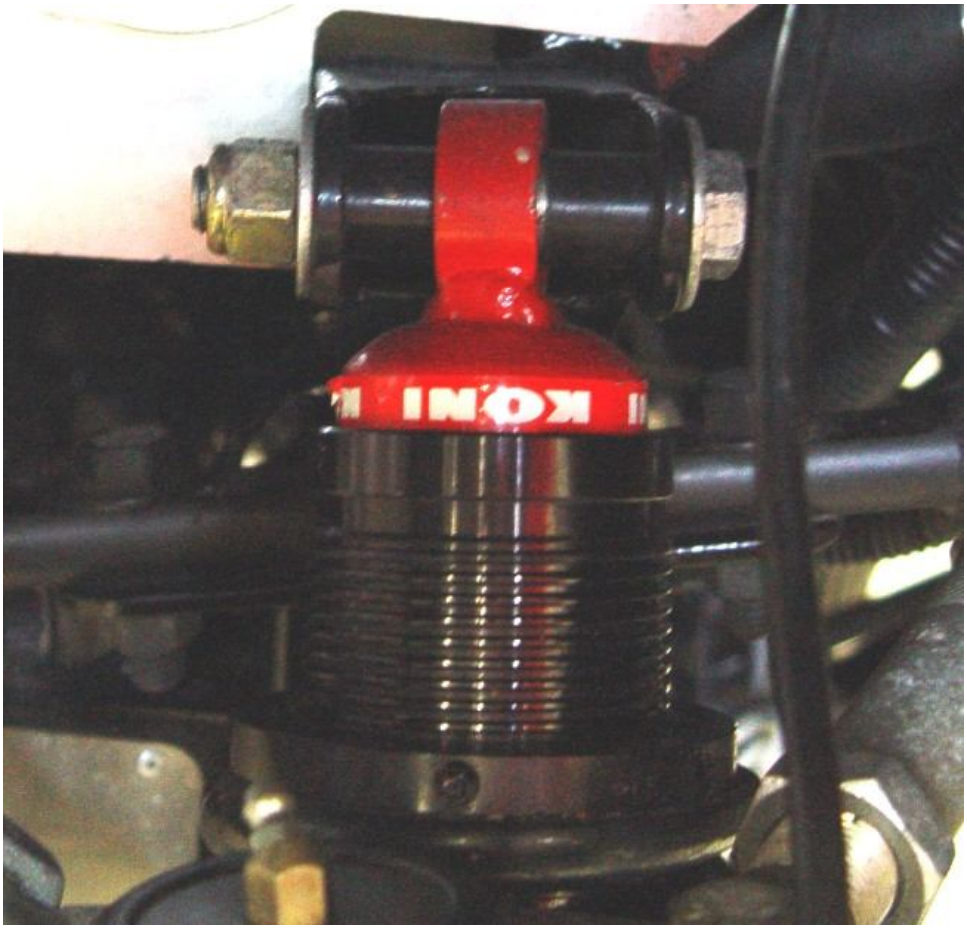
7. Put the spring on the shock, then install the spring hat on the shaft end of the shock and push the rubber bumper up against it.
8. Rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.
9. Install the snap ring on the spring hat so that it holds onto the shock end. Make sure that the slot in the snap ring and the slot in the spring hat are not aligned.

Assembled Koni coil-over shock.

10. Pass the shock assembly (**with the body of the shock up**) through the upper A-arm and attach them to the Mustang rear shock bracket on the stock lower control arm using the 0.43" spacers that are supplied in the kit.
11. **Check for shock clearance on brake lines, emergency brake cables, Brake Calipers, frame and control arms.**
12. Check to make sure that the spring is seated correctly on the shock
13. Run zip ties through the holes in the spring hat and around the spring to prevent the spring from becoming unseated.



14. Fasten the shock to the top mount with the fasteners and 0.675” spacers provided.



15. Adjust the ride height of the car.
16. Once the ride height is set, tighten the small set screw in the spring seat just until you feel it contact. The end of the set screw is plastic so that the threads are not destroyed. Not a lot of pressure is needed to prevent the seat from turning.

Steering Shaft

TOOLS: *5/32", 5/16", 3/16" hex key, ½", 9/16", 10mm wrench, marker, drill, 3/16" drill bit, Philips head screwdriver, 15mm deep socket.*

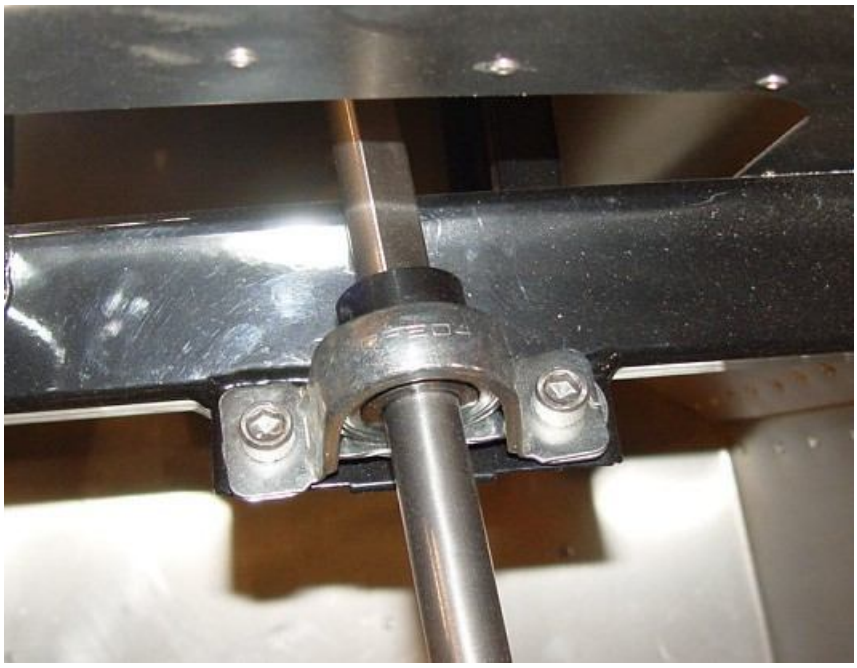
PARTS: *Steering system hardware (FFR# 11073), Box 9A Steering shaft assembly (14453), Box 15B 1994-2004 steering kit (13692), pillow block/hardware (FFR# 11072).*

ATTENTION:

- *Like the suspension and fuel/brake lines, you will be trusting this assembly with your life. Use extra care when doing the final assembly.*
- *If you are doing a Complete Kit build, makes sure that you use the Front Footbox panel packed with the Wilwood Pedal box assembly*

TOOLS: *5/32", 3/16", 5/16" hex key, ½", 9/16", 10mm wrench, marker, drill, 3/16" drill bit, Philips head screwdriver, 15mm deep socket.*

1. Install the driver's side foot box front aluminum vertical wall (FFR# 10904) using the factory screws to position it. Make sure all of the holes are aligned.
2. Remove the panel.
3. Apply silicone to the aluminum. **Do not** silicone along the front ¾" tube as inside wall will go behind this panel later.
4. Reinstall the panel with the screws and clamp the front panel to the steel plate so the silicone can dry.
5. Mount the ¾" upper pillow block to the bracket on the back of the 2"x 2" tube. Make sure the locking collar is on the front side. Again, use a 5/16" hex key, 9/16" wrench and the kit fasteners. Do not tighten the bolts completely, allow the bearing to swivel in the bracket.



Overhead view looking down onto upper steering pillow block installed on frame 2"x 2" dash support.

6. Remove the steering shaft adapter from the lower universal joint.
7. Attach the correct adapter (has the same pyramid shape as the steering rack input shaft) to the steering shaft.
8. Slide the 1" flange bearing onto the top of the shaft, the 1" DD tube end, with the set screw side of the bearing towards the top of the shaft.
9. Slide half of the flange bearing mount down over the shaft to the bearing.
10. Mount the 1" flange bearing on the front of the foot box (collar on the inside of foot box) using a 5/16" hex key and 9/16" wrench along with the kit fasteners. Do not tighten the bolts all the way, allow the bearing to swivel in the bracket.

Flange Bearing mounted to front of footbox.

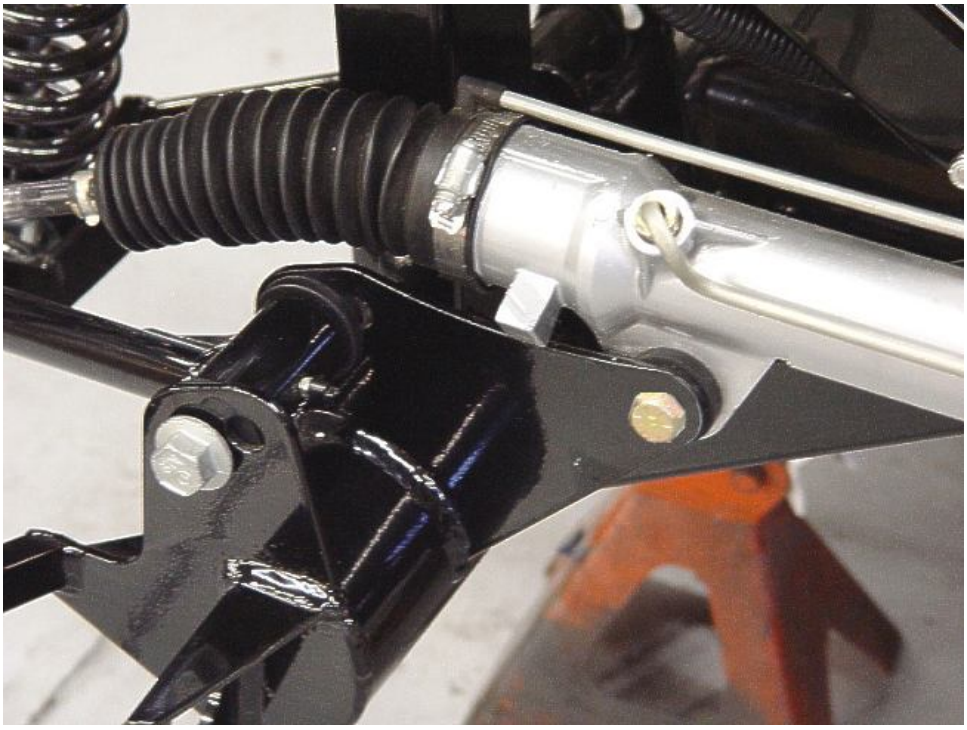
Note: 87-93 Power steering racks have a different spline than a manual steering rack. The 94-04 Power rack uses a "Pyramid" shaped end. All of these lower adapters are available from FFR.

11. Slide the upper steering shaft through the upper pillow block, place the two Bellville washers in the circular spaces on the shaft and insert the shaft into the 1" DD tube.
12. Tighten the set screws and the jam nuts on both U-joints and the 1" locking collar.
13. Tighten the bolts holding the ¾" Pillow block and 1" flange bearing to the frame.
14. Rotate the upper shaft and make sure that it rotates freely. If necessary, trim the lower part of the flange and/or grind the set screw slightly.
15. Attach the steering wheel boss to the upper steering shaft using a 3/16" hex key. Be careful not to force fit the aluminum steering wheel boss. Match the flat sides on the shaft to the flat sides on the boss.
16. Attach the steering wheel to the steering wheel boss. Use a 10mm wrench and a Phillips-head screwdriver. The steering wheel will only line up with the holes one way. Rotate the wheel until all of the holes line up.
17. Push the aluminum center section into the steering wheel boss through the steering wheel without the emblem attached.
18. With the backing still on the emblem tape, test fit the emblem in the center section. If necessary, file any flashing off the bottom edge of the emblem so that it will fit.

Steering Rack Installation

TOOLS: *¾" Socket, ¾", 1.50" Wrench, Needle nose pliers, Adjustable wrench, thread lock*
PARTS: *Steering system hardware (FFR# 11073), 1994-2004 Steering kit (FFR# 13692), Donor steering rack.*

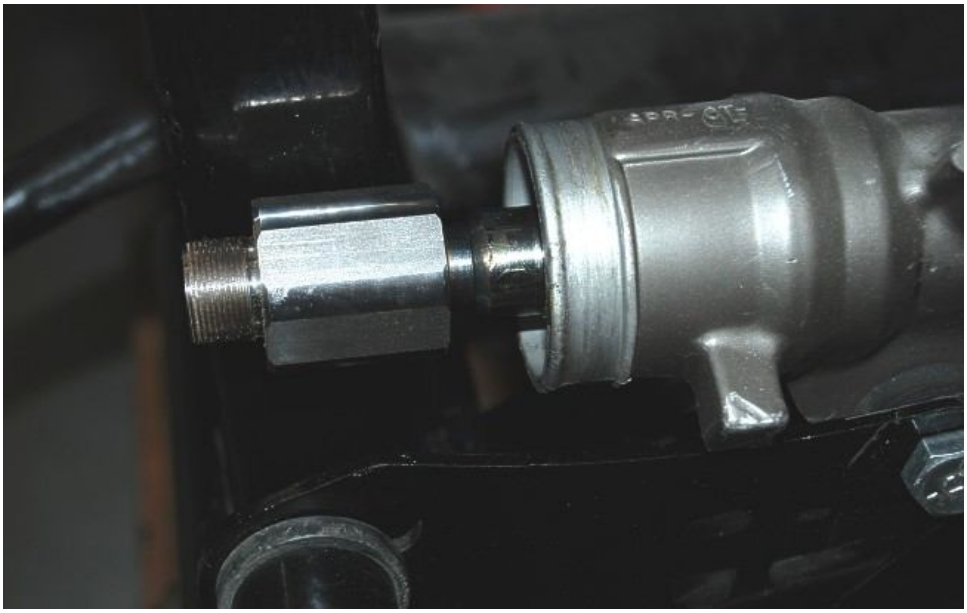
1. If not already in, insert the stock rubber bushings and kit spacer sleeves into the rack.
2. Slide the lower steering shaft onto the pyramid shaped input of the steering rack and, place the steering rack between the rack mounts on the frame (behind the front lower control arm bolt).
3. Insert and tighten the bolt between the steering shaft and the rack.
4. Tighten the set screw and jam nut going between the steering shaft and rack.
5. Insert the steering rack bolts through the frame mount, rack and rear frame mount and lock nut. Use the provided washers on the driver side (slotted) only.
6. Tighten the bolts to the bolt torque spec.



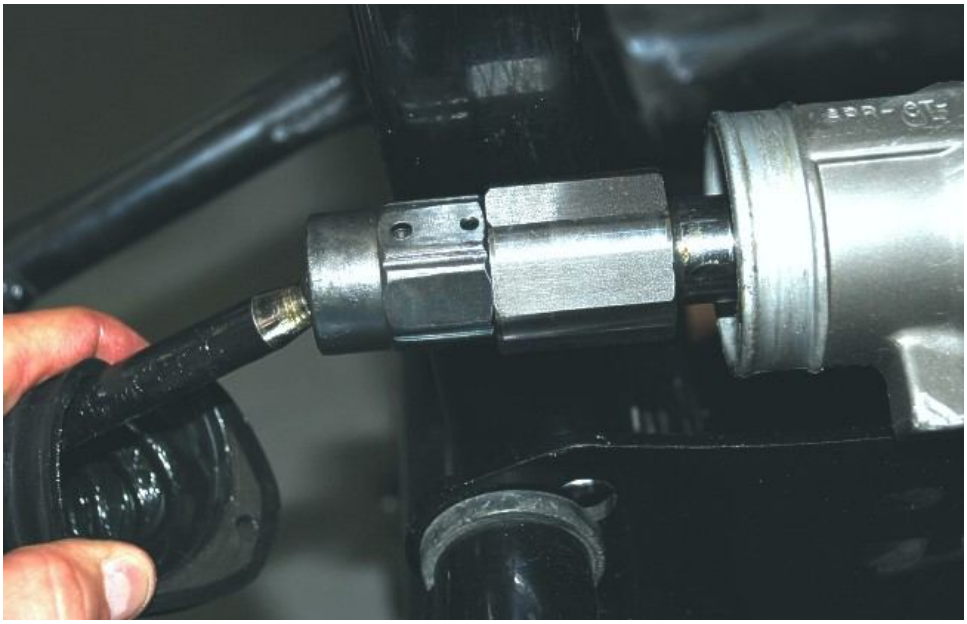
Steering rack mounted to frame.

Note: The inner Tie Rod Extensions are for stock Power Steering Racks only, not for manual steering racks.

7. Pull back the rubber boot on the inner tie rod and remove the inner tie rod from the steering rack.
8. Put a dot of thread lock on the threads of the steering rack and attach the steering rack extension to the steering rack using a 1.50” wrench.



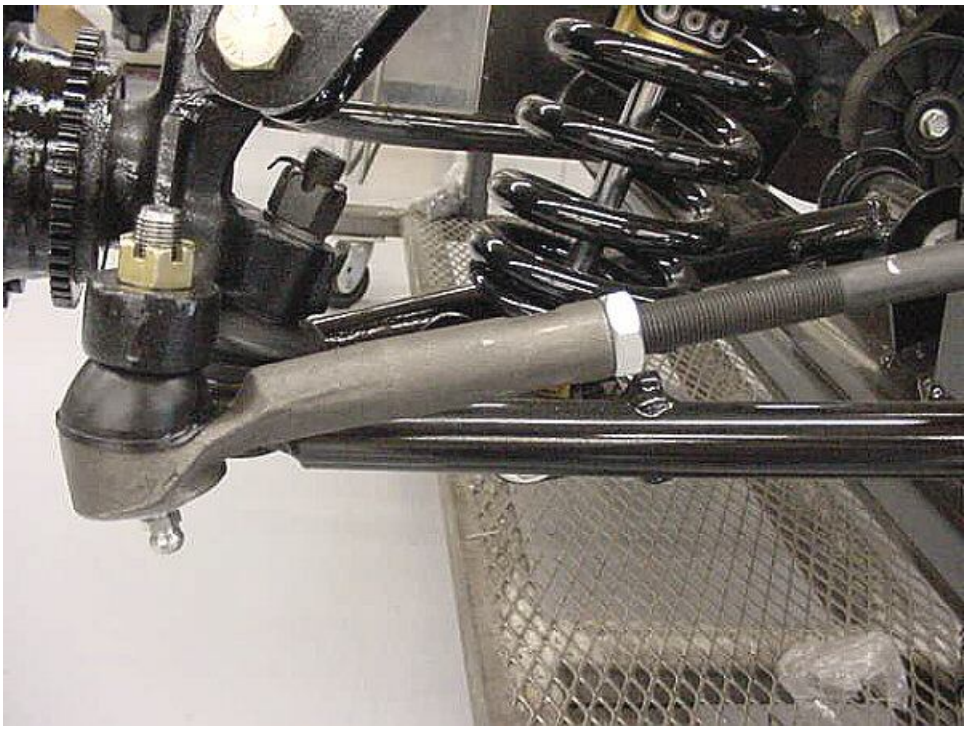
9. Put a dot of thread lock on the threads of the steering rack extension and attach the new inner tie rods to the steering rack.



Inner tie rod attached to the steering rack.

10. Push the boot back onto the steering rack body and attach with zip ties.
11. Make sure there is a jam nut on the inner tie rod, then, screw the outer tie rods onto the inner tie rods.
12. Attach the outer tie rods to the spindles and secure with the castle nuts and cotter pins.

13. Note: The wheels will look toed in until the car is on the ground and at ride height.



Outer tie rod attached to spindle.

Mk. III Front Suspension.

14. Turn the steering wheel to make sure there is no bind in the U-joints. The steering should be smooth. Readjust the U-joints if necessary to prevent any binding.
15. Sit in the car and adjust the steering wheel to desired height by adding washers under the upper pillow block.

Rear-End

ATTENTION: *Use caution when working with the rear end assembly, it is heavy.*

TOOLS: *15mm, 18mm and ⅝", ¾" sockets, ¾", ⅝" combination wrenches, ½", 9/16" drill bits, drill, floor jack, marker.*

PARTS: *Rear-end assembly with quad shocks, rear control arm bolts, flexible brake line mounting bracket, rear traction-lock brackets/fasteners (FFR# 10885).*

1. If not already done, fill the rear axle with fluid. See Appendix H for specifications and capacities.
2. Drill the upper mount holes on the traction lock brackets out with a 9/16" drill bit.
3. If you are using the stock rear lower control arms, drill the rear lower control arm frame mounts and the lower traction lock bracket holes out using a 9/16" drill bit.
4. Position the brackets on the rear end with the bolts provided (the two short bolts go on the sides). Attach the lower shock bracket through the traction lock bracket at the stock location.
5. Tighten the two short bolts. **Torque to Ford Specs 75-95 Nm (55-70 lbft)**.
6. Attach the lower control arms loosely to the brackets on the axle using the bolt provided.

Note: The lower bolt holes provide more traction than the upper holes.

7. If not already on the axle, attach the Mustang upper rear control arms loosely to the rear end.
8. Attach the vertical shocks to the axle brackets. Insert the bolts from the inside out. Do not tighten the bolts yet.

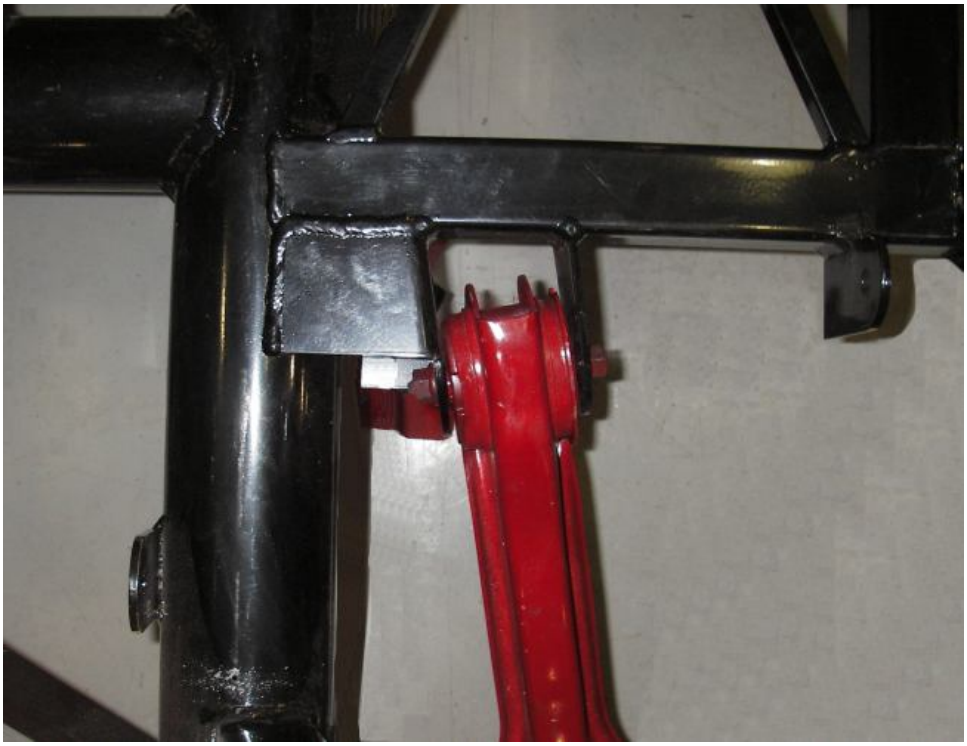
9. If using the Mustang springs, hold the spring perches up to the frame so the vertical perch mount is in between the 2"x 3" tube and the vertical frame mount.
10. Mark the location of the holes on the bottom of the 2"x 3" tube with a marker.
11. Drill the two hole locations using a ½" drill bit.
12. Bolt on the perch using the ½" bolts provided.

Spring perch mount bolted on frame.

13. Thread the cut rear springs onto the conical frame mounts all the way.
14. Insert the cut rubber spring mount between the spring and the steel seat. Make sure the end of it is flush with the end of the spring mount.
15. Place the flat part of the rear end on a floor jack.
16. Raise the rear end so that the upper control arms are flat.
17. There are three sets of bolt holes that the upper control arms can attach to. As a guideline, if the engine you are using has under 300hp use the top set of holes. If the engine has between 300 and 400 hp use the middle set of holes. If the engine has more than 400 hp use the lowest set of holes. Use the highest set of holes possible that prevents the car from having axle hop.

ATTENTION: *The best street and track handling is achieved using the highest set of holes. For the best launch at the drag-strip use the lowest set of holes. Using the lower set of holes requires putting the bolts in from the opposite direction. Once the rear cockpit wall aluminum is installed, these bolts will not come out unless a hole is drilled in the aluminum.*

18. Bolt the upper control arms into the upper mount brackets on the frame. The bolts install from the outside in. Leave the bolts hand tight.
19. Lower the rear end so the lower control arms can mount to the frame using the Mustang bolts. Tighten the bolts by hand for now.



Passenger side stock rear lower control arm in the frame mount.

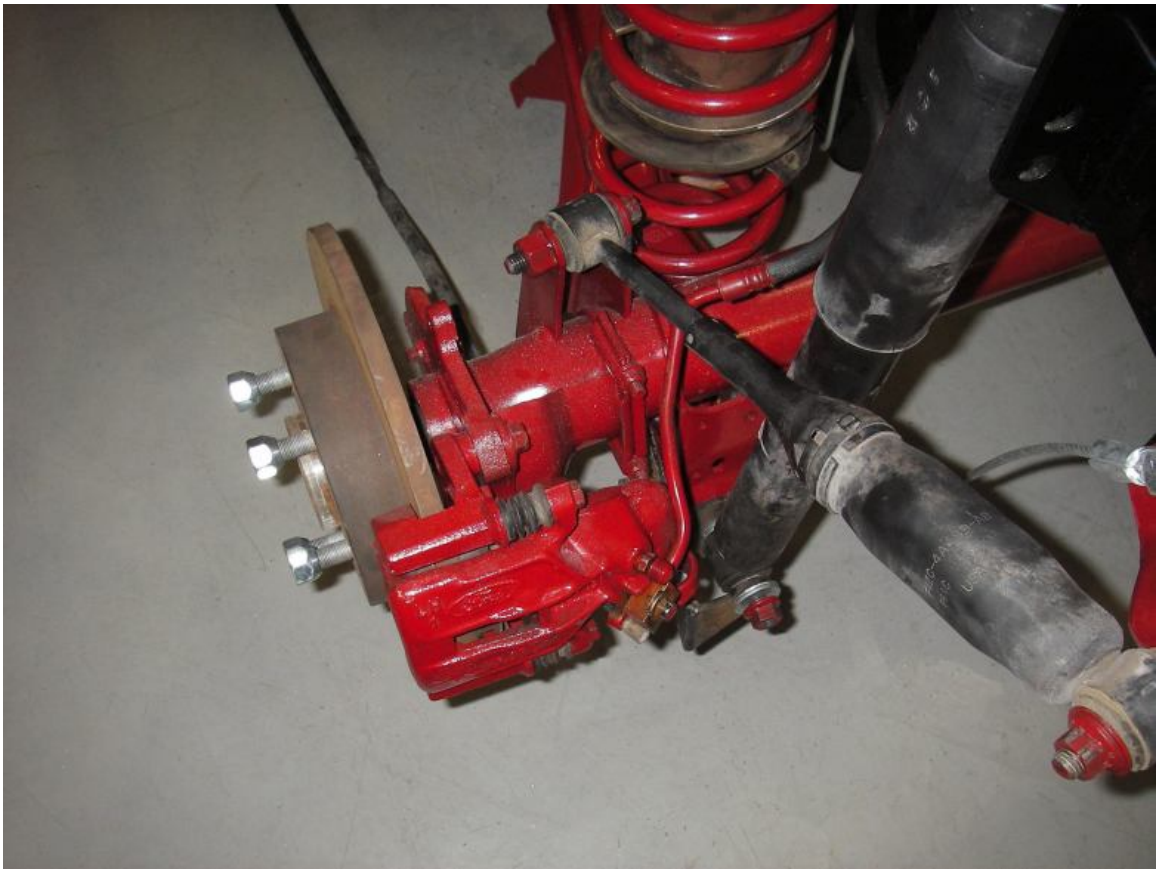
20. Start raising the rear, taking care to position the two lower control arm rubber spring mounts and the springs in their correct seats on the lower control arms.

Rear driver's side quad shock mount. Leading bolt holds axle-limiting cable.

21. Screw the springs down so the end of the spring is ½ coil past the end of the mount.
22. Suspension height adjustments are done in the rear by turning the spring from its normal position on

the mount to a position higher or lower. Remember that the spring is located halfway to the arm mount, so any height changes at the spring will be multiplied by roughly two at the axle.

23. Attach the rear vertical shocks at the top through the holes in the plates located in the trunk area using the Mustang rubber bushings and fasteners. **Torque to 37-47 Nm (27 lbft)**.
24. Attach the lower vertical shock mount to the axle using the kit fasteners. Use the shims next to the shock as needed to take up any space between the shock and the bracket.
25. Mount the quad shocks and their brackets to the rectangular frame plate shown in the picture.
26. Attach the rear end axle straps (included with the kit). These cables will prevent drive shaft binding if you happen to achieve airborne status. The rear end straps bolt to the front bolt of the quad shock up high, and the inboard side of the vertical shock down low.



Rear horizontal Quad shock mounted to frame and axle.

27. Put the wheels and tires on the suspension and lower the chassis to the correct ride height.

Ride height should be 4 ½" at the front and 4 ½" at the back measured to the bottom of the 4" round tube. This will also have to be done after the car is finished. This is just a rough setting for now.

28. Tighten upper and lower control arms to the correct torque specification, shown on the following chart. This is done so that the bushings are not pre-loaded which will affect handling and ride quality.
29. The rear end is attached to the Factory Five Racing frame at the shocks, springs, and control arms (upper and lower). Checking the tightness of the bolts on the rear control arms should be done with your car's regular maintenance.
30. Using the rear sway bar is not recommended. The bar can be installed on the factory mounts for auto-crossing or depending on your driving style.

ATTENTION: *Torque the nut if possible. Only torque the head of the bolt if the nut is inaccessible. See Appendix F for a general bolt Torque chart.*

Suspension Torque Specs Chart

Item	Nm	Lbft
Front		
Front lower control arm to frame	135-149	100-110
Front lower ball joint to spindle	106-163	80-120
Upper A-arm to frame	135-162	100-110
Upper ball joint to IFS bracket	95-122	70-90
IFS bracket to spindle	135-162	100-110
Rear		
Upper control arm to axle	95-135	70-100
Item	**Nm**	**Lbft**
Upper control arm to frame	101-111	75-82
Lower control arm to axle	101-111	75-82
Lower control arm to frame	101-111	75-82
Lower vertical shock to axle bracket	61-81	45-60
Quad shock bracket to frame	63-67	47-50
Quad shock to bracket	63-67	47-50
Quad shock to axle	63-67	47-50

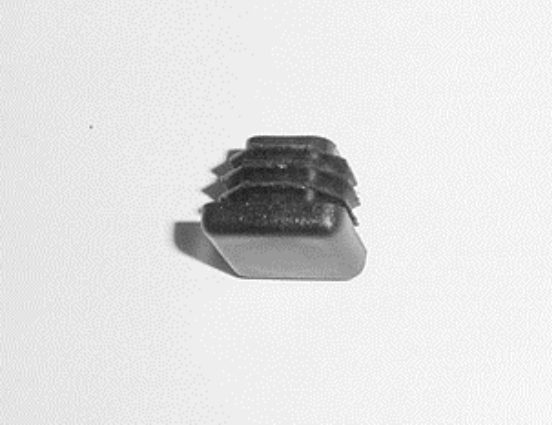
Fuel Tank and Fuel Filter

ATTENTION: *Extreme caution should be used when handling and storing fuel tanks that contain fuel. Make sure to close off the tank with the factory cap and seal the fuel line ends. Keep the tank level.*

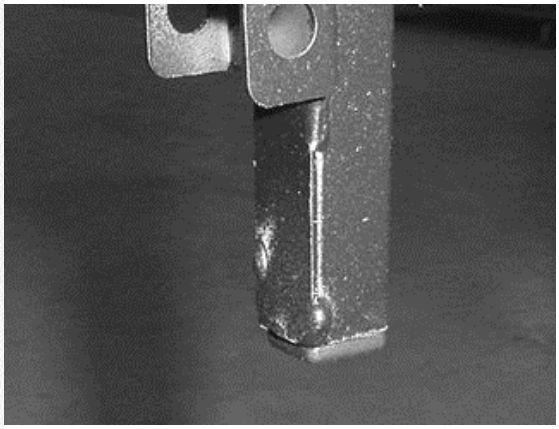
TOOLS: *9/16" and 5/16"deep sockets, combination wrenches, rubber mallet, hammer, 5/16" hex key, floor jack, friend.*

PARTS: *Donor fuel tank, mounting straps, fuel line from tank to filter and fuel neck. Secondary Body Fasteners Assembly (FFR# 10788), Fuel strap fasteners (FFR# 10896), fuel line components (FFR# 11078), fuel lines.*

1. Put the four square plastic plugs (FFR# 14161) into the ¾" vertical frame extensions under the trunk area (these are the open ended tubes that stick straight down from the floor of the trunk steel framework). The plastic caps prevent the metal tube from touching the fuel tank edge flange.



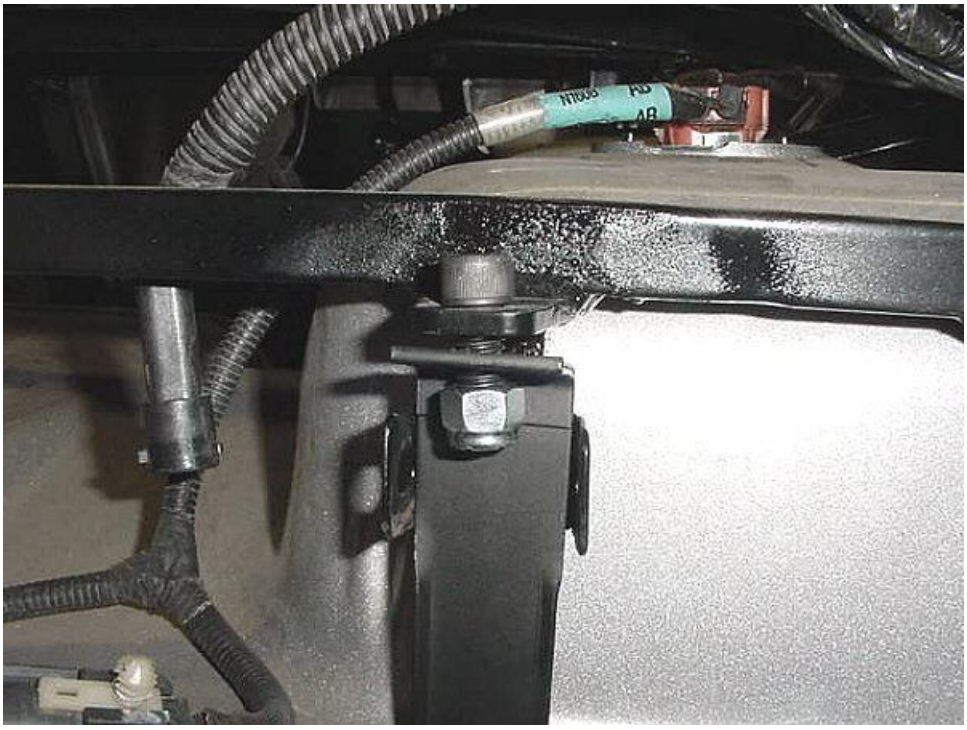
Cap Plug



Cap Plug installed

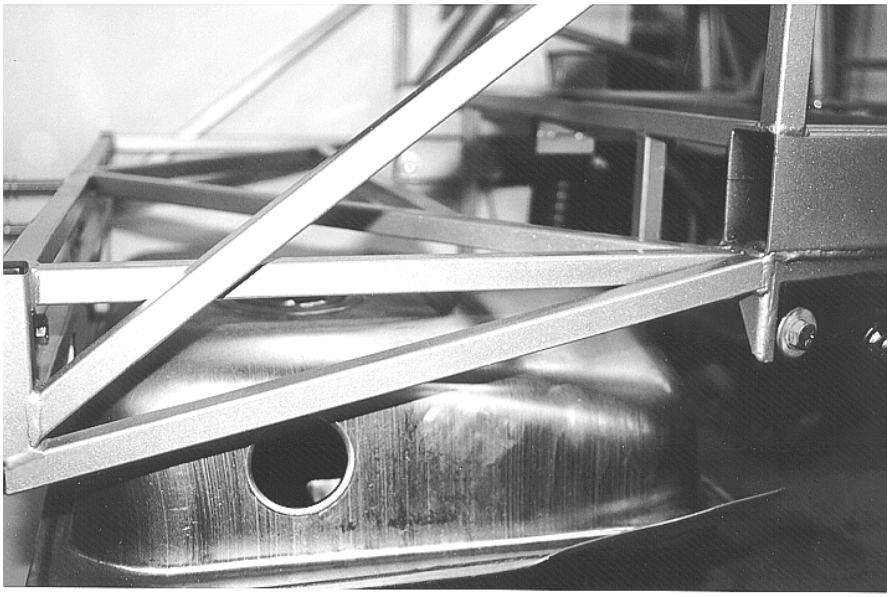
2. Place the plastic cover on the fuel tank bottom (if not already in position) and position the tank behind the trunk so that the fuel filler neck is on the passenger's side.
3. Put a floor jack underneath the center of the gas tank with a friend holding one end of the gas tank for balance.
4. Raise the tank and hold it up to the ¾" vertical tubes while you get the straps positioned.
5. The straps install first at the rear of the frame with the 2" bolts provided. Swing the straps under the tank and bolt them to the front posts. Use kit fasteners provided.

Driver side rear tank strap mount.



Passenger side Tank strap attached to frame.

6. Do not tighten the passenger side fastener. It will have to be removed to install the floor.



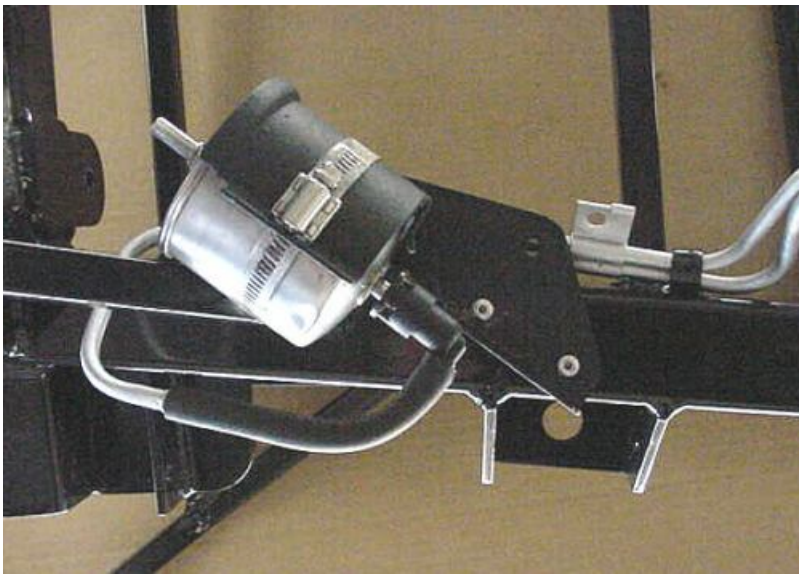
Side view. The Mustang fuel tank installed into the rear frame.

Fuel Filter

ATTENTION: *Make sure to install the fuel filter in the correct flow direction. Determine whether or not a new filter is needed. It's a good general rule to replace the filter no matter what.*

1. Attach the stock Mustang high-pressure (large diameter) hose to the fuel tank and to the inside of the fuel filter in its bracket.
2. Mount the bracket and filter on the inside of the passenger side 2"x 3" rear trunk frame extension.

3. Make sure that the fuel line will not get in the way of the tire. Use zip-ties or fasten the lines securely to make sure there is sufficient clearance.



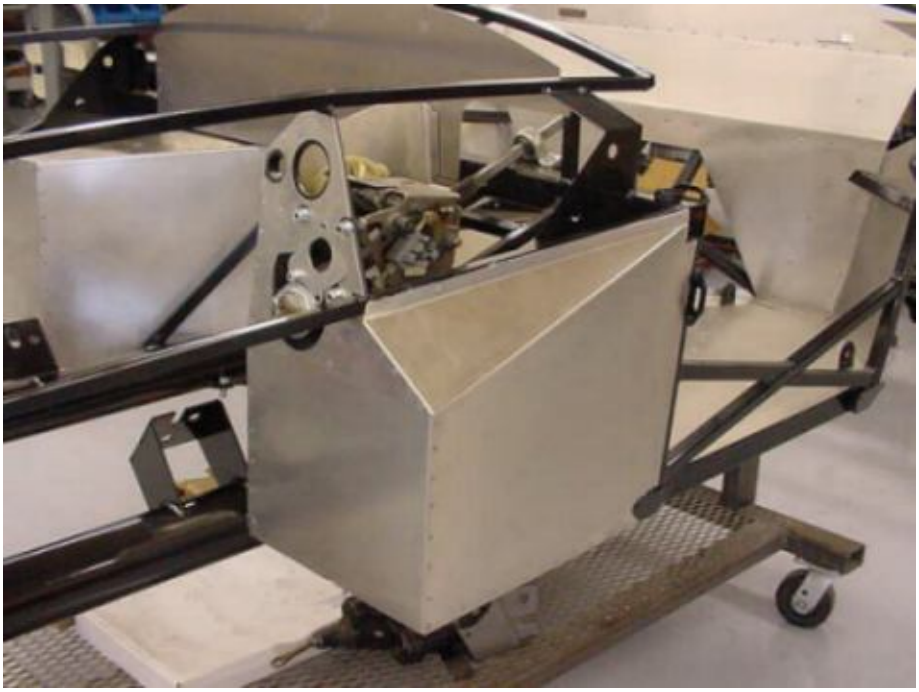
Bottom view of fuel filter mounted to frame.

Pedals

TOOLS: *9/16" sockets, 3/16", 5/16" hex key, drill, 9/16" combination wrench, 1/8", 7/16" drill bits, silicone, rivet tool, marker, hacksaw.*

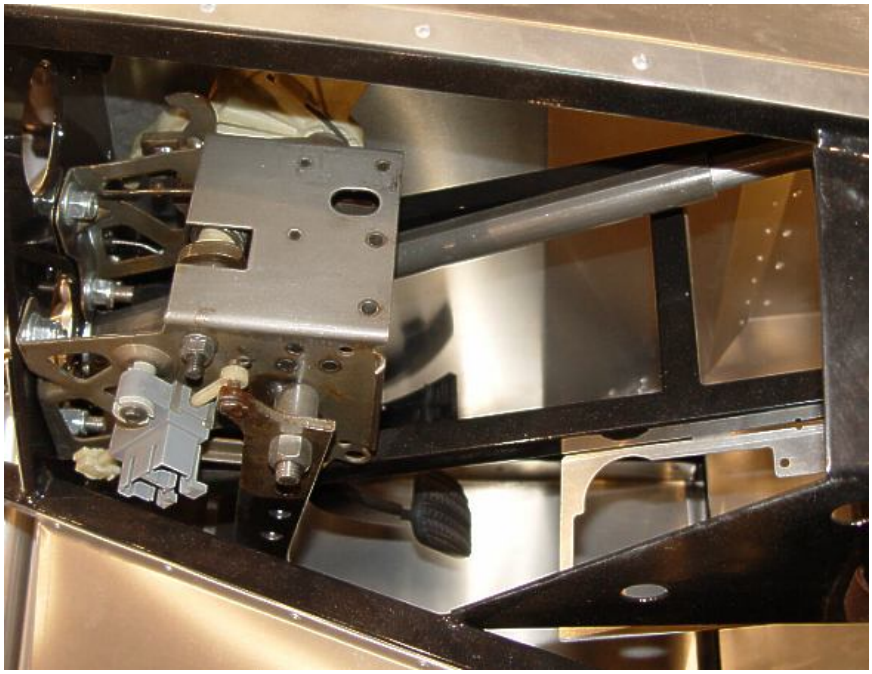
PARTS: *Mustang pedal box, pedal box hardware (FFR# 11023), cockpit aluminum (FFR# 10890), 1/8" rivets.*

1. Position the Mustang pedal box over the two angled ¾" tubes over the driver's feet, the clutch pedal goes to the left of the tubes and the brake pedal goes between the tubes.
2. Attach the pedal box using two short ⅜" bolts and two washers to the front wall at the front of the foot box.
3. The right hole for the master cylinder must also be marked on the pedal box. Use the laser cut hole in the foot box steel as a guide to mark the Mustang pedal box.
4. If not already done, mark the corner of the pedal box that sticks out past the front foot box plate. This will have to be trimmed.
5. Remove the pedal assembly.
6. Use a 7/16" drill bit to drill the bolt hole in the pedal box for the master cylinder bolt.
7. The front foot box aluminum panel can now be siliconed and riveted in place with the ⅛" long rivets.



Foot box vertical wall attached to frame.

8. Install the pedal box with the two ⅜" bolts and washers at the top as before. They go through existing holes in the front of the foot box.



Pedalbox mounted to frame.

9. Attach the trimmed accelerator pedal using the kit fasteners [(2) ¼" x ¾" long bolts (FFR# 12335), washers and nuts (FFR# 10802)] to the bracket on the vertical ¾" tubing at the front of the foot box.

Brake Hydro-booster and Master Cylinder

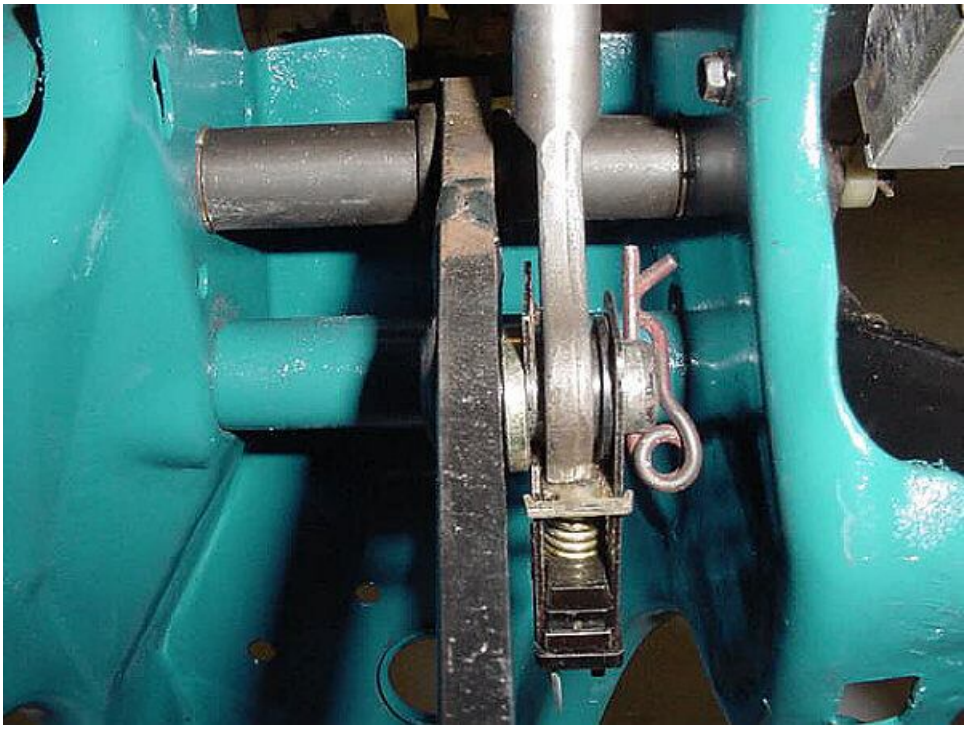
ATTENTION: *Avoid dripping brake fluid on any painted surfaces. Clean up spills immediately. The*

Master cylinder that you use depends on the size and number of pistons in the brake calipers.

TOOLS: *5/16" hex key, 9/16" socket, 3/8" rachet, ½" rachet, Hydro-boost nut tool.*

PARTS: *Master cylinder, Hydro-booster, OEM brake line fittings, pedal box hardware (FFR# 11023).*

1. Using the Hydro-boost nut tool and a ½" rachet, attach the Hydro-boost unit to the aluminum mount.
2. Attach the Master cylinder fill plate to the front of the footbox.
3. Use the 3/8"x 1" bolts provided to mount the hydro-boost mount to the front of the footbox.
4. Tighten the mounting bolts for the hydro-boost mount.
5. Insert the white plastic bushing in the ring end of the brake pedal mount.
6. Hold the rod between the two ears of the brake light switch and slide it over the brake pedal post.
7. Put the clip through the hole in the pedal so that the push rod will not come off.



View up at the mounted brake pedal

Cockpit Aluminum

ATTENTION: *Do one panel at a time. Be careful of the sharp aluminum edges, they can cut you. If you have not marked and drilled the panels for rivets, as explained in the uncrating and disassembly of the kit, do so at this time.*

TOOLS: *Drill, 1/8" drill bit, rivet tool, Silicone, #8 self tapping screws, #8 hex nut driver, ruler, marker, Acetone or carburetor cleaner, rags.*

PARTS: *Cockpit aluminum (FFR# 10890), secondary body fasteners (FFR# 10788).*

NOTE: Included in the kit are Block-off covers for six aluminum holes if the holes are not used in your application or your personal preference. The holes that can be covered are:

- The transmission wiring harness hole in the driver side of the transmission tunnel.
- The dash harness hole in the front of the driver footbox.
- The engine harness hole in the passenger side firewall extension.

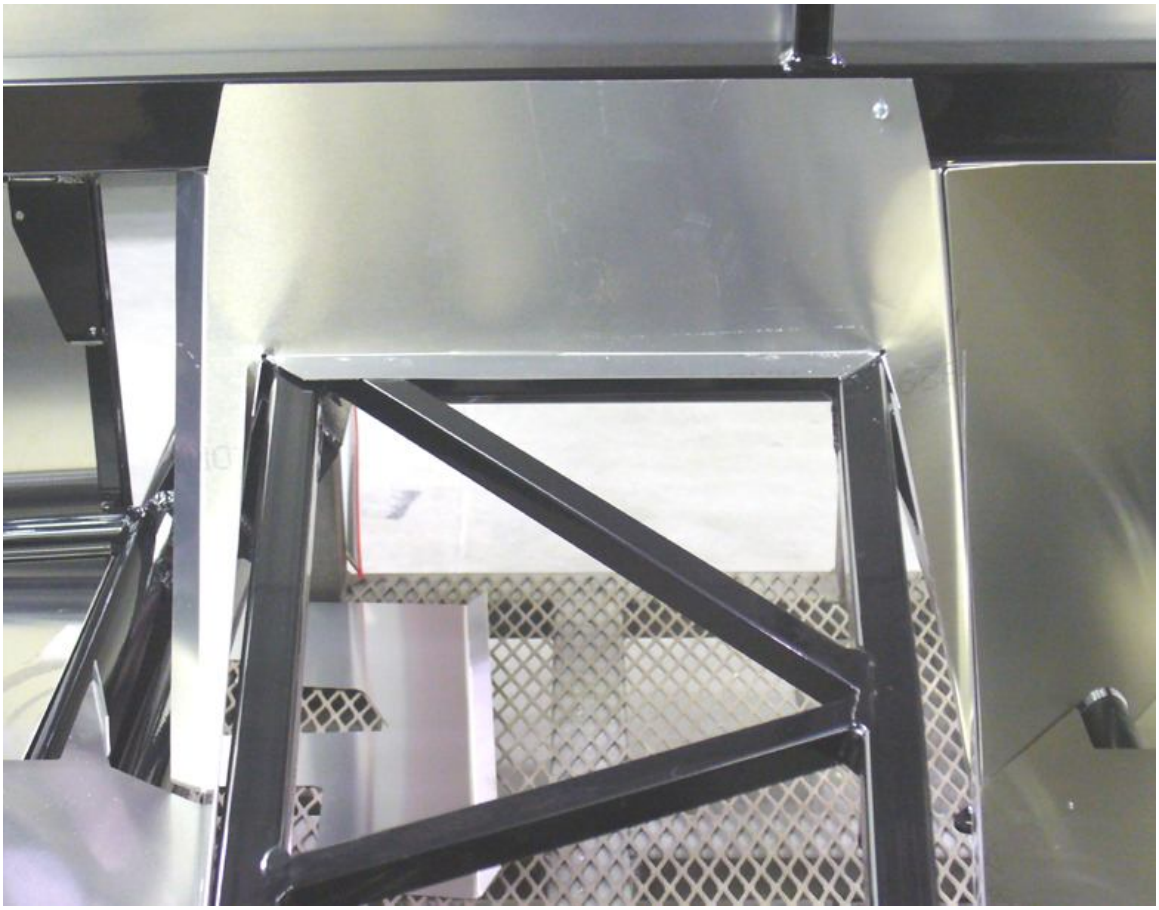
- The Passenger side “F” panel hole.
- The transmission top cover shifter hole.
- The speedometer cable hole in the driver footbox top inside panel.

Aluminum Floor Panels

1. Position the pieces before doing any work to make sure you are familiar with placing them in the frame accurately.
2. With the floor in place, drill through the holes in the aluminum and into the frame.
3. Remove the panels.
4. Wipe and clean the aluminum panel and frame.
5. Apply silicone or bonding agent to the frame on the main floor contact points of the 4” round tube, 2” cross member supports, and the ¾” tubes but, not the transmission tunnel 1” tubes.
6. Attach the floor panels with self-tapping screws.
7. Rivet the floors to the frame but do not rivet the transmission tunnel sides.
8. Repeat for the other floor panel.

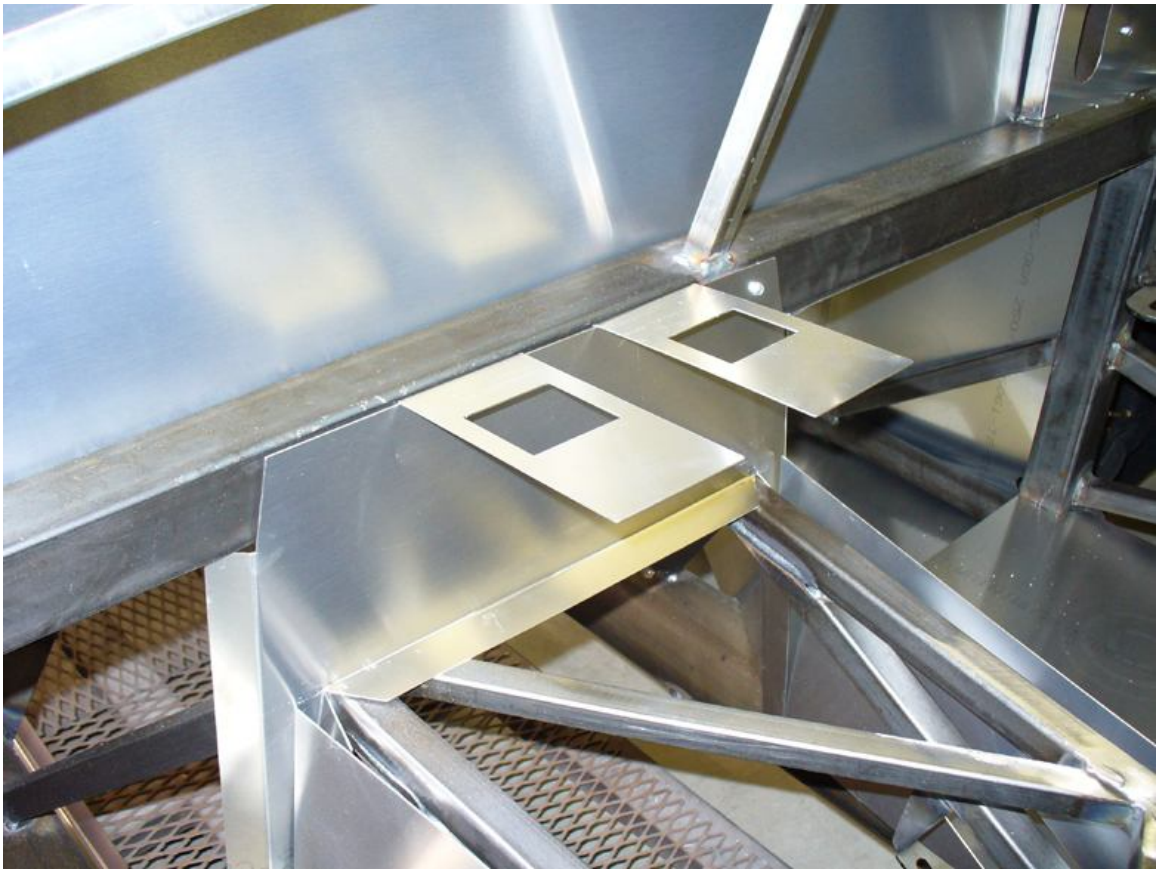
Transmission Tunnel Front Vertical Wall

1. Position the Front Vertical Wall so that the top tab is flush with the 2”x 2” tube running across the car, use the factory mount hole as a guide.
2. Mark where the rivets will go.
3. Attach the panel with a couple of self-tapping screws through the rivet marks.



Transmission tunnel Front Vertical Wall positioned.

4. Push the top front of the floor transmission tunnel sides in against the front vertical wall then, while holding it in place, use your other hand in the transmission tunnel to position the bottom of the Front Vertical wall so that it is located in the lower corner properly.
5. Attach a self-tapping screw in the bottom corner first and then the top corner to hold the panel in place.
6. Repeat for the other side of the transmission tunnel.
7. Insert the two dash switch plates behind the front vertical wall in the center of the car.



Switch plates spaced and behind the front vertical wall panel.

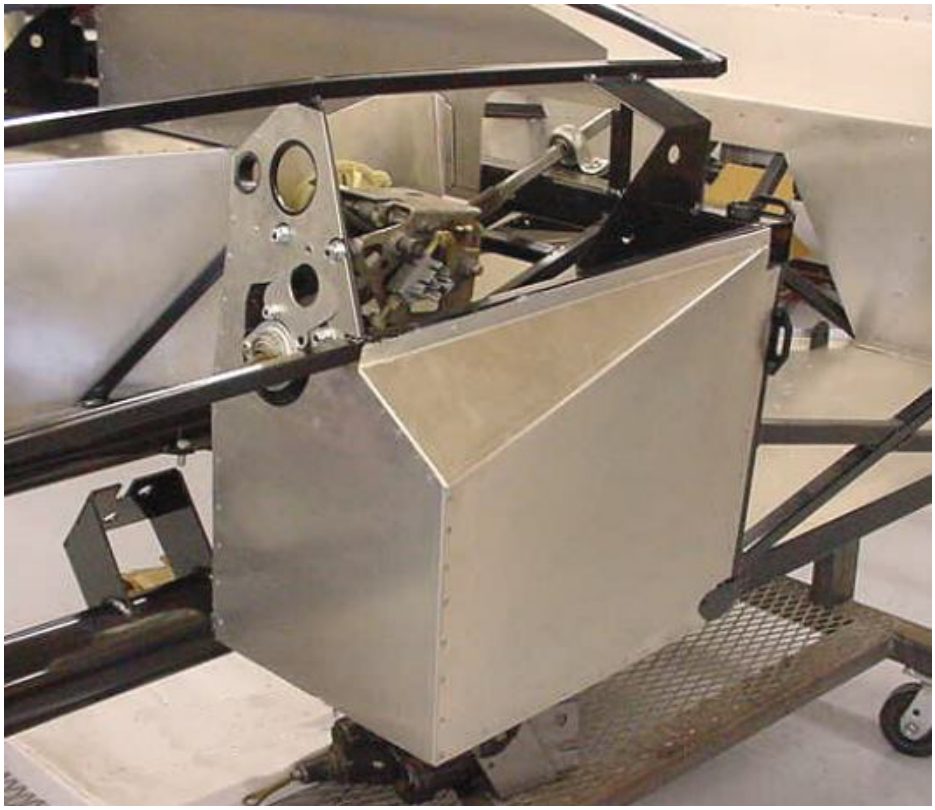
8. Mark the front vertical wall so each switch plate will get two rivets through them
9. Drill the panel for the rivet holes.
9. Remove the Front Vertical Wall panel and switch plates.
10. Wipe and clean the aluminum panel and frame.
11. Apply silicone to the back side of the top tab of the panel.
2. Attach the top of the panel with self-tapping screws.
3. Pull the transmission tunnel walls back and silicone along the Front Vertical wall tab and the 1" tubes in the transmission tunnel.
4. Insert the switch plates behind the front vertical wall.
5. Attach the transmission tunnel walls to the Front Vertical and transmission tunnel tubes with self-tapping screws.
6. Rivet the panels in place.

Driver's Foot Box

Note: If you are doing a Complete Kit build, makes sure that you use the Front Footbox panel packed with the Wilwood Pedal box assembly

1. Position the foot box floor. The front edge sits on top of the front wall bottom tab and the back gets attached to the 2"x 2" tube.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panel with self-tapping screws.
5. Rivet the panel in place.

6. Position the outside wall on the foot box. The tab on the front wall goes on the inside of the outside foot box wall.
7. Mark where the rivets will go.
8. Remove the panel and apply silicone to the frame.
9. Attach the panel with self-tapping screws.
10. Leave the top edge of the panel that rests along the ¾" tubing unattached so that the foot box top can fit under it later.
11. Rivet the panels in place.

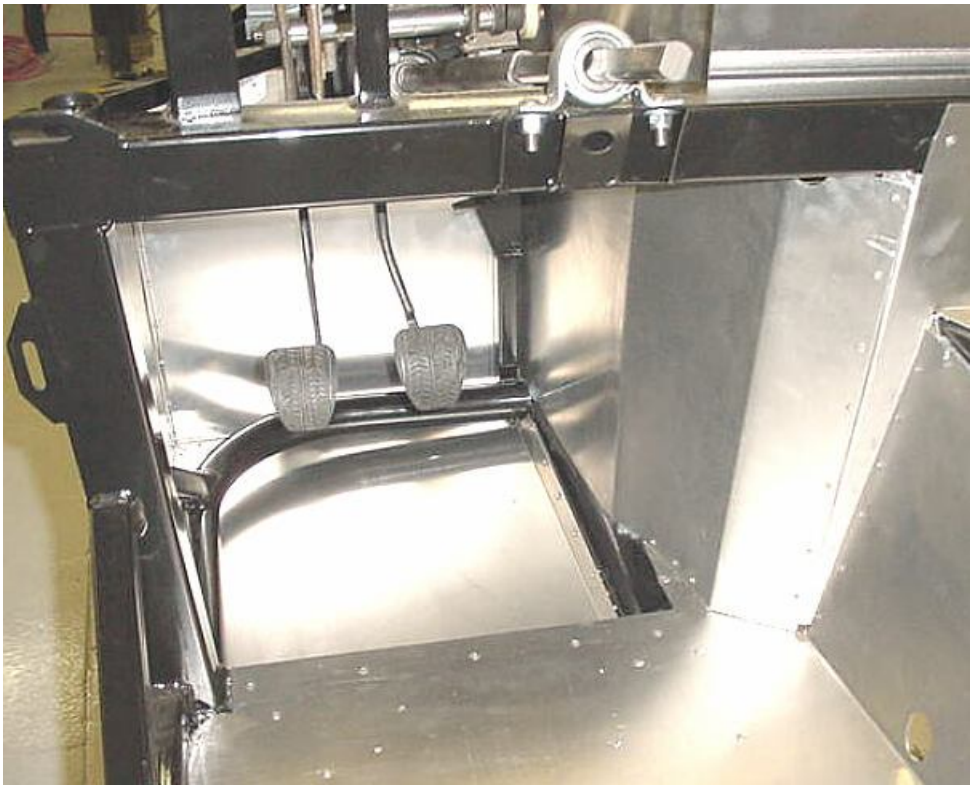


Driver's footbox

12. Position the inside wall on the foot box from the engine compartment side. The bent tabs go behind the front wall.
13. Mark where the rivets will go.
14. Remove the panel and apply silicone to the frame.
15. Attach the panel with self-tapping screws.
16. Rivet the panel in place.
17. Position the top/inside panel.
18. Remove the panel and apply silicone to the inside wall, front wall and along the top ¾" frame tube.
19. Rivet the panel to the inside and front walls only.

ATTENTION: *Leave the top/outside of the driver's footbox open in order to do the wiring.*

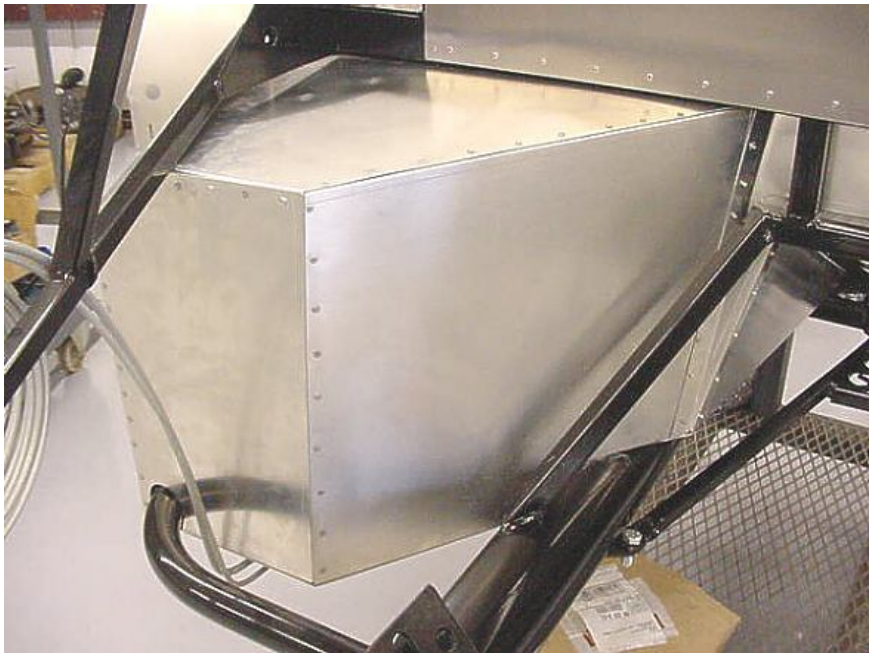
20. Take a look at the completed foot box and floor for gaps between the panels and around the seat harness mounts. Use silicone to fill these gaps.



Drivers inside footbox

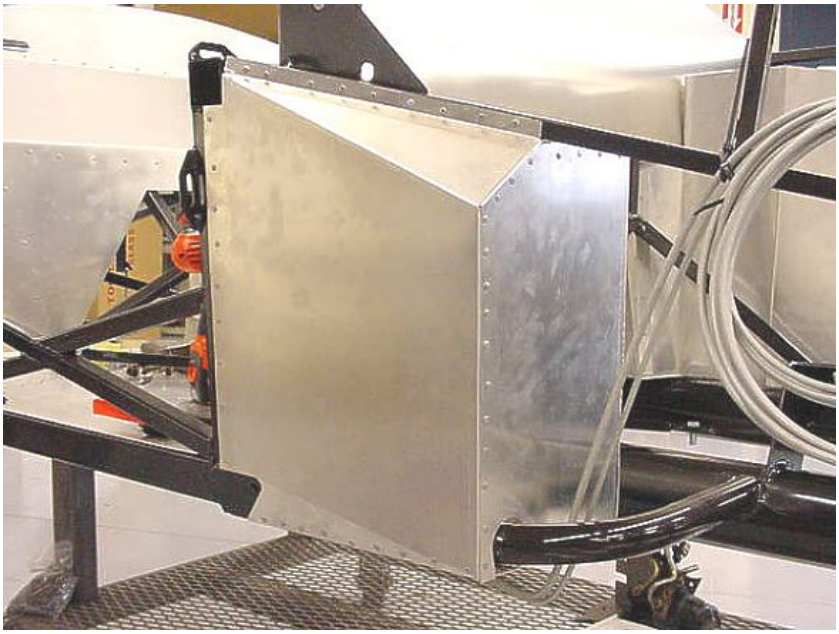
Passenger Foot Box

1. Position the foot box floor. The front edge sits on top of the front wall bottom tab and the back gets attached to the 2”x 2” tube.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the foot box top panel to the frame using the factory-mounting hole and self-tapping screws. Note where the panel touches the frame.
5. Remove the panel.
6. Apply silicone to the underside of the 2”x 2” frame tube where the panel will contact.
7. Install the top panel again with a self-tapping screw.
8. Drill and rivet the panel to the underside only of the 2”x 2” frame tube.
9. Position the foot box inside wall with self-tapping screws in the factory holes. Note where the panel tabs go under the floor and top panels.
10. Use a ruler and marker to mark where rivets will go.
11. Remove the inside wall.
12. Apply silicone to the inner wall tabs.
13. Install the inner wall with self-tapping screws.
14. Drill and final rivet the panel in place.



Passenger inside wall assembled.

15. Position the front wall with self-tapping screws.
16. Mark where the rivets will go, remove the panel and apply silicone to the panels.
17. Rivet the panel in place.
18. Position the outside wall with self-tapping screws.
19. Mark where the rivets will go, remove the panel and apply silicone to the panels.
20. Install the outer wall and drill and rivet the panel into place. The entire passenger foot box should now be complete. With both foot boxes complete, use silicone to seal any holes and around each seat harness mount.



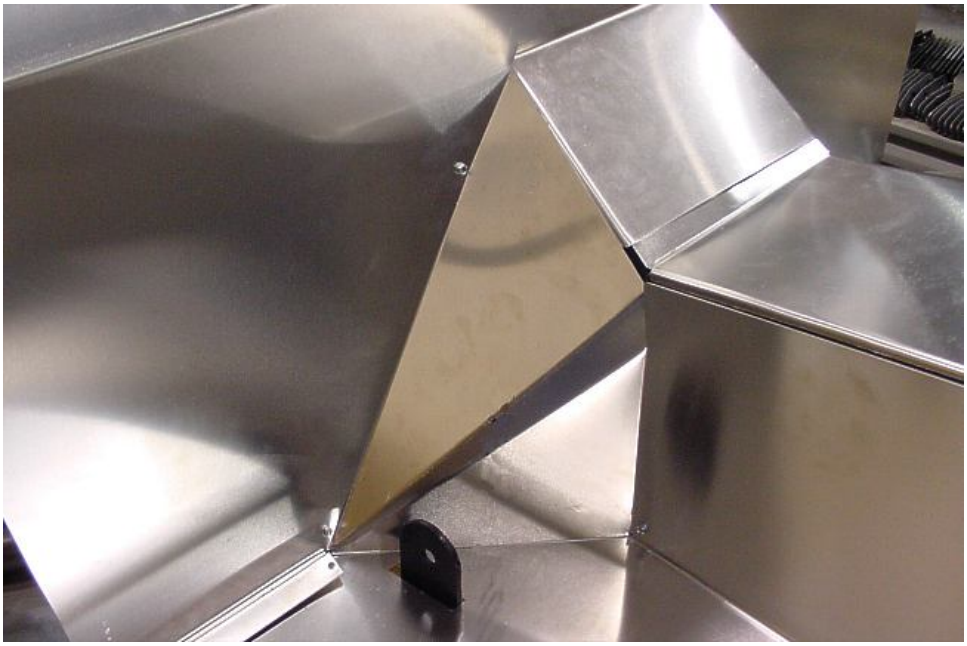
Passenger side foot box.

Cockpit Rear Wall

1. Position the panel on the frame. The panel sits on top of the floors.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame and aluminum tabs.
4. Attach the panels with self-tapping screws.
5. Rivet the panel in place.

Transmission Tunnel U-joint Cover

1. Position the panel on the frame as shown in the photo below.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panels with self-tapping screws.
5. Rivet the panel in place.



U-joint and Transmission rear corner pieces

Transmission Tunnel Rear Corners

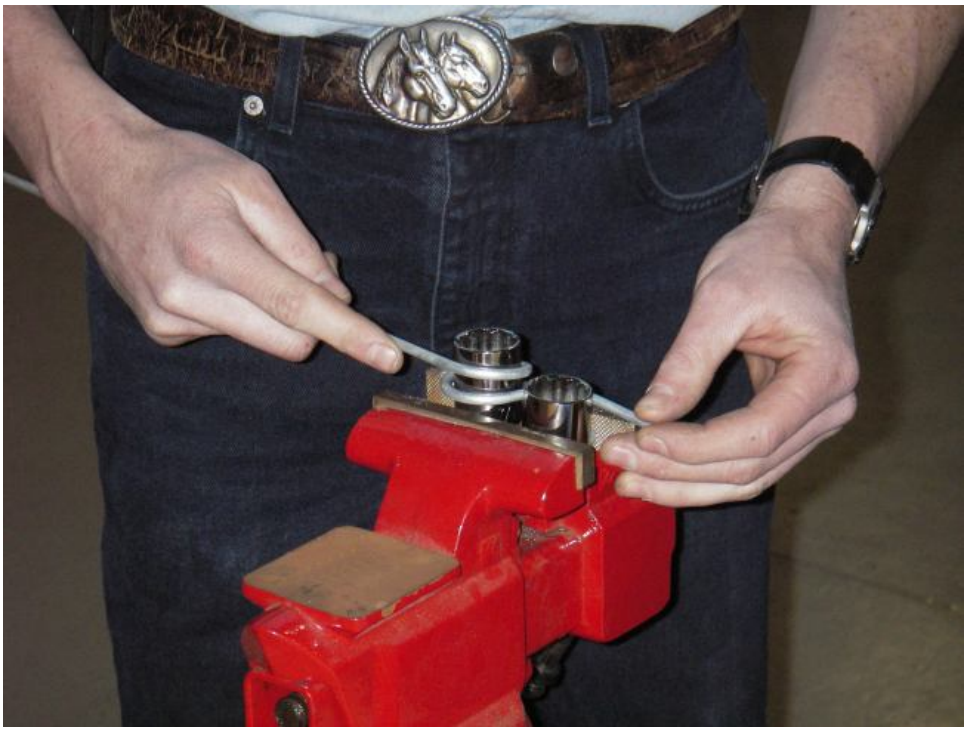
6. Position the panels on the frame.
7. Mark where the rivets will go.
8. Remove the panel and apply silicone to the frame.
9. Attach the panels with self-tapping screws.
10. Rivet the panel in place.

Fuel, Brake and Battery Lines

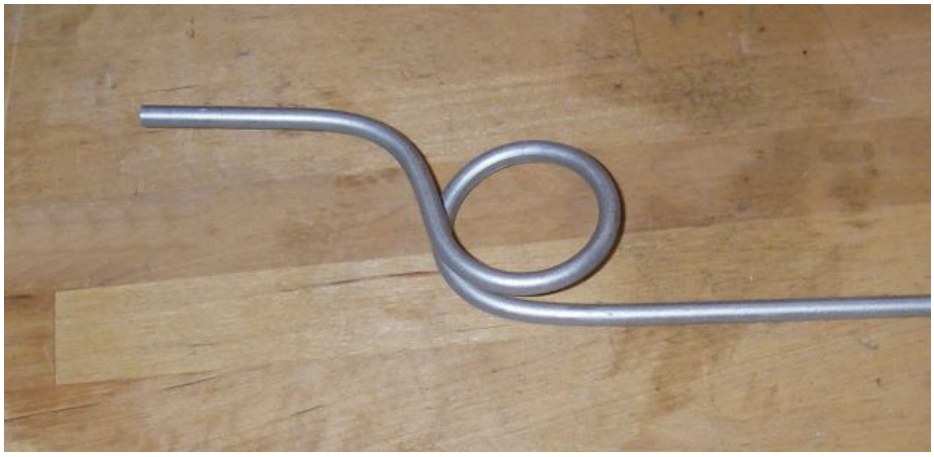
ATTENTION:

- *Use care not to crimp any lines, make sure to avoid over-tightening any mounts that may lead to bending or crimping.*
- *It is a good idea to make a small loop at the end of the lines (where they secure to the brake line*

mounts or master cylinder). This loop will provide good adjustment for any small variances without bending or crimping the line and provide protection from vibration.



Brake line loop made using two ⅞" sockets and a vise.



Brake line loop.

- *If you are planning on using the ABS from the Mustang, keep in mind that the fittings are metric and additional adapters will be necessary.*

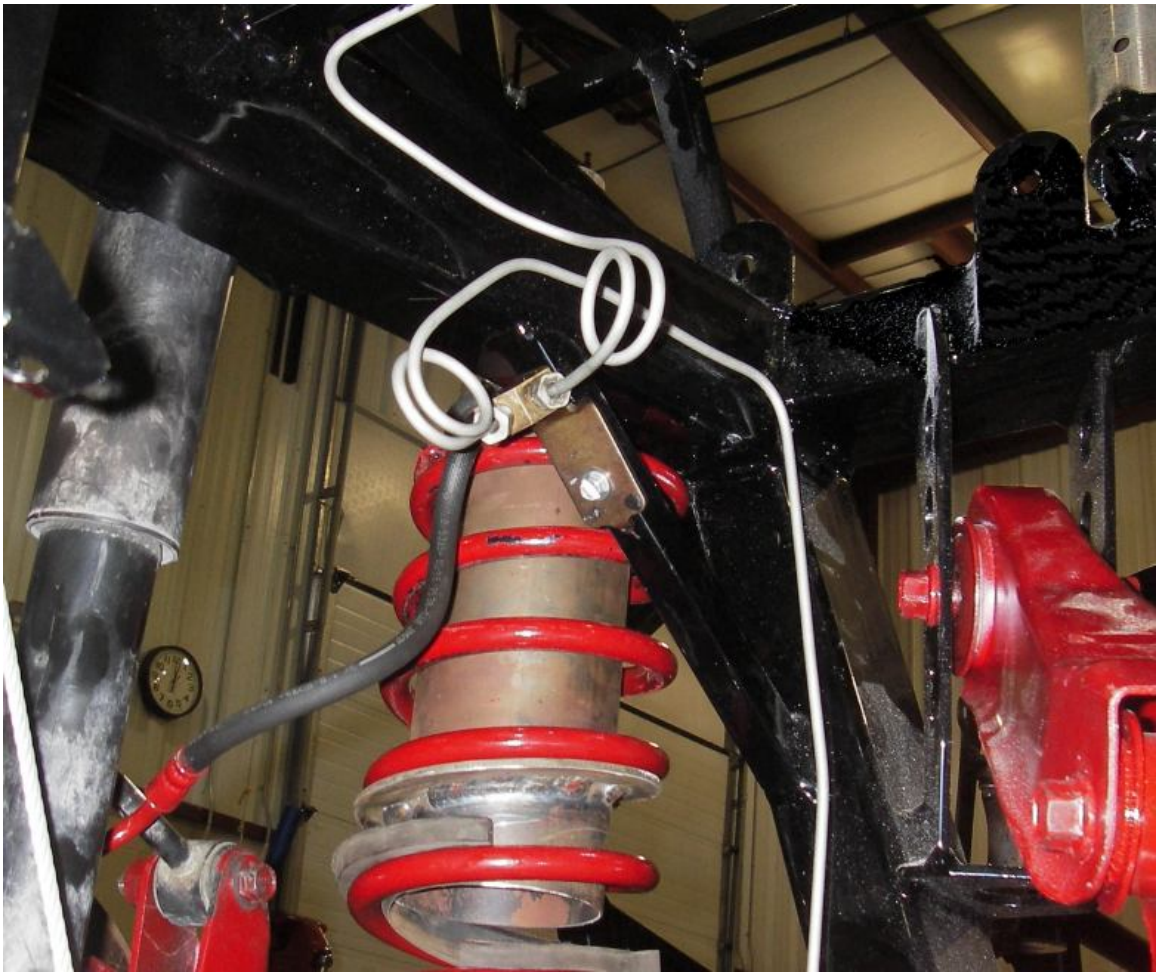
TOOLS: *Phillips and regular head screwdrivers, tube bender, double flaring set, tube cutter, 3/16"drill bit, drill, rivet tool, marker, tape measure, electrical tape.*

PARTS: *Insulated clip hardware (FFR# 11029), battery relocation kit (FFR# 12396), misc. electrical components (FFR# 10975), ¼" fuel line (FFR# 10784), 5/16" fuel line (FFR# 10783), 20", 51" and 60" 3/16" brake lines (FFR#'s 13740, 13739, 13738).*

Rear Brake Line

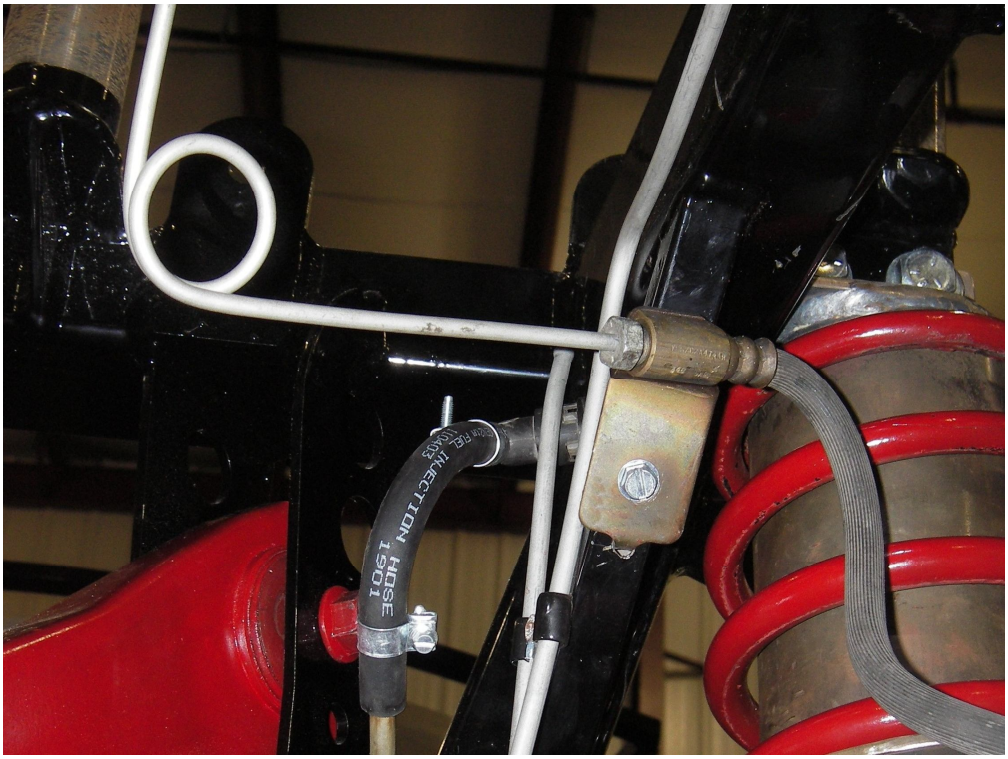
1. Attach two 60" lines together using the union provided.

2. Run the rear brake line under the driver's side on the outside of the 4" round tube and fasten to the 2" x 2" cockpit outriggers.
3. Run the line up along the backside of the 2"x 3" frame members and up to the driver side brake line mount.
4. Attach the line to the frame with the small size insulated line clips (FFR# 10970) and 3/16" rivets provided with your kit.
5. Connect the line to the driver side Mustang brake line mount using the adapters provided if necessary.



Driver side brake line mount. Note the loops in the line.

6. Run another 60" line across the car to the passenger side mount.

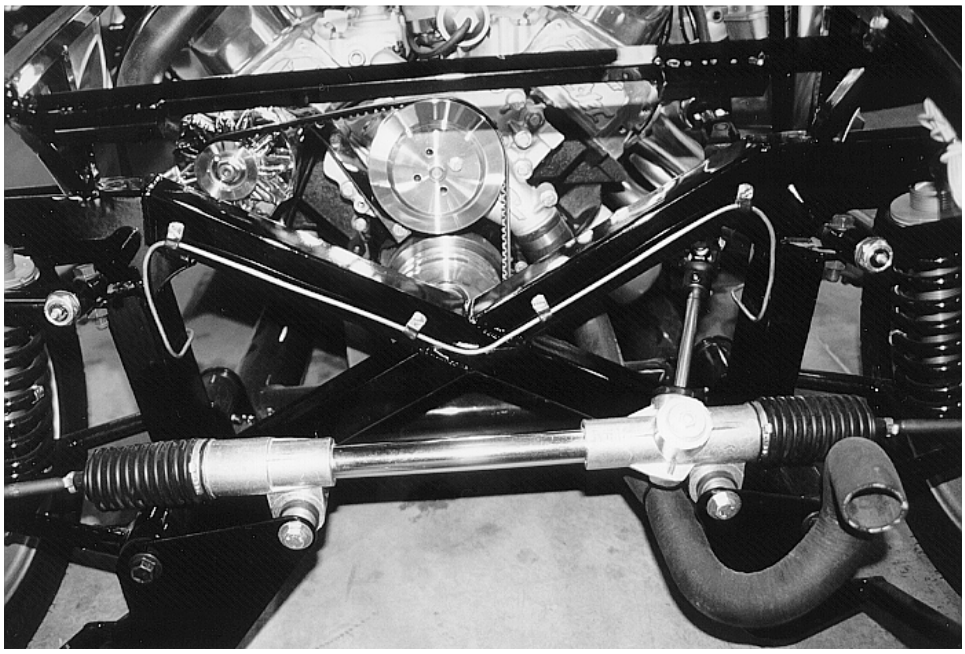


Passenger side brake line mount.

7. Connect the line to the passenger side Mustang brake line mount using the adapters and provided and looping the brake line if necessary.

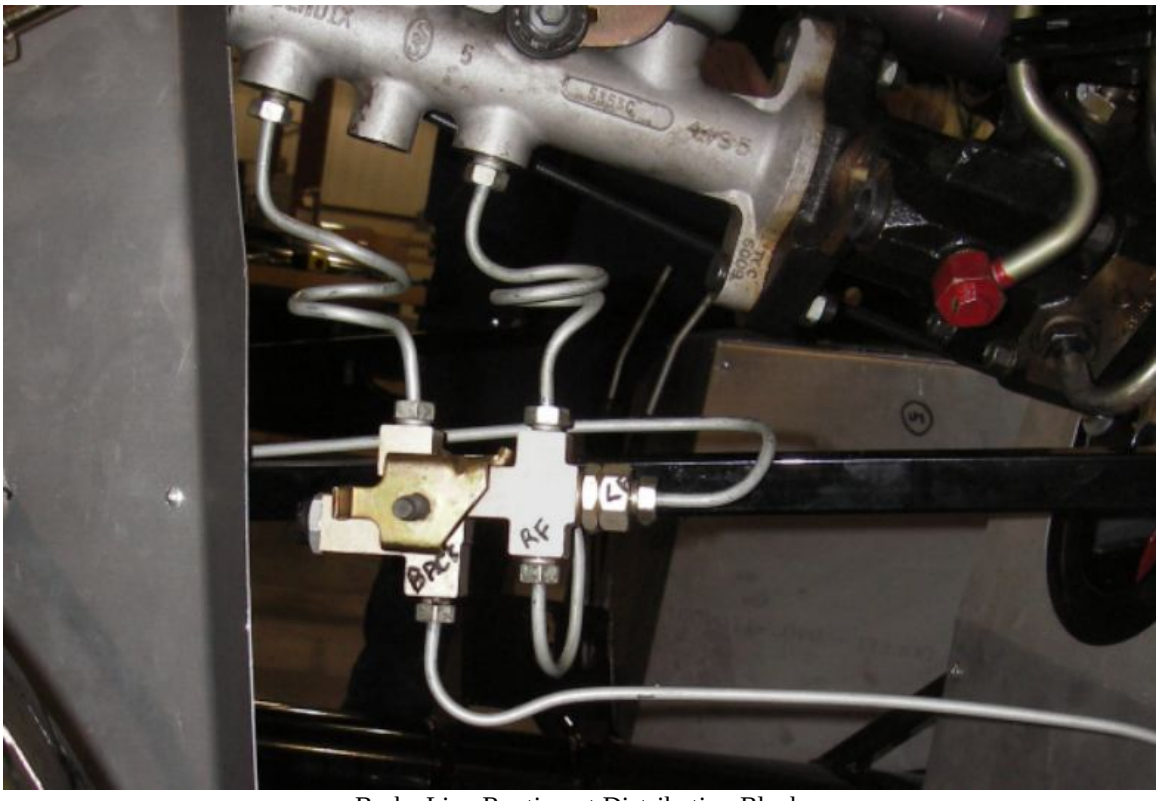
Front Brake Line

1. Hold the front flexible line to the frame just behind the upper A-arm on the ¾" tubing in the opening. Rotate the front wheels to check for wheel clearance. Move the brake line mount around if necessary or bend the hard line attached to the caliper slightly so that when the wheel is turned all the way, the line is not stretched too tight.
2. Attach the front flexible brake line to frame.
3. Use the Mustang clip to attach the flexible line.
4. Run the right front brake line forward along the ¾" tubing to the front side of the "X" member for a clean engine appearance. Go down along the "X" and up again then along the ¾" tube to the brake bracket.



Brake line routing along frame X-member. This Mark II has a manual steering rack.

5. Run the brake line back towards the driver's foot box and to the master cylinder. The distribution block connections are shown on the next page.

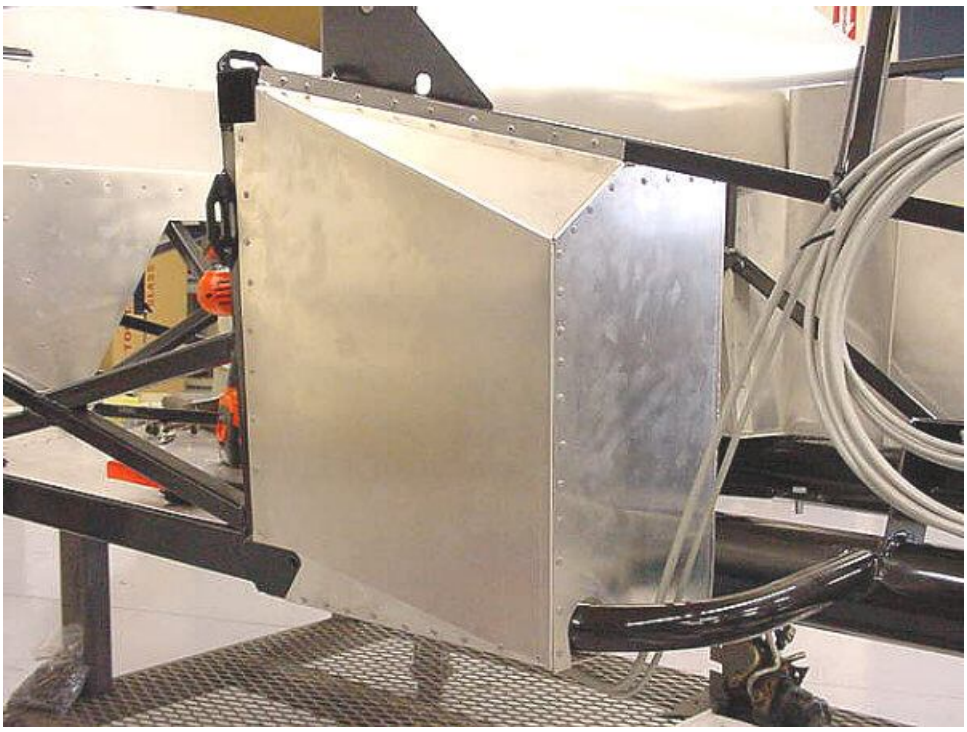


Brake Line Routing at Distribution Block

Fuel Line

1. The ¼" return (FFR# 10784) and $^{5}/_{16}$" send (FFR# 10783) fuel lines are provided in the kit. The vapor line is used from the Mustang donor.

2. Measure two feet of both lines and mark with a marker pen. Use a tube bender of the appropriate size, make a 90° bend at the point marked. This bend goes at the front right corner of the passenger foot-box so that the lines stick straight up in the air. This will give enough so that the exact engine location can be made.

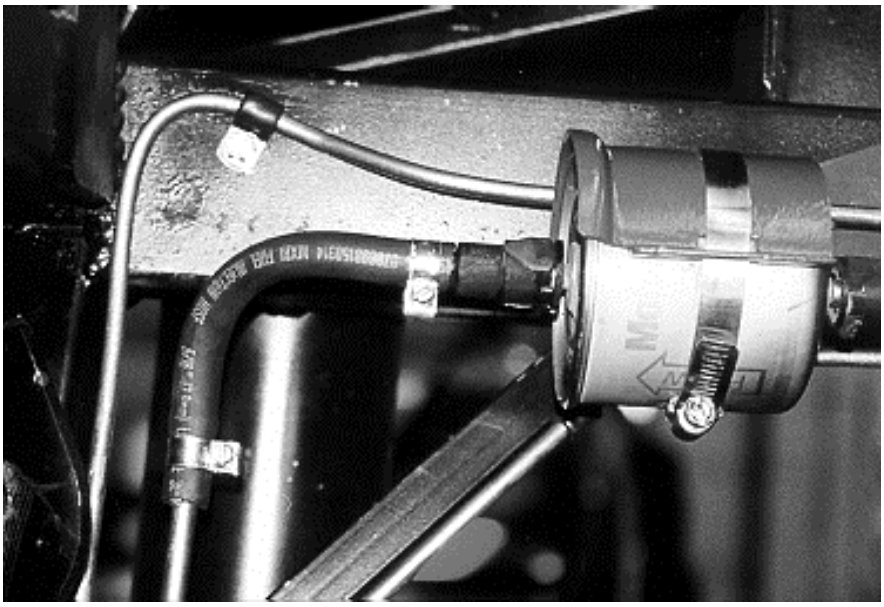


Fuel line routing in front of the passenger foot box. You will not have a coil here.

3. From the passenger outer corner, go towards the first 2"x 2" frame outrigger alongside the 4" round tube.
4. Fasten the lines to the 2"x 2" square cockpit outriggers with the insulated line clips.
5. In a similar fashion to the rear brake line, run the fuel lines up the back of the 2"x 3" frame member to the fuel filter for the $^{5}/_{16}$" line. Cut the $^{5}/_{16}$" line three to four inches from the fuel filter.
6. Continue the ¼" line to the end of the 2"x 3" frame member then go down and make another bend so that the line will clear under the ¾" tubing that forms the lower trunk section.
7. Bend the line so that it will cross to the fuel return connector (the smaller tube) on the gas tank.
8. Cut the line four inches from the connector.
9. Do the first part of a double flare on the ends of the fuel lines. This helps prevent the hoses from coming off.

Fuel Line flared.

10. Use the ¼" flexible line (FFR# 10997), $^{5}/_{16}$" flexible line (FFR# 11051), and fuel injection hose clamps (FFR# 10855) to connect the Mustang connectors to the hard line.

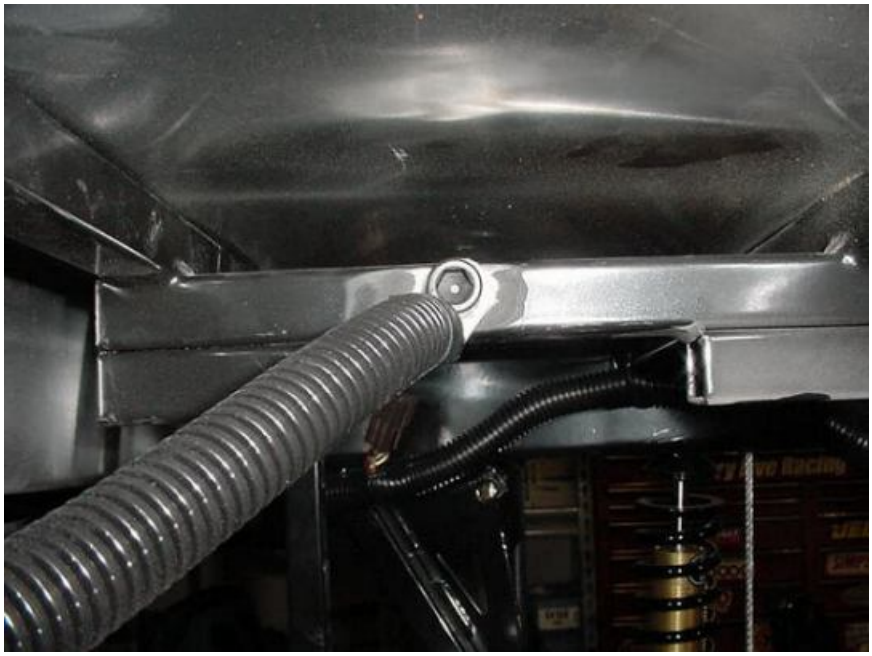


Rubber fuel line and Mustang connector on fuel filter

11. Attach the connectors onto the fuel filter and fuel pump.
12. If you are going to run the emissions equipment and fuel vapor line, run it along with the fuel lines to the plastic connector that will attach to the evaporative canister which will mount on the driver side rear later after the trunk aluminum is mounted. At the front of the car, the line will go to the evaporative canister purge valve on the passenger side which will also get mounted later.

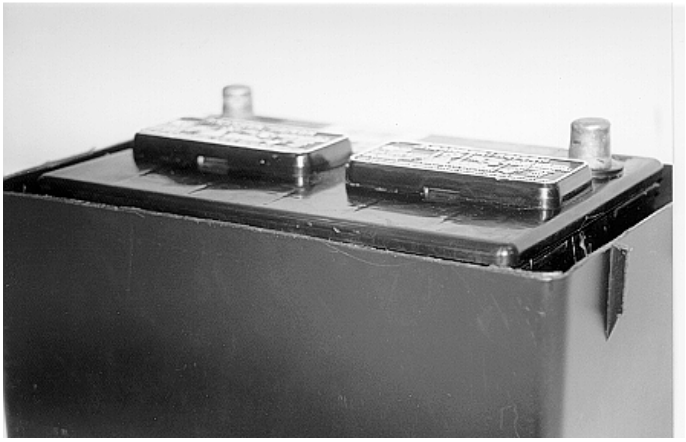
Battery Relocation Kit

1. Attach the battery ground cable securely to an area free of paint, behind fuel filter bracket. NAPA sells a 2 ft. long cable with an eyelet at one end and terminal connector at the other end if the donor piece is not available or is not usable.



Battery grounded to sanded frame area.

2. Place the battery in the battery box and mark the height of the flat top of the battery on the box.
3. Remove the battery and use a ruler and marker to mark a line 3/16" below the point marked previously. Mark this all the way around the box.
4. Using a razor blade or tin snips or scissors cut the top of the battery box down to the line marked.

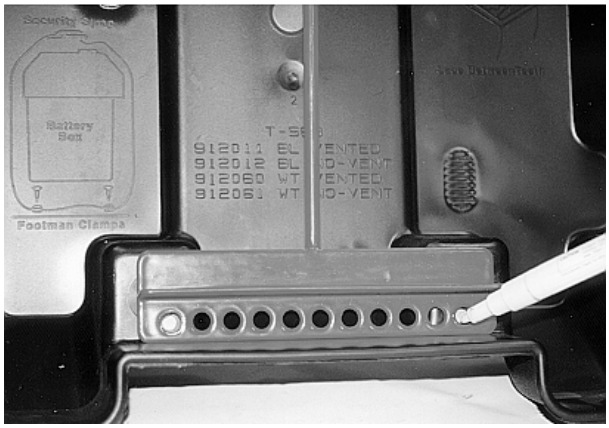


Battery box cut down to size.

5. Replace the battery and place the crossbar hold down over the battery. The crossbar should be able to go over the sides of the battery box.
6. Position the box with battery on the passenger side lower part of the car trunk. Push it forward against the aluminum step and just far enough over so that the crossbar does not touch the side.
7. Use a marker and mark around the base of the box on the aluminum.
8. Hold one of the "J" bolts vertically through the crossbar holddown and locate the ¾" tubes below the aluminum that will be used to fasten the "J" bolts. You may need to slide the crossbar or battery around in the box to line up with the diagonal tube in the trunk. We have included 4 bolts for the battery. Three of these will be able to go into ¾" tubes while the forth can only go into aluminum. If you wish to run all four bolts use a fender washer or weld an additional tube in for the bolt to go into. Note: In SCCA, as long as the battery does not move it is ok. NHRA rules specify two ⅜" bolts as

required. Mark the locations of the bolts on the aluminum so that holes can be drilled.

9. Decide which way around the box you would like to run the battery cables and make sure there is enough room for them. There should be enough room in the current location to run them on out of the box on the wall side.
10. There is more than one way to route the battery cable to the front of the car. One way is to Drill a ¾" hole through the aluminum step next to the wall in order to pass the positive battery cable through. Pass the eye end through the aluminum then push on some of the plastic grommeting around the aluminum edge before pushing through the remaining cable. Another way is to pass the cable through the aluminum next to the shock tower, again using grommeting on the aluminum.
11. Follow the manual instructions on the routing up to the front of the car once the cable is through the trunk.
12. Locate a point on the frame for the ground cable. You may drill another hole like the positive cable or attach it inside the trunk.
13. Without moving the crossbar or battery move the battery box to the middle of the trunk.
14. Take the battery box top and press it down onto the box over the crossbar.
15. Lift the top of the box off along with the crossbar that should be wedged inside.
16. Mark the location of the holes used for the crossbar bolts with a marker.



Marking the bolt locations on the box top.

17. Drill ¼" holes through the top of the ¾" tubes only, at the bolt locations marked.
18. Insert the "J" bolts into the tubes so that the threaded part stick straight up.
19. Position the battery box with battery between the bolts and place the crossbar over the bolts.
20. Attach the battery cables to the battery so that they exit the box in the desired location.
21. Place the cover over and onto the "J" bolts.

Put washers and the locknuts on the bolts and tighten them evenly until the box does not move.

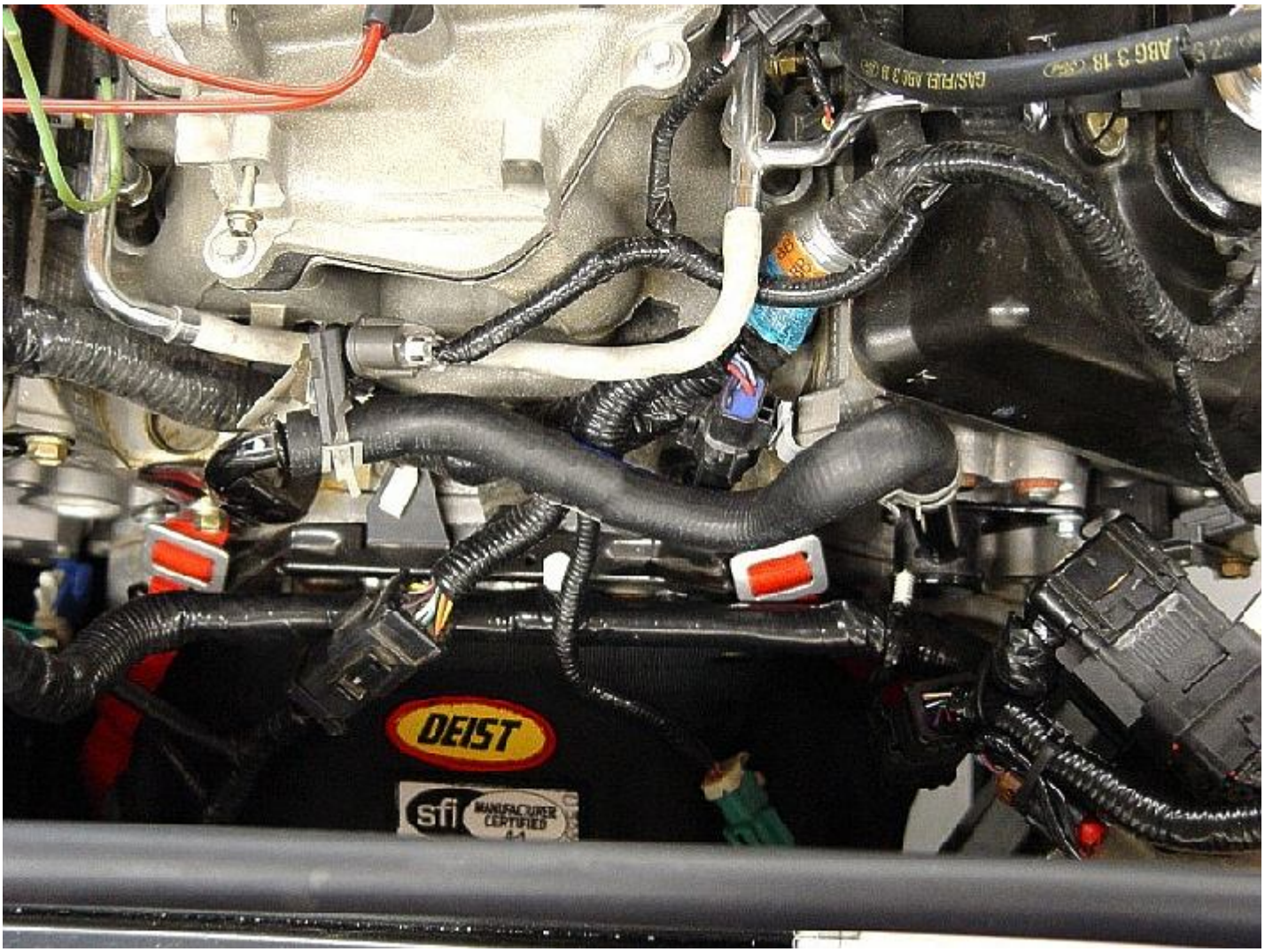
22. Run the battery cable (FFR# 10579) from the positive terminal of the battery straight forward, down the driver's side of the transmission tunnel to the floor/tunnel wall bend and along the edge to the front of the driver's foot box. Zip tie as you go.
23. Run the cable under the floor to the outside of the car and up to the ¾" tube next to the master cylinder. Wrap the end of the cable with electrical tape to prevent any short-circuiting.
24. Use some of the white press-on plastic grommeting (included in the kit) on the edge of the aluminum to prevent cable damage.
25. Attach the cable to the side of the foot box and the floor using kit zip ties.
26. Drill two $^{3}/_{16}$" holes and pass the zip ties through one hole, inside the car then through the other hole and fasten it.
27. Leave the battery cable fastened for now with zip ties everywhere so that the rear harness can be run with the cable later. Use the rubber insulated clips and screws for final assembly.

Engine Preparation

TOOLS: *¾", ⅜" sockets, $^{5}/_{16}$", ⅜" hex keys, regular screwdriver, Teflon tape, tube bender, $^{9}/_{16}$" deep socket, $^{9}/_{16}$", ½" combination wrenches, ⅛" drill bit, drill.*

PARTS: *4.6L Oil pan kit (FFR# 13781 or 13711), Radiator mount Components (FFR# 13645).*

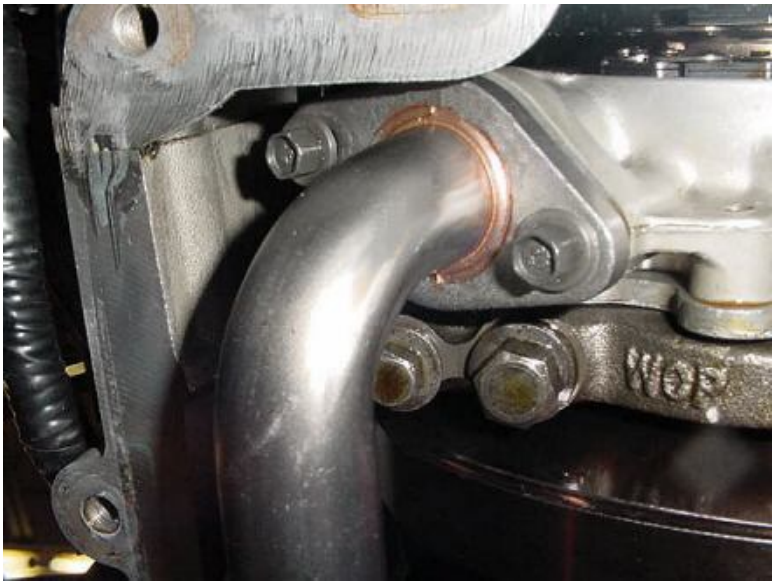
1. If you are installing aftermarket gauges, some of the gauge sending units will need to be changed. Do this now while the engine is empty and out of the car. See your gauge instructions for more information.
2. Use the heater bypass hose provided to loop between the inlet and outlet on the back of the engine.



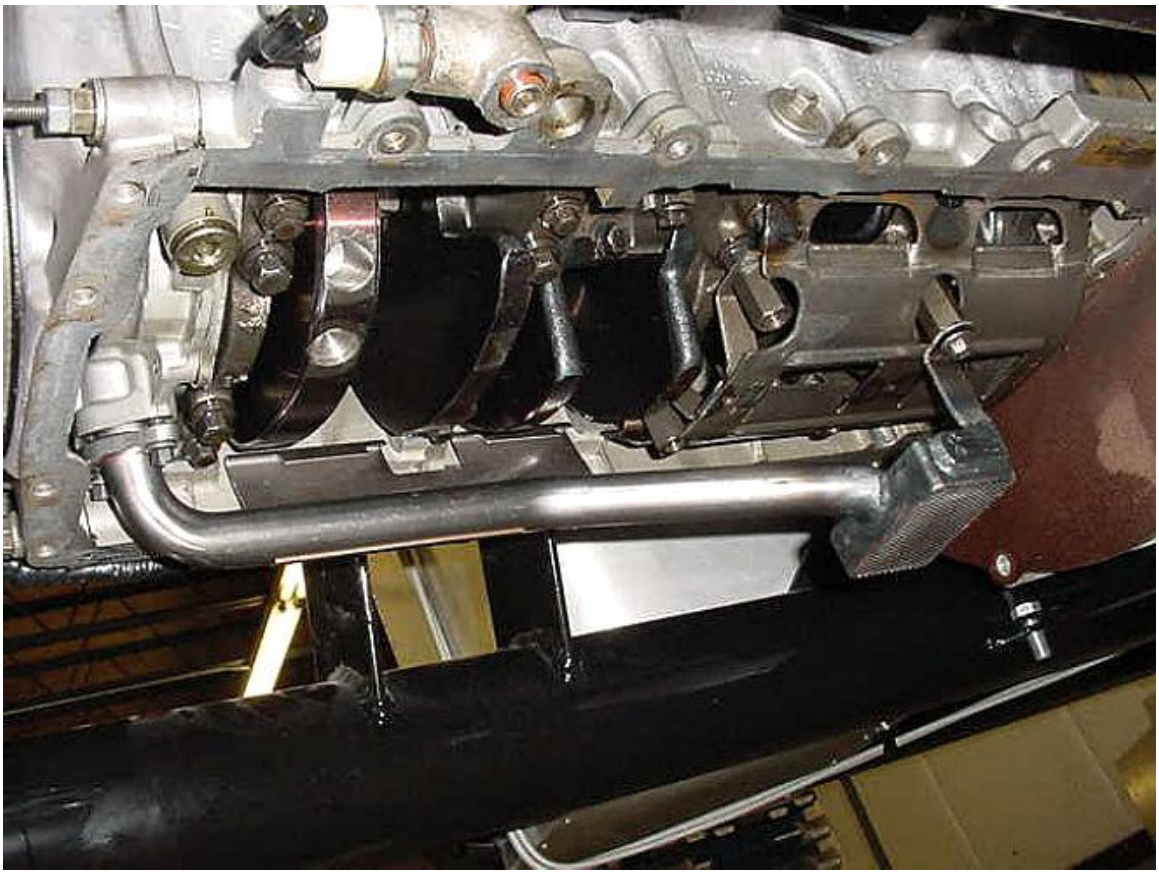
Heater bypass hose attached to a DOHC engine.

3. Locate the pin stamped VIN number on the engine and the transmission. Some states check for these numbers during registration and they are hard to see on the 4.6. It may be useful to take pictures of these for the inspector. The engine VIN is located on the drivers' side on the engine block just above the oil pan near the bellhousing (it is very small). The Transmission VIN number is on the drivers' side in front of the Speedo sensor near the middle of the transmission (it is very small).

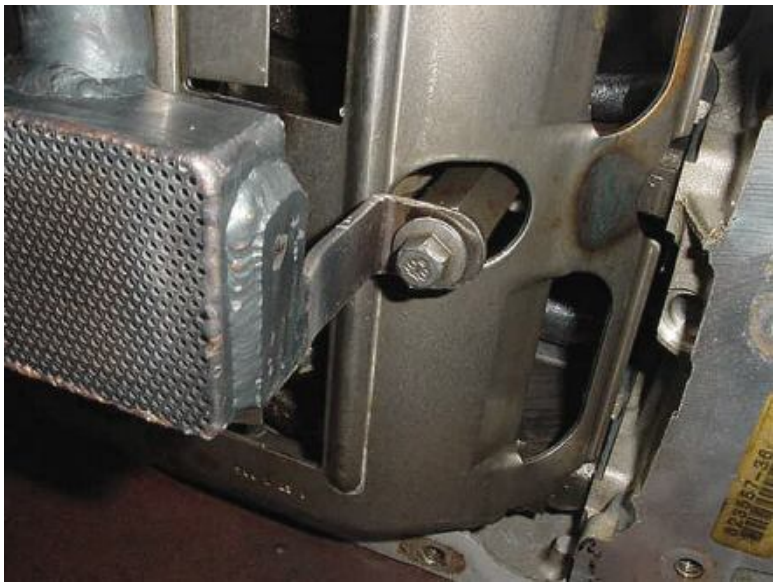
4. Check to make sure the trap doors in the new oil pan work and swing freely.
5. Drain the oil from the pan if not already done.
   6. Remove the oil pan from the engine.
7. Remove the oil pick-up from the engine.
8. Install the new pick-up provided. Tighten the inlet tube bolts to 71-106 lb-in (8-12Nm). Tighten the inlet screen bolt to 15-22lb-ft (20-30 Nm).



DOHC Oil pick-up bolted to block.

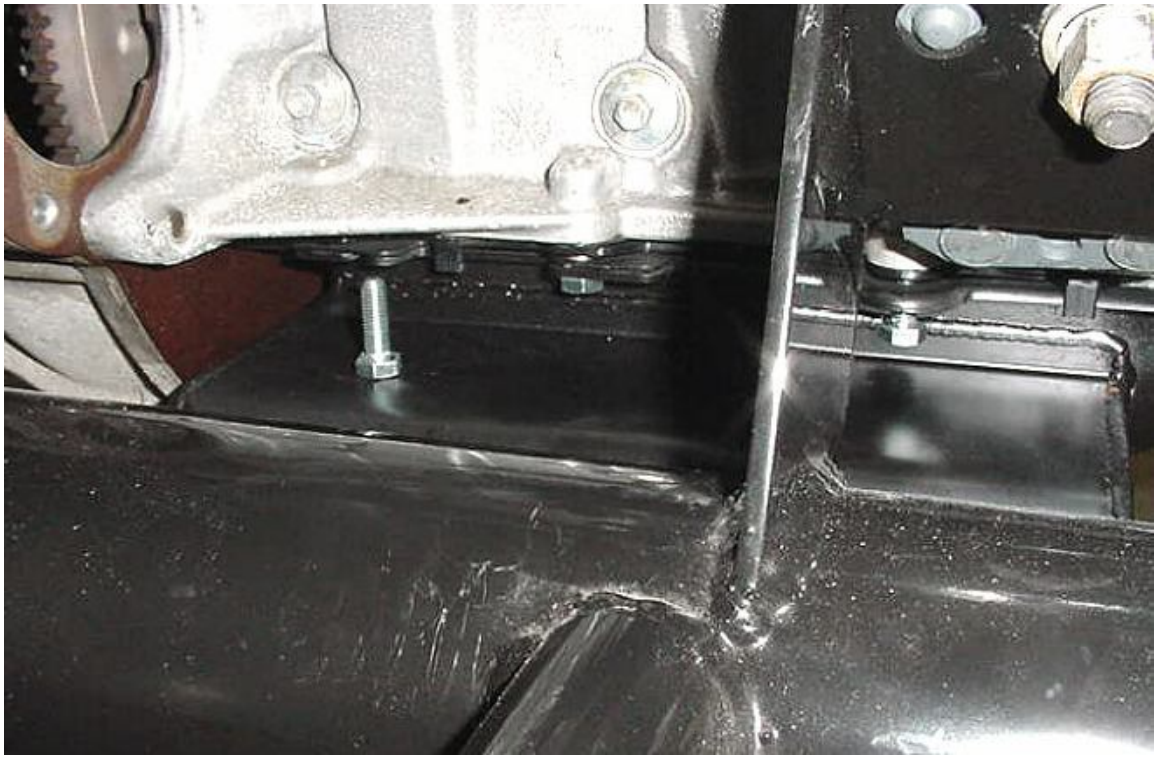


New oil pick-up mounted to the engine.



Oil pick-up inlet bolted to block.

9. Attach the new oil pan to the block using the included short bolts over the rear kick-out. Torque the oil pan bolts using Fords tightening sequence and 15 ft-lbs. (20 Nm) plus an additional 60 degrees.

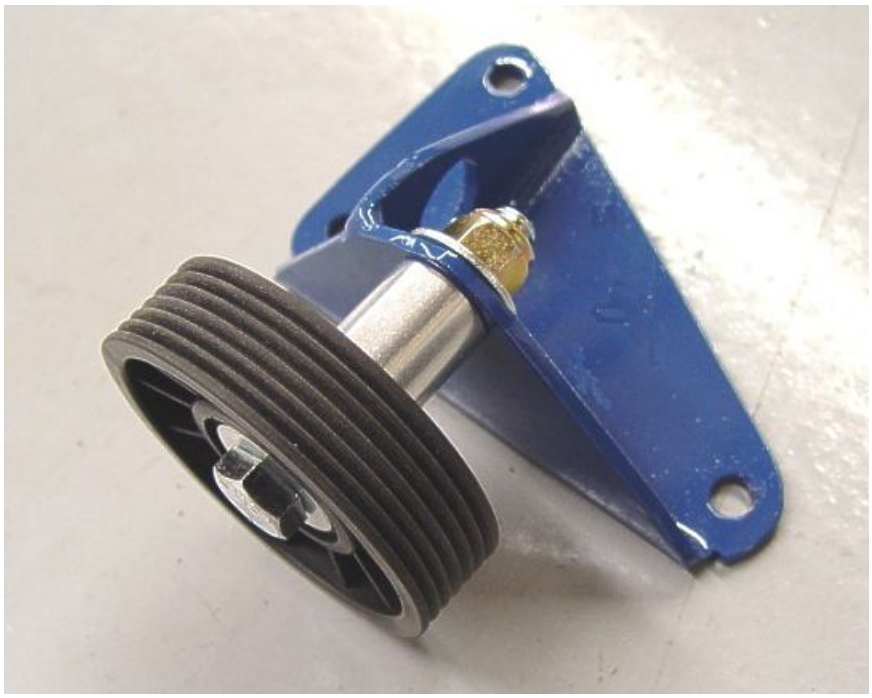


Short oil pan attaching bolts over kick out.

A/C Eliminator Kit

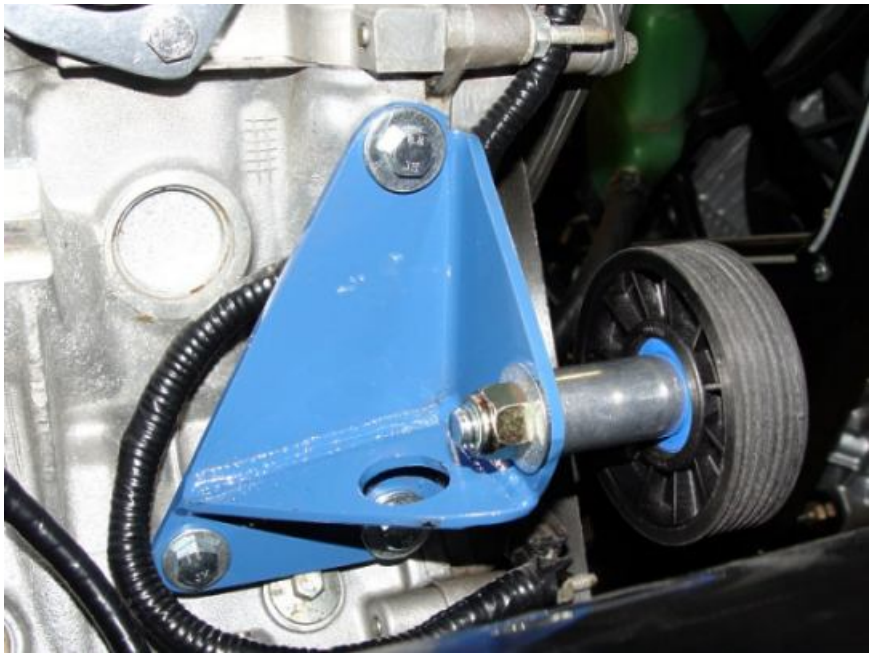
TOOLS: *18mm socket, 18mm combination wrench.*
PARTS: *Alternate drive pulley components (FFR# 11080), A/C Eliminator Kit (FFR# 13700)*

1. Attach the pulley to the bracket to using the included ½" bolt.



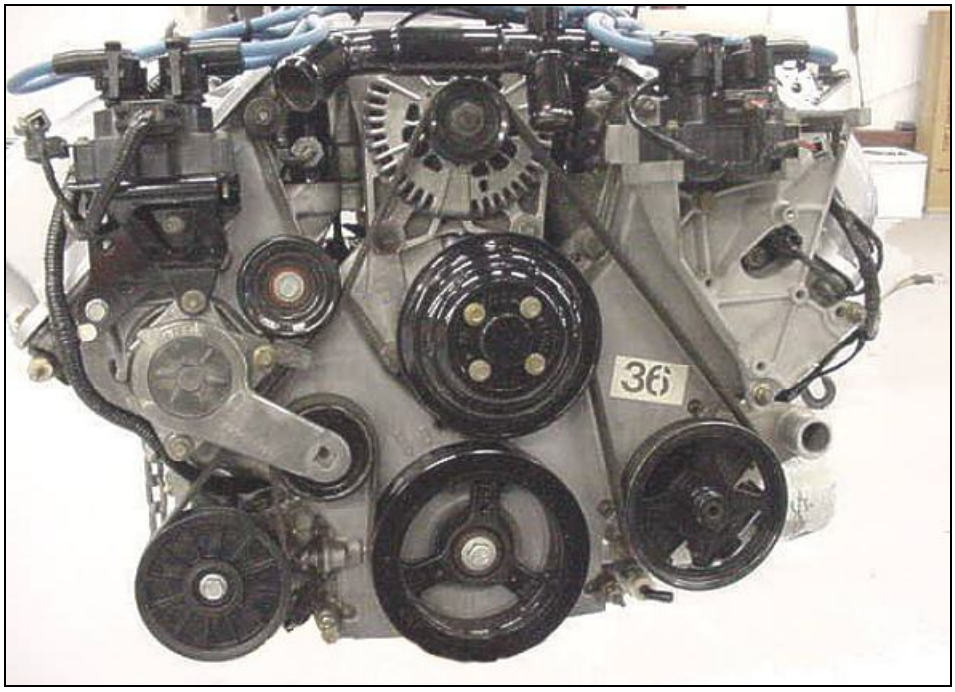
Pulley mounted to bracket.

2. Attach the A/C eliminator bracket to the engine. Use double washers for the two front bolts that have the sleeves in the holes.



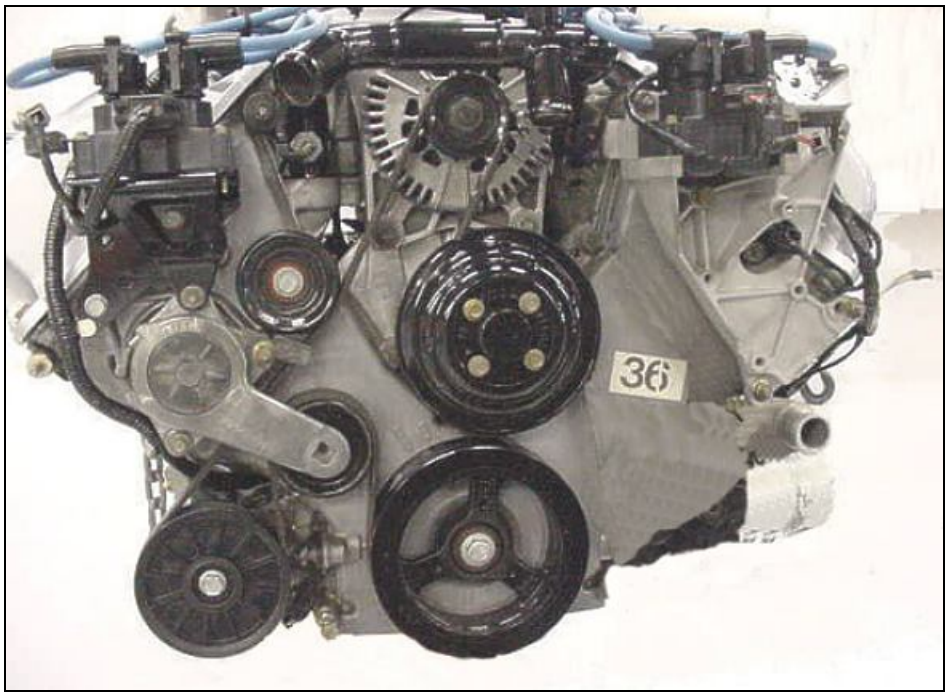
A/C Eliminator bracket attached to engine.

3. Pull the tension pulley back using a Ratchet in the square hole.
4. Carefully install the Serpentine belt using the picture below for reference if using power steering.

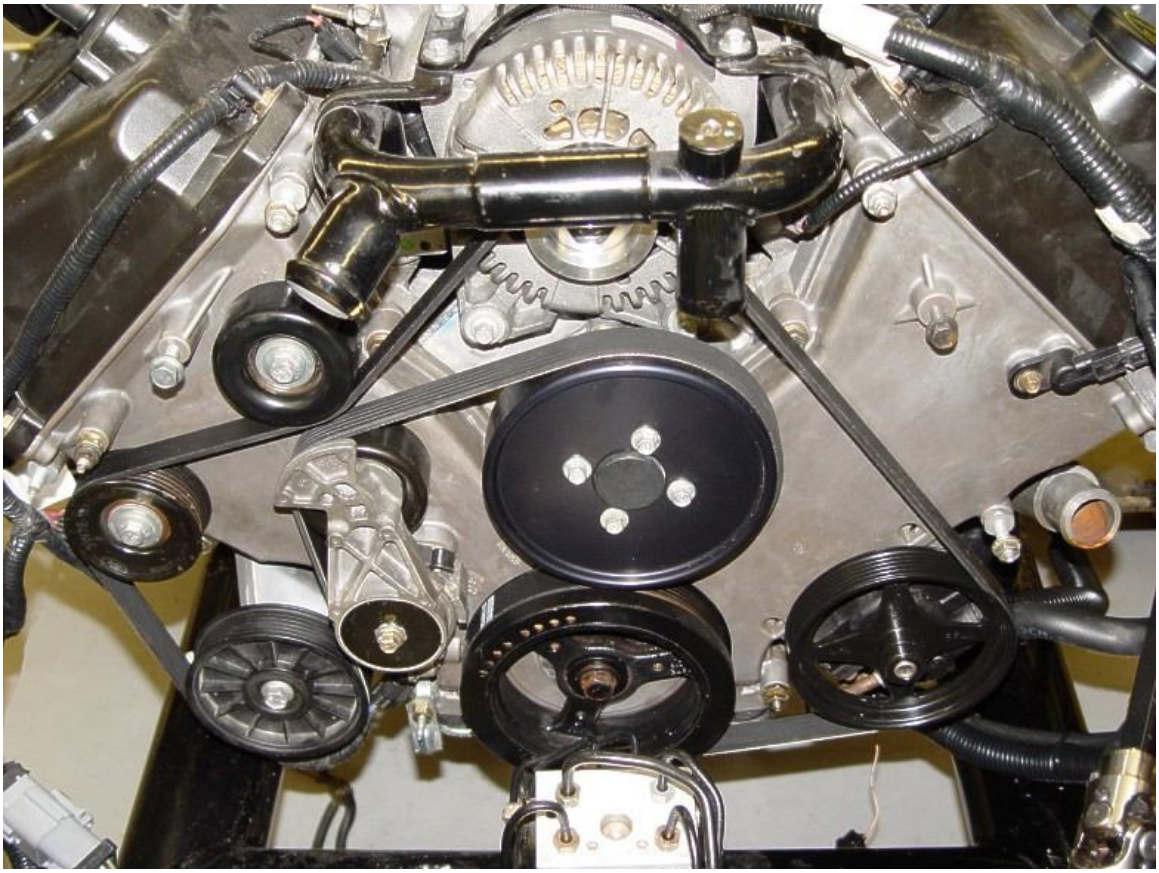


96-98 DOHC Serpentine belt routed on engine using power steering.

5. If not using power steering, use the following picture for routing.



96-98 DOHC Belt routing without power steering.



99-03 DOHC Serpentine belt routed on engine using power steering.

Engine/Transmission/Drive shaft

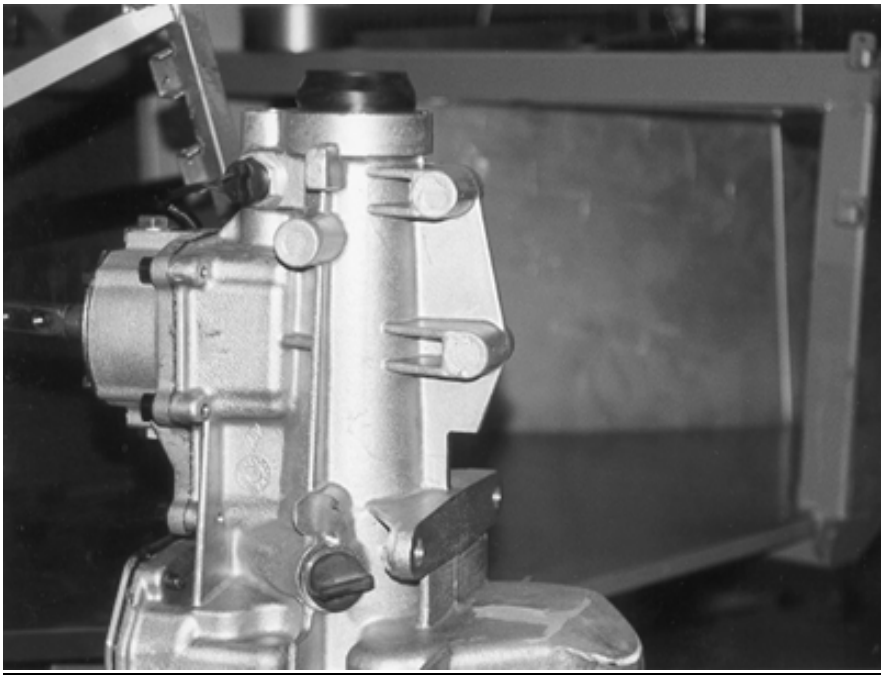
ATTENTION: *Use extreme caution when lifting and positioning engine assembly. Never get underneath an engine hoist. A couple of extra people come in handy at this point in the build-up. It's easier to roll the car under the engine/trans than to roll the engine into the car.*

- *If using a 96-98 T-45, bolt the transmission mount to the top of the frame mounts and do not use any spacers under the mount.*
- *If using a 99-04 T-45 or 3650, bolt the transmission mount to the underside of the frame mounts. Do not use any spacers if using the stock mount and adapter. If using the polyurethane mounts, use the spacers provided to raise the transmission.*

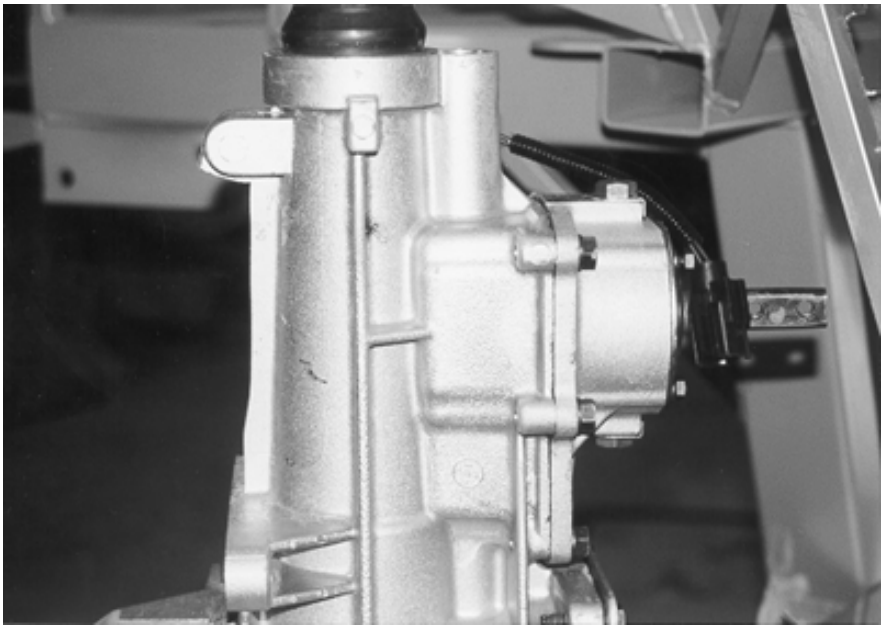
TOOLS: *Engine hoist, $^{9}/_{16}$" deep socket, 12pt. 12mm wrench, $^{5}/_{8}$", $^{13}/_{16}$" sockets, $^{5}/_{16}$" drill bit, drill, combination wrenches, and friends.*

PARTS: *Transmission mount /hardware (FFR# 13661), 4.6L Engine and transmission, 99-04 Transmission mount Adapter (FFR# 13969) (if applicable).*

1. If you are using a TKO transmission, the rear of the transmission needs to be modified. The rear of the transmission needs to be trimmed to fit over the 4" crossmember. The mount hanging off the bottom of the housing is for a torque arm and must be trimmed off level as shown in the picture.



Tremec housing with torque arm mount



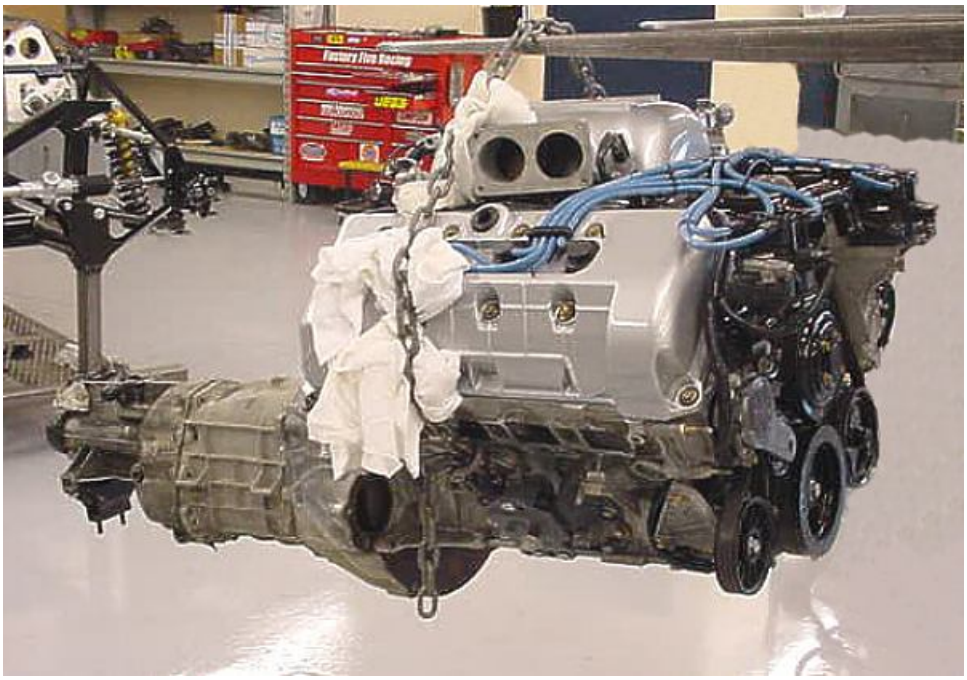
Torque arm mount removed for crossmember clearance

NOTE: If you are using a TKO transmission, two ¾" spacers need to be used between the mount and the transmission, which raises the entire assembly ¾".

2. Bolt the transmission mount to the frame using the fasteners provided. The ½" bolts are used in the back and the ⅜" in the front.

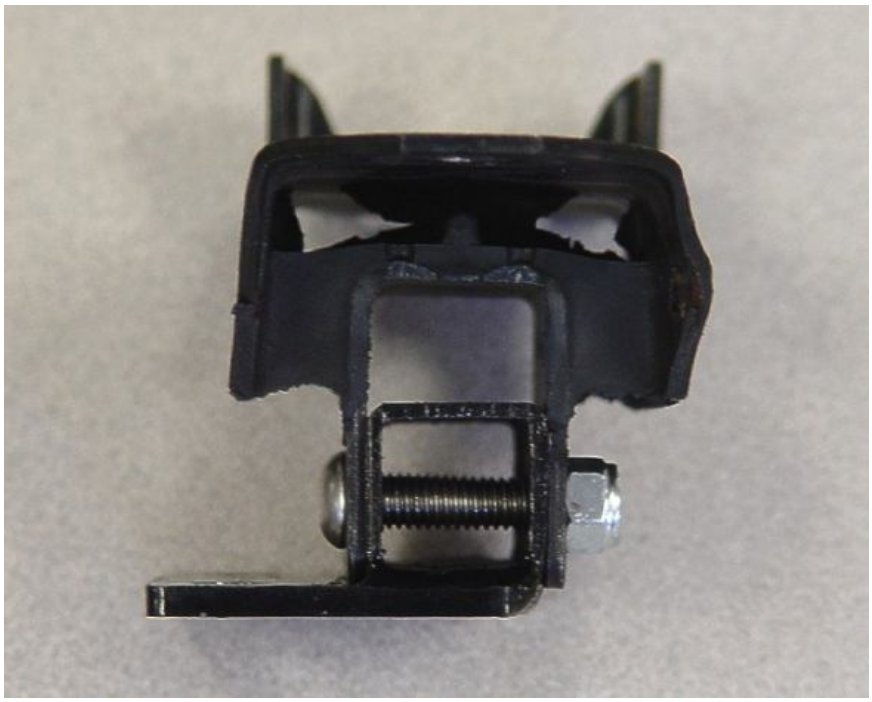
Transmission mount bolted to frame.

3. Wrap chains through the back of the engine mounts and bolt the chain together for lifting. This will give you a balanced lift point.

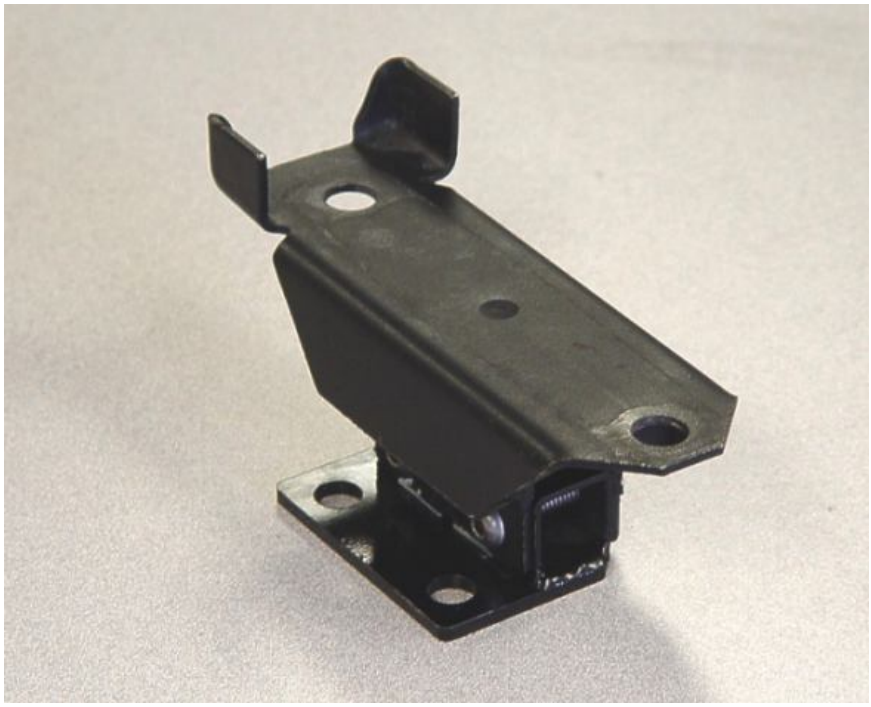


4.6L 1997 DOHC Engine and T-45 transmission on hoist

4. The engine/transmission assembly should be drained of oil to ease installation and so that the transmission oil does not leak when at the installation angle. Apply tape over the rear of the transmission to help reduce drips even if already drained of fluid.
5. Make sure that the Ford rubber engine mounts are installed on the engine.
6. If using a 99-04 engine, the Transmission mount adapter bracket provided in the kit must be used when using the stock transmission mount.
    a. Drill the rivets out of the stock mount.
    b. Locate the stock mount on the adapter so that the bottom edge of the mount is $^{9}/_{16}$" from the adapter plate. Mark the hole locations.
    c. Drill $^{5}/_{16}$" holes for the bolts.
    d. Bolt the transmission side of the mount to the mount provided as shown in the pictures below.

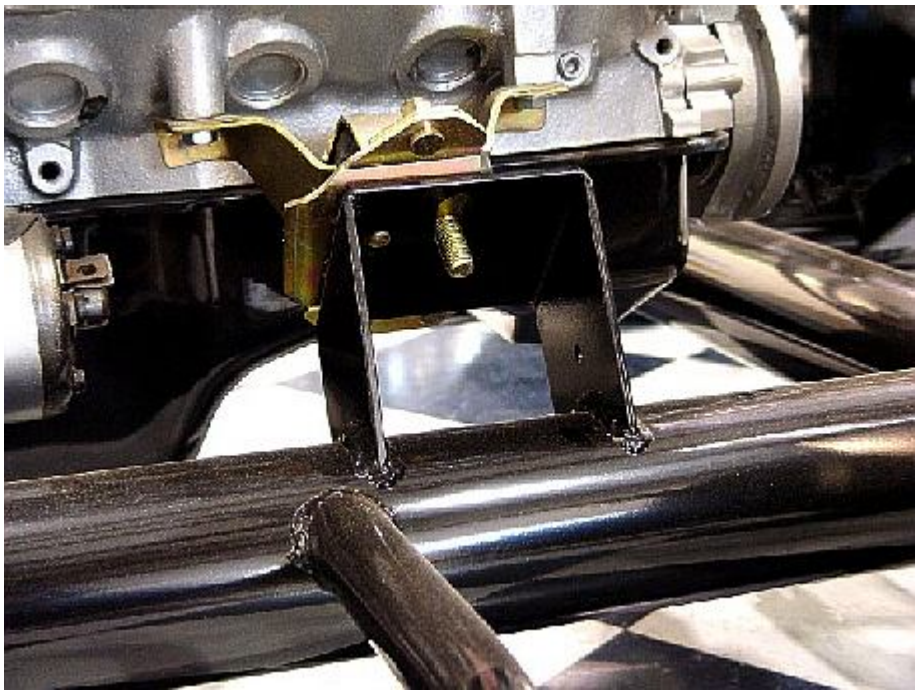


Side view of 99-04 Transmission mount Adapter Bracket.



99-04 Transmission mount Adapter Bracket.

7. Slowly lower the engine and transmission assembly in the engine bay.
8. Lower the transmission mount bolts into the rear transmission mount plate on the cross member and then lower the engine onto the frame engine mounts. Make sure that the passenger's side engine mount hole is installed first, followed by the slotted driver's side mount.
9. Tighten the large engine mount bolt on each side and secure the two smaller transmission bolts.
10. Fill the engine with oil. See Appendix H for specifications and capacities. Use the stock dip stick line as a fill level. The pan will hold approximately 8 quarts.



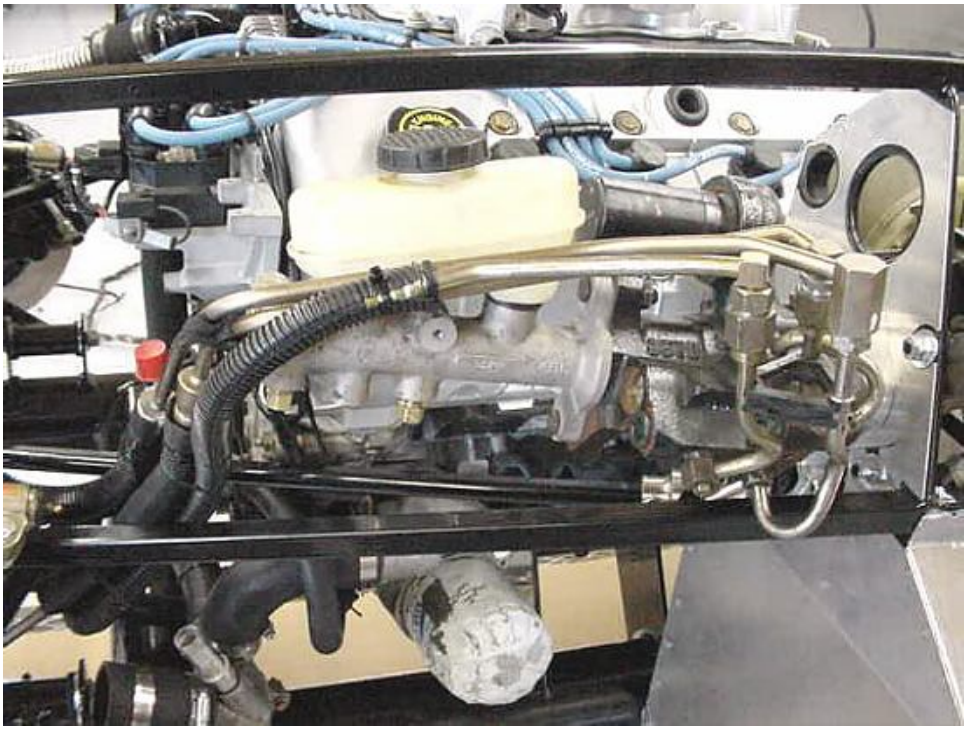
Engine mount on the frame. Note the ground cable hole in the side of the engine mount.

11. Attach the engine ground cable to the hole in the passenger side engine mount. Make sure to sand the contact area down to bare metal before attaching.
12. Attach the braided engine ground strap on the back of the driver's side cylinder head to the frame. Make sure to sand the contact area down to bare metal before attaching.
13. Before installing the driveshaft, the rear axle should be allowed to hang with the frame being supported and the transmission should be in neutral.
14. Slide the driveshaft on the end of the transmission then line up the four holes in the rear flange with the holes in the rear axle and install the pinion flange bolts using a 12pt. 12 mm wrench.
15. Fill the transmission with fluid. See Appendix H for specifications and capacities.

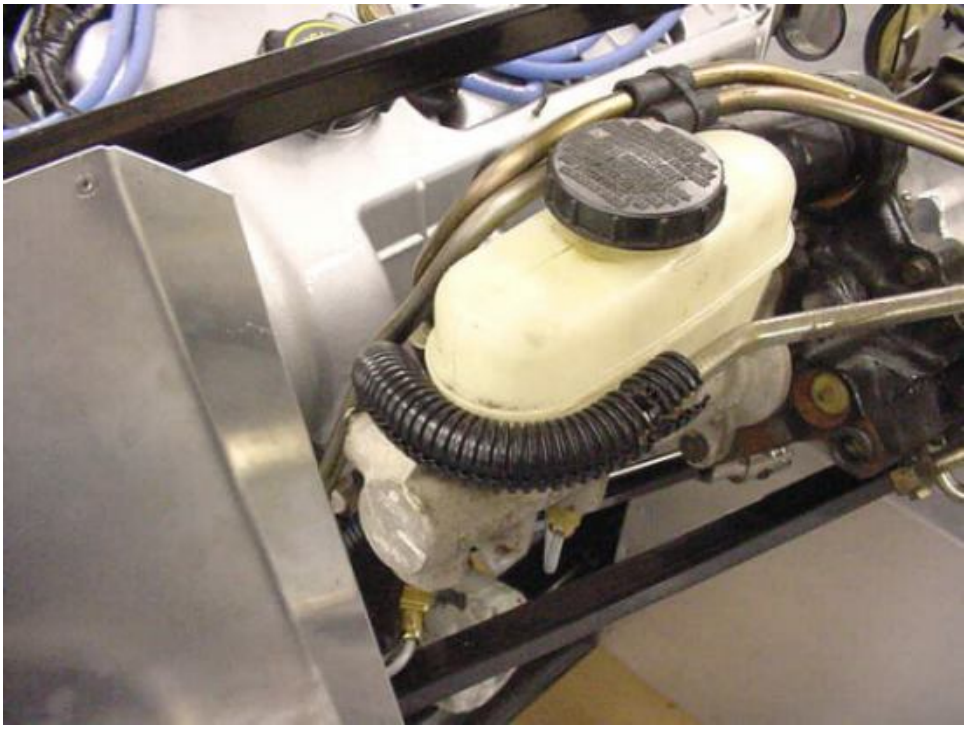
Hydro-booster and Power Steering

TOOLS: *Tubing bender, 5/16" hex key, 9/16" wrench*
PARTS: *Power steering and Hydro-boost hoses.*

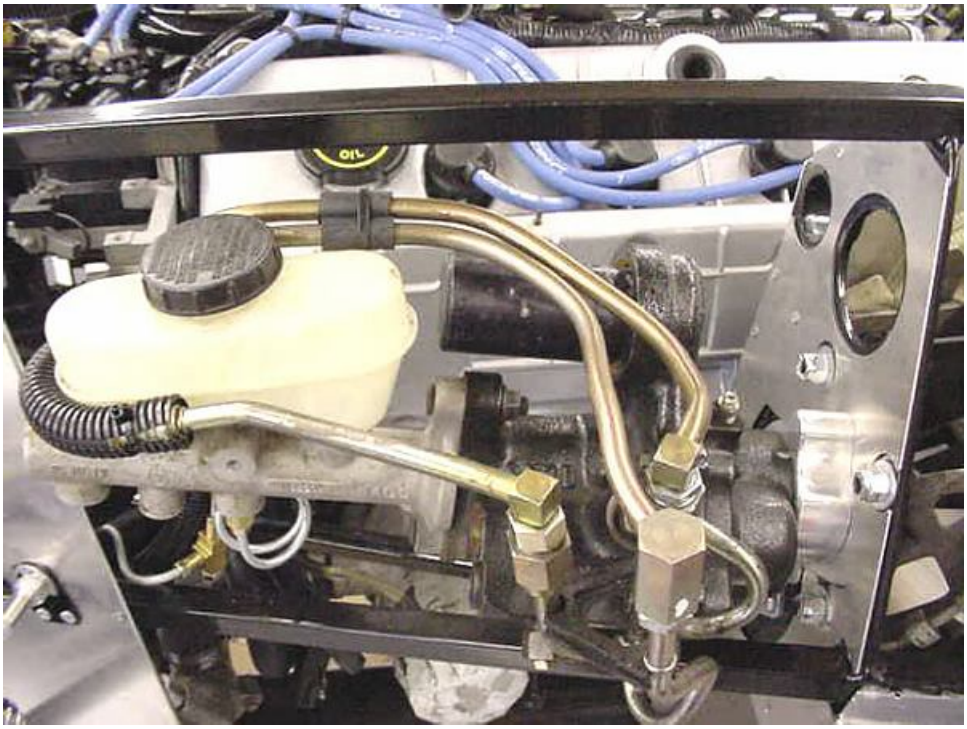
1. Run the power steering/hydro boost hoses from the pump to the booster to the rack then to the cooler (if being used) back to the pump. The following pictures show one way to route them. An alternative way would be to run them along the outside of the ¾" upper tube through the wheel well.



Hydro-boost lines shown in stock location. Lines must be bent and re-routed to fit behind aluminum



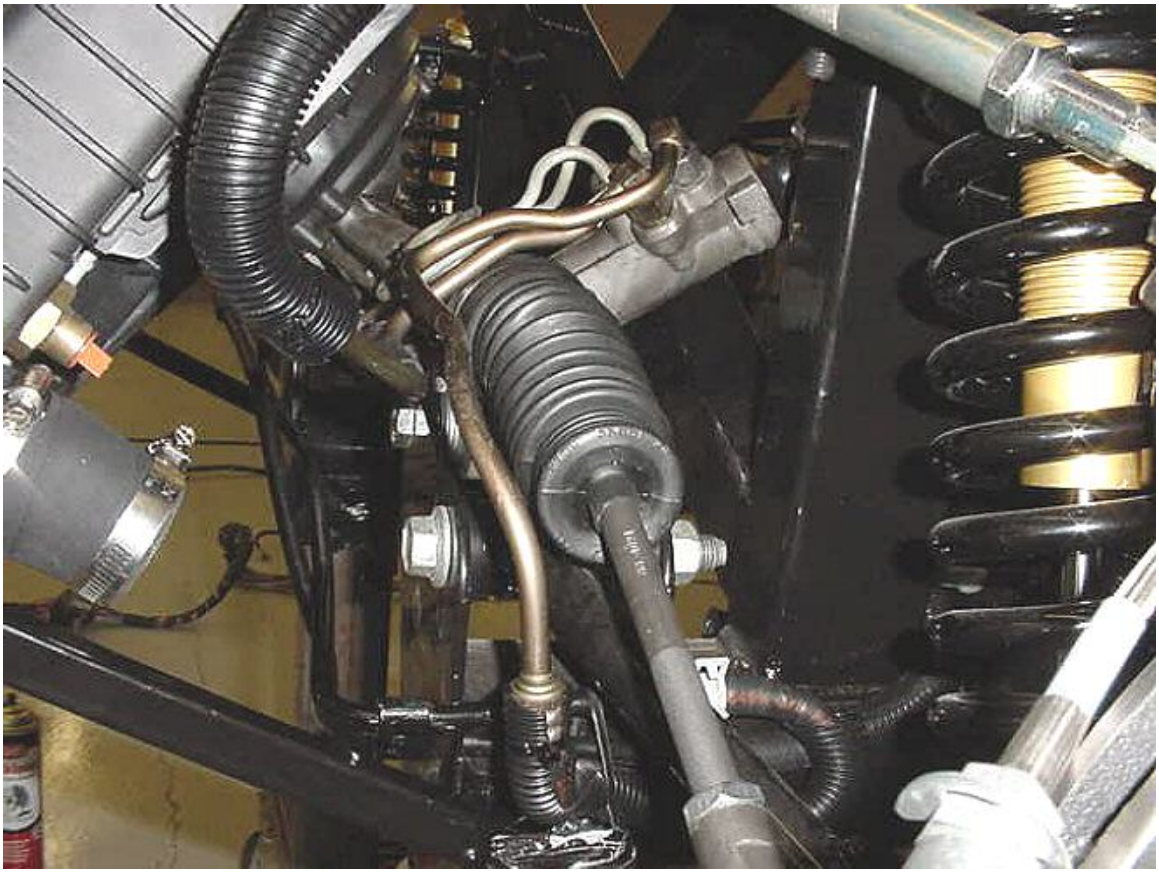
Tubes bent around inside of Master cylinder.



Lines in bent and routed in final locations.

Lines running from booster, along steering shaft to steering rack.

Hose routing for 96-2000 power steering cooler.



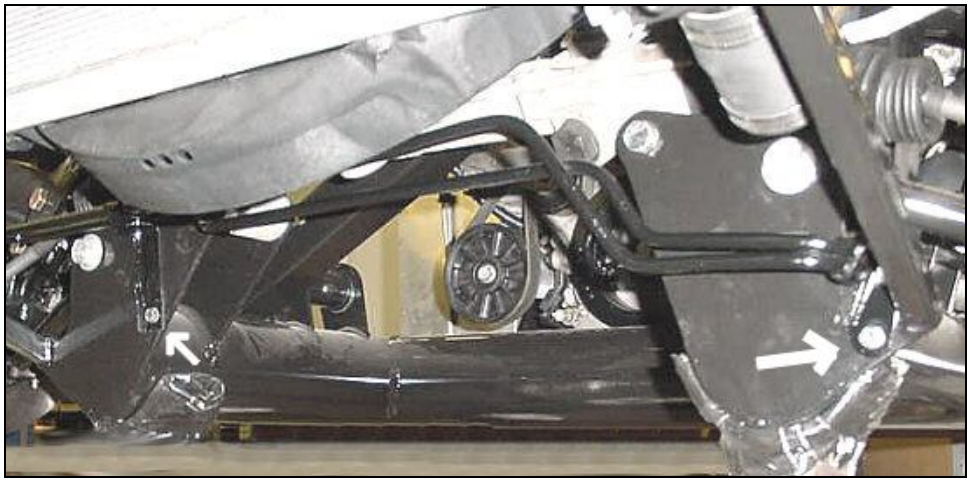
Power steering line for steering rack. Note stock line bent.

Power Steering Oil Cooler (If applicable)

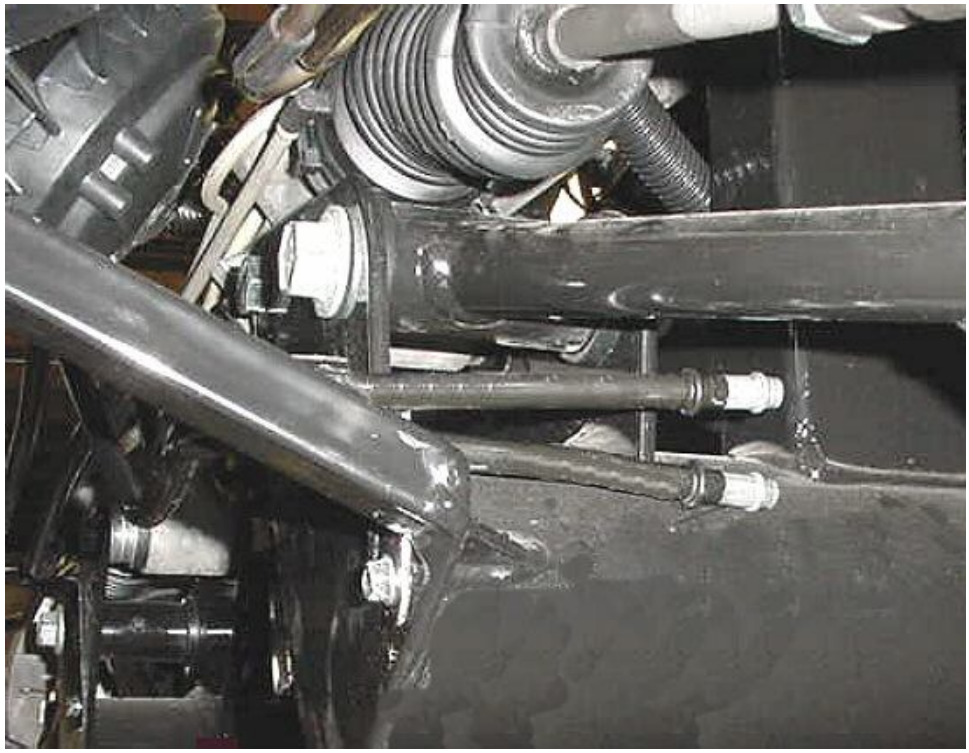
TOOLS: *Drill, 3/16" drill bit, ⅜" wrench.*
PARTS: *Power steering cooler and hoses.*

1996-1999 Version

1. Mount the power steering cooler to the 3/16" plate on the front of the 4" main rails. Use the original mount on the passenger side and the hole drilled in the preparation section earlier on the other side.
2. If using the tubular lower control arms, drill two 3/16" holes in the 3/16" plate at the locations shown in the picture below. If using the stock Mustang control arms, lower the driver side mount so that the outlets are routed under the ¾" front body mount tube.



Mount locations for the power steering cooler.



Location of power steering cooler inlet/outlet if using tubular control arms.

2000-2004 Version

Note: This cooler is the replacement for the older coolers. There are a couple of different locations that the cooler can be mounted: To the bottom of the radiator so it is visible through the oil cooler opening or, in the location above and in front of the radiator. Both locations will require the fabrication of a mounting bracket for the passenger mount. The following shows the installation when attached to the bottom of the radiator.

1. Hold the cooler up under the radiator so that the inlet/outlet are on the driver side and the driver side cooler mount is under the lower front body mount ¾" tube.
2. Mark the mount hole location on the ¾" tube.

Driver side mount of the cooler mounted to ¾" tube and inlet/outlet tubes bent.

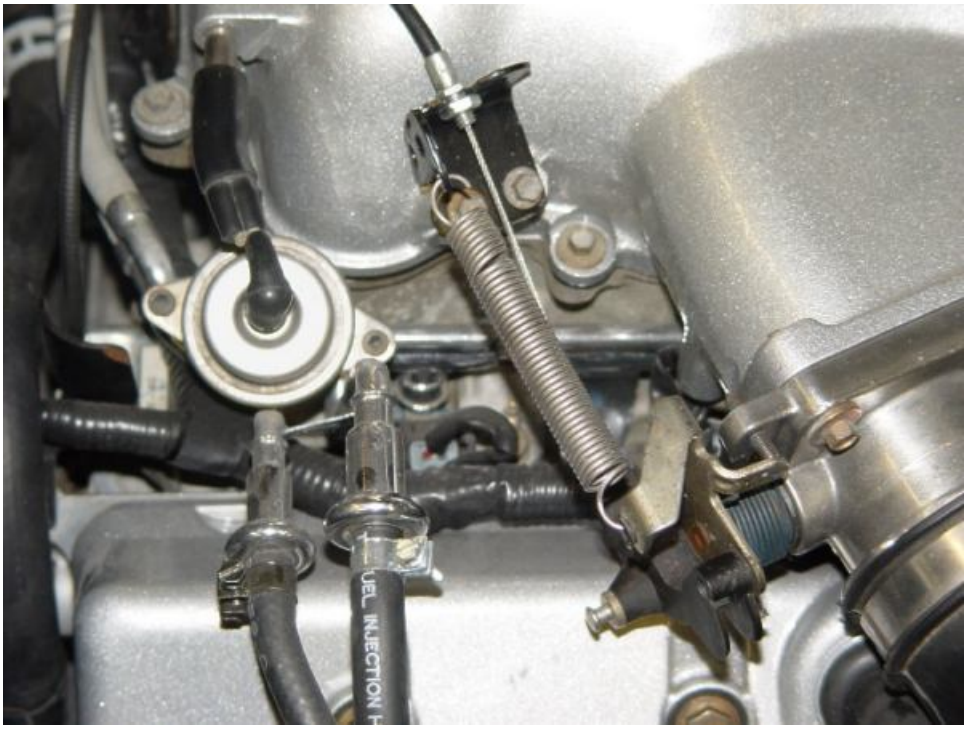
3. Drill and temporarily mount the driver side mount.
4. Measure the distance from the radiator and make a bracket to mount the passenger side mount such as the one shown below.

Power steering cooler mounted to the bottom of the radiator. Note the 90 degree bent mount bracket.

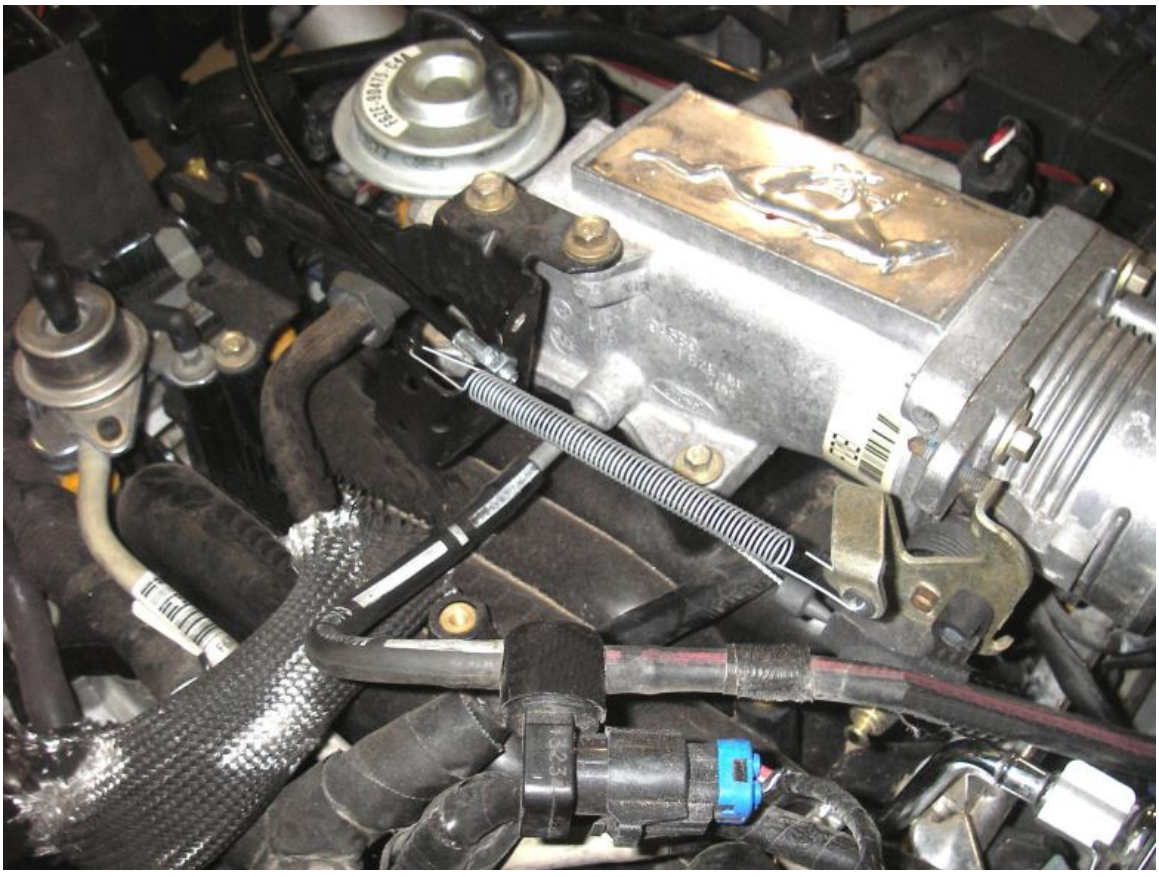
Accelerator Cable

Attention: The Ball stud and Retainer are not used in this application.
TOOLS: *5/64" hex key, 3/8", 7/16", 1/2" wrenches.*
PARTS: *Pedal box hardware (FFR# 11023), Accelerator cable components (FFR# 13777).*

1. Loosen the nut on the engine end of the accelerator cable with the cylinder slug on the end.
2. Put the accelerator cable in the stock accelerator bracket slot on the engine intake.
3. Tighten the nut against the bracket.
4. Put a dab of silicone on the rear edge of the rubber wipe then push the rubber wipe back onto the threads.



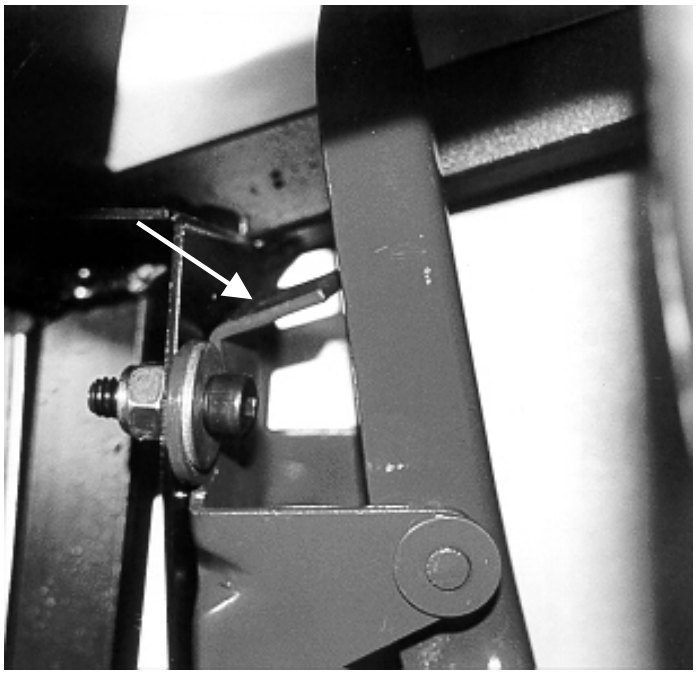
Accelerator cable mounted on ‘98 4 valve intake.



Accelerator cable mounted on ’96 2 valve intake.

5. Run the cable from the mount plate, tightly against the intake and over to the driver’s foot box front panel.
6. Insert the pedal end of the cable into the foot box.

7. Screw on and tighten the 5/16" locknut on the cable sheath inside the foot box using two ½" wrenches.
8. Cut the accelerator pedal capture in the corner using a pair of wire cutters.
9. Slip the accelerator cable through the cut so that the ball will sit in the recess.
10. Push the capture into the end of the throttle pedal.
11. Check the idle screw underneath the throttle body to see if the throttle arm is hitting it. If it is not, the small tab behind the accelerator pedal may be stopping the plate from closing. Bend it up until the idle screw hits the throttle arm. You will notice a fairly high idle later when the car starts if this has not been done.
12. After driving the car for the first time you may want to adjust the pedal locations for optimum heal/toe and shoe size differences.

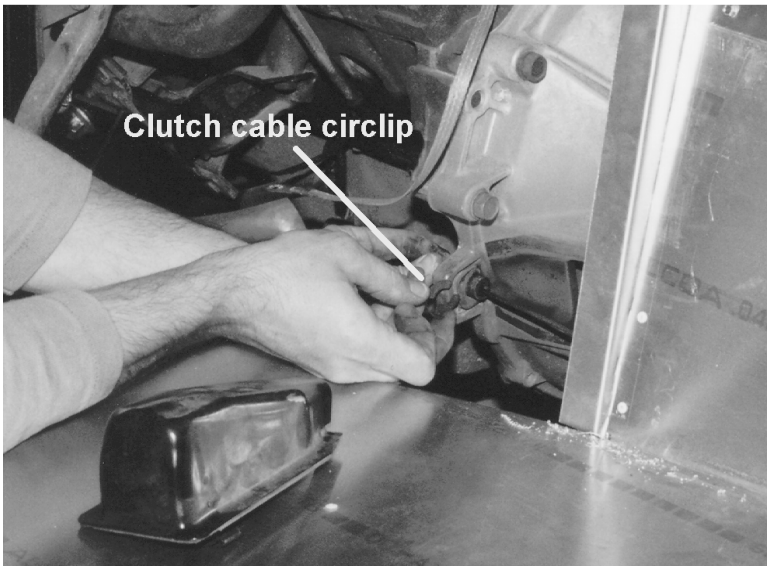


Stop tab on accelerator pedal.

Clutch Cable

ATTENTION: *Inspect donor clutch cable for signs of wear.*
TOOLS: *Pry bar, 5/16" sockets.*
PARTS: *Clutch cable.*

5. Anchor the clutch cable to the clutch release arm, which is located under the small cover on the bell housing. A 5/16" bolt anchors the cover and a circlip anchors the cable shielding to the bell housing. Be careful anchoring the cover as the aluminum threads can strip easily.



Installing the clutch cable. Note: The Inner footbox wall will already have been installed.

6. The clutch cable is routed under the exhaust header and up behind the oil pressure-sending unit. It can be fastened to the engine using the bracket on the cable to the front lower bolt that holds the starter cable just before it leaves the block or, to the lower engine bay ¾" tubing.
7. Loop the cable around to the clutch-mounting hole on the foot box front. Make sure that the cable is clear of the hot exhaust header and the steering shaft or the cable may fail prematurely.

Mass Air Meter, Air filter, Fuel Vapor Canister

TOOLS: *Drill, 3/16" drill bit, rivet gun.*
PARTS: *Harness mounting hardware (FFR# 11070), Mass air sensor, 4.6 Air filter mount hardware (FFR# 13800), 3/16" rivets.*

1. Slide the large hose clamp onto the intake hose.
2. Slide the mass air end of the intake hose over the intake end.
3. Position the hose clamp over the joint. Do not tighten, this will be done on the car.

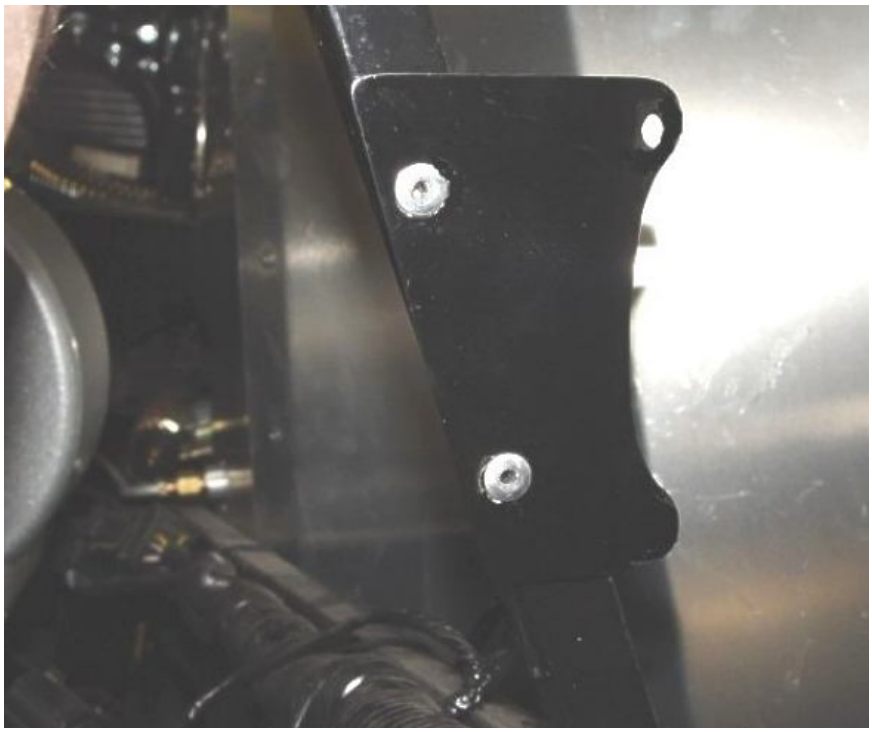
Modified 1997 intake hose.

Modified 2003 intake tube.

Mass Air Mounting

1. Attach the mass air mount to the backside of the vertical ¾" tube on the passenger side as shown in the picture below using two $^{3}/_{16}$" rivets.
2. Attach the Mass air meter to the mount using the stock nuts.

3. Attach the intake hose to the engine and the mass air meter. Bend the Mass Air mount so tha the hose will fit on the meter. Rotate the two sections of the hose as needed
4. Tighten the hose clamp connecting the hoses and the clamps at the ends of the intake hose.



Mass air mount mounted to frame.

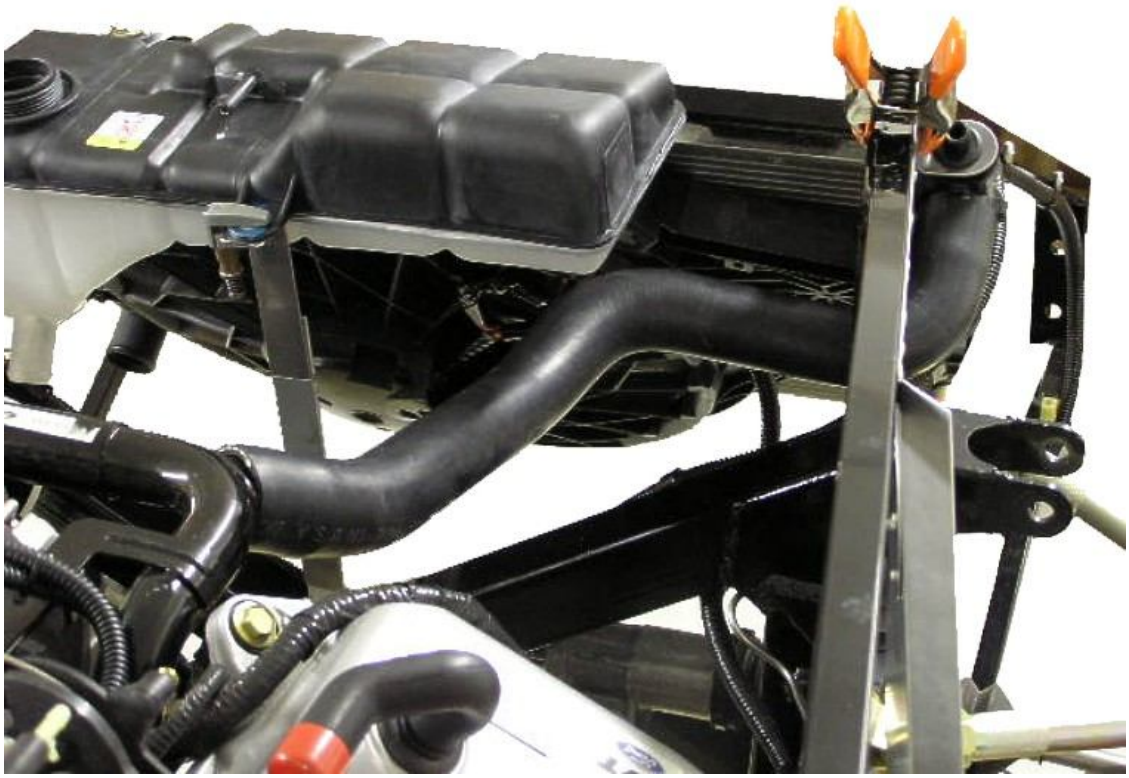
Radiator, Hoses & Fan Shroud

ATTENTION: *Avoid damage to the delicate radiator fins during handling. Make sure the electric fan shroud does not bend/oval or it will cause the fan blades to hit. Do not lean on the fan shroud while engine is running as this may bend shroud and cause fan blade to hit fan shroud.*

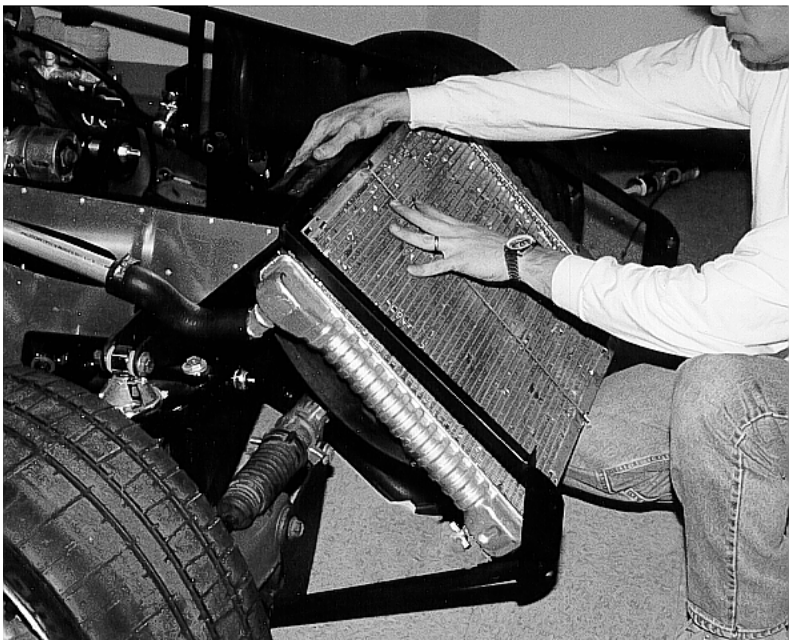
TOOLS: *5/16" and 3/8" sockets, 1/8", 9/64", 3/16" drill bits, drill, jack stands (2), razor knife to cut hoses, Phillips head screwdriver, rivet gun, Hack Saw, Tape Measure, Marker, Tin snips.*

PARTS: *Radiator mount components (FFR# 13645). Stainless Radiator hose kit (FFR# 13883), 1/8" and 3/16" rivets, Mustang fan shroud with fan, & overflow reservoir.*

Note: If you prefer to use rubber radiator hoses, use NAPA # 7575 for the top hose. Use the stock lower hose to the thermostat housing then use Gates #21383 to attach to the radiator going under the steering rack.



1. Attach the stock radiator fan/shroud to the radiator.
2. Install the Mustang radiator from the underside of the rolling chassis up to the top support bar. Hold the radiator at an angle with the lower edge pulled out about 8” so the front of the top lip is fully contacting the ¾” support.
3. Use cable ties to hold it in place against the upper frame support tube. If the radiator has a filler neck, move the radiator towards passenger side until the filling cap just clears the frame. If the radiator **does not** have a fill neck, Use one of the radiator side aluminum pieces to locate the radiator.
4. Place a jack stand under the front or zip tie it to the front body mount once the correct location is found.



Mounting the radiator.

5. Hold the upper radiator mount plate up to the frame, and line up the bend with the bend in the ¾" tube.
6. Mark rivet locations every 3"- 4".
7. Drill and rivet the mount plate to the tube using ⅛" rivets.
8. Mark the location of the radiator edge on the plate and mark rivet hole locations every 3"- 4" on the plate that will go through the top flange and mount plate.
9. Drill and rivet the upper mount plate to the radiator using ⅛" rivets.

Mounting the top of radiator.

10. The aluminum nosepieces that form a picture frame-like support for the entire lower edge of the radiator will be installed <u>after</u> the body is in place.

11. Use the corrugated hose provided for the upper and lower radiator hoses to the radiator.

Note: The hose reducers reduce the adapter hose from 1.75” to 1.50” and from 1.75” to 1.25”.

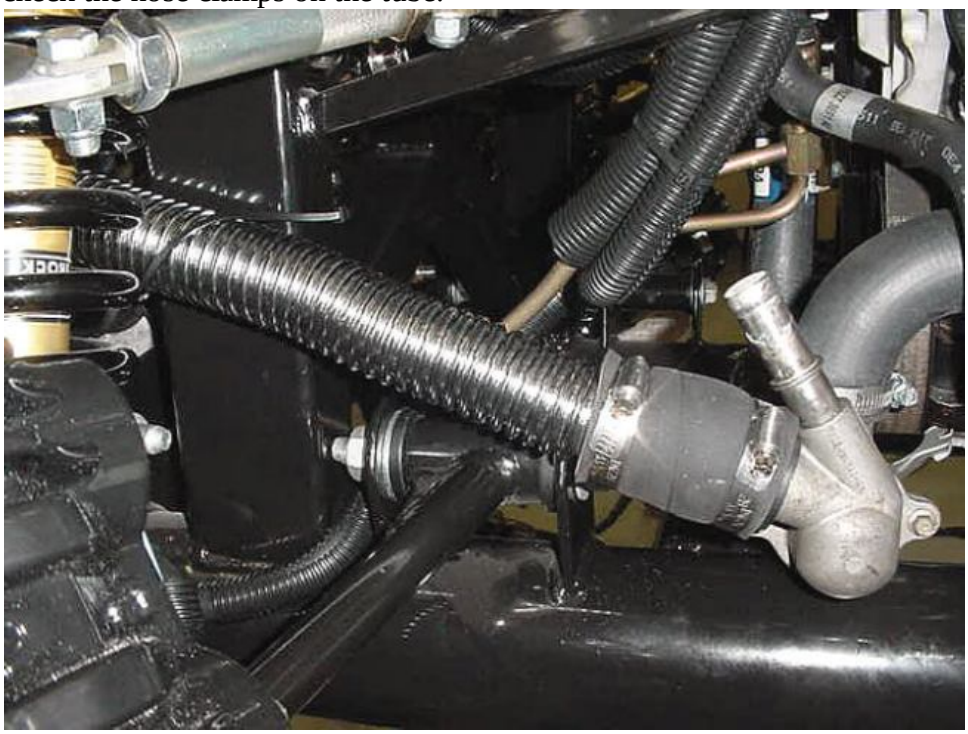
A. Measure the location that the new hose will be attached to.
B. If an adapter is needed use one of the adapter hose kits. Measure which reducer will be needed and remove the one that is not needed.

Adapter hose, reducers and hose clamps.

C. If necessary, trim one end of the corrugated tube so that it will not cut the hoses.
D. Push the adapter hose onto the end of the corrugated stainless hose until the tube touches the reducer
E. Slip a hose clamp over the adapter hose and tighten the clamp on the adapter hose and tube.

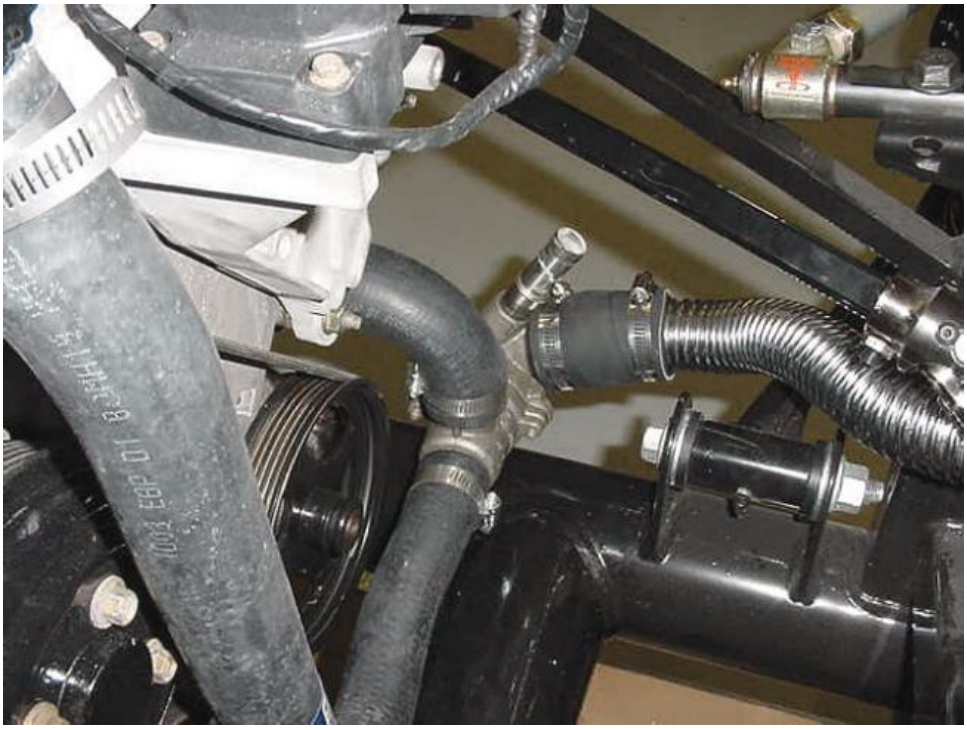
Adapter hose pushed onto the tube.

F. Connect the lower radiator hose to the engine.
G. Run the hose next to the 4” main rail and under the steering rack.
H. Route the tube to the radiator.
I. Mark the tube where it needs to be cut so that the tube will just touch the attaching location.
J. Remove the tube/hose assembly from the vehicle.
K. Cut the tube using a hack saw or if available a cut-off wheel. If necessary clean the end up with tin snips or a grinder.
L. Shake and blow the tube out so that no metal pieces are in the tube.
M. Remount the tube assembly and tighten the hose clamps on the mount locations.
N. Check to make sure that the lower hose is not hanging down. If necessary, zip tie the hose to the frame.
O. Double check the hose clamps on the tube.

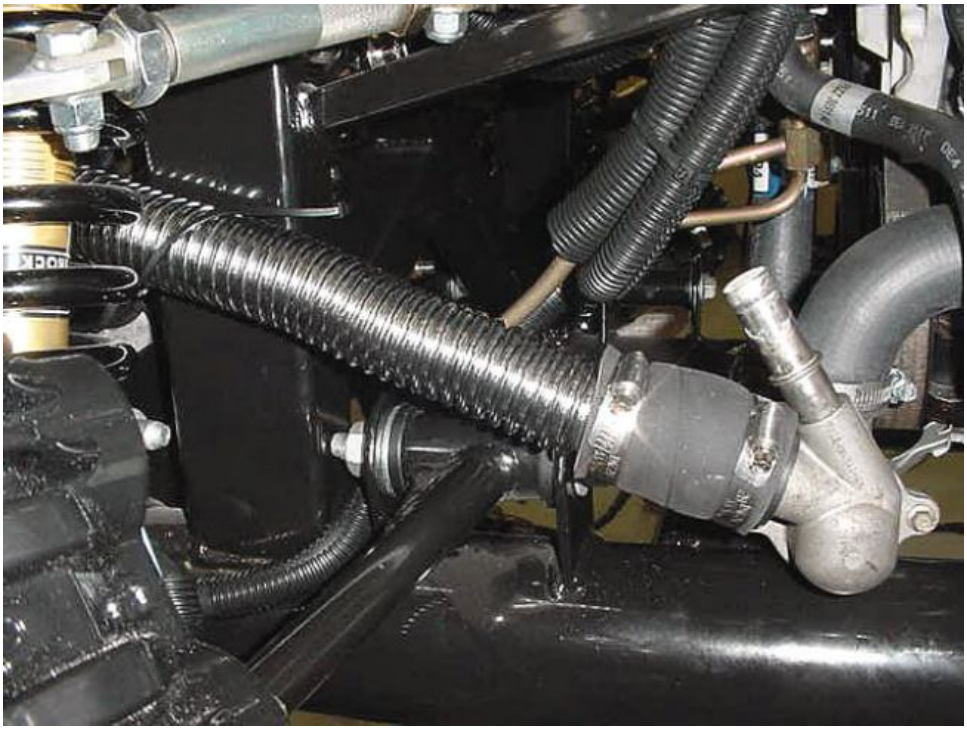


Tube assembly mounted in car.

P. If installing the tube onto another location repeat the procedures above.
Q. Once the new tubes are on the vehicle fill the vehicle with the appropriate coolant/water for the vehicle.
R. Connect the lower radiator hose to the thermostat housing.



Lower radiator hose from engine to thermostat housing and bypass tube from DOHC engine to radiator housing.

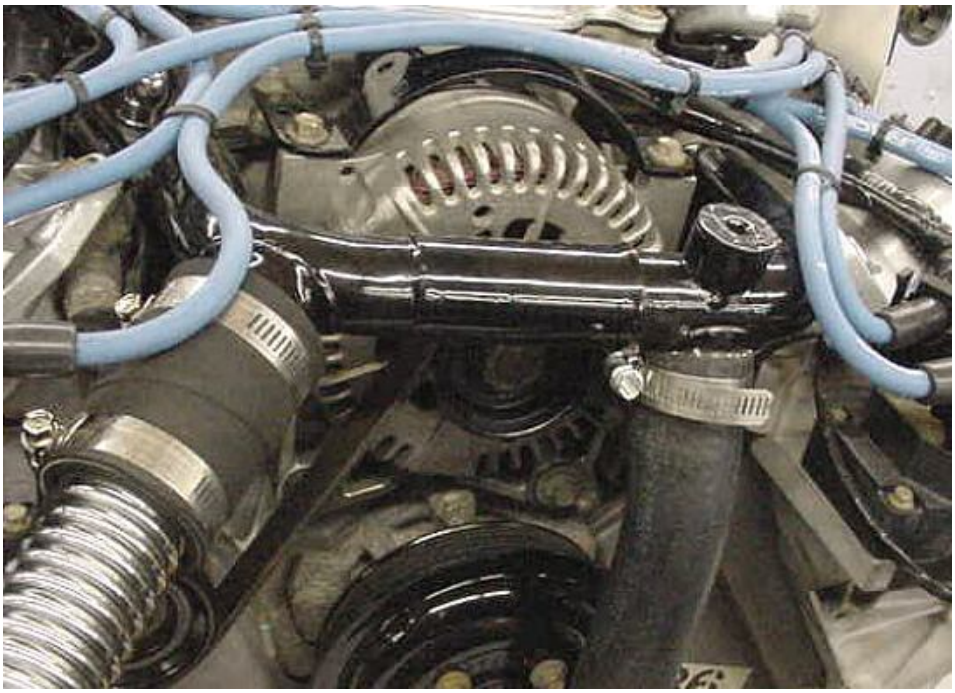


Corrugated lower radiator hose from radiator to thermostat housing.

S. Tighten the hose to the radiator.

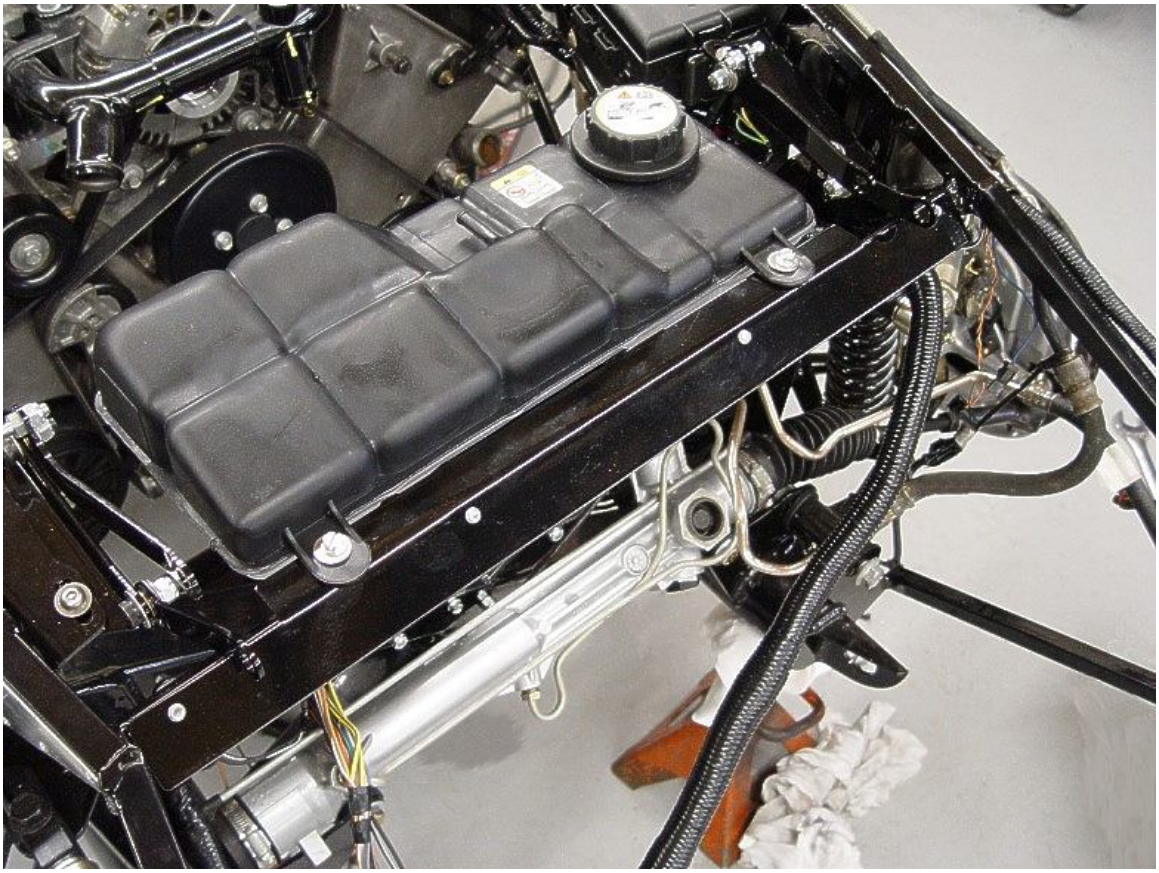
Upper radiator tube. Note, the “F” panel would already be riveted in place.

T. Attach the upper hose to the engine and tighten the hose clamps on the upper hose.



Upper radiator hose attached to DOHC engine.

12. Position the stock overflow tank so that it is centered across the front radiator mount plate.

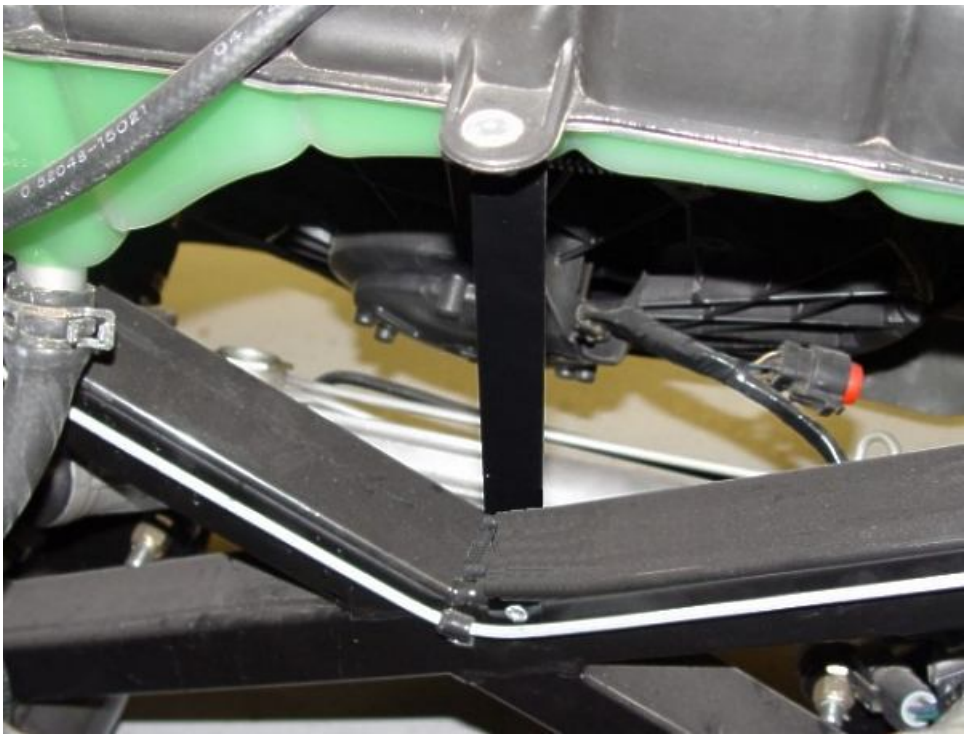


DOHC overflow front overflow mounts positioned on the radiator mount.

13. Mount the rear of the overflow tank to the front side of the 2”x 2” frame tube using the bracket included and $^{3}/_{16}$” rivets.

Rear overflow support mounted to front of “X”.

21. Mount the front of the overflow tank to the radiator mount using #14x ½” screws provided.



Overflow tank mounted to frame

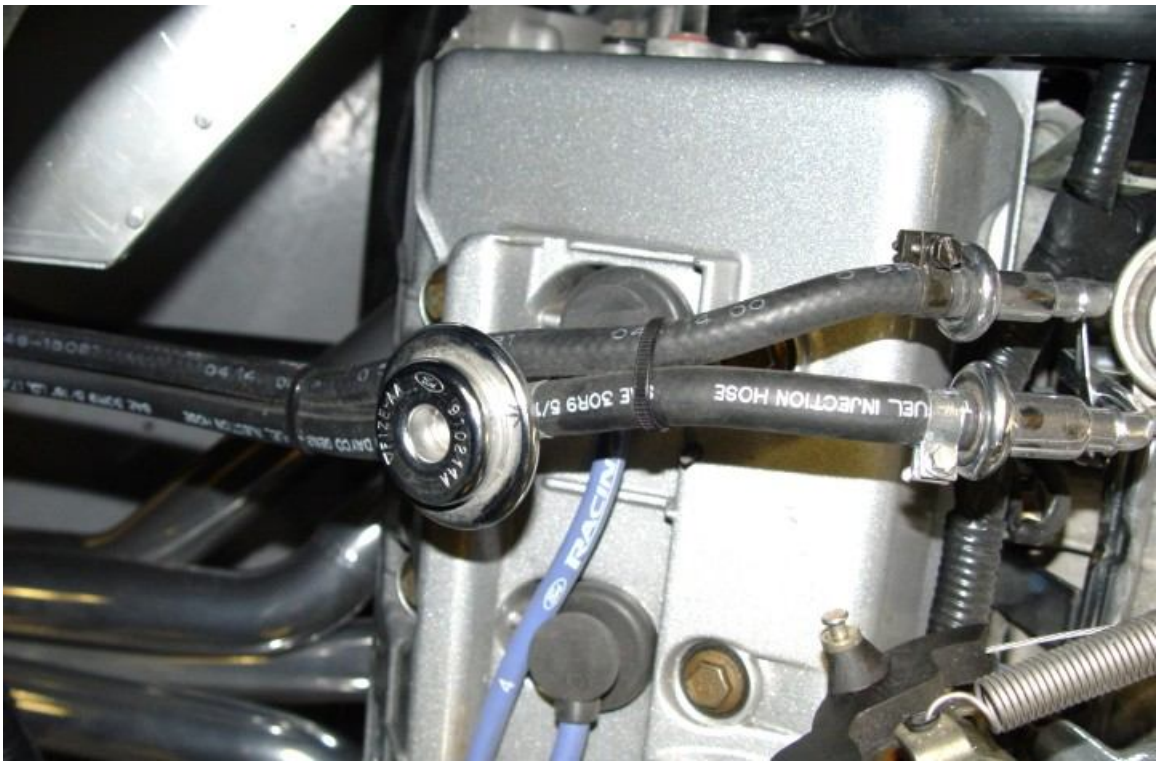
14. Attach the overflow tank tubing to the radiator and coolant bypass.

15. When filling the radiator, (on the DOHC) use the bypass tube hex key cap and the Expansion/overflow tank. Make sure to get as much air out of the system as possible. If after starting and running it a few times you have a problem with the engine getting too hot and you are using a 96-98 engine try drilling a 1/8" hole through the thermostat. The later years have this done from the factory.

Fuel lines on Engine

TOOLS: *¼" socket, razor knife to cut hoses, flat head screwdriver.*
PARTS: *Donor engine fuel line parts, Fuel line components (FFR# 11078).*

1. Insert one end of the 5/16"x 16" onto the inlet side of the fuel pulse dampener.
2. Slide and attach the fuel injection clamp over the end of the pulse dampener end.
3. Slide another fuel injection clamp onto the hose and push the inlet end onto the 5/16" hard line coming from the rear of the car.



Fuel lines coming off the intake. Surge dampner shown.

Wiring Harness and EEC-V Computer

ATTENTION:

- *Make sure that the battery is not connected any time you are working with the computer unit.*
- *If during this section, you decide to cut your harness, wait until after the car has been started then remove sections one at a time, starting the car after each cut to make sure it runs. Use the Chilton's or Ford wiring diagrams!*
- *If you did not take the harness out of the car yourself, when connecting the plugs together, check the wire colors going into and out of the plugs to make sure that they line up and are the same*

color. The only plug that may not be the same color is the fuel tank harness. All other plugs that go together should be matching in color and shape or they will not connect. Different color plugs means you may have a different year harness than the rest of the harness that you have and could cause complications later when trying to start the car.

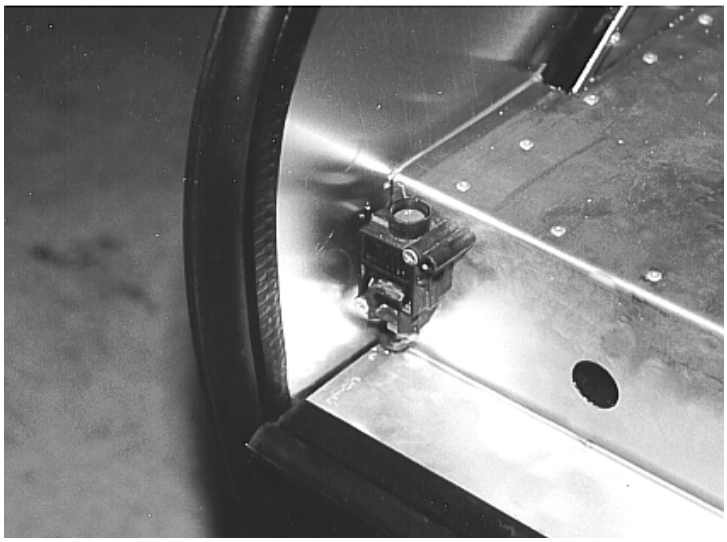
TOOLS: *⅜" socket, regular head screwdriver, slip joint pliers, 3/16" and ⅛" drill bits, drill, #8 nut driver, electrical tape, wire cutters.*

PARTS: *Misc. electrical components (FFR# 10975), insulated clip hardware (FFR# 11029)*

2003 DOHC Complete harness. Front is on the right.

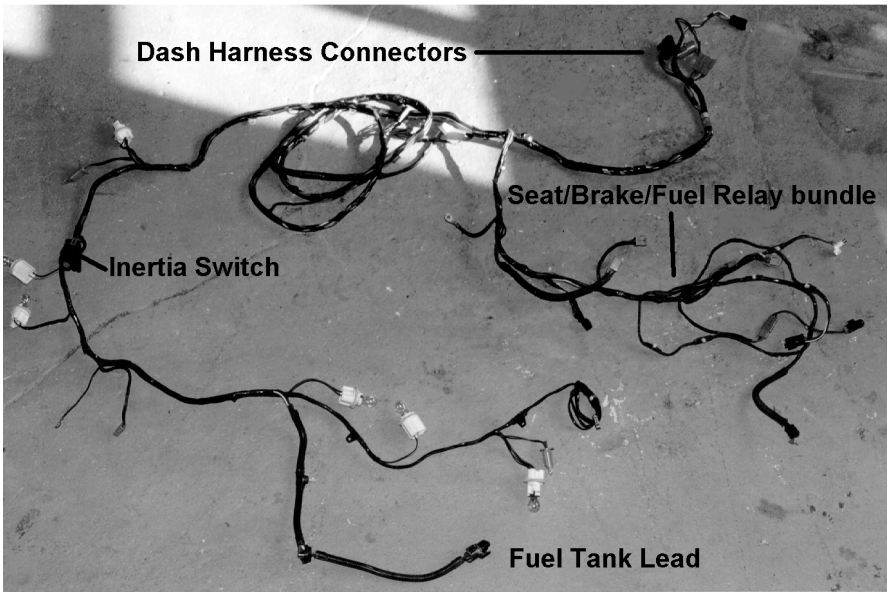
Rear Harness

1. Run rear harness along left side of the frame trunk extensions.
2. Use the inertia cut-off switch as a template and drill two holes in the trunk aluminum on the far corner of the driver's side. Mount the inertia fuel cut-off switch on the inside.



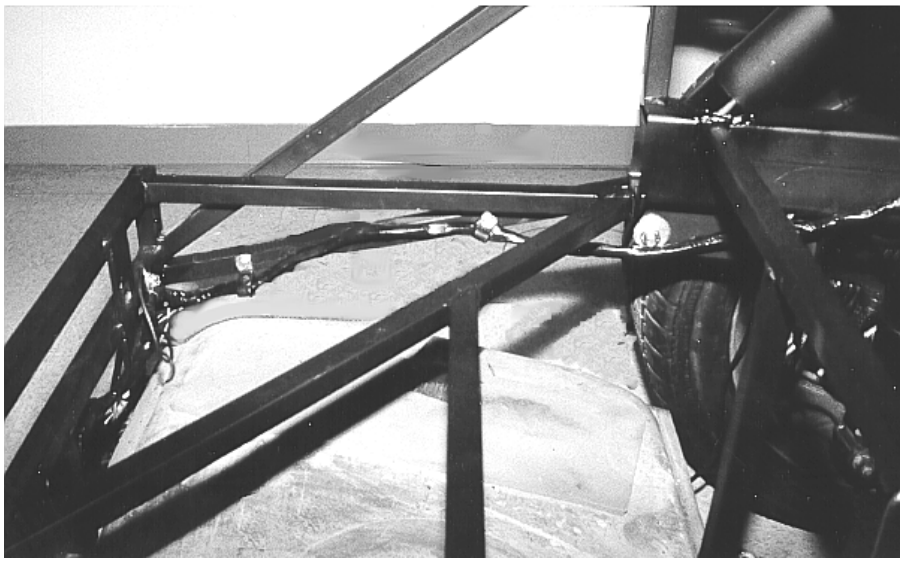
Mustang inertia cut off switch.

3. Run (2) wires (using blue wire extensions provided in kit) from the left rear, side marker-light, up through the roll bar rear leg hole to be used for the license plate light. Leave the wires in the trunk for now.



Rear harness

4. The remaining section of the rear harness runs to the battery where it joins the battery cable and runs along the transmission tunnel down tubes.



Rear trunk wiring harness attached along frame.

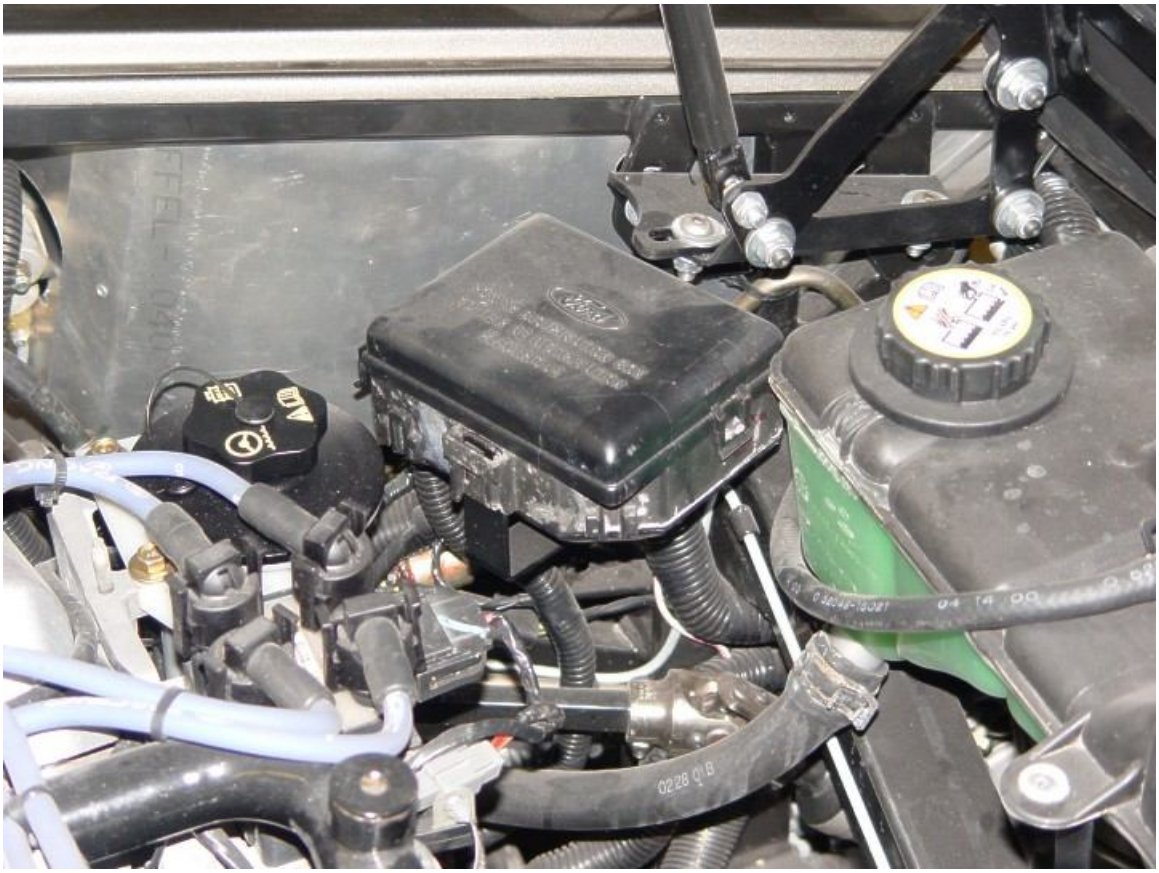
5. From the battery forward, use some of the black plastic wire loom (included with kit) to cover and protect the rear harness and the battery cable.
6. Replace the cable ties that were used earlier during the battery cable install with the large insulated line clips where possible.
7. Run the harness forward with the battery cable (zip tie them together to prevent movement) to the beginning of the driver foot box, passing over the transmission harness section on the way.
8. Place insulation grommeting around the ¾" hole in the upper corner of the inside driver foot box.
9. Slide the harness down the edge of foot box into hole.
10. Cable ties can be used to secure the harness up to the hole by drilling two $^{3}/_{16}$" holes about a ¼" apart and passing a zip tie through it.
11. At the front of the tunnel, the rear harness goes up into the top foot box area where it meets the dash/engine main harness.
12. Wrap the extra harness around the ¾" tubing in the foot box and zip tie it in place.

Transmission Harness

1. Run the transmission wiring harness from the top of the passenger footbox down to the transmission.
2. Use the drilled holes and the zip tie trick to keep the harness in the corner along the floor.

Front Harness

1. Starts at the drivers footbox then runs forward to the "X" then over to the passenger side of the car where it attaches to the engine harness.
2. Mount the engine bay fuse box using the stock mount in the front driver side corner of the engine bay to the "X" leaving room for the Hood Pin or Hood Hinge mount and the Power steering reservoir.



Fuse Panel mounted in the engine Bay.

3. The Mustang is wider than the FFR Roadster at the front and there is extra wiring between the headlights.
4. By removing the tape from the harness under the radiator, overlapping the wires, re-taping and using the loom material provided, a cleaner looking harness can be made.
5. Attach the harness to the channel on the bottom of the radiator using zip ties.
6. Attach the electric fan to the wiring harness.

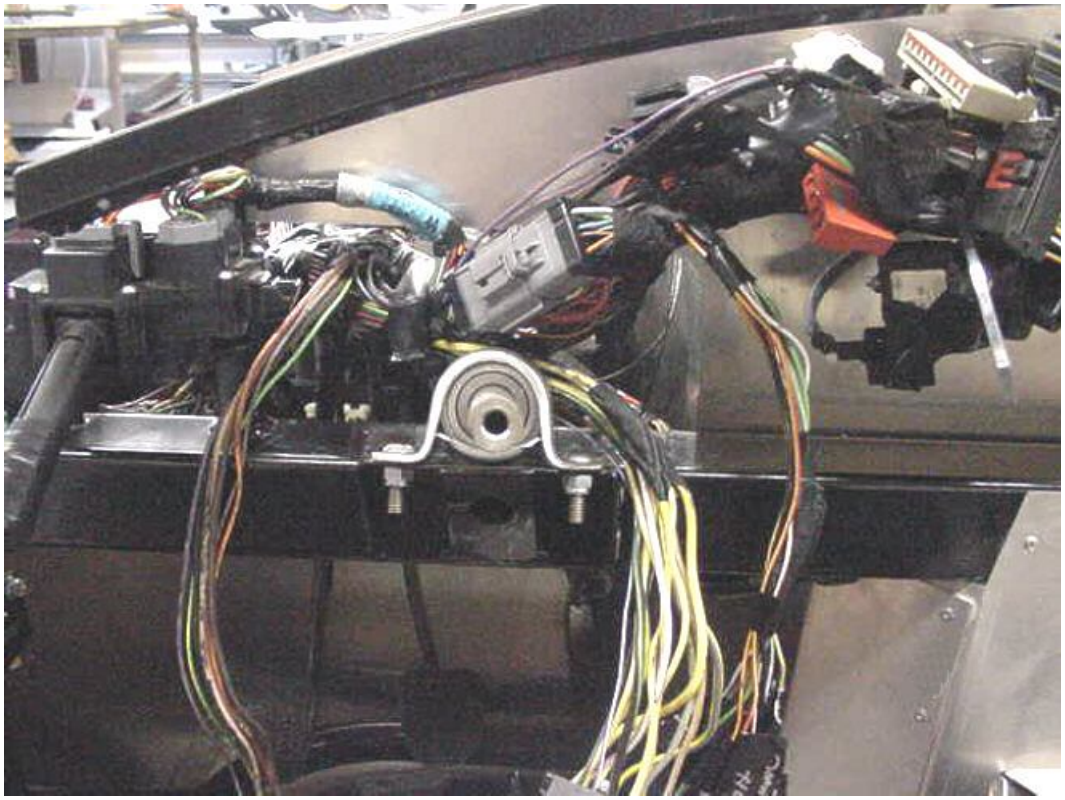
Dash Harness

Dash wiring showing computer mounted on the passenger side of the firewall.

1. Either modify the dash harness as described in the donor parts modification section at the beginning of the manual or cut a hole in the top outer footbox panel for the rectangular plug. If you decide to cut the hole, make sure that you do it low enough so that the body will not hit it.

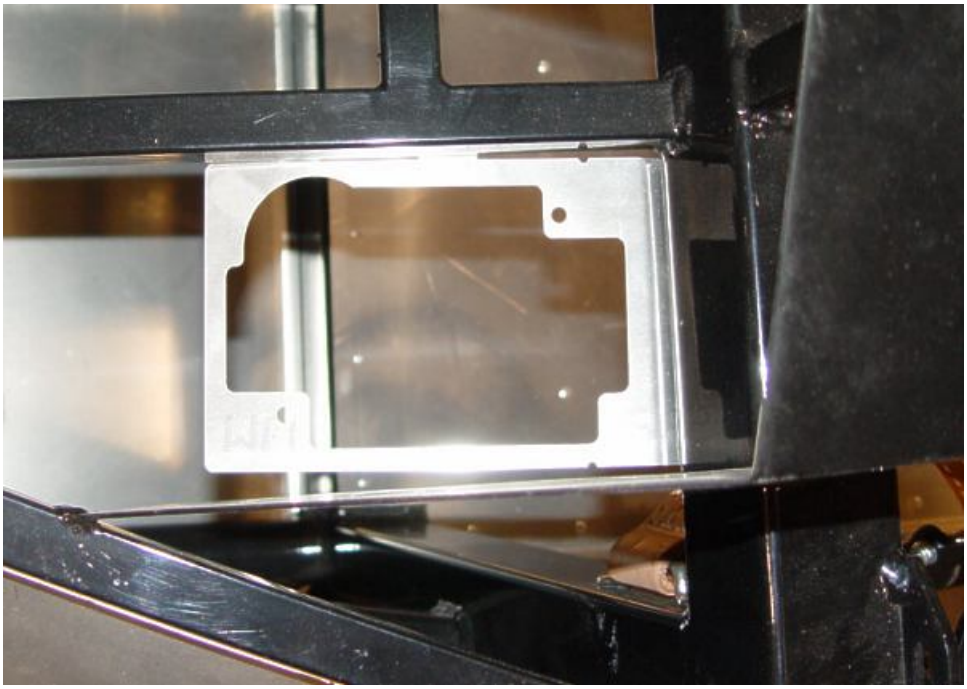
Optional way to run the dash harness so the conical rubber bushing does not need to be cut.

2. Run the harness over the pedal box and through the large slot in the firewall. The connectors for the rest of the harness easily fit through this hole and the big rubber grommet on the harness press fits into the laser cut hole.
3. Attach the rectangular plug to the other harness.
4. The remainder of the dash harness can be run on top of the 2”x 2” square tube over to the computer side. Run everything loosely so that final positioning can be done.



Dash harness going over the steering shaft.

5. Connect the relays and snap connectors to their original spots along with all sensors and relays.
6. When the wire harness is installed, mount the fuse panel (Use the diagram in Appendix A to determine the correct shape) to the 2"x 2" dash hoop support and between the two ¾" x ¾" frame tubes in the driver's side footbox using the aluminum bracket provided and a few of the self-tapping screws.

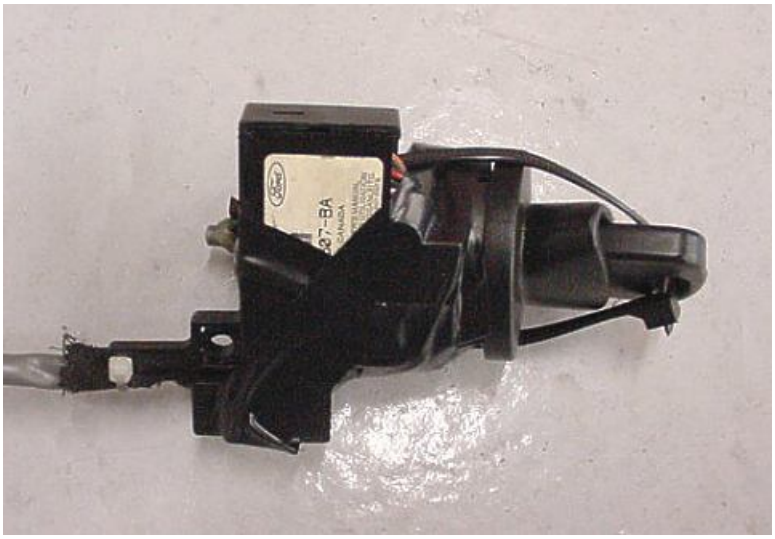


Aluminum fuse panel (87-98 only) mounted to the frame.

7. The headlight switch can either be mounted in the dash to the left or right of the steering wheel, next to

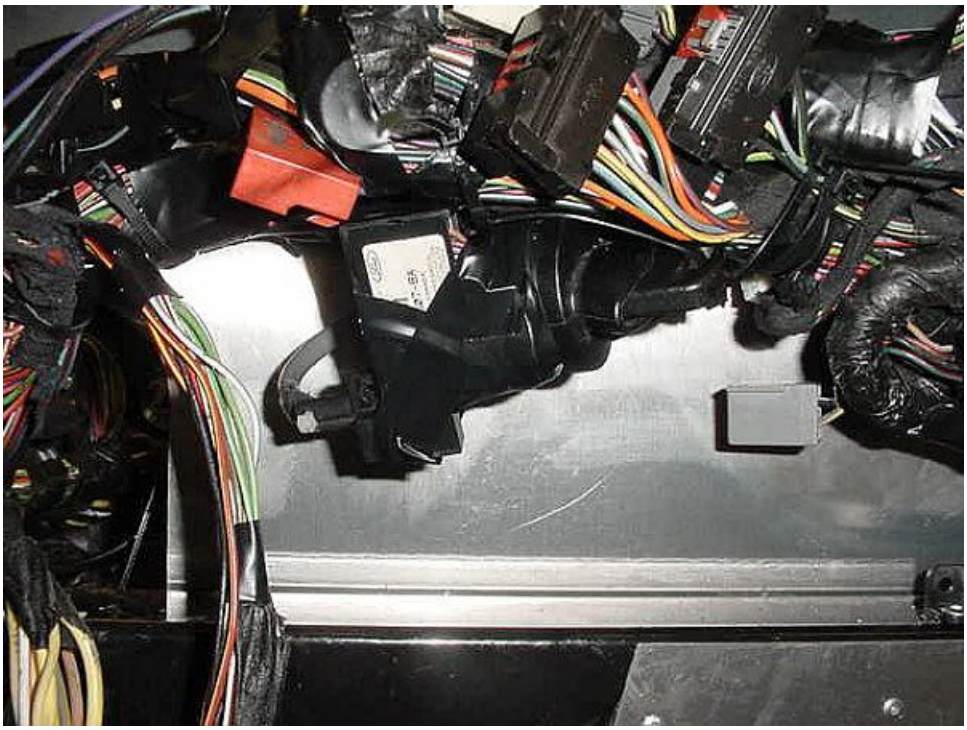
the ignition or using the stock bracket, mount it to the 87-93 headlight switch mount bracket so that it sticks vertically down under the dash.

8. Attach the harness across the 2"x 2" tube, using the insulated line clips.
9. The Mustang harness requires the stock *Mustang* key and PATS module Use the ignition key provided for the ignition
10. Tape or zip-tie the Pats module to the ignition ignition key.



Mustang key zip tied in cylinder and PATS module taped to cylinder.

11. Attach the PATS module pigtail to the dash harness and zip-tie the ignition cylinder assembly to the dash harness.

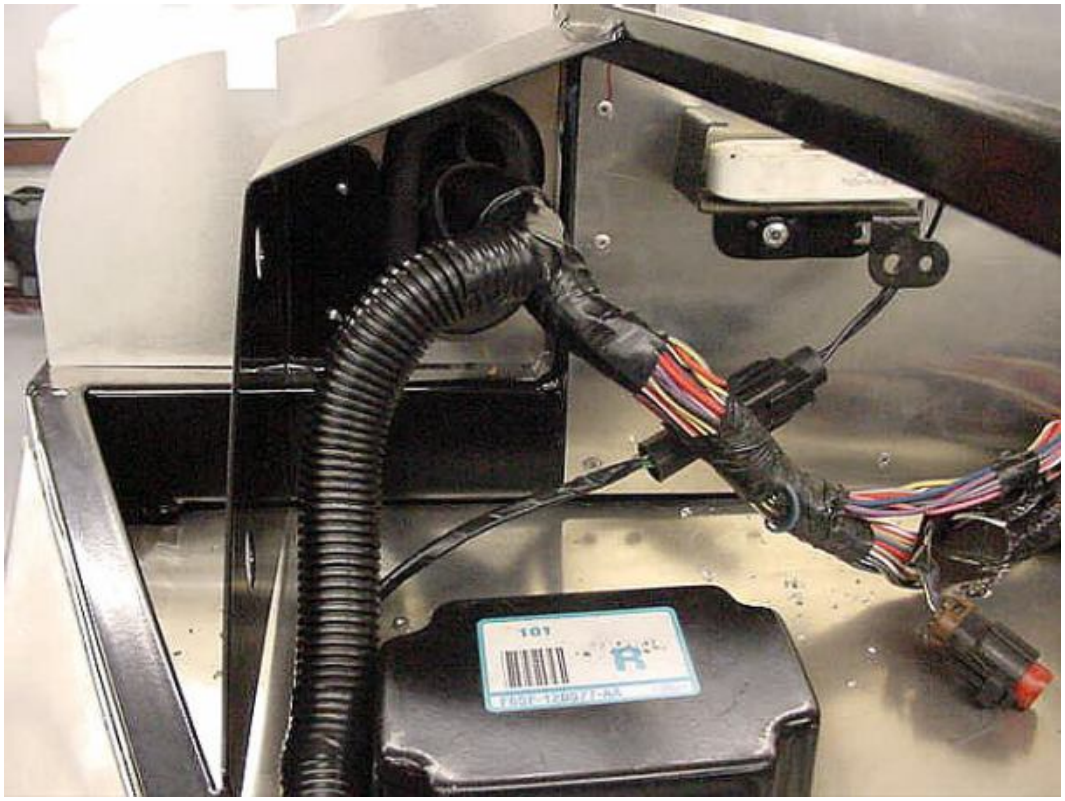


Ignition cylinder zip tied to wiring harness.

Engine Harness

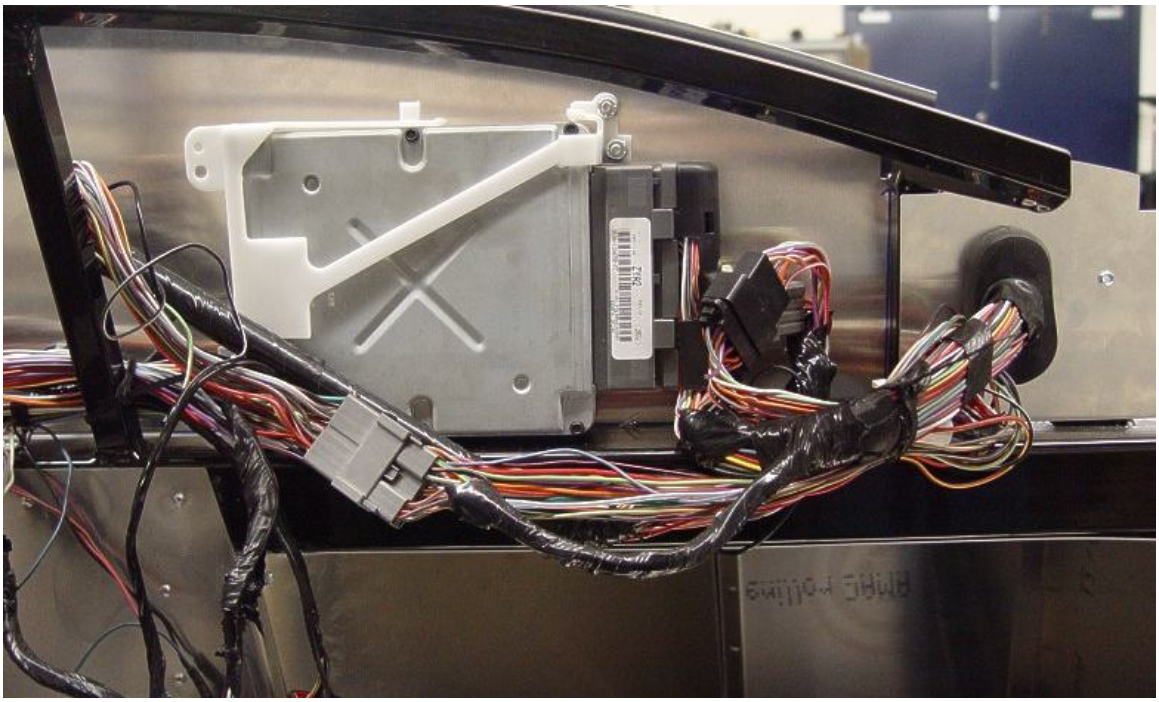
1. On the passenger's side, the engine harness begins in the passenger foot box. The computer plug is pushed through the oval shaped hole on the passenger firewall extension from the engine bay side.

Engine harness plug mounted in firewall.



Engine harness passing through firewall extension.

2. Attach the computer to the underside of the top of the passenger footbox using the plastic bracket from the Mustang and the screws provided. Alternatively the computer can be mounted to the inside of the firewall provided the optional heater/defroster is not being used.

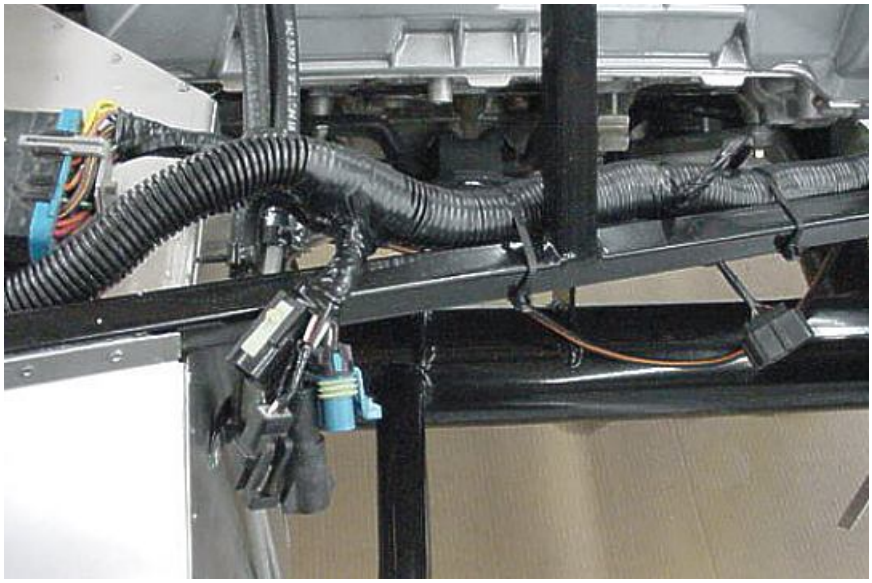


Computer mounted to firewall.

3. Use the drilled holes and cable tie trick to hold the extra harness to the top of the passenger foot box.
4. The harness splits into two on top of the foot box. The harness with the square plug gets routed along

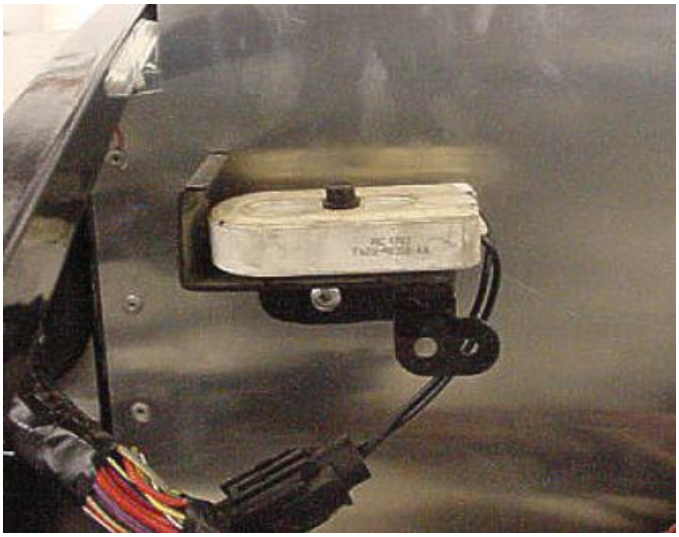
the firewall as shown in the picture below. This contains the wiring for the engine. The other larger bundle goes forward to the front of the frame.

Engine wiring harness crossing on top of passenger foot box in engine bay.



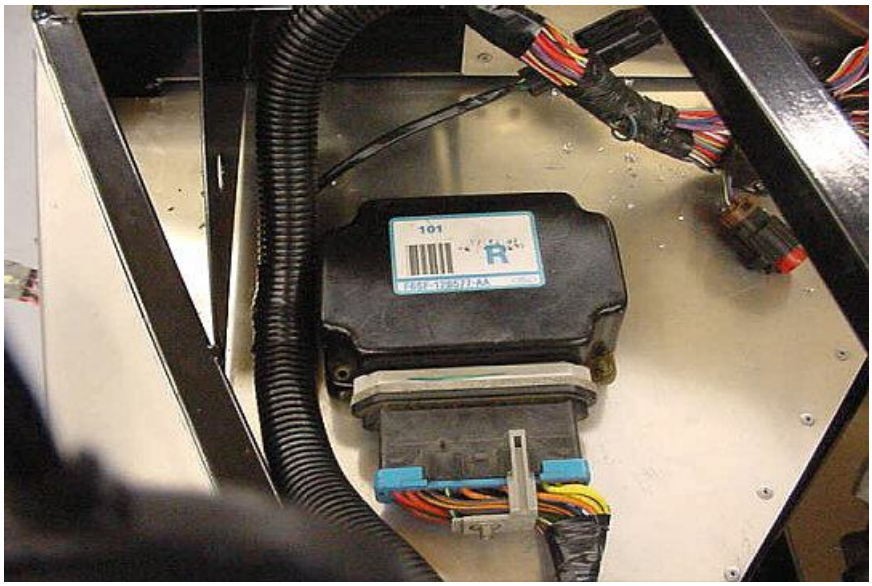
Wiring harness running forward for the O_2 sensors.
Connectors shown at the front of the footbox are not needed

5. Using the fuel pump resistor as a template, hold it against the firewall and mark the firewall where the mount hole and tab hole.
6. Drill 3/16" mounting holes for the resistor.
7. Use 3/16" rivets provided with kit to mount the fuel pump resistor and to the firewall.



96-98 Fuel pump resistor mounted to passenger side firewall.

8. Attach the constant control relay to the top of the passenger footbox using ⅛" rivets.



Constant control relay mounted to the top of the passenger footbox.

Ignition and Turn Stalk

TOOLS: *Hack saw, 5/16" socket, 9/64" drill bit, drill.*
PARTS: ***D****ash Electrical Components (FFR# 13327), Mustang ignition switch and turn signal stalk.*

1. Mount the turn signal stalk with the stalk pointed towards the seat as high as possible between the plate steel that also holds the windshield and the vertical ¾" tubing next to it. The switch spans the gap. Use two 1" screws and a 5/16" socket and 9/64" drill bit.
2. The ignition switch will get mounted in the dash. Refer to the *Mustang* wiring diagrams to find the correct wires to attach to the key switch.
3. The turn signal stalk can be cut shorter so that when it's mounted it will not protrude past the dash lip. If you want to cut the stalk length, do it after the dash is installed and you have sat in the car to see if it

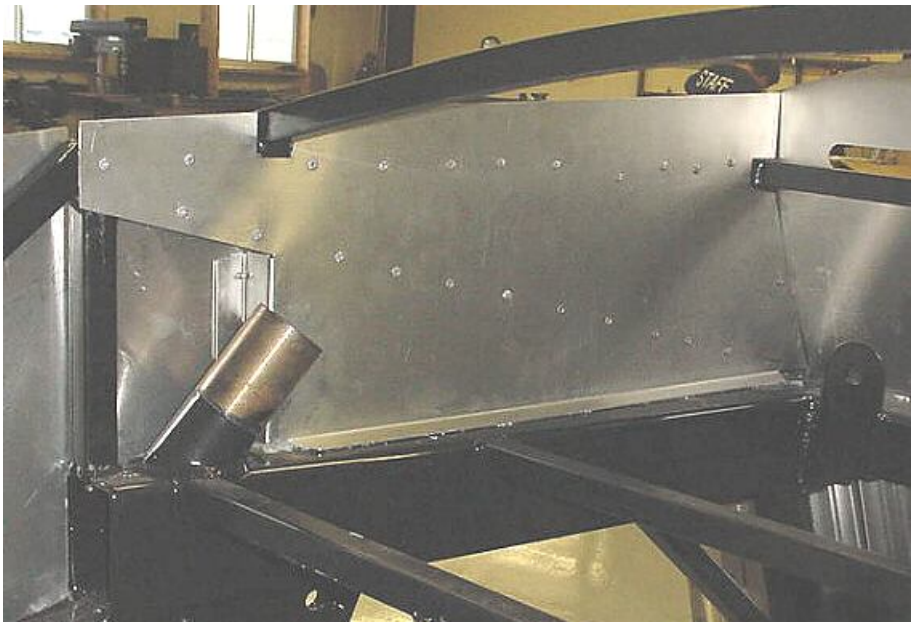
is needed. Cut half of the length first. Do not worry about the pieces that fall out, they are for the Mustang wipers and are not used. Re-use the end cap and epoxy glue it to the newly cut stalk to give it a nice finished look.

Aluminum Trunk & Side Walls

TOOLS: *Drill, #8 hex head driver, ⅛" drill bit, rivet tool, silicone, caulk gun, marker, ruler, floor jack, 9/16"wrench, 3/16"hex key.*

PARTS: *Trunk aluminum (FFR# 10889), ⅛" rivets (FFR# 10782).*

1. The front trunk sidewall is mounted to the inside of the frame.



Front trunk side wall.

2. The Rear trunk sidewall is mounted to the outside of the frame.

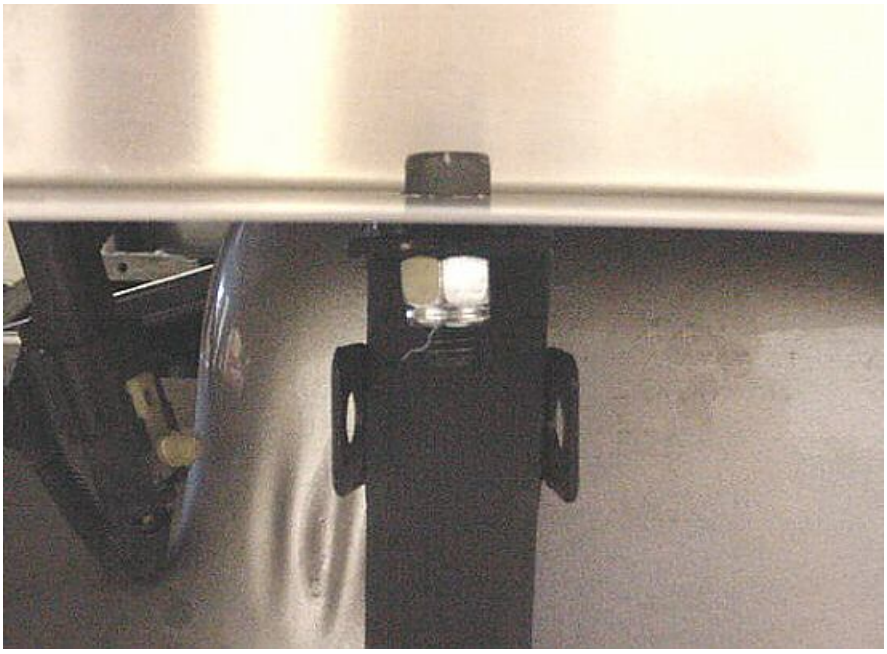
Rear trunk side wall.

Trunk front and rear side walls.

3. Place the mid-trunk floor panel (FFR# 10560) over the roll bar tube mounts by arching the panel up in the middle lengthwise and passing it from the cockpit side into the upper trunk. This can be tricky, but take your time and it will fit without damage. This is one of those steps where you need to take your time and proceed slowly.

Fitting the mid-trunk panel. Bend the panel as shown and insert the passenger's side first.

4. Trace around the frame with a marker.
5. Remove the aluminum panel. Measure and mark the panel for the rivets every 2-3 inches.
6. Drill ⅛" holes where the rivet holes were marked.
7. Apply silicone to the flat surfaces of the frame where the aluminum will contact.
8. Re-install the aluminum panel.
9. Use #8 screws to hold the panel in place.
10. Drill through the aluminum rivet holes into the frame.
11. Wipe and clean the aluminum.
12. Rivet the panel in place with the short rivets.
13. Using a jack, support the fuel tank and remove the rear tank strap bolt on the passenger side.
14. Position the rear trunk floor.
15. The rear trunk floor is riveted in the same manner with rivets spaced every 2-3 inches along the ¾" tube framework. You can use the self-tapping screws to make this go faster, but final installation must be done with the rivets.
16. Use a ⅜" drill bit and drill through the passenger rear fuel strap mount and the trunk aluminum piece.
17. Reattach the fuel strap bolt and tighten.



Passenger side rear tank strap mount.

18. Remove the floor jack.
19. Silicone around the seat harness mounts in the trunk.
20. Attach the triangular covers to the frame inside the trunk.

Fuel Evaporative Canister

1. If you are going to run a vapor line and a fuel evaporative canister (charcoal can), mount the can at the back of the car on the driver side using the stock bracket so that the stock plastic line will still reach the correct connection.

Charcoal can mounted on drivers side rear. Note: Splash guards are not mounted until after the body is on.

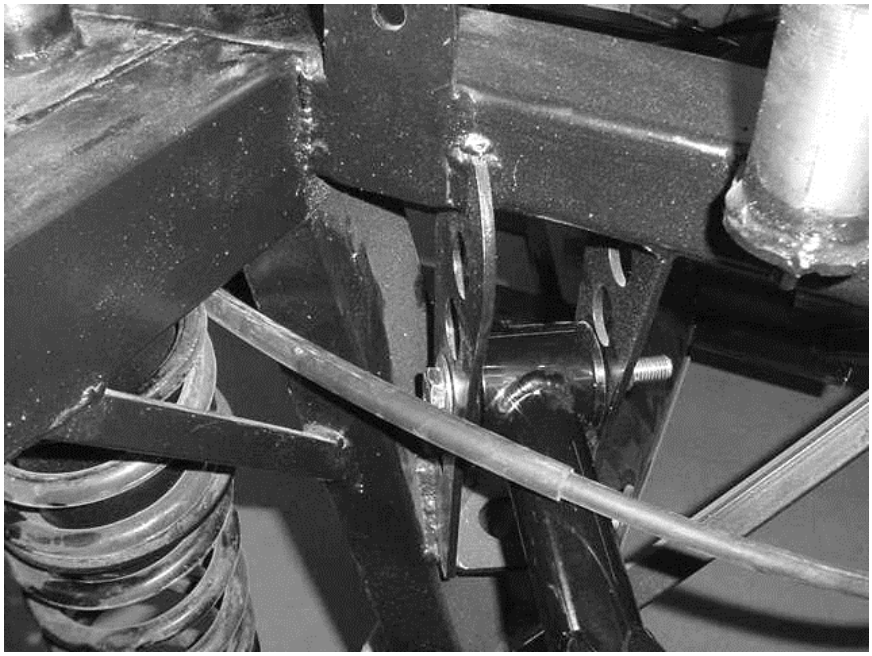
Emergency Brake Handle and cables

ATTENTION: *The 99-04 Parking brake handle has different mounting locations and "T" cable length than the older 87-98 handles.*

TOOLS: *½" deep socket, $^{3}/_{16}$" hex key, marker, scissors, hacksaw.*

PARTS: *Black vinyl trim (FFR# 13990), brake line components (FFR# 11076).*

1. The emergency brake cables are run from the rear axle forward in front of the spring mounts and through the triangular area between the ¾" tube and the 2"x 3" tubes.



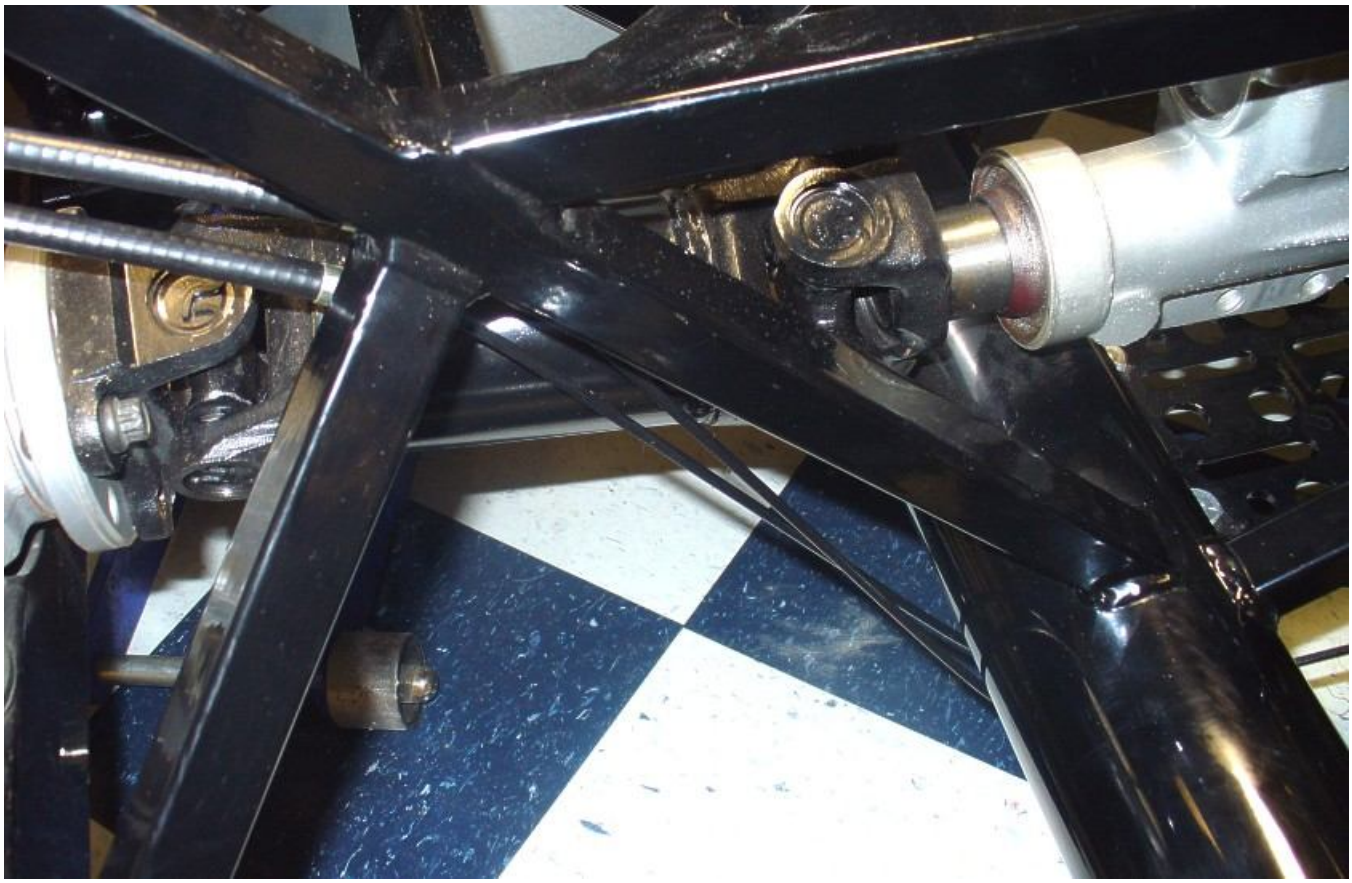
Parking brake cable passing through triangle and in front of coil spring on driver's side

2. Next, go over the upper control arms and rear-end to the transmission tunnel area of the car. In the tunnel, there are two brackets with two holes mounted to the frame. The bracket closest to the handle is for 93-04 length cables while the other is for 87-92 cables.

Brake cables in mount bracket.

3. Push the cable through the holes, and snap in the cable retainers.
4. **If using 87-92 cables, after the sheath is snapped into the bracket, and run the cable down and under the 4" cross member and up to the "T" cable. The cable**

runs against the tube.

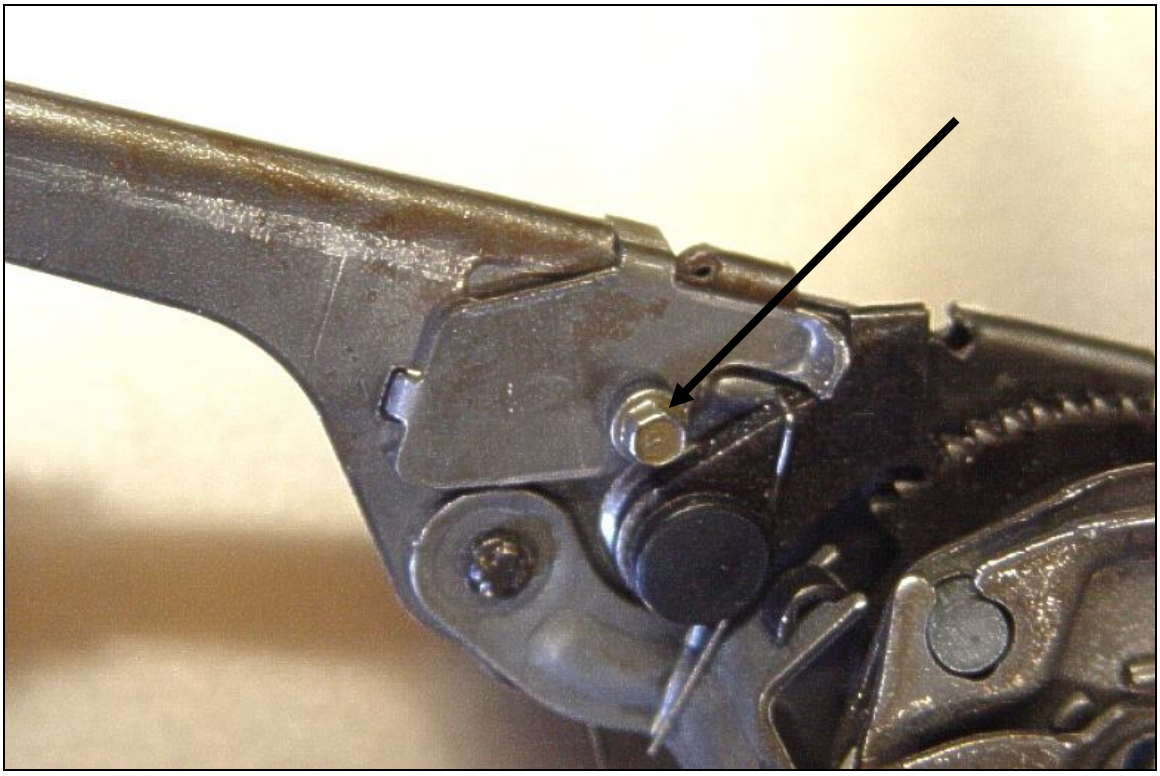


Brake cables running under the 4” crossmember.

Brake cables attached to the T cable

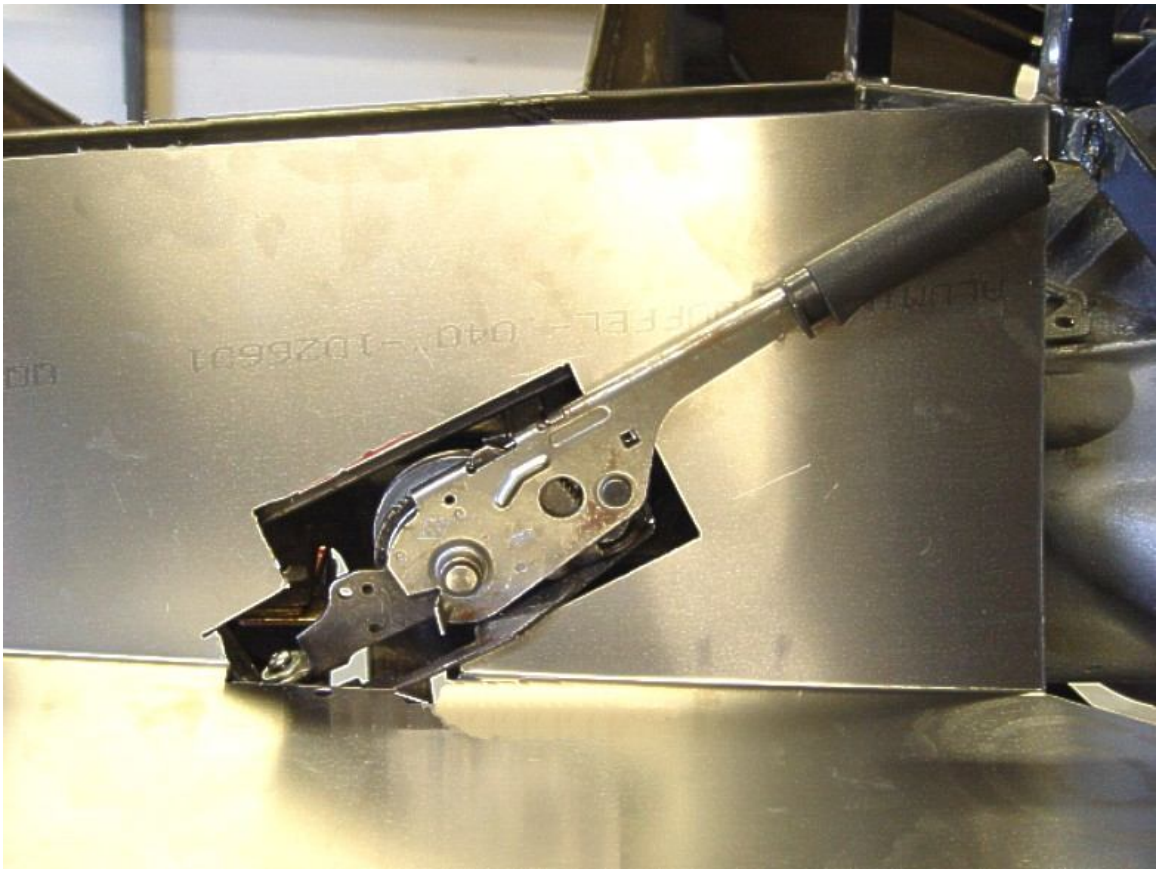
Emergency Brake Handle

5. Push the captive nuts onto the handle so the screw can be attached from the underside.
6. On 99-04 handles, remove the small bracket and screw that prevents the racheting adjustment gear from turning.



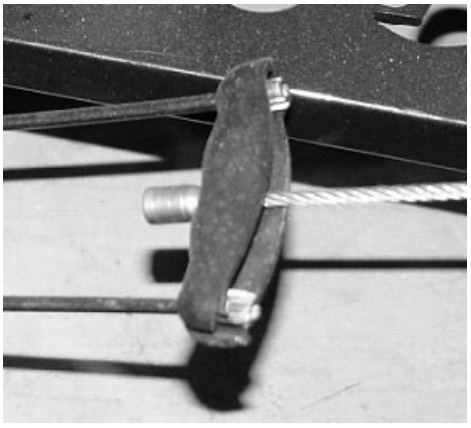
Ratchet gear stop bracket and screw.

7. Bolt the handle to the mount bracket using the kit fasteners. The holes are slotted so the handle can get positioned properly to allow room for your hand around the handle.



2003 E-brake Handle mounted.

8. Attach the 2-into-1 cable with the “T” connector to the handle if it is not already there.
9. Release the emergency brake handle using the button and make sure it is all the way in the down position.
10. Pull on the cables one at a time and slide them into the slots on the “T” connector from the Mustang.



Emergency brake “T”

11. Pull up on the emergency brake handle, so that the automatic tensioning cog can adjust the free play in the lines.
12. Reattach the ratcheting stop bracket and screw if equipped.
13.

Transmission Top Cover

1. Slide the top cover under the rear U-joint cover, then forward and down as much as possible on top of the front wall tab.
2. Use a marker and ruler to mark rivet positions.
3. Remove the panel and silicone where the panel will touch the already mounted panels.
4. Reassemble the Transmission cover using a couple of self-tapping screws to hold the top and sides in position.
5. Drill the rivet holes.
6. Rivet the panel in place.
7. The transmission/clutch and removed through this panel for service if necessary.

Power Steering System Bleeding

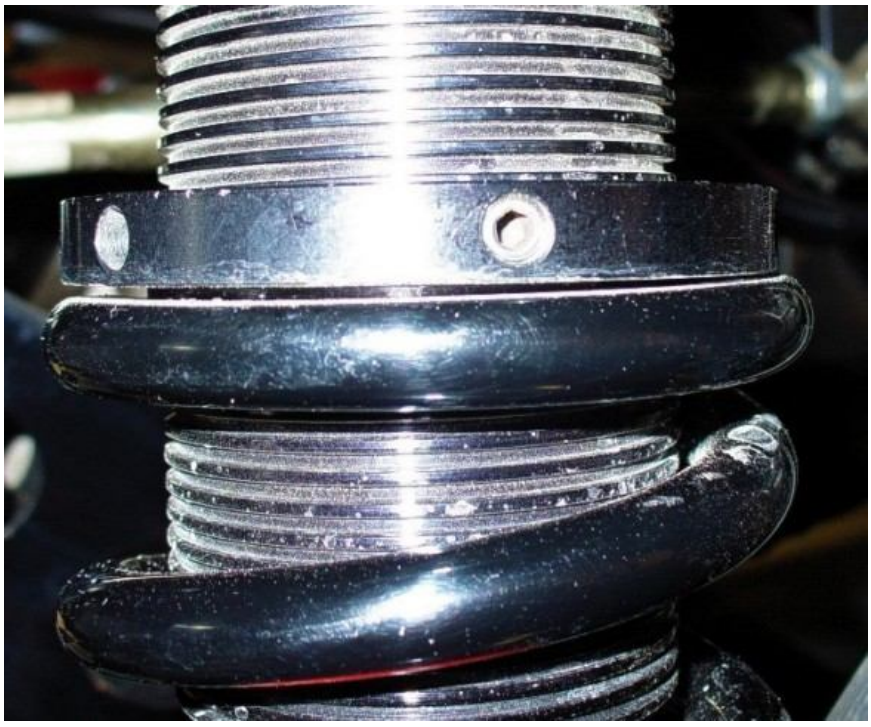
1. Raise the front wheels off the ground if they are not already
2. Turn the steering wheel all the way to the left.
3. Fill the reservoir to the full cold level and leave the cap off.
4. Turn the steering wheel lock to lock 20 times checking the fluid level every few times. Top off if necessary.
5. Start the engine and check the fluid level.

6. Reinstall the reservoir cap and turn the steering wheel lock to lock a few times.
7. Check for leaks, smooth assist and noiseless operation. If there are noises, turn the engine off, wait two minutes and redo the procedure.

Wheels, Tires and Ride Height

ATTENTION: *The wheel/tire size charts are in the performance modification section of the manual*.

1. Mount the wheels onto the car.
2. The ride height in the front is 4.5". This is measured from the bottom of the 4" round tube to the ground, using 235/60R15 tires.
3. Ride height in the rear is 4.5". This is using 275/50R15 tires and includes a person in the driver's seat. If measuring with out a person in the car, set the ride height to 4.75". If you use 295/60R15 tires, the ride height will be slightly higher. For other tire sizes, check Chapter 3 of this manual.
4. The initial suspension heights may settle slightly with the first 50 miles of driving and may have to be re-adjusted at that time.
5. Once the ride height is set, tighten the small set screw in the spring seat just until you feel it contact. The end of the set screw is plastic so that the threads are not destroyed. Not a lot of pressure is needed to prevent the seat from turning.



6. **Check for shock clearance on brake lines, emergency brake cables, Brake Calipers, frame and control arms.**

Checking the Running Gear

1. Secure loose and unused wires with cable ties. Look up the function of the wires in your Chilton's

manual before you tape. Never get out the snips to cut a seemingly unimportant wire or bundle.

2. Problems are commonly due to a wire or relay not being hooked up or grounded properly. Sand through the paint to bare metal whenever attaching a ground.
3. Before you start your engine. Check the ground connections. The computer ground is near the starter solenoid (sort of looks like the female part of a stereo head phone connector). Check the following items…
   - Battery ground strap.
   - Engine to frame ground.
   - Fuel pump/rear harness ground.
   - Fuel pump relay ground.
   - EEC V computer ground.
   - Lighting grounds at each corner where the lights are located.
   - Dash area grounds.
   - Any other black wires with circular toothed clips.
4. When the ignition is turned to the "on" position, the fuel pump should be heard whirring for about three seconds and then shuts off. This sound is simply the fuel pump pressurizing the system. If you don't hear this sound. Check the emergency inertia cut-off switch. The red button should be pressed in. Double-check that the computer is hooked-up and re-check all of the ground connections. The computer ground near the starter solenoid has a black plastic one wire quick disconnect that many people forget to ground because the other half of the connector is missing. If it is found to be missing, cut the connector off and attach a circular ground connector.
5. Various clicking and whirring sounds are a great indication that things are working well.
6. **Check the oil level**.
7. **Check the coolant level**.
8. Crank the engine for ten seconds with the coil connector removed so that the oil pressure can build up before starting the engine.
9. Reconnect the coil lead and start the car.
10. After running the car for two minutes at idle, turn off the engine and recheck everything for leaks and problems.
11. If you run the motor for any longer than two minutes it will be necessary to bleed the air out of the cooling system.
12. Several warm-up and cool down cycles are necessary before air in the coolant system is bled out enough to allow water to be pumped by the water pump. You will ruin your motor if you start it and drive without checking to see if the radiator is getting hot water pumped to it from the water pump. The best way to tell if the water pump is working is to feel the radiator after the engine has warmed up and see if it is warm. Usually it will be very cool if water is not being pumped through and you will have to add water and allow the purge tank to replace some of the water as the motor cools down. The purge tank on the shroud should be full all during the test sessions so that it can bleed water into the system as the motor cools. Twenty cycles is not too many to purge air out from the cooling system.
13. Turn the steering stop to stop to check for wheel rubbing on the control arm or aluminum wheel wells. There should not be any contact. If there is contact, you can put an extra spacer ring in the steering rack. This effectively changes (reducing) your steering travel and turning radius, but it's a good trick to remember if you use oversize tires or have bought custom wheels (not from us!) and the wheels rub slightly.

Foot Box Top Cover

ATTENTION: *Check for electrical problems now, it is easier to fix a problem now than later.*

TOOLS: *Drill, #8 nut driver, ⅛" drill bit, rivet tool, silicone, caulk gun.*
PARTS: *Cockpit aluminum (FFR# 10890), ⅛" small rivets.*

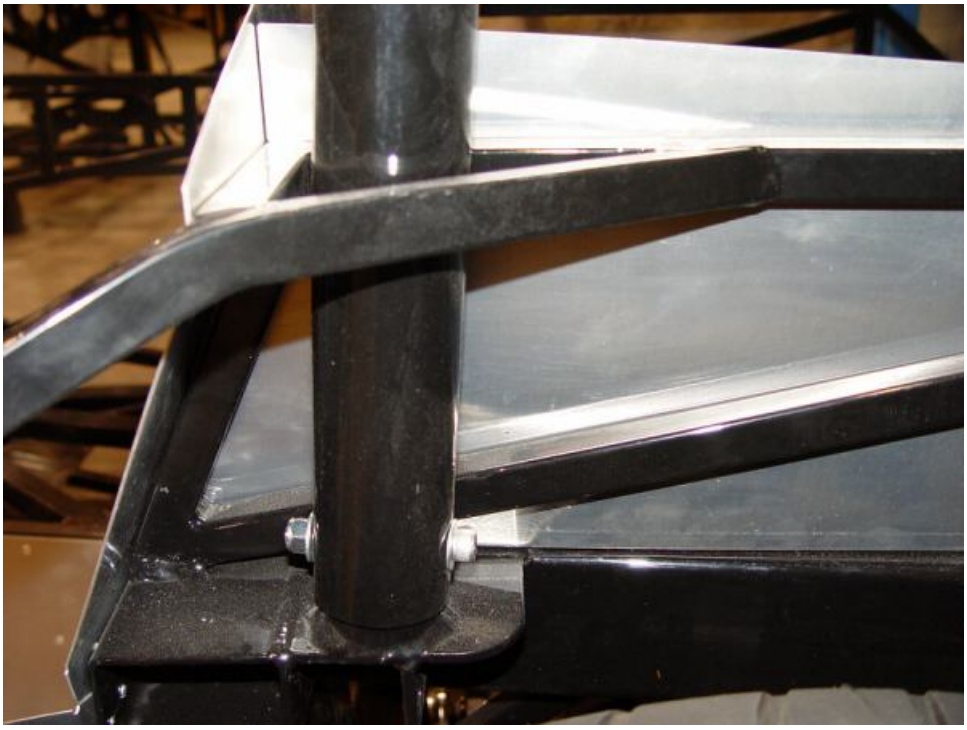
1. All wires should be inspected in the foot box area before the foot box top is installed. Double check the following areas:
   a. Clutch pedal movement. As the clutch pedal moves you don't want contact with any wires.
   b. Check the distance to the white gauge pod on the firewall. The length of the wires from the ignition and turn signal switches to the white control box is very tight. Make sure that these items are installed and wired before the top panel is put in place.
2. Run the speedometer cable through the hole in the foot box top, the rubber grommet on the cable pushes into the laser cut hole.
3. When positioning the foot box top take care to keep the speedometer cable out of the way of the pedals and steering shaft. The cable runs through the slot in the firewall along with the wiring harness inside the foot box and down the transmission tunnel to the transmission on the outside.
4. If you are at this point and are driving the rolling chassis, remember that the car does not charge the battery without the charge indicator light and resistor hooked up and the battery will run down over time.

Kit Driver Footbox panels

Roll Bar Drilling

TOOLS: *Drill, $^{5}/_{16}$" long drill bit, vise grips*

1. Assemble the roll bar on the frame. Put the rear leg on, then slide the front hoop on all the way down to the small knobs on the holders. Push the rear leg up onto the front tube.
2. Use vise grips or a friend to hold the rear roll bar leg in place.
3. Drill $^{5}/_{16}$" holes for the stainless roll bar bolts. Insert one of the bolts after drilling each hole to prevent movement and ensure fit.



Front outside rollbar bolt.

4. Remove the roll bar.

Roll Bar from inside trunk view, assembled and bolted in place.

Body Cut-Outs

At this time you should be finished with the rolling chassis. This is an exciting time because the bulk of the real difficult work is behind you. From here on out, the time is really in the details. Take your time with the bodywork. Since the body is in one piece, get four people to help when you're ready to position the body onto the frame. The body is delicate at the area near the doorsills. During bodywork, take care to look for any small flaws. Time spent here will pay off down the road.

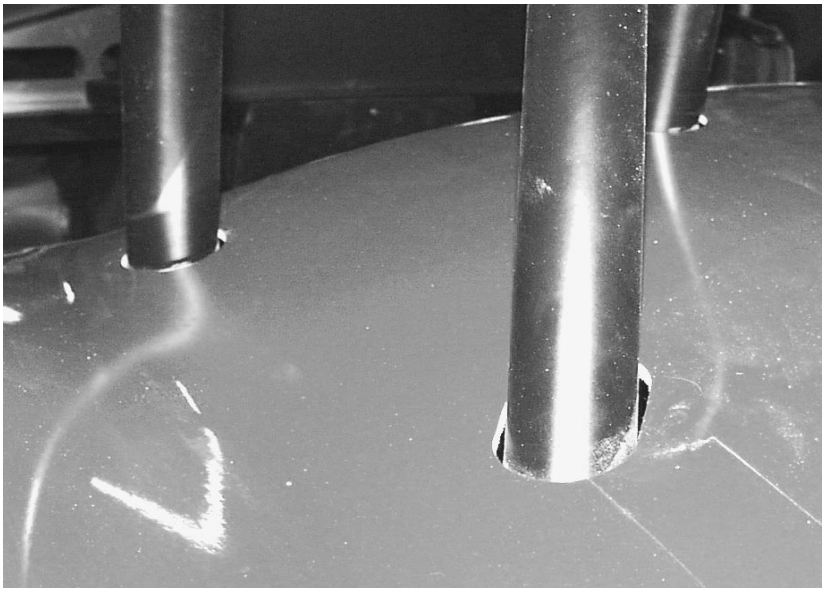
ATTENTION:

- *If body cut outs were ordered, the roll bar, side exhaust, louver, headlight, tail light, turn signal, windshield slots, wipers (if ordered), gas cap, hood scoop, and side mount holes are done at the factory. The body comes standard with the large nose hole, oil cooler hole, and side holes cut.*
- *The roll bar holes are marked for you on the top of the composite body.*

Roll Bar Cut-outs

TOOLS: *Drill, large file, 2.25" hole saw, safety goggles.*

1. In an open area with the body on the ground, use a 2.25" hole saw to cut the roll bar holes. Center the hole-saw on the marks and drill just so the center bit goes through.
2. Make a circle with the hole-saw and compare it to the marks. Adjust the drill if necessary.
3. To cut the rear roll bar leg, make 2 holes overlapping so that they form the right length. Use a file to connect the holes and create an oval.
4. Enlarge the holes if necessary or desired. Try not to cut or grind off too much material.



Roll bar holes cut out with roll bar installed.

Gas Filler hole

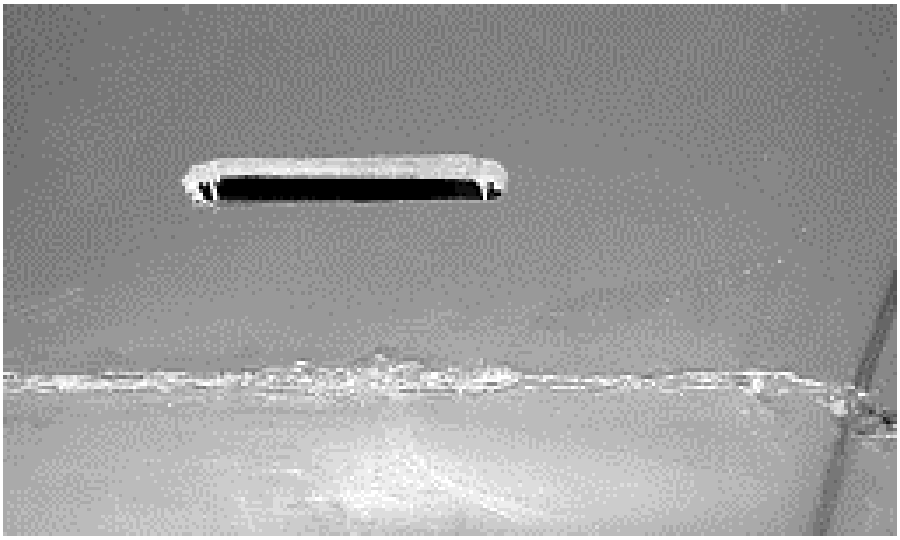
TOOLS: *3.50" hole saw*

1. Use the template in appendix A.
2. Cut the large circle out of the template.
3. Center the circle in the gas cap location.
4. Drill the 3.50" hole in the center of the cutout.

Windshield Cut-Outs

TOOLS: *Hand jigsaw, marker pen and ruler.*

1. At the factory, in the chassis assembly station, we drill two holes at each side of the body, forward of the cockpit area and near the back top of the fender. These holes serve to locate the position of the windshield cutouts. Use a ruler and marker to connect the outside edges of the two holes just forward of the door openings.
2. Connect the two holes on the lines with a jigsaw to make an elongated oval.



Connect the two holes with a jig saw to form the windshield slot

3. Repeat on the other side of the body. These ovals will be the slots through which the windshield bars will insert.

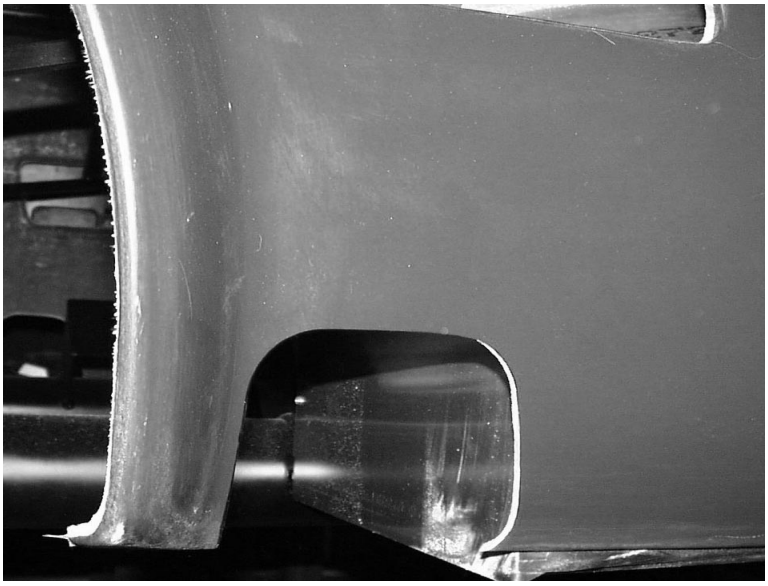
Side Exhaust Cut-Outs

ATTENTION: *Use caution when cutting. Go slowly measure twice, and cut once. Make two photocopies of the template (one for each side of the car) from Appendix A so that it does not get lost or destroyed.*

TOOLS: *Hand jigsaw, 2.5" hole-saw, drill, marker, clear tape.*

1. Cut out the side exhaust template from Appendix A.

2. The template goes down to the bottom edge of the body. There is nothing but air under the side exhaust.
3. Tape or hold the template and mark around it with a pen.
4. Use a 2.5" hole saw in the two upper corners to ease the amount of cutting needed and to make the corners look nicer.
5. Use a jigsaw to cut out the marked area.
6. The template is tight so enlarge the holes after fitting the side pipes later if desired. Do not allow the exhaust to get too close to the body or it will cause the paint to blister from the heat.



Driver's side exhaust cut out

Turn Signal and Tail Light Cut-Outs

TOOLS: *1.25"holesaw, 3/16" drill bit, drill.*

1. Use a 1.25" hole saw at the turn signal mount location to make the center hole.
2. Use the rubber gasket as a template to mark the locations of the smaller holes.
3. Use a drill and a 7/32" bit for the small holes.
4. Test fit the lights. You may have to bend the ground tab slightly or file away a bit at the hole to make it fit perfectly.
5. Use a 1.25" hole saw at the Tail light mount location to make the center hole.
6. Cut out the template in Appendix A using the center holes to position the template on the body.
7. Drill the Tail light small hole locations using a 3/16" drill bit.

Side Louver Cut-Outs

TOOLS: *Hand jigsaw, 7/8", 1.25" hole saw.*

1. At the corners of the louver indentation, use a 1.25" hole-saw for the larger angle and a 7/8" hole saw for the smaller angle.
2. The hole-saws will fit in the louver lip.
3. Use a jigsaw or hacksaw for the straight edges.

Side louver cut out.

Headlight Cut-Outs

TOOLS: *Hand jigsaw, drill, marker, compass, clear tape, $^{7}/_{16}$" drill bit.*

1. Use the template in Appendix A.
2. Fold the paper into quarters to find the center of the circle.
3. Use a compass and set its length from the center of the circle to the guide hole centers.
4. On the body, put the stationary end of the compass in one of the small guide hole divots.
5. Draw an arc across the headlight area.
6. Repeat this using the other guide hole divot.
7. Where these arcs cross, is the center of the circle.
8. Using the folded template, set the compass length from the center to the large inner circle.
9. On the body, at the point just found to be the center, place the stationary end of the compass.
10. Draw a circle around this point.
11. Using a $^{7}/_{16}$" drill bit, drill the marker holes and make sure that they do not hit the circle.
12. Drill a $^{7}/_{16}$" hole in the inside of the circle so that the edge of the hole is just touching the circle.
13. Use a jigsaw to cut the circle out.

Headlight and turn signals cut out.

Hood Scoop Cut-out

TOOLS: *Hand jigsaw, ¾" hole saw.*

A painted hood with the hood scoop cut out.

1. Use a ¾" hole saw in the upper corners of the hood scoop leaving room on the edge slightly more than the thickness of the material.
2. Cut out the scoop making sure that the saw has clearance on the backside and is not at an angle.
3. File the edges of the scoop so that the cutout follows the surface of the hood on the bottom and follows the underside of the top with no noticeable ridge.

Trunk License Plate Light Hole Cut-Outs

ATTENTION: *This kit is only a collection of parts designed for use primarily as a race car. Applying the license plate bracket does not mean that this vehicle is street legal. Factory Five Racing does not build completed or partially completed street vehicles. If you choose to title, register and operate your kit on public roads, you are responsible for ensuring that the vehicle you build complies with all Federal, State and local laws regarding its use. The inclusion of the license plate bracket does not indicate that this kit complies in any way with these laws.*

TOOLS: Drill, *3/16", 3/8" drill bits, masking or clear tape.*

PARTS: *License light/bracket components (FFR# 11041).*

1. Position the template (found in Appendix A) on the flat area on the edge of the outside of the trunk lid.
2. Affix the template to the trunk with tape.
3. Use the 3/16" drill bit for the small holes.

Drilling the license plate light holes in the trunk.

4. Use the 3/8" drill bit for the large hole.
5. Remove the template.
6. Test fit the part.

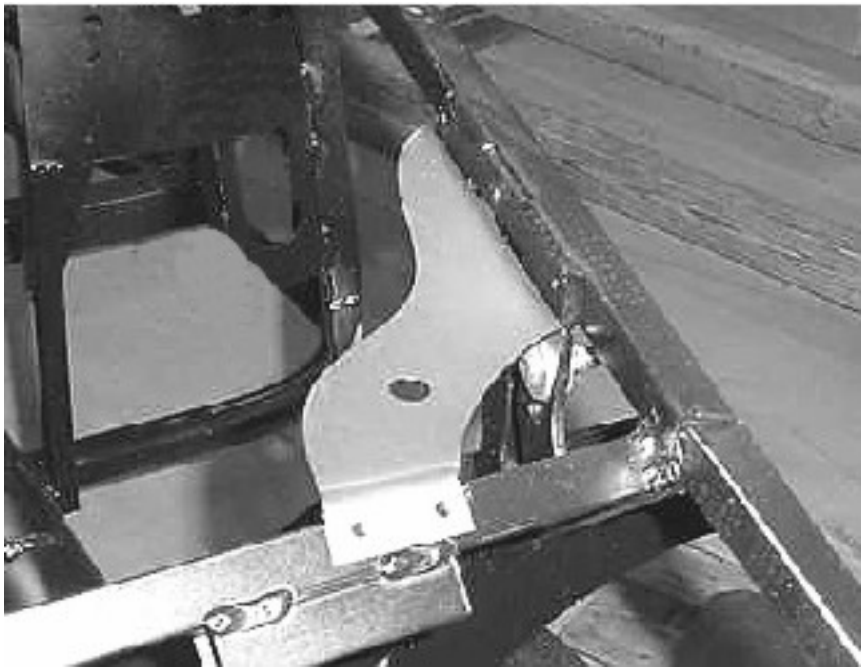
Hood Pins

ATTENTION: If using the hood hinge, do not do this assembly, follow the hood hinge instructions.

TOOLS: Drill, *3/32", 7/16" drill bits, Phillips head screwdriver, (2) 11/16" combination wrenches.*

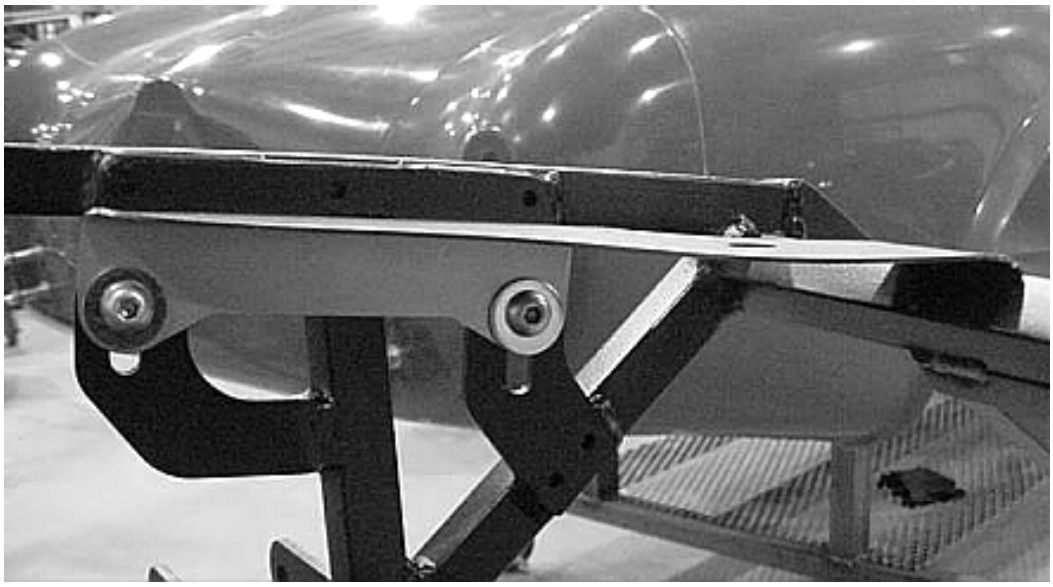
PARTS: *Three lock set and fasteners (FFR# 11019), hood/trunk fasteners (FFR# 10646).*

1. At the front side corners of the engine bay, on the ¾" frame tubing, there are steel mounting plates which to attach the hood pin vertical mounting plates.



Top hood pin plate ready for drilling and riveting.

2. Bolt the top mounting plates to the side mounting plates. (Be sure to line the top plate with the front ¾" tube.



Top hood pin plate mounted to side plate.

3. Drill a $^{3}/_{16}$" hole in the front ¾" tube.
4. Rivet the plate to the front ¾" tube.

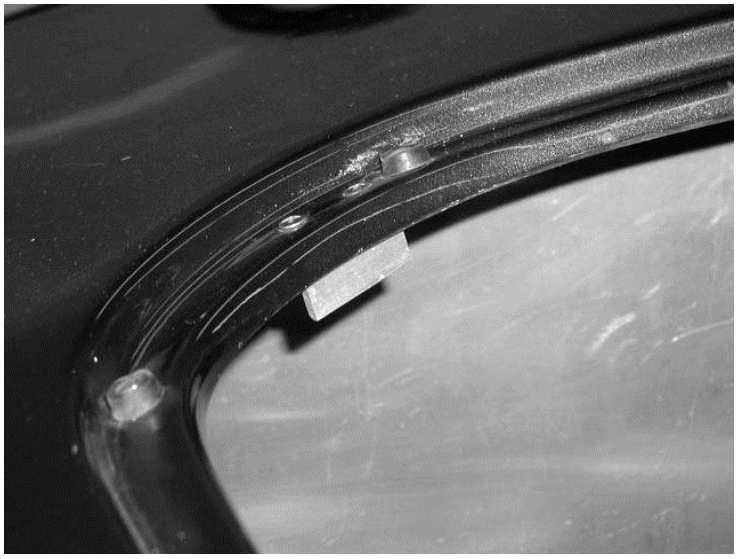
L-Shaped Hood Handles

TOOLS: *Drill, ⅛"drill bit, $^{7}/_{8}$" hole saw, Phillips head screwdriver, small hex key set, small square file, hack saw, masking tape.*
PARTS: *Three lock set and fasteners (FFR# 11019), hood/trunk fasteners (FFR# 10646).*

1. Position the rear L-shaped handles (part of the three lock set FFR# 10624) in the holes near the rear of the hood. Point the handles to the rear of the hood.
2. Use a small square file to make room for the tabs on the handles.
3. Using a ⅛" drill bit, drill holes in the hood for the mounting screws. Attach the handles to the hood using the Philips head screws.
4. Using the key for the three-lock set, lock the handles.
5. Place the hood on the car. The driver's side handle square rod is too long and hits the top of the foot box. Mark and shorten this rod with a hacksaw until it clears the foot box.
6. The handle is locked pointing towards the back of the car. Place some masking tape on the body behind the handles then, using a pen, mark on the body where the handle is pointing.

Driver side hood handle.

7. Remove the hood. Hold the angled aluminum brackets (included with kit) to the underside of the hood lip at the locations just marked.
8. Using a pen, mark on the brackets where two screws can go.
9. Drill two ⅛" holes through the bracket.
10. Using a pen, mark the location of the bracket holes on the hood lip.
11. Remove the bracket and drill the holes.
12. Countersink the holes on the body's hood lip a little by turning a Philips head screwdriver in the hole.
13. Mount the brackets with the angled part pointed down and towards the hood opening.



Hood handle hold down bracket mounted to underside of hood lip.

14. Attach the cam wedge to the square handle shaft using a small hex key. Adjust them so that they will go under the angled aluminum bracket when the hood is on the car and the handles are locked.
15. Cut off any excess square rod that hangs down past the cam wedge on the hood handles.

Mounted L-shaped hood handle with cam wedge.

Body Mounting

ATTENTION: *It is smart to have some help when doing this step. Much of this positioning is push and pull until all holes line up. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body.*

TOOLS: *2"x 4"x 36" brace, duct tape.*

1. Place a 36" long 2"x 4" brace in between the front of the cockpit and the rear of the cockpit.
2. Get three friends to help with the next step.
3. Have one person lift the body at the nose and another person lift the body at the back of the body's lower edge.

Lowering a painted body down onto the completed chassis.
You will not have weatherstripping on the frame at this point.

4. Raise the body up above the rolling chassis.
5. While holding the rear end of the body above the rear of the chassis, lower the nose section down, making sure that the $^{1}/_{16}$" bent steel plates (the front quick jack bumpers fasten to these) are not in the brake vent slots. The quick jack and body mount plate does not go through the brake vent holes nor does it go through the front nose openings.
6. Gently lower the rear tail section of the body. At the same time, have someone at the front of the body push the body towards the back of the car. Stretch the body slightly to clear the trunk aluminum and the door hinge mounts.
7. Pull the sides of the body outwards slightly to clear the 2"x 2" outriggers and lower the body.
8. Work from the rear of the car towards the front.
9. Use the original body mounting holes to line things up.

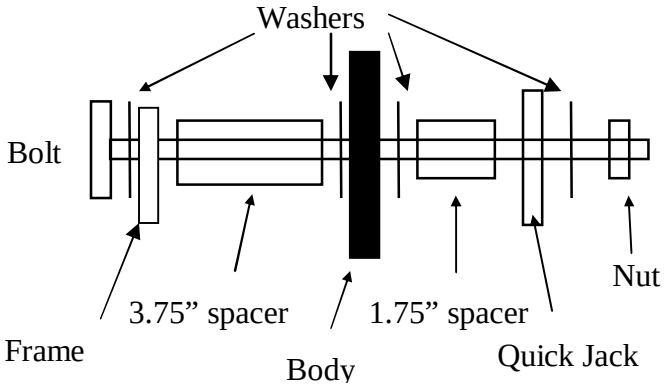
Slide the nose on first with the body up in the air.

Rear Quick Jack Bumpers

ATTENTION: *If you ordered the optional chrome bumper assembly, follow the instructions for these under the optional accessories section near the end of this manual. The quick jack bolts can be installed from the outside of the car so the gas tank does not have to be dropped.*

TOOLS: *$^{9}/_{16}$" and ⅝"combination wrenches, ⅝" socket, $^{5}/_{16}$"hex key, floor jack.*

PARTS: *Quick jack bumper components (FFR# 10533)*



1. Lower the gas tank using a jack in the middle of the tank to hold it. You'll need a $^{9}/_{16}$" wrench and $^{5}/_{16}$" hex key. This is necessary in order to insert the bolts for the quick jacks into their holes.
2. Mount the rear quick jacks using the 3.75" and 1.75" stainless spacers with 4 washers on each long bolt. Use a ⅝" wrench and ⅝" socket.
3. Raise and bolt the gas tank back into place.
4. Tighten the gas tank strap bolts with a $^{5}/_{16}$" hex key and $^{9}/_{16}$" wrench.

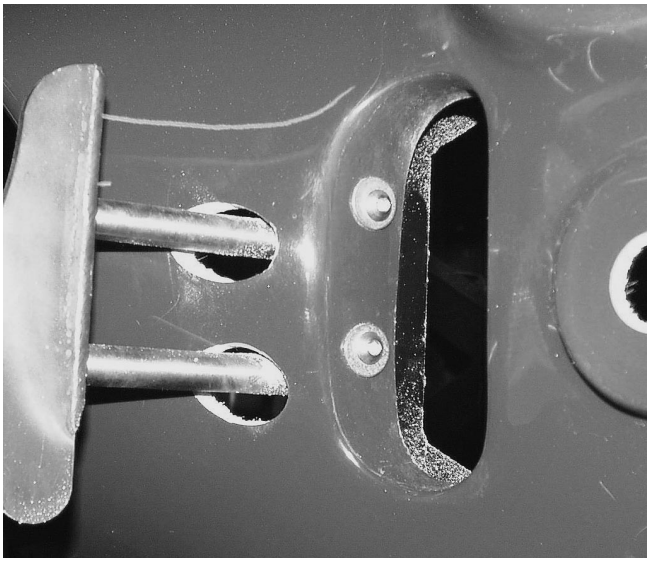
Side Body Mounts

TOOLS: *5/16" drill bit, 3/16" hex key, drill, ½" wrench.*
PARTS: *Secondary body fasteners (FFR# 10788).*

1. Drill the holes at the points marked on the side of the body.
2. Push the U-nuts onto the side body mount plates.
3. Install the stainless side bolts (FFR# 10839) with a washer (FFR# 10981) next to the head and as few washers between the body and the frame as possible so that the body clears the frame and there is enough thread left so the lock part of the nut is used. Use a 3/16" hex key.

Front Body Mounts

TOOLS: *3/16" hex key, ½"combination wrench, tape measure.*
PARTS: *Secondary body fasteners (FFR# 10788)*



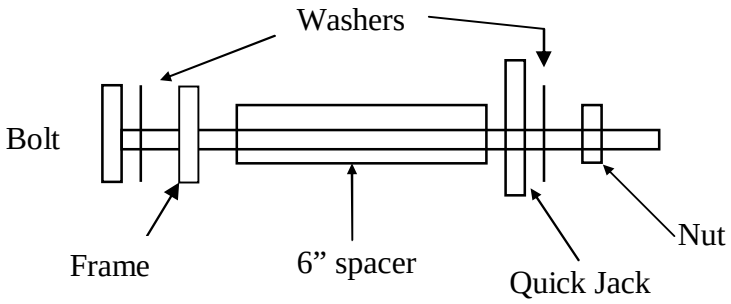
Front body mounts as assembled by the factory.

1. Center the body over the frame using a tape measure to measure from the lip of the body to the rear mounting plate of the front coil-over bracket. Check the line up with the front "X" member so that the tape measure is parallel. Make this measurement on each side of the body so that the front of the body is centered over the frame. Move the front of the body as necessary. If the body will not stay where you put it, put a screw through the lip of the body into the ¾" tube.
2. Install the front mount bolts from the outside in, with washers next to the heads. Use a 3/16" hex key and a ½" wrench or deep socket. Do not torque the Stainless bolts. Snug is good.
3. The hood opening is attached to the ¾" frame rails using countersunk sheet metal screws. Use six screws on each side equally spaced along the length of the opening.

Front Quick Jack Bumpers

TOOLS: *9/16"* and *5/8"combination wrenches, 5/8" socket.*
PARTS: *Quick jack bumper components (FFR# 10553)*

1. File the inside of the quick jack hole if necessary so that the spacers do not touch the body.
2. Tighten the bolts with a ⅝" socket and ⅝" wrench.
3. If, after tightening the bolt, the spacer hits the body, move it so that it does not. The mounting plate will bend to accommodate.



Body Prep and Painting

ATTENTION: *The door, hood and trunk panels are molded without flanges (edges), and then they are cut by a robot using a high-speed router that leaves a sharp and unfinished edge. The panels are made BIGGER than you need or want. This is so that they can custom fit them to the MOUNTED body. For proper panel operation, the gaps need to be sanded to greater than 3/16". Panel edges should be rounded to match the body opening radius.*

All of the exterior body accessories and side exhaust must be mounted to the car to obtain the correct body location in order to create the correct gaps and opening sizes on the car before it is painted.

1. With the body mounted, fit the doors and door latches to the car.
2. Use the small and large bumpers included with the kit to set the height of the different panels so that they are flush with the body. If necessary, cut the large bumpers to the correct height if the small ones are too small.
3. Use a marker around the door opening, marking the panel with a ⅛"- 3/16" line.
4. Remove the door and trim the panel so that the line can not be seen. This will give an even gap around the door. Repeat as necessary to set the size gap that is both necessary to allow the door to open easily and that you feel is appropriate.
5. Fit the trunk the same way as the doors.
6. Fit the hood.
7. Mount the remainder of the exterior accessories (headlights, turn signals, taillights, rollbar, side exhaust) using the remaining instructions in the manual.

ATTENTION: *If you have never done bodywork before, talk to an auto body person who is familiar with working on fiberglass first. Before painting your body and panels we recommend mounting them all on the finished car including all lights, windshield and doors. After working with more than 4000 customers we have found the best results to be with folks who paint their body at the very end. After everything is tight and aligned properly, we suggest removing the body and painting it off the car. This eliminates over spray and keeps your nice work up to this point intact.*

If you will be painting stripes on your car it's a good idea to mark or scribe the start points of the lines on

the body. When the body is off the car it's flexible and difficult to get stripes on the front half of the body to line up perfectly with those on the back half.

Refer to appendix A for a drawing on how to make a wooden buck to hold the body. A body buck diagram is in the appendix. The dimensions do not have to be exact. A rough shape is all that is needed to hold the body.

TOOLS: *100, 220, 400 grit sand paper, sanding blocks.*

1. Remove all trim, doors, windshield etc. before beginning body work
2. Take extra care to sand away the fibers and strands specifically around the roll bar area. Finished flange around door should not exceed ½" to make sure the press-on door trim fits.
3. The primer gel coat sands easily, and is a forgiving material to work with. Remember that the body comes out of the mold with a wax release compound and a thorough cleaning with a wax remover is the best way to begin this job. After the body is cleaned you can begin the sanding steps.
4. The parting lines are easiest to remove with a file or scrapper (these are the lines where the mold comes apart). For a car that will be painted a dark color such as black or dark blue it is very important to understand the nature of fiberglass as a material. The vinyl ester resins used for these bodies will shrink with a final stage of curing with the elevated temperatures that are present in the sun on a dark car. The parting seams and any area of body filler repair should be given at LEAST several days to cure. If you want to heat cure the bodies do not exceed 140° F. When the final paint is applied it is very smart to add several coats of clear to those areas where work was done so that years later you or the next owner can simply sand out and buff any imperfections that may develop.
5. Much time and energy was spent on the mold so that the parts line up evenly and don't have a different height when you begin sanding. Take your time at this final fitting stage and you'll be rewarded with a fine finish, and a perfectly straight body. Of all the areas to be a perfectionist this is the one.
6. Block sand the entire body surface with 100 grit sandpaper. For flat sections you can use a harder rubber sanding block. For curved sections, use a firm sponge at an angle to the curve that you are sanding.
7. Make sure the body is clean and grease/wax free before priming.
8. Allow the bodywork or repairs performed to sit for several days outside in the sun or at elevated temperatures to allow the repair materials to cure.
9. Prime the body surface with a polyester primer/surfacer such as featherfill. Make sure you prime with a polyester primer over all areas of repair. This polyester primer is the same chemical base as gel coat and acts as a barrier between the raw fiberglass and the topcoat you will be applying.
10. Block sand with 220 grit paper.
11. The last coat of primer should be a different color so that you can see scratches or flaws that were missed the first time around. Pay particular attention to the areas on the top of the car since these are the most visible to the person looking at the car.
12. After the primer is dry, use a 400-grit wet sanding paper with wet sponge soaked frequently to finish the surface preparation. You will see the heavier 220 grit scratches in the surface you are sanding with 400 grit and you want to sand until these heavier scratches are gone.
13. While you're wet sanding, you know you're finished with an area when it appears foggy and water doesn't bead up on the surface. Wipe the area with a flat squeegee while sanding to inspect the surface for defects.
14. Spray a sealer coat over the primer and follow this with your first paint coats. The modern two stage basecoat/clear coat urethanes are the best choice since they offer the workability of the lacquer paints with the flexibility and resistance to cracking of the enamels. The clear coat should be fairly thick since you can repair this layer in the future if something happens to the cars finish. We've seen bad looking

scratches repaired if the scratch didn't pass through the clear.

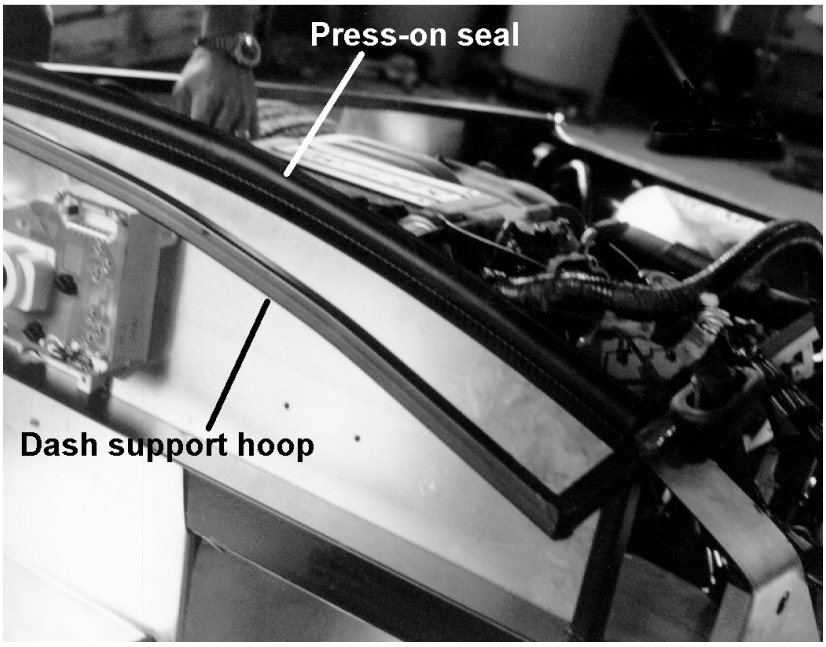
15. Go slow. It is amazing how many people (including us) rush the last steps in order to get the paint on the body when only a few more hours would give you a show car. Keep in mind that paint is impossible to keep looking perfect if you are going to put miles on the car. If the car will sit in a protected garage all its life then yes, spend the $5000.00 on the show car paint. If you are like the rest of the world, try to control the expense of the project. The joy we get from the *use* of our cars is because we spend $2000.00 instead of $5000.00.

Rubber Seal on Aluminum

ATTENTION: *Press on the bulb type gasket material with care. Do not press too hard, use caution, the bare edge of trimmed aluminum can be sharp.*

TOOLS: *Tin snips, razor knife, slip joint pliers.*

PARTS: *Secondary body fasteners (FFR# 10788).*



Press on bulb seal on firewall aluminum.

1. Any aluminum edge that will contact the fiberglass body must have the kit rubber bulb seal (FFR# 10761) pushed in place before the body is lowered on and installed. The contact areas are as follows…
    a. Front splash guards (installed after body is on)
    b. Fire-wall
    c. Rear trunk side-walls
    d. Lower trunk floor
    e. Top of splashguards in front of rear tires.
    f. Radiator side panels.

Press on bulb seal on trunk sidewall.

2. The top edge of the aluminum cockpit rear wall (FFR# 10823) does not have a rubber seal since it does not go all the way to the body seat, but is covered with the rear lip flange of the body.
3. Use the small adhesive backed ½" wide weatherstripping (FFR# 10857) on the ¾" tubing from the firewall forward that will touch the edge of the hood opening and the arched ¾" tube that is over the trunk. It can also be used on the door openings once the car is complete.

ATTENTION: *Do not do the next two steps until just before the body will be final mounted.*

4. Use the large adhesive backed 1" wide weatherstripping (FFR# 13712) starting at the bottom of the driver footbox just forward of the 2"x 2" tube up onto the top of the footbox.
5. Use the large adhesive weatherstripping on the passenger side footbox as well.

Note: The large weatherstripping is self expanding. Over a two day period, the foam will expand to a height of 2". It will remain soft. Its purpose is to close off any large air gaps.

Final Body Mounting

Remount the body using the previous mounting instructions for the body and quick jacks.
You may want to use some thread locker to prevent the screw from backing out. Do not torque the Stainless bolts. Snug is good.

Rear Cockpit Corners

1. Push some bulb weatherstipping onto the curved edge of aluminum that will go against the body.
2. Position the upper splash panels so that they are flat against the rear cockpit wall and the corner is against the edge of the ¾" tube. The panel may fit better with the rear wall tab behind the cockpit rear wall as shown on the next page.
3. Bend or unbend the curved edge as needed so that the weatherstripping will seal against the body.
4. Hold the panels in place with #8 screws.

Upper splash panel.

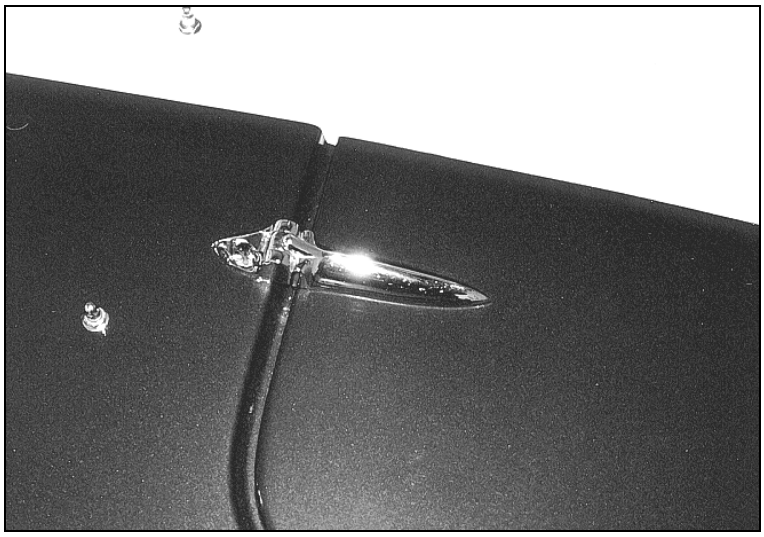
Rear cockpit lower splash panel.

5. Hold the panels in place with #8 screws.
6. Use a marker and ruler to mark the rivet holes on the aluminum panel.
7. Note where the panels touch each other and where they touch the frame. Remove the panels.
8. Apply silicone to the upper splash panels.
9. Install the upper splash panels with #8 screws.
10. Apply silicone to where the lower splash panels touch.
11. Install the lower splash panels with #8 screws.
12. Use ⅛" drill bit and drill the rivet marks.
13. Rivet the panels in place with ⅛" short or long rivets.

Trunk Hinges

ATTENTION: *The hinges are marked left and right on the underside with a little (R) and (L). The hinges will bind and can damage the paint if mounted incorrectly.*
TOOLS: *⅜", ½" Wrenches.*
PARTS: *Hood/trunk fasteners (FFR# 10646)*

1. Mount the hinges to the trunk lid using the original hardware as installed at the factory. The hinge studs go through the trunk lid and are fastened using washers and lock nuts.
2. Hand tighten the lock nuts only at this point.



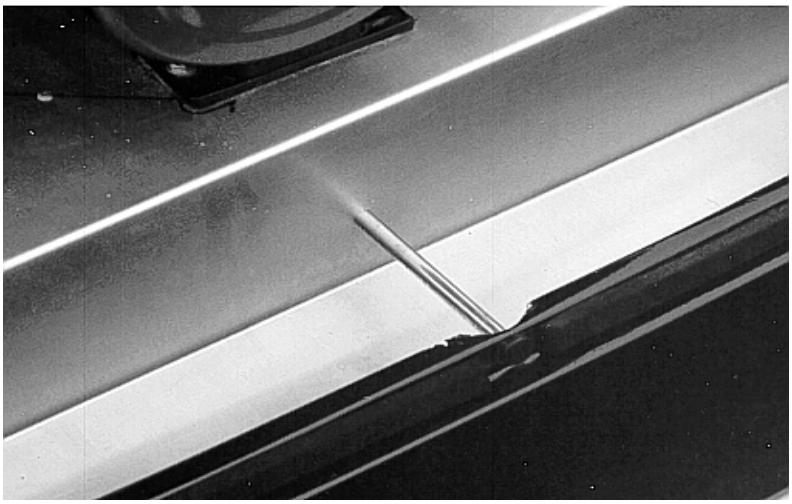
Driver's side hinge.

3. Attach the trunk to the body by pushing the hinge studs through the body. The hinge studs then go through the hole on each of the "Z" shaped metal brackets. The "Z" shaped metal brackets should be hanging down directly behind the ¾" arched tube.
4. The hinge studs and "Z" shaped metal brackets are held to the body with lock nuts, as installed at the factory. Rivet or screw the "Z" shaped metal bracket to the arched ¾" tube, where they cross each other.
5. When satisfied with fit and alignment, final tighten the hinge nuts

Trunk Latch

TOOLS: *Regular screwdriver, Phillips head screwdriver, ⅜" wrench, marker, masking tape.*
PARTS: *Three lock set and fasteners (FFR# 11019).*

1. If the trunk latch assembly was disassembled for painting, re-assemble the trunk latch T-handle (third part of the three-lock set) in the center of the trunk. On the inside portion of the trunk you will need to slide the latch/hook over and onto the shaft.
2. The trunk latch hooks onto a pin. This should already have the hinged cap, latch pin sleeve, washer, and nut assembled in the assembly bag. Remove everything except the hinged cap.



Trunk latch pin mounted in trunk.

3. Pass the pin through pre-drilled hole in the body, then the pin sleeve and on through the aluminum and the $^{1}/_{16}$" plate on the frame.
4. Put the washer and nut on the pin and tighten with a ⅜" wrench and regular screwdriver.
5. Engage the T-Handle and make sure that the latch hooks onto the pin securely.
6. Lock the handle and make sure it stops the trunk from opening.

Note: Trim the sleeve if necessary to pull the body into alignment with the trunk lid

Side louvers

TOOLS: *Silicone, caulk gun, and duct tape.*
PARTS: *Side Louvers (FFR# 10985)*

1. Bend more of an angle into the louver fins carefully if desired.
2. Lay a thick bead of silicone on the upper and lower flat sections of the louvers.
3. Position the louvers on each side of the body, the louvers act as air exits from the hot engine bay so the forward edge of the blades should be pointing toward the inside. Apply duct tape to both edges of each louver to secure until silicone cures.

Side louver attached to body.

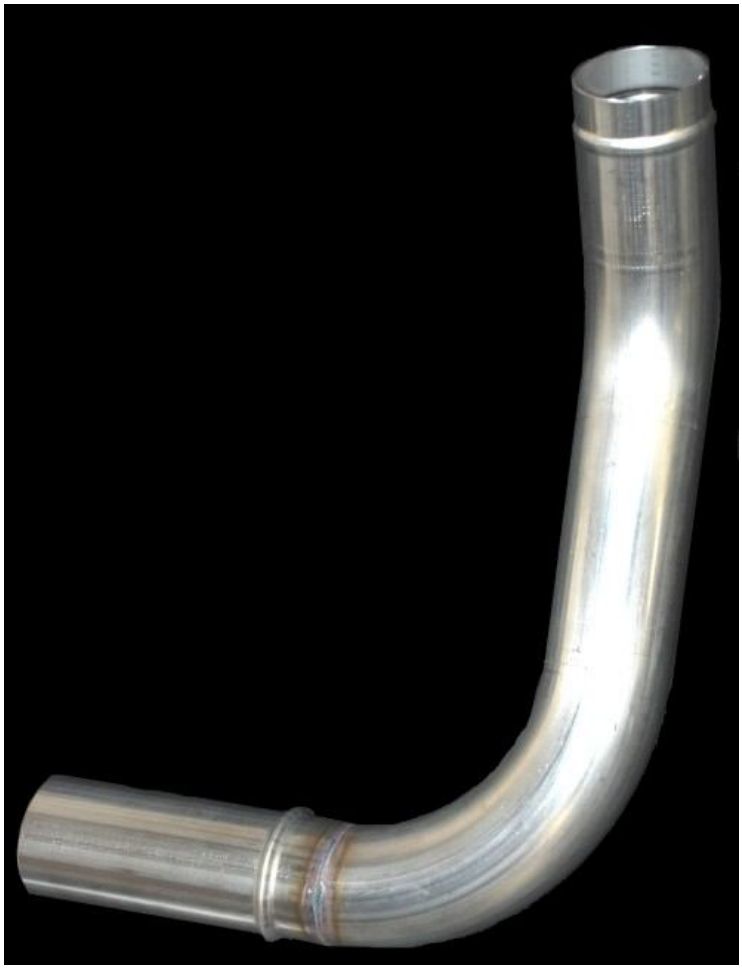
Fuel Neck and Gas Cap

ATTENTION: *When you're finished, double check the hose clamps that connect the rubber fuel neck to tank to cap. Previously the fuel neck hole was cut out of the body using the template. The template provided has holes located on it to use for mounting hardware with the flange neck. In 1999, Ford changed the style of the filler neck. Filler neck tubing is provided for both types of necks. Use the appropriate tubing for the neck that you have.*

TOOLS: *⅜" deep well socket, hex key set, Phillips head screw driver, hack saw, drill, ⅝₄" drill bit, safety goggles.*

PARTS: *Aston Lemans Cap Components (FFR# 14744), Fuel strap fasteners (FFR# 10896).*

1. Remove the filler neck from the gas tank.



Stainless Steel filler neck

1. Use the hose clamps to attach the fuel neck extension tubing to the lower half.

Optional Stainless Steel filler neck with extension.

99-04 Fuel Filler Neck

1. Remove the stock filler neck and fuel tank gasket
2. Insert the new fuel tank gasket into the tank.

All years

1. Insert the neck back into the tank to prevent gas fume leakage.
2. Push the filler cap through the body hole.
3. From the wheel well, rotate the filler end until the flange is parallel with the body. Get a friend to make sure the cap is centered in the previously drilled hole.
4. Mark the underside through the holes onto the body.
5. Drill three $^{9}/_{64}$" holes from the underside for the mounting bolts.
6. Connect the ring connectors to the grounding wire provided.
7. Slip the fuel neck spacers between the body and the Mustang fuel neck (this part has the gas cap and flange on it). The spacers drop the height of the Mustang screw fuel cap so that it clears the roller gas cap lid.
8. Place one end of the ground wire to one of the filler neck mounting bolts and attach the other end to the frame.

Note: This wire prevents any static charge build-up and must be used.

2. Rotate the filler neck up and check the length of the filler hose. If necessary cut the excess hose off so that the rubber hose will leave ¼" or ⅛" before hitting the bottom of the Aston Lemans cap.
3. Push the second hose clamp onto the rubber filler neck.
4. Push the filler neck onto the gas cap and fasten the hose clamp about ⅛" above the bead.

Underside view of installed fuel filler neck extension.

Windscreen

ATTENTION: *Handle the windshield with care. This piece costs close to $645. Store in a safe place. Use Caution while installing the screws into the windshield, they strip the brass strip very easily. Be careful to use the correct screws (the ones from the wind wings and sun visors are longer and can break the windshield if used in the wrong place).*

TOOLS: *¾" combination wrench, ¾" deep socket, small regular screw driver, small hex key set, drill, ½" drill bit, hack-saw, marker and ruler.*

PARTS: *Windshield/Fasteners (FFR# 10895).*

1. Carefully mount the sidebars on the windshield, with the included screws, using a small flat head screwdriver. Start all of the screws before tightening them.
2. With the help of another person, lower the windshield into the slots that were previously cut in the body.

Inserting the windshield into the body.

3. Line up the windshield mount bars with the frame mount brackets below the body surface. Open up the slots in the body to get the correct angle if necessary.
4. Press the windshield down onto the body so that the rubber along the bottom seals against the body and there are no air gaps. The metal windshield will be about ⅛" above the body. If the rubber seal does not seal, cut 1.5" off the bottom of the sidebars.
5. If there are pre-drilled holes in the bars, they are not used. Use a marker through the laser cut frame-mounting holes to mark the windscreen mount bars with the position that the holes need to be in. Make sure that you are pressing down when this is done and the rubber is seated on the body.
6. Remove the windshield and lay it flat on a clean, non- scratching surface.
7. At the points that were just marked, move across to the center of the bar and mark again. The holes you will drill need to be centered on the bars. Disassemble the windshield sidebars from the windshield body before drilling.
8. Drill two ½" holes in the each brass windshield support bar and reassemble the sidebars to the windshield.
9. Slide the windshield base plates (FFR# 10944) over each windshield bar with the holes towards the outside. Use aluminum polish and clear coat paint on the base plates to make them shine and resist oxidation.
10. Insert the windshield into the slots and use a ¾" socket and ¾" wrench to attach the windshield to the frame mounts.

Inserting the windshield with the base plates in place.

11. Fasten the base plates to the body using the small screws and a matching drill bit to start the hole.

Base plate screwed to body.

Hood Pins

ATTENTION: ***If using the Hood Hinge, disregard this section and following the Hood hinge instructions.***

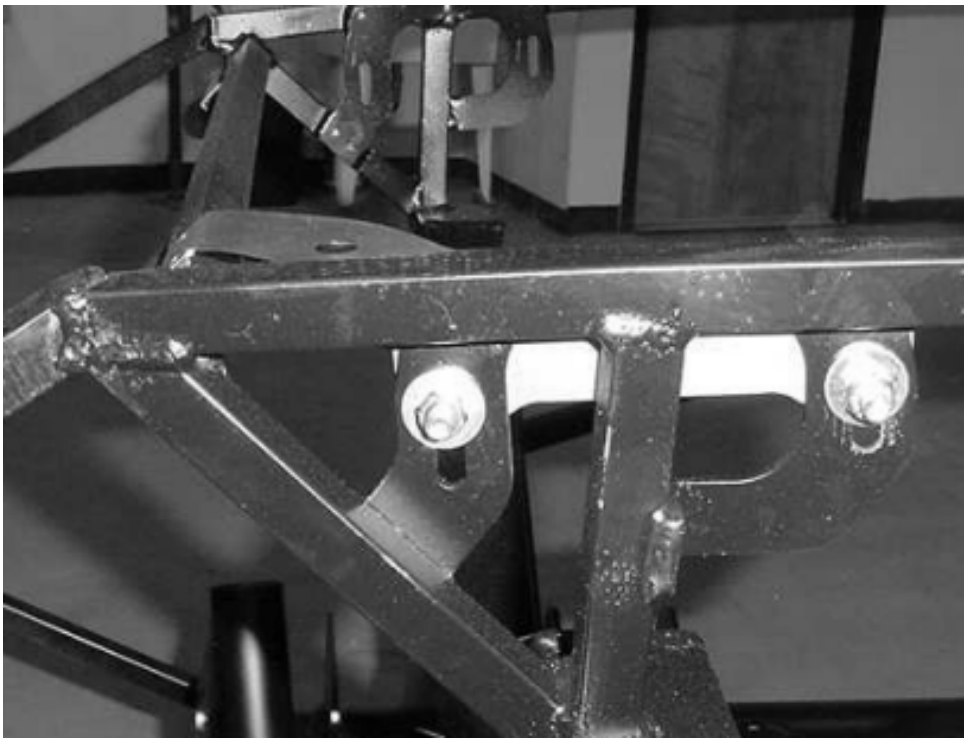
TOOLS: *Drill, 3/32", 7/16" drill bits, Phillips head screwdriver, (2) 11/16" combination wrenches.*

PARTS: *Three lock set and fasteners (FFR# 11019), hood/trunk fasteners (FFR# 10646).*

1. Attach the hood pin vertical posts to the top mounting plate.
2. One nut goes on each side of the plate.
3. Adjust the height of the pins.
4. When the hood is on the posts it should just barely touch the post.(This is only for alignment

purposes)

5. Put a small dab of silicone or white grease on each of the hood pin posts.
6. Center the hood in the opening and press down.
7. This should leave a couple of small silicone marks on the underside of the hood.
8. Drill two $^{7}/_{16}$" holes in the hood where the marks are located.
9. Raise the height of the posts so that they stick through the hood.
10. Place the circular chrome plates, packaged with the hood posts, over the posts.
11. Drill through the circular chrome plates with a $^{3}/_{32}$" drill bit.
12. Screw the chrome plates to the hood using the short hood pin screws and a Philips head screwdriver.
13. Adjust the height of the posts and the angle of the hole through the posts so that the hood is held firmly in place. The pins can be removed and installed pointed in the direction desired.



Hood pin side mounting plate with top plate bolted in. (Before the F panel is installed)

Doors and Hinges

ATTENTION: *Take your time to align the doors properly.*

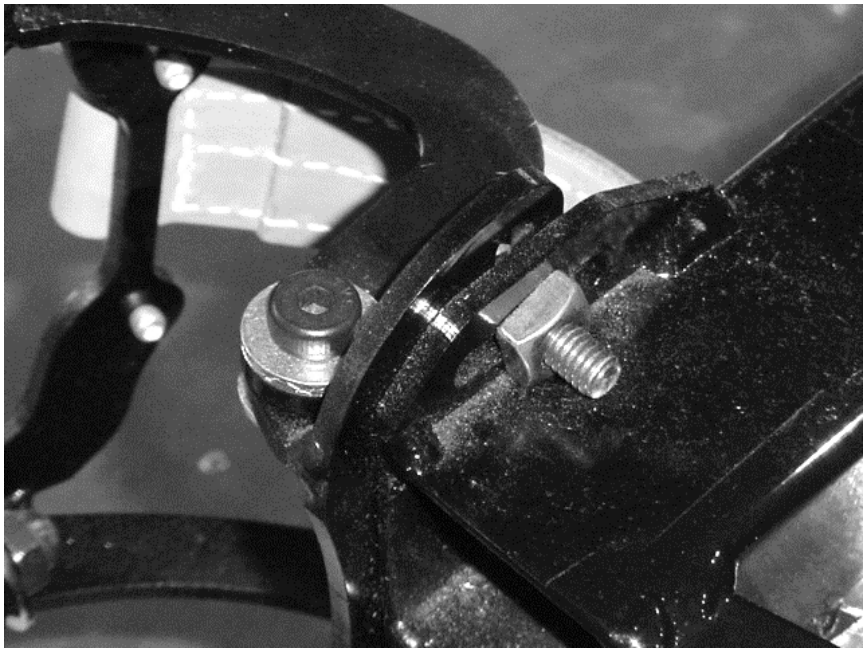
TOOLS: ½", $^{9}/_{16}$" deep s*ocket, vise grips, drill, ⅛" drill bit, 13mm combination wrench, rivet tool, silicone, caulk gun, #8 nut driver, White lithium grease or WD 40.*

PARTS: *Black vinyl trim (FFR# 13990), door components (FFR# 11065), secondary body fasteners (FFR# 10788).*

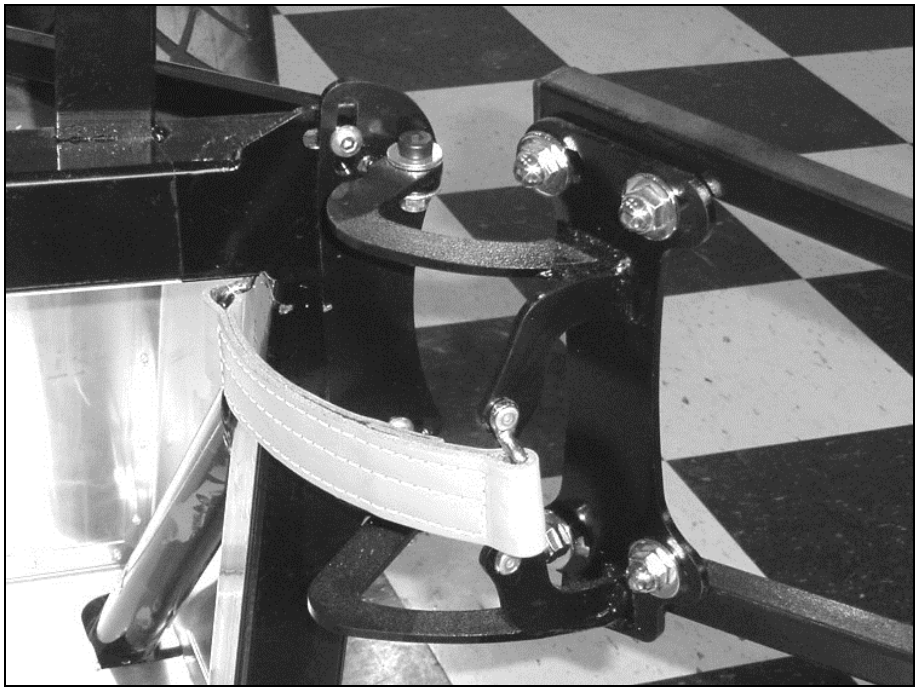
1. Remove the cover from the latch.
2. Apply lithium grease to the rotating plate and pin.
3. Work the latch until the action is smooth and easy.
4. Attach the latch to the door using four of the small screws.

Latch without cover mounted to door.

5. Bolt the door to the car and roughly align (bolt in the center of the slot) the door at the hinge end.



Top backside of door hinge



Door hinge.

6. Remove the striker bolt from the striker plate.
7. Loosely bolt the striker bolt to the frame.

Door striker mounted. Note, seat and carpet are mounted in photo which

would not have been done at this time.

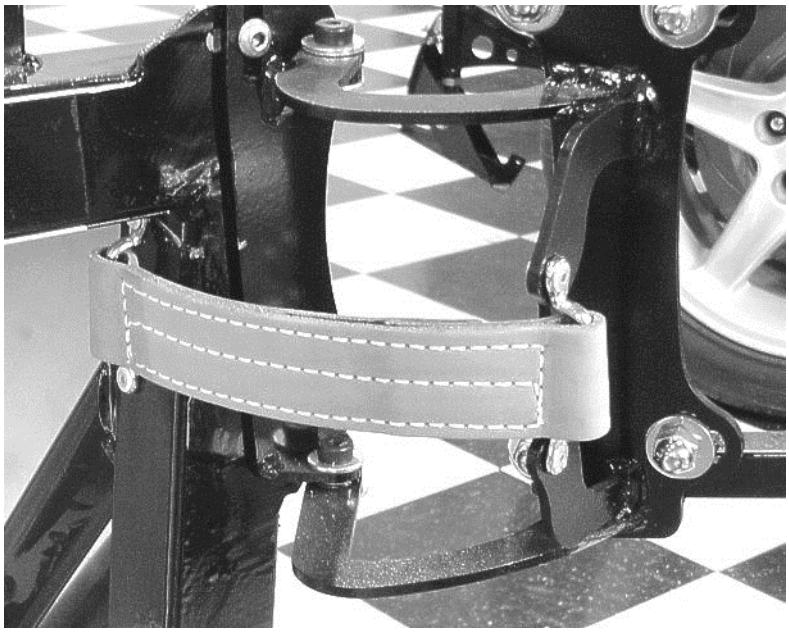
8. Shut the door slowly adjusting the striker to where it lines up with the latch. It may be necessary to shim the striker with washers to get the best alignment.
9. Finish the alignment of the door. Tighten down the striker once you achieve a good fit between the door and striker.
10. Check the door for proper operation.
11. Once you are satisfied that the doors are lined up for the final time remove the acorn nuts one at a time and put a dab of thread-locker on them.

Check Straps

TOOLS: *Drill, 3/16" drill bit, rivet gun, marker, masking tape.*
PARTS: *Door components (FFR# 11065).*

Note: The door check straps simply stop the door from opening all the way up and scratching your paint. Test the placement of the strap for door travel before final assembly.

1. Attach a check strap to each door hinge with 3/16" rivets.
2. Open the passenger door wide but not enough so that the door hits the body. The straps will stretch slightly over time so allow enough room for this by closing the door slightly from the maximum.
3. While holding the door open pull the check strap tight and mark the location of the mount holes on the inside face of the 2"x 2".
4. Use a 3/16" drill bit to drill holes for the rivets to attach the straps.
5. Repeat steps 2-5 on the driver side.

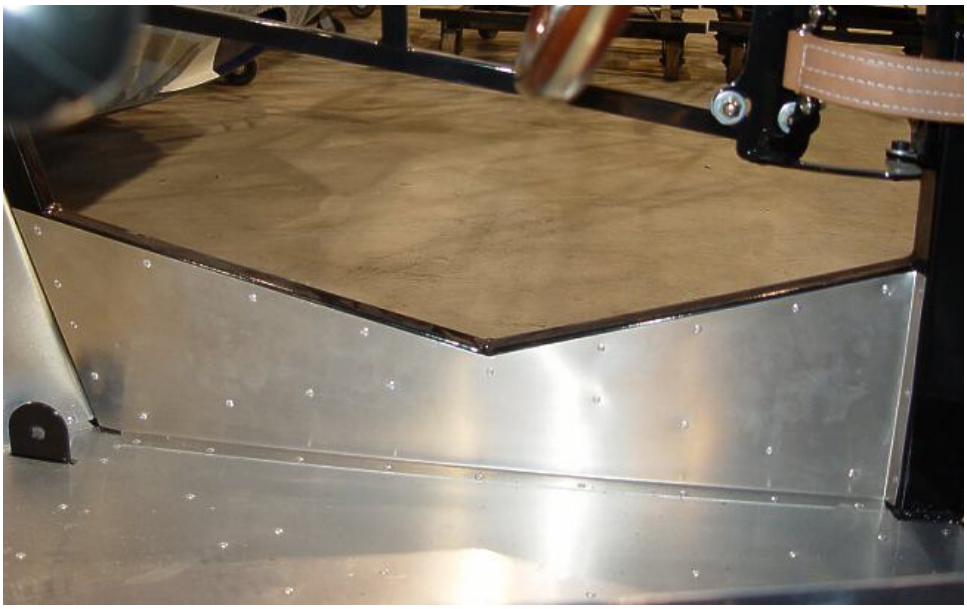

Check Strap riveted to hinge

Under-door Aluminum

TOOLS: *Drill, #8 nut driver, ⅛" drill bit, rivet tool, silicone, caulk gun.*
PARTS: *Cockpit aluminum (FFR# 10890), ⅛" shortl rivets.*

Under-door side impact protection.

1. Position the under door aluminum pieces.
2. Mark the rivet locations on the aluminum panel.
3. Remove the panel and silicone the frame.
4. Rivet the panel in place.



Finished lower under door aluminum.

5. Test fit the upper under door aluminum piece on the frame by pushing down on the aluminum and out so that the curve of the aluminum goes under the door body curve.

Passenger side upper under door aluminum.

Passenger side upper under door aluminum positioned.

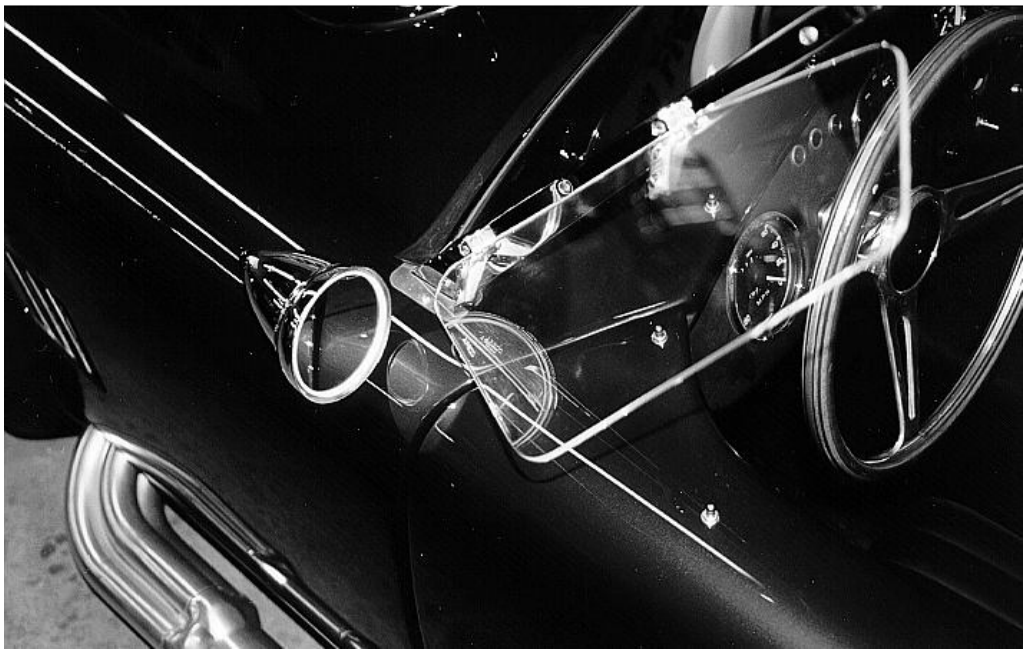
6. Remove the panel and silicone the frame.
7. Use the self tapping screws to hold the aluminum in place.
8. Rivet the panel in place.

Side View Mirror

TOOLS: *½" wrench, Drill, ⅛" drill bit, Philips head screwdriver, Flat head screwdriver.*
PARTS: ***Rear view m****irrors/fasteners (FFR# 11066)*

1. The side view mirror location must be determined from sitting inside the car, so place one of your seats in the driver's side.
2. The mirror must be positioned to clear the door when it is fully open. If you have ordered the wind wings, fit them now to the windshield to ensure that they don't interfere with the mirror.
3. Sit in the driver's seat and determine a comfortable position for the mirror.
4. Once you have determined a comfortable position with ample clearance, mark around the base of the mirror with a pencil.
5. Disassemble the mirror by removing the screw from the back and the screw that holds on the base.
6. Position the base plate in the center of the marks you made for the mirror and mark the screw holes.
7. Mount the mirror to the base and adjust using the screw in the back.
8. Drill the holes with a ⅛" drill bit. Install the base with the (2) screws and gasket provided.

Mirror attached near windshield.



Standard side view polished mirror installed.

Radiator Aluminum

ATTENTION: *Use care when handling the aluminum, the edges are sharp and can cut you.*

TOOLS: *Drill, #8 nut driver, ⅛", 3/16", ¼" drill bits, rivet tool, floor jack, marker, ruler, silicone, caulk gun.*

PARTS: *Secondary body fasteners (FFR# 10788), engine bay aluminum (FFR# 10892).*

1. The radiator and its plumbing were installed before the body was mounted. The radiator is being held up at the bottom by a couple of zip ties through a quick jack bumper hole.
2. Use a floor jack under the radiator to hold it in place.
3. Cut and remove the zip ties.
4. Mark the radiator floor piece for either screws or, rivets for a cleaner look (attach every 2" if using rivets).
5. Pass the radiator floor piece through the nose and attach it to the bottom of the radiator with a couple of self-tapping screws on the marks.
6. Raise or lower the bottom of the radiator until the floor piece is underneath the nose lip enough so that later, it can be riveted as shown in the picture above.
7. With the radiator held in the correct position, remove the floor piece.
8. Pass the radiator sidepieces through the nose and put them on their respective sides. Trimming aluminum may be necessary if you use the press-on rubber bulb seal weather-stripping.

Radiator nose aluminum mounted.

9. Line up the edge of the radiator fins with the edge of the side aluminum.
10. The top angle of the sidepieces will not go all the way down to the top of the quick jack mount.
11. From the wheel well side of the radiator, mark the aluminum along the ¾" tubing that goes down to the quick jack mounts. This way you can get straight, evenly spaced rivets.


Passenger Side aluminum mounted with weather-stripping.

12. Remove the sidepieces, mark and drill the rivet holes.
13. Remove the floor aluminum.

14. Apply silicone to the bottom of the radiator where the aluminum will contact.
15. Insert and attach the radiator floor aluminum using either the screws provided or ⅛" rivets every 2".

Drilling the radiator and aluminum nose panels.

16. Apply silicone to the ¾" tubing where it will contact the aluminum sidepieces.
17. Install the sidepieces. The bottom goes on top of the floor aluminum. Hold the pieces in place with a couple of #8 screws.
18. Drill and rivet them into place.
19. Drill three $^{3}/_{16}$" holes and rivet the nose aluminum floor to the body with $^{3}/_{16}$" rivets.
20. Remove the floor jack from the radiator.
21. Apply silicone where the aluminum and body meet and where the radiator and aluminum meet.

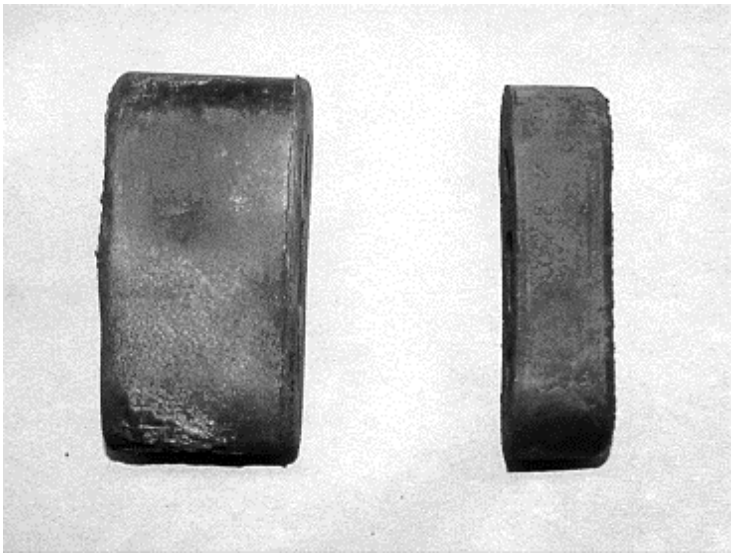
Side Exhaust

ATTENTION:

- *Try not to drop the side exhaust assembly as it will probably land on the outer curved surface and dent (if it sounds like this has happened to us, it has). If you are using our optional headers, some of these instructions may not be necessary.*
- *The passenger side pipe may look crooked without the body mounted. This is normal. Once the body is mounted it will be parallel to the body.*

TOOLS: *½" and $^{9}/_{16}$" sockets, jack stands, jack, ¼", $^{5}/_{16}$" hex keys, $^{5}/_{16}$", $^{5}/_{16}$"drill bits, drill, hack saw.*
PARTS: *4 into 4 side exhaust (FFR# 13940), straight tubes (FFR# 13891), Mustang Oxygen sensors.*

1. Cut the large exhaust hanger in half lengthwise.

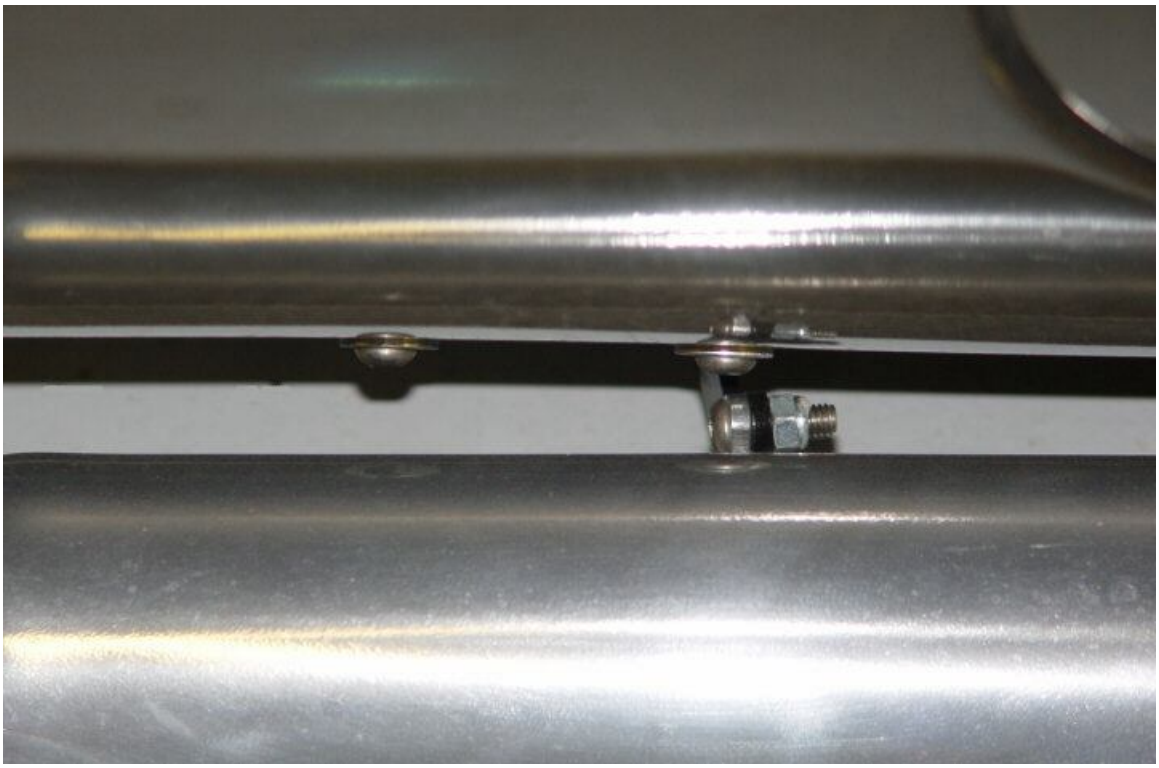


Exhaust mount cut in half.

2. Mount the straight pipes to the Mustang headers. *The passenger straight pipe has two flat flanges.* Aftermarket headers may require "ovaling" the holes on the two-bolt flange.
3. Leave the bolts hand tight in order to locate the side pipes properly.
4. Attach the side exhaust mount to the side pipe using the 5/16" button head bolts and locknuts as shown below.

Side exhaust hanger installed.

5. The side exhaust are positioned with the rear mount on the bottom of the pipe facing the body.
6. Mount the side exhaust to the four bolt flange on the straight pipes using the kit fasteners and gasket. Leave the bolts slightly loose to allow adjustment.
7. With the help of someone or using a couple of jack stands, line the side pipe up with the side of the body.

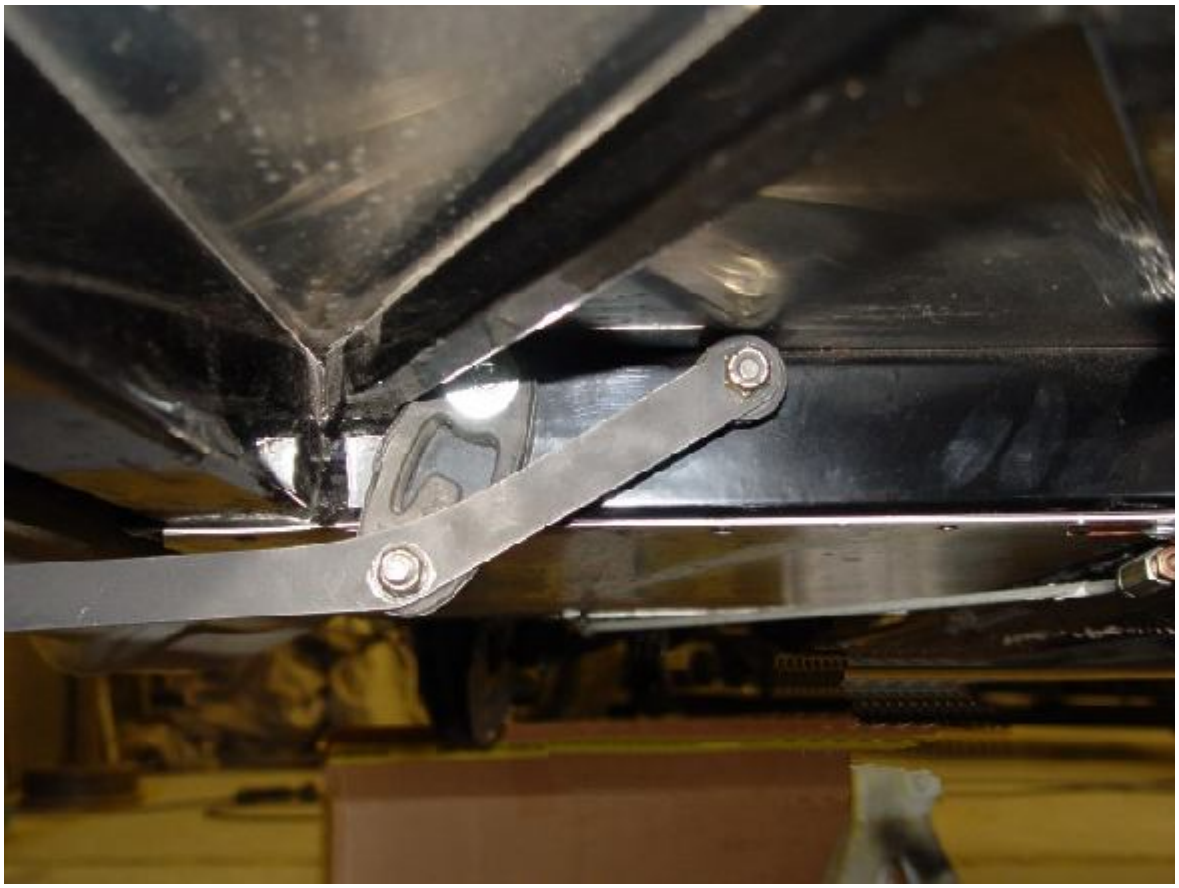


Side exhaust mount post and its relative position to the front side body mount bolts

Side exhaust mounted on car.

8. Tighten the straight pipe bolts to the header.
9. Tighten the straight pipe to side exhaust bolts.

10. Check the alignment of the side exhaust again.
11. Using the rear exhaust mount as a guide drill a 5/16" hole through the inner most hole through the 2"x 2" tube.
12. Insert the rubber hanger into the side exhaust mount so that the female threaded part faces the 2"x 2".
13. Attach a locknut and tighten the rubber mount to the exhaust mount.
14. Insert the 5/16"x 2.5" bolt and a washer from the front side of the 2"x 2" tube through the hole and into the rubber hanger.
15. Attach one of the halves of the sock mustang exhaust hanger to the outside hole in the mount using a 3/8" bolt, washer and nut.
16. Hold the hanger up to the 2"x 2" tube so that the rubber hanger is taking the weight of the side pipe and drill a 3/16" hole through the hanger into the one side of the tube.
17. Use a washer and the 1.5" screw to attach the hanger to the tube.



Side Exhaust mount attached to frame.

The passenger side pipe may look crooked without the body mounted. This is normal. Once the body is mounted it will be parallel to the body. If the side pipes do not line up against the body or if they are different heights going through the body, adjust the engine position slightly to even them out.

Roll Bar

1. Slide the rear leg through the body onto its mount.
2. Slide the front tube through the body all the way down to the small knobs on the mounts.
3. Push the rear leg up onto the front tube.

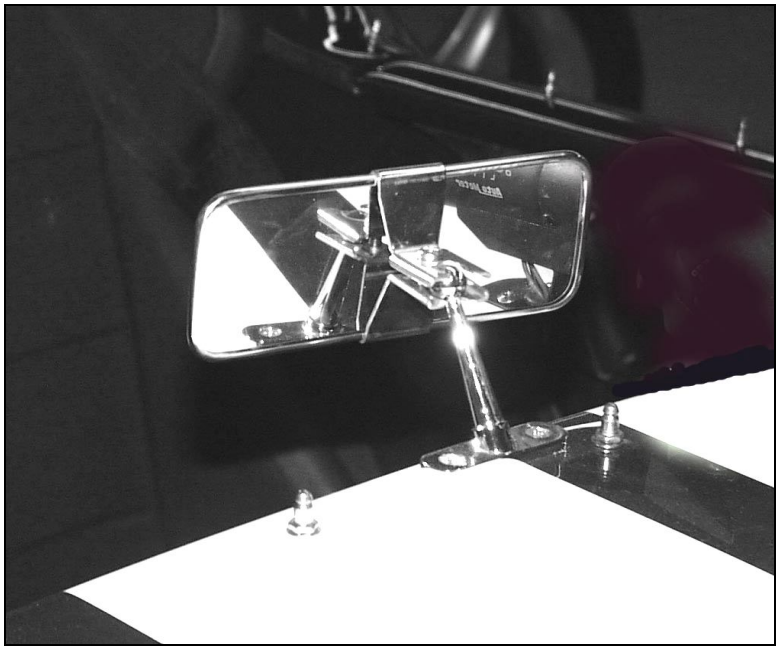
4. Bolt the roll bar in place using the holes drilled earlier and kit fasteners (FFR#10829, 10830). Do not torque the bolt to more than 14 lb-ft or 170 in-lb.

Installing the roll bar.

Rearview Mirror

TOOLS: *Drill, Philips head screwdriver, ⅛", 9/64" drill bits, tape measure, marker.*
PARTS: *Rearview mirrors/fasteners (FFR# 11066)*

1. Use a tape measure and marker to mark the center of the dash area on the ¾" dash tubing.
2. From the center, measure 1.5" towards the passenger side. This is the center of where the mirror is located. The mirror is off center to match the Tonneau cover.
3. Measure the distance from the middle of the ¾" tube to the edge of the body.
4. Measure this same distance and mark on top of the body. The point here is to find the location of the rearview mirror so that it will hit the ¾" tube.
5. Hold the mirror in place and mark the screw holes.
6. Drill the screw hole marks in the body with a 9/64" drill bit. Use a ⅛" drill bit to drill into the ¾" tube.
7. Position the mirror and insert the long screws and the spacers between the body and ¾" tube.
8. Screw the mirror into place.



The rear view mirror, looking at it from the front of the car into the cockpit.

Gauges and Dash

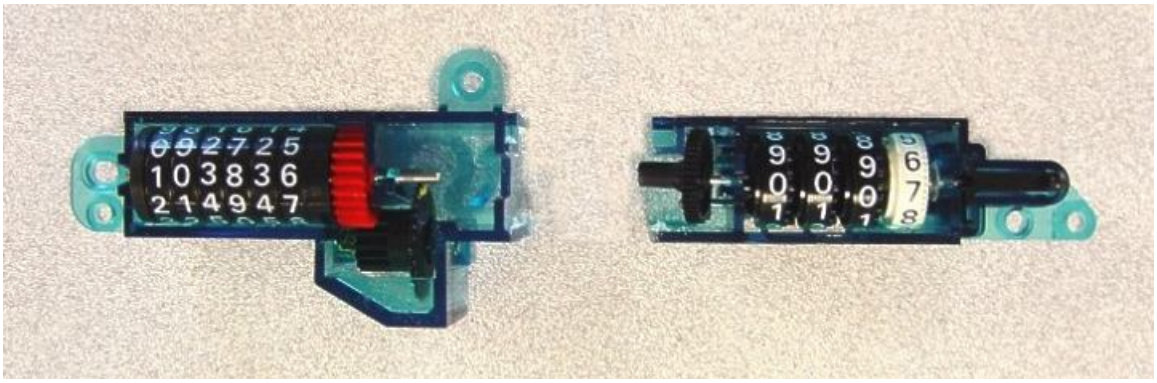
ATTENTION:

- *This assembly should be done carefully to avoid damage to the instruments. If you are using aftermarket, this section does not apply. The dash should only be mounted after the body is on since the top of the dash is not designed to mate with the top edge of the ¾" dash hoop on the chassis.*
- *1999-2004 Mustangs require the gauge pod to be hooked up in order to run the car. This means that if aftermarket gauges are used, the gauge pod will still need to be mounted behind the dash.*
- ***If you are planning on flashing your computer to eliminate the PATS, you will not need the gauge pod but you will need to have a 490Ω resistor in parallel with the dash charge indicator light on the light green with red stripe wire in order for the battery to charge.***
- ***The Mustang gauges do not work with the Carbureted kit.***

TOOLS: *Wire stripper, crimping tool, electrical tape, wire cutters, Phillips head screw driver, 3/8" socket head and socket wrench, razor knife, spray adhesive, silicone, caulk gun, scraper, masking tape, marker, 5/32", ⅛", ½",phillips head drill bits, drill, paper, five minute epoxy glue, small Torx screwdriver, hammer.*

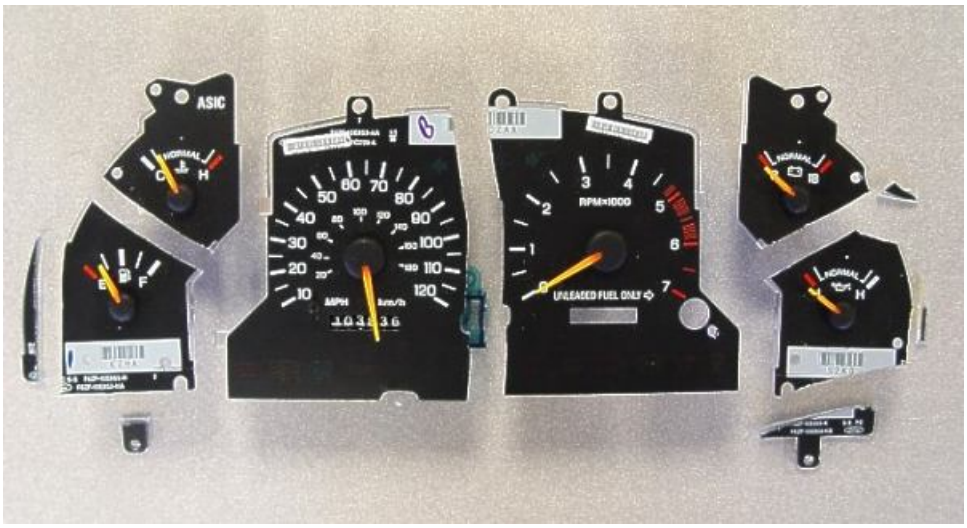
PARTS: *Dash electrical components (FFR# 13327), Mustang gauge conversion kit (FFR# 10893).*

1. The Mustang gauges are attached to the aluminum dash before the dash cover is applied. Trim the gauges as shown. If you are using a 1994-2004 Mustang gauges, remove the odometer and trip before cutting.
2. With 1994-1998 versions, cut the trip meter off from the odometer as shown, and disregard it. Retain the odometer to reattach to the speedometer later. With the 1999-2004 versions the wires that connect the odometer to the gauge pod need to be extended with the included wires and butt connectors.



Odometer and trip meters.

3. Cut the gauges apart, using a hacksaw. It is best to put the gauges in a vise facing you and to only use a downward motion, with the hack saw, to avoid tearing the gauge face label.
4. With the gauges separated center them in their designated dash holes from the back side and scribe a mark from the front at each mounting hole. The mounting holes are already laser cut into the dash. At the same time trace the perimeter of the plastic on the back of the dash to see where any of the back side of the gauges overlap or interfere with any other components. Trim off any of the pieces that interfere.
5. When cutting the top row gauges, give as much clearance from the top edge of the dash as possible, because they can sometimes come close to the chassis dash hoop.

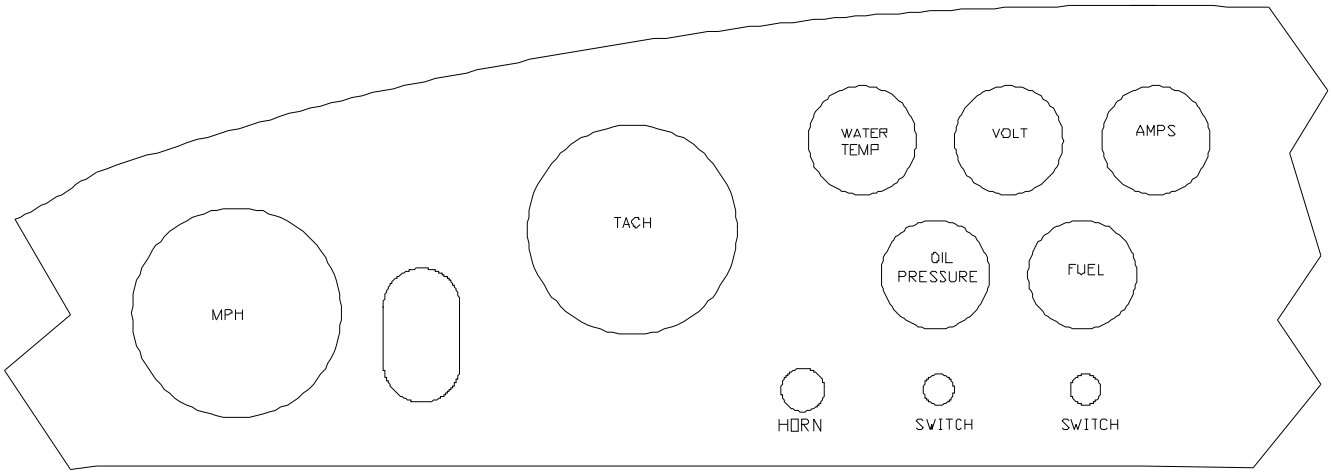


1994-1998

1999-2004

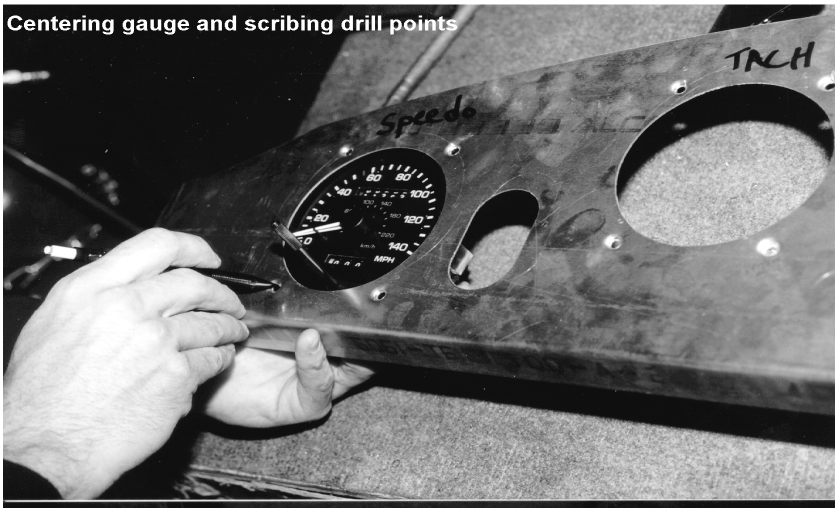
6. Drill the scribe marks on the gauges with the 5/32" drill bit.
7. The speedometer and tachometer holes in the dash are designed to work for two different size gauges. You will see a fine laser cut dashed line surrounding the cut out. These lines are at the diameter necessary for the Mustang gauges, as well as Smith, and Autometer Vintage gauges. To achieve the larger hole diameter, simply use tin snips to cut between the inside hole and the laser cut line on each side of the dashed marks, then take pliers and bend the remaining tab back and forth until it snaps off.
8. Counter sink the gauge mounting holes in the dash. To do this take one of the 1.5" long Philips head screws included in the kit, and use a drill to screw the screws into all of the gauge mounting holes from the front side of the dash. Next take the included 2" long steel tube and place it on a hard surface, then one by one set each screw into the center of the spacer and give the screw a few light taps with a hammer to countersink each hole as shown. There are multiple gauge mounting holes for the different years, so there will be some unused holes in the dash, which will be covered by the padded dash.

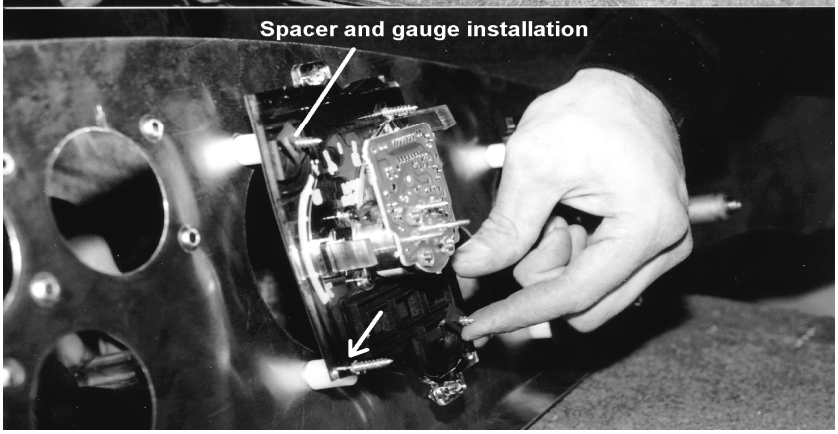
Countersinking the screw holes.



Gauge Layout

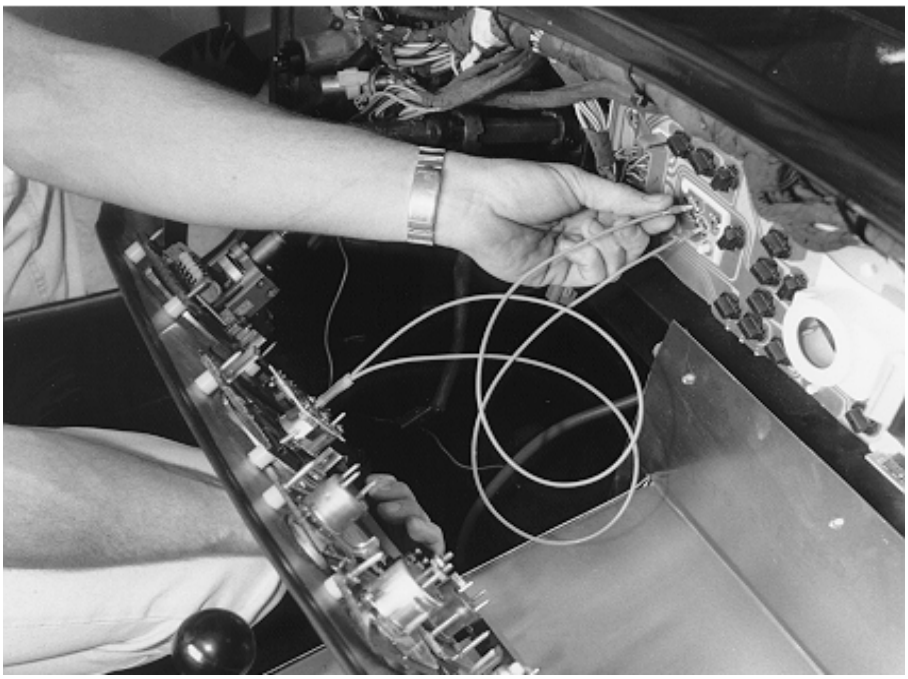
9. Install the large gauges with the taller spacers and the smaller gauges with the shorter spacers that are included with the kit so that the faces of the gauges stand away from the back face of the aluminum dash panel. This distance has been pre-set at the factory so that the sweep hands of each gauge fit. It is also a good idea to counter sink the spacers to match the countersunk holes for a good fit and so they lay flat against the dash.
10. If you would like to install the three lights that are included in the kit, the original Roadster's had them positioned directly over the steering column in a straight line. Use a ½" drill bit for the holes.





11. The blue light will light when the high beams are on.
    a. Connect one lead from the blue light to the black wire and the other lead to the second 4 conductor 2' section.
    b. Attach the other end of the same wire to:
       96-98 Attach the other end of the same wire to the High beam indicator (+).
       99-04 Attach the other end of the same wire to the Power – Hot w/high beams on.
12. The red light is check engine or charge. Use wires and run them to the appropriate bulb on the white pod. The green light is for turn signals.
13. The turn signal light uses a three prong flasher unless two lights are used, one for each direction. Using the one light in the kit, remove the two-prong flasher from above the passenger compartment. Break/cut the connector for it in half and connect the purple/pink wire to the prong marked "L". Attach the other wire to the prong marked "X" and then attach the dash light to the center flasher connection with a female connector and using the 4 ft. long extension. The other lead, on the light, connects to the ground terminal block. With this set-up, the green light will flash when either the left or right turn signal is triggered.Tape or silicone over the dimpled area where the set screws are, so that the dash cover does not show any wrinkles or imperfections underneath. The standard dash cover has a thin foam backing, which will help cover any imperfections from the screw heads.

14. Cover each gauge face with paper so that spray adhesive does not get on the gauge faces.
15. Spray 3M Super 77™ adhesive over the front of the clean aluminum dash panel as well as the back surface of the vinyl or leather dash cover.
16. Remove the paper that you placed on the gauge faces so that this paper does not adhere to the cover as you place the cover on the dash.
17. After several minutes with the dash pad sprayed on its back side laying on a flat surface, place the sprayed dash face down on the dash pad. When placing the dash down on the pad keep the bottom of the dash approximately 2" above the base edge of the pad to allow material to roll under the bottom side of the dash.
18. Trim the cover around the perimeter of the dash, leaving 1" of overlap on the tops side beyond the aluminum edge.
19. Spray 3M adhesive along the back of the outer edge of the aluminum as well as the material sticking out. Slit the material along any curve with a "V" cut so that it does not overlap on the back.
20. Press the material onto the adhesive covered edge on the backside of the dash.
21. While looking at the front of the dash, find each gauge hole. Using a razor, cut the dash material from the center to the edge of the aluminum hole. Make a pizza cut with at least six linear cuts.
22. Cut out the material in the center of each opening so that there is ¾" of material hanging into the hole area.
23. Press fit the 4" and 2" bezels into the dash by pressing on the outer rim section only. Using a razor, cut the switch holes.
24. Install the switches in the dash. One switch can be used to turn the fan on and off. The other is up to your discretion.
25. The black push button is used for the horn and installs in the dash next to the switches.
26. Remove the upper steering shaft by pulling the steering wheel towards the cockpit.
27. With the dash lying face down on a clean tabletop, bend the edges of the dash down 1.25" in from the ends so they are at a 45° angle.
28. Use the wiring extension pins to connect the gauges to the white master panel (the dash pod). This was previously mounted on the firewall behind the dash**.**



Connecting the wire extensions from the dash to the gauge pod.

29. Hold and center the dash by using the steering shaft and steering hole then adjust the vertical height by raising the dash. Put the collar on the front side of the bearing. Do this after the shaft is through the dash. Put the small clips back on the bottom of the shaft taken off earlier. They must be put on after the shaft is through the bearing, otherwise it will not go through. Reach up behind the 2"x 2" tube to do this. The clips help prevent the shaft from sliding in and out while driving around.
30. You should not see a gap between the dash and body at the top edge while sitting in the car.

Installation of the dash with Mustang gauge conversion set.

31. Make sure the gauges do not hit the ¾" tubing.
32. Screw the dash to the center of the dash support hoop using a ⅛" drill and Philips head screw and countersunk washer.
33. Push the ends of the dash behind the top of the door hinge. There is a small hole at the top of the hinge

piece on the 2" x 2" tube that the dash will attach to.

34. Hold the dash so that it touches the hinge and drill a 1/8" hole through the aluminum by drilling through the hinge hole.
35. Put a dash screw with washer through the hinge hole into the aluminum.Attach the dash to the switch mount plates using either 1/8" rivets or a couple of the #8 self tapping screws.

Front Wheel Splash Guards

TOOLS: *⅛" drill bit, drill, silicone, caulk gun, vise, tin snips, pliers, marker, #8 hex head driver.*
PARTS: *Secondary body fasteners (FFR# 10788), Engine Bay Aluminum (FFR# 10892)*

1. Put some of the press-on bulb seal around the outside edge of the aluminum front splash guards (they look like large elephant ears).
2. Use the tin snips to cut the length and a pair of pliers to squeeze the bulb so that it will grip the aluminum.
3. Hold the splashguards up against the rear bent lip of the engine bay "F" aluminum. Overlap the two lips.
4. If you are running the Hydroboost set-up you will have to either cut a hole for the end of the master cylinder or use a Ball Pien Hammer to dome the aluminum where the master cylinder will hit. To dome the aluminum, put the aluminum on top a roll of duct tape centering the hammer location in the middle of the roll.
5. Mark where the bottom of the splashguards needs to be bent in order to go into the rear fender area.
6. Bend the bottom edge of the splashguards.
7. Apply silicone to the bent lip on the F-shaped aluminum panel where it will meet the splashguards.
8. Attach each side to the F-shaped aluminum pieces with #8 self-tapping screw.
9. Put a wheel and tire on the car and check for aluminum clearance. If necessary push the aluminum in and mark the inside of the body at the outer edge of the splashguards.
10. Drill and rivet the Splash Guards to the "F" pieces using ⅛" rivets.
11. Attach the Splash Guards to the body just forward of the exhaust cut-outs. Use the tab that you bent up and the almost horizontal flat area on the body. Drill and use ⅛" long rivet or a $^{3}/_{16}$" long rivet.
12. Silicone around the splashguard from the exhaust side.

Rear Wheel Splash Guards

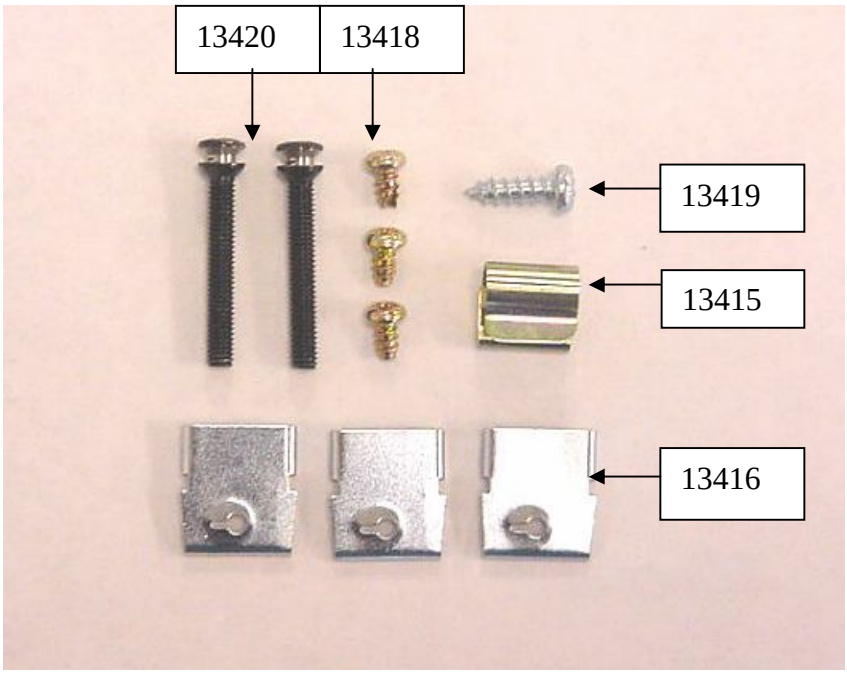
1. Push press-on trim onto the rear splashguards and hold in place in the wheel well. The small tab on the bottom faces towards the rear of the car and is on the bottom. The bent edge should be vertical and aligned with the trunk side pieces where they drop down, behind the quad shock mounts. It should also be on top of the ¾" vertical tube that is behind the trunk wall.
2. Remove the panel and silicone where it will contact the trunk side.
3. Drill and rivet the panel in place using ⅛" drill bit and ⅛" long rivets.

Rear splash guard mounted.

Headlight Assemblies

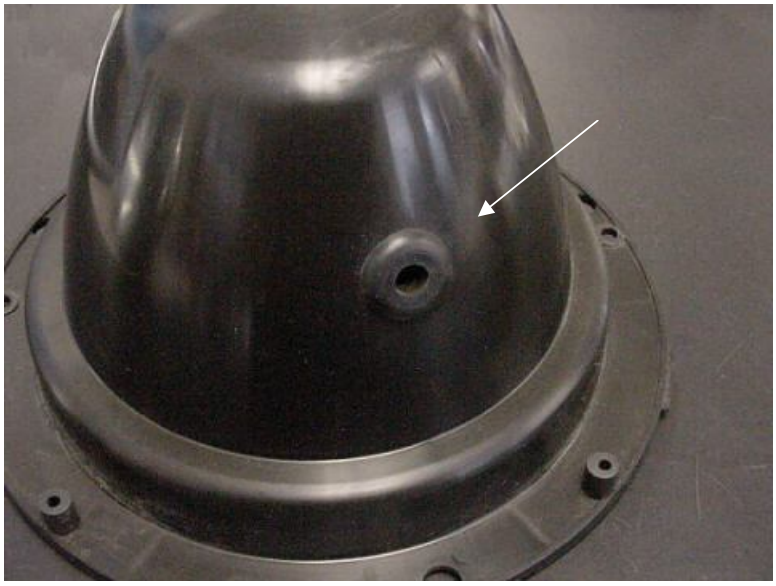
TOOLS: *Phillips head screwdriver, drill, ⅛"drill bit, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Headlamp components (FFR# 11043).*

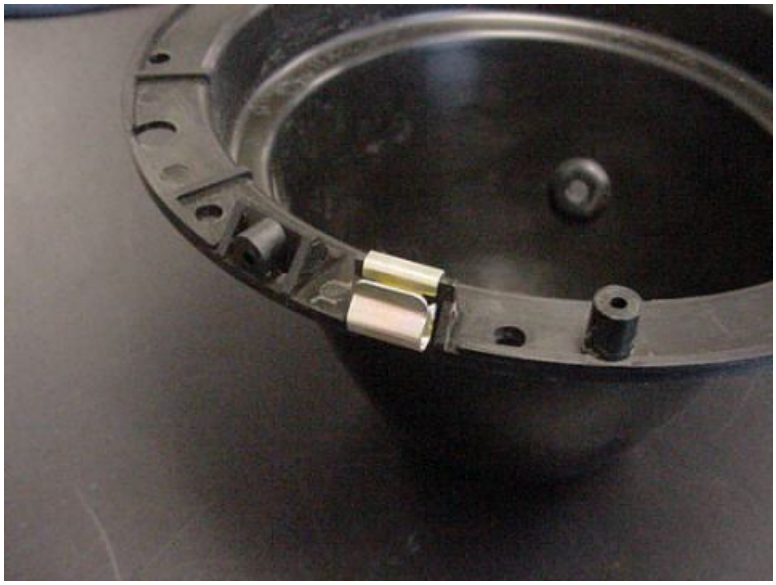


Headlight Fasteners.

1. Insert the grommet in the hole in the side of the bucket.


Grommet installed.

2. Push the headlight chrome clip (FFR#13415) onto the bucket bracket.

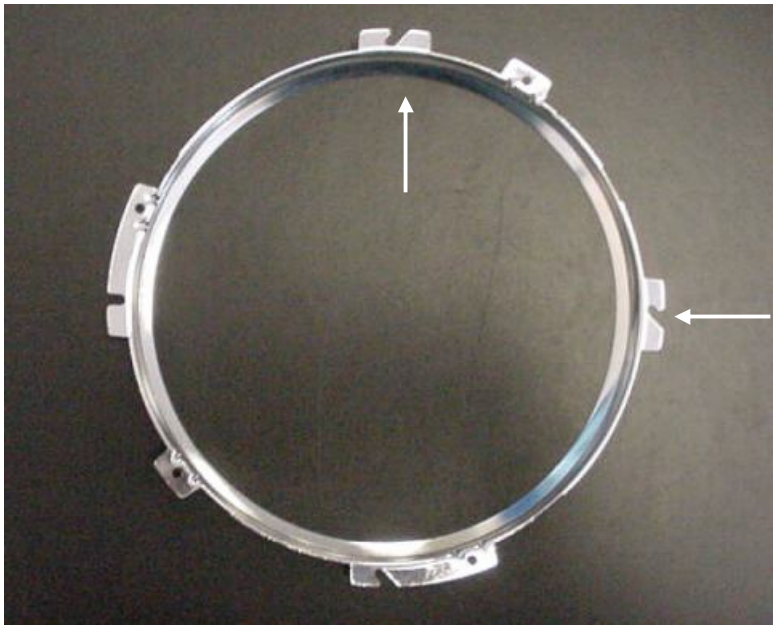


Chrome ring clip mounted.

3. Screw the two headlight adjustment screws (FFR# 13420) half way into the bucket using a Philips head screwdriver.

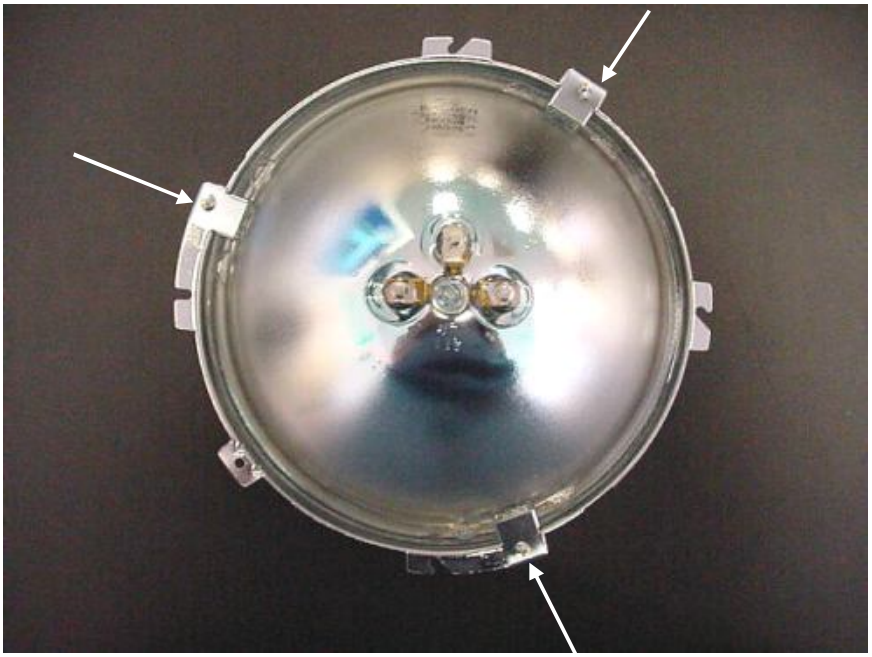
Adjustment screws installed.

4. Turn retaining ring over and positioned so that one tab is at the top and one is to the right.



Retaining ring.

5. Position the headlight in the retaining ring so that the light is the correct way up and the electrical tabs are as shown below.
6. Screw (FFR# 13418) the retaining ring clips (FFR# 13416) to the retaining ring. See the picture below for the correct locations.

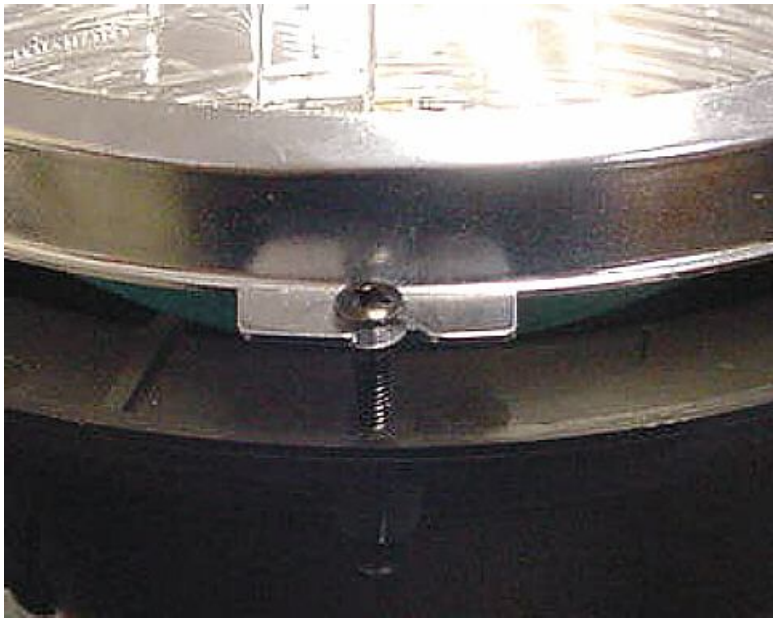


Headlight positioned and retaining tabs attached.

7. Attach the wiring pigtail to the back of the light.
8. Pass the wires from the pigtail through the grommet taking care to pull the wire covering through the grommet as well.

Pigtail wires and covering pulled through grommet.

9. Slide the retaining ring slots around the adjustment screws.



Adjustment screw in slot.

10. Attach the retaining ring to the bucket using the last Philips head screw (FFR# 13419).

Retaining ring screw mounted.

11. Push the rubber gasket on the back of the bucket.
12. Hold a headlight up to the body holes cut earlier and use the bucket holes as a template to mark the screw holes.
13. Drill ⅛" mounting holes.
14. Screw on each headlight with four screws.

Attaching the headlight to the body.

15. The trim ring slides down over the top of the light and is fastened at the bottom. This is a tight fit and takes some effort to line up the lower screw hole.
16. Wire the headlights to the Mustang harness. The Mustang high beam is light green/black. The low beam is red/black. On the headlight, there are three wires, black is ground, white is high beam and the red is low beam.

Turn Signal Lights

TOOLS: *Drill, 13/64" drill bit, 8mm deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Front turn signals and hardware (FFR# 11044).*

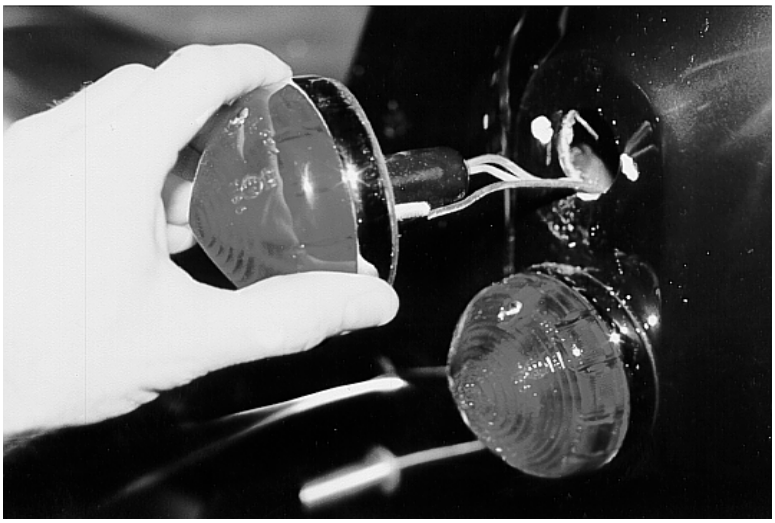
1. Hold the light up to the body with the bulb mount sticking through the hole.
2. Mark the locations of the mounting studs.
3. Remove the lights and drill 13/64" holes.
4. Mount the light to the body with the provided fasteners.
5. Wire the turn signals up to the Mustang harness. The driver's side Mustang turn signal wire is light green/white. The passenger's side is white/light blue. The running lights are brown. On the light, the red wire is the dim light and the green wire is the bright light and the brass ring is the ground.
6. If the turn signals do not work when the lights are hooked up, the answer is commonly found in the wiring harness. In the Mustang harness, the turn signal flasher gets its power from the rear defroster circuit. Since this is not hooked up, the power lead for the flasher (purple/orange wire at flasher-one over the passenger footbox) must be cut and hooked into the #2 fuse box hole which has a red wire on one side and now the flasher lead on the other.

Tail-Lights

TOOLS: *Drill, 13/64" drill bit, 8mm deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Tail-lights and hardware (FFR# 11042).*

1. Insert the taillights into the holes made earlier.
2. Use a 13/64" deep well socket and the kit supplied nylon lock-nuts and washers to fasten the lights to the body.
3. Wire the taillights into the Mustang harness. On the Mustang rear wiring harness black is ground. The running lights are brown. The red with green is the brake lights.
4. Use the top light for the brake and running lights. Use the bottom light for the turn signal and running lights.



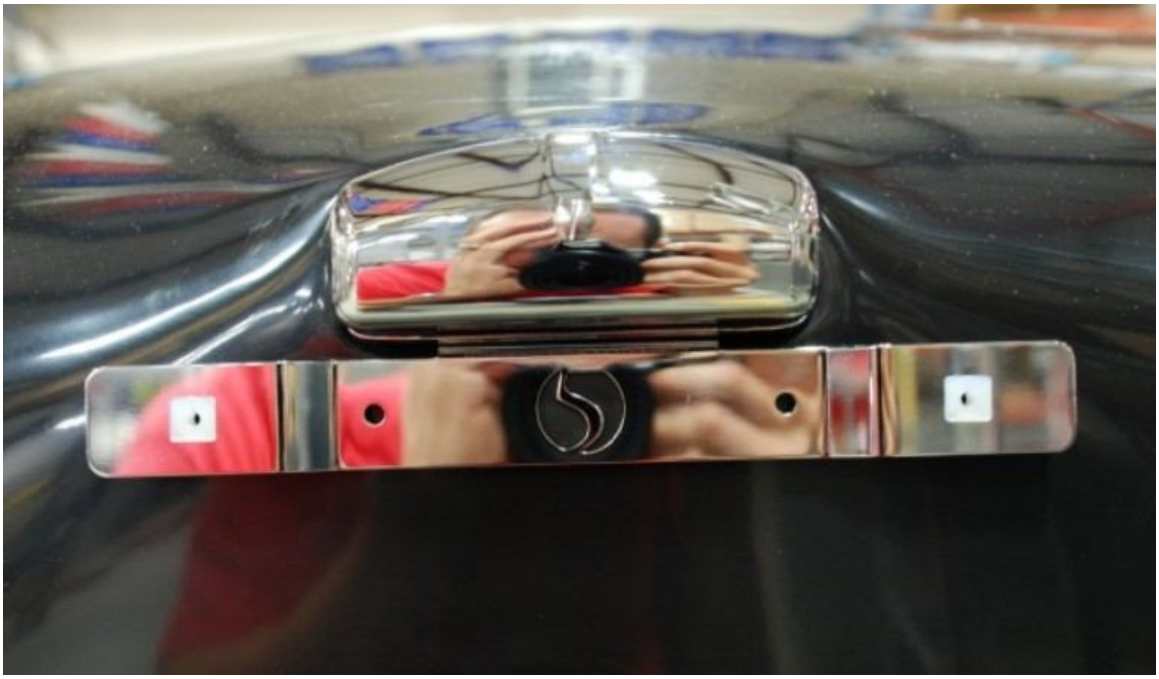
Inserting the rear taillights into the body.

License Plate Light and Bracket

TOOLS: ***R****egular head screwdriver, drill, 3/16"drill bit, 3/8" deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *License light/bracket components (FFR# 11041)*

1. Take the two wires from the rear harness that were spliced into the harness during the disassembly section and inserted into the trunk during the rear harness section and route them to the trunk light. Use some insulated line clips on the ¾" tube above the trunk and on one of the trunk hinge studs. Use a couple of the small insulated line clips, with screws or rivets, to hold it to the trunk lid to hold the wires.
2. Pass the two wires from the License plate light through into the trunk.
3. Insert the rear license plate lamp into the trunk holes drilled earlier. Attach the washers and the nuts to the backside of the body. The lamp comes with nuts for the bolt mounts.



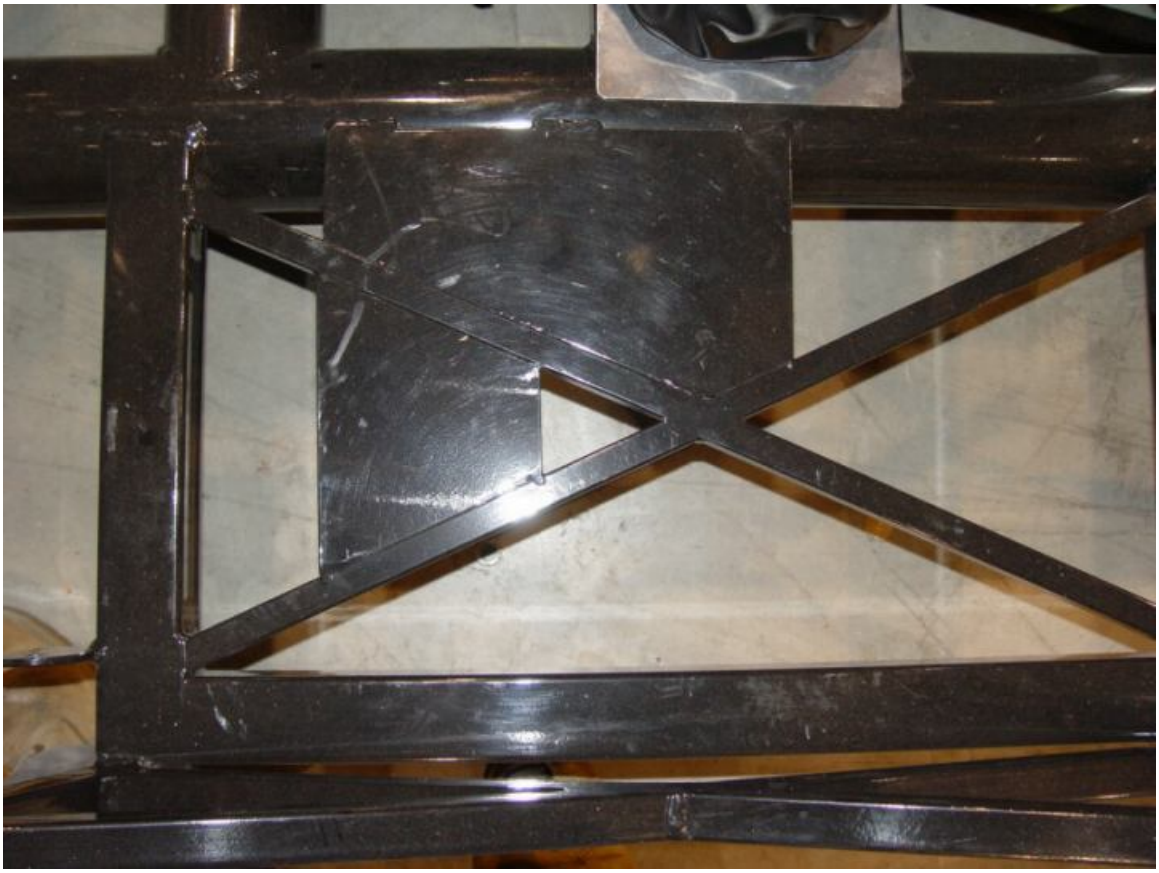
4. Connect the wires to the light.
5. Drill two 3/16" holes through the license plate bracket and the trunk.
6. Use two 3/16" rivets to attach the bracket to the trunk.
7. Put a small section (5"- 6" long) of adhesive backed foam (included with kit) on back lower edge of a license plate.
8. Attach the license plate to the mount using self-tapping screws provided with the kit.

ATTENTION: *This kit is only a collection of parts designed for use primarily as a race car. Applying the license plate bracket does not mean that this vehicle is street legal. Factory Five Racing does not build completed or partially completed street vehicles. If you choose to title, register and operate your kit on public roads, you are responsible for ensuring that the vehicle you build complies with all Federal, Sate and local laws regarding its use. The inclusion of the license plate bracket does not indicate that this kit complies in any way with local, State or Federal laws.*

Seat Installation

TOOLS: *8mm socket, drill, 13/64" and 9/32" drill bits, marker, ruler, silicone, and caulk gun.*
PARTS: *Black Vinyl seats (FFR# 13939).*

1. The seats are mounted in four places through the base into the frame. The frame points that can be used are: The 4" round tube, the rear 2"x 2" outrigger, the 1/16" mount plates or, a ¾" tube.



Seat mounting area on frame.

2. Mark on the floor the location of the 4” round tube, the 2”x 2” tubes, and where the frame steel mount plate is located (between the X tubes under the seat).
   a. Use a marker and a ruler and measure 2” towards the outside of the car from the inner seat belt mount.
   b. Mark a line from this point forward 2 feet. This is where the 4” round tube is.
   c. There should be rivets along the 2”x 2” tube and ¾” tubing, so finding these is easy.
3. Look on the underside of the frame to find the steel plate between the “X”. Mark this on the aluminum.
4. Test fit the seats on the floor to find where it is most comfortable. (If the seat to steering wheel relationship feels good but the pedals do not you can change the height of the brake pedal by adding or removing the master cylinder spacers and both pedals will bend side to side if they are to close to each other or the gas pedal).
5. Outline the seat on the aluminum.
6. Flip the base of the seat forward, it is held in place with Velcro, and compare the lines drawn on the aluminum to the seat frame.

7. If the seat can not get mounted in four places, reposition the seat.

Note: The further apart the mounting locations are, the more solid the seat will feel.

8. Drill 13/64” holes, through the seat frame into the chassis.

9. Remove the seat and drill through the seat frame holes only with a 9/32" drill bit so the screws can pass through the seat easily.
10. Re-align the seat in the cockpit and fasten the seat using an 8mm socket, ratchet and fasteners included with the seats. Do not torque the screws to more than 20lb/ft.

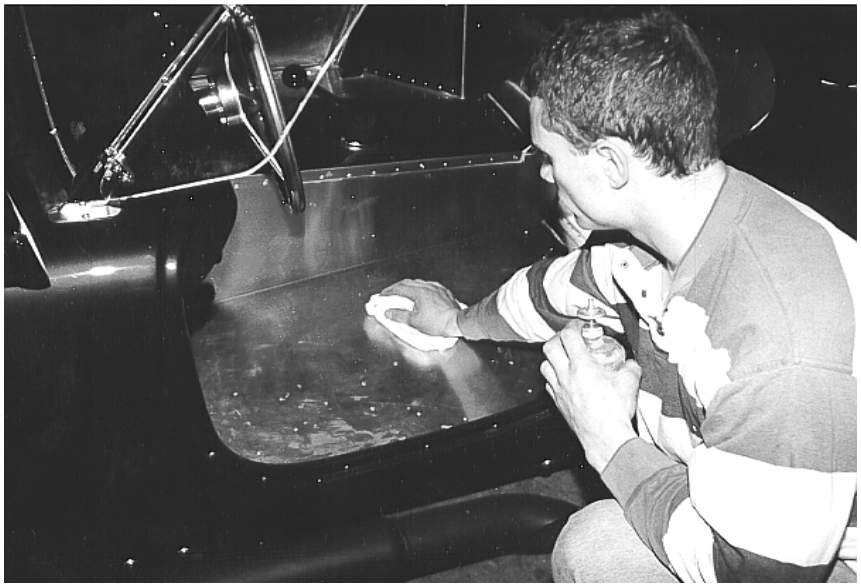
Seat frame screwed to chassis.

12. Remove the seats so the carpet can be installed.

Carpet Installation

TOOLS: *Razor knife, 3M Super 77 Spray Adhesive, marker pen, ruler, silicone, and caulk gun.*
PARTS: ***Mk III Black c****arpet (FFR# 13939)*

1. Install any remainder of the large adhesive self expanding weatherstripping in any large openings between the aluminum and the body.
2. Position each piece of carpet in the correct location before installing it to do any final trimming if necessary. The floor carpet will go on last and cover any extra.
3. Wipe and clean the aluminum to ensure good adhesion and eliminate debris accumulated during the build-up process.



Clean the aluminum cockpit floor before final assembly.

4. Use the following for the order of installation for all the carpet except the main floor pieces:

    Rear cockpit corners
    Rear cockpit wall
    Transmission top cover
    U-joint cover
    Passenger side footbox outside/front walls
    Driver side footbox outside/front walls
    Driver inside/middle/passenger inside walls
    Driver side dropped floor
    Passenger side dropped floor

5. For easier positioning of the seats later, cut a small hole in the carpet where each seat screw hole is and around the emergency brake handle.
6. Install the main cockpit floor carpets.

Carpet installed.

Seat Harness Installation

ATTENTION: *These seat belts are frame mounted in four locations. Never drill a hole and attach these to aluminum alone. If you are not wearing a helmet, make sure that the roll bar is padded for adequate rear head protection. Even in a small rear end collision, you can be seriously injured when your head hits steel.*

TOOLS: *¾" socket and ¾" combination wrench*

PARTS: *Seat harness/fasteners (FFR# 13024)*

1. Feed the rear section each harness through the aluminum rear cockpit wall.
2. Follow the manufacturer's directions inside the seat harness boxes on how to loop the harness straps through the attachment brackets.
3. Attach the harness mounts to the frame mount plates that protrude up through the aluminum. Use a washer between the mount plate and the harness bracket so the harness is not pinched.

Attaching harness to frame mounts.

4. Position the brackets at the correct angle before tightening. Use a ¾" socket and ¾" combination wrench to tighten the bolts.
5. The seat belt quick release latch should be on the right side if you are right handed, left if you are a lefty.
6. Once the seat harnesses are installed, you can adjust the belts and shoulder harnesses with the cinching tabs that are at the end of each rolling buckle.

Final Seat Installation

1. Install the seats in the holes made earlier. Flip the seat forward and attach using fasteners. Do not torque the screws to more than 20lb/ft.
2. Now is a good time to finish off the lower door openings (door sills).
3. Cut the door press-on trim in half and press over the body lip and carpet edge.
4. The weather-strip should start at the bottom of the door hinge area and go back along the doorsill to just below the latch. The trim presses down over the lip of the doorsill and carpet edge.

Emergency Brake Boot Installation

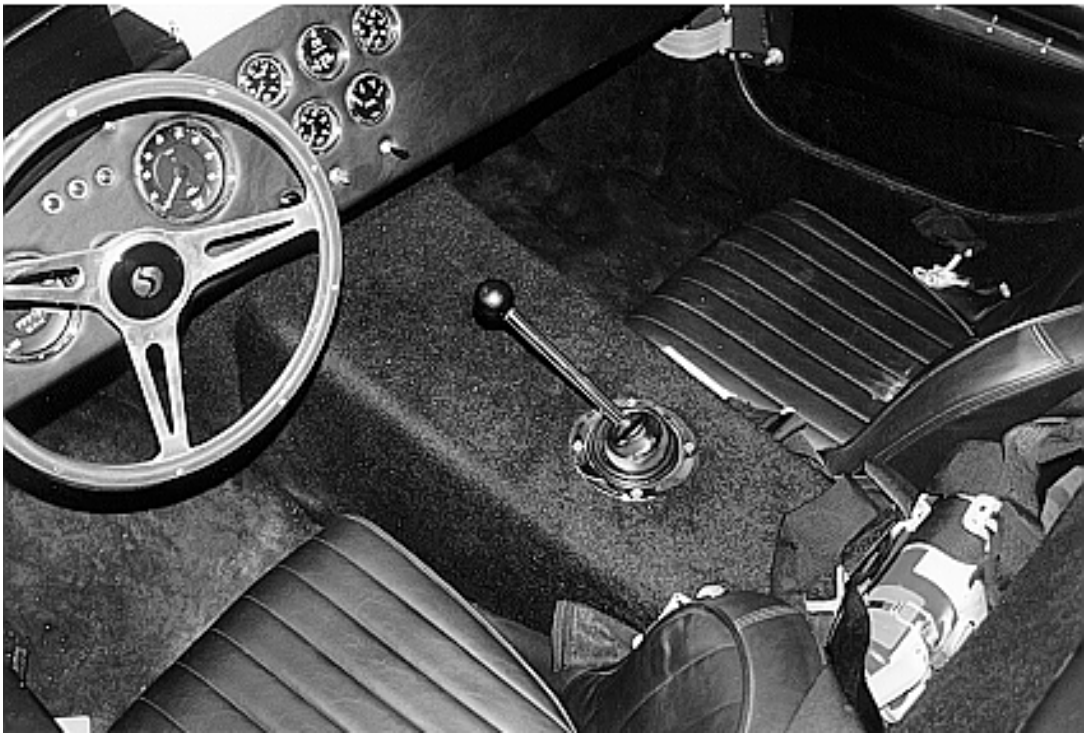
TOOLS: *⅛" Drill bit, Drill, Philips head screwdriver*
PARTS: *Emergency brake boot (FFR# 10879), Screws (FFR# 13979).*

1. Pull the handle cover over the handle.
2. Hold the cover in place and drill ⅛" holes through the ring that is captured in the boot and the cockpit aluminum.
3. Attach the boot to the cockpit aluminum using the screws provided.

Emergency brake boot installed.

Shifter Installation

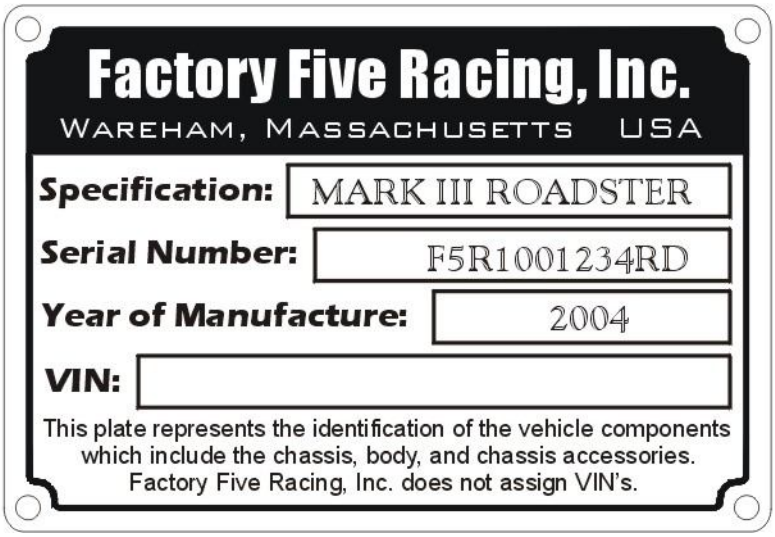
1. Install the shifter handle onto the transmission neck using the shifter bolts provided.
2. Slide the boot over the shifter to determine where the holes need to be for the screws to hold it in place.
3. Drill the four holes with a ⅛" drill bit and screw the boot down using the 4 screws provided.
4. Screw the shifter knob onto rod and hand-tighten.



Completed interior. You cannot see any of the aluminum.

Nameplate

Factory Five Racing has included a Nameplate for your kit. This can be engraved at any Trophy or mall engraver. The VIN number space is provided so that your state issued VIN number can be engraved if you so desire. A few places that people have riveted these plates are: front of the 2"x 2" hoop in the cockpit; on top of the driver footbox; on top of the passenger footbox; on the 2"x 2" "X" on the front suspension.



Finishing Touches

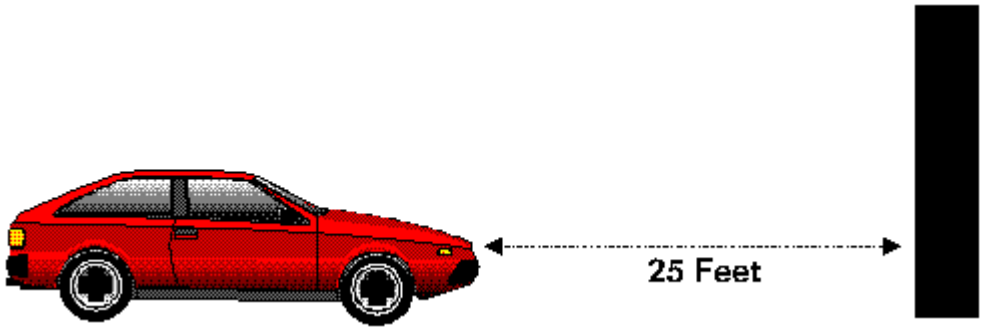
Headlight alignment

TOOLS: Marker, masking tape, tape measure.

Note:

- Make sure that the car is at the correct ride height before the alignment procedure is done. Ride height should be 4 ½" at the front and 4 ½" at the back measured to the bottom of the 4" round tube with the normal number of people/weight in the car.
- It is important that the headlights are aimed properly in order for it to perform at their best. Lights that are aimed incorrectly will not only perform poorly but may also offend oncoming traffic. When replacing bulbs, it is a good idea to verify that your lights are properly aimed. Slight variances in filament position can translate to large variances in beam pattern. The following procedure does not require special aiming equipment and ensures proper aim.

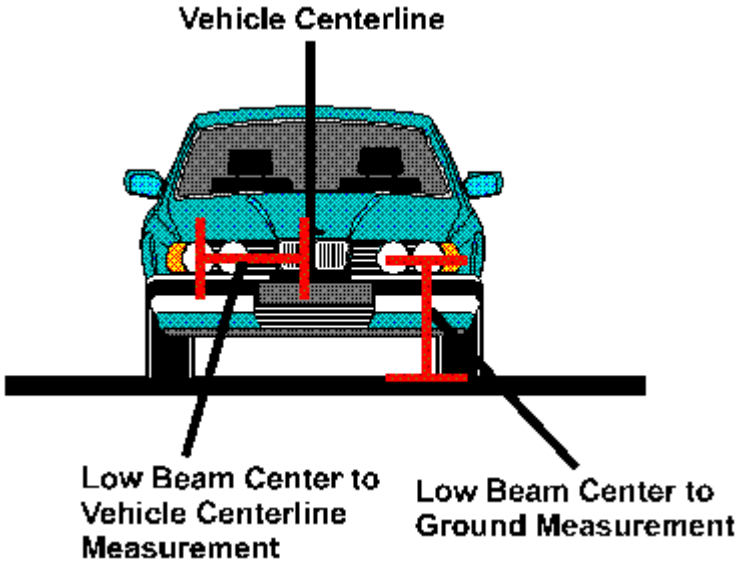
1. Find a *flat level* surface next to a *vertical white* wall where the car can be parked (a garage door is an ideal location at home).
2. Pull the car straight up to the wall as close as possible.
3. Using masking tape and a marker, draw a vertical line on the wall corresponding to the centerline of the vehicle.
4. Pull the car straight back until the headlights are 25 feet from the wall.



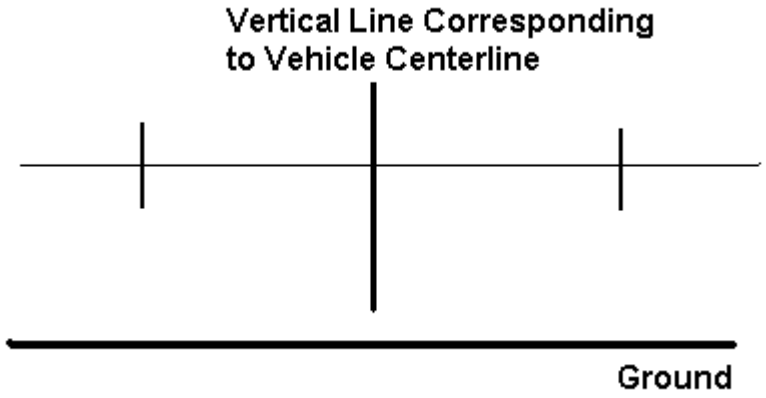
5. Make the following two measurements:

   Measurement A: From the ground to the geometric center of one of the headlight lenses

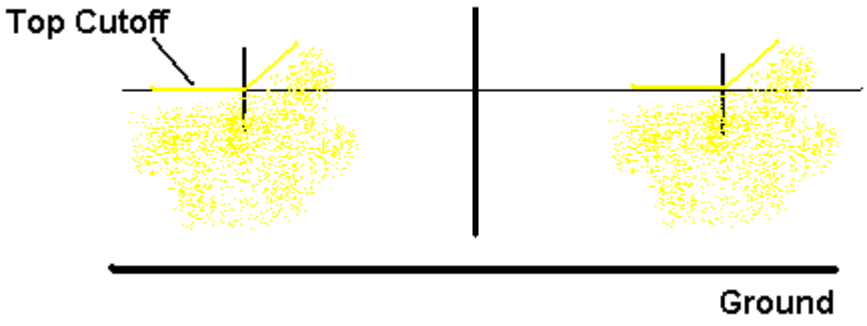
   Measurement B: From one of the low beam headlights to the vehicle centerline.
   (Also measure from high beam center to vehicle centerline for 4 headlight systems)
   Note these measurements.



6. On a piece of masking tape, draw one horizontal line on the wall at a height exactly 2 inches lower than Measurement A.
7. On the line, make vertical marks both to the right and left of the vehicle centerline mark at the distance of Measurement B from the vehicle centerline vertical line.



8. Turn the headlights on and adjust the vertical aim of the headlights so that the top horizontal cutoff of each of the beams is located along the horizontal line drawn on the wall.
9. Adjust the horizontal aim of the low beam headlights so that the point at which the top cutoff of the beam begins to slope upwards is located at the vertical marks.



Alignment Specifications

Take your new car to an alignment shop and have the car aligned properly before hitting the track. A minor flaw in alignment can cause very "twitchy" handling. Avoid temptation and never drive a car without proper alignment.

For a manual steering car use the following specifications:

Caster: 3°
Camber: -0.5°
Total Toe: 1/16"

For a power steering car use the following specifications:

Caster: 7°
Camber: -0.5°
Total Toe: 1/16"

Optional Installations

Instructions are included separately with each option when shipped.

Chapter 3 - Performance Reference Material and Technical Support

Technical Support

Our success depends on you being able to build your kit without problems or frustration. We are counting on you to build and drive this car and in so doing, provide us with the most important advertising of all.

If you have purchased a kit, we want to make sure that you know that you are not alone. Although we know our kit is the most straightforward assembly around, there may be a time when you need to speak to us. We will be there for you to make sure you are successful. No question is too simple. We are easily reached in a number of ways.

The Web:	www.factoryfive.com
Phone:	508-291-3443
Fax:	508-291-3883
E-mail:	Tech@factory five.com
Mail:	9 Tow Rd, Wareham, MA 02571

FFR's Dave Smith discusses "the line" at Infinion Raceway with Legendary driver Bob Bondurant, Nov. 2002.

Registration and Titling

You are building a race car. It was designed with closed course competition as its focus. If you choose to use this vehicle on a public road, you are responsible for complying with all State and Federal regulations governing Home-built vehicles.

Regulations vary from state-to-state. Your best source of information about titling and registration is from your State Department of Motor Vehicles. Most of these agencies have specific regulations and steps for you to complete when seeking registration of your vehicle.

Provided with your Factory Five Racing Coupe kit is a Manufacturer's Certificate of Origin. This document records the origin of the vehicle and is not a vehicle title. The component kit that we manufacture has no VIN number. The number stamped on the frame matches the Certificate of Origin and is the kit serial number.

In most States, upon completion of your kit, you need to bring this certificate along with receipts for any parts used on your car and a copy of our invoice to your State DMV. Some states like Massachusetts have a separate vehicle inspection division for specialty cars and custom built cars. Often times this division handles "salvage" vehicles as well.

We know you will be excited about driving your car. Take the time to make sure you have made it race-worthy and safe and legal before you get behind the wheel.

Wheels

For the **FRONT** wheel, use the following equations:

1987-1998 Spindles: (width/2)+1.25"
1999-2004 Spindles: (width/2)+1.50"

Only 7"-9" wheels are recommended for the front. If using a wheel wider than 7", FFR front lower control arms are needed to prevent the wheels rubbing the control arms.

Below is a chart indicating the **REAR** wheel sizes and backspacings that are possible using the Mark III kit:

Rear Wheel Backspace Equations

Max Tire width	**87-93**	**94-98**	**99-04**
275mm*	(Width/2)+1	(Width/2)+2	(Width/2)+2.75
315mm	(Width/2)+1.625	(Width/2)+2.5625	(Width/2)+3.25

*Can be used up to 10.50" wide wheel

	99-04	**94-98**	**87-93**	
OEM 17"x 8" FRONT/REAR	5.72	5.72	5.72	MAX TIRE WIDTH 245/45 R17
AFTERMARKET 17"x 9"	-	6.00	6.00	MAX TIRE WIDTH 275/40 R17
AFTERMARKET 17"x 10.5"	-	-	6.80	MAX TIRE WIDTH 315/35 R17

Note: The max rim width for a 3-link is a 10.50"

If you have any questions please call the Tech department at 508-291-3443.

If a modern look is what you're after, you may want to try the 17" Cobra-R or FR style wheels. If using the standard width 1987-93 rear, it is possible to use aftermarket 10.5" wide, 27mm offset wheels. If using a rear end that has been converted to 5-lug using the "Cobra" brake kit use two (4) 5.95" backspace wheels.


Left: FFR car using late model 17" Cobra-R rims. Right: Ford Motorsport Cobra R 17" wheels and 12" Cobra Brakes.

17"x 9" and 17"x 10.5" FR style wheels.

1994-1998 rear end

Use two (4) 9" wide, 5.95" backspace wheels in the front and the rear. If you would like a wider tire than this in the rear it is possible to use aftermarket 10.5" wide, 27mm offset wheels if the axles and caliper brackets are changed so that the rear is the same width as the 87-93 rear ends. See the table above for different width wheel backspacings.

1999-2003 rear end

Because of the width of this rear end, custom wheels are needed if 10" or wider wheels are wanted. Use two (2) 9" wide, 5.95" backspace wheels in the front. See the table above for different width wheel backspacings.

Performance Modifications

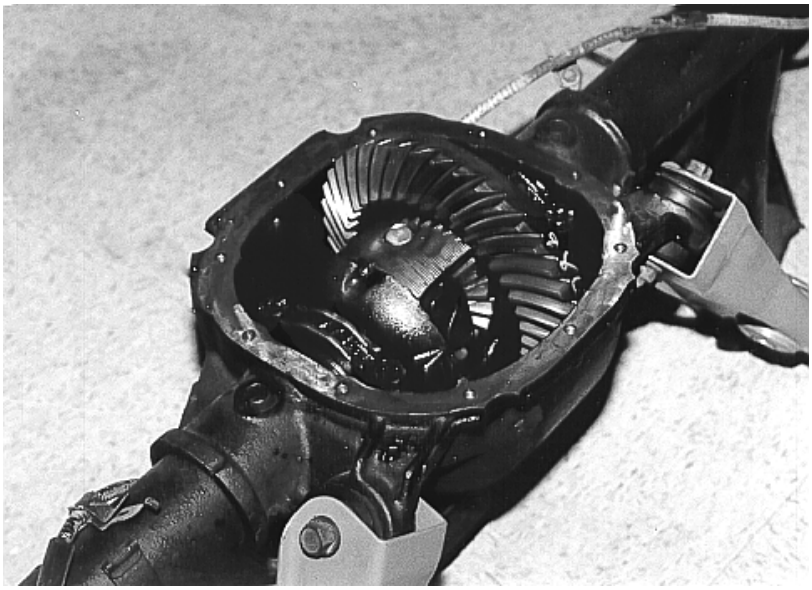
The following modifications and set-ups fall under the category of getting more horsepower from your engine and making your car perform better. You will find a hundred people a day that will tell you what you've got to have. We just want to start you out with the easy modifications that net large returns without large cash outlays or serious changes to the stock motor and drive train. Remember that a 2,100 lb. car stresses the parts less than a 3,100 lb. Mustang does, so all of the components will last longer and can take more abuse than they did on the Mustang. Check out www.factoryfive.com to see what we offer.

Greg Lapoint at Run and Gun 1997 10.50 at 139 mph.

Gears

There is an ID tag on the rear differential. If you find that your rear end is missing its ID tag, there is a good chance that the rear end was modified. To find out what ratio is on the differential, mark the pinion and axle at a start point. Turn the axle exactly one rotation and count the number of rotations that the pinion makes compared to the reference mark. For example: 3 ½ turns is a 3.55 rear ratio, etc.… The other way to check the ratio out is to open the rear differential up and look on the ring gear. While the rear is open change the fluid. This never gets done enough on the car.

Changing the gear ratio is one way to improve your car's performance and it is easiest to do before assembly, since the rear is out of the car. All of the gear ratios work well with our car but we've found that installing an aftermarket 3.55 ratio really wakes the motor up. If you change the rear end gears, don't forget to change the speedometer sending unit gear so that the speedometer reads correctly. Wherever you get the rear gears from should be able to get the correct gear for your application. If you cannot find the correct gear call "Texas Mustang Parts" 800-527-1588, www.texasmustang.com , they have the "hard to find" gears.



Rear end gears.

Differentials

There are many different companies that offer limited slip differentials. The most popular are *Auburn* (cone style), *Ford Racing Performance Parts* (clutch plates), *Torsen* (gears). Each type has its advantages and disadvantages. The Torsen will never wear out and is the ultimate for road racing but is not really designed for heavy duty drag racing. The Auburn is a good all round set-up as is the Ford unit.

Induction/Fuel Injection

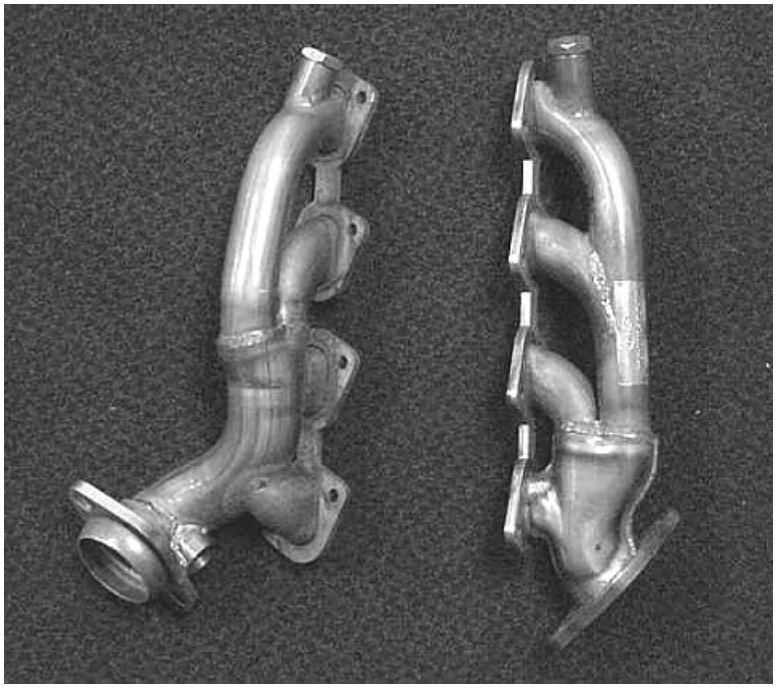
There are three things an engine needs; air, fuel and spark. If you allow more of each of these into the engine, it will make more power.

Headers

Stock: Cast iron manifolds

Ford Motorsports offers 1⅝" unequal length Stainless Steel headers that are bolt on parts. They will reward you with a nicer look and a small horsepower increase.

4.6L 2 valve FRPP # M9430-E462
4.6L 4 valve FRPP # M9430-E464



4.6L 4 valve FRPP Headers.

Under-drive Pulleys

Yes. They work well on all cars.

Rear Suspension

The standard solid axle rear suspension works well, is low maintenance and is reliable. The next step in performance is the 3-Link upgrade for the solid axle. This is for the more serious driver that goes to more track events and wants to start exploring the limit without giving up the "off the line" bite of a solid axle. We recommend higher rate springs or use of the factory sway bar with the use of the 3-Link.

The ultimate rear suspension is the FFR independent rear suspension package. Both driver comfort and handling are significantly improved especially on rough surfaces.

Control Arms

Stock: Stamped steel with rubber bushings.

Front: The stock front arms work well all round. The tubular front lower control arms with polyurethane bushings are lighter, eliminate the rubber and look better than the stock Mustang arms.

Rear: Using tubular control arms with polyurethane bushings helps to locate the solid axle and hook up better on the drag launches.

Shocks/Springs

Using the Mustang rear coil springs and shocks gives a comfortable ride. For a slightly stiffer suspension, replace the stock rear shocks with aftermarket units. We have found that KYB makes an inexpensive good

replacement that roughly 20% stiffer than stock.

For the pro-roadracer, rear coil-over shocks gives you the ease to change spring rates, ride height (i.e. drag racing vs. road racing), and shock valving.

Factory Five offers a few different shock/spring packages.

- An affordable rear coil-over package which includes shocks and 250 lb/in springs.
- A roadracing oriented 3-Link and front coil-over package, which includes stiffer valved shocks and 600 lb/in front springs and 400 lb/in rear springs.

Miscellaneous Brake Information

- The caliper from either Lincoln will bolt on to the Mustang spindle although the piston is 73mm in diameter, so it would not be well suited for the recommended brake setups above. If this caliper is used, a 1" master cylinder from a '93 Mustang Cobra, 84-86 Mustang SVO or Bendix # 12669, although this is not an ideal setup.
- Thunderbird *Super Coupe* 5-lug rear brakes have a 4.25" bolt circle where as the Mustang 5-lug bolt pattern uses a 4.5" bolt circle. The IRS hubs need to be drilled to the Mustang pattern. FFR supplies new studs with the IRS kit.
- If you desire a dual master cylinder set up (having individual master cylinders for the front and rear), the following information will help with those installations:

  There are several different versions on the market. Dual master cylinder units usually use a balance bar to proportion the amount of line pressures from the front to rear, so no proportioning valve is necessary. We have used a unit from CNC brakes (part # 241). This unit uses the Mustang bolt pattern, so it will simply bolt to the FFR foot box. Use the following table to determine each master cylinder required.

Baer Brakes	602-233-1411	www.baer.com
Stainless Steel Brakes Corporation	800-448-7722	www.ssbrakes.com
Disc Brakes R' Us	888-558-5757	www.discbrakesrus.com
Forte's Parts Connection, Inc. (Ford Motorsports Dealer)	781-647-1530	www.fortesparts.com
CNC, Inc.	619-275-1663	
AFCO Racing Products (supplier of CNC components)	812-897-0900	www.afcoracing.com
Mustang Part's Specialties, Inc.	770-867-2644	www.stangparts.com
Porterfield Enterprises Ltd.	800-537-6842	
Carbotech Engineering	954-493-9669	
Hawk Brake, Inc.	800-542-0972	www.hawkbrake.com

- To calculate piston area, use the following equation: πr^2 (3.14159 x radius squared.)
- If using calipers with more than one piston, calculate the area for each piston, and then add the areas together. If the caliper has pistons on both sides of the rotor, disregard one side.

Caliper Piston Area (in^2)	**Master Cylinder Bore Diameter (in)**
Up to 3.6	5/8
3.6 to 4.2	7/10
4.2 to 4.5	3/4

4.5 to 4.7	13/16
4.7 to 5.5	7/8
5.5 to 5.9	15/16
5.9 to 6.3	1
6.3 to 7.6 max	1⅛

Seats

For the roadracers/autocrossers that want more side support, Factory five offers a variety of different options. Check out www.factoryfive.com , in the parts and options interior section.

Helpful Reference Material

We have found the following books and reference materials to be invaluable. Items are separated into different categories.

1. Must Reads
2. Helpful
3. Catalogs/Parts
4. Factory Five Aftermarket
5. Insurance
6. Other

Must Reads

- The Helm electrical manual for the model year you are using. They cost between $30-$55 ea. but are well worth the money. www.helminc.com

1996 Mustang Electrical & Vacuum Troubleshooting Manual	FCS1212196
1997 Mustang Electrical & Vacuum Troubleshooting Manual	FCS1212197
1998 Mustang Electrical & Vacuum Troubleshooting Manual	FCS1212198
1999 Mustang Wiring Diagram	FCS1212199
2000 Mustang Wiring Diagrams	FCS1212100
2001 Mustang Wiring Diagram	FCS1212101
2002 Mustang Wiring Diagram Manual	FCS1212102
2003 Mustang Wiring Diagram Manual	FCS1212102
2004 Mustang Wiring Diagram	FCS1212104

- www.FFCobra.com . The largest discussion forum for Factory Five Racing Cobra replicas. Also has many vendor links.

Helpful

- Engineer to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers Inc. PO Box 2, 729 Prospect Avenue, Osceola, WI 54020
- Prepare to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.
- Performance Handling, How to make your car handle. By Alexander and published by Motorbooks International Publishers and Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.

Catalogs/Parts

- **Ford Racing Performance Parts** - Catalog, current edition. Available at your local speed shop, an authorized Ford Racing distributor or www.fordracingparts.com
- **Sean Hyland Motorsports** – 4.6L Aftermarket parts. www.seanhylandmotorsport.com
- **Kar Kraft Engineering, Inc –** New and used 4.6 stock parts. 734-422-8510. www.karkraft.com
- **Tire Rack** - Wholesale tire and wheel source. 888-541-1777. www.tirerack.com
- **Repair Manuals** - Repair manual specialists. 800-426-4214. www.repairmanual.com
- **Jeg's Performance** - High performance products. 800-345-4545. www.jegs.com
- **Mustangs Unlimited** - Performance, restoration, accessories, large-scale wiring diagrams. 800-243-7278. www.mustangsunlimited.com
- **Summit Racing** - High performance products. 800-230-3030. www.summitracing.com

Factory Five Aftermarket

- **Breeze Automotive** - Products, kits & parts to streamline FFR assembly. 508-533-6455. www.breezeautomotive.com
- **FF Metal** - Custom metal components for your FFR Roadster. 703-550-2777. www.ffmetal.com
- **Finish Line** - Large selection of vintage parts and accessories. 888-436-9113. www.cobraaccessories.com
- **Mike's Custom Parts** - Custom billet aluminum parts for your FFR. 508-226-2265. www.replicaparts.net
- **Very Cool Parts** - Distributor of the coolest parts available for your FFR. 760-403-6266. www.verycoolparts.com

Tools

- **Automotive Equipment and Supply** - (a division of Northern Tools) Serves autobody and repair shops nationwide. 800-468-8298. www.northernautosupply.com
- **Craftsman Tools** - Sears brand "guaranteed forever" tools. 800-549-4505. www.craftsman.com
- **Husky Tools** – Home Depot "guaranteed forever" tools. www.homedepot.com
- **Eastwood** - Unique automotive tools. 800-345-1178. www.eastwoodco.com
- **Harbor Freight** - Discount tools. 800-423-2567. www.harborfreight.com
- **Northern Tools** - Discount tools and service products. 800-221-0516. www.northerntools.com/auto
- **Paint over Rust 15** - Stops rust permanently – guaranteed! 800-4576715. www.por15.com

Insurance

- **Northeast Classic Auto Insurance** - Mike Smith. 800-866-6440. www.classiccarinsurance.com
- **Country Companies** - 800-950-5877. www.countryfinancial.com
- **Spinap** - Fred Benedict. Eastern US. 914-946-9300.

Others

- Autoweek Magazine
- Muscle Mustang & Fast Fords Magazine Magazine
- Kit Car Magazine
    - Grassroots Motorsport Magazine

A Final Note about Completed Cars and Car Builders

If you are reading this manual then you must be at least contemplating the task of building your own race

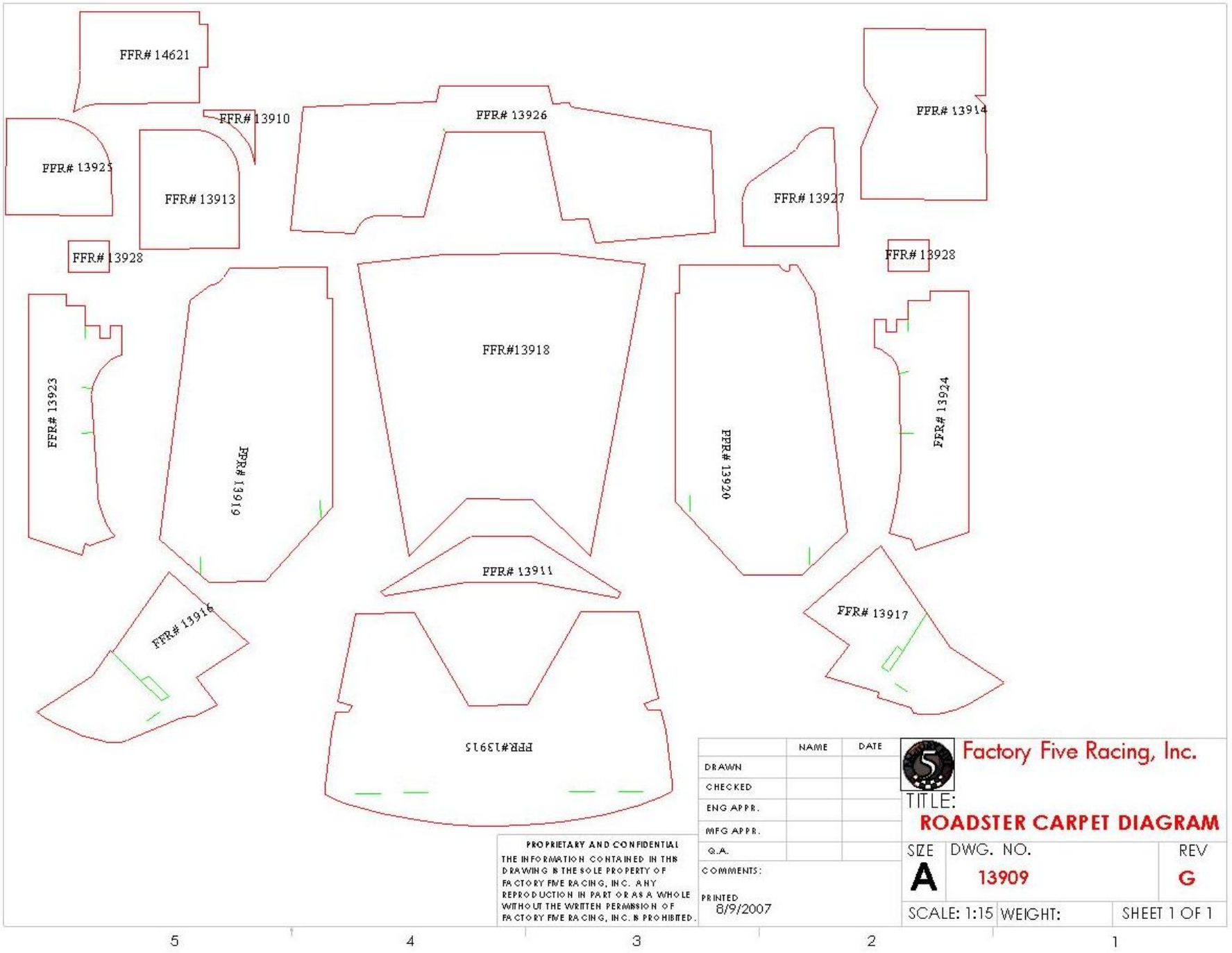
car. Many component car companies offer services to those folks who find part or all of this too much to tackle. We don't.

If you are considering buying a completed vehicle from a third party (we do not and will not perform any vehicle assembly work for customers), keep the following in mind.

Factory Five Racing does not build or sell completed or partially completed vehicles. We are aware of a number of performance and hot rod shops that claim to specialize in building race cars and kit cars. We have over the years compiled a list of some of them, which includes parts yards, used parts suppliers, paint and body shops, hot rod assemblers, and race car shops.

Please know that there is no connection between FFR and those outside shops. There are no authorized FFR dealerships, and we cannot recommend any of the particular businesses that are on our lists, nor do we warrant their work. They are provided simply to help you identify businesses in your area that offer these types of services. You should research these carefully before choosing to purchase their products and/or services.

Appendix A – Templates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FFR# 13917
FFR#13915
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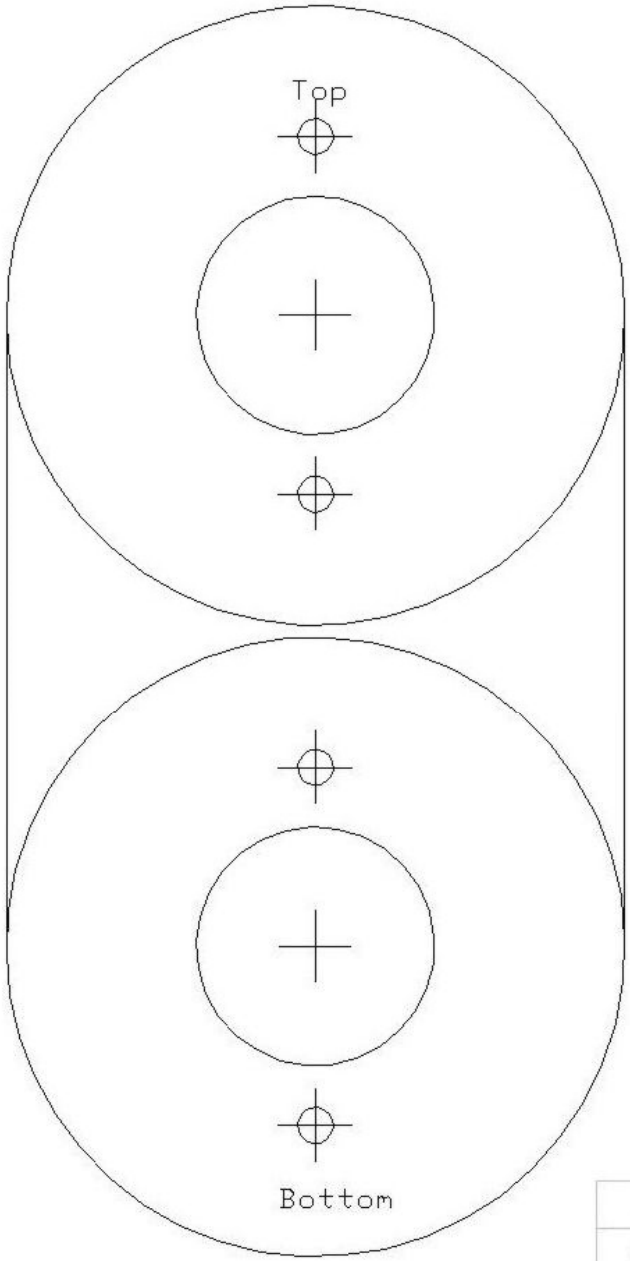
NAME
DATE
DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
PRINTED
8/9/2007
Factory Five Racing, Inc.
TITLE:
ROADSTER CARPET DIAGRAM
SIZE
A
DWG. NO.
13909
REV
G
SCALE: 1:15
WEIGHT:
SHEET 1 OF 1
5
4
3
2
1



REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
B	CHANGED	8/26/97	
C	CHANGED	4/9/01	
D	MOUNT HOLES ROTATED	4/30/09	

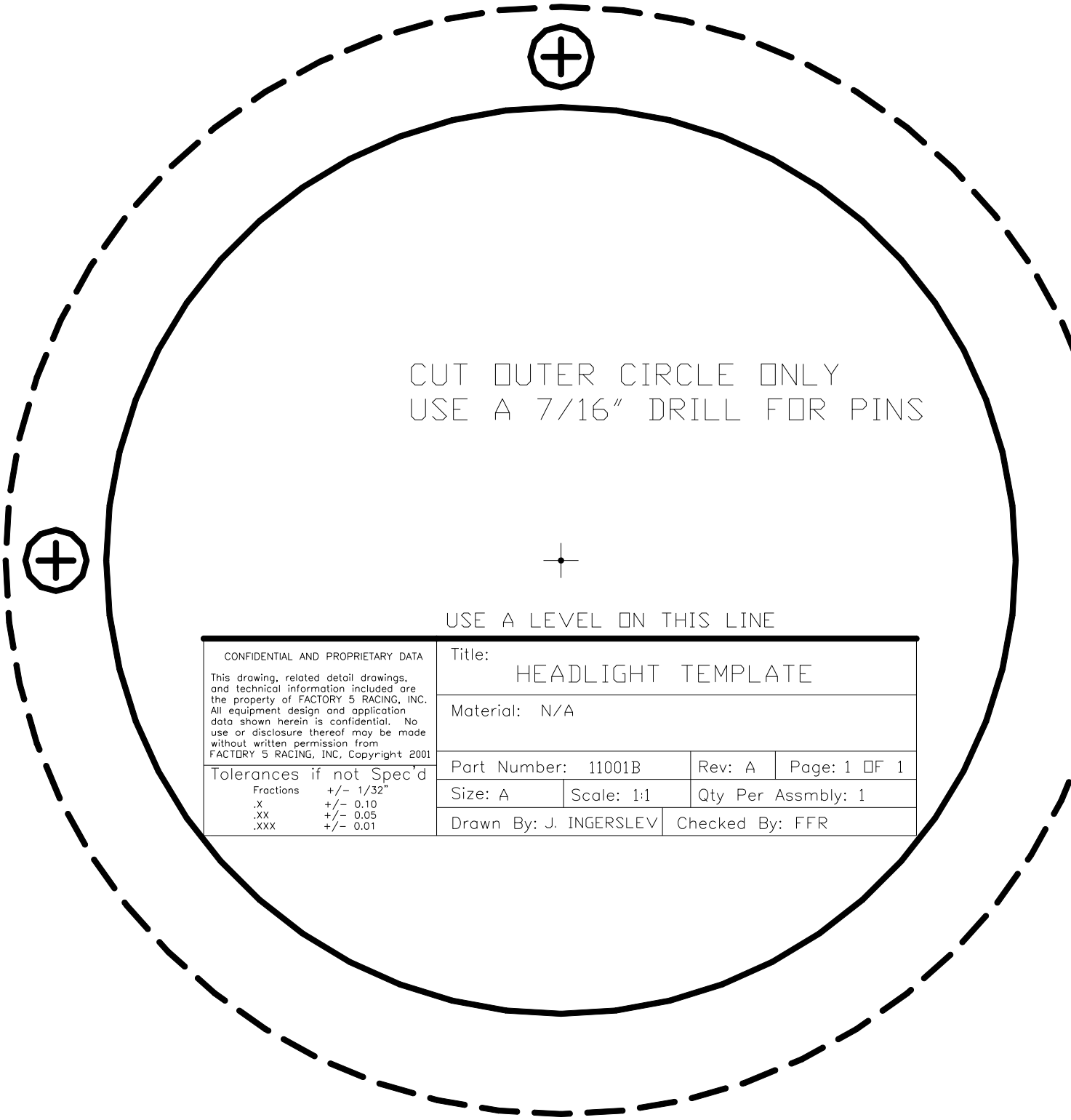
NOTE: Use 7/32" drill bit on small holes and 1 1/4" hole saw on large holes.

ROADSTER	UNLESS OTHERWISE SPECIFIED:		NAME	DATE
SPEC CAR	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±0.01 THREE PLACE DECIMAL ±0.005 FOUR PLACE DECIMAL ±0.001	DRAWN	D. SMITH	1995
		CHECKED		
		ENG APPR.		
		MFG APPR.		
	MATERIAL	Q.A.		
APPLICATION	PRINTED 4/30/2009	COMMENTS:		

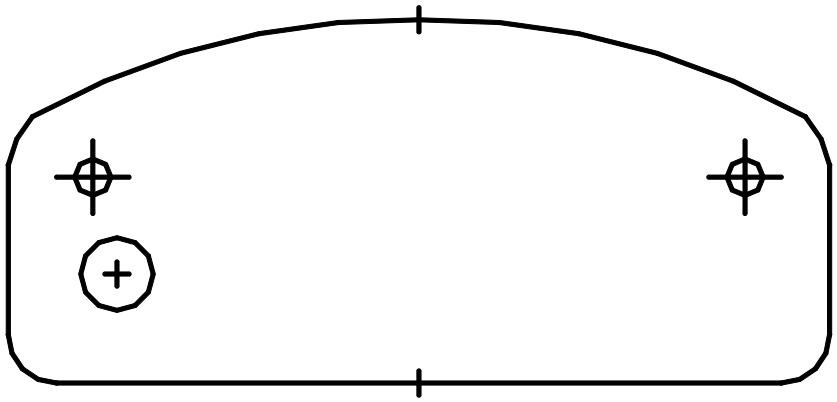
Factory Five Racing, Inc.

TITLE:
TEMPLATE, REAR TAIL LIGHTS, (L,R)

SIZE	DWG. NO.	REV
A	11000	D



CONFIDENTIAL AND PROPRIETARY DATA This drawing, related detail drawings, and technical information included are the property of FACTORY 5 RACING, INC. All equipment design and application data shown herein is confidential. No use or disclosure thereof may be made without written permission from FACTORY 5 RACING, INC, Copyright 2001	Title: HEADLIGHT TEMPLATE		
	Material: N/A		
Tolerances if not Spec'd Fractions +/- 1/32" .X +/- 0.10 .XX +/- 0.05 .XXX +/- 0.01	Part Number: 11001B	Rev: A	Page: 1 OF 1
	Size: A	Scale: 1:1	Qty Per Assmbly: 1
	Drawn By: J. INGERSLEV	Checked By: FFR	

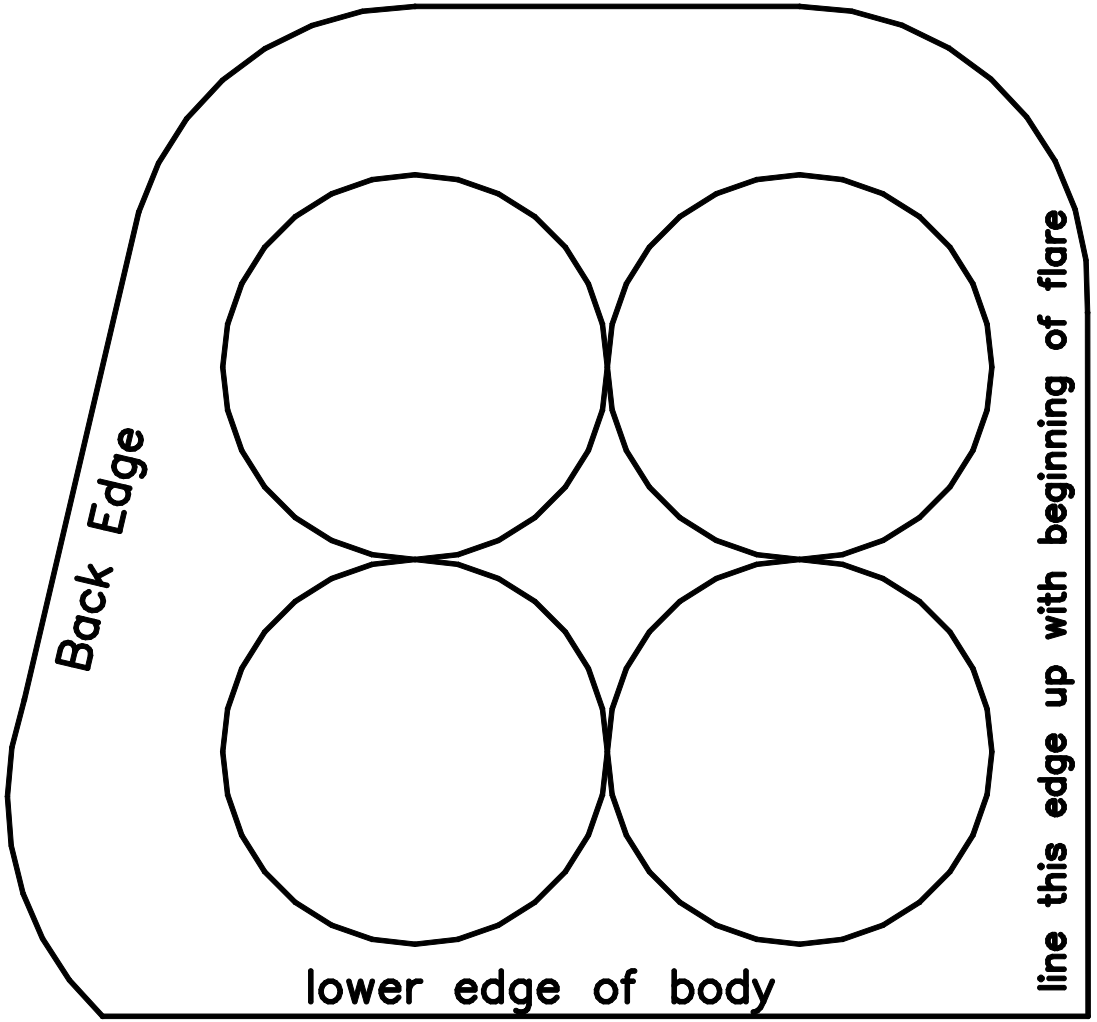


NOTE: Use 3/16" drill bit for smaller holes and 3/8" drill bit on large hole.

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

Title: TEMPLATE, LICENSE PLATE LIGHT			
Material: N/A			
Part Number: 11003		Rev: A	Page: 1 OF 1
Size: A	Scale: 1:1	Qty Per Assmbly: 1	
Drawn By: D. SMITH		Checked By: FFR	



Note: This template is very conservative (tight), you can always cut more, it's hard to cut less.

(cut outline and use on both sides R&L)

Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

Title: Side Exhaust Cut-out Template

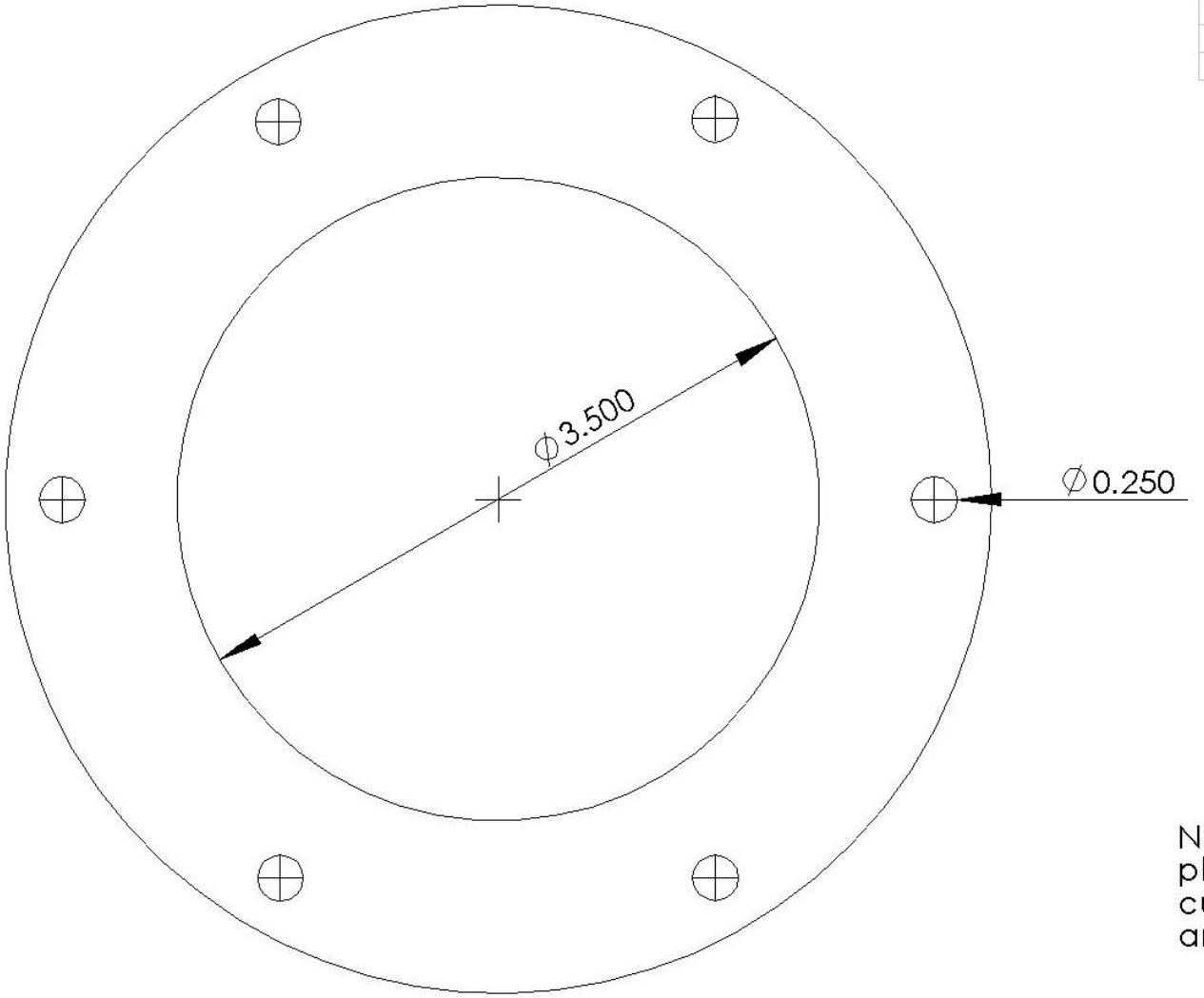
Material: N/A

Part Number: 11004 | Rev: A | Page: 1 OF 1

Size: A | Scale: 1:1 | Qty Per Assembly: 1

Drawn By: B. SMITH | Checked By: FFR

B	HOLE CENTERS ADDED	1/23/01	
C	CENTER HOLE SIZE CHANGED	6/27/02	
D	CENTER HOLE SIZE CHANGED	12/6/07	



NOTE: Outside circle is shown for placement orientation only, do not cut. Use a 3.5" holesaw in center and 0.25" drill bit for small holes.

ROADSTER
COUPE
USED ON

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001
MATERIAL
FINISH

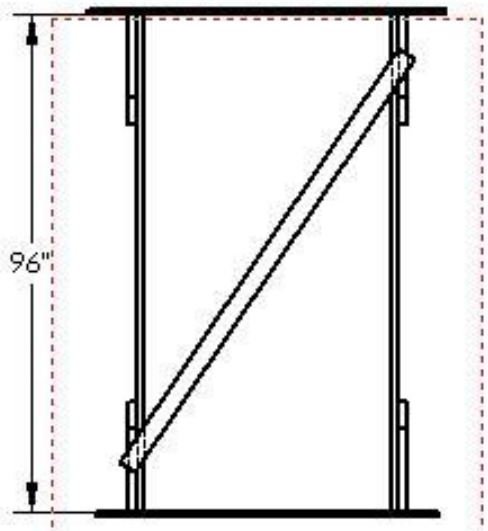
	NAME	DATE
DRAWN	JI	9/26/97
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

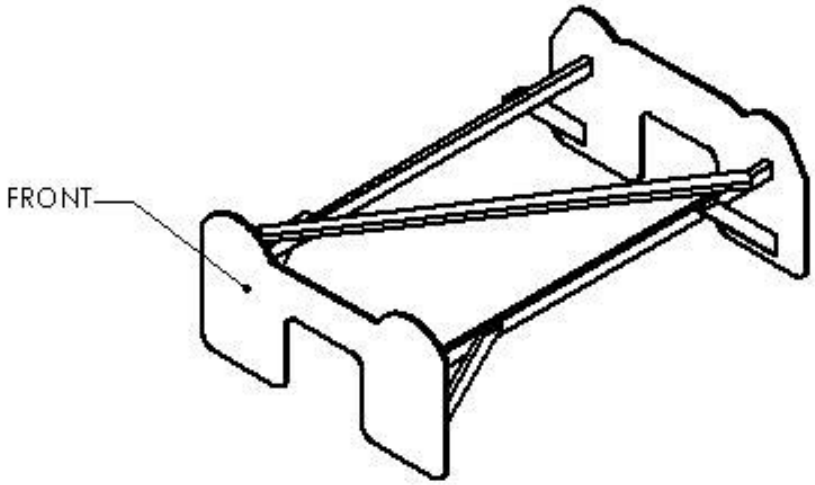
Factory Five Racing, Inc.

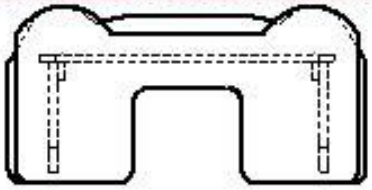
TITLE:
FUEL NECK FLANGE TEMPLATE

SIZE	DWG. NO.	REV
A	11009	D

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	1998	
B	REDRAWN	1/21/04	







UNLESS OTHERWISE SPECIFIED:

ROADSTER

DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

MATERIAL

FINISH

USED ON

APPLICATION

	NAME	DATE
DRAWN	DP	1/19/04
CHECKED		
ENG APPR		
MFG APPR		
Q.A		

COMMENTS:

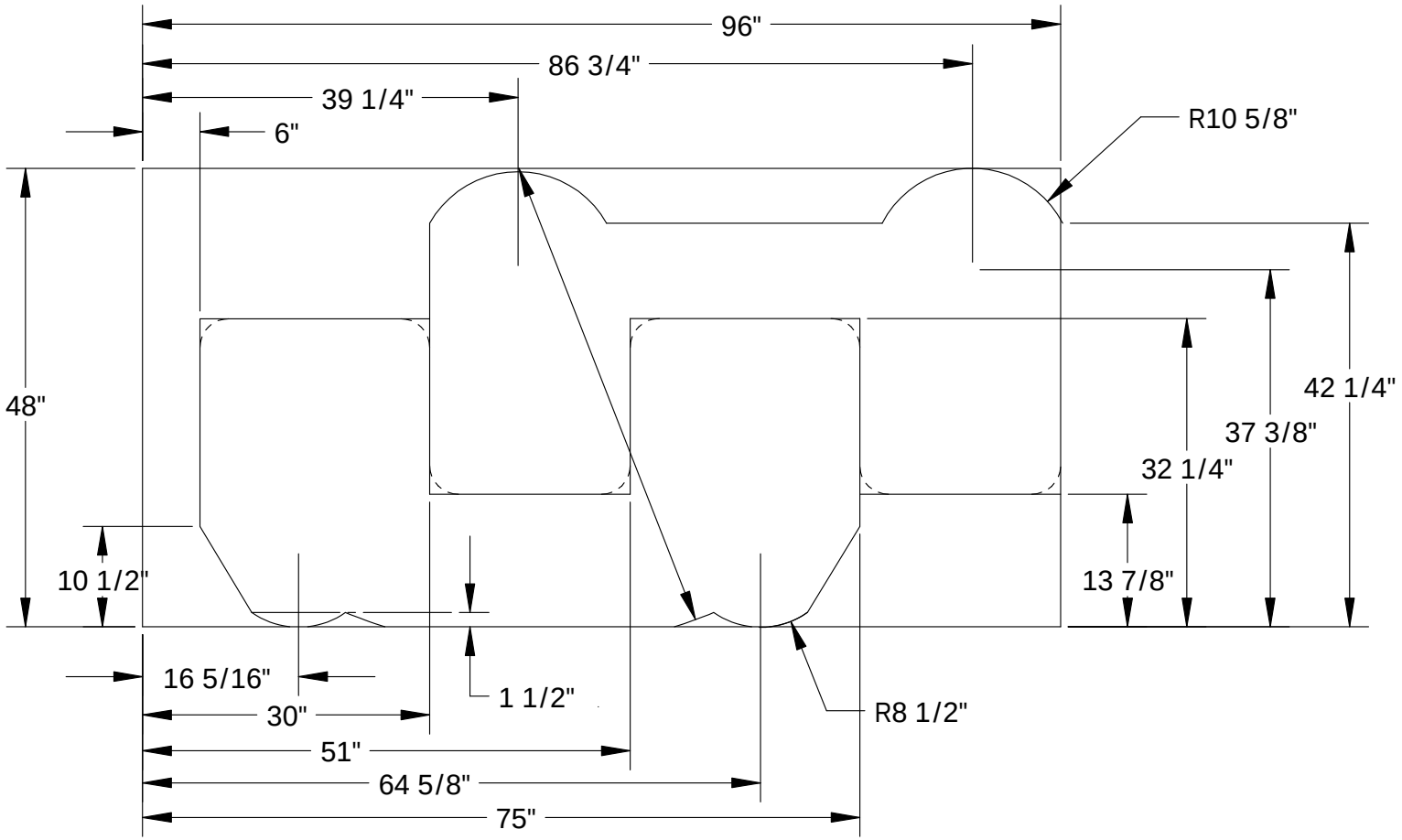
Factory Five Racing, Inc.

TITLE:
BODY BUCK

SIZE A | DWG. NO. 11190 | REV B

SCALE: 1:20 WEIGHT: | SHEET 1 OF 2

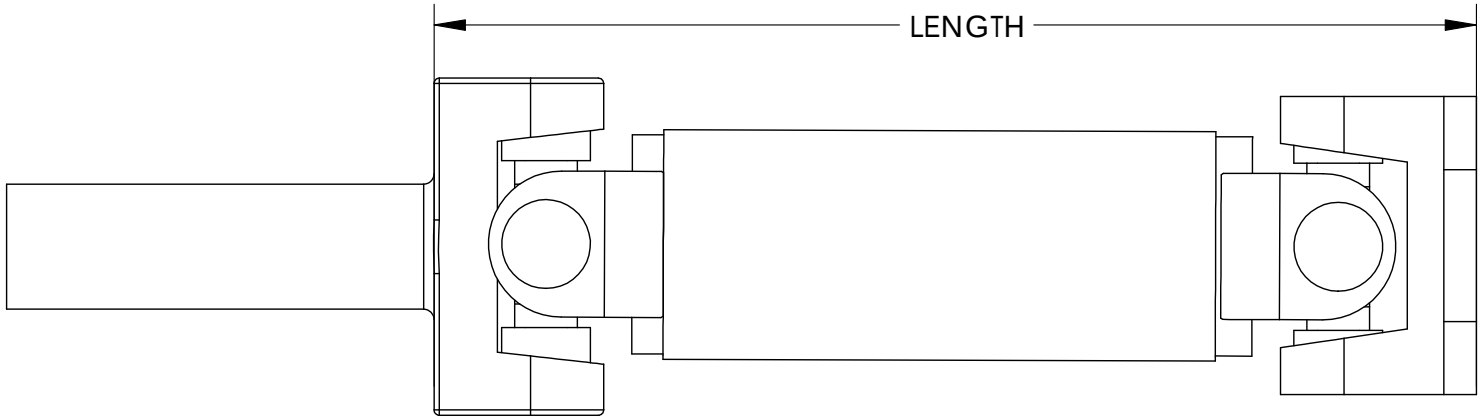
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	1998	
B	REDRAWN	1/21/04	



	UNLESS OTHERWISE SPECIFIED:		NAME	DATE	**Factory Five Racing, Inc.**
ROADSTER	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL +/-0.01 THREE PLACE DECIMAL +/-0.005 FOUR PLACE DECIMAL +/-0.001	DRAWN	DR	1/21/04	TITLE: BODY BUCK
		CHECKED			
		ENG APPR.			
		MFG APPR.			
	MATERIAL 3/4" PLYWOOD	Q.A.			SIZE A / DWG. NO. 11190 / REV B
USED ON	FINISH	COMMENTS:			
APPLICATION					SCALE: 1:16 WEIGHT: / SHEET 2 OF 2

5 4 3 2 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	12/18/00	
B	ALL SPECIFICATIONS ADDED	6/8/04	
C	SPECIFICATIONS ADDED	8/20/04	



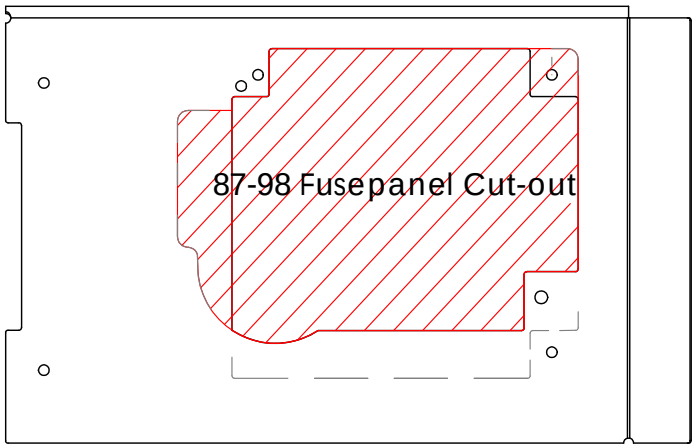
MODEL		LENGTH
Mk. III ROADSTER	1993 OR EARLIER FORD ENGINE USING T-5 OR TKO TRANS.	11.00"
Mk. III ROADSTER	302 USING 1994-1995 BELLHOUSING AND T-5 TRANS.	10.375"
Mk. III ROADSTER	4.6L ENGINE USING T-45 OR 3650 TRANSMISSION	13.00"
COUPE/SPYDER	1993 OR EARLIER PUSHROD ENGINE USING T-5 OR TKO TRANS.	12.50"

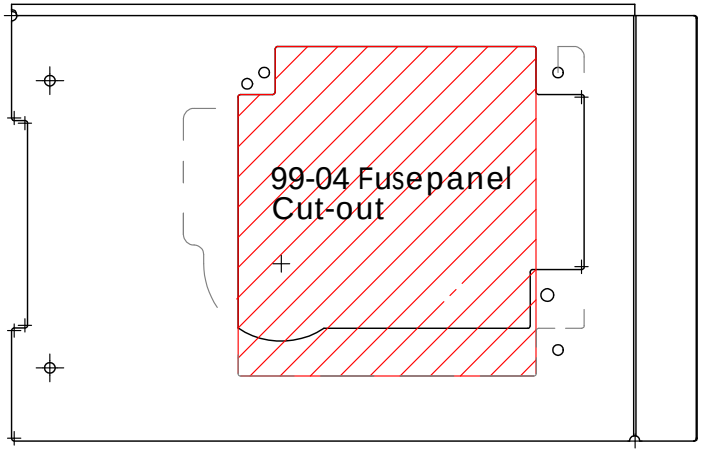
NOTE: FOR ALL OTHER TRANSMISSIONS, INSTALL TRANS. AND MEASURE

UNLESS OTHERWISE SPECIFIED:		NAME	DATE	**Factory Five Racing, Inc.**
ROADSTER	DRAWN	JI	12/18/03	
SPEC CAR	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL +/-0.01 THREE PLACE DECIMAL +/-0.005 FOUR PLACE DECIMAL +/-0.001	CHECKED		TITLE: DRIVESHAFT DIAGRAM
COUPE		ENG APPR.		
SPYDER		MFG APPR.		
USED ON	MATERIAL MUSTANG DRIVESHAFT	Q.A.		SIZE A / DWG. NO. 13023 / REV C
APPLICATION	FINISH	COMMENTS:		SCALE: 1:2 / WEIGHT: / SHEET 1 OF 1

5 4 3 2 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED





USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
TWO PLACE DECIMAL ±0.01
THREE PLACE DECIMAL ±0.005
FOUR PLACE DECIMAL ±0.001

MATERIAL
0.040" 6061-T6 ALUM

FINISH

PRINTED
3/3/2005

	NAME	DATE
DRAWN	JI	3/2/05
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

NOT TO SCALE

Factory Five Racing, Inc.

TITLE:

FUSE PANEL MOUNT

SIZE	DWG. NO.	REV
A	13647	B

SCALE: 1:2 | WEIGHT: | SHEET 3 OF 3

5 4 3 2 1

Appendix B – Donor Parts List

DONOR PARTS FROM FORD MUSTANG 4.6L, 1996 TO 2004

Assembly Name	Part Name	Qty	Removed from donor
ENGINE	CLUTCH CABLE	1	
	ENGINE, 4.6L FORD & TRANS, W/BOLTS/NUTS	1	
	TRANSMISSION MOUNT W/BOLTS	1	
	DRIVESHAFT AND 4 ORIGINAL BOLTS	1	
	CIRCLIP, CLUTCH CABLE RETAINER	1	
	ENGINE MOUNTS, CLEAN STRAIGHT, W/OEM NUTS	2	
	AIR FILTER HOUSING	1	
	MASS AIR SENSOR AND INTAKE HOSE	1	
EXHAUST	OXYGEN SENSORS	4	
	EXHAUST MANIFOLDS	2	
	FLANGE NUTS, HEADER	4	
COOLING	RADIATOR HOSES	1	
	HEATER HOSES, CUT AT FIREWALL, W/OEM CLAMPS	2	
	RADIATOR W/CAP	1	
	FAN, SHROUD, AND OVERFLOW TANK	1	
FUEL SYSTEM	FUEL TANK W/COVER AND MOUNT STRAPS	1	
	FUEL FILLER NECK W/BRACKET AND CAP	1	
	FUEL FILTER W/BRACKET AND HOSES	1	
	HIGH PRESSURE FUEL LINE, TANK TO FILTER	1	
	LOW PRESSURE RETURN FUEL LINE TO TANK (IF APPLICABLE)	1	
	HIGH PRESSURE FUEL LINE W/FITTING, ENGINE BAY, CUT 4" INTO STEEL LINE	1	
	LOW PRESSURE FUEL LINE W/FITTING, ENGINE BAY, CUT 4" INTO STEEL LINE	1	
	FUEL EVAPORATIVE CANISTER, SOLENOID AND TUBING	1	
	INERTIA CUT-OFF SWITCH	1	
BRAKES/WHEELS	BRAKE ASSEMBLY, FRONT, CUT 4" INTO STEEL BRAKE LINES	2	
	MOUNT, REAR BRAKE LINE, RIVETED TO DONOR	1	
	MASTER CYLINDER, HYDROBOOSTER, DISTRIBUTION BLOCK, STEEL CONNECTION LINES	1	
	FRONT WHEELS	2	
	EMERGENCY BRAKE HANDLE, CABLES, W/HARDWARE	1	
	BRAKE ASSEMBLY, REAR, W/LINES ON REAR AXLE	1	
	REAR WHEELS	2	
SUSPENSION	REAR QUAD SHOCKS W/ FRAME MOUNTS AND OEM NUTS/BOLTS	2	
	FRONT SPINDLES	2	
	CONTROL ARMS, FRONT W/BOLTS/NUTS	2	
	CONTROL ARMS, REAR UPPER W/BOLTS/NUTS	2	
	CONTROL ARMS, REAR LOWER W/BOLTS/NUTS	2	
	REAR AXLE ASSEMBLY, COMPLETE	1	
	REAR COIL SPRINGS, W/OEM RUBBER ISOLATOR SEATS	2	
STEERING	UPPER STEERING COLUMN, W/IGNITION, TURN SIGNAL STALK	1	
	STEERING RACK W/BOOTS, MOUNT BUSHINGS, HOSES	1	
ELECTRICAL	WIRING HARNESS, ENGINE	1	
	WIRING HARNESS, FRONT	1	
	WIRING HARNESS, DASH	1	
	WIRING HARNESS, TRANSMISSION	1	
	WIRING HARNESS, REAR	1	
	EEC V COMPUTER W/ PLASTIC HOLDER	1	
	HORNS	2	
	IGNITION CYLINDER WITH KEY	1	

	GAUGE CLUSTER	1	
	GROUND STRAP, BATTERY CABLE WITH TERMINAL	1	
MISCELLANEOUS	PEDAL BOX, BRAKE CLIP AND (2) PLASTIC WASHERS	1	
	ACCELERATOR PEDAL	1	

Appendix C – 4.6L Roadster Pack List

CUSTOMER:_____

BOX 1A PRIMARY CHASSIS COMPONENTS (ROADSTER)					
FFR #	***Part Name***	***Unit***	***Qty***	***Check-off***	***Status***
10632	'87-'95 ROADSTER BUILD MANUAL	EA	1.00		
11074	**ROADSTER IFS COMPONENTS**				
13819	'87-'04 SPINDLE ADAPTER BRACKET	EA	2.00		
14846	SHOCK, FRONT (Bilstein#F4BE3A273-T1)	EA	2.00		
13666	UPPER SPRING SEAT, (HAT)	EA	2.00		
13665	LOWER SPRING SEAT (THREADED)	EA	2.00		
13664	COIL-OVER THREADED SLEEVE	EA	2.00		
13667	SPRING, FRONT COIL-OVER, BLACK, 1.875", 450#	EA	2.00		
13067	ADJUSTABLE FRONT UPPER CONTROL ARM	EA	2.00		
10590	UPPER BALL JOINT	EA	2.00		
13525	BOLT, ½"-13x1.75" FLANGE BOLT, GRADE 8, (UPPER TUBULAR A-ARM)	EA	4.00		
11038	LOCK NUT, ½"-13 FLANGED, GRADE 8, (UPPER TUBULAR A-ARM)	EA	4.00		
12386	BOLT, ½"-13x3.25", (COIL-OVER UPPER MOUNT)	EA	2.00		
10842	BOLT, ½"-13x2.75" , (LOWER COIL-OVER MOUNT)	EA	2.00		
10834	LOCK NUT, NYLON, ½"-13, (UPPER/LOWER COIL-OVER MOUNT)	EA	4.00		
13976	WASHER, ½" SAE	EA	8.00		
14058	SPACER, 0.675", (FRONT COIL-OVER SHOCK, TOP)	EA	4.00		
14059	SPACER, 0.43", (FRONT COIL-OVER SHOCK, BOTTOM)	EA	4.00		
10937	COTTER PIN, (SPINDLE TO LOWER CONTROL ARM)	EA	2.00		
11073	**ROADSTER STEERING SYSTEM HARDWARE**				
14060	SPACER, 0.750" OD x 0.120" WALL, 2.45"LG.,(STEERING RACK SPACER)	EA	2.00		
12332	BOLT, 1/2"-13 x 4.00"	EA	2.00		
10834	LOCK NUT, NYLON, ½"-13	EA	2.00		
13976	WASHER, ½" SAE	EA	2.00		
10937	COTTER PIN, (FOR TIE ROD ENDS)	EA	2.00		
14687	POWER STEERING RACK INNER TIE ROD EXTENSION	EA	2.00		
13859	**STEERING SHAFT COMPONENTS**				
13695	UPPER STEERING SHAFT	EA	1.00		
11005	WASHER, 5/16" USS	EA	1.00		
10520	BOLT, 3/8"x1"	EA	1.00		
13860	1/4" SPRING WASHER	EA	2.00		
11071	**STEERING WHEEL / HARDWARE**				
11008	BOSS, ALUMINUM, (STEERING WHEEL TO UPPER SHAFT)	EA	1.00		
12239	STEERING WHEEL, 14" WOOD	EA	1.00		
12338	SCREW, M6-1MM x 30MM	EA	6.00		
12339	NUT, M6-1MM	EA	6.00		
14657	CENTER SECTION, ALUMINUM	EA	1.00		
11072	**STEERING BEARINGS / HARDWARE**				
12640	1" FLANGE BEARING	EA	1.00		
11024	BOLT, BUTTON HEAD, 5/16"-18 x 1"	EA	4.00		
13963	LOCK NUT, NYLON, 5/16"-18	EA	4.00		
10577	PILLOW BLOCK, 3/4" ID	EA	1.00		
11005	WASHER, 5/16" USS	EA	2.00		
END OF BOX 1A					

BOX 2A SECONDARY CHASSIS COMPONENTS (ROADSTER)					
FFR #	***Part Name***	***Unit***	***Qty***	***Check-off***	***Status***
10788	**ROADSTER SECONDARY BODY FASTENERS**				
11061	RUBBER BUMPER, SMALL, (HOOD POST)	EA	10.00		
10701	RUBBER BUMPER, LARGE, (HOOD POST)	EA	10.00		
10983	SCREW, #8 X 3/4", (HOOD POST)	EA	10.00		
13712	FOAM WEATHERSTRIP	EA	1.00		
13841	TRUNK SEAL, RUBBER PUSH-ON TRIM	FT	9.50		
10761	ALUMINUM-BODY SEAL, RUBBER PUSH-ON TRIM	FT	38.00		
10857	WEATHERSTRIP, ADHESIVE-BACK	ROLL	1.00		
12129	DOOR EDGE TRIM, C-CHANNEL, (3 FT FOR EACH SIDE)	FT	6.00		
11024	BOLT, BUTTON HEAD, 5/16"-18 x 1", (BODY MOUNT)	EA	12.00		
13963	LOCK NUT, NYLON, 5/16"-18 , (BODY MOUNT)	EA	4.00		
11005	WASHER, 5/16" USS, (BODY MOUNTS)	EA	36.00		
13025	"U" NUT, 5/16"-18 , (SIDE BODY MOUNT)	EA	8.00		
14161	¾"x ¾" PLASTIC END CAPS	EA	4.00		
14698	**RIVET PACKAGE**				
10782	RIVETS, 1/8" SHORT	EA	1000.00		
11290	RIVETS, 1/8" LONG	EA	100.00		
25799	RIVETS, 3/16" SHORT	EA	20.00		
11291	RIVETS, 3/16" LONG	EA	80.00		
12396	**BATTERY RELOCATION KIT**				
12397	BATTERY BOX	EA	1.00		
14821	CENTER MOUNT BATTERY CROSSBAR HOLDOWN	EA	1.00		
10801	"J" BOLT, ¼"-20 x 9"	EA	4.00		
10802	LOCK NUT, NYLON, ¼"-20	EA	4.00		
11088	WASHER, ¼" USS	EA	4.00		
10973	FLEXIBLE SERRATED POLYETHYLENE GROMMETING	FT	1.00		
13931	BATTERY CABLE W/ATTACHED TERMINALS	EA	1.00		
10896	**FUEL STRAP FASTENERS**				
11020	BOLT, ALLEN HEAD, 3/8"-16 x 2"	EA	4.00		
13964	LOCK NUT, NYLON, 3/8"-16	EA	4.00		
13977	WASHER, 3/8" SAE	EA	2.00		
11023	**PEDAL BOX HARDWARE**				
11020	BOLT, 3/8"-16 x 2", (PEDAL BOX TO FRONT PLATE, LOWER)	EA	2.00		
10520	BOLT, 3/8"-16 x 1", (PEDAL BOX TO FRONT PLATE, UPPER)	EA	3.00		
13964	LOCK NUT, NYLON, 3/8"-16, (PEDAL BOX TO FRONT PLATE)	EA	5.00		
13977	WASHER, 3/8" SAE	EA	5.00		
12336	BOLT, SOCKET HEAD, ¼"-20 x 1.5", (PEDAL BOX TO DOWN TUBES)	EA	4.00		
12335	BOLT, ¼"-20 x 3/4", (ACC. PEDAL AND CABLE)	EA	4.00		
11088	WASHER, ¼" USS, (PEDAL BOX, ACC. PEDAL AND CABLE)	EA	8.00		
10802	LOCK NUT, NYLON, ¼"-20, (PEDAL BOX, ACC. PEDAL AND CABLE)	EA	8.00		
12337	FENDER WASHER, ¼", (PEDAL BOX TO FRAME DOWN TUBES)	EA	4.00		
10629	PEDAL SPACER, 3/16" STEEL	EA	3.00		
13806	ALUMINUM FILL PLATE	EA	1.00		
11029	**INSULATED CLIP HARDWARE**				
10970	INSULATED CLIP, ¼"	EA	45.00		
13328	CABLE TIES, 8" LG., BAG OF 100	BAG	1.00		
10971	INSULATED CLIP, 5/8"	EA	30.00		
10975	**MISC. ELECTRICAL COMPONENTS**				
10972	¾" FLEXIBLE WIRE LOOM	FT	10.00		
12754	½" FLEXIBLE WIRE LOOM	FT	10.00		
10942	WIRE EXTENSION, 16 GAUGE	FT	16.00		
10940	BUTT CONNECTOR, RED	EA	30.00		
10973	FLEXIBLE SERRATED POLYETHYLENE GROMMETING	FT	4.00		

11070	**WIRING HARNESS MOUNTING HARDWARE**				
10984	BOLT, #14 x 1/2"	EA	7.00		
13979	SCREW WITH COUNTERSUNK WASHER, #8 x 3/4"	EA	8.00		
10995	SCREW, #10 X 1" , (INERTIA CUT-OFF SWITCH)	EA	2.00		
10851	SCREW, #14 x 1 1/2", (VACUUM CONTROLS)	EA	2.00		
11217	RING CONNECTOR, 16 GAUGE, BLUE, (COMPUTER GROUND)	EA	1.00		
13647	FUSE PANEL MOUNT, ALUMINUM	EA	1.00		
13327	**DASH ELECTRICAL COMPONENTS**				
10995	SCREW, SELF TAPPING #10	EA	4.00		
10942	WIRE EXTENSION, (TURN SIGNAL INDICATOR)	FT	4.00		
11180	FEMALE BLADE CONNECTOR, BLUE, ¼"	EA	4.00		
10817	BLUE LIGHT, (HIGH BEAM INDICATOR)	EA	1.00		
10816	GREEN LIGHT, (TURN SIGNAL INDICATOR)	EA	1.00		
10815	RED LIGHT, (WARNING INDICATOR)	EA	1.00		
13979	SCREW W/COUNTERSUNK WASHER, #8 x 3/4"(DASH/E-BRAKE BOOT)	EA	12.00		
11288	FLASHER, 3 PRONG	EA	1.00		
10596	ON/OFF SWITCH	EA	2.00		
11053	HORN BUTTON	EA	1.00		
14744	**ASTON LEMANS CAP COMPONENTS**				
14651	ASTON LEMANS CAP	EA	1.00		
	INCLUDED WITH ABOVE PART# LEMANS ALUMINUM CAP LEMANS CAP TO BODY GASKET 2 HOSE CLAMP, 1 9/16" – 2 ½" 5 #8 x 3/4" SCREW GROUND STRAP #8-32, 1" BOLT #8-32 LOCKNUT WASHER #14 x ½" SCREW				
11030	EXTENSION TUBING, RUBBER 2" ID	FT	1.00		
14617	PLASTIC FILL CAP	EA	1.00		
14652	**FUEL LINE COMPONENTS**				
14745	UNION, ¼"	EA	1.00		
14844	BARB, ¼"	EA	2.00		
14747	UNION, 5/16"	EA	1.00		
14748	BARB, 5/16"	EA	2.00		
10855	HOSE CLAMP, 1/4" FUEL LINE	EA	5.00		
11138	HOSE CLAMP, 5/16" FUEL LINE	EA	5.00		
13900	FLEXIBLE FUEL LINE, 1/4" ID, HIGH PRESSURE	FT	3.00		
13932	FLEXIBLE FUEL LINE, 5/16" ID, HIGH PRESSURE	FT	3.00		
10984	SCREW, #14 x 1/2", (FUEL FILTER MOUNTING)	EA	3.00		
11076	**BRAKE LINE COMPONENTS**				
11024	BOLT, 5/16"-18 x 1", (EMERGENCY BRAKE HANDLE)	EA	2.00		
13025	"U" NUT, 5/16"-18, (EMERGENCY BRAKE HANDLE)	EA	2.00		
11005	WASHER, 5/16" USS, (EMERGENCY BRAKE HANDLE)	EA	2.00		
10984	SCREW, #14 x 1/2", (DONOR BRAKE LINE BRACKET)	EA	3.00		
13653	BRAKE LINE MOUNT BRACKET, 1/8" STEEL	EA	2.00		
12962	SCREW, #6x 1/2", (BRAKE LINE MOUNT BRACKET)	EA	4.00		
13743	BRAKE LINE UNION, 3/16"	EA	2.00		
25507	BRAKE LINE "T" ADAPTER, 2 FEMALE, 1 MALE	EA	1.00		
25502	10MM BRAKE LINE METRIC ADAPTER	EA	1.00		
12409	¼" BRAKE LINE ADAPTER	EA	1.00		
	END OF BOX 2A				

BOX 3A BODY FINISH COMPONENTS

FFR #	Part Name	Unit	Qty	Check-off	Status
14636	FACTORY FIVE BADGE	EA	3.00		
11043	HEADLAMP COMPONENTS	EA	2.00		
	INCLUDED WITH ABOVE PART# MOUNT GASKET BUCKET, BLACK PLASTIC 5 #8 x ½" SCREWS RETAINER RING, CHROME 3 RETAINER RING CLIPS 3 RETAINER RING CLIP SCREWS 2 ADJUSTMENT SCREWS OUTER TRIM RING, CHROME TRIM RING RETAINING CLIP TRIM RING SCREW GROMMET WIRING PIGTAIL				
13545	HALOGEN HEADLIGHT (WAGNER #H6024)	EA	2.00		
10983	SCREW, #8x 3/4" (HEADLIGHT TO BODY MOUNTING)	EA	2.00		
10621	FRONT TURN SIGNAL LIGHT, AMBER, TWIN FILAMENT	EA	2.00		
10622	REAR LIGHT, RED, TWIN FILAMENT	EA	4.00		
14234	LICENSE PLATE LIGHT/BRACKET COMPONENTS	EA	1.00		
	INCLUDED WITH ABOVE PART# 2 3/16" ALUMINUM RIVETS 2 LICENSE PLATE SCREWS 2 MOUNTING NUTS				
11019	THREE LOCK SET AND FASTENERS	EA	1.00		
	INCLUDED WITH ABOVE PART# 2 HOOD HANDLE HOLD DOWN BRACKET 1 TRUNK "T" HANDLE 2 HOOD "L" HANDLES 2 KEYS 2 CAM WEDGES, LONG 10 SCREWS, #8 X ¾", (HANDLE MOUNTING) LATCH/HOOK, TRUNK 2SCREWS, #14 x 1/2", (LATCH/HOOK, TRUNK) BOLT, #10-24 x 5", (TRUNK LATCH PIN) WASHER, #10, (TRUNK LATCH PIN) LOCK NUT, NYLON, #10-24 , (TRUNK LATCH PIN) TRUNK LATCH MOUNT, 1/16" STEEL LATCH PIN SLEEVE, 0.312" OD x 4.00", STAINLESS HINGED CAP (FOR LATCH PIN SCREW)				
10888	SHIFTER HANDLE COMPONENTS	EA	1.00		
	INCLUDED WITH ABOVE PART# CHROME SHIFTER ROD 2 SHIFTER BOLTS (ROD TO TRANSMISSION) SHIFTER BOOT SHIFTER RING, POLISHED STAINLESS 4 #8 x ¾" SCREW SHIFTER KNOB SHIFTER KNOB BASE				
10646	**HOOD MOUNTING COMPONENTS**				
14608	LH HOOD PIN MOUNT PLATE, FRONT, 1/16" STEEL	EA	1.00		
13532	RH HOOD PIN MOUNT PLATE, FRONT, 1/16" STEEL	EA	1.00		
11024	BOLT, 5/16"-18 x 1"	EA	4.00		
11005	WASHER, 5/16" USS	EA	8.00		
13963	LOCK NUT, NYLON, 5/16"-18	EA	4.00		
10813	HOOD PIN SET	EA	1.00		

	INCLUDED WITH ABOVE PART# 2 HOOD PINS 2 HOOD PIN PLATES 4 JAM NUTS 8 PAN HEAD SCREWS 2 HOOD PIN CLIP				
10553	**QUICK JACK BUMPER COMPONENTS**				
10654	SLEEVE, 6", (QUICKJACK BUMPER, FRONT)	EA	4.00		
12470	QUICKJACK, BENT LEFT (HOOK ON OUTSIDE OF CAR)	EA	2.00		
12471	QUICKJACK, BENT RIGHT, (HOOK ON OUTSIDE OF CAR)	EA	2.00		
10832	BOLT, 7/16"-14 x 7", (BUMPER MOUNT, FRONT/REAR)	EA	4.00		
13965	LOCK NUT, NYLON, 7/16"-14, (QUICKJACK BUMPER BOLT)	EA	4.00		
13976	WASHER, 1/2" SAE	EA	8.00		
10985	**SIDE LOUVERS**				
10814	SIDE LOUVER, ALUMINUM	EA	2.00		
10895	**WINDSHIELD TRIM PLATE**				
10944	BASE PLATE, ALUMINUM, (WINDSHIELD POST THROUGH BODY)	EA	2.00		
12780	SCREW, TRUSS HEAD, #6 X ½", (BASE PLATE)	EA	2.00		
11065	**DOOR COMPONENTS**				
10627	DOOR LATCH SET	EA	1.00		
	INCLUDED WITH ABOVE PART# LH DOOR LATCH RH DOOR LATCH 2 DOOR STRIKERS				
13531	SPACER, 3/16" STEEL, (DOOR LATCH)	EA	2.00		
10983	SCREW, #8 X 3/4"	EA	12.00		
12908	STAINLESS STEEL WASHER	EA	20.00		
11212	LOCK NUT, NYLON, 5/16"-24	EA	2.00		
12572	ACORN NUT, 3/8"-16	EA	8.00		
11005	WASHER, 5/16" USS	EA	8.00		
12408	LEATHER CHECK STRAP	EA	2.00		
11066	**MIRRORS/FASTENERS**				
10614	POLISHED SIDEVIEW MIRROR	EA	1.00		
10613	INTERIOR REARVIEW MIRROR	EA	1.00		
11086	SCREW, #8 X 1.5", (REARVIEW MIRROR)	EA	2.00		
10960	SPACER, ½" ODx 5/8", (REARVIEW MIRROR)	EA	2.00		
13024	**SEAT HARNESS/FASTENERS**				
12528	5 PT. SEAT HARNESS, BLACK	EA	2.00		
10833	BOLT, ½"-13 x 1.25"	EA	10.00		
13976	WASHER, 1/2" SAE	EA	20.00		
10834	LOCK NUT, NYLON, ½"-13	EA	10.00		
	END OF BOX 3A				

BOX 4A ANCILLARY COMPONENTS

FFR #	*Part Name*	*Unit*	*Qty*	*Check-Off*	*Status*
10789	AIR FILTER, CONICAL	EA	1.00		
10781	FAN BELT, SIX RIB, SINGLE	EA	1.00		
13661	**A-FRAME TRANSMISSION MOUNT /HARDWARE**				
13929	TRANSMISSION BOLT ON MOUNT, A-FRAME, POWDER COATED	EA	1.00		
10833	BOLT, 1/2"x 1.25"	EA	2.00		
10834	LOCK NUT, NYLON, 1/2"-13	EA	2.00		
10520	BOLT, 3/8"x 1.00"	EA	2.00		

13964	LOCK NUT, NYLON, 3/8"-16	EA	2.00		
11080	**ALTERNATE DRIVE PULLEY COMPONENTS**				
10775	PULLEY WHEEL, (TO REPLACE A/C)	EA	1.00		
10952	PULLEY SPACER, MACHINED ALUMINUM	EA	1.00		
12386	BOLT, ½"-13 x 3.25"	EA	1.00		
10834	LOCKNUT, NYLON, ½"-13	EA	1.00		
13976	WASHER, ½" SAE	EA	2.00		
13777	**ACCELERATOR CABLE COMPONENTS**				
13774	ACCELERATOR PEDAL CAPTURE	EA	1.00		
13775	ACCELERATOR CABLE	EA	1.00		
11212	5/16-24 LOCK NUT	EA	1.00		
13974	RETURN SPRING	EA	1.00		
13975	BALL STUD RETAINER W/BALL STUD	EA	1.00		
10992	**OIL FILTER RELOCATING KIT**				
12119	OIL FILTER RELOCATOR, (BOLTS ON TO CHASSIS)	EA	1.00		
10995	SCREW, #10 X 1", OIL FILTER RELOCATOR SCREW	EA	3.00		
10635	WASHER, #10, OIL FILTER RELOCATOR WASHER	EA	3.00		
12132	THREADED NIPPLE, (SCREWS INTO RELOCATOR)	EA	1.00		
12120	SPIN-ON-ADAPTER, (SCREWS ONTO ENGINE BLOCK)	EA	1.00		
12133	O-RING	EA	1.00		
12121	BRASS FITTING, BARBED, 1/2"x1/2" MPT	EA	4.00		
12134	THREADED HOLE PLUG	EA	2.00		
12118	OIL HOSE, 1/2"ID x 5FT	EA	1.00		
11206	HOSE CLAMP, (CONNECTION FROM HOSE TO BARBS)	EA	4.00		
13883	**STAINLESS RADIATOR HOSE KIT**				
13392	CORRUGATED METAL HOSE	FT	7.00		
13930	RADIATOR HOSE ADAPTER SET W/CLAMPS	EA	6.00		
	INCLUDED WITH ABOVE PART# REINFORCED 2.5" LONG RUBBER HOSE SMALL RUBBER HOSE ADAPTER LARGE RUBBER HOSE ADAPTER 2 HOSE CLAMPS				
10760	**FAN MOUNTING COMPONENTS**				
10668	RADIATOR FAN, 16", REVERSIBLE, 1620 CFM @ 13.7 A	EA	1.00		
10954	FAN MOUNT BAR, 1/16" STEEL	EA	2.00		
13979	SCREW WITH COUNTERSUNK WASHER, #8 x 3/4"	EA	8.00		
12455	FAN RELAY, SPST, 30/40 AMP	EA	1.00		
25839	RELAY SOCKET	EA	1.00		
10942	WIRE EXTENSION, 16 GAUGE, (FOR FAN WIRING)	FT	16.00		
10941	BUTT CONNECTORS, BLUE	EA	6.00		
11217	RING CONNECTORS, BLUE, 16 GAUGE, (FAN GROUND)	EA	2.00		
11180	0.25" FEMALE BLADE CONNECTOR	EA	2.00		
10984	SCREW, #14 x 1/2", (GROUND)	EA	2.00		

END OF BOX 4A

BOX 5A LOWER STEERING SHAFT / CUT DASH / BRAKE-FUEL LINE

FFR #	*Part Name*	*Unit*	*Qty*	*Check-Off*	*Status*
14553	LOWER STEERING SHAFT WITH 1987-1993 RACK ADAPTER (3/4"-36 SPLINE)	EA	1.00		
13544	MKIII CUT DASH BOARD	EA	1.00		
13738	BRAKE LINE, 3/16" O.D. x 60"	EA	4.00		
13740	BRAKE LINE, 3/16" O.D. x 20"	EA	1.00		
14692	BRAKE LINE, 3/16" O.D. x 8"	EA	1.00		

14751	FUEL LINE, ¼" O.D. x 60"	EA	2.00		
14752	FUEL LINE, 5/16" O.D .x 60"	EA	2.00		

END OF BOX 5A

BOX 6A MKIII PACKAGED ALUMINUM

FFR #	Part Name	Unit	Qty	Check-off	Status
10890	**COCKPIT PACKAGED ALUMINUM**				
10566	ALUMINUM MOUNT, DASH/SWITCH (FOUR WAY FLASHERS)	EA	1.00		
10638	ALUMINUM MOUNT, DASH/SWITCH (HEADLIGHT)	EA	1.00		
14578	ALUMINUM PANEL, LH COCKPIT REAR CORNER, UPPER SPLASH COVER	EA	1.00		
14579	ALUMINUM PANEL, RH COCKPIT REAR CORNER, UPPER SPLASH COVER	EA	1.00		
14580	ALUMINUM PANEL, LH COCKPIT REAR CORNER, LOWER SPLASH COVER	EA	1.00		
14581	ALUMINUM PANEL, RH COCKPIT REAR CORNER, LOWER SPLASH COVER	EA	1.00		
12275	ALUMINUM PANEL, SPEEDOMETER CABLE BLOCK OFF PLATE	EA	1.00		
12274	ALUMINUM PANEL, TRANSMISSION HARNESS BLOCK-OFF PLATE	EA	1.00		
14582	ALUMINUM PANEL, LH COCKPIT WALL, UNDER DOOR, SIDE	EA	1.00		
13642	ALUMINUM PANEL, RH COCKPIT WALL, UNDER DOOR, SIDE	EA	1.00		
10906	ALUMINUM PANEL, U-JOINT ACCESS PANEL, (REAR TUNNEL COVER)	EA	1.00		
14583	ALUMINUM PANEL, LH TRANSMISSION TUNNEL, REAR CORNER	EA	1.00		
13247	ALUMINUM PANEL, RH TRANSMISSION TUNNEL, REAR CORNER	EA	1.00		
14584	ALUMINUM PANEL, RH SIDE COCKPIT WALL, UNDER DOOR, TOP	EA	1.00		
13803	ALUMINUM PANEL, LH SIDE COCKPIT WALL, UNDER DOOR, TOP	EA	1.00		
10563	ALUMINUM PANEL, TRANSMISSION TUNNEL TOP COVER	EA	1.00		
12959	ALUMINUM PANEL, TRANS. TUNNEL COVER BLOCK-OFF PLATE W/O HOLE	EA	1.00		
14057	ALUMINUM PANEL, TRANS. TUNNEL COVER BLOCK-OFF PLATE W/HOLE	EA	1.00		
14733	ALUMINUM PANEL, DRIVER FOOTBOX, FRONT PATCH COVER	EA	1.00		
13140	ALUMINUM PATCH COVER, LARGE HALF, (OPTIONAL USE)	EA	1.00		
13141	ALUMINUM PATCH COVER, SMALL HALF, (OPTIONAL USE)	EA	1.00		
14842	**ENGINE BAY PACKAGED ALUMINUM**				
13713	ALUMINUM PANEL, ENGINE BAY PASS. "F" BLOCK-OFF	EA	1.00		
10865	ALUMINUM PANEL, FRONT NOSE FLOOR	EA	1.00		
12273	ALUMINUM PANEL, ENGINE HARNESS BLOCK-OFF PLATE	EA	1.00		
12407	ALUMINUM PANEL, DASH HARNESS BLOCK-OFF PLATE	EA	1.00		
10907	ALUMINUM PANEL, LH FRONT NOSE WALL	EA	1.00		
10908	ALUMINUM PANEL, RH FRONT NOSE WALL	EA	1.00		
10861	ALUMINUM PANEL, LH SPLASH GUARD	EA	1.00		
14587	ALUMINUM PANEL, RH SPLASH GUARD	EA	1.00		
14843	**TRUNK PACKAGED ALUMINUM**				
13855	ALUMINUM PANEL, LH/RH TRUNK WALL FRONT SIDE COVER PANEL	EA	2.00		
10870	ALUMINUM PANEL, LH/RH TRUNK WALL REAR SIDE COVER PANEL	EA	2.00		
14585	ALUMINUM PANEL, LH REAR SPLASH GUARD	EA	1.00		
14586	ALUMINUM PANEL, RH REAR SPLASH GUARD	EA	1.00		

END OF BOX 6A

BOX 7A MKIII INTERIOR TRIM / CARPET

FFR #	Part Name	Unit	Qty	Check-off	Status

10948	PADDED BLACK VINYL DASH COVER	EA	1.00		
10879	EMERGENCY BRAKE BOOT, BLACK VINYL	EA	1.00		
13936	**MKIII BLACK CARPET KIT**				
13910	CARPET, LH FOOTBOX FLOOR, OUTSIDE/FRONT	EA	1.00		
13911	CARPET, U-JOINT COVER	EA	1.00		
13913	CARPET, LH FOOTBOX FLOOR	EA	1.00		
13914	CARPET, RH OUTSIDE/FRONT FOOTBOX	EA	1.00		
13915	CARPET, COCKPIT REAR WALL, BEHIND SEATS	EA	1.00		
13916	CARPET, LH REAR WALL OUTER ¼	EA	1.00		
13917	CARPET, RH REAR WALL OUTER ¼	EA	1.00		
13918	CARPET, TRANSMISSION TUNNEL, TOP/WALLS	EA	1.00		
13919	CARPET, LH FLOOR, COCKPIT	EA	1.00		
13920	CARPET, RH FLOOR, COCKPIT	EA	1.00		
13923	CARPET, LH SUB-DOOR SECTION	EA	1.00		
13924	CARPET, RH SUB-DOOR SECTION	EA	1.00		
13925	CARPET, LH OUTSIDE FOOTBOX WALL	EA	1.00		
14621	CARPET, LH FRONT FOOTBOX WALL	EA	1.00		
13926	CARPET, WRAP AROUND BETWEEN FOOTBOXES	EA	1.00		
13927	CARPET, RH FOOTBOX FLOOR	EA	1.00		
13928	CARPET, 2"x 2" COVER	EA	2.00		

END OF BOX 7A

BOX 8A WINDSCREEN (ROADSTER)

FFR #	Part Name	Unit	Qty	Check-off	Status
10611	WINDSCREEN, CHROME ON BRASS (ROADSTER)	EA	1.00		

INCLUDED WITH ABOVE PART#
4 BOLTS, ½"-13 x 1.25"
8 WASHERS, ½" SAE
4 LOCK NUTS, NYLON, ½"-13

END OF BOX 8A

BOX 9 A BLACK VINYL SEATS

FFR #	Part Name	Unit	Qty	Check-off	Status
13939	VINYL ROADSTER SEATS WITH HARDWARE, BLACK	EA	1.00		

INCLUDED WITH ABOVE PART#
2 VINYL SEATS
8 WASHERS, 5/16" USS
8 SCREWS, 8mm x 30mm SCREW

END OF BOX 9A

C

BOX 10 A LH ROLLBAR (POWDER)

FFR #	Part Name	Unit	Qty	Check-Off	Status
13984	**LH POWDER COATED ROLLBAR COMPONENTS**				
14162	LH MAIN HOOP, ROLL BAR, 180 DEG, POWDER COATED BLACK	EA	1.00		
10647	ROLLBAR REAR LEG, POWDER COATED BLACK	EA	1.00		
10800	**ROLLBAR FASTENERS**				
10829	BOLT, 5/16"-18 x 2.5"	EA	4.00		

13963	LOCK NUT, NYLON, 5/16"-18	EA	4.00		

END OF BOX 10A

BOX 11 A SOLID AXLE ADAPTERS/HARDWARE

FFR #	Part Name	Unit	Qty	Check-Off	Status
10885	**REAR TRACTION-LOCK KIT**				
14019	RH TRACTION-LOK BRACKET	EA	1.00		
14021	LH TRACTION-LOK BRACKET	EA	1.00		
10833	BOLT, 1/2"-13 x 1.25", (UPPER, REAR TRACTION-LOCK EXTENTION)	EA	4.00		
10834	LOCK-NUT, NYLON, 1/2"-13, (UPPER, REAR TRACTION LOCK BRACKET)	EA	4.00		
13706	BOLT, M12 x 110MM, (CONTROL ARM TO TRACTION LOCK BRACKET)	EA	2.00		
13751	LOCKNUT, NYLON, M12, (CONTROL ARM TO TRACTION LOCK BRACKET)	EA	2.00		
13976	WASHER, 1/2" SAE	EA	12.00		
11196	REAR AXLE STRAP	EA	2.00		
10520	BOLT, 3/8"-16 x 1", (AXLE STRAP TO AXLE)	EA	2.00		
13964	LOCKNUT, NYLON, 3/8"-16, (AXLE STRAP TO AXLE)	EA	2.00		
13977	WASHER, 3/8", (AXLE STRAP TO AXLE)	EA	4.00		
12217	BOLT, 1/2"-20 x 3", (LOWER MOUNT)	EA	2.00		
12218	LOCKNUT, NYLON, 1/2"-20, (LOWER MOUNT)	EA	2.00		
13210	SHOCK SPACER SHIM	EA	8.00		
11075	**QUAD SHOCK FASTENERS**				
11058	BOLTS, 7/16"-14 x 1.25"	EA	4.00		
13965	LOCK NUT, NYLON, 7/16"-14	EA	4.00		
13976	WASHER, ½" SAE	EA	8.00		
13842	**REAR SPRING PERCH KIT**				
13843	LH REAR SPRING PERCH	EA	1.00		
13652	RH REAR SPRING PERCH	EA	1.00		
10833	BOLT, 1/2"-13 x 1.25", (UPPER, REAR TRACTION-LOCK EXTENTION)	EA	8.00		
10834	LOCK NUT, NYLON, 1/2"-13	EA	8.00		
13976	WASHER, 1/2" SAE	EA	16.00		

END OF BOX 11A

BOX 12 B '96-'04 STRAIGHT TUBES

FFR #	Part Name	Unit	Qty	Check-Off	Status
13849	LH STRAIGHT PIPE, 4-PORT, '96-'04	EA	1.00		
13850	RH STRAIGHT PIPE, 4-PORT, '96-'04	EA	1.00		
13890	COPPER SPACER, FORMED	EA	1.00		
13682	TWO HOLE GASKET	EA	1.00		

END OF BOX 12B

BOX 13 A ROADSTER SIDE EXHAUST (UNCOATED)

FFR #	Part Name	Unit	Qty	Check-Off	Status
12426	LH 4 INTO 4 SIDE EXHAUST	EA	1.00		

12427	RH 4 INTO 4 SIDE EXHAUST	EA	1.00		
14240	**ROADSTER EXHAUST MOUNTING HARDWARE**				
12423	HEADER TO SIDE EXHAUST GASKET	EA	2.00		
11040	BOLT, ALLEN HEAD, 3/8"-16 x 1.25", (EXHAUST MOUNTING FLANGE)	EA	8.00		
12172	LOCK NUT, MECHANICAL, 3/8"-16, (EXHAUST MOUNT FLANGE)	EA	8.00		
13704	SIDE EXHAUST SIDE MOUNT PLATE, 3/16" STEEL	EA	2.00		
12776	BOLT, 5/16"-18 x 1.5", (OUTSIDE EXHAUST MOUNT)	EA	2.00		
11024	BOLT, 5/16"-18 x 1", (OUTSIDE EXHAUST MOUNT)	EA	4.00		
13963	LOCK NUT, NYLON, 5/16"-18	EA	8.00		
13778	RUBBER EXHAUST MOUNT	EA	2.00		
10851	SCREW, #14 x 1 1/2", (RUBBER HANGER TO CHASSIS)	EA	2.00		
10829	BOLT, 5/16"-18 x 2.5", (INSIDE EXHAUST MOUNT TO CHASSIS)	EA	2.00		
11005	WASHER, 5/16"	EA	4.00		
14742	FRONT EXHUAST HANGER, OVAL, RUBBER	EA	2.00		
END OF BOX 13A					

CHASSIS NUMBER:_____

MKIII M O U N T E D C O M P O N E N T S					
FFR #	***Part Name***	***Unit***	***Qty***	***Check-Off***	***Status***
13029	MKIII ROADSTER FRAME, COMPLETE	EA	1.00		
10788	**SECONDARY BODY FASTENERS**				
11024	BOLT, 5/16"-18 x 1", (BODY MOUNT)	EA	6.00		
12776	BOLT, 5/16"-18 x 1½", (BODY MOUNT)	EA	2.00		
13963	LOCK NUT, NYLON, 5/16"-18, (BODY MOUNT)	EA	4.00		
11005	WASHER, 5/16" USS, (BODY MOUNT)	EA	20.00		
13025	"U" NUT, 5/16"-18, (SIDE BODY MOUNT)	EA	4.00		
14658	**TRUNK HINGE COMPONENTS**				
10616	LH/RH VINTAGE HINGES, TRUNK, PAIR	EA	1.00		
11088	FLAT WASHER, 1/4", (VINTAGE HINGES)	EA	4.00		
11212	LOCK NUT, NYLON, 5/16"-24, (VINTAGE HINGES, LARGE)	EA	2.00		
11213	LOCK NUT, NYLON, 1/4"-28, (VINTAGE HINGES, SMALL)	EA	4.00		
10873	TRUNK HINGE SUPPORT, 1/16" STEEL, (BODY MOUNT, REAR)	EA	2.00		
10876	**DOOR HINGE KIT**				
13326	NUT, SQUARE, CROWNED, 5/16"-18, (DOOR HINGE TO FRAME)	EA	4.00		
13183	HINGE BUSHING, 1/2" OD x 1/4"LG, BRONZE	EA	4.00		
13325	SHOULDER BOLT, 3/8" SHOULDER x 0.50", 5/16"-18	EA	4.00		
13963	LOCK NUT, NYLON, 5/16"-18	EA	4.00		
11005	WASHER, 5/16" USS	EA	8.00		
13977	WASHER, 3/8" SAE	EA	4.00		
11024	BOLT, 5/16"-18 x 1", (DOOR HINGE TO FRAME)	EA	4.00		
13964	LOCKNUT, NYLON, 3/8"-16, (DOOR HINGE TO DOOR)	EA	4.00		
14600	LH DOOR HINGE FRAME MOUNT	EA	1.00		
14601	LH DOOR HINGE DOOR MOUNT	EA	1.00		
14602	RH DOOR HINGE FRAME MOUNT	EA	1.00		
14603	RH DOOR HINGE DOOR MOUNT	EA	1.00		
10570	**BODY, COMPONENTS**				
10841	BODY PANEL, DOOR, LH	EA	1.00		
12181	BODY PANEL, DOOR, RH	EA	1.00		
14015	BODY PANEL, HOOD	EA	1.00		
10887	BODY PANEL, MAIN BODY, 1 PC	EA	1.00		
10818	BODY PANEL, TRUNK	EA	1.00		
13482	PANEL TRIMMING STICKER	EA	1.00		
10553	**QUICKJACK BUMPERS W/HARDWARE**				
10832	BOLT, 7/16"-14 x 7", (BUMPER MOUNT, REAR)	EA	4.00		

13965	LOCK NUT, NYLON, 7/16"-14, (QUICKJACK BUMPER)	EA	4.00		
12456	SLEEVE, 1.75", (QUICKJACK BUMPER, REAR OUTER)	EA	4.00		
10957	SLEEVE, 3.75", (QUICKJACK BUMPER, REAR INNER)	EA	4.00		
13977	WASHER, 3/8" SAE	EA	16.00		
14841	**COCKPIT MOUNTED ALUMINUM**				
14627	SCREWS, SELF TAPPERS, KIT BUILDING	EA	50.00		
10859	ALUMINUM PANEL, LH FOOTBOX, TOP/INSIDE SECTION	EA	1.00		
10858	ALUMINUM PANEL, LH FOOTBOX, TOP/OUTSIDE SECTION	EA	1.00		
10905	ALUMINUM PANEL, LH FOOTBOX, VERTICAL WALL, INSIDE	EA	1.00		
10904	ALUMINUM PANEL, LH FOOTBOX, VERTICAL WALL, FRONT	EA	1.00		
10554	ALUMINUM PANEL, LH FOOTBOX, VERTICAL WALLS, OUTSIDE	EA	1.00		
12985	ALUMINUM PANEL, LH FOOTBOX, DROPPED FLOOR	EA	1.00		
10557	ALUMINUM PANEL, LH COCKPIT FLOOR, W/TUNNEL WALL	EA	1.00		
10558	ALUMINUM PANEL, RH COCKPIT FLOOR, W/TUNNEL WALL	EA	1.00		
13634	ALUMINUM PANEL, RH FOOTBOX, DROPPED FLOOR	EA	1.00		
10853	ALUMINUM PANEL, RH FOOTBOX, TOP	EA	1.00		
13139	ALUMINUM PANEL, RH FOOTBOX, VERTICAL WALL, INSIDE WALL	EA	1.00		
13138	ALUMINUM PANEL, RH FOOTBOX, VERTICAL WALL, FRONT WALL	EA	1.00		
10551	ALUMINUM PANEL, RH FOOTBOX, VERTICAL WALL, OUTSIDE WALL	EA	1.00		
10823	ALUMINUM PANEL, REAR COCKPIT VERTICAL WALL (BEHIND SEATS)	EA	1.00		
12806	ALUMINUM PANEL, TRANSMISSION TUNNEL FRONT VERTICAL WALL	EA	1.00		
10892	ENGINE BAY MOUNTED ALUMINUM				
10864	ALUMINUM PANEL, LH ENGINE BAY WALL "F"	EA	1.00		
10863	ALUMINUM PANEL, RH ENGINE BAY WALL "F"	EA	1.00		
10559	ALUMINUM PANEL, FIREWALL	EA	1.00		
10963	ALUMINUM PANEL, RH FIREWALL EXTENSION	EA	1.00		
10889	TRUNK MOUNTED ALUMINUM				
10560	ALUMINUM PANEL, TRUNK FLOOR, FRONT SECTION	EA	1.00		
10561	ALUMINUM PANEL, TRUNK FLOOR, REAR, MAIN CARGO AREA	EA	1.00		
14588	ALUMINUM PANEL, RH TRUNK WALL, FRONT	EA	1.00		
13637	ALUMINUM PANEL, LH TRUNK WALL, FRONT	EA	1.00		
13636	ALUMINUM PANEL, LH/RH TRUNK WALL, REAR	EA	2.00		
	END OF MOUNTED COMPONENTS				

C

Appendix D – 3-Link Instructions

3 Link Rear Suspension
Installation Instructions – Initial Build with Frame Prepared at Factory

Parts Included in Kit:

13269	**3 LINK HARDWARE**	EA	1.00
10833	1/2"-13 x 1.25" BOLT	EA	4.00
13976	1/2" WASHER	EA	10.00
12387	5/8" WASHER	EA	4.00
12383	5/8"-11 NYLON LOCKNUT	EA	2.00
14063	SHOCK SPACER BUSHING, 0.32"	EA	1.00
13788	1/2"-13 x 3.50" BOLT	EA	2.00
10834	1/2"-13 NYLON LOCK NUT	EA	6.00
13210	SHOCK SPACER SHIM	EA	2.00
13212	5/8"-11 x 3.50" BOLT	EA	2.00
13780	**UPPER LINK FRAME MOUNT**	EA	1.00
13206	**PANHARD BAR FRAME MOUNT**	EA	1.00
13200	**PANHARD BAR AXLE MOUNT (PASSENGER SIDE)**	EA	1.00
14021	**TRACTION-LOK BRACKET (DRIVER)**	EA	1.00
14147	**PANHARD BAR KIT**	EA	1.00
13167	PANHARD BAR	EA	1.00
13166	JAM NUT, LEFT HAND THREAD	EA	1.00
13165	ROD END, LEFT HAND THREAD	EA	1.00
12380	JAM NUT, RIGHT HAND THREAD	EA	1.00
12348	ROD END, RIGHT HAND THREAD	EA	1.00
14064	ROD END SPACER, 0.375"	EA	4.00
14065	ROD END SPACER, 0.25"	EA	1.00
12382	5/8"-11 x 3" BOLT	EA	2.00
12387	5/8" WASHER	EA	2.00
12383	5/8"-11 NYLON LOCKNUT	EA	2.00
12385	2.5" LOWER FRAME MOUNT BOLT	EA	1.00
10834	1/2"-13 NYLON LOCK NUT	EA	1.00
14148	**UPPER LINK KIT**	EA	1.00
13211	UPPER LINK TUBE	EA	1.00
12217	1/2"-13 x 3" BOLT	EA	4.00
12218	CLAMP LOCKNUT, 1/2"-20	EA	4.00
12380	JAM NUT, RIGHT HAND THREAD	EA	1.00
12348	ROD END, RIGHT HAND THREAD	EA	1.00
14065	ROD END SPACER, 0.25"	EA	4.00
13166	JAM NUT, LEFT HAND THREAD	EA	1.00
13165	ROD END, LEFT HAND THREAD	EA	1.00
12382	5/8"-11 x 3" BOLT	EA	2.00
12387	5/8" WASHER	EA	2.00
12383	5/8"-11 NYLON LOCKNUT	EA	2.00
11020	3/8"-16 x 2" BOLT	EA	1.00
13964	3/8"-16 NYLON LOCK NUT	EA	1.00
13977	3/8" WASHER	EA	2.00
13203	**UPPER LINK AXLE MOUNT**	EA	1.00
13322	**UPPER LINK, AXLE CLAMP**	EA	1.00

***Tools**: 3/16", 3/8", ½" drill bits, 5/8", ¾", 15/16", 1" wrenches, 3/8", 5/8", ¾", 15/16" sockets, Ratchet, Drill, Ruler/Tape measure, Pliers, Flat head Screwdriver, Tin Snips/scissors/razor, Marker*

Note: For participants in the Factory Five Challenge several of these components should be welded in place. (This also applies to street cars used on the track with race compound tires.) Specifically the panhard bar mount on the frame, and the upper control arm mount on the axle. Care should be taken when welding to the axle housing to ensure that no warping of the axle tubes occurs.

Note:

- The axle limiting straps are not required when using the 3-link suspension.
- If the kit is ordered with the 3-link option then the panhard bar frame mount will be welded to the frame at the factory. This means that the driver side rear Brake rotor and Caliper will need to be installed after the rear end is passed through the opening between the panhard bar mount and the frame.

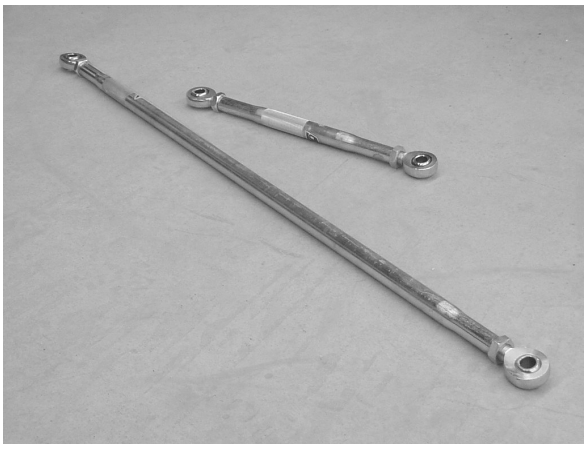
Installation Instructions

1. Remove the traction lock bracket from each side of the Mustang rear-end. Replace with the competition driver's side and competition passenger's side bracket using the ½" bolts provided in the kit. You may need a rubber mallet as they are purposely a snug fit.
2. Place the Mustang rear-end on jack stands under the frame (also on jack stands) at approximate final height relative to the frame.
3. Install the lower control arm on each side using donor bolts. Hand tighten. The lower bolt holes provide more traction than the upper holes.
4. Install rear coil-over shocks using grade 8 bolts, nuts, washers, and spacers provided in the kit. The top shock mount gets 2 equal spacers while the bottom mount gets a larger spacer toward the front and a ⅛" shim (provided) toward the rear. The lower shock bolts should be installed from front to rear.

Panhard bar Axle mount bracket

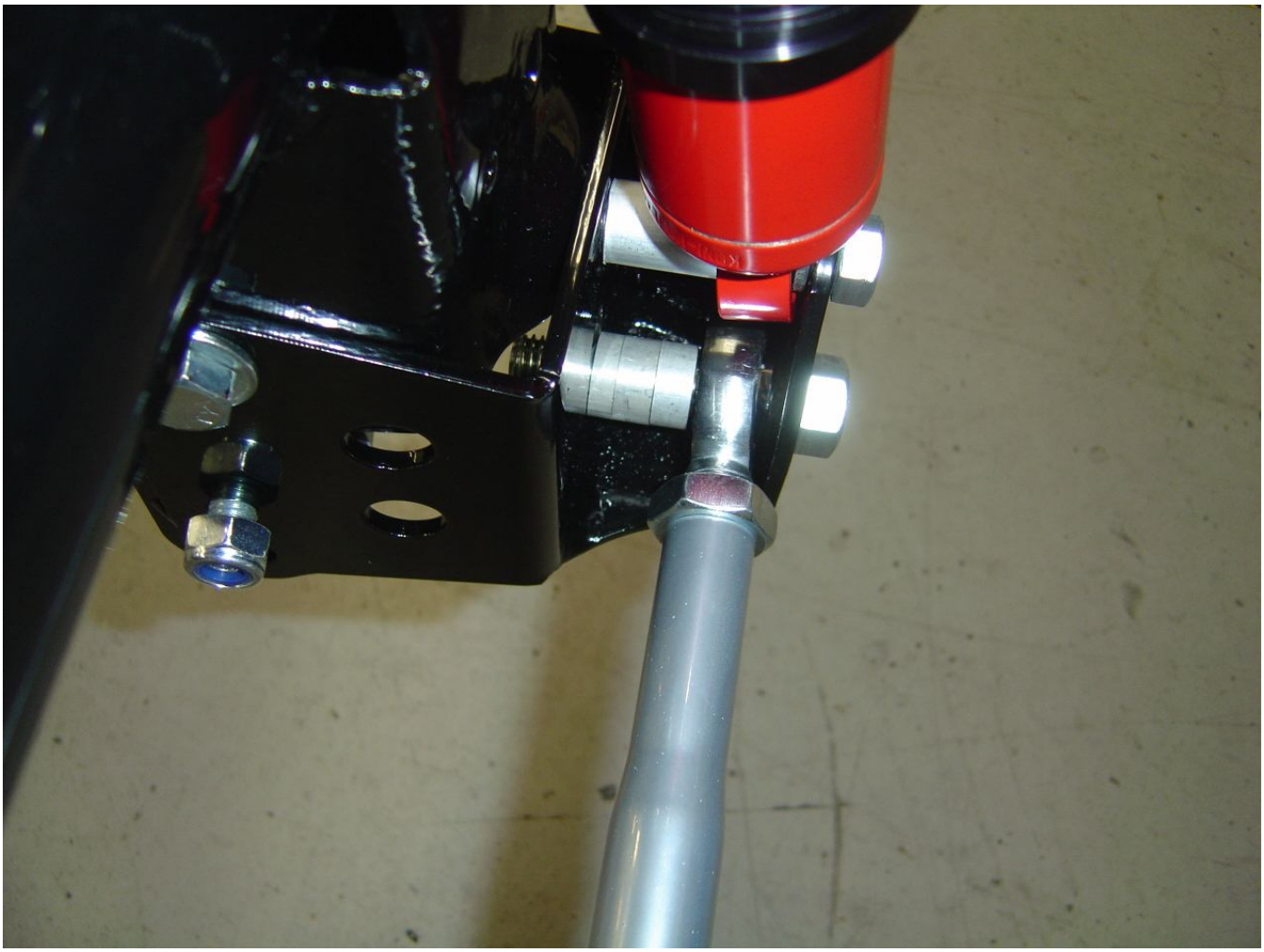
Driver's Side Competition Traction-lok bracket

5. Once the hole has been drilled, install the panhard bar. Tighten all nuts.
6. Install a jam nut on each of the rod ends, remembering that two of them are left hand thread.
7. Thread each rod end into the panhard bar and upper arm until approximately ¼" of thread is showing between the jam nut and end of the rod end.



Panhard bar and upper arm.

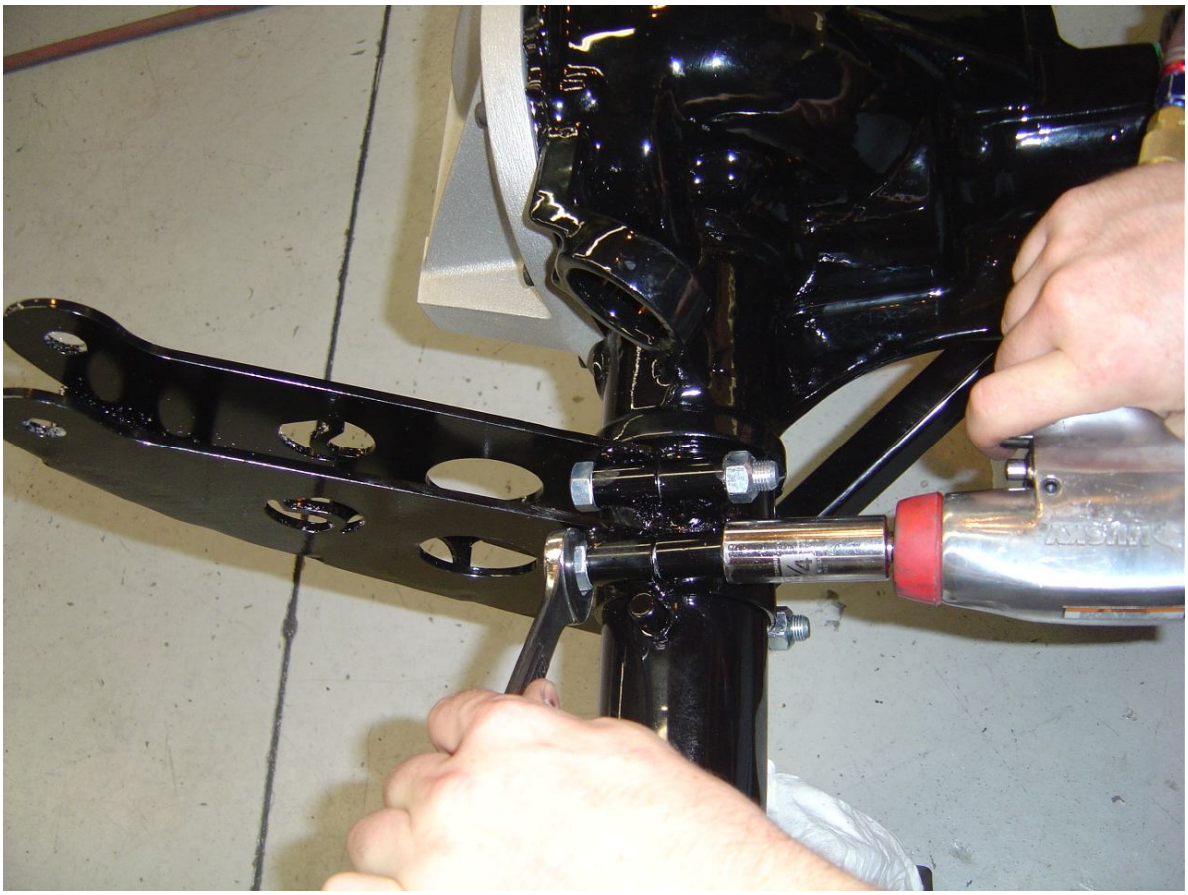
8. Mount the panhard bar to the car using the ⅝”x 3” bolts and spacers. Install the panhard bar into the passenger side traction lock bracket. Three spacers are used in the front (2) @ 0.375" (FFR# 14064) and (1) @ 0.25" (FFR# 14065). The rear uses the thin 0.0625" shim (FFR# 13337). It will be necessary to adjust the length some to fit, make sure that you adjust the same amount on both sides. There should never be less than ¾” of threads screwed into either the Panhard bar or the upper arm.

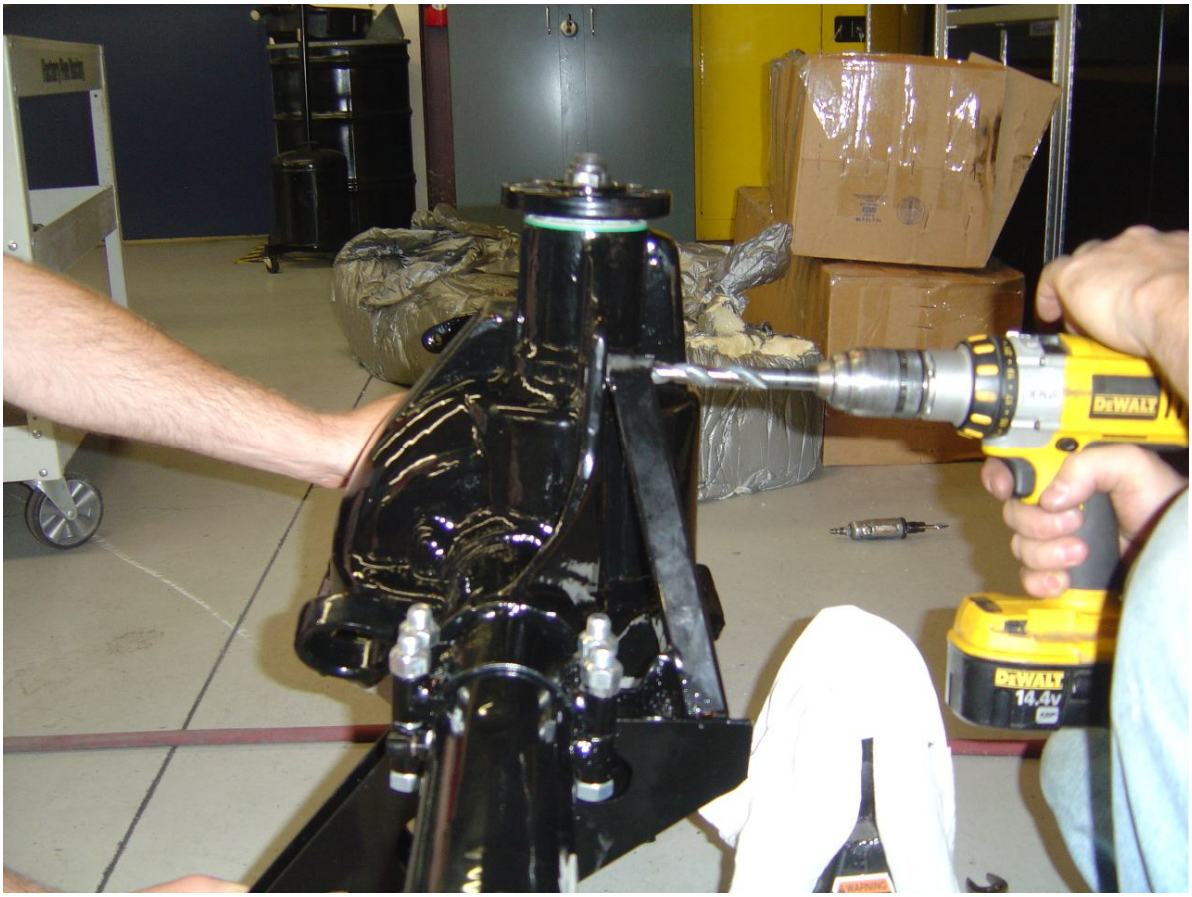


Panhard bar axle mount

9. Attach the Panhard bar to the frame mount.
10. Test fit the two halves of the upper arm mount together. If it is hard to put all of the bolts in the mount holes, put in as many as you can then use a ½" drill bit through the remaining bolt holes.
11. The upper arm bracket clamps around the axle with the lower leg attaching to the hole where the counter weight was attached using the ⅜" Allen head bolt. If you still have this weight on your axle you will have to remove it. If the mounting hole does not line up well with the existing hole, drill the axle flange by drilling through the mount into the flange.

NOTE: Before Clamping the mount tight check the clearance around the axle vent tube, if the mount interferes with this tube then you need to grind or file some material away. Once this is done tighten the four bolts on the axle clamp the bolt through the housing.

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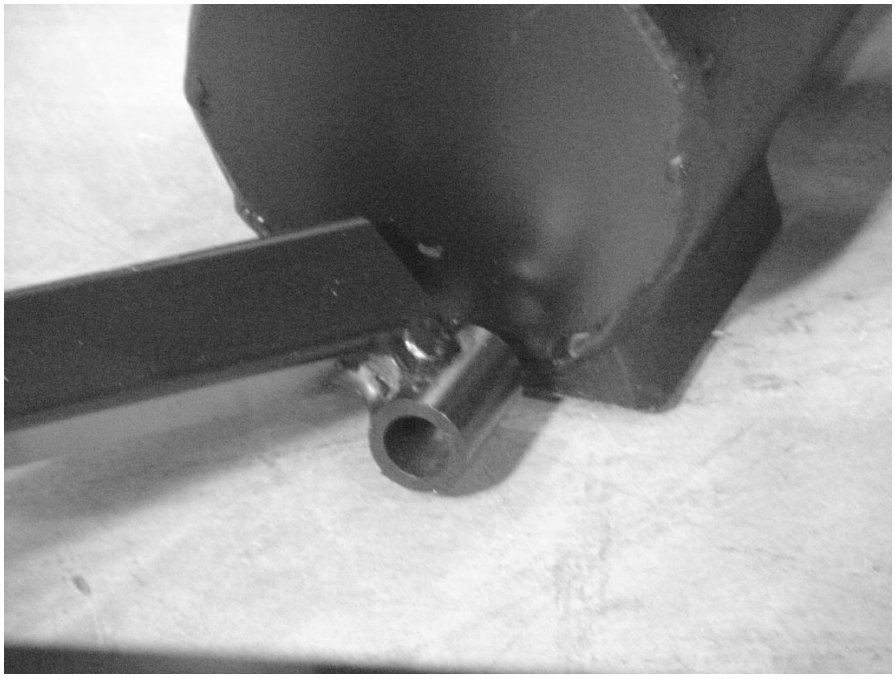
DEWALT
14.4v


WARNING

12. Install the rod ends with jam nuts in the upper control arm and bolt the arm in place. One end bolts to the axle bracket just installed and the other end to the bracket welded in at the factory on the passenger side of the 2"x 3" frame rail. Use the spacers and ⅝" bolts provided. The lower bolt hole provides more traction than the upper hole.
13. Drill the Panhard bar frame mount hole for the front leg mount through the back of the 4" round tube. Make sure before drilling that the hole is lined up close to the center of the 2"x 3" vertical tube so that a nut can be attached on the back of the bolt from the bottom.



Drill through mount into back of frame

14. Bolt the Panhard bar frame mount to the back of the frame using the supplied ½"x 2.5" bolt and locknut.
15. To set the alignment, make sure that your ride height is where you want it, then adjust the pinion angle. We usually run about 2˚ up on the rear axle, but you can adjust this to fit your particular set-up.
16. The panhard bar can also be set left to right, as well as leveled.
17. Double check all your nuts and bolts, and make sure that all four jam nuts are tight.

TESTING AND TUNING

The three link will make a dramatic difference in the way your car handles, most noticeably the lower roll center in the rear will produce much more body roll in corners. In order to fully optimize the new suspension we recommend using the rear coil-over shocks and springs with the set-up.

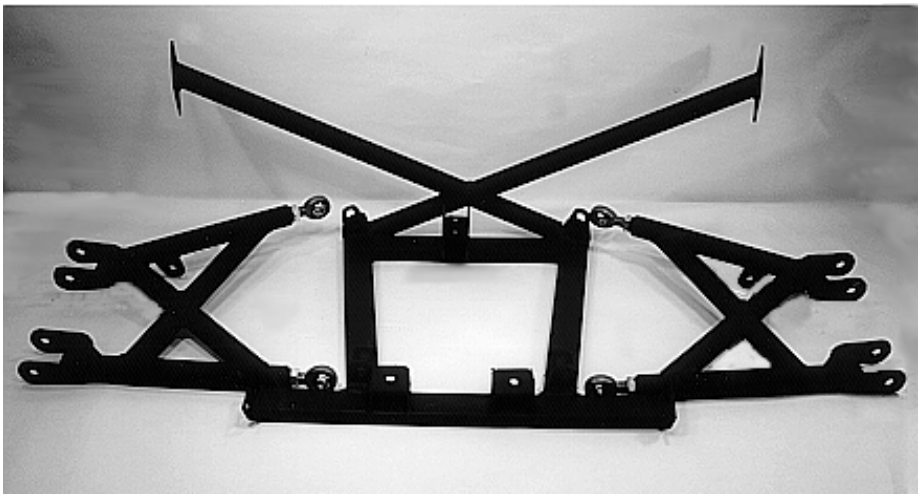
Appendix E – Independent Rear Suspension

Independent Rear Suspension
Installation Instructions

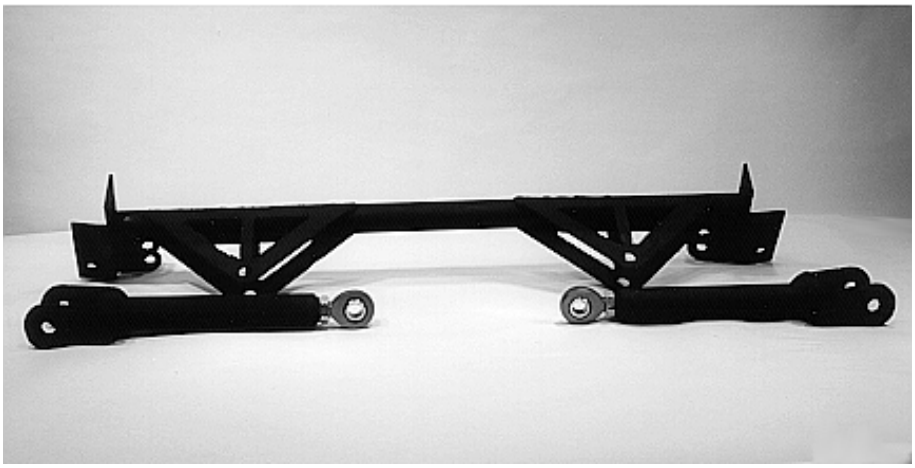
Note:

- These instructions are designed to supplement the Assembly manual where the assembly process is different from the build using a solid axle. Sections of the manual that deal with the assembly of the rear end will not apply and can be skipped. Read through these instructions before beginning assembly as some of the changes occur early in the build-up.
- These instructions use donor Thunderbird parts. The assembly process is similar if using the FFR 14791 IRS Completion Package.
- Using the Factory Five Racing Independent Rear Suspension will require a conversion to 5 lug which, if you are not currently using 5 lug will require new wheels.
- If you need 11" 5 Lug rotors for the front then use '82-'83 Lincoln Continental or '91 Lincoln Mark VII LSC or Ford Motorsport # M-1102-C

I. Parts Included in Kit:



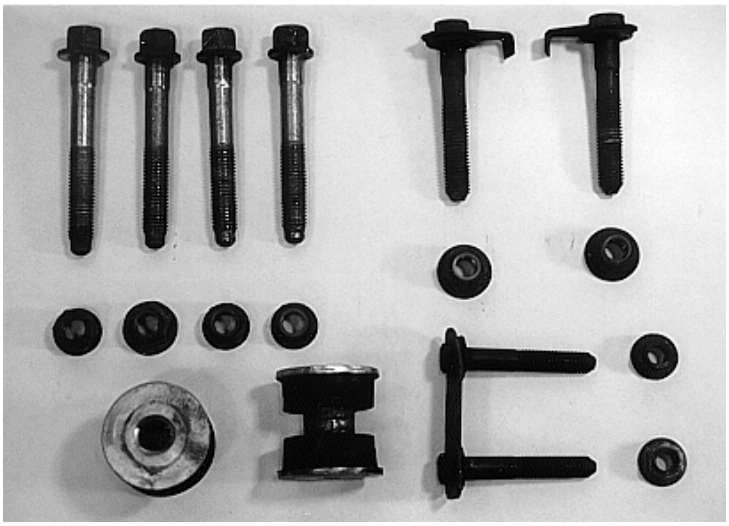
Lower arms and Cage (Cage separate from frame)



Upper arms and Cage (Cage separate from frame)

I. Thunderbird Parts needed

- 8.8” Center section and front mounting bushings
- Spindles and attaching hardware
- Brakes with flexible lines and mounting brackets
- Rear 10.50” brake Rotors.



Donor bolts/fasteners needed. (Upper) Spindle attaching bolts.
(Lower left) Center Section front mounts. (Lower right) Center Section rear mount bolts.

III. Non-Thunderbird parts needed

- If axle hop is felt add Mustang Quad shocks – Do not use aftermarket KYB shocks
- ½” Lug nuts (if they don’t come with your wheels)
- 15/16” Master cylinder (FFR# 14739) if using a Mustang Pedal Box only.

Note:
Parts can be bought new in the FFR 14791 IRS Completion Package which includes the following:

New Aluminum 8.8” IRS housing
3.27 gear set

Ford Traction lock limited slip differential
New Ford aluminum spindles with bearings, rubber bushings and 5 x 4.50" bolt circle hubs
Rear Brake Calipers
Rear Brake Pads
Stainless braided brake lines
11.65" Rear brake Rotors
Rear caliper adapter brackets

IV. Tools Needed

Drill
3/16" drill Bit
3/8", 3/4", 15/16" sockets
3/8", 3/4", 15/16" wrenches
3/8"-7/16" Brake line box wrench
Brake line bender
Snap ring pliers
Ruler/Tape measure
Pliers
Flat head Screwdriver
Tin Snips/scissors/razor
Marker

V. Supplies needed

3.25 pints Gear oil
4 oz. Friction Modifier
Brake Fluid
Rear brake pads

VI. Torque Specification Chart

	Ft-lb
Metric Threads	
M12	60
U.S. Threads	
¼-20	6-9
½"-13	70
5/8"-11	85

VII. Alignment Specifications

Front: Caster 3
Camber -1
Toe in 1/16" Total

Rear: Camber -1
Toe in $^{1}/_{16}$" Total

VIII. Selection and Disassembly of the Thunderbird Donor

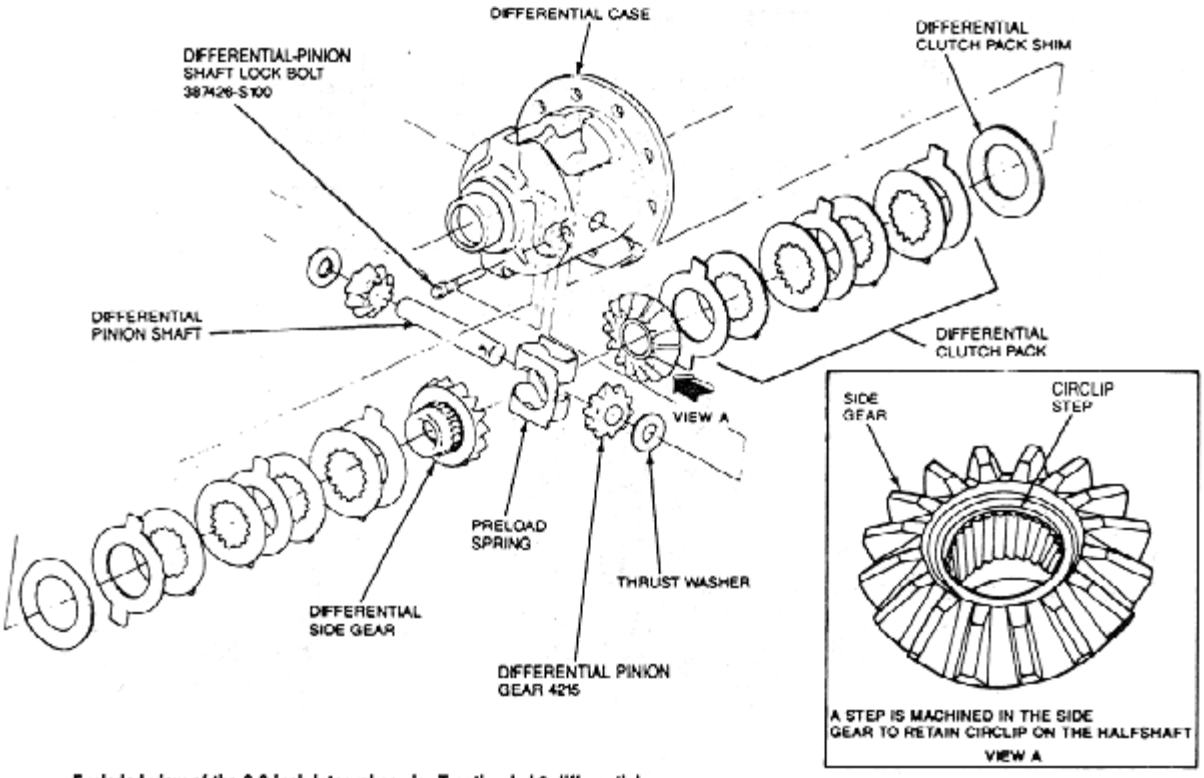
When selecting a donor vehicle, there are several important things to look for to avoid problems. Ford used the same IRS set-up for a few different cars. Thunderbirds between 1989 and 1997, Lincoln Mark VIII's between 1992 and 1999, and Mercury Cougar XR7's between 1989 and 1992. Only some of the cars have the correct parts that are needed. The points to check are as follows:

1. Check the center section. What you need is an 8.8 inch unit. It will have 8.8 cast into the top of the differential and is noticeably larger than the 7.5 inch center that was also used. Lincoln Mark VIII came with aluminum center sections that are 15lbs lighter than the iron one.
2. The Thunderbirds were available with and without rear disc brakes. We recommend one with the discs (free upgrade from a drum brake solid axle).

- When you find a rear you like, ask for the whole rear clip from the car. The whole thing unbolts with four bolts and they usually cut the driveshaft. This way you will be sure to get everything that you need.
- The rear ends we have found work the best are from Thunderbird Supercoupes. We have found them for between $300-$350. Lincoln Mark VIII's go for around $600.

Limited slip (Posi-traction/Traction-Lok) and Open Differentials

- Early Mark VIII center sections do not have a limited slip differential.
- The Thunderbird Supercoupe does have a limited slip differential.
- The IRS is an 8.8 center section and it can use the same gears that the solid axle 8.8 from the Mustang uses but, it can not use the same differentials. The IRS differential has a step cut in the side gears to hold the CV joints in the center section. Without this step there is nothing holding the axles from coming out.



Exploded view of the 8.8 inch Integral carrier Traction-Lok® differential

- There are only three differentials that will work in either the Mark VIII or T-bird center section, the stock Supercoupe traction-Lok, an *Auburn Gear* differential and a Torsen differential. *Auburn* offers two units that will work. The high performance unit (part # 542079) for standard OE replacement (~$250), and the pro series unit (part # 542080) for better traction and faster engagement (~$350). The *Torsen*, sold by *Ford Motorsport* is the best differential around and is used by many performance car companies (*Porsche*) as standard equipment. It is all gears inside and never wears out. It isn't designed for a life of drag racing though, it's designed for roadracing. The *Ford Motorsport* part number is M-4204-T28 (~$500).

IX. Modification of IRS parts

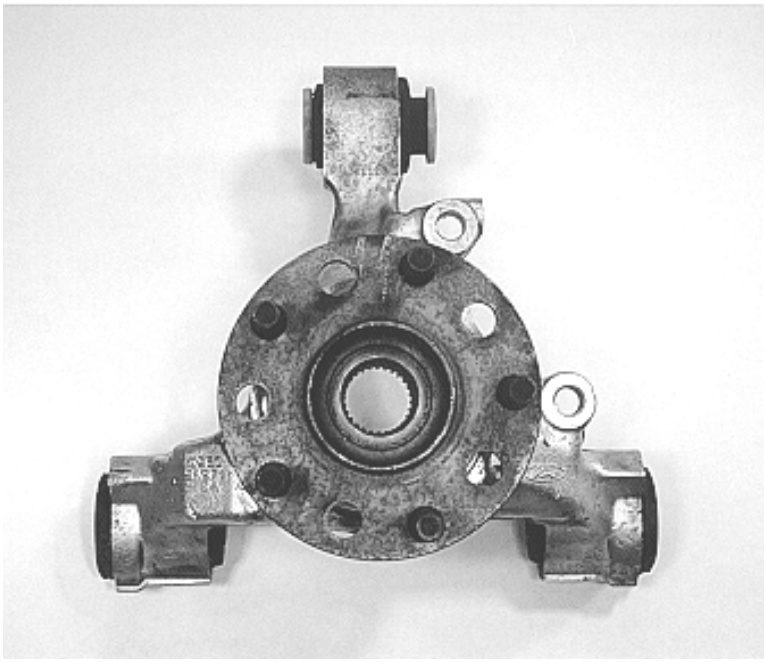
Note:

- Skip this section if using the IRS Completion Package and go to the Installation section
- Do not throw away any parts from the IRS until the IRS is installed.

- **Spindles**

Note: The Thunderbird uses a 5 lug x 4.25" Lug pattern. This is not very helpful since the Mustang uses either a 4 lug x 4.25" pattern or a 5 lug x 4.5" pattern. Unless you want a different lug pattern on your rear, the hubs will have to be drilled to the 5 lug x 4.5" pattern. We would recommend that a machine shop do this, as the measurements need to be precise otherwise your wheels will not fit. We had a shop do both hubs for $100. The machine shop will press the hubs out of the bearings and press the wheel studs out of the hubs. We have included new ½"studs so that the front and rear lug nuts are the same and are good and strong. The Thunderbird used metric studs and lugs which should not be used.

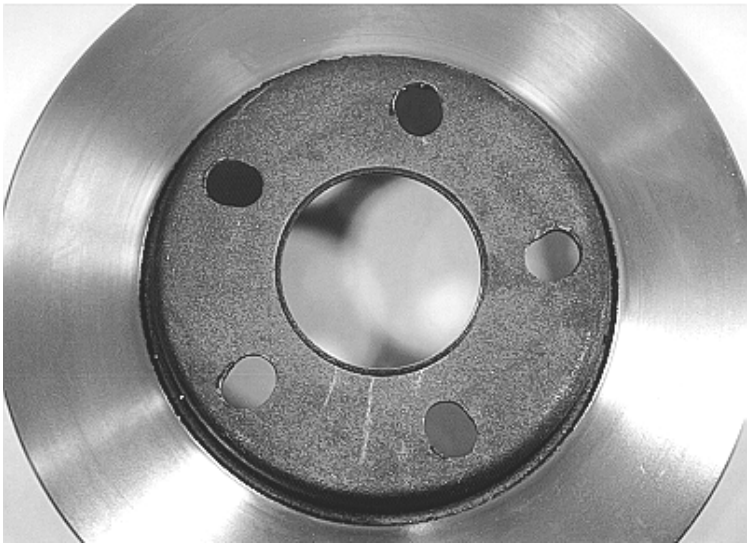
When you get the spindles back, check the hubs for slop in the bearings. There should be none. If there is, have the shop replace the bearings. Check the new bolt pattern in a wheel to make sure that it will go on.



Wheel studs in new location.

- **Rotors**

Once the spindles have been re-drilled, the rotors must be made to fit the new lug pattern. The easiest way to do this is using a Dremel tool or grinder to oval out the existing stud holes. Mustang 5 lug rotors can not be used as they have a different wheel mount surface to rotor surface distance.



Wheel Stud holes elongated

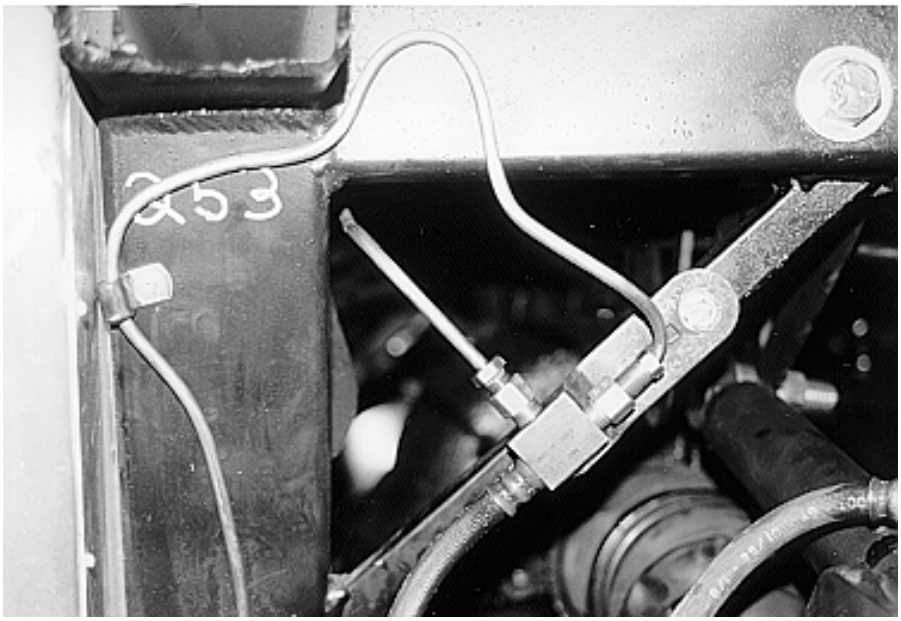
- **Brake Calipers**

Unpack the included parking brake cables and find the smooth end of the cable (the end without the built in retaining barbs) and try in insert it into the bracket on the caliper. If necessary, use a screwdriver and bend the bracket until the cable end fits.

E-brake cable holder on caliper with cable sleeve inside

X. Installation

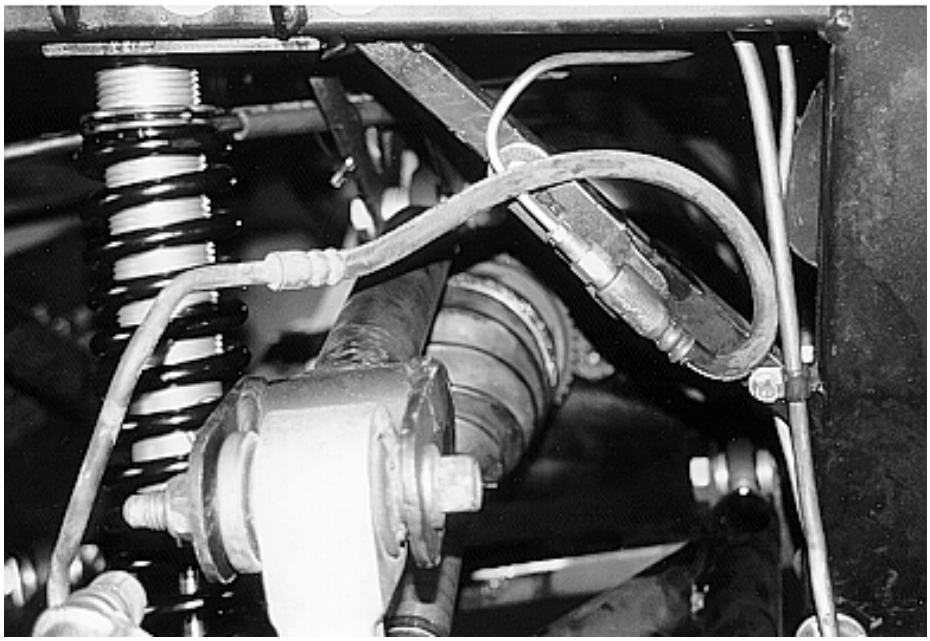
1. Using the Thunderbird flexible brake line with the “T” connection on it, hold it up to the ¾” tubing on the driver’s side that connects the two 2”x3” frame rails. Mark the location of the mount hole and the locating pin hole on the tube as shown in the picture.



Driver side brake line mount

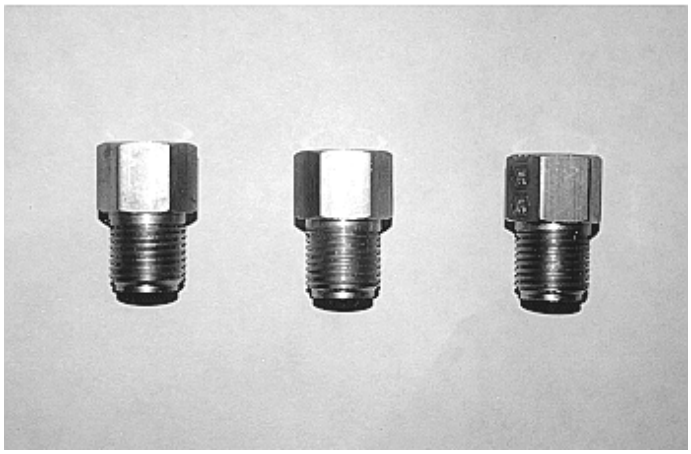
2. Drill two $^{3}/_{16}$" holes, one for the mount screw and one for the locating pin.
3. Mount the "T" junction to the tubing.
4. If using the Completion Package the brake line mount will attach to the frame in this location and support the “T” adapter.

5. Mount the other flexible line to the passenger side of the frame in the same location.



Passenger side brake line mount

6. Insert two of the brake fitting adapters into the "T" and tighten with a ½" wrench. These are not used with the completion Package.



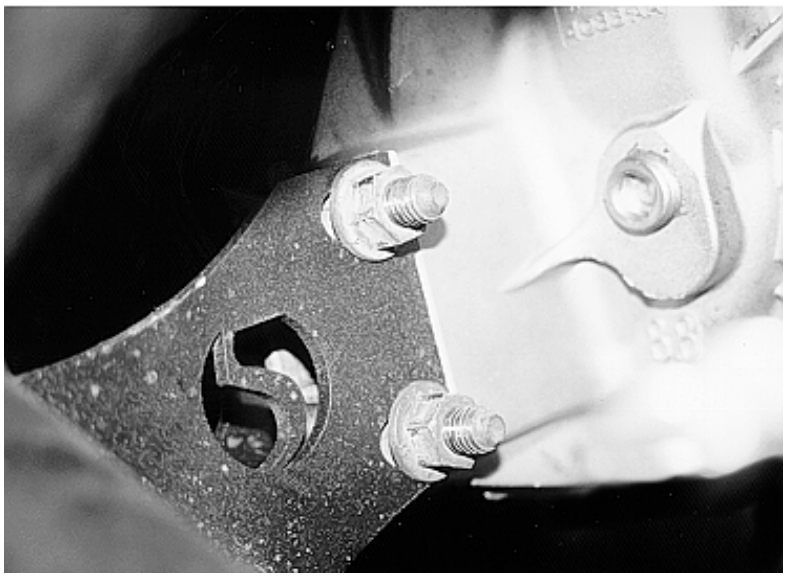
Brake line fittings

7. Attach the brake line going from the Master Cylinder to the rear brakes to the "T".
8. Using the 60" brake line provided, make a line to run between the two flexible line mounts. Run the line along the 2"x 3" tube. Use the insulated line clips and screws provided to mount the line to the frame.
9. Check the routing of the fuel and brake lines. No lines can run up the backside of the 2"x 3" tube. Bend the lines forward and out of the way. The IRS lower arms run approximately ¾" away from the backside of the 4" frame rail.

- **Differential Installation**

1. Drain the Differential and make sure the rear cover seal does not leak. Replace if necessary. **Do not fill with oil yet!**

2. If not installed, install the Center Section front mounts from the donor onto the Center Section.
3. Slide the Center Section under the lower cage. With the help of a friend from the top and you under the Cage, raise the Differential up through the middle of the Cage, sideways and Pinion first. Rotate the differential and rest the front on the front member and insert the rear mount bolts.

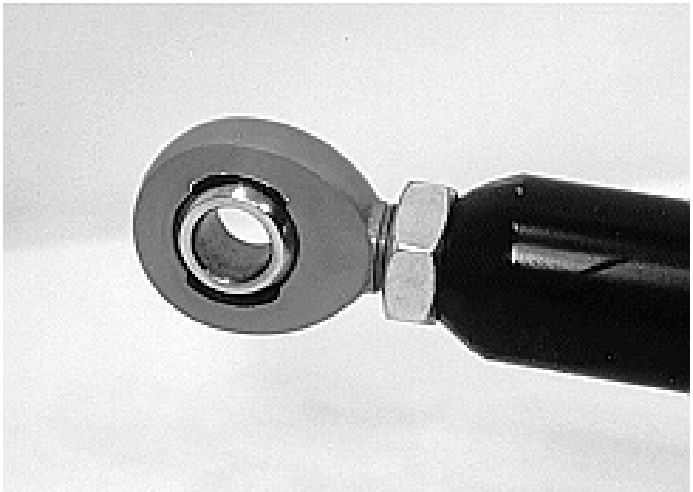


Rear of differential bolted in place.

4. Install the front mount bolts from the top down with a washer next to the head. A deep ¾" socket must be used to tighten the nut from the underside.
5. Tighten the rear differential bolts.
6. **Fill the differential** with 3.25 pints Gear oil and 4oz. Friction modifier.

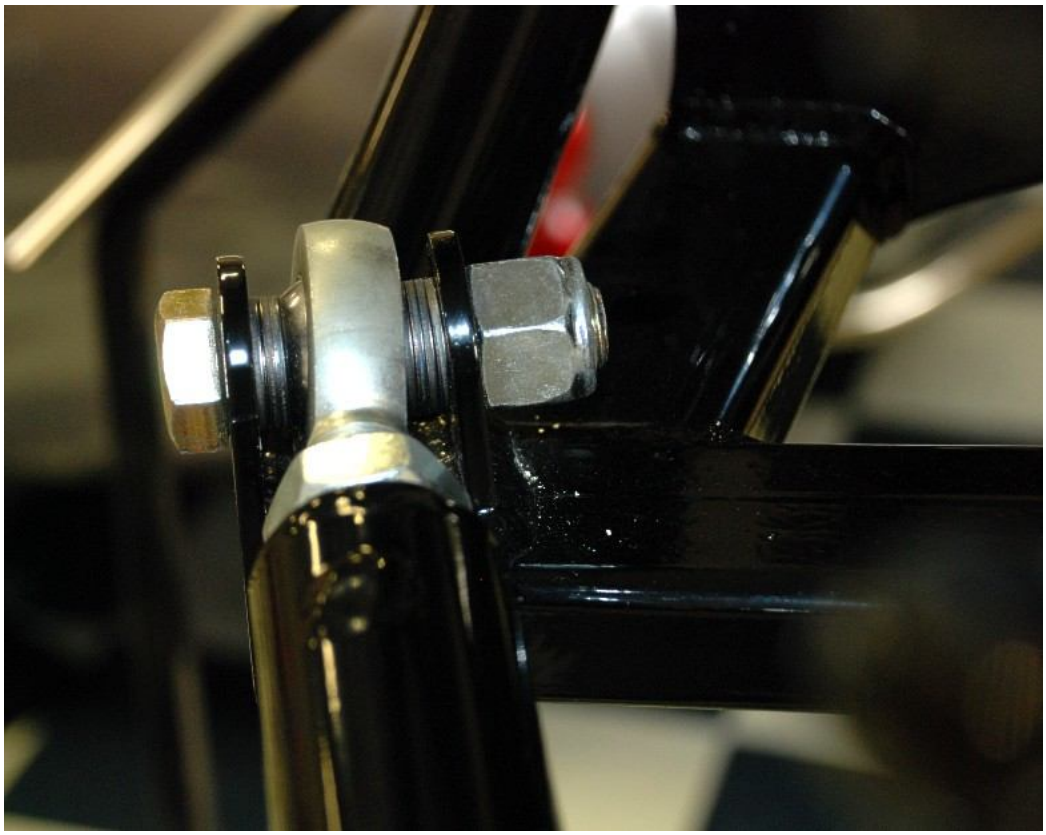
- **Lower Control Arm Installation**

1. Screw the Jam nuts all the way onto the Rod Ends.
2. Screw the Rod Ends into the lower arms so that there is only ½" total of thread (including the Jam nut) sticking out of the arms.



½" of threads sticking out of arm.

3. Attach the lower arms to the cage using the supplied ⅝" fasteners. Attach the front lower mount first using an equal number of shims on either side of the rod end.
4. Attach the rear mount using only as many shims as will fit without being forced into place on either side of the rod end. As the alignment changes the number of shims per side will change as well.
5. The shock mount should be toward the back of the car and **under** the arm.



Alignment shims in place.

6. Tighten the control arm bolts to spec. Tighten the jam nuts on the rod ends making sure that the rod ends are vertical and have room to articulate as the control arm moves.

Koni IRS Coil-Over Shock Assembly

TOOLS: *Snap ring pliers, ¾" wrench, ¾" socket, ratchet.*

ATTENTION: *The IRS shocks are pre-valved at the factory in compression and rebound for good street use. The shocks can be adjusted in rebound as per Koni's instructions if so desired. The IRS springs are 750lb. Other springs are available for different ride characteristics. Standard width and Narrow (Pin Drive) width suspensions use different shock. Please refer to the following for correct part numbers:*

14622	STANDARD WIDTH IRS KONI SHOCK, (30-1720)	15.15" EXTENDED LENGTH
14623	NARROW (PIN DRIVE) WIDTH KONI SHOCK (30-1721)	17.63" EXTENDED LENGTH

WARNING! Incorrect assembly and maintenance of this part can cause serious injury or death.

1. If retro fitting the Koni shocks, place the car on jack stands and remove the old shocks and springs. Save all of the fasteners and spacers, they will be reused.
2. Double check the jam nut under the rod end and bump stop to make sure that it is tight.
3. Screw the spring seat down on the sleeve so it is closer to the unthreaded end.
4. Slide the coil sleeve over the body of the damper beginning at the end which has the rubber bump stop. The unthreaded end of the sleeve goes first so that it will sit on the snap ring on the shock body.

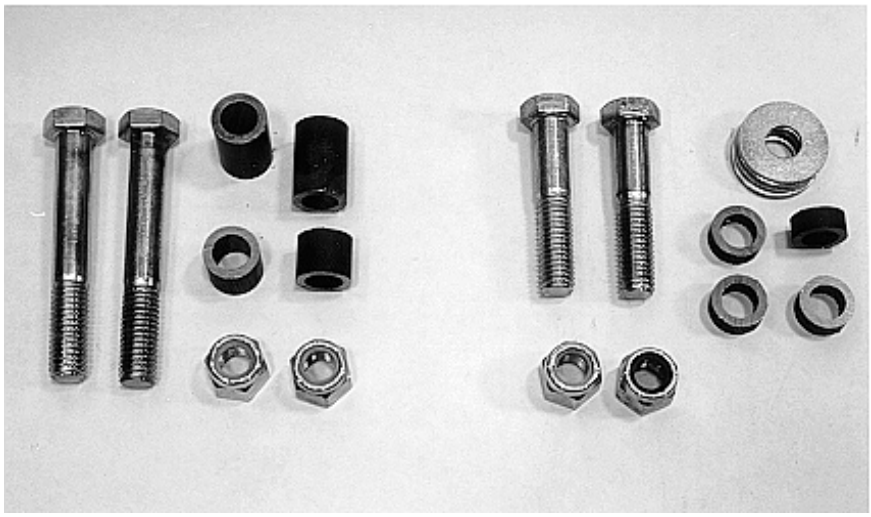
5. The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

6. Slide the rubber bumper about two inches down on the shaft.

7. Put the spring on the shock, then install the spring hat on the shaft end of the shock and push the rubber bumper up against it.
8. Rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.
9. Install the snap ring on the spring hat so that it holds onto the shock end. Make sure that the slot in the snap ring and the slot in the spring hat are not aligned.

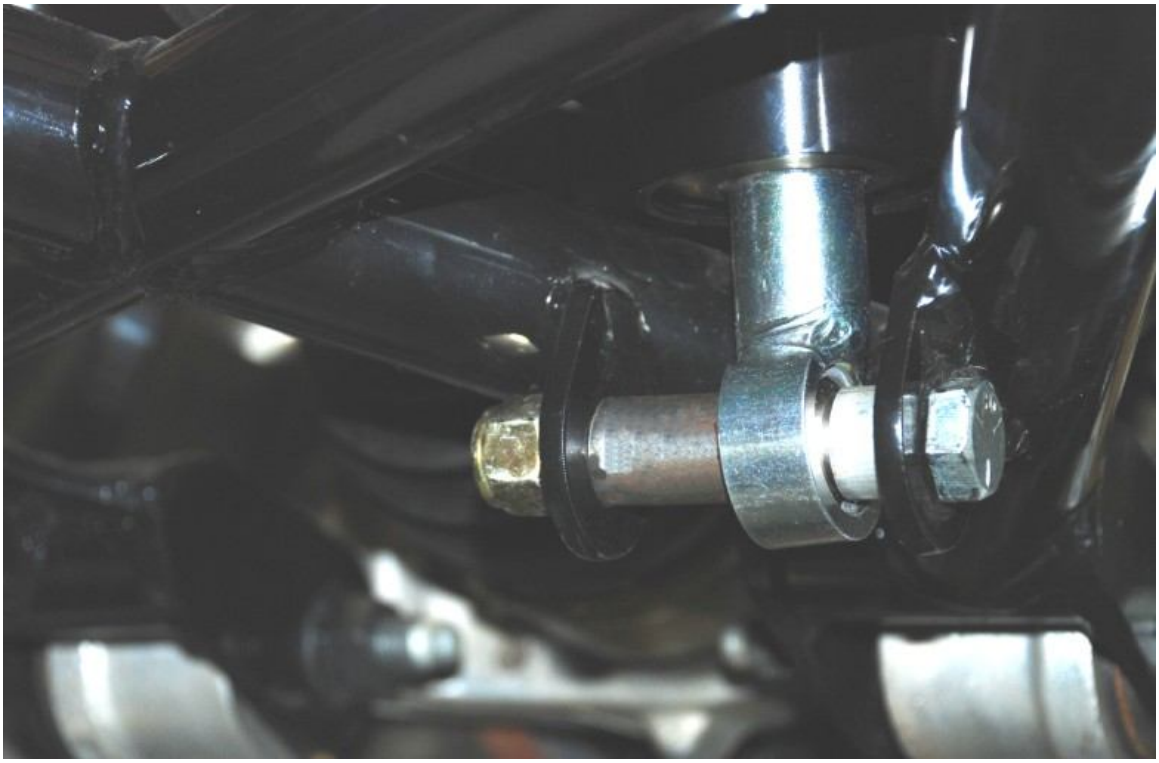
Assembled Koni coil-over shock.

10. Position the shock so that the shock body is on top and the rod end is in the triangle of the lower control arm that the shock mount is in.
11. Fasten the shock to the top mount with the fasteners, washers and spacers provided in the kit.



(Left) Lower shock-mounting fasteners/spacers. (Right) Upper shock mounting fasteners/spacers.

12. Fasten the shock to the bottom mount with the fasteners and spacers provided. The longer spacer goes towards the front of the car.



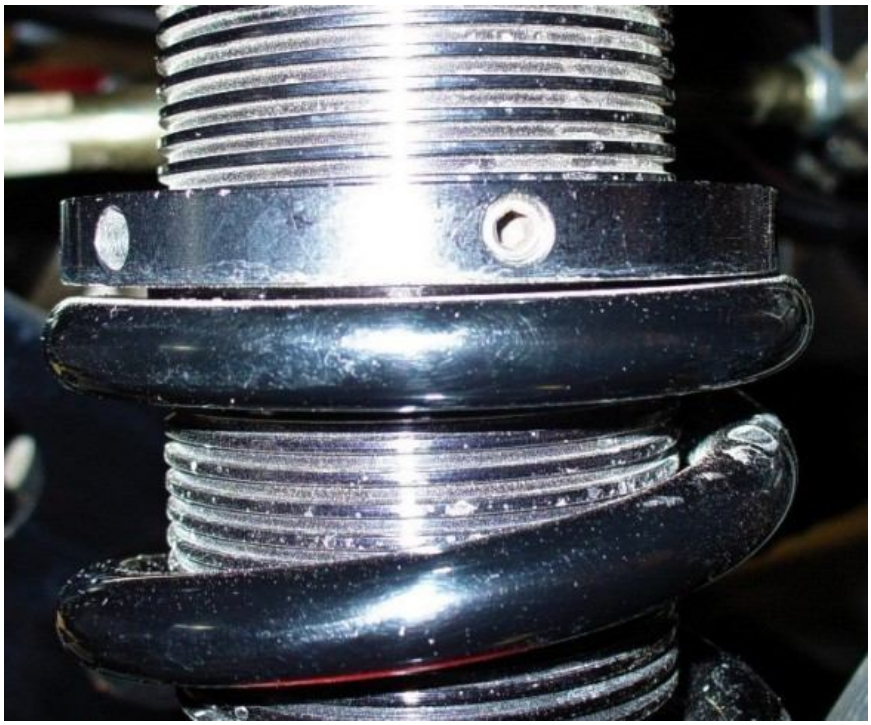
Lower shock mount.

13. **Check for clearance on brake lines, emergency brake cables, Brake Calipers, frame and control arm parts.**
14. Run zip ties through the holes in the spring hat and around the spring to prevent the spring from becoming unseated.

15. Adjust the ride height of the car.

Note: On Pin Drive IRS suspensions it may be necessary to move the shock snap ring to the upper groove to allow for correct ride height adjustment depending on the desired ride height and tire height combination. See the picture below:

16. Once the ride height is set, tighten the small set screw in the spring seat just until you feel it contact. The end of the set screw is plastic so that the threads are not destroyed. Not a lot of pressure is needed to prevent the seat from turning.



Check to make sure that the spring is seated correctly on the shock.

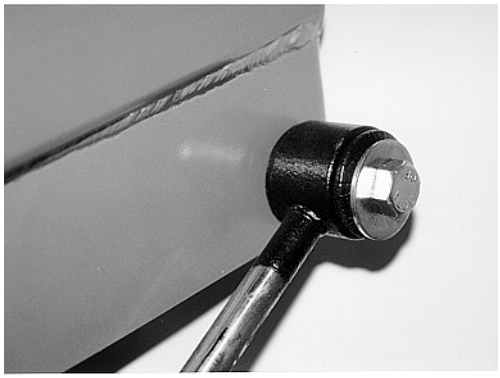
- **Upper Control Arm Installation**

1. Screw the Jam nuts all the way onto the Rod Ends.
2. Screw the Rod Ends into the upper arms so that there is only ½" of thread sticking out of the arms.
3. Attach the upper arms to the cage using the supplied ⅝" fasteners, washers and spacers. The Quad shock mount should be under the arm.

- **Quad shock Installation**

1. Attach the body end of the Quad shock to the upper arm of the IRS with the supplied metric bolt.

2. Attach the shaft end of the Quad shock to the rear quad shock bracket hole on the frame using the washer on the outside of the quad shock as shown in the picture.

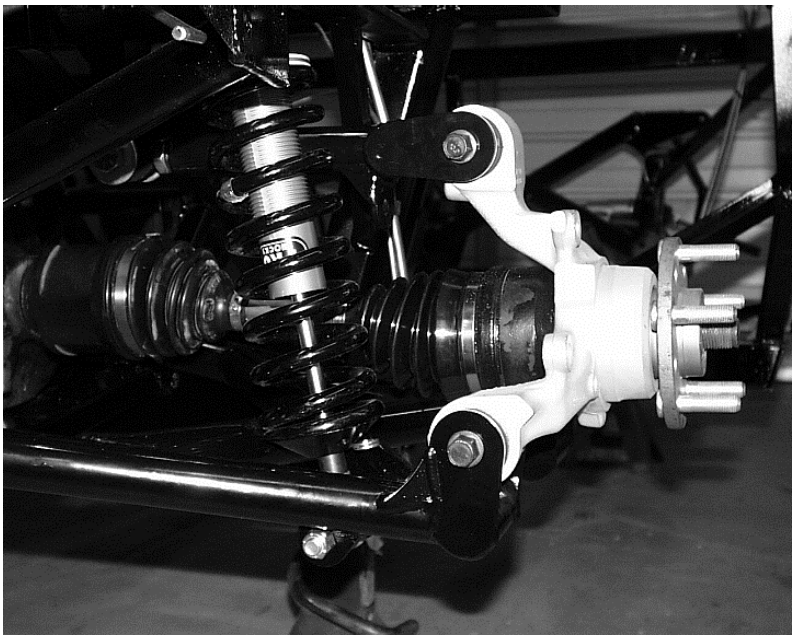


Quadshock mounted to frame bracket.

- **Spindle Installation**

Attention: The caliper is mounted on the rearward side of the spindle.

1. Push the inner joint into the center section until it clicks.
2. Push the outer CV Joint through the spindle.
3. Using the OEM T-bird nuts and bolts, fasten the spindle to the control arms.



Pin Drive Independent Rear Suspension assembled on the frame.

4. Attach the large nut using an impact wrench.
5. Put a jack under the lower shock mount and raise the jack until just before the frame lifts off the jack stands in order to simulate ride height.
6. Torque the spindle attachment bolts to **100 Ft-lbs.**

Note:

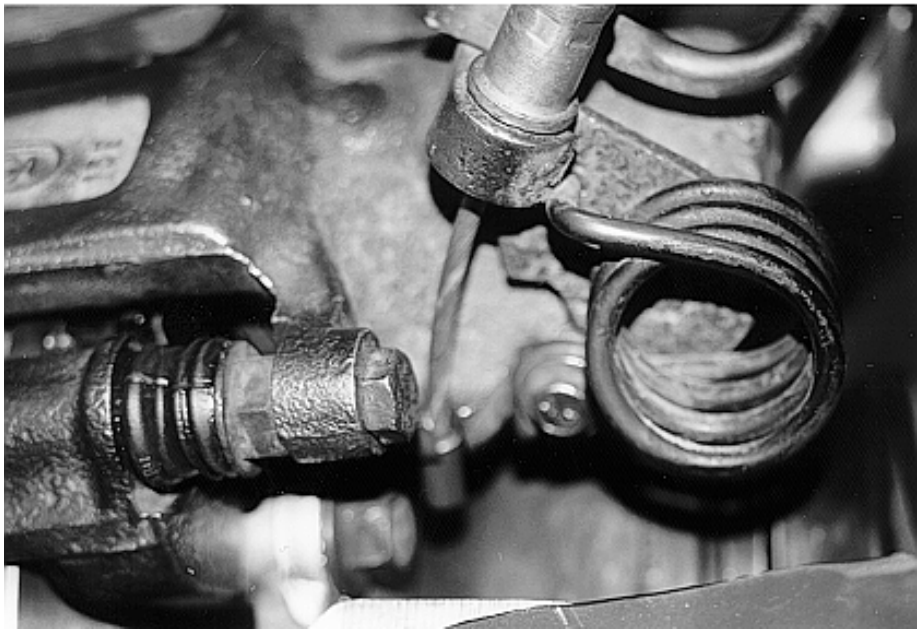
If using the IRS Completion Package, follow the IRS 11.65" brake instructions for the Calipers and Emergency brake cable installation.

- **Rear Calipers and Rotors**

1. Push the slotted rotor onto the spindle.
2. Attach the caliper to the spindle using the OEM T-Bird bolts.

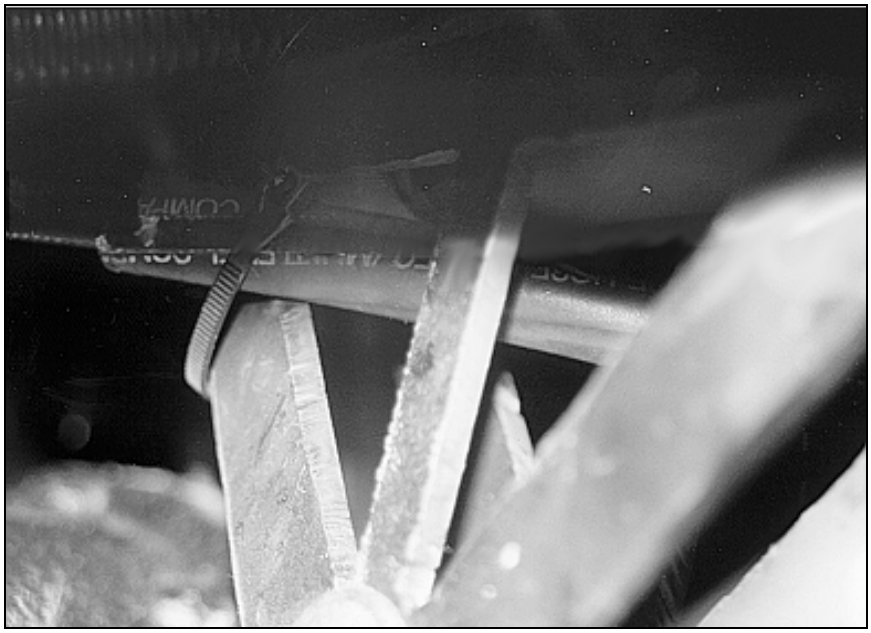
- **Emergency Brake Cable Installation**

1. Release the emergency brake handle using the button and make sure it is all the way in the down position.
2. Push the cable sleeves into the caliper brackets and attach the cables to the caliper.

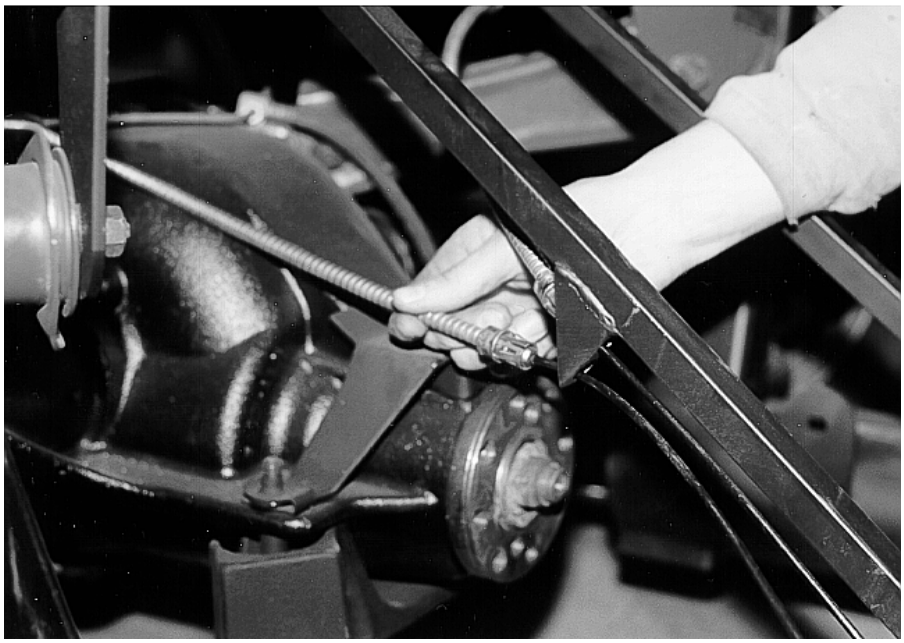


Emergency brake cable in caliper bracket.

3. Bend and route the cables through the upper cage triangles and to the cable bracket in the transmission tunnel.



E-brake cables attached to triangles

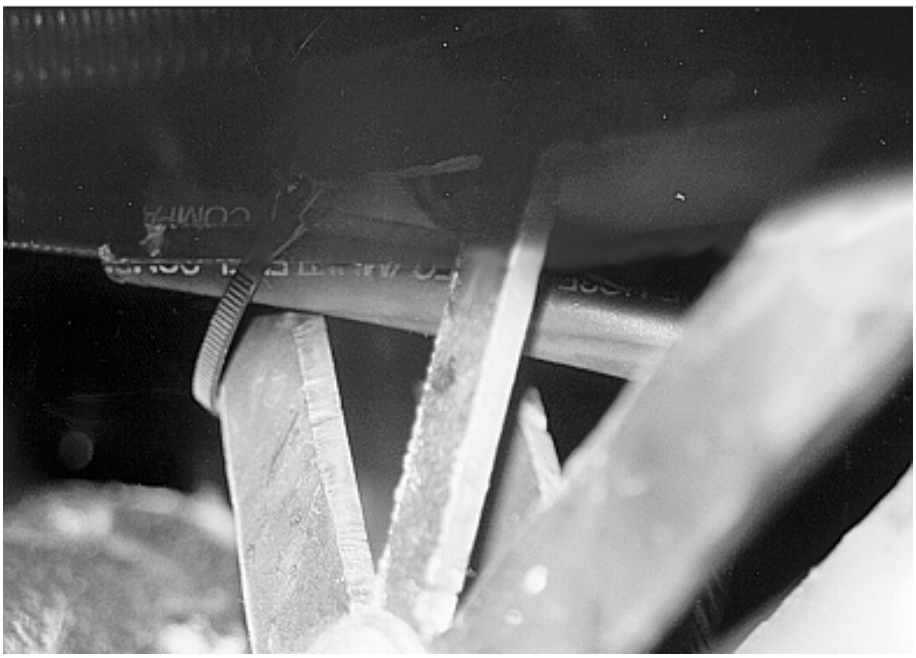


Emergency brake cable next to mounting bracket.

4. Pull on the "T" connector attached to the emergency brake handle and slide on the cables one at a time.
5. Pull up on the emergency brake handle, so that the automatic tensioning cog can adjust the free play in the lines.

- **Fuel line Installation**

1. Use the included $^{5}/_{16}$" flexible line, and fuel injection hose clamps (FFR#10855) to connect the fuel filter to the hard line using the Mustang connector. Route the hose through the triangles in the upper cage.
2. Slit the old 6" piece of fuel line and wrap it around the new fuel line where it goes through the triangles. Zip tie the line and slit hose in place so that the hose will not wear on the edge of the steel.

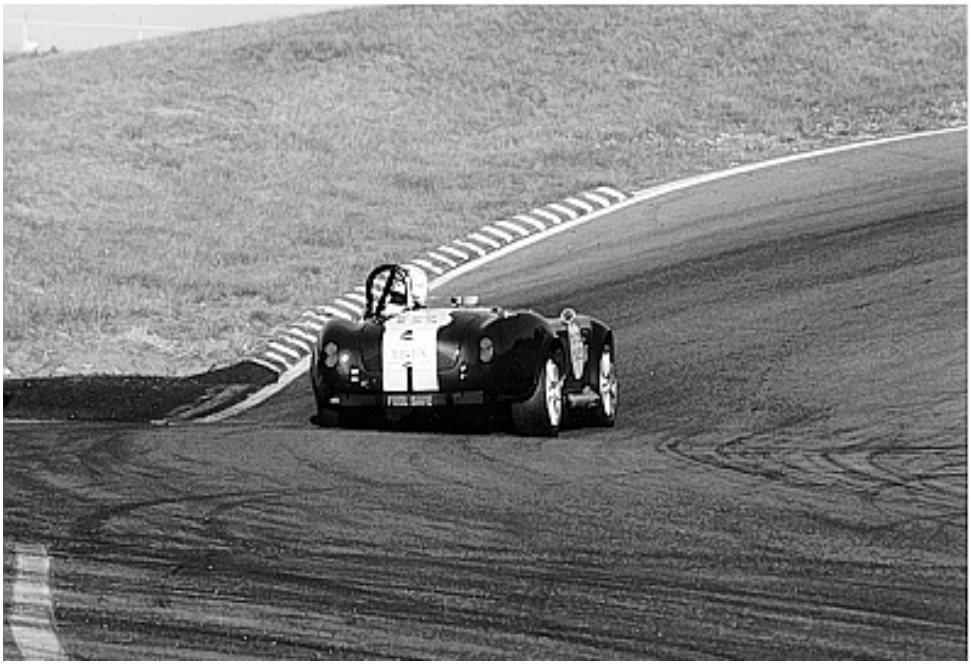


Old hose slit and covering new hose. Zip tied in place.

XI. Final assembly

1. Double check that all of the bolts are tight.
2. Mount your wheels and tires.
3. Lower the car off the jack stands.
4. Set the ride height in the car as specified in the manual
5. Once the ride height is set, tighten the small set screw in the spring seat just until you feel it contact. The end of the set screw is plastic so that the threads are not destroyed. Not a lot of pressure is needed to prevent the seat from turning.
6. Check to make sure that the spring is seated correctly on the shock
7. Align the car to the specifications at the front of these instructions. Do not change the ride height after this is done as this will change the alignment and it will need to be done again.
8. Installing the IRS changes the roll centers of the car compared to the solid axle so the car will roll slightly more than the solid axle car. If you are racing the car, call for alignment and spring suggestions.
9. Check the rod end jam nuts to make sure they are tight on a regular basis.

XII. Pictures



Initial testing at New Hampshire International Speedway

Mark Drag racing the twin turbo/IRS prototype car at Run & Gun 1999.
10.91 seconds at 127mph

Appendix F – General Torque Specifications

General Bolt torque specifications*

Thread	SAE English
	Zinc Plated
	Ft-Lb.
¼ -20	8
¼ -28	10
5/16 -18	17
5/16 -24	19
⅜ -16	30
⅜ -24	34
7/16 -14	48
7/16 -24	54
½ -13	75
½ -20	83
9/16 -12	100
9/16 -18	100
⅝ -11	100
⅝ -14	100

Thread	SAE Metric
	Zinc Plated
	Ft-Lb.
M8	18
M10	33
M12	61
M14	98
M16	120

ATTENTION: Use the following specs in order to torque Stainless Bolts.

5/16” 11 ft-lb (132 in-lb)
⅜” 16 ft-lb (192 in-lb)

*Use above specs unless otherwise noted in the assembly process.

Appendix G – Mustang Specifications

Between 1996 and 1998 Ford made 125,231 GT and 28,708 Cobra versions of the Mustang
Between 1999 and 2003 Ford made GT, 5,582 Bullitt, 9,652 Mach 1 and 20,727 Cobra versions of the Mustang.

(All information is based on V8 Ford Mustangs from 1979 to 2004)

Special Version Mustangs with Specifications

Year & Model	Engine	HP	Torque	Rear Susp.	Transmission	Wheels
93' Mustang Cobra	302, 5.0L	235@4600	280@4000	Solid Axle	T-5	17"x8"
93' Mustang Cobra "R"	302, 5.0L	235@4600	280@4000	Solid Axle	T-5	17"x8"
94'-95' Mustang Cobra	302, 5.0L	240@4800	285@4000	Solid Axle	T-5	17"x8"
95' Mustang Cobra "R"	351, 5.8L	300@4800	365@3750	Solid Axle	Tremec 3550	17"x9"
96'-98' Mustang Cobra	DOHC 4.6L	305@5800	300@4800	Solid Axle	T-45	17"x8"
99'-02' Mustang Cobra	DOHC 4.6L	320@5000	317@4750	Independent	T-45	17"x8"
00' Mustang Cobra "R"	331, 5.4L	385@6250	385@4250	Independent	T-56	18"x9.5"
01' Mustang Bullitt	SOHC 4.6L	265@5000	305@4000	Solid Axle	T-45	17"x8"
03'-04' Mustang Cobra	DOHC 4.6L Supercharged	390@6000	390@3500	Independent	T-56	17"x8"
03'-04' Mustang Mach I	DOHC 4.6L	305@5800	320@4200	Solid Axle	Tremec 3650	17"x8"

Engine

Year/Engine	Horsepower	Torque Rating	Induction	Comp Ratio
1982 5.0L V8	157 @ 4200	240 @ 2400	2V carb	8.3:1
1983 5.0L V8	175 @ 4200	245 @ 2400	4V carb	8.3:1
1984 5.0L V8	175 @ 4200	245 @ 2400	4V carb	8.3:1
1984 5.0L V8	165 @ 3800	245 @ 2000	CFI	8.3:1
1985 5.0L V8	210 @ 4400	270 @ 3200	4V carb	8.4:1
1985 5.0L V8	180 @ 4200	260 @ 2600	CFI	8.4:1
1986 5.0L V8	200 @ 4000	285 @ 3000	SFI	9.2:1
1987-93 5.0L V8	225 @ 4000	300 @ 3000	SFI	9.0:1
1994-95 5.0L V8	225 @ 4000	300 @ 3000	SFI	9.0:1
1996-97 SOHC	215 @ 4400	285 @ 3500	SFI	9.5:1
1998 SOHC	225 @ 4400	290 @ 3500	SFI	9.0:1
1999-04 SOHC	260 @ 5250	302 @ 4000	SFI	9.4:1

Transmission

Tranny	1st	2nd	3rd	4th	5th	6th	R	Torque Capacity lbs-ft	Part Number	Weight
1983.5 T-5	2.95	1.94	1.34	1.00	0.725	N/A	2.76	265	E3ZR-7003-A	75
1984 T-5	2.95	1.94	1.34	1.00	0.625	N/A	2.76	265	E4ZR-7003-DA	75
1985-89 T-5	3.35	1.93	1.29	1.00	0.675	N/A	3.15	265	E(5,6)ZR-7003-(FA,FB)	75
1989-93 T-5	3.35	1.99	1.33	1.00	0.675	N/A	3.15	300	F(Z,9,0)ZR-7003-(A,AA)	75
1994-95 T-5	3.35	1.99	1.33	1.00	0.675	N/A	3.15	300		75
1995 TR-3550	3.27	1.98	1.34	1.00	0.680	N/A	3.00	350		100
1996-98 T-45	3.37	1.99	1.33	1.00	0.670	N/A	3.22	325		109
1999-02 TR-3650	3.38	2.00	1.32	1.00	0.620	N/A	3.38	360		120

2003-04 T-56	2.97	2.07	1.43	1.00	0.800	0.62	3.28	450		129

Rear Axle Ratio

	Manual	Optional	Automatic
2004	3.55		2.49
2003	3.55		3.27
1996-2002	3.27		3.27
1995	3.08		3.27
1994	3.08		3.27
1987-1993	2.73	3.08	3.27

Front brakes

1987 to 1993 front rotors are 11" diameter, and use a 4.25" 4-lug bolt pattern. They use a cast iron single piston caliper. These rotors also contain the hub that carries the wheel bearings cast in as a one piece rotor/hub assembly (1982 Lincoln Continental rotors are an exact rotor/hub assembly except they have a 4.5" 5-lug bolt pattern). In 1994 the Mustang had a separate hub and rotor, and had a 4.5" 5-bolt lug pattern. The rotor stayed 11inches in diameter, but a new style caliper was added. All Cobra and the 1995 Cobra R versions of the Mustang from 1993 to 2004 used 13 inch front rotors with PBR 2 piston calipers. The 2000 Cobra R used Brembo 4 piston calipers and rotors. In all cases the flexible brake lines with mounting brackets and banjo bolts are required from the donor. (More brake component information can be found in the High Performance Braking Systems section of this Manual)

Rear Brakes

1987 to1993 Mustangs used a 4.25" 4-lug bolt pattern drum brake. From 1994 to 2004 Mustangs switched to have a 10.5"diameter 4.5" 5-lug bolt pattern solid rear rotor with a single piston cast iron caliper. All Cobra and the Cobra R versions of the Mustang from 1993 had an 11.65" rear vented rotors with the same calipers that the 10.5" rotors used, however the caliper slider brackets were slightly different. Because the 10.5" rotors were solid and the 11.65" rotors were vented, the caliper slider bracket is manufactured with a slightly wider opening for the rotor. All flexible brakes lines and there mounting brackets are required donor parts for FFR kits. Emergency brake cables with the drum brakes will clip right into a Factory Five kit. For the 94-04 calipers, the stock e-brake cables do not work with FFR kits. FFR 94-04 EFI kits come with the needed e-brake cables. . (More brake component information can be found in the High Performance Braking Systems section of this Manual)

Master cylinder

1987 to 1993 Mustangs use a single master cylinder with two different piston sizes, one for the front and one for the back, which works well with the stock brakes. Vacuum boosters are not used on FFR kits due to interference with the chassis. For most disc brake applications we have found the 1994 Mustang Cobra master cylinder ($^{15}/_{16}$") to work the best. From 1996 to 2004 Mustangs used a brake boosting system called a hydro-boost system. This system utilized pressurized power steering fluid to assist in pedal pressure. This unit works with FFR kits with an adaptor bracket which comes standard with FFR 96-04 EFI kits (More brake component information can be found in the High Performance Braking Systems section of this Manual).

Rear axle

From 1986 to 2004 8.8" rear axles were used in Mustangs. In 1994 they went from a 4.25" 4-lug bolt pattern to a 4.5" 5-lug bolt pattern. Most wheels fit the 59.25" width the best. Make sure you know what axle you have before ordering wheels.

Year	Rear End Width	Rear Brake Type	
87-93	59.25"	9" drum	
94-98	61.125"	10.5" solid disc (GT)	11.65" vented disc (Cobra)
99-04	62.52"	10.5" solid disc (GT)	

Starter

From 1979 to 1991 the V8 starters used were all the same one wire starters. In 1992 Ford switched to a lighter, more powerful starter which had a built in solenoid, but required a second external solenoid for wiring and they continue to use this starter.

Driveshaft

Driveshafts were unpainted steel with a 28 spline yoke from 1979 to 1993. This 28 spline fits into the T-5 and Tremec 3550. In 1994 Ford used a 31 spline yoke, which was used through 2004. This 31 spline fits the T-45, the Tremec TKO, and the Tremec 3650. The Tremec T-56 used in the 2003-2004 Cobra Mustang, and the 2000Cobra R Mustang has a 27 spline yoke.

Clutch Cable, Quadrant

Clutch cables and quadrants remain the same from 1982 to 1995. From 1996 to 2002 cables and quadrants changed.

Speedometer cable

From 1983.5 to 1993 Mustangs used a mechanical speedometer with a cable which had a plastic gear c-clipped on to its end, which was inserted into the driver side of the transmission. This plastic gear is designed to translate the proper vehicles speeds that will correspond with the ratio of the gears in the rear axle. Below is a chart describing which plastic gear is used with the corresponding rear axle gear ratios. From 1986 to 1993 the mustang still retained a mechanics cable speedometer, and plastic gear on the transmission end, however an electronic sensor was added on the transmission end to send a signal to the vehicles computer. From 1994 to 2004 there was only the electronic sensor with plastic gear attached to the transmission. The speedometer translated the electronic signal to display the vehicles speed. The 1986 to 1995 cable, sensor and gear assembly will fit into the 1996 to 2004 transmissions.

1983-89	3.27:1(19)	3.55:1(20)	3.73:1(21)	4.10:1(23)
1990-98	3.27:1(21)	3.55:1(23)	3.73:1(23*)	4.10:1(23*)

*23 Tooth gear may not be completely accurate in the selected application without changing the transmission drive gear.

1983-98	19 Tooth	Pink	C0DZ-00017271-B
1983-98	20 Tooth	Black	C1DZ-00017271-A
1983-98	21 Tooth	Red	C40Z-00017271-A
1983-98	23 Tooth	White	E6MS-0017271C-M

Mass Air Sensor

Mass air sensors are devices used to measure air flow into the engine for the vehicles computer. These started to be used in Mustangs in 1989 and are still being used.
1986-1988 engines measured air pressure in the intake to provide information for the computer. Mass air sensors send more accurate information to the computer than speed density sensors. A speed density ('86-88) controlled vehicle can be converted to mass air by changing the computer, adding the sensor, and running 4 wires (two to the computer, one positive, and one ground). There is a flexible rubber elbow that connects the mass air meter to the throttle body, which is required for use in a Factory Five kit. When a 1996-2003 Mustang is used as a donor for a Roadster kit, the stock air filter and filter box are required to complete the kit.

Oxygen Sensors

Oxygen sensors are placed in the exhaust to measure the oxygen content of the exhaust. This measurement is used by the computer to determine whether fuel delivery to the engine needs to be increased or decreased. From 1986-1995 Ford Mustangs used two oxygen sensors, one in each side of the exhaust system. From 1996-2004 Mustangs used four oxygen sensors, two per side. At full throttle the oxygen sensor signals are not used by the computer, because the computer has a built in program to run the engine rich at wide open throttle. Oxygen sensors will usually be most effective when placed near the collection point of headers because the exhaust will remain very hot, and an average measurement of all of the cylinders can be taken. All oxygen sensors are recommended to be used when placing a fuel injected motor into a Factory Five kit, however in the 1996-2004 models with 4 oxygen sensors, it is suggested to purchase a by pass kit to eliminate two of the sensors. This can also be done with modifications to the wiring harness.

Exhaust headers

1986 to 1993 Mustang headers have 1.5" tubes, and remained the same shape. From 1994 to 1995 Mustang headers still have 1.5" headers, but the collector flanges have a larger ball and socket joint. 1996 to 2004 Mustangs used cast exhaust manifolds. SOHC engines had circular exhaust ports, and the DOHC had oval ports, however the collector flange changed in 2003 and 2004. Factory Five Produces J-pipes to connect stock Mustang headers in a reversed position to Roadster 4 port side pipes for the following years: 1986-1995, 1996-2004. 4 into 4 headers are also available from Factory Five for the following applications: pre 1995 289/302, 96-04 SOHC 4.6L, 96-04 DOHC 4.6L, 351W, 390/427/428 big blocks, and 429/460 big blocks. For those installing 351 Windsor engines there are a few companies including Ford Motorsports that carry exhaust headers for the installation of a 351 Windsor into a 1986-1993 Mustang. These headers will work with Factory Five 1986-1995 J-pipes.

A Flexible exhaust hanger is a required donor part used to hang the side pipes on a Factory Five kit, and can be found on almost any Mustang since the 80's.

Upper and lower radiator hoses

From 1986 to 1993 the Mustang upper and lower radiator hoses, as well as the firewall heater hoses remained the same, and are a required donor part for FFR 87-93 EFI kits. The bypass hose, engine to thermostat housing hose, and the thermostat to overflow tank hose, are all required donor parts for FFR 96-04 EFI kits.

Radiator and overflow tank

Radiators were painted brass 2 core radiators from 1986-1993. 1994 through 2004 used an aluminum single core radiator with plastic side tanks. All work with Factory Five Roadster kits. Overflow tanks are a required donor part for all FFR Roadster kits. In 86-93 Mustangs, the overflow was directly attached to the fan shroud. From 94-04 the overflow tank design was changed and was attached to the chassis.

Fan and fan shroud

1986 to 1993 Mustangs had a clutch fan attached to the water pump and the fan shroud was attached to the radiator which also had the overflow tank attached to it. The fan shroud, and overflow tank are required for Roadster kits using 87-93 donors. This version of the kit also comes with an electric 1300cfm. fan and brackets to attach it to the shroud. The clutch fan can be eliminated. 1994 to 2004 Mustangs had a shroud with an electric fan built in, which is a required donor part.

Fuel tank, pump, pick ups, vents

1986-2004 Mustang fuel tanks were stamped steel with a plastic under tray, and had two straps that held them to the chassis. All driver side straps are the same however in 1994 the passenger side strap changed. Factory Five kits can except all versions of the strap. The fuel pumps are all in the tank. From 1988 to 1993 fuel pumps were 88 liters/hr., and the 1994 to 2004 pumps were 110 liters/hr. The Fuel filler neck is also a donor part required for an FFR kit.

Fuel lines, fuel filter and bracket

The fuel filter and bracket is the same from 1986 - 2004. All of the front and rear flexible fuel lines from the 1986-2004 Mustangs are required donor parts for all FFR EFI kits where the donor fuel rails, and tank are used.

Steering components

Power steering racks from 1987 - 2004 are mostly all 15:1. In 1994 the racks switched from having a splined shaft for attachment to the steering column to a triangle shaped end, as well as changing the inner and outer tie rod ends. The 1994 to 2004 inner and outer tie rods are too long and do not work with an FFR kit. The Factory Five kit includes the correct inner and outer tie rod ends. The rubber bushings that mount the rack are a required donor part.

Emergency brake handle

Emergency brake handles with the attached “T”-junction equalizer bar from 1984 to 2004 all work with FFR kits.

Rear quad shocks

Quad shocks are attached between the axle and the chassis of solid axle Mustangs from 1983.5 to 2004 to prevent wheel hop. This is a required donor part for all solid axle FFR kits, and they are also used for independent rear suspension FFR kits. There is a mounting bracket for the quad shock to mount to the Mustang chassis which is also used for solid axle FFR kits. The IRS kits do not use the mounting bracket.

Spindles

1979 to 1993 Mustang spindles used a rotor with built in bearing carrier hubs. 1994 to 2004 Mustangs used a hub that was separate from the rotor, and is often considered part of the spindle. In 1996 the mount on the spindle for the tie rod end was positioned slightly different than the 94 and 95's. Factory Five kits come with a bracket to attach the spindle to the kits upper control arm. In 1999 the lower ball joints switched over to metric. 1983.5 to 1986 spindles are similar to the 1987 to 1993 spindle except they are thicker and are designed for a smaller 10" rotor. To use them, one of the shims tack welded into the standard IFS bracket needs to be removed.

Rear 4 link control arms

Upper control and lower control arms stay the same from 1979 to 1998, and then from 1999 to 2004 the diameter of the mounting bolts changed to a larger metric size.

Front lower control arms

Front lower control arms from 1979 to 1993 all have the same dimensions and will work with any FFR kit by following the simple modification shown below. In 1994 the control arms had a similar design, though they increased in length by approximately ¾". This arm can also be used by following the same modifications as the 1979 to 1993 arms. There are two sets of holes on the Factory Five chassis to mount the lower control arms. The inner holes are for the 1994 to 2004 Control arms, and the outer holes are for the 1979 to 1993 arms. FFR offers a tubular lower control arm powder coated, with Energy Suspension polyurethane bushings, ball joints, and mounting bolts which are designed to mount in the outer chassis mount hole. For an arm with the proper ball joint for a 1987-1998 spindle, order FFR# 12066. For 1999 to 2004 spindles, with the metric ball joint order FFR# 13868.

Springs (MODIFICATION)

Rear springs from 1979 to 2004 will all fit an FFR kit with a slight modification as shown below. Below is a chart of every spring rate from 1979 to 2004. These rates are for un cut springs. In all cases there are rubber isolation pads between the spring/control arm and spring chassis, which are a required donor part for an FFR 4 link stock kit.

1979-04 Production Spring Rates (lbs./in.)			
YEAR	Mustang V-8	Cobra	Cobra "R"
1979	F395/R160		
1980-81	F370/R160		
1982	F395/R160		
1983-84	F410/R160		
1984.5-93	F425/R200 F525/R300		
1993	F425/R200 F525/R300	F425/R160 F525/R160	F750/R240 F850/R260
1994	F400/R165 F500/R265	F400/R160	
1995	F400/R165 F500/R265	F400/R160	F700/R200 F850/R260

1996-98	F400/R165 F500/R265	F400/R160	
1999	F450/R210	F500/R470	
2000	F450/R210		F800/R750
2001-02	F450/R210	F500/R470*	
2003	F450/R210	F600/R600*	
2004	F450/R210		
*Convertible	F500/R470		

Wiring harness

With all FFR EFI kits, the donor car wiring harness's are required. The 87-93 harness has 5 sections: engine, rear, front, dash, and transmission. For a carbureted car, a wiring harness for the entire vehicle can be purchased through Factory Five, FFR# 12411.

Accelerator Pedal

The accelerator pedals remained unchanged from 1979 to 2004, and they all work with FFR kits.

Gauge Cluster

All FFR Roadster kits can use a modified version of the 1987-2004 donor car gauges.

Pedal Box (clutch and brake pedals)

Pedal boxes are the same from 1982 to 1993. In 1994 the box switched to a new design. This newer pedal box needs four tack welds to be drilled out, and a notch to be made in the clutch pedal stop to allow use in an FFR kit. The notch is required for clearance of the gas pedal.

Appendix H - Fluid Specifications and Capacities

	Engine	
	Oil Type	Capacity
302	10W-30	5.0 qts.
4.6L	5W-30	8.0 qts w/FFR pan

	Transmission				
Oil Type	T-5	T-45	3650	TKO	T-56
Mercon/Dexron III Trans. Fluid	2.8 qts.	3.25 qts.	4.0 qts.	2.64 qts.	4.0 qts

8.8 Solid Rear Axle		
Oil Type	Capacity	Friction Modifier
80W-90 Gear oil	1.875 qts.	4 oz.