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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.

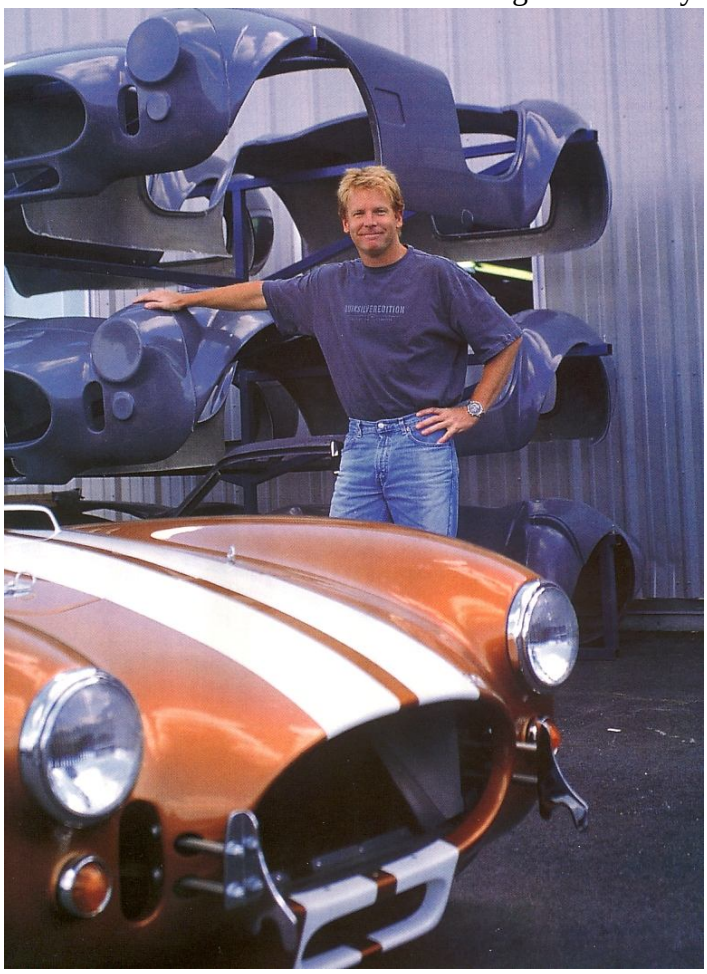


Figure 1:
David Smith

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.

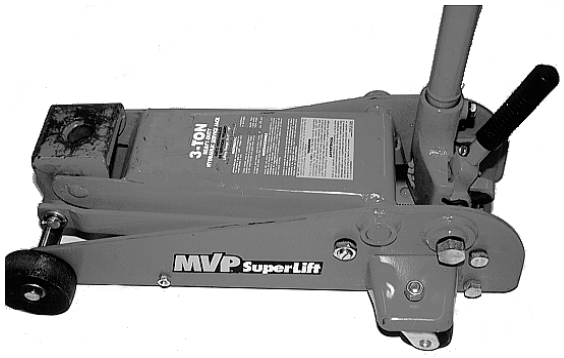
Safety Tips

- 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, 10W-30 – 5 Qts
_____ Gear oil, 80W-90 (for rear end) – 2 Qts.
_____ Transmission fluid, Mercon automatic Trans fluid – 4 Qts.
_____ Brake fluid, DOT 3
_____ Oil filter
_____ Fuel filter
_____ Battery
_____ Spark plugs
_____ 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

If using a 4.6L engine or donor parts newer than 1995 call and ask for the 4.6L Assembly Manual

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 H.

Donor Parts and the Mustang 5.0

In 1987, the Mustang 5.0 started a modern muscle-car revolution. For slightly more than ten thousand dollars the average Joe could pick up a brand new 225 hp car that weighed in at only about 3000 lbs. (in LX trim). Since its introduction, virtually every enthusiast magazine has hailed the Mustang 5.0 as the best speed bargain of the decade. It had performance numbers of six seconds 0-60 and a quarter mile time in the 14's right off the showroom floor. This factory hot rod came with stainless tubular headers, a terrific five speed transmission, a big 8.8 inch ring and pinion traction locking rear end, 11" front disc brakes and much more... all standard! The Mustang 5.0 literally created a multi-billion dollar aftermarket in less than five years because of the great bang for the buck that Ford was providing. From racetracks and drag strips all across the country to street racers in every town, the ***Mustang 5.0 has earned a faithful following for its high performance, reliability, and affordability.*** Many who have owned or driven Mustang 5.0's feel that the car is the rightful heir to the legacy of the original high performance 289 Mustangs of the 60's.

We saw the Mustang as more than just the functionally perfect donor car. It is truly the spiritual successor to the factory muscle Fords of the 60's. The 289 block that beat Ferrari in 1965 still beats strong in each Factory Five Roadster. The lightweight small block with modern computer controls is one of the keys to our well-balanced replica. Our design bridges the gap between yesterday and today. Our kit delivers the precise handling of a racecar along with the mechanical reliability of a modern Mustang without compromising vintage period authentic looks.

Donor Part Selection Tips

The following are a few tips we've picked up over the years when dealing with used parts. In addition to the parts that come with the kit, you have to provide the running gear and some other parts that can be taken directly off a modern Mustang 5.0. This section deals with those donor parts. If you are getting parts from a different source, please refer to the last section in this chapter, "Not using a Donor"

The Factory Five Roadster kit is designed to use parts from the 1987-2004 Mustang. You can use many of the same parts from earlier and later model Mustangs but there are some differences. For example, before 1987 the Mustang used smaller components such as 10" front brakes, 7.5" rear-ends, and the engines produced less horsepower. Likewise, the 1994 and later SN95 models have many shared parts but there are some important differences. If you choose to use older or newer donor parts, call the FFR tech department and ask about what specific parts you can use. Check out Appendix B.

If you go to a salvage yard for parts, the donor parts list will help you check to see that you have procured all the required parts in order to avoid a return trip. Try to get everything you need before you pay and leave. We've found that the average parts yard doesn't exactly serve as a model of modern customer service philosophy. Ford made over a million Mustangs so the availability of complete running, non-

crashed cars is very good.

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 Auto parts	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		

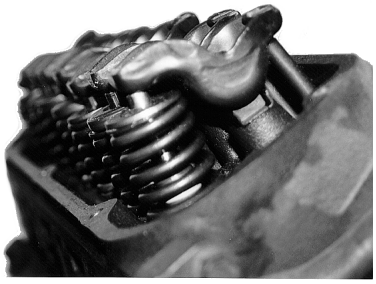
Price

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 promise to let them have the parts you won't be utilizing. 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, you will inevitably do a 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. It is should be easy to buy a complete donor car from a salvage yard for less than $3,000.00.

Running Gear

In order to make a wise choice on running gear, there are several things to look for. First, 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 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. Aftermarket engine and transmission mounts are cheap and an excellent alternative to donor car ones.
- Check the steel sections of the engine mounts for damage since these are areas that can bend.
- The **mileage** is not the most important aspect of selecting a donor Mustang. The 5.0 drive train is one of the toughest things about these cars. It's obvious however, that the lower the mileage the higher the chances of avoiding additional expenses down the road.
- 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. A quick way to verify mileage is by inspecting the drum brake shoes on the unit. The drum pulls straight out, off the axle. Rear shoes are never really replaced until about 60-100K miles unless there was severe duty (read abuse) placed on the car. A 30,000 mile car should have a good amount of rear shoe material remaining. Try to avoid cars with **aftermarket undercoating**. Undercoating all over the front suspension is really hard to get off.
- 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 for some reason, that's 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 really 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. Valve cover gaskets commonly leak at around 50,000 miles and are easy to replace so don't sweat them. Let a leak serve as a clue that the car probably has more than 40,000 miles on the odometer.



- If the **block** has been **painted**, it is a good indication that the engine was re-manufactured since the Ford 5.0 block was never painted at the factory. Even brand new 5.0 blocks with relatively few miles

on the odometer will have a surface dusting of corrosion.

- 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. There should be no deep grooves or huge flakes of rust inside the rotor contact area. If you do have rotors with lots of rust inside the cooling fins, you are usually looking at an older car part or it has been sitting for a while.

We've 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. Second gear seems to get the lion's share of abuse in the T5 transmission. The factory drive train is remarkably tough so try not to worry excessively about the donor parts; odds are they'll work just fine.

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, please refer to the Appendix B (donor parts list). The Chilton's repair manual has quite 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 an authorized service center evacuates the Freon in your A/C system. Dispose of hazardous waste correctly. If your car was in a front collision and the radiator shroud and reservoir were damaged, the Ford part number for the shroud is E6ZZ-8146-A and the reservoir part number is F2ZZ-8A080-B.*

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

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

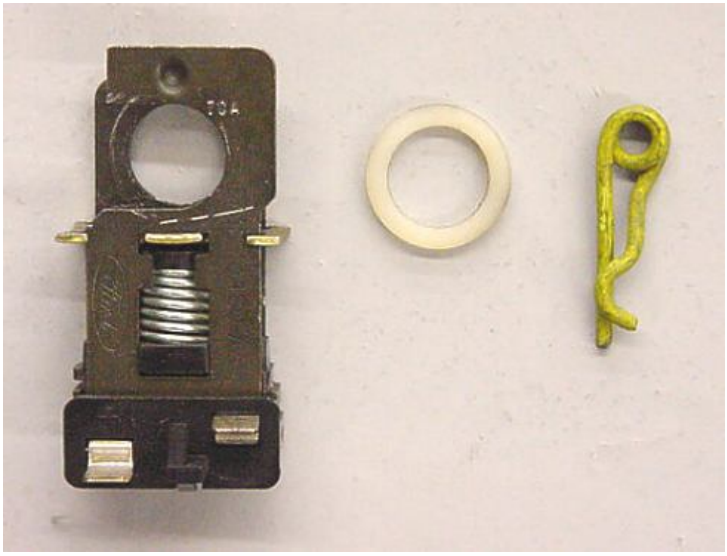
1. Place a bucket under the radiator drain petcock on the lower passenger side of the radiator
2. Loosen the radiator drain petcock with pliers.
3. Collect all used coolant.
4. Close drain petcock and dispose of the coolant properly (local garage or parts store).
5. Loosen and remove the upper radiator 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 or zip ties to secure the lower radiator hose up to the power steering pump area so that it won't spill fluid as the engine is removed later.
9. Remove the fan clutch from the water pump shaft so that it is sitting in the fan shroud.
10. Loosen the bolts on the brackets at the top of radiator.
11. Lift the radiator, shroud and the fan with clutch up and out of the engine bay. Discard or sell the fan. Keep the shroud. You won't need the Mustang fan since a 16" puller fan is included in the kit.
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 Freon removed and disposed of safely. Don't release this stuff into the ozone.
13. Store radiator, fan shroud and overflow reservoir in a safe place.

Brake Power Booster

TOOLS: *Socket set, wrenches or box wrenches for brake lines, tube cutter, tape, and marker pen.*
PARTS: *Mustang power booster push rod.*

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.

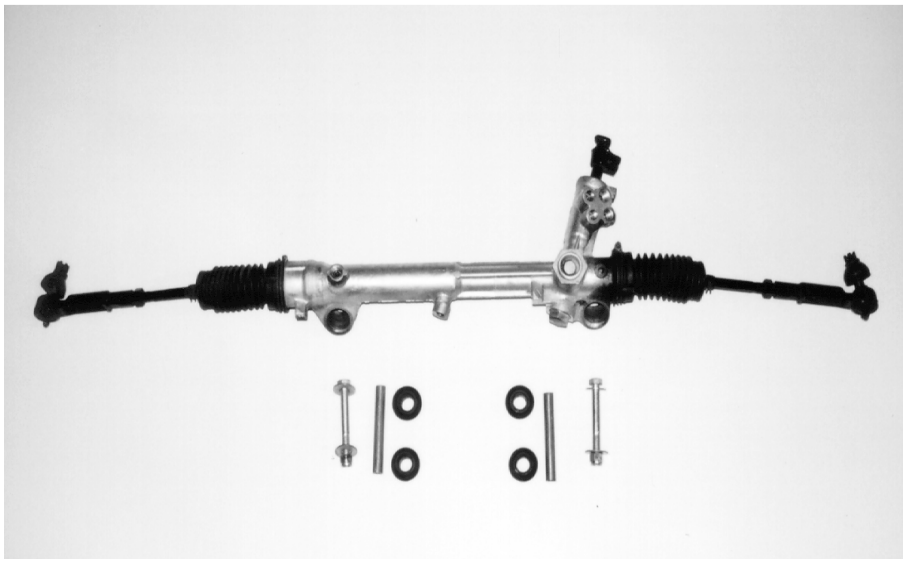
3. Remove the four bolts that retain the power booster to the firewall, these bolts also go through the pedal box front mount plate inside the foot-box area.
4. Attach tape to the brake lines and mark their positions on the master cylinder and distribution block. Leave the lines that go from the distribution block to the master cylinder in place.
5. Cut 4" into the hard brake lines from the distribution block. New brake line is provided with the kit.
6. The power booster/master cylinder assembly can now be taken out of the engine compartment.

Steering Rack

TOOLS: *⅝" and 11/16" combination wrenches.*

PARTS: *Mustang rack assembly, rubber mounting bushings.*

1. Remove the U-joint bolt from the steering column sleeve.
2. Remove the lower steering column by taking off the two bolts at the flexible collar in the area where the splined steering rack shaft begins.
3. Remove the steering rack outer tie rod nuts and cotter pins. If the tie rod will not come out of the spindles easily, use a hammer but be careful not to damage the threads. Never heat or lubricate the tie rod end to make removal easier.
4. Remove the two bolts that secure the steering rack to the frame and lower the rack out of the car.



Mustang steering rack with lines removed with rubber bushings and fasteners.

Engine Bay Sensors and Electrical Connections

ATTENTION: *Remember to identify both ends of every connector disassembled. The easy way to do this is to tape and number each side of the connector the same. The connectors will only work if they're mated to the other similar shaped connector. Each connector is different in the car.*

TOOLS: *Socket set, combination wrenches, Phillips head screwdriver, slip joint pliers, tape, marker, and bucket.*

PARTS: *Mustang coil, EGR assembly, vacuum lines, starter solenoid, mass air meter, and throttle cable.*

1. Disconnect and remove the battery.
2. At the starter solenoid and coil, disconnect the wires, labeling which wires connect to which screw.
3. Disconnect the connectors from the headlights and engine harnesses.
4. Disconnect and remove the coil from the engine compartment wall.
5. Disconnect and remove the starter solenoid from the same area.
6. Disconnect and remove the Barometric Air Pressure sensor from the firewall behind the engine.
7. Disconnect and remove the mass air sensor. Store with the computer.
8. Disconnect the throttle cable from the throttle body on the engine.
9. 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.

ATTENTION: *Napa sells a replacement heater hose loop, part number #10743. This part is designed to*

loop the heater hose circuit perfectly and it works better than the stock hose, which has two different inner diameters. Connect the two hard black heater tubes on the engine with the one larger diameter tube with a bend. Do not kink the hose.

10. Remove the power steering lines from the pump, catching the fluid in a bucket.
11. Remove the braided ground strap from the rear driver's side of the engine.
12. Follow the fuel lines off the engine and cut the lines 4" after they turn into the hard plastic line.
13. Remove and discard the front driver's side plastic wheel well using a 7mm socket to loosen it from the body.
14. 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.

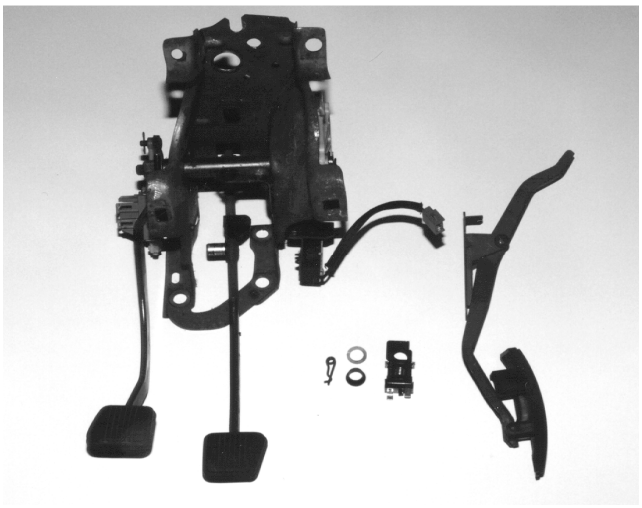
Interior

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

1. Remove the seats from the car.
2. Remove the center consul cover the handle.
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.*



Pedal box assembly with switch and throttle pedal.

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.
2. Unbolt and remove the pedal box.

Computer

ATTENTION: *If you are going to run the car with a Carburetor you can disregard the wiring harness part in this section. We still recommend the use of a fuel inertia cut off switch in your car if using an electric fuel pump.*
TOOLS: *Socket set*
PARTS: *Mustang Computer and OEM plastic cradle.*

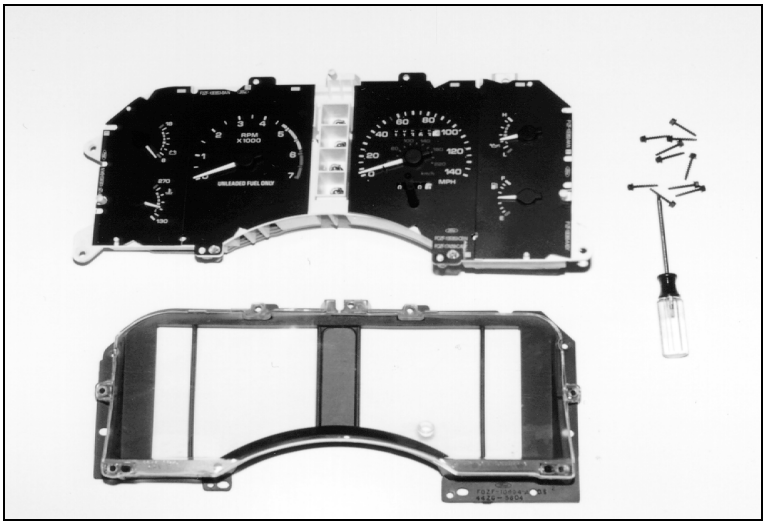
EEC-IV computer and cradle.

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 and Speedometer Cable

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

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 speedometer cable is unsnapped from the speedometer by squeezing the white retainer ring and then pulling off.
3. The other end of the cable will be removed later in the disassembly.
4. Remove the snap connectors that feed the outside pod switches. This is done by pulling the switch out toward the driver and requires a regular head screwdriver to press on the side before the piece can slide out.

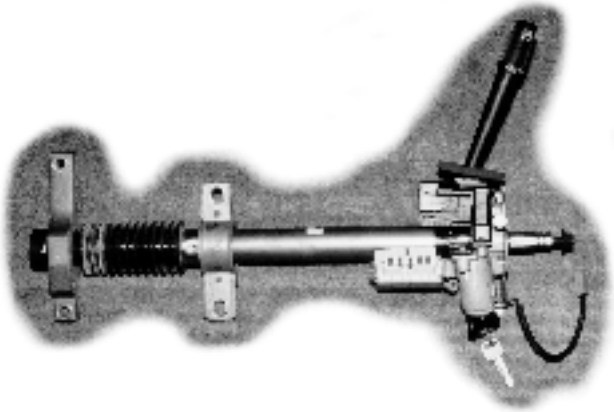


Mustang gauges mounted in gauge pod.

5. The two gauge wiring connectors are removed from the gauge cluster by squeezing the outside clips. Remove the clear plastic gauge cover with a Torx screwdriver and discard. Place the switches and gauge pod in your parts area, awaiting kit assembly.

Turn Signal and Ignition Switches

TOOLS: *Socket set, extension, Phillips head screwdrivers, needle nose pliers.*
PARTS: *Turn signal and ignition switches*



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.
2. Remove the wiring connectors have from the turn signal and ignition switches.
3. Remove the turn signal stalk and the ignition switches from the column.

Dash Wiring Harness

TOOLS: *Socket set, extension, regular, Torx and Phillips head screwdrivers, needle nose pliers,*

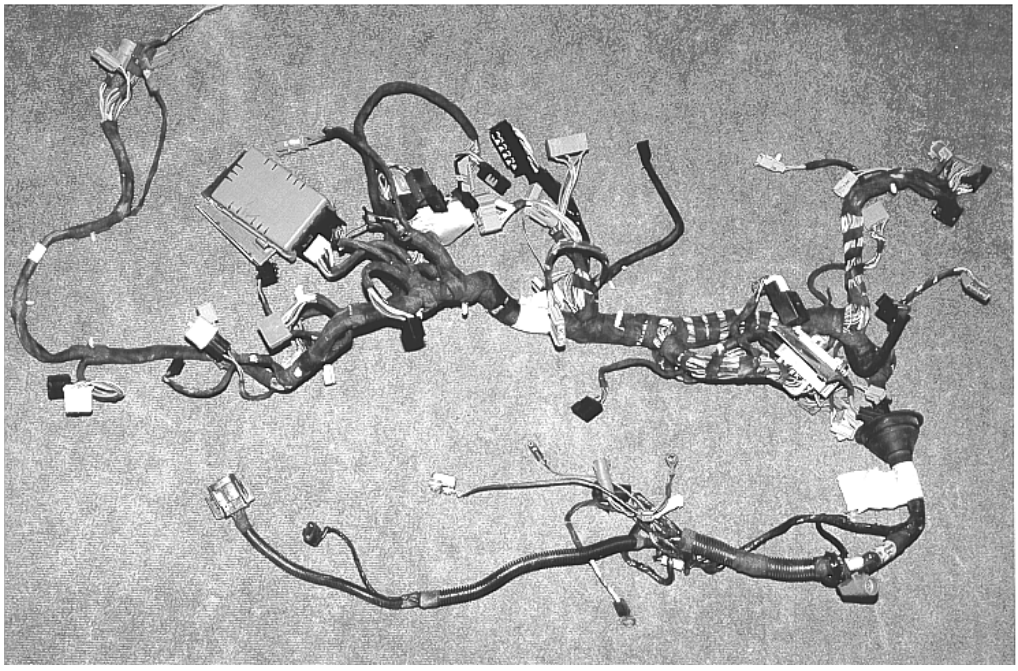
hammer, and marker tape.

PARTS: ***D****ash wiring harnesses.*

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.

Note: The headlight dimmer switch should be kept if dash lights are wanted otherwise the switch will have to be bypassed.



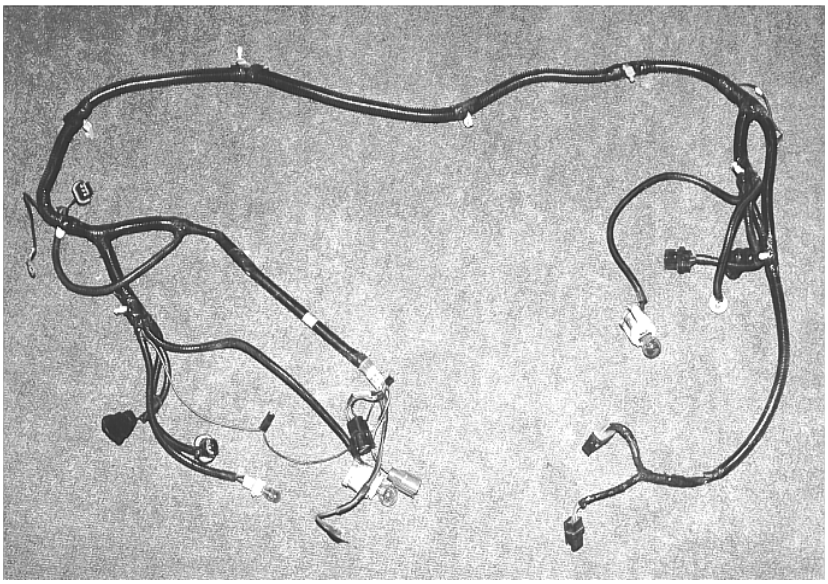
Dash harness with air bag and fuse panel attachments.

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 light harness from the engine bay wall working from the starter solenoid area to the alternator. Unscrew any ground wires and mark the connectors (Especially the headlight and turn signal lights) as you go.



Front wiring harness with hookups for headlights, alternator, and horn.

Speedometer and Clutch Cables

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

1. Pull the speedometer cable out from the dash area keeping the rubber grommet that is on it in place. This grommet will also be used.
2. Remove the bolt that holds the cable to the body near the exhaust in the engine bay.
3. Remove the wiring harness plug from the sending unit.
4. Remove the speedometer sending unit bolt using an 11mm socket.
5. Pull the sending unit straight out.
6. Replace the screw in the transmission once the sending unit is removed.
7. Cover the speedometer drive hole with duct tape to prevent dust and dirt from entering.
8. Remove the clutch cable cover from the bell housing and push the cable out of the clutch fork.
9. Release 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.*
TOOLS: *Socket set, Phillips head screwdriver.*
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.

Emergency Brake Handle

TOOLS: *Socket set.*
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 couple of inches.
4. Carefully remove one brake cable from the "T" at a time.
5. Unbolt and remove the emergency brake handle.

Fuel Inertia cut-off switch

ATTENTION: *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.

Rear Wiring Harness

ATTENTION: *Whenever you handle a wiring harness make sure to avoid cutting any leads. Ford uses multiple grounds in circuits and cutting any line may interrupt a circuit. Keep any/all seemingly useless leads intact and handle harness with care. If you decide to cut your harness down (remove all non-essential wires) follow a wiring schematic.*

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

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 for use later. 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 5/8" 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. Attach an engine hoist to the engine lift points at the driver's front and passenger's rear areas of the engine. One easy way to do this is with a chain and bolt on the other side of the hole.
9. Take up the slack on the chain slowly. Check to make sure that no hoses or wires remain connected to the engine.
10. Remove the bolts from the transmission cross-member and remove the cross-member.
11. Check again to make sure that all wires and straps are removed.
12. Lift the engine off the engine mounts and guide it out of the engine bay. Guide the rear of the transmission out of the transmission tunnel carefully. Watch your fingers!
13. Set the engine/transmission assembly on an old tire with no rim or on engine stands to avoid damaging the oil pan.
14. 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.

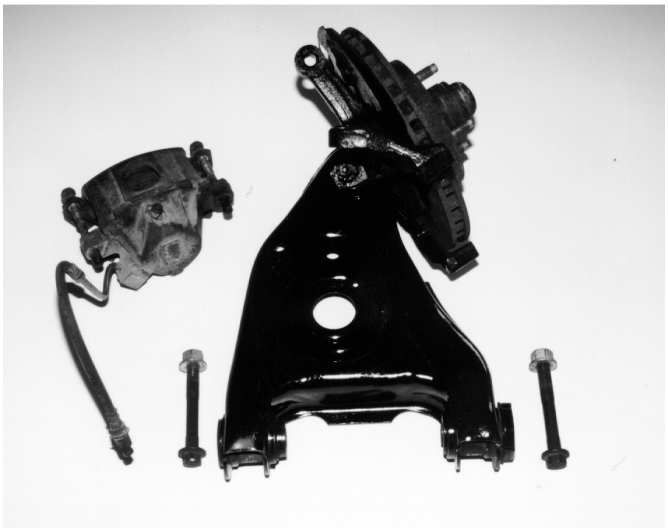
Front Suspension

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 or death if you are not extremely careful.*

TOOLS: *Spring compression tool, socket set, combination wrenches, breaker bar, tubing cutter, floor jack, tire iron, jack stands, chain, long nose pliers, rags, ball joint removal tool or plastic dead blow hammer.*

PARTS: *Brake calipers, rotors, spindles, 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.



Lower A-arm w/bolts, brake caliper, spindle and brake rotor.

9. Use a spring compression tool to remove the front springs or chain the spring to the chassis.
10. Remove the three bolts that retain the struts to the top mounting plate.
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 ball joint separation tool or dead blow hammer the ball joint 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, fuel filter, fuel filter bracket and lines from fuel filter to tank. 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.*

1. Remove the rear wheels.
2. Remove the flexible brake line from the body-mounted bracket.
3. Remove the body-mounted brake line bracket from the car.
4. 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.
5. Put a jack on the flat part of the middle of the rear axle.
6. In the trunk/hatch area of the car, undo the nuts on the top of the vertical shock absorbers.
7. 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.
8. Lower the jack slowly with the rear end so that they come down together.
9. 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.
10. Remove the OEM bolts and nuts from the lower rear Mustang control arm, where the arms are mounted to the body/chassis.

11. Remove the OEM bolts and nuts from the upper Mustang control arm, where the arms are mounted to the body/chassis.
12. 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.
13. Remove the rear end from under the car.
14. Remove the brackets that secure the quad shocks to the frame. Make sure you get the complete bracket and not just the shock.
15. 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.
16. 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.

Donor Part Preparation

Rear Coil Springs

Rear coil spring.

1. Remove the rubber spacer from inside the coil.

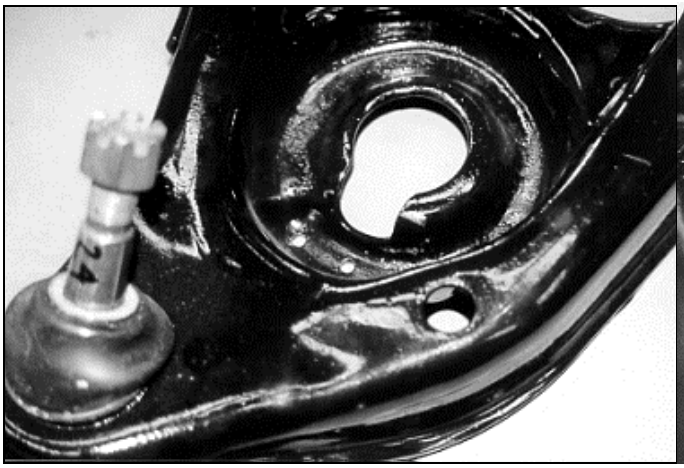
2. Cut one full coil from the top of the spring for correct ride height setting.
3. Cut the upper rubber spring seat so that during assembly of the kit, it will conform to the spring mount on the frame. This is done with one cut across the part. Do not replace these bushings with aftermarket silicone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

Rear End

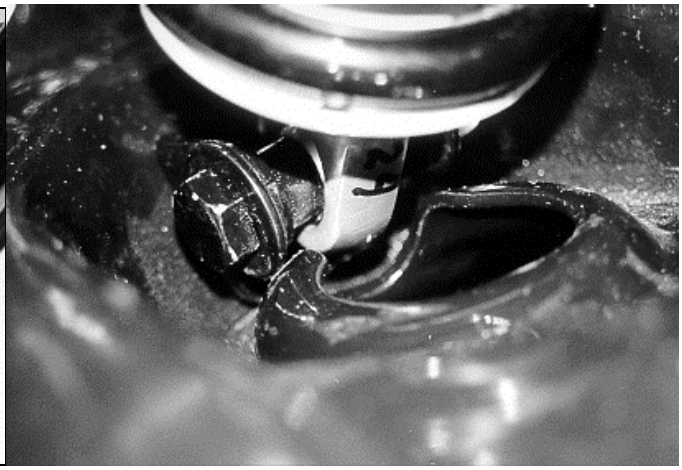
1. Change the rear end oil. See Appendix I for specifications and capacities. It is easier to do out of the car and probably hasn't been done for a while if at all. RTV is good to use to seal the cover.
2. Remove the shock mounts from the axle. These will be used on the front control arms for the coil-over shocks.
3. Drill the lower control arm mount holes with a ½" drill bit.

Front Lower Control Arms

1. Remove the area, near the center of the spring mount to prevent damage to the coil-over unit thru any contact whatsoever.
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.



Section removed from front lower control arm

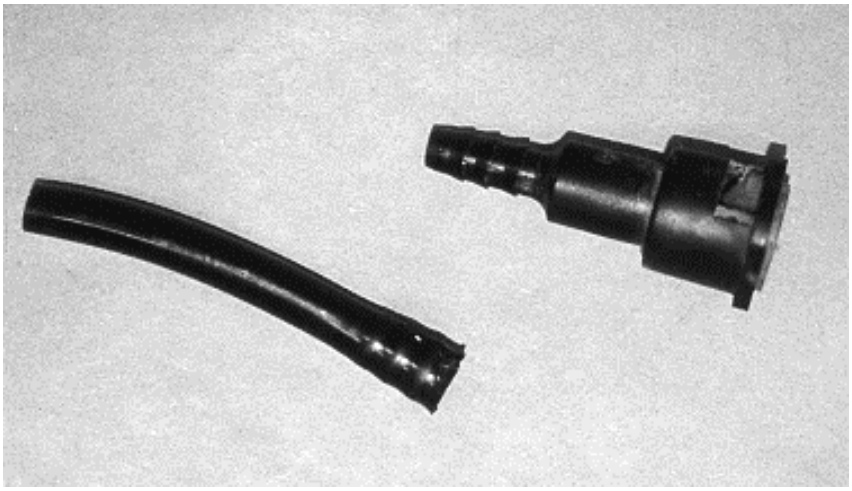


Coil-over mounted in lower arm with clearance hole.

Fuel Filter Fittings

TOOLS: *Razor knife*
PARTS: *Donor plastic fuel line fittings from fuel filter to body hard line and from return line from body hard line to fuel tank.*

1. Cut the hard plastic off the plastic barbs.



Barbed fitting removed from plastic hose.

Fuel Tank

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

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

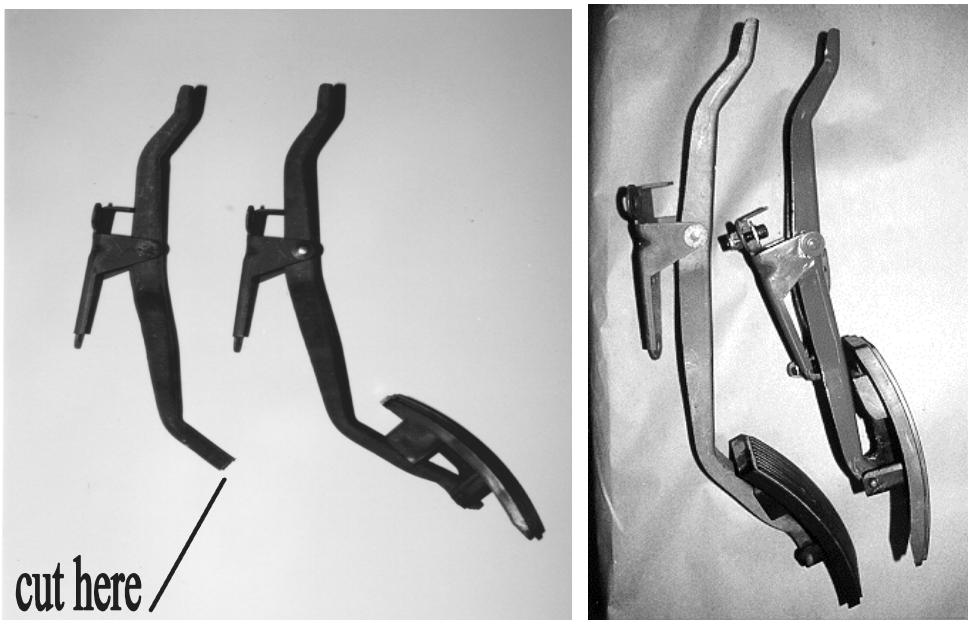
Pedal Box and Accelerator Pedal

The FFR Roadster uses a manual braking system. It is highly recommended that the stock Mustang brake pedal, which is set-up for power brakes, be modified to put more pressure on the master cylinder. There are two ways to change the brake pedal.

Change the 5.0 brake pedal. A pedal from a 1982 four cylinder Mustang with manual brakes provides better leverage.

Cut the existing pedal. Look at the pedal box where the brake pedal pivot bolt is attached and you will notice that 1.5" lower than the bolt, there is another set of holes. This hole is the four-cylinder pivot bolt hole. By keeping the master cylinder push rod in the same place and lowering the brake pedal bolt to the four-cylinder location, more pressure is put on the master cylinder when the pedal is pressed. You can accomplish this by cutting 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 is different.

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.

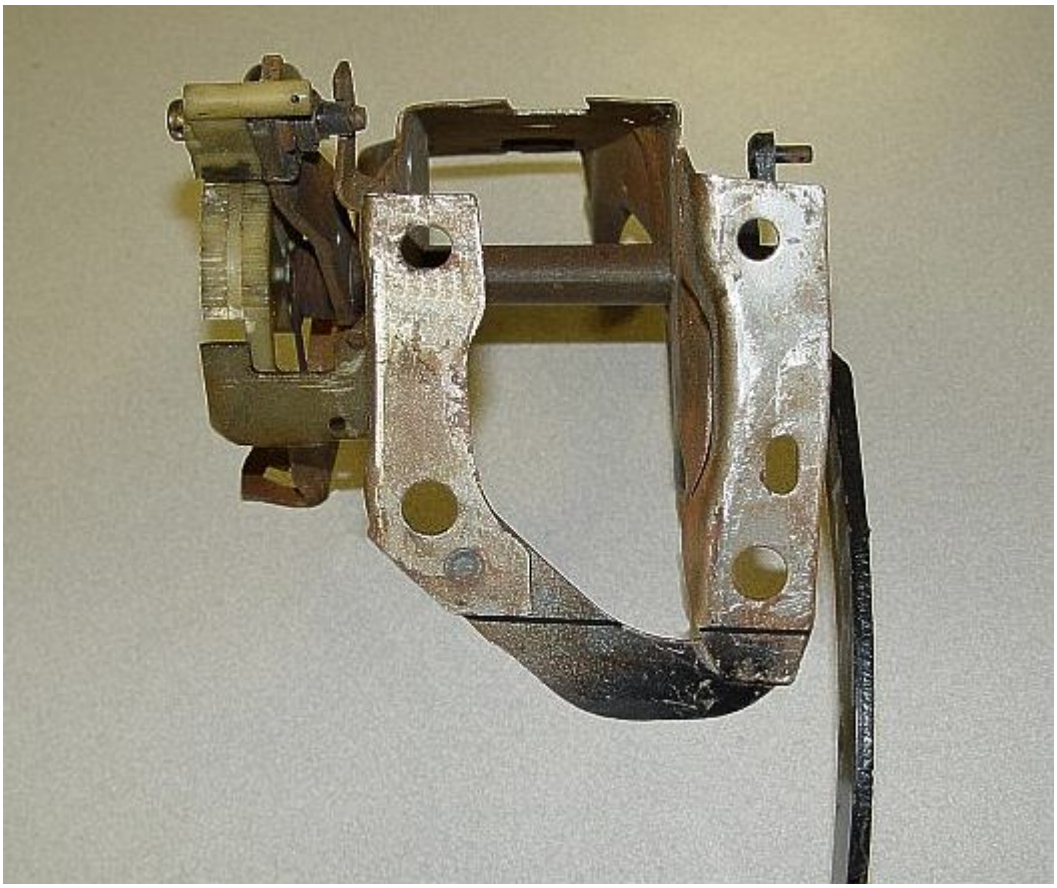


Accelerator pedal modified.

3. Remove the bracket for the cruise control brake switch from the pedal box.

87-93 Pedal Box

1. Mark the mounting face of the 1” up from the bottom of the mounting plate.

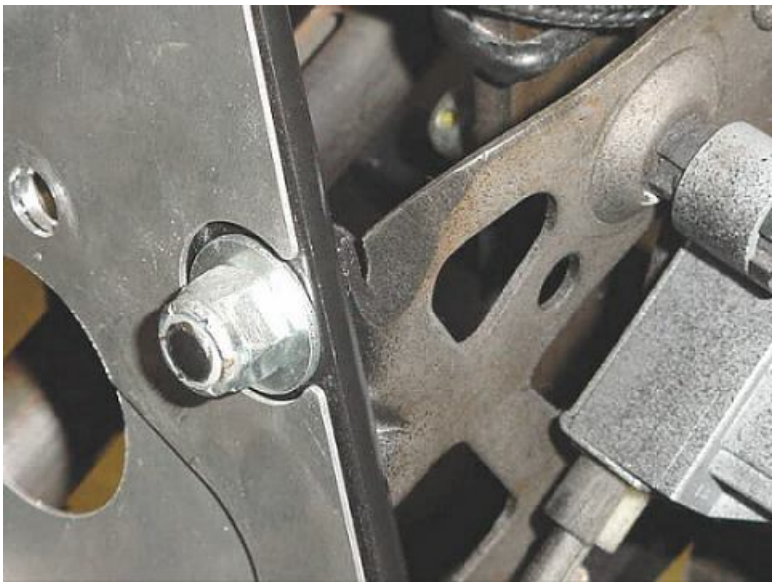


87-93 Pedalbox marked for cutting.

2. Cut-off the marked area with a hack saw. This is necessary for steering shaft clearance.

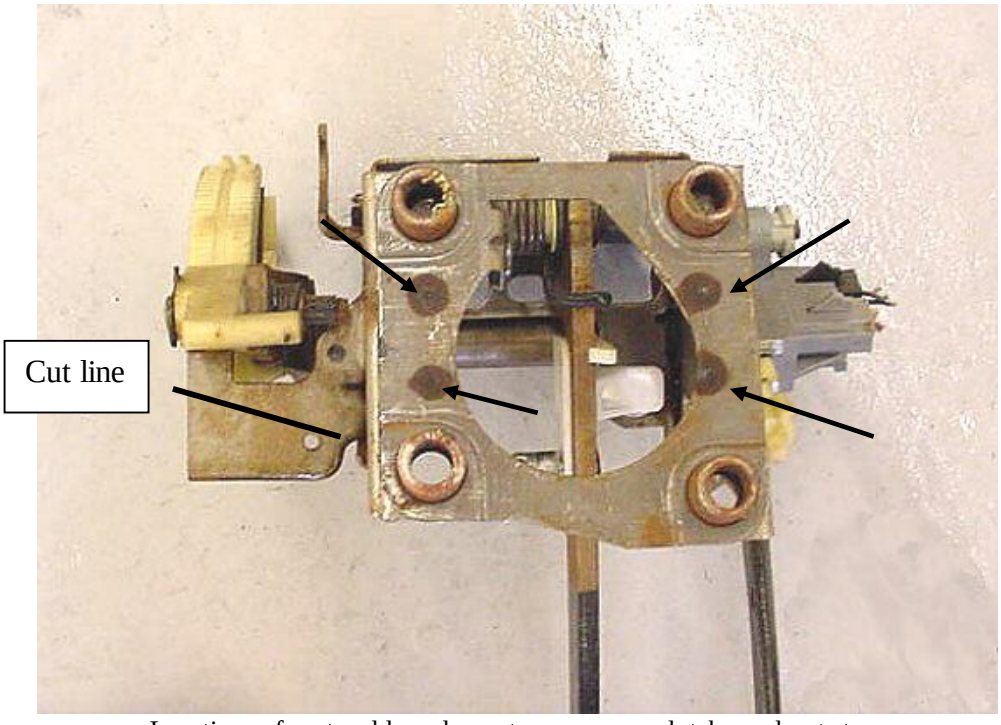
1994-1995 Pedal Box

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



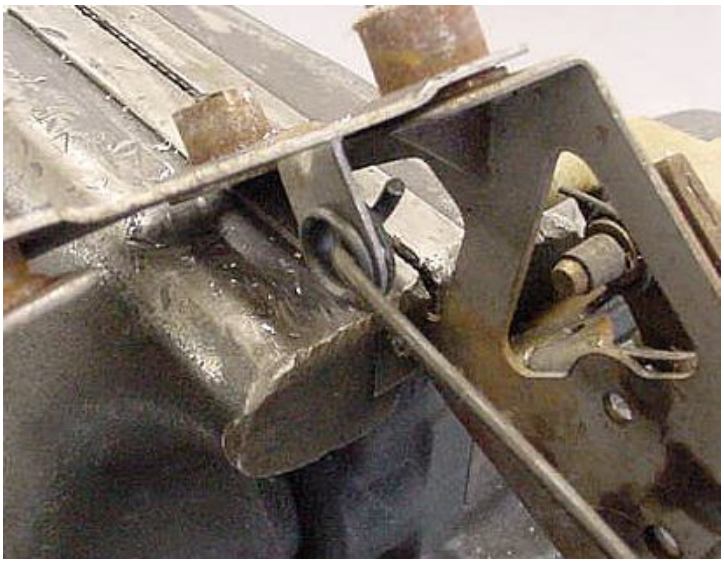
Top outside of pedal box.

2. Remove the cruise control switch located under the plastic clutch quadrant on the right side of the pedal box.
3. Drill out the four spot welds on the front face of the pedalbox.
4. Cut off the corner of clutch quadrant stop shown in the picture below for accelerator pedal clearance.



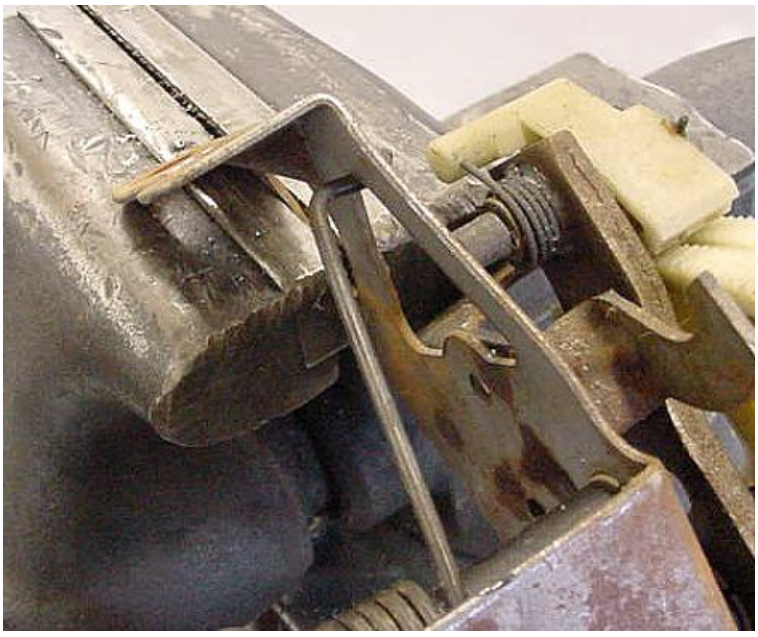
Locations of spot welds and area to remove on clutch quadrant stop.

5. 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.

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



Brake pedal spring in triangular opening.

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. Heater wires
4. Air bag blue boxes and wires
5. Electronic seat and window controls.
6. 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.

Brake Power Booster Push-rod

1. Remove the master cylinder from the power booster.
2. The power master cylinder assembly must be changed to manual for this kit. This simple modification is done on many SCCA Mustangs for improved brake feel. In a 2,100 lb. car, the feedback is fine and power brakes are not really necessary.
3. The brake push rod is on the cockpit side of the booster canister and must be removed for use.
4. To get the power booster push rod out of the housing, put cockpit side of the booster in a vise and break the plastic end.
5. After separating the booster housing, pull the rod out. This rod will have an aluminum fitting attached to it. In order to get it to release, heat the aluminum fitting with a torch and the rod will pop right out.

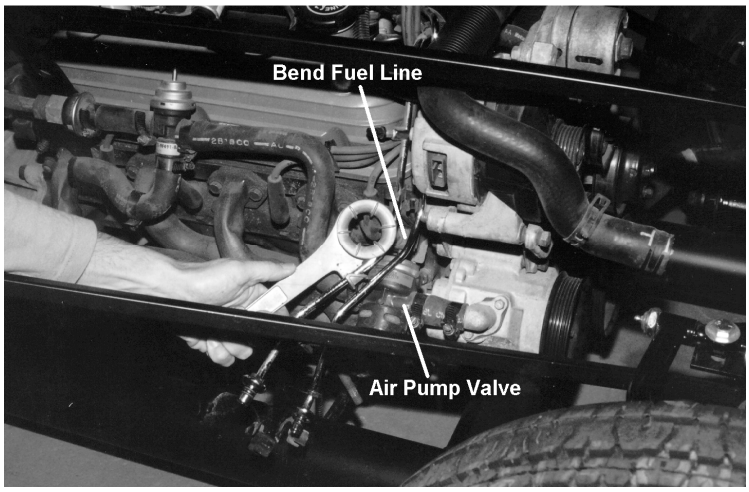
Power booster with the rod removed.

Driveshaft

Shortening a driveshaft is not for the "Do-it-yourselfer". Take the driveshaft to a professional shop to have it shortened to the drawing. 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 written instructions. Make sure your machine 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: *⅜", 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.*



Bending the fuel lines on the engine.

1. Bend the fuel lines away from the engine block just at the point where they are held in place by the retaining clips. This is so that the fuel does not travel near the hot header. Don't make tight bends here or it will affect your fuel flow.
2. If you are using a Lakewood bell housing, trim the area around the starter so that is flush with the inspection cover.
3. 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.
4. If you are not running emissions equipment, the hoses, mounts and solenoids can be removed.
5. Install the headers using the header originally for the left side on the right side of the engine, and the right header on the left side of the engine. Thread all of the bolts on the headers before tightening any of them, to make installation easier.

Alternate Drive Pulley Preparation

ATTENTION:

- *If you are planning on using under drive pulleys, do not use the template.*
- *If you are planning on running power steering the alternate pulley is not needed. You will however need the power steering mounting brackets for a non A/C car.*

TOOLS: *Cordless drill, ½" drill bit.*

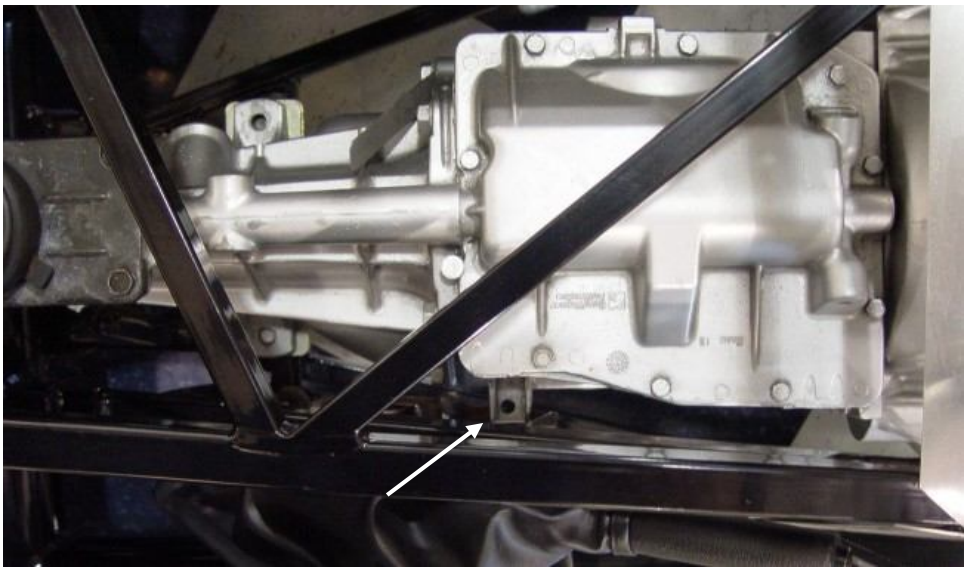
PARTS: *Alternate drive pulley template, appendix A. On all EFI cars the pulley and fan belt replace the A/C compressor and power steering pump.*

1. Remove the A/C and power steering pump. Use the alternate drive pulley template to prepare the bracket for the pulley.
2. Use the template in appendix A to drill into the original Mustang A/C bracket. If you are choosing to run either A/C or power steering, you do not need to use this alternate drive pulley assembly.
3. If you really want power steering on the car (which is not necessary in a car this light) use the non-A/C

power steering brackets from Ford to move the power steering unit up out of the way of the steering shaft.

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.

Steering Rack and Shaft

ATTENTION: If you are planning on running power steering this section is not needed.
TOOLS: *11/16" and 5/8" wrenches*

5. Remove the hydraulic lines. Use 11/16" and 5/8" wrenches. Drain all fluid by turning it, lock to lock, upside down over a collection pan. Dispose of the fluid properly. The rack is greased on the gears at the ends.
6. The Mustang power rack is converted to a manual rack by removing the hydraulic lines from it and draining the fluid. You can leave the holes open without concern since the hydraulic cylinder is no longer used, however, for cosmetic reasons you may want to close them off. You can use a ½" **Non-threaded** hole plug. Keep in mind, this must not be airtight! Air must be allowed to move in and out of the holes. If you use a hole-plug, drill a small air release hole in the center.

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 5.0 Mustang 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 and upper steering shaft do not get a lot of wear and are quite expensive when purchased new. These can be easily sourced from a salvage yard.

Read 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 McLeod
Blow proof bellhousing blanket	Deist
Drive shaft	Local drive shaft shop
EFI Wiring Harness	Painless Wiring

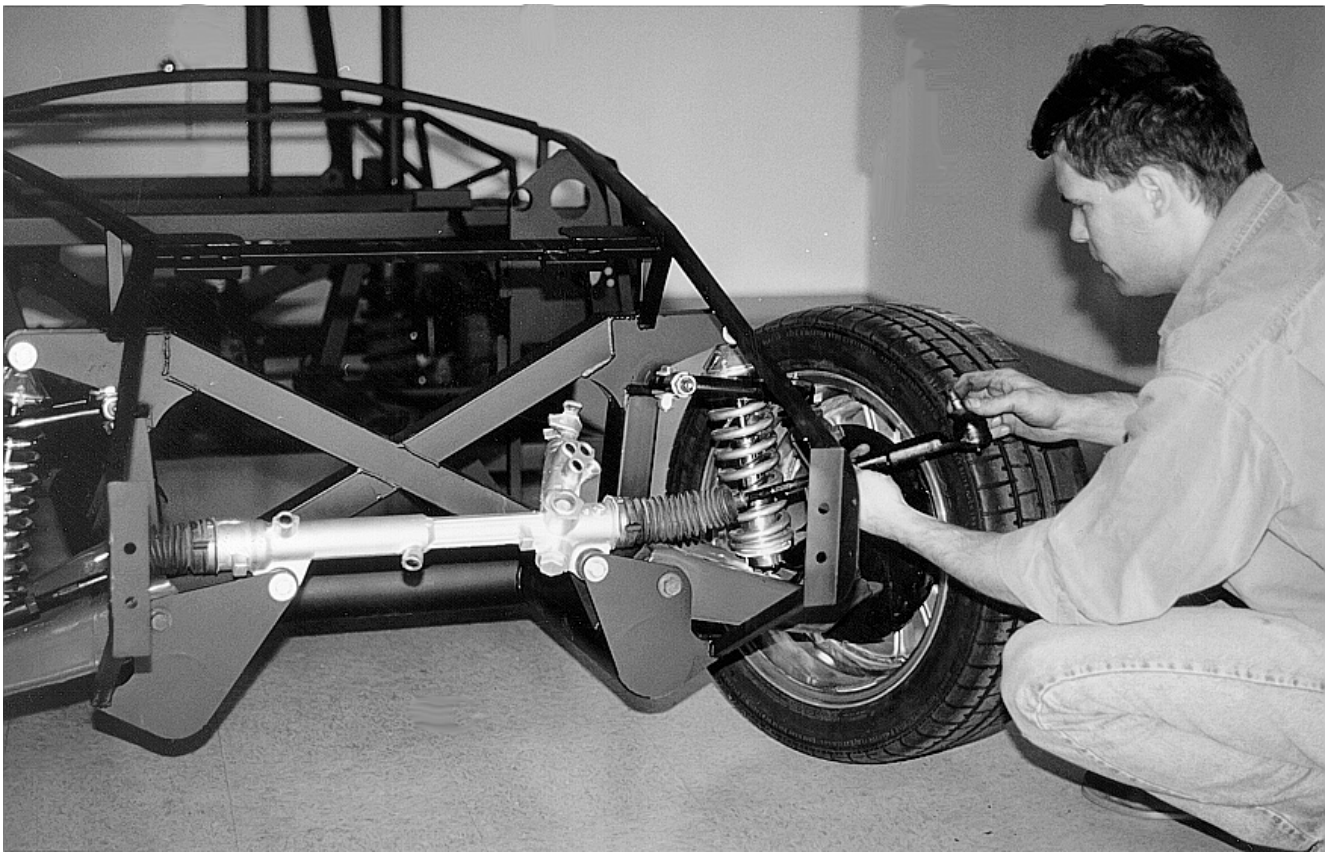
	www.thedetailzone.com
	Ford Racing Performance Parts – Diversified Products
All new parts	Breeze Automotive – www.breezeautomotive.com

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.

If you are going to use donor parts from a year other than 1987-1993, see Appendix B

Chapter 2 - Step By Step Chassis Build-up



If using a 4.6L engine or donor parts newer than 1995 call and ask for the 4.6L Assembly Manual

Unpacking Your Replica Kit

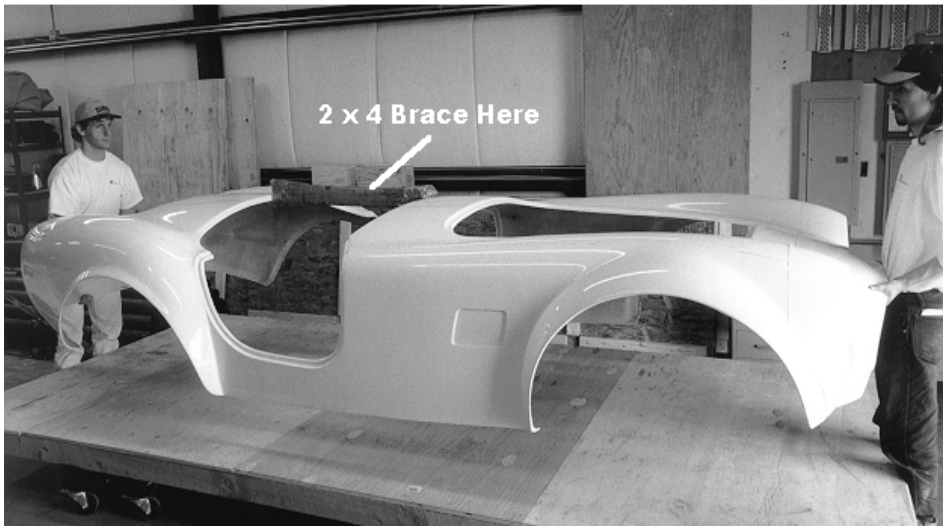
Please note that your boxes are numbered, when you read your packing list you will see that next to each assembly there is a number circled. This is the box number that the assembly was packaged in. The kit is packaged in the order that you will be using the parts.
After everything is safely in your 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.*

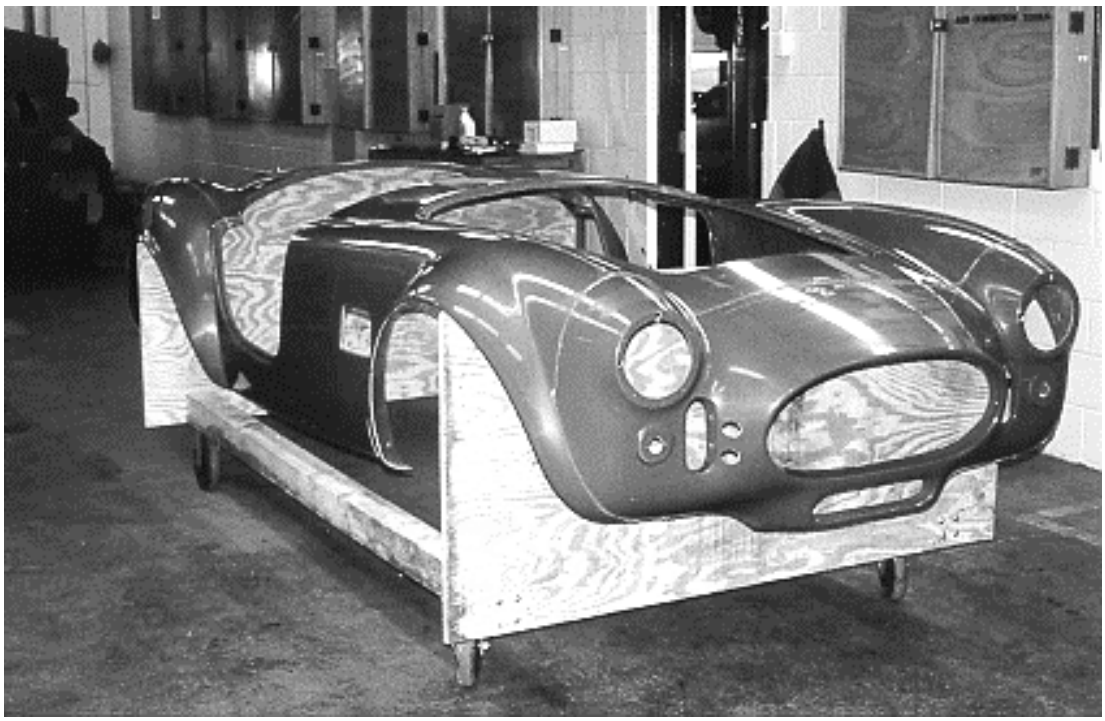
TOOLS: *½", 9/16", 5/8" sockets, "vise-grip" pliers or slip joint pliers, hex key set, ½", 5/8" wrenches, marker, 2"x 4"x 34.25" brace, 2"x 4"x 24" (for body support), duct tape, #8 hex driver.*

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.

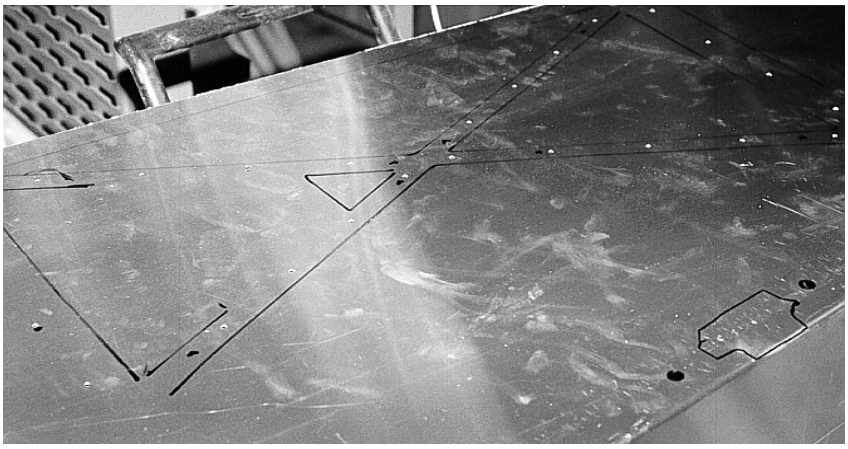


Body buck

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

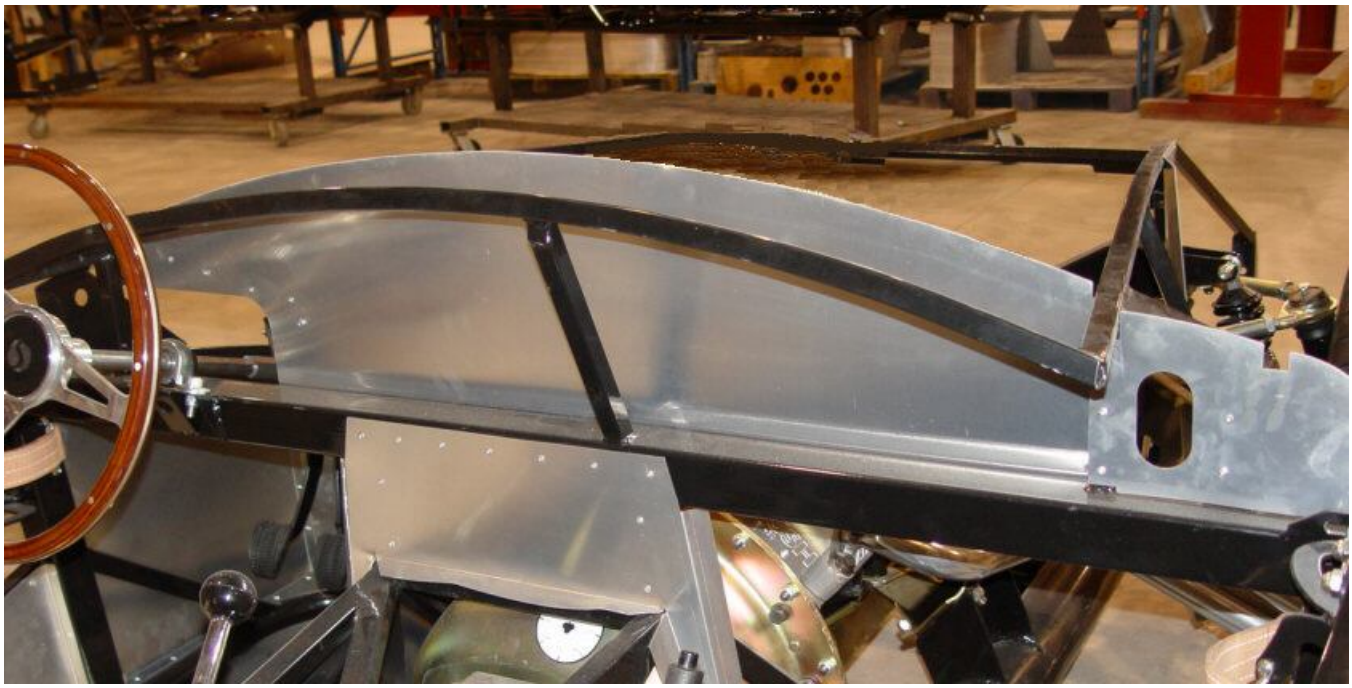
TOOLS: *Eye protection, drill w/#8 hex nut driver, ⅛" drill bits, drill, rivet tool, silicone, caulk gun, #8 self tapping screws.*

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.

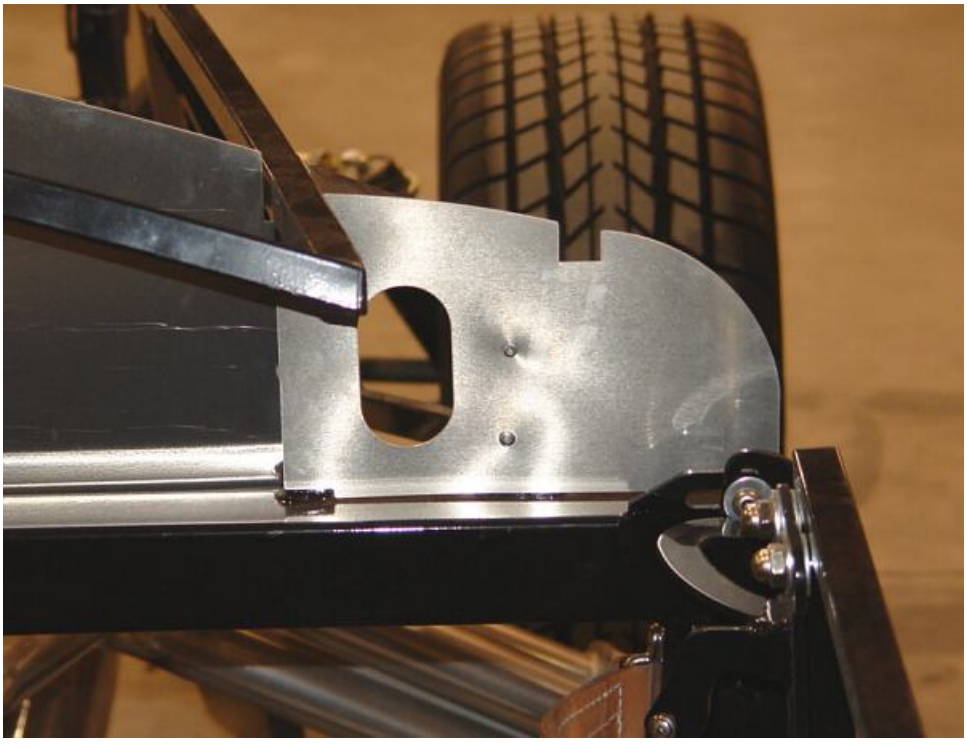
Note: If installing a heater/defroster, it is easier to make the necessary holes now before the firewall is installed. See the instructions included with the heater for hole size and location.

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

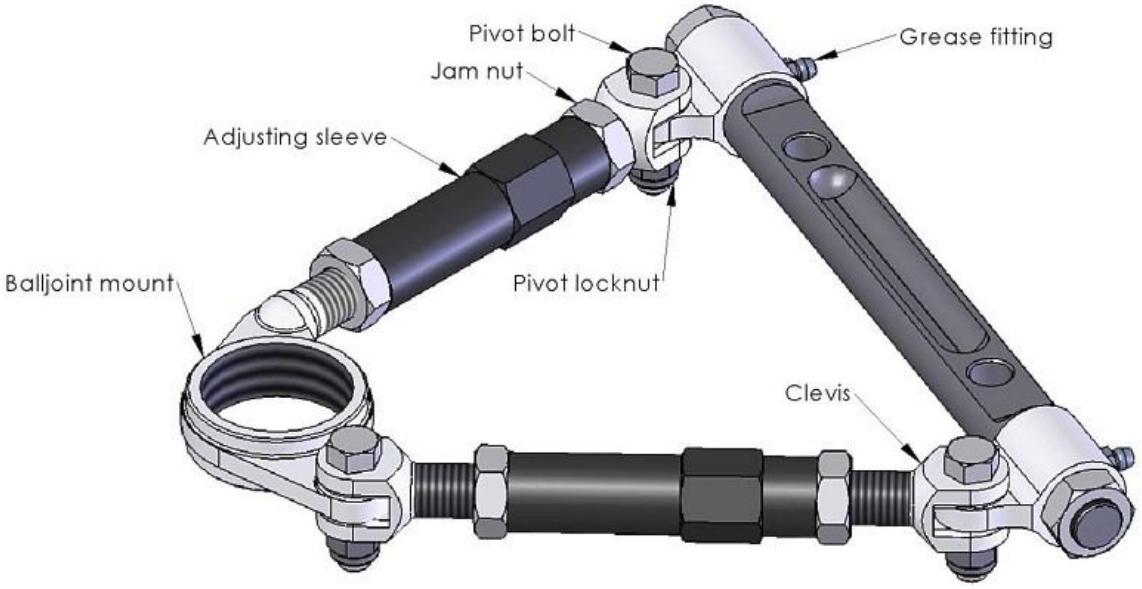
TOOLS: *Combination wrenches, coil-over adjusting tool (FFR# 10961), ⅜", ⅝", ¾", 11/16", 13/16", ⅞", 15/16", 1⅛", 18mm sockets. Rubber mallet, eye protection, drill w/#8 hex nut driver, ⅛", ½" drill bits, drill, rivet tool, torque wrench, silicone, caulk gun, #8 self tapping screws.*

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.
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).**

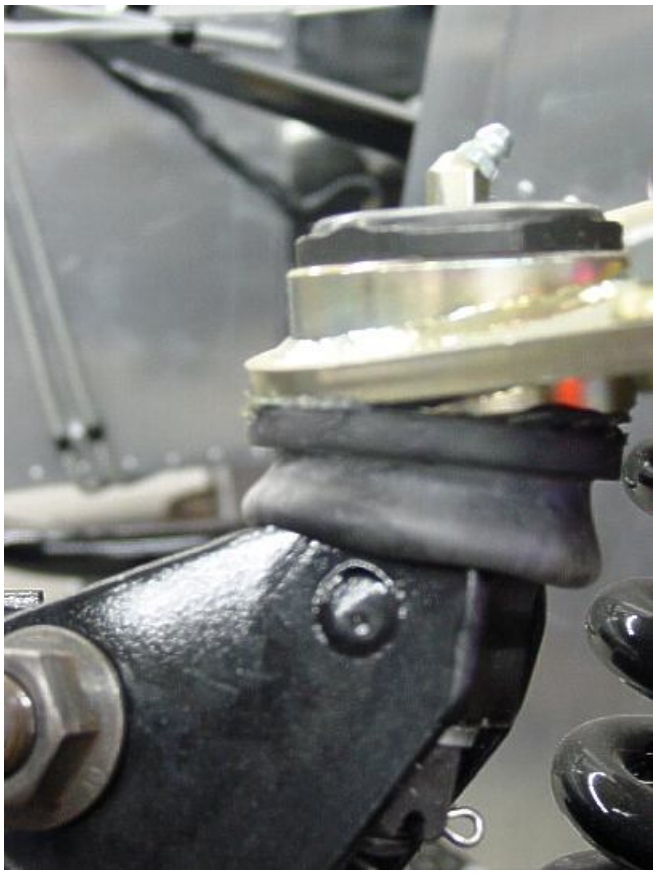
Adjusting the Arm - Use the diagram below for reference.



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.

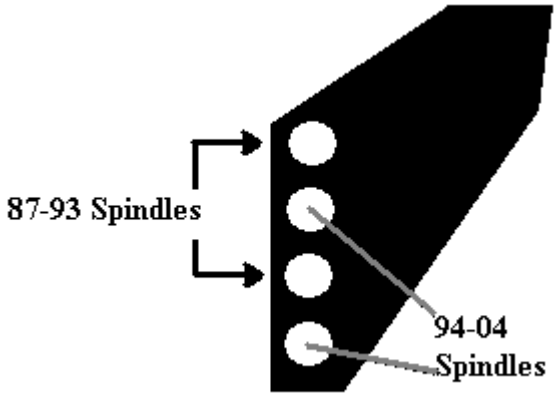
5. Holding the dust boot in place, insert the ball joint into the Spindle Adapter bracket (FFR# 13819). This bracket replaces the Mustang strut. Be sure to use the cotter pins included with the ball joint. Torque the ball joint to **95-122Nm (70-90 lbft).** If the top of the crown nut goes past the hole in the ball joint, use the spacer that comes with the ball joint.



Ball joint in IFS Bracket.

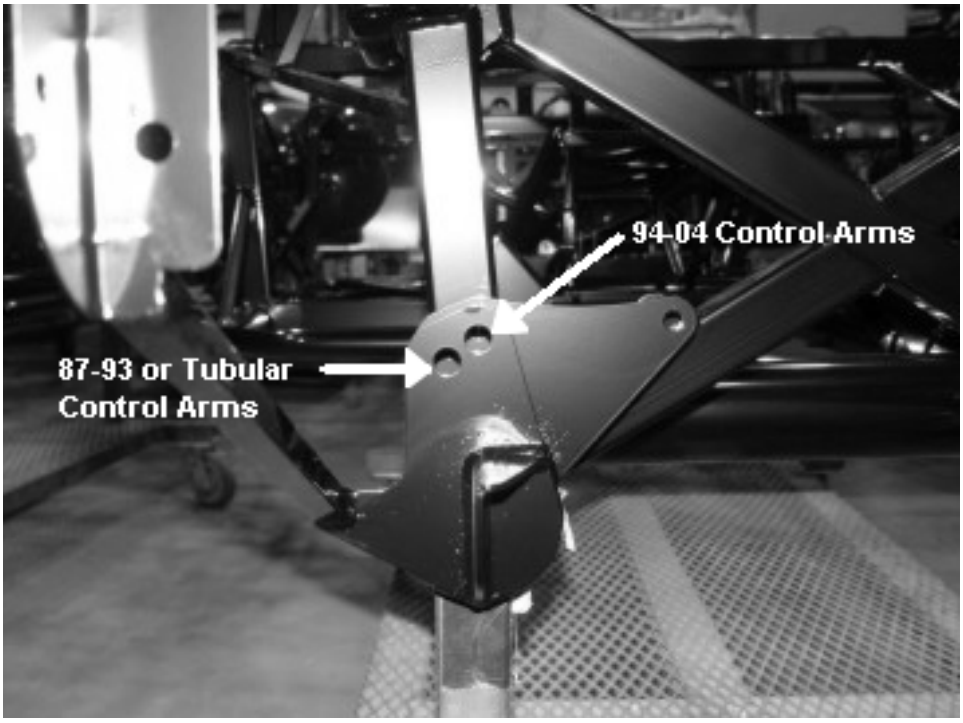
6. Attach the Spindle adapter bracket/upper A-arm assembly to the spindle using the factory strut bolts and torque to **135-149Nm (100-110 lbft).**

Note: Using the 87-93 spindles, use the hole closest to the ball joint and the third hole down. 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.



7. Install the front lower control arms on the frame using the holes towards the **<u>OUTSIDE</u>** of the frame.

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.



Control Arm Mounts

8. While holding the 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.

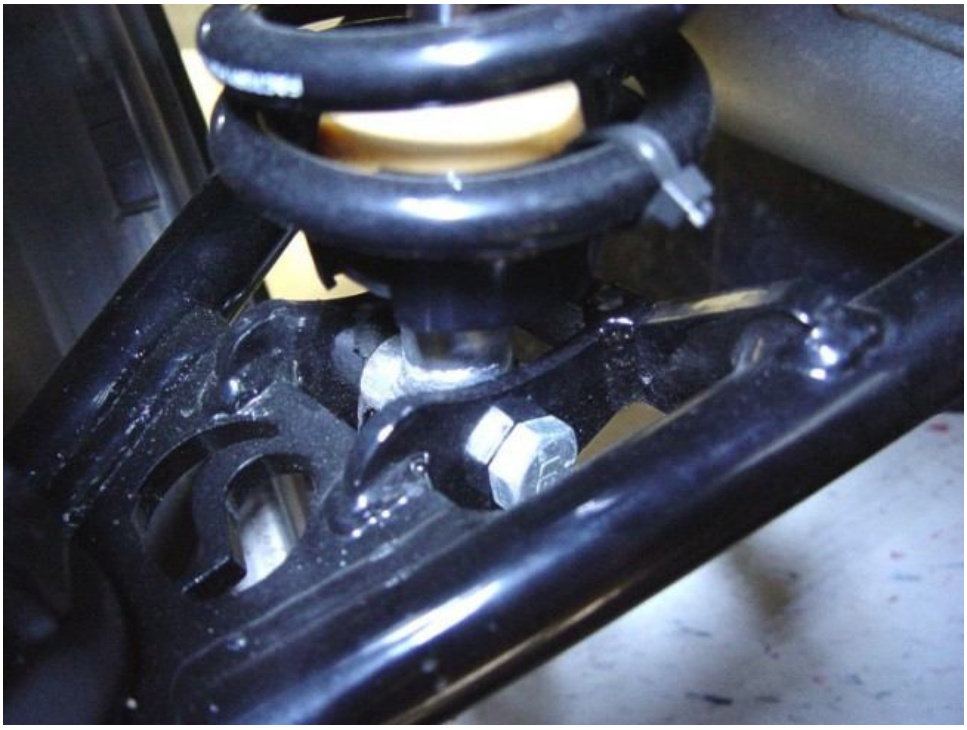
5. The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

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

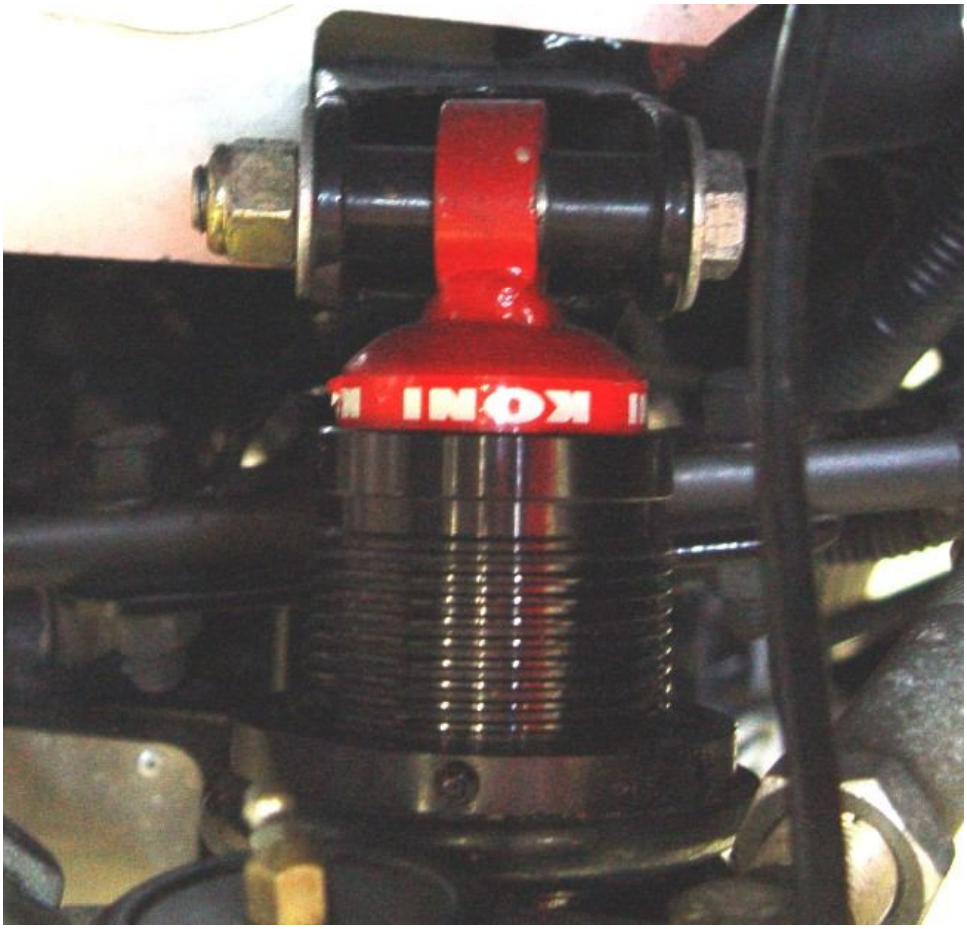
7. Put the spring on the shock, then install the spring hat on the shaft end of the shock and push the rubber bumper up against it.
8. Rotate the spring seat back up the sleeve so that the spring pushes the hat tight against the end of the shock.
9. Install the snap ring on the spring hat so that it 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

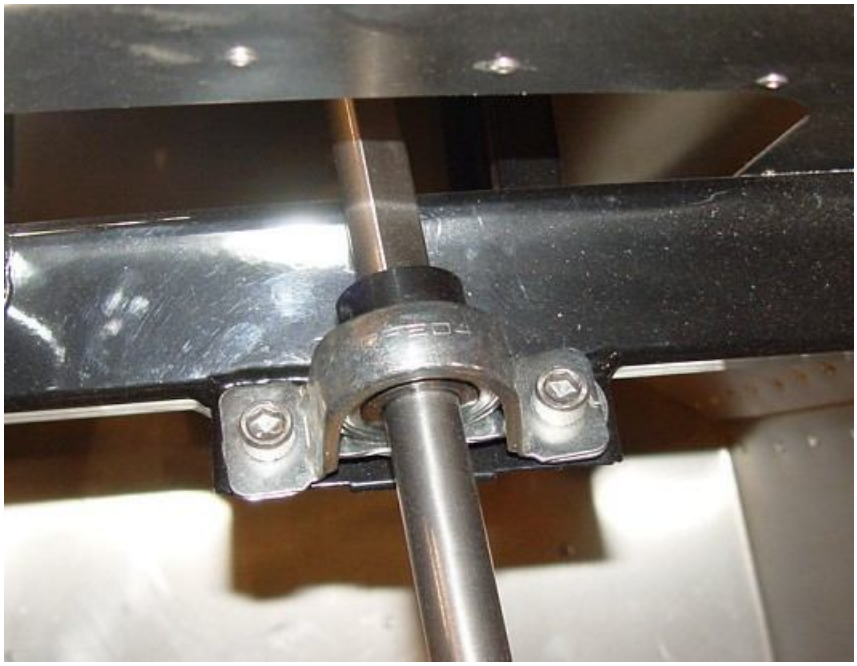
ATTENTION:

- *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.*

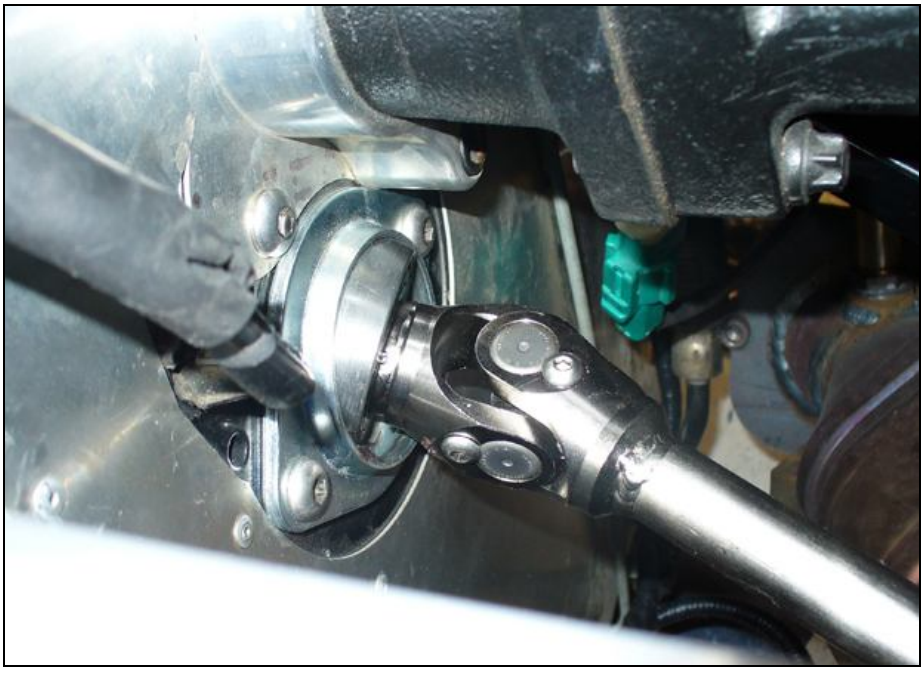
PARTS: *Steering system hardware (FFR# 11073), Box 9A Steering shaft assembly (14453), pillow block/hardware (FFR# 11072).*

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. 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.
7. Slide half of the flange bearing mount down over the shaft to the bearing.
8. 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.



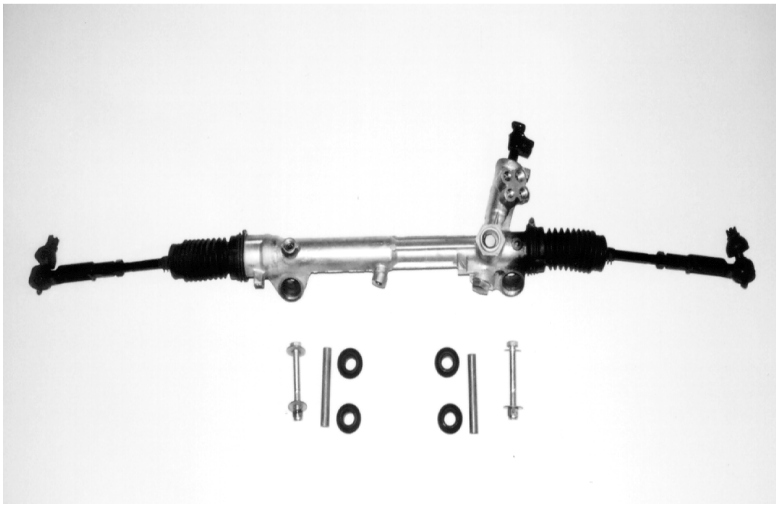
Flange Bearing mounted to front of footbox.

Note: 87-93 Power steering racks have a different spline than a manual steering rack. The 94-95 Power rack uses a “Pyramid” shaped end. All of these lower adapters are available from FFR.

9. 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.
10. Tighten the set screws and the jam nuts on both U-joints and the 1” locking collar.
11. Tighten the bolts holding the ¾” Pillow block and 1” flange bearing to the frame.
12. Rotate the upper shaft and make sure that it rotates freely. If necessary, trim the upper part of the flange and/or grind the set screw slightly.
13. 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.
14. 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.
15. Push the aluminum center section into the steering wheel boss through the steering wheel without the emblem attached.
16. 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

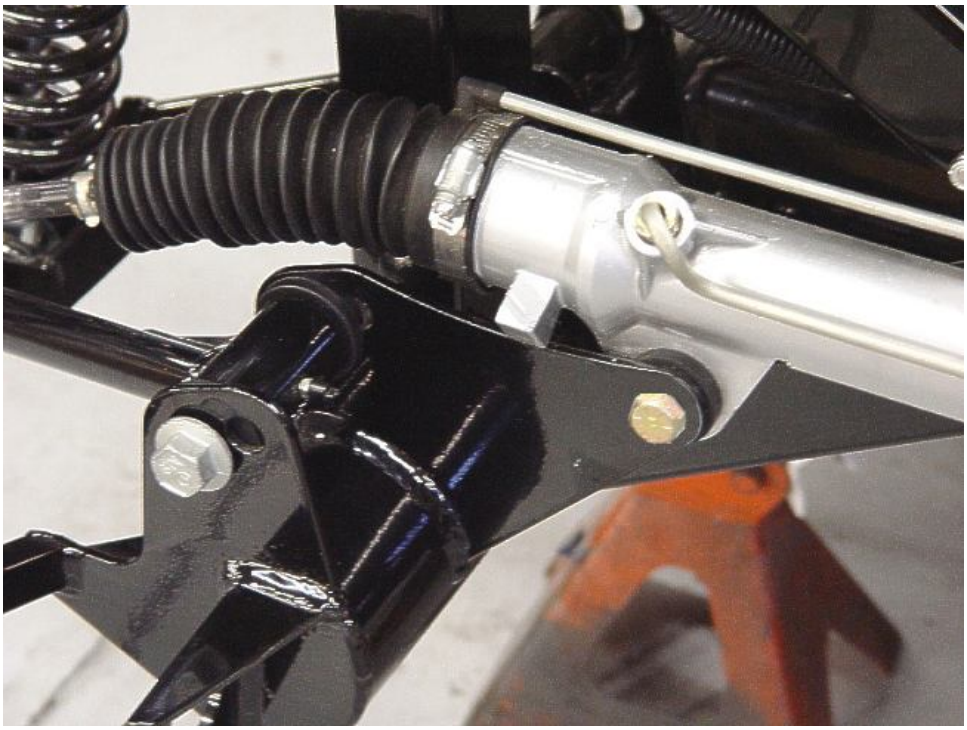
TOOLS: *¾" Socket, ¾", 1.50" Wrench, Needle nose pliers, Adjustable wrench, thread lock*
PARTS: *Steering system hardware (FFR# 11073), 87-93 Lower Steering shaft (FFR# 13701), Donor steering rack.*



Above: Ford steering rack and fasteners (hydraulic lines removed).

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 splined input of the steering rack and, place the steering rack between the rack mounts on the frame (behind the front lower control arm bolt).

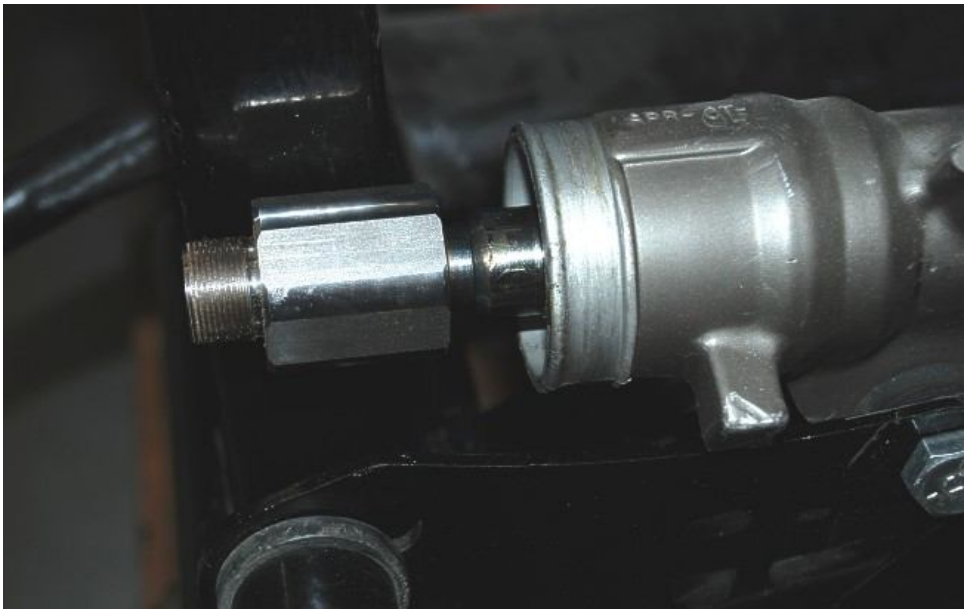
3. Insert the steering rack bolts through the frame mount, rack and rear frame mount and lock nut. Use the provided washers on the driver side (slotted) only.
4. Tighten the bolts to the bolt torque spec.



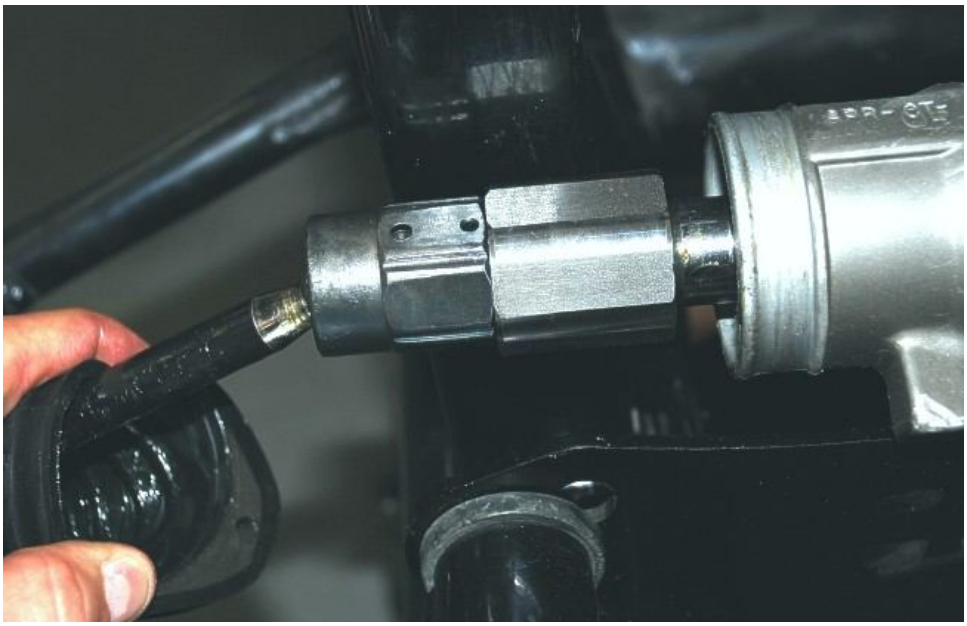
Steering rack mounted to frame.

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

5. Pull back the rubber boot on the inner tie rod and remove the inner tie rod from the steering rack.
6. 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.

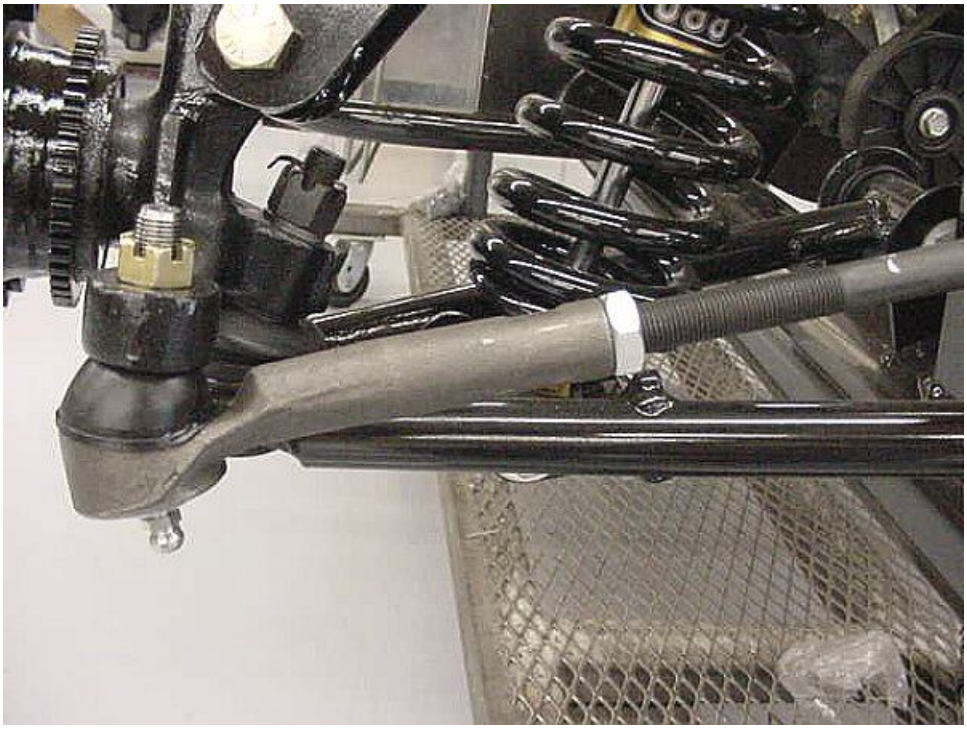


7. Put a dot of thread lock on the threads of the steering rack extension and attach the new inner tie rods to the steering rack.



Inner tie rod attached to the steering rack.

8. Push the boot back onto the steering rack body and attach with zip ties.
9. The track of the FFR Roadster front end is a little narrower than the Mustang. Screw in the tie rod ends until the inner tie rod is flush with the end of the threaded section on the driver side, ¾" past the end on passenger's side.
10. Attach the tie rods to the spindles and secure with the castle nuts and cotter pins.



Outer tie rod attached to spindle.

Steering rack installed.

11. 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.
12. 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. If using a complete kit, do not forget to install the axle breather vent on top of the passenger side axle tube.*

TOOLS: *15mm, 18mm and ⅝" sockets, ¾", ⅝" combination wrenches, ½" drill bit, drill, floor jack.*

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 axle with gear oil. See Appendix I for specifications and capacities.
2. 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.
3. Tighten the two short bolts. **Torque to Ford Specs 75-95 Nm (55-70 lbft)**.
4. 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.

5. If not already on the axle, attach the Mustang upper rear control arms loosely to the rear end.
6. Attach the vertical shocks to the axle brackets. Insert the bolts from the inside out. Do not tighten the bolts yet.
7. 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.
8. Mark the location of the holes on the bottom of the 2"x 3" tube with a marker.

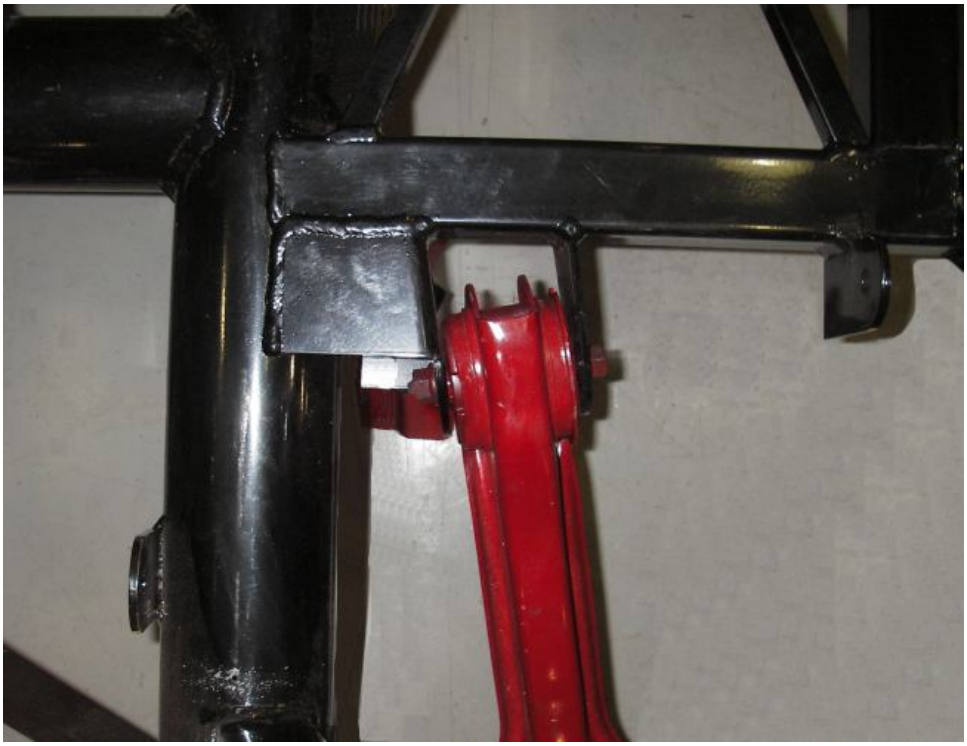
9. Drill the two hole locations using a ½" drill bit.
10. Bolt on the perch using the ½" bolts provided.

Spring perch mount bolted on frame.

11. Thread the cut rear springs onto the conical frame mounts all the way.
12. 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.
13. Place the flat part of the rear end on a floor jack.
14. Raise the rear end so that the upper control arms are flat.
15. 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 less than 300 hp 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.*

16. 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.
17. 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.



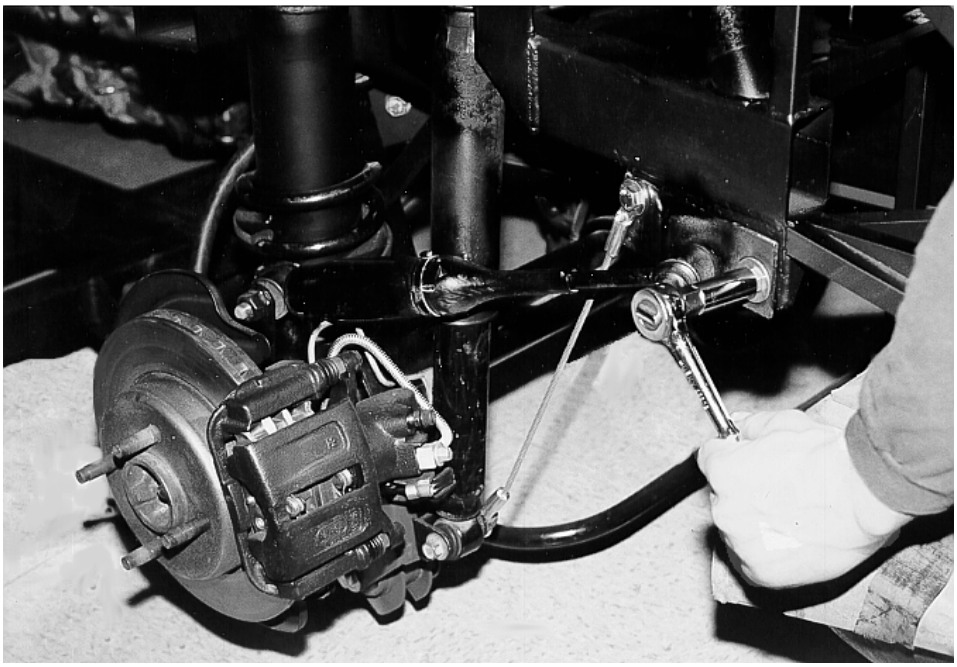
Passenger side stock rear lower control arm in the frame mount.

18. 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.

19. Screw the springs down so the end of the spring is ½ coil past the end of the mount.

20. 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.
21. 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 37-47Nm (27 lbft)**.
22. Mount the quad shocks and their brackets to the rectangular frame plate shown in the picture.
23. 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.



Bolting the rear horizontal quad shock to the frame w/ axle straps.

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

Ride height should be 4½" at the front and 4½" 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.

25. 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.
26. 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.
27. 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	135-162	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

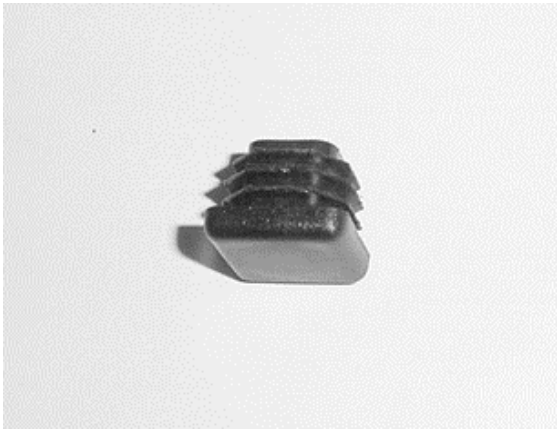
Fuel Tank and Fuel Filter

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.*

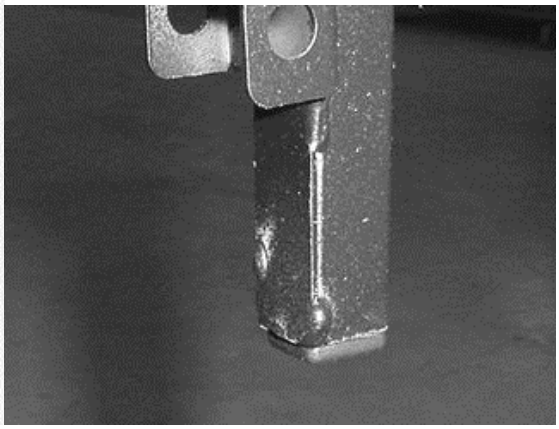
TOOLS: *9/16" and 5/16"deep sockets, combination wrenches, rubber mallet, hammer, 5/16" hex key, floor jack, friend.*

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.

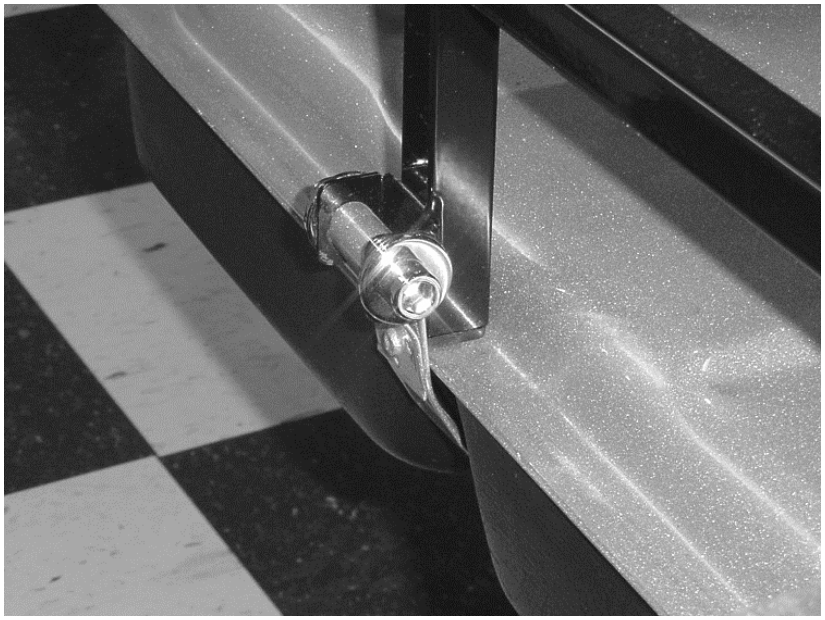


Cap Plug

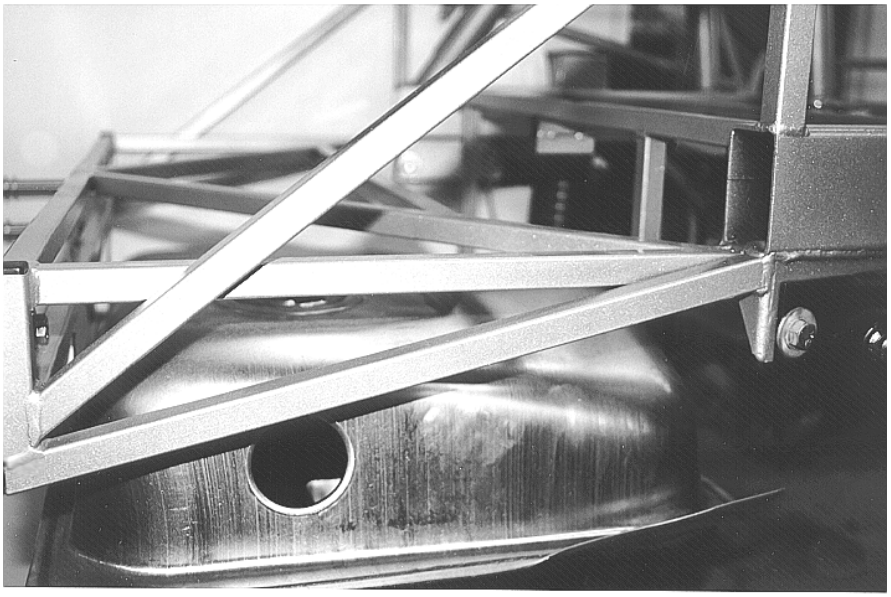


Cap Plug installed

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.



Tank strap attached to frame

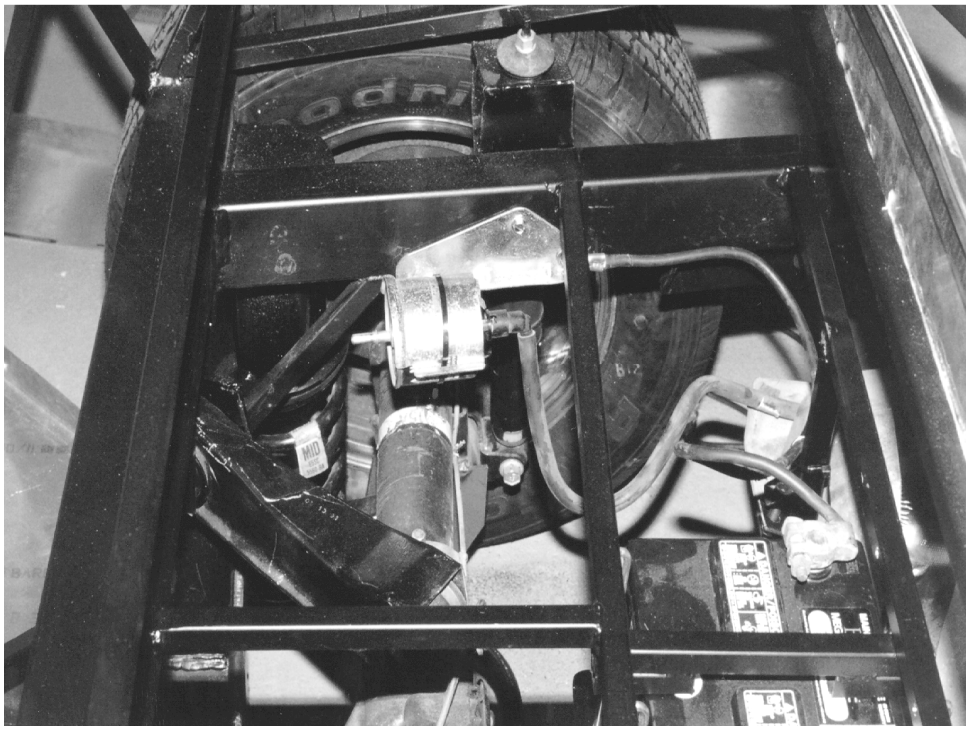


Side view. The Mustang fuel tank installed into the rear frame.

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 in side 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.

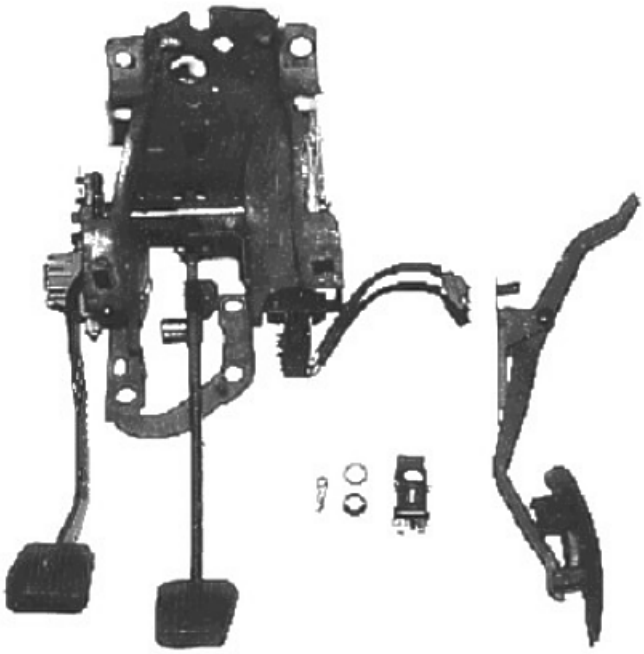


Fuel filter mounted to the passenger side 2”x 3” tube.

Pedals

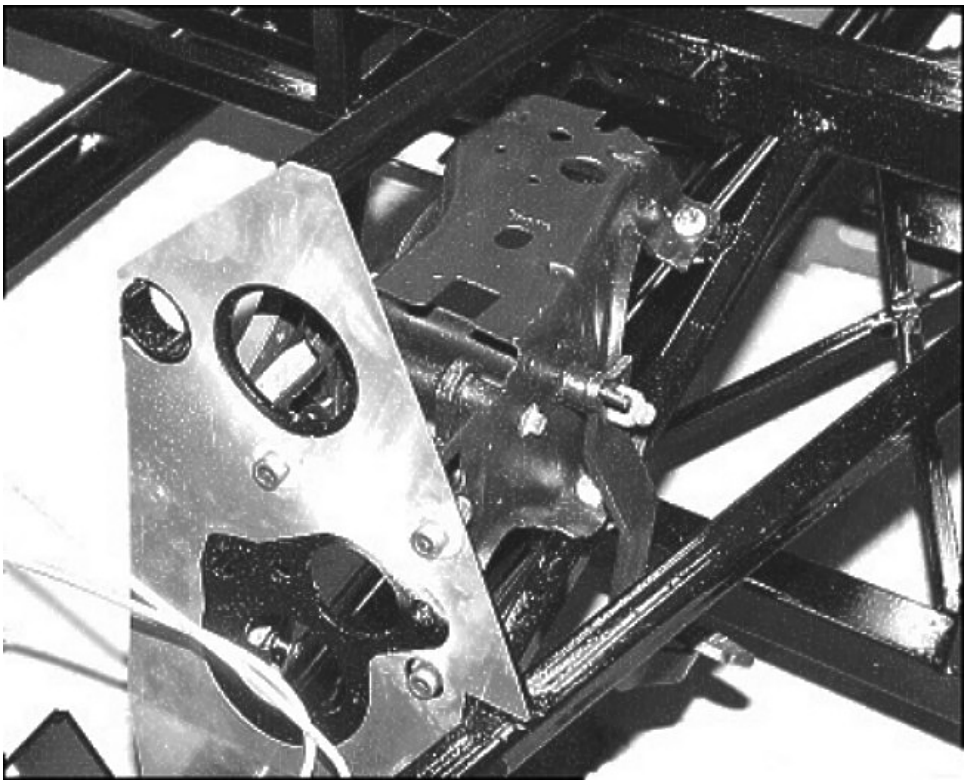
TOOLS: *⅜”, ⁹⁄₁₆” sockets, ³⁄₁₆”, ⁵⁄₁₆” hex key, drill, ⁹⁄₁₆” combination wrench, ⅛”, ¼”, ⁷⁄₁₆” drill bits, silicone, rivet tool, marker, hacksaw.*

PARTS: *Mustang pedal box, pedal box hardware (FFR# 11023), cockpit aluminum (FFR# 10890), ⅛” rivets.*



Mustang pedal box and Accelerator pedal

1. Position the Mustang pedal box on the two angled ¾" tubes over the driver's feet, and attach using two short ⅜" bolts and two washers to the front wall at the front of the foot box.



Positioning the pedal box.

2. There are four holes on the Mustang pedal assembly on top of the ¾" tubing. Mark these holes on the tubes.
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. Mark the corner of the pedal box that sticks out past the front foot box plate. This will have to be trimmed.

Pedal box positioned. Note corner to be removed on pedal box.

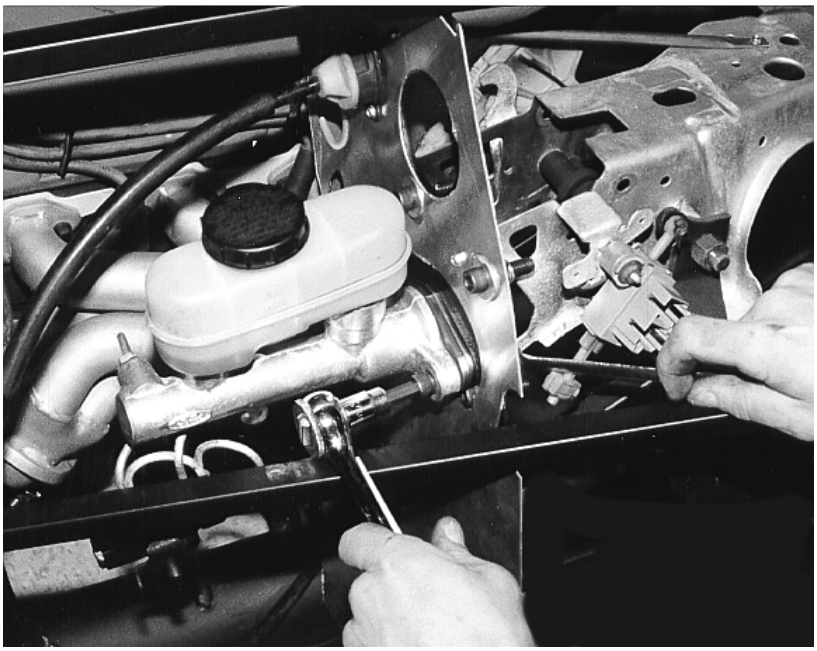
5. Remove the pedal assembly.
6. Drill ¼" holes completely through the ¾" tubing for the pedal box.
7. Use a 7/16" drill bit to drill the bolt hole in the pedal box for the master cylinder bolt.
8. Trim the corner off the pedal box using a Hacksaw.
9. The front foot box aluminum panel can now be siliconed and riveted in place with the ⅛" long rivets.
10. 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. The four ¼" socket head bolts hold the foot box to the ¾" tubes. Use the large fender washers (FFR# 12337) on the underside of the tubing.
11. 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.

Master Cylinder & Push Rod

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.*

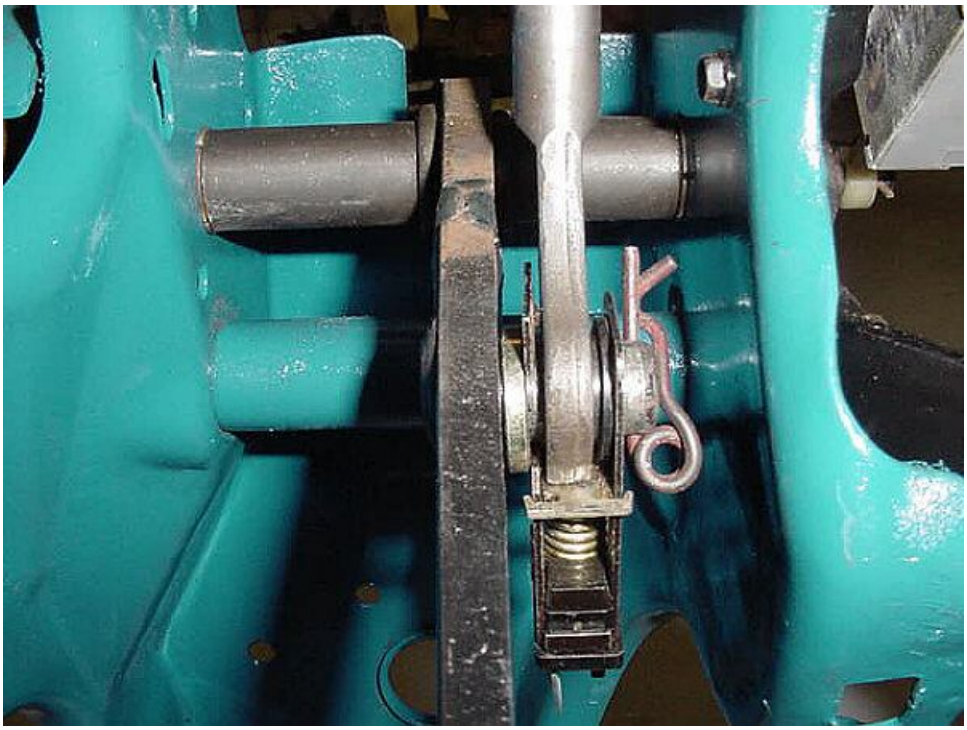
TOOLS: *5/16" hex key, 9/16" socket, tube bender, double flaring set, tube cutter.*

PARTS: *Master cylinder, Mustang power booster push rod, OEM brake line fittings, pedal box hardware (FFR# 11023).*



Tightening the master cylinder. Note the spacers directly behind it.

1. Use the ⅜”x 2” bolts provided to mount the master cylinder and spacers to the footbox front wall. The number of spacers used dictates the height of the brake pedal. Start with one spacer unless you are 6’ or taller then use more.
2. One of these bolts doubles as a foot box lower mounting bolt.
3. Tighten all of the mounting bolts for the pedal box and master cylinder.
4. Install the push rod from the power booster into the master cylinder and insert the white plastic bushing in the ring end.
5. Hold the rod between the two ears of the brake light switch and slide it over the brake pedal post.
6. 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

7. If you plan to race frequently, use some small springs and attach them to the brake pedal and pedal box to prevent the pedal from moving during severe acceleration.
8. The small aluminum piece packed in the assembly is not used for this application.

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, ⅛" 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:

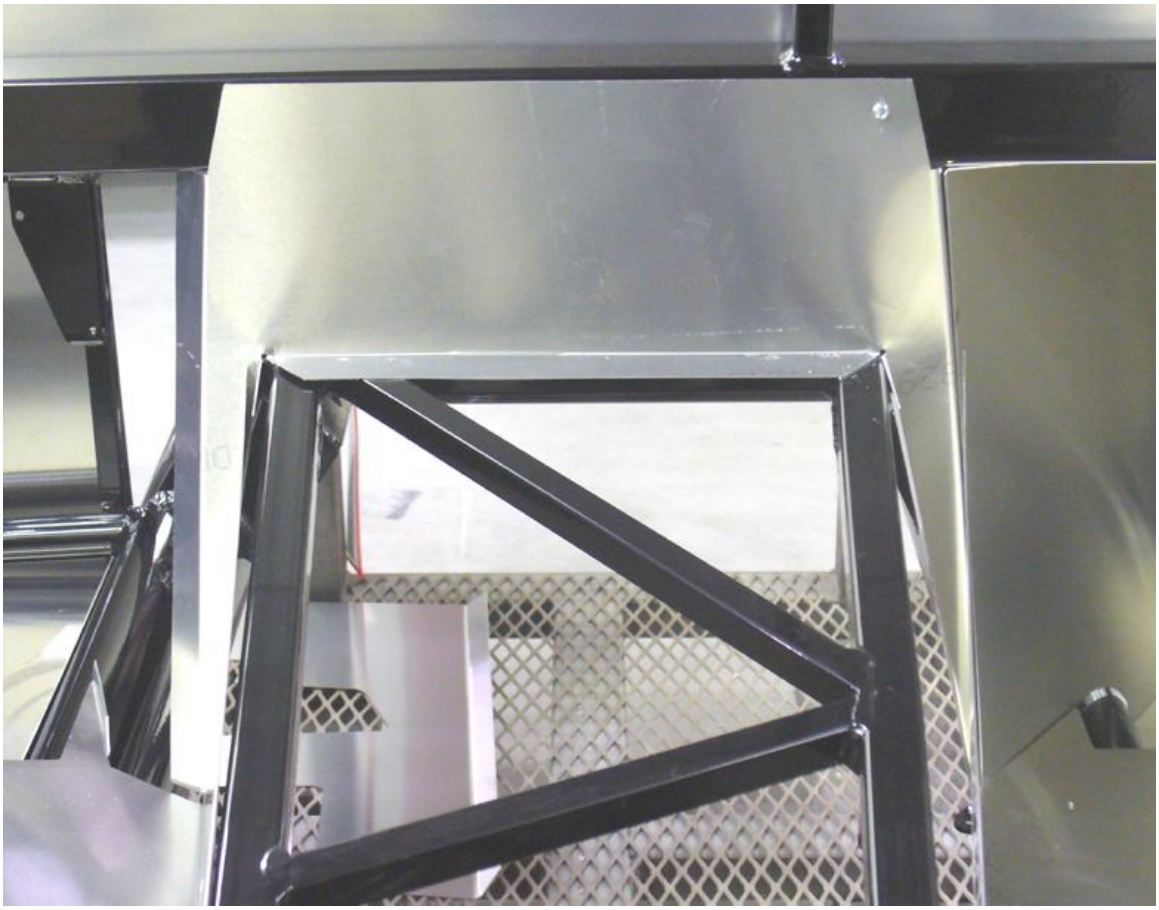
- The transmission wiring harness hole in the driver side of the transmission tunnel.
- The dash harness hole in the front of the driver footbox.
- The engine harness hole in the passenger side firewall extension.
- The Passenger side "F" panel hole.
- The transmission top cover shifter hole.
- The speedometer 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.

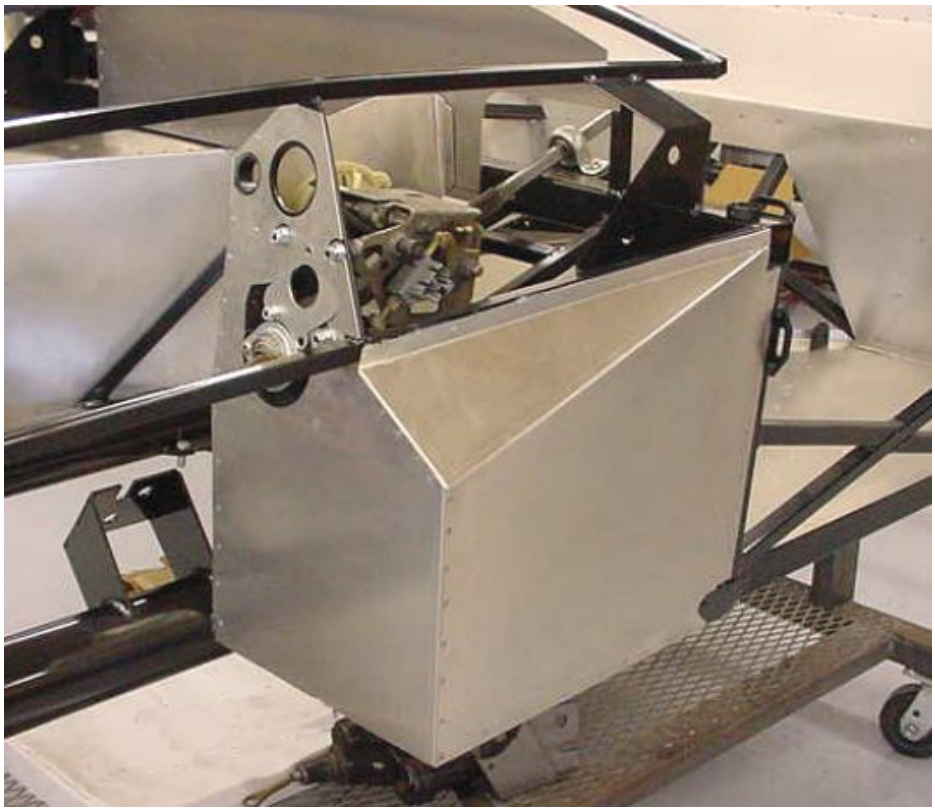
4. Push the top front of the floor transmission tunnel sides in against the front vertical wall then, while holding it in place, use your other hand in the transmission tunnel to position the bottom of the Front Vertical wall so that it is located in the lower corner properly.
5. Attach a self-tapping 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. Drill the panel for the rivet holes.
9. Remove the Front Vertical Wall panel.
8. Wipe and clean the aluminum panel and frame.
9. 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. Attach the transmission tunnel walls to the Front Vertical and transmission tunnel tubes with self-tapping screws.
5. 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.

10. Mark where the rivets will go.
11. Remove the panel and apply silicone to the frame.
12. Attach the panel with self-tapping screws.
13. Rivet the panel in place.
14. Position the outside wall on the foot box. The tab on the front wall goes on the inside of the outside foot box wall.
15. Mark where the rivets will go.
16. Remove the panel and apply silicone to the frame.
17. Attach the panel with self-tapping screws.
18. 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.
19. Rivet the panels in place.

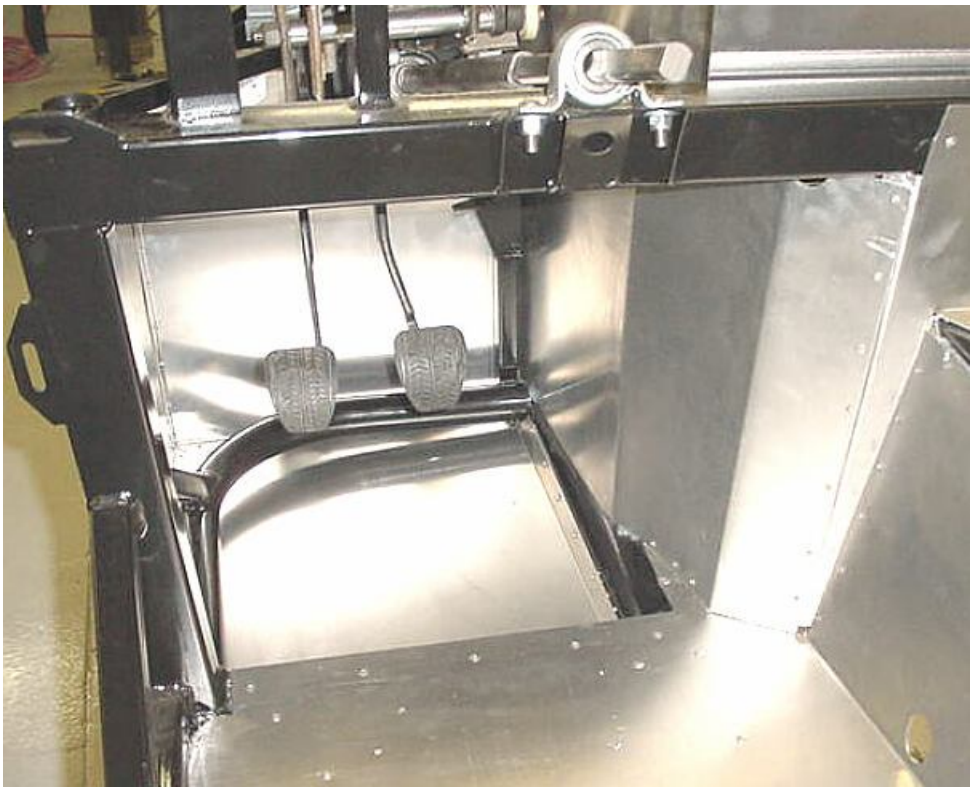


Driver's footbox

20. Position the inside wall on the foot box from the engine compartment side. The bent tabs go behind the front wall.
21. Mark where the rivets will go.
22. Remove the panel and apply silicone to the frame.
23. Attach the panel with self-tapping screws.
24. Rivet the panel in place.
25. Position the top/inside panel.
26. Remove the panel and apply silicone to the inside wall, front wall and along the top ¾" frame tube.
27. 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.*

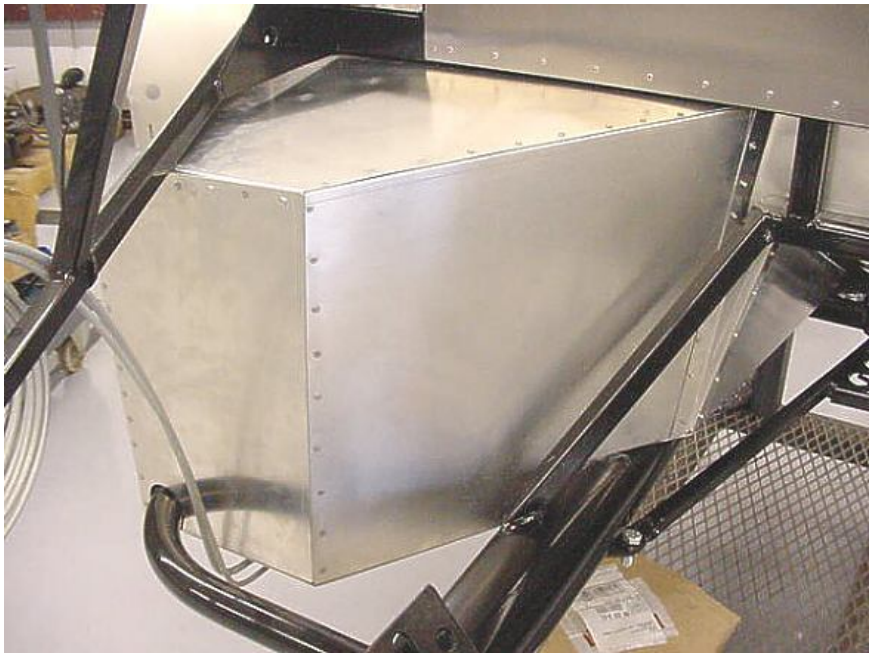
28. Take a look at the completed foot box and floor for gaps between the panels and around the seat harness mounts. Use silicone to fill these gaps.



Drivers inside footbox

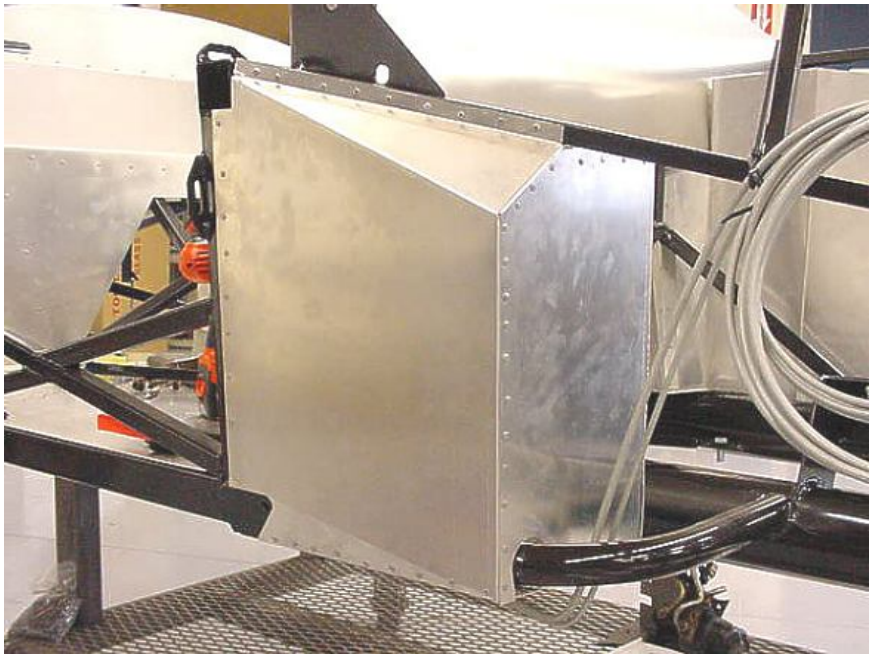
Passenger Foot Box

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 #8 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.



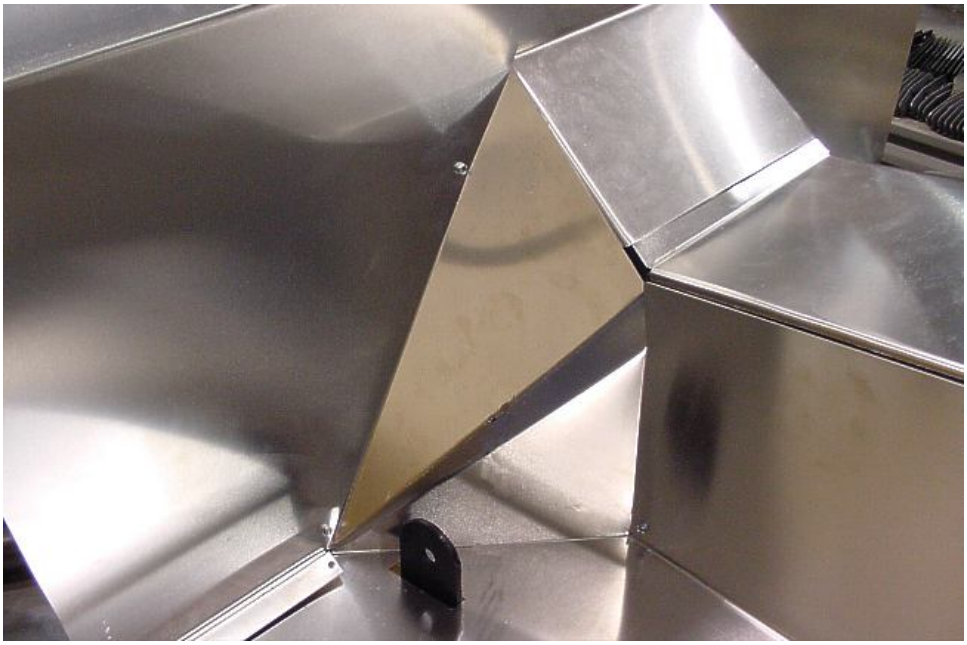
Passenger side foot box.

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

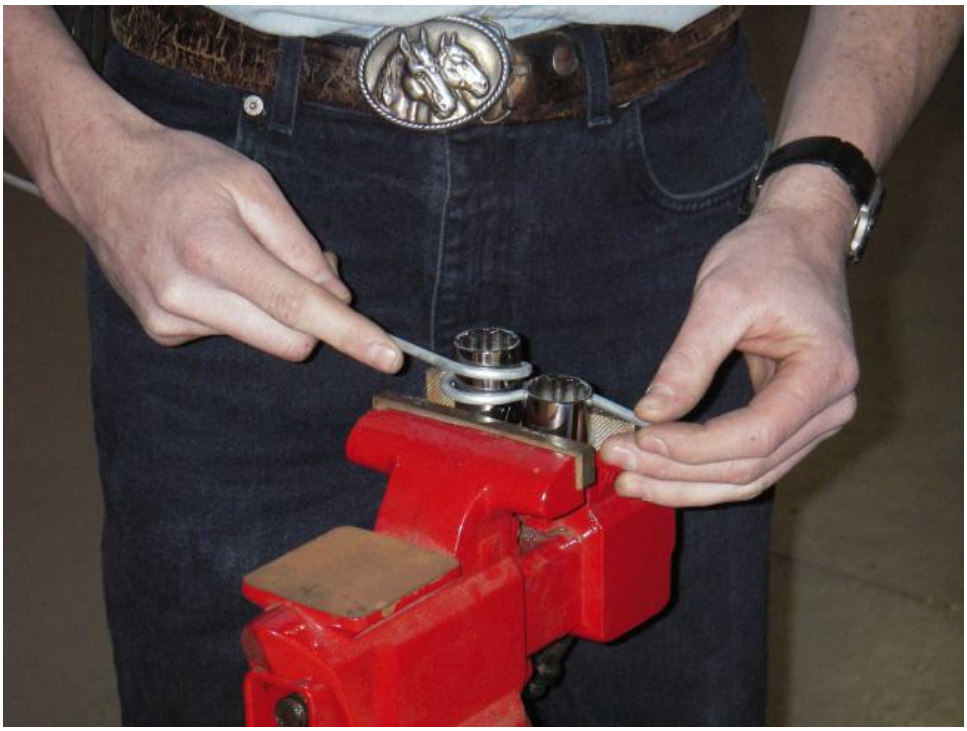
Transmission Tunnel Rear Corners

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.

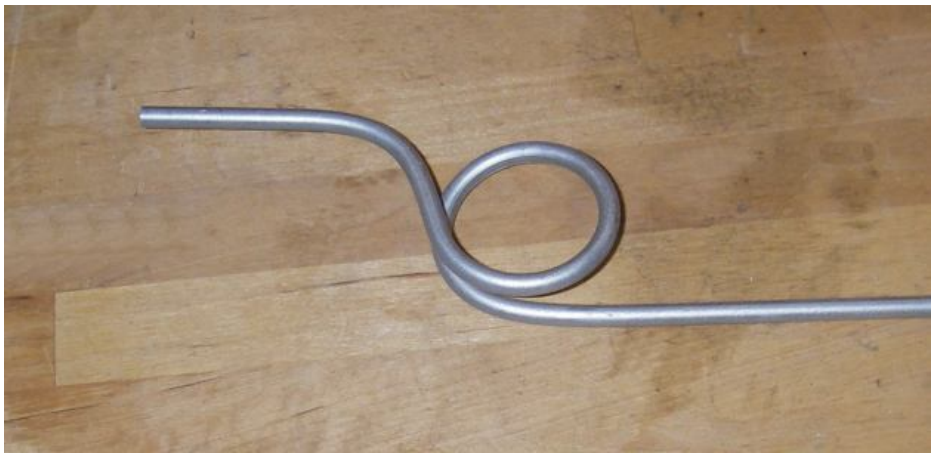
Fuel, Brake and Battery Lines

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.



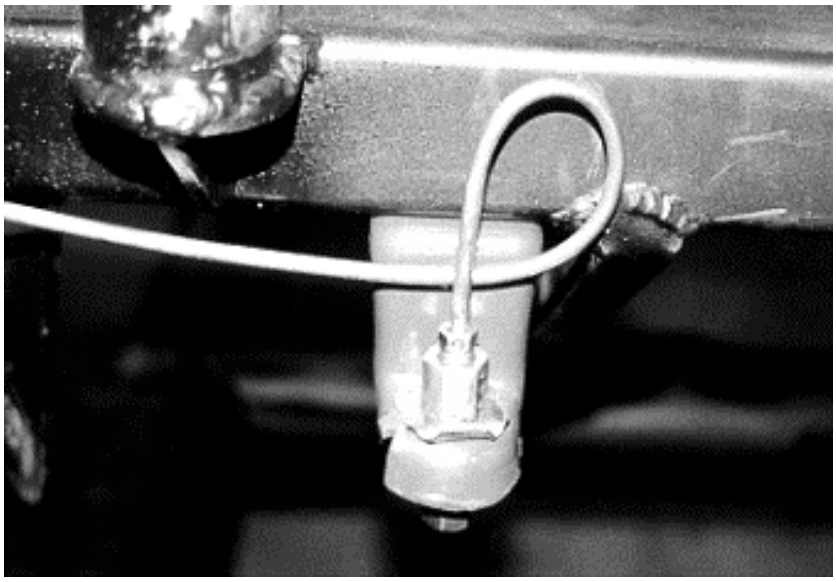
Brake line loop.

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 across to the ¾” tubing that runs down forward to the transmission rear 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. Drill two holes for the Mustang brake bracket on the underside of the 2”x 3” frame member and mount the Mustang bracket.



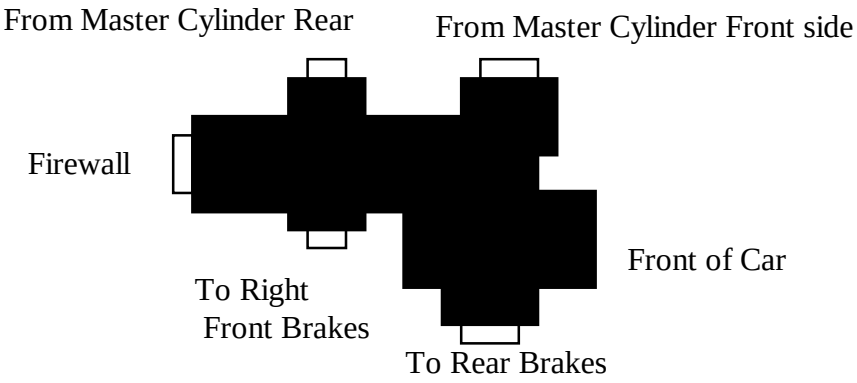
Rear end brake line mount next to the ¾” tubing.

6. Attach the brake line to the Mustang mount.

Front Brake Line

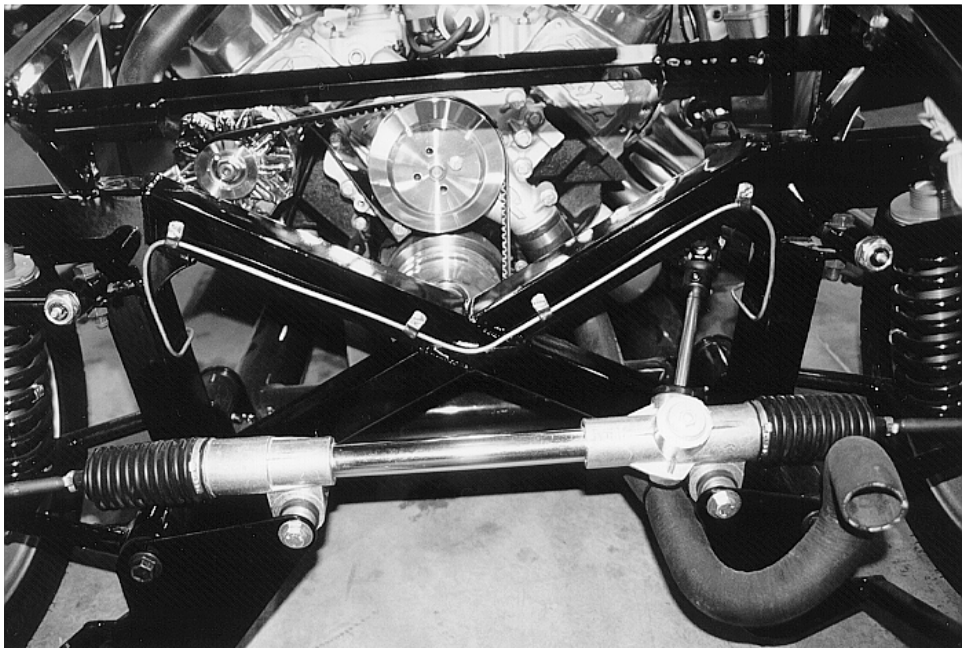
1. Hold the front flexible line to the frame just behind the upper A-arm on the ¾” tubing in the opening. Rotate the front wheels to check for wheel clearance. Move the brake line mount around if necessary or bend the hard line attached to the caliper slightly so that when the wheel is turned all the 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. From the bottom of the master cylinder, run the 20” brake line forward to the left front brakes.
5. Using the distribution block diagram below, attach the other 60” brake line to the distribution block.

Brake Line Routing at Distribution Block



Brake distribution block line routing. Right is towards front of car.

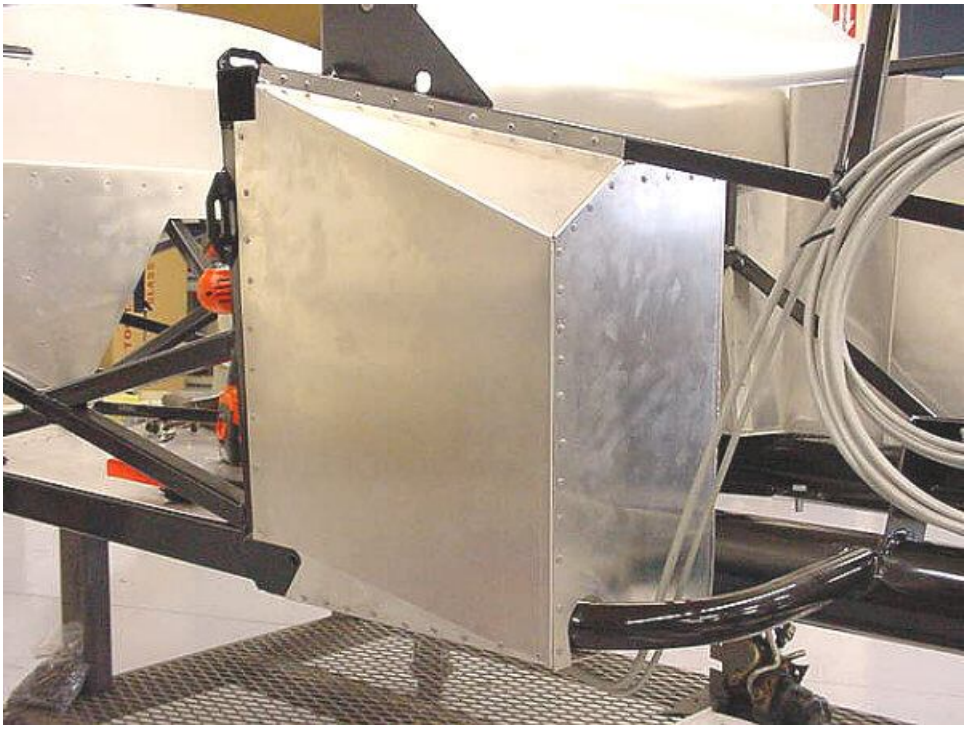
6. From the distribution block, run the line forward along the ¾" tubing to the front side of the "X" member for a clean engine appearance. Go down along the "X" and up again then along the ¾" tube to the right front brake bracket.



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

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 and give enough so that the exact engine location can be made.

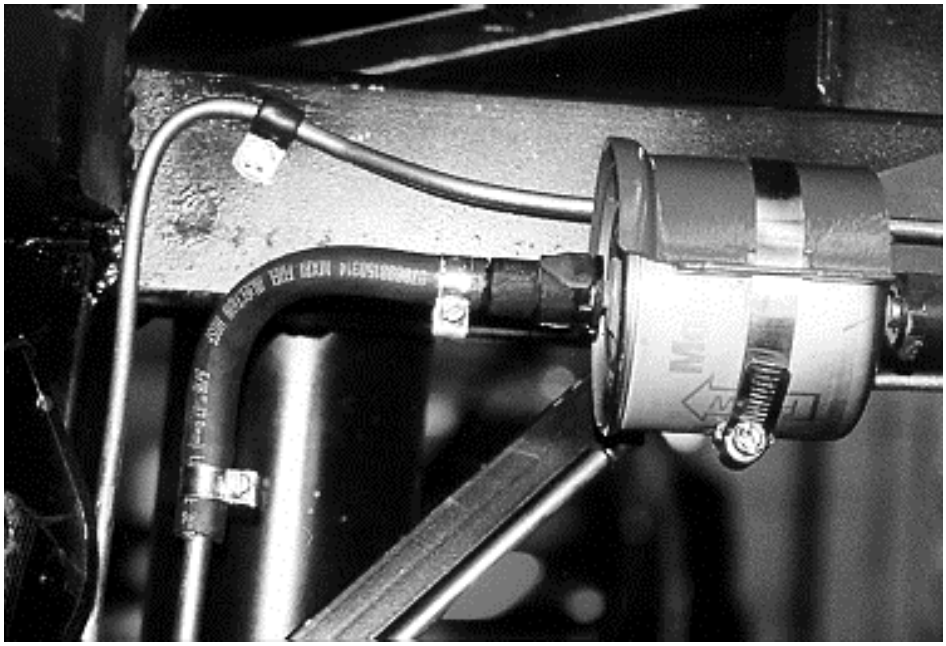


Fuel line routing in front of the passenger foot box.

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.

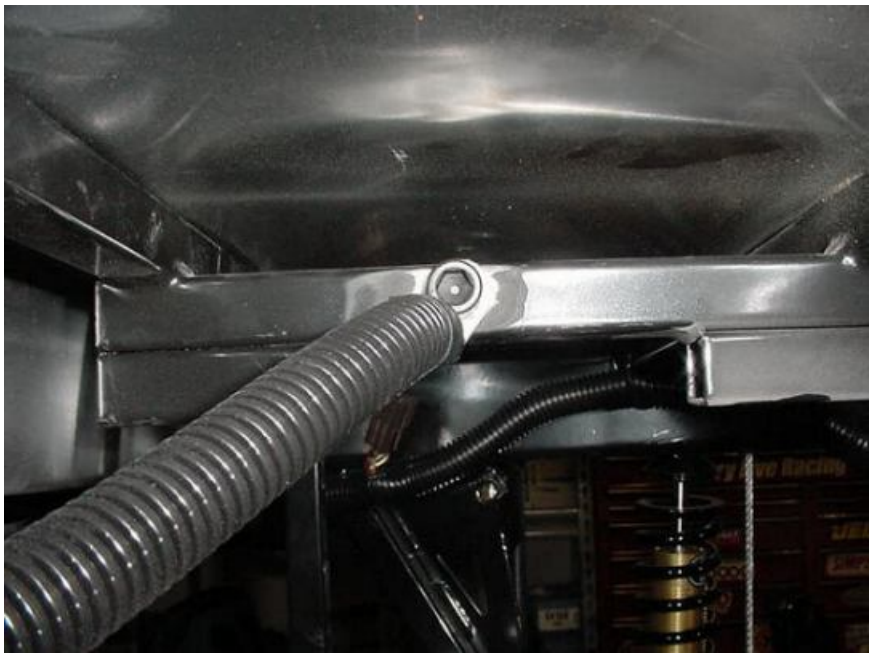


Rubber fuel line and Mustang connector on fuel filter

11. Attach the connectors onto the fuel filter and fuel pump.
12. Run the vapor line to the plastic connector on the fuel tank along with the hard line to the fuel canister, which will be mounted later to about where the fuel lines end up in the engine bay.

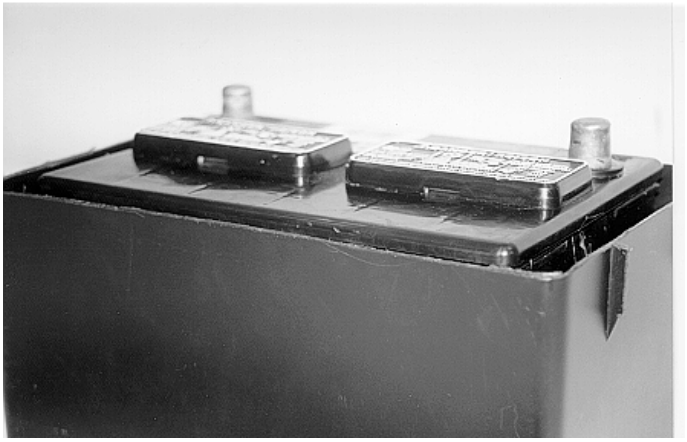
Battery Relocation Kit

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.



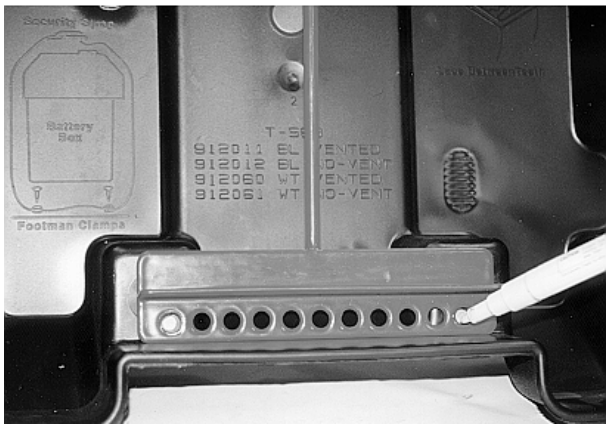
Battery grounded to sanded frame area.

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 hold-down 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 sticks 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

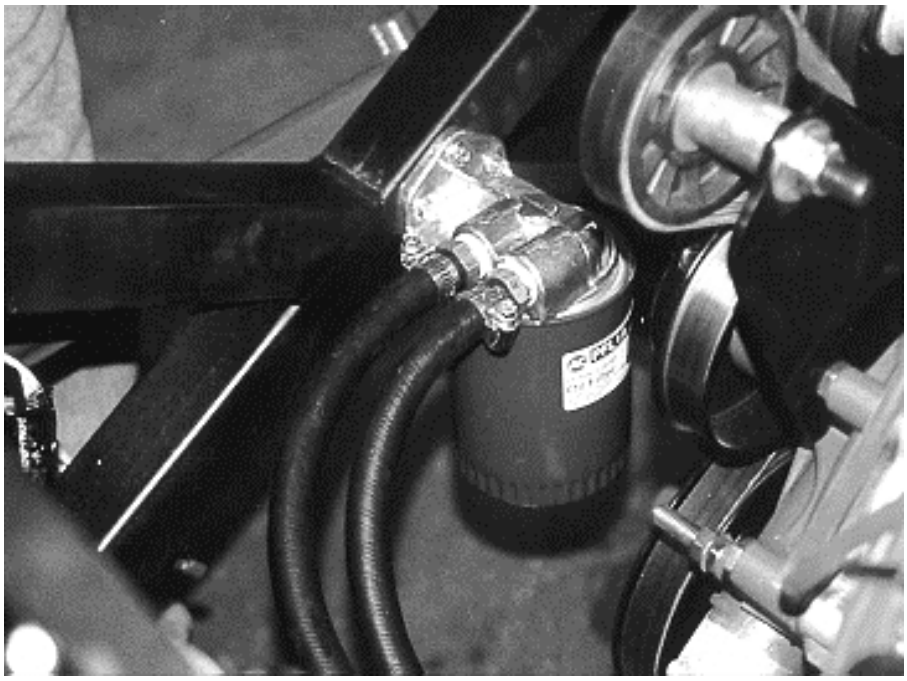
ATTENTION: *The air tube assembly should be used on computer-controlled engines. Improper or incomplete installation of air tubes or vacuum lines may result in emissions level problems.*

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: *Oil filter relocating kit (FFR# 10992)*

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. Install the oil filter relocate base plate to the engine. Place the O-ring in the adapter groove. If the O-ring will not seat properly, put it in the freezer for 15 minutes and use a small amount of chassis grease to hold it in place while spinning on the adapter. Tighten ½ turn after solid resistance is felt. The outlets for the hoses should be facing *towards* the front of the engine.

3. Install the block off plugs (with a ⅜" hex key) in the adapter holes not being used. Use the Teflon tape on the threads of the plugs as you tighten them. Wrap the Teflon tape so it stretches when you attach the plug into the threaded socket. **Max torque** for the fittings on the relocate kit is **28 lbft**.



Remote oil filter mount on the X-member.

4. Thread the short end of the threaded nipple into the relocator.
5. Mount the oil filter relocator on the old AC bracket or on the front frame X member (preferred location). If you're going to mount the relocate bracket on the X member, make sure to drill this before you install your engine. Otherwise, your drill won't fit in between the engine and the frame.

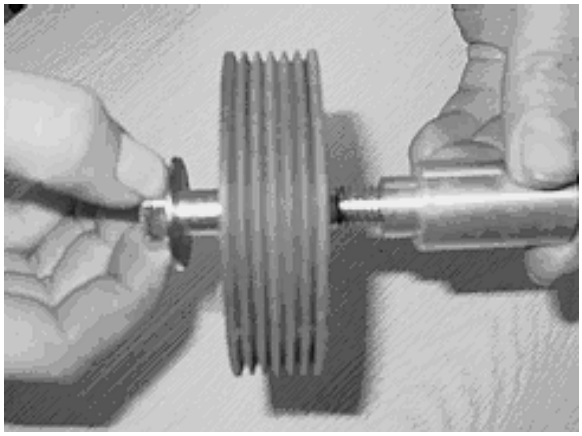
Alternate Drive Pulley

***ATTENTION**: If you are using under-drive pulleys or eliminating the smog pump do not drill the A/C bracket according to the diagram. Instead use the belt as a guide to mount the pulley where the belt will fit and have sufficient tension*

***TOOLS:** ¾" socket, ¾" combination wrench.*

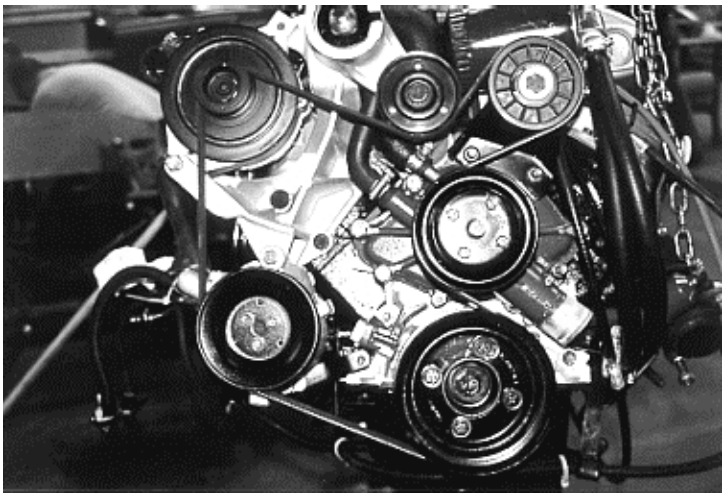
***PARTS:** Alternate drive pulley components (FFR# 11080*)

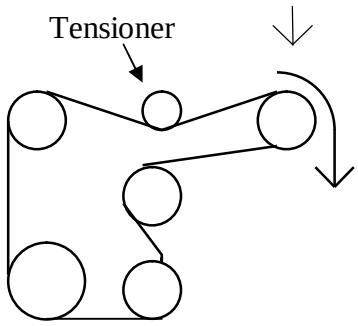
1. The fasteners should be packed with the pulley.
2. Place a washer onto the bolt.
3. Place the pulley wheel onto the bolt.
4. Place the aluminum sleeve on the bolt with the flange towards the pulley wheel, so that it slides inside the pulley.



Assembling pulley on mount sleeve

5. Install the bolt assembly on the A/C bracket (previously drilled in the disassembly section), using the lock nut provided.
6. Pull the tension pulley back with a pry bar carefully and install the fan belt. If the belt does not fit using this routing, check to see if after-market under-drive pulleys have been fitted on any of the accessories or the crankshaft, if so you may have to also use an after-market belt.





Belt Routing

7. Check the pulley wheel for alignment with the other pulleys so that premature belt wear does not occur. With one eye, carefully align the front side of the pulley with the front side of the other pulleys. If the new pulley is not lined up properly and is too far in, use the arbor shims included with the kit to go between the aluminum sleeve and the pulley wheel, effectively pushing the assembly outwards.

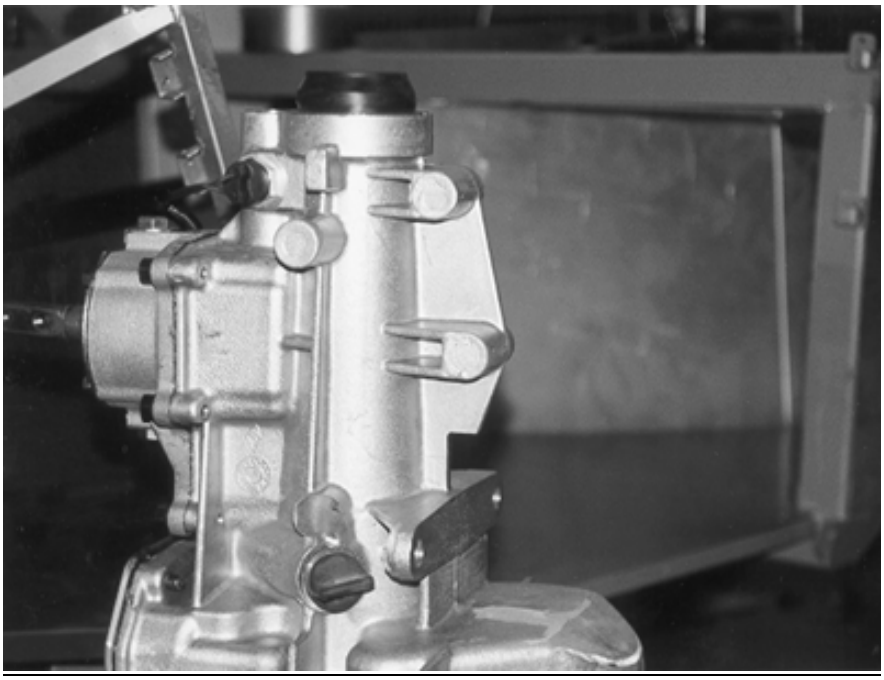
Engine/Transmission/Drive shaft

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.*

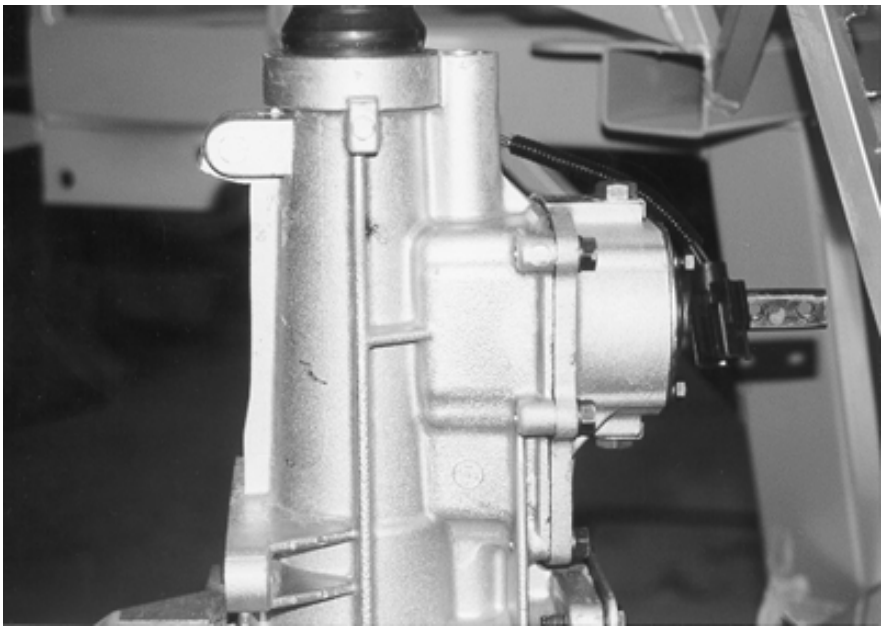
TOOLS: *Engine hoist, 9/16" deep socket, 12pt. 12mm wrench, 5/8", 13/16" sockets, 5/16" drill bit, drill,hack saw, combination wrenches, and friends.*

PARTS: *Transmission mount /hardware (FFR# 13661), Engine and transmission.*

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



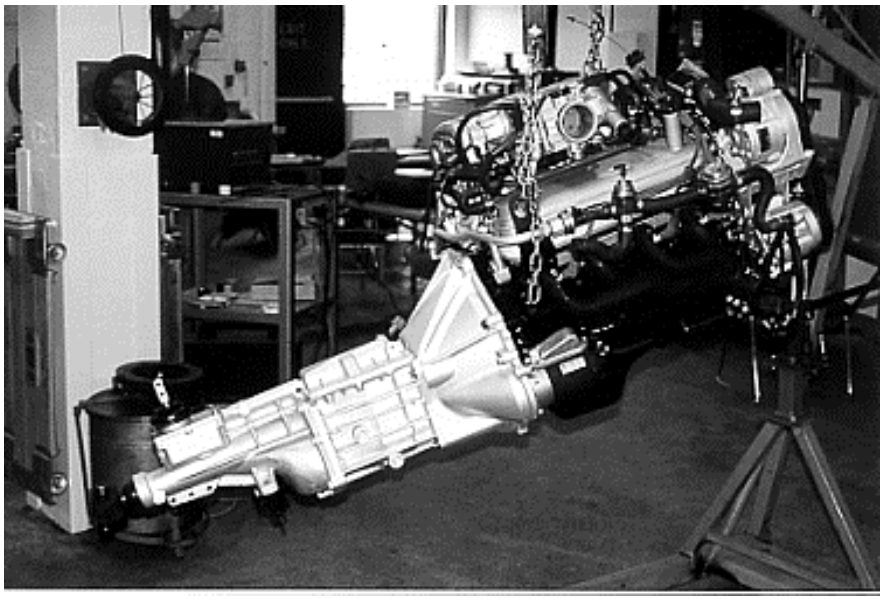
Torque arm mount removed for crossmember clearance

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. Using the T-5 or TKO style transmissions, bolt the transmission mount to the top of the frame mount with the fasteners provided. The ½" bolts are used in the back and the ⅜" in the front.

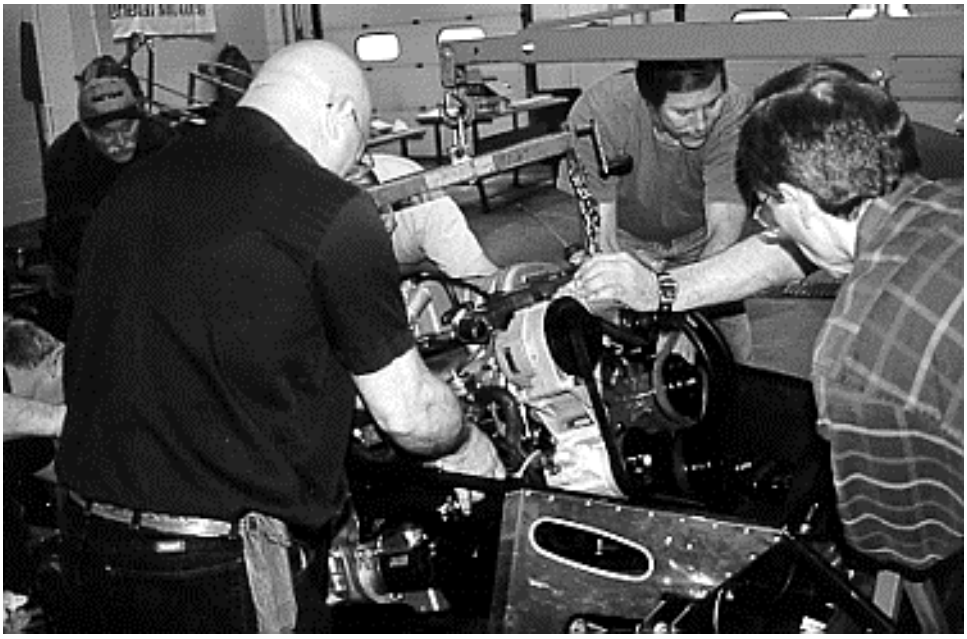
Transmission mount bolted to frame.

3. Lift the engine using the two factory brackets that are on the 5.0 engine (make sure that the brackets are turned the correct way). Sometimes people put these lift brackets on backwards since they are removed when removing the headers and reversing the headers.



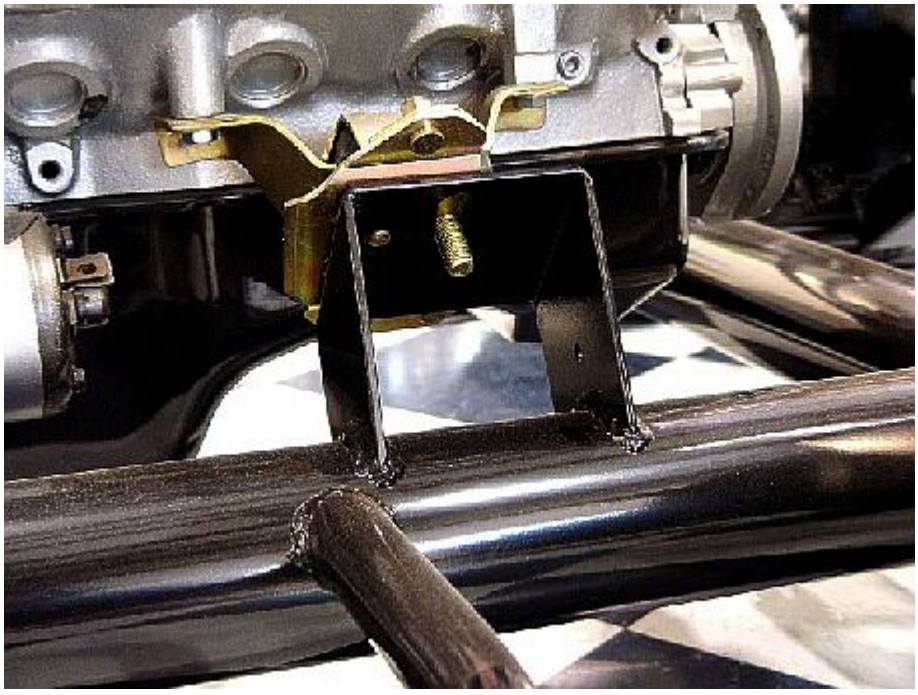
Engine/transmission on hoist

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 engine mounts are installed on the engine correctly.
6. Slowly lower the engine and transmission assembly in the engine bay.



Lowering engine into frame. Friends are helpful here.

7. 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.



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

8. Tighten the large engine mount bolt on each side and secure the two smaller transmission bolts.
9. Attach the engine ground cable to the hole in the engine mount on the passenger side. Make sure to sand the contact area down to bare metal before attaching.
10. 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.

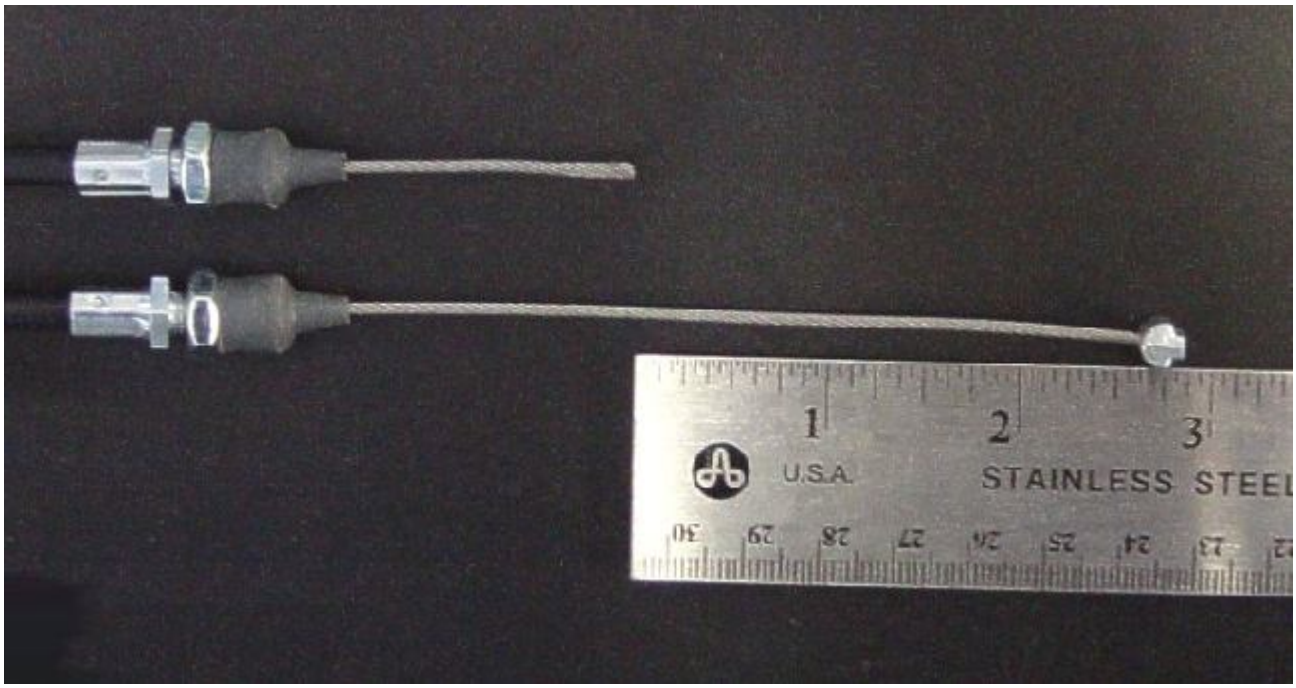
11. Fill the engine with oil. Use the stock dip stick line as a fill level. See Appendix I for specifications and capacities.
12. Before installing the driveshaft, the rear axle should be allowed to hang with the frame being supported and the transmission should be in neutral.
13. Slide the driveshaft 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.
14. Hook the oil lines up to the Oil filter Relocator and the adapter on the engine. Make sure that the lines go to the correct ports or the engine will be starved for oil. The **out** on the engine goes to the **in** on the Relocator and the **out** on the Relocator goes to the **in** on the engine.
15. Fill the Transmission with fluid. See Appendix I for specifications and capacities.

Accelerator Cable

TOOLS: *5/64" hex key, 3/8", 7/16", 1/2" wrenches.*
PARTS: *Pedal box hardware (FFR# 11023), Accelerator cable components (FFR# 13777).*

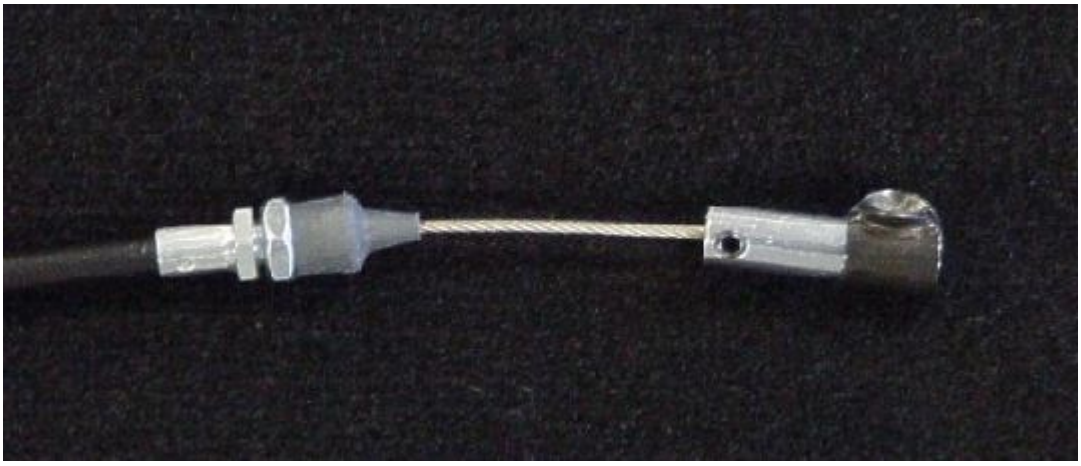
87-93 Fuel Injected Applications

1. Using a ruler and marker measure and mark 2⅝" from the cylinder slug on the engine end of the cable.



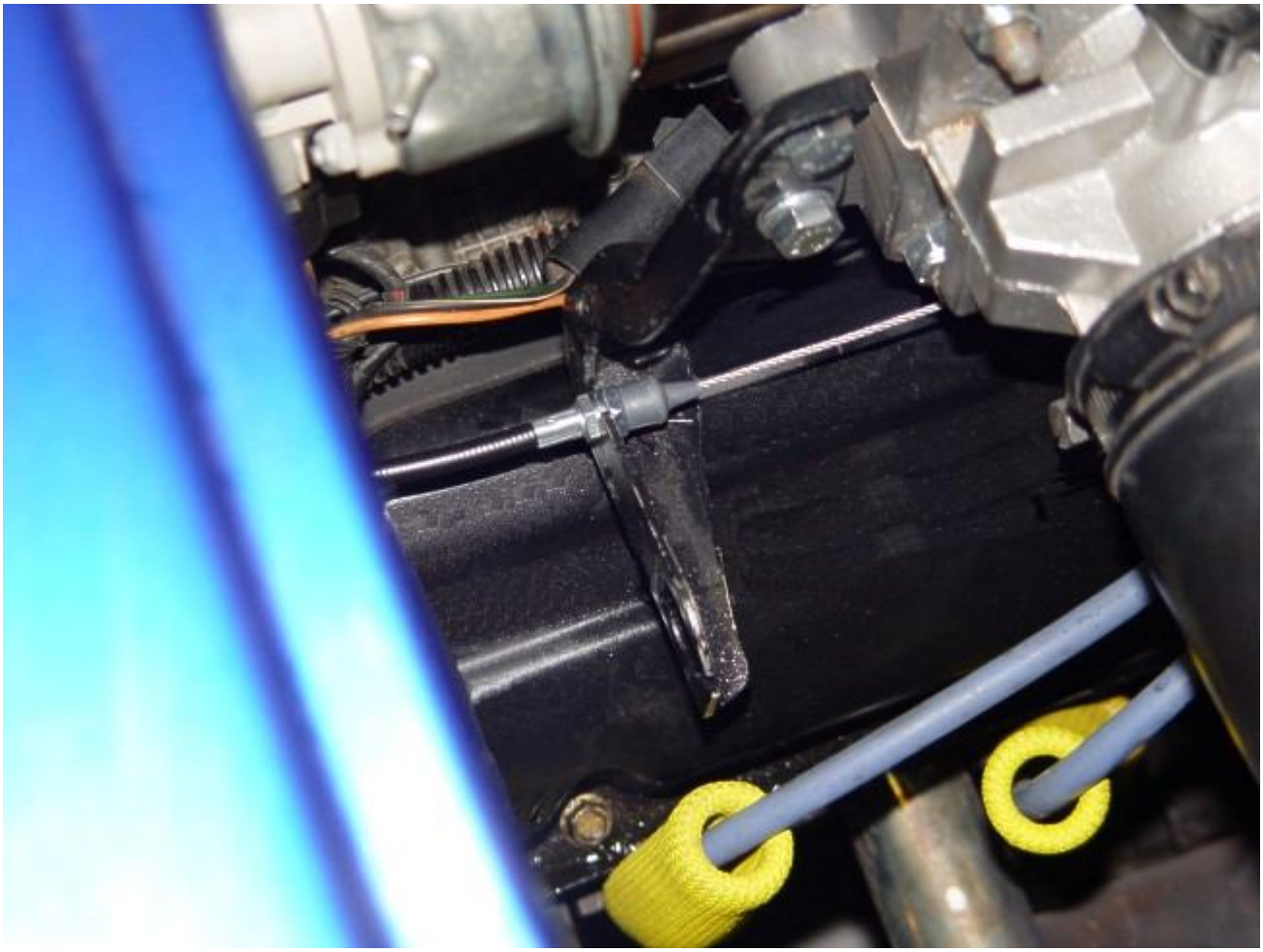
Engine end of cable measured and cut 2⅝".

2. Using a pair of wire cutters, cut the cable at the location marked.
3. Remove and discard the included ball stud. It is for carbureted applications
4. Push and twist the included ball stud retainer onto the end of the cable. Do not tighten the set screw yet.



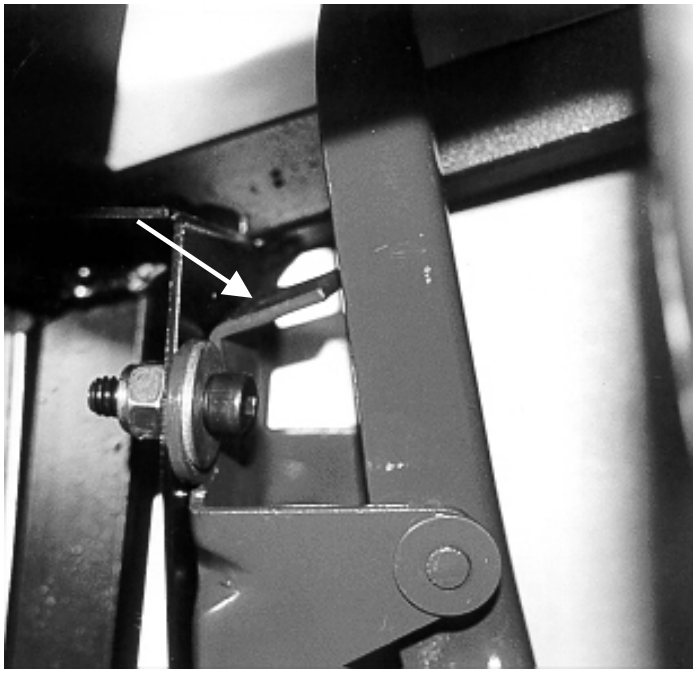
Ball stud retainer pushed onto cable.

5. Insert the pedal end of the cable into the foot box.
6. Screw on and tighten the 5/16" locknut on the cable sheath inside the foot box using two ½" wrenches.
7. Hold the accelerator pedal up to the mount on the ¾" tube at the front of the foot box. The higher you can mount the pedal the better the pedal will be positioned on your foot. The key things to watch for is clearance between the accelerator pedal and clutch quadrant stop and keeping the cable straight so it will not rub on the side of the cable sheath. If a higher location is desired, some material can be removed from the bottom of the clutch quadrant stop. If mounting higher, mark and drill new holes for the bolts in the pedal.
8. Attach the accelerator pedal to the mount using the ¼"x ¾" bolts, washers and lock nuts.
9. Cut the accelerator pedal capture in the corner using a pair of wire cutters.
10. Slip the accelerator cable through the cut so that the ball will sit in the recess.
11. Push the capture into the end of the throttle pedal.
12. Attach the engine end of the cable sheath to the cable mount on the intake using ⅜" and 7/16" wrenches and push the cable wiper onto the remaining threads.



Accelerator cable attached to engine.

13. Push the ball stud retainer onto the ball on the bottom of the throttle body.
14. Push/pull the cable into the retainer so that the cable is tight.
15. Tighten the set screw in the retainer using a 5/64" hex key.
16. Check the idle screw underneath the throttle body to see if the throttle arm is hitting it. If it is not, either loosen the ball stud retainer set screw and readjust the cable or, bend the small tab behind the accelerator pedal until the idle screw hits the throttle arm. You will notice a fairly high idle later when the car starts if the throttle is held open.
17. 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.

94-95 Fuel Injected Applications

Use the accelerator cable without modification. Follow the installation instructions above.

Carburated applications

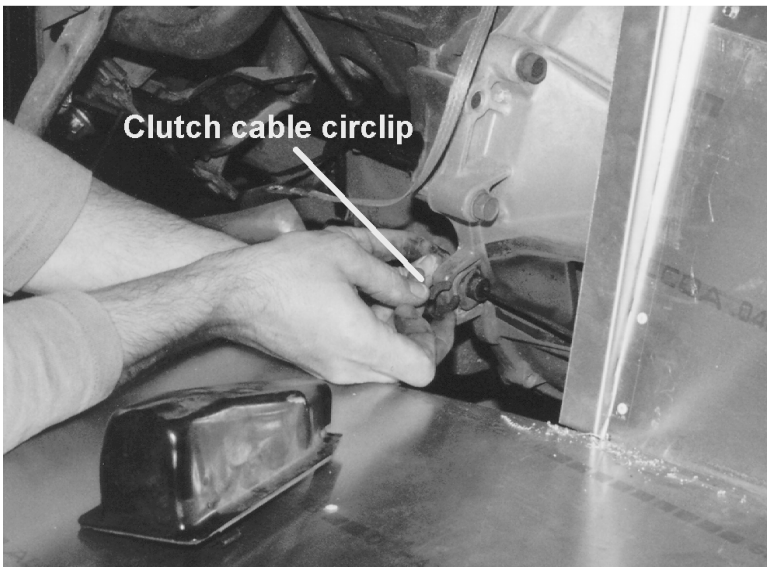
1. Insert the pedal end of the cable into the foot box.
2. Screw on and tighten the 5/16" locknut on the cable sheath inside the foot box using two ½" wrenches.
3. Hold the accelerator pedal up to the mount on the ¾" tube at the front of the foot box. The higher you can mount the pedal the better the pedal will be positioned on your foot. The key things to watch for is clearance between the accelerator pedal and clutch quadrant stop and keeping the cable straight so it will not rub on the side of the cable sheath. If a higher location is desired, some material can be removed from the bottom of the clutch quadrant stop. If mounting higher, mark and drill new holes for the bolts in the pedal.
4. Attach the accelerator pedal to the mount using the ¼"x ¾" bolts, washers and lock nuts.
5. Cut the accelerator pedal capture in the corner using a pair of wire cutters.
6. Slip the accelerator cable through the cut so that the ball will sit in the recess as shown.
7. Push the capture into the end of the throttle pedal.
8. Attach the cable sheath to your cable mount on the engine.
9. If necessary, attach the supplied ball stud to the carburetor in the appropriate location. Refer to the carburetor instructions for placement.
10. Attach the ball stud retainer to the ball stud.
11. Pull the cable tight holding the cable against the ball stud retainer. Align the ball stud retainer with the cable as if the cable was going into the retainer.
12. Mark on the cable where the retainer ends.
13. Measure 3/8" from the mark on the cable towards the end of the cable and re-mark the cable.
14. Using a pair of wire cutters, cut the cable at the new location marked.
15. Push and twist the ball stud retainer onto the end of the cable. Do not tighten the set screw yet.

16. Attach the engine end of the cable sheath to the cable mount on the engine using ⅜" and 7/16" wrenches and push the cable wiper onto the remaining threads.
17. Push the ball stud retainer onto the ball stud.
18. Push/pull the cable into the retainer so that the cable is tight.
19. Tighten the set screw in the retainer using a 5/64" hex key.
20. After driving the car for the first time you may want to adjust the pedal locations for optimum heal/toe and shoe size differences.

Clutch Cable

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

1. 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.

2. 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.
3. 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, Fuel Vapor Canister

ATTENTION: *If you've chosen to run a carbureted engine, this step is not needed.*
TOOLS: *Drill, 3/16" drill bit, ⅜" socket.*
PARTS: *Harness mounting hardware (FFR# 11070), Mass air sensor, Mustang fuel vapor canister (if applicable).*

Mass Air Mounting

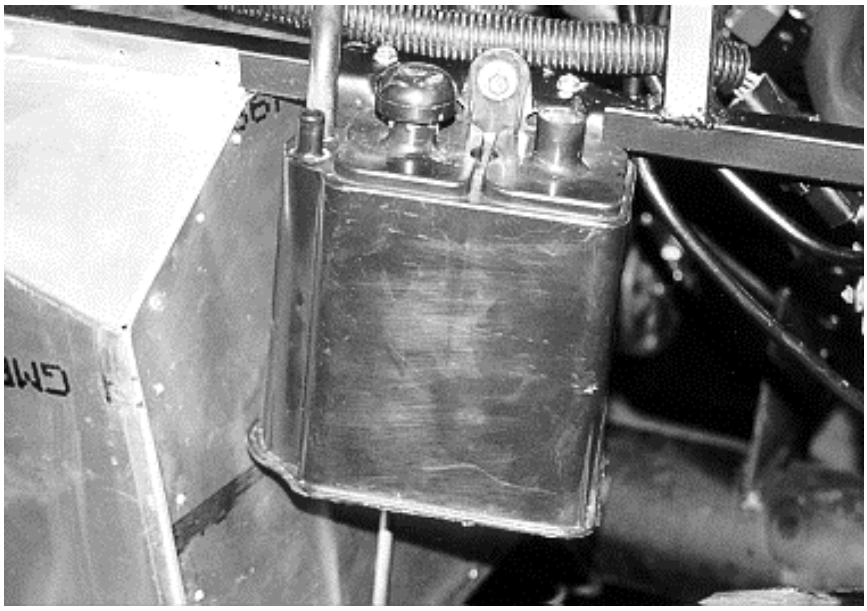
Note: If your engine is a 1989 or newer, follow this procedure for mounting the mass air meter and air filter.

1. Flatten the outer edge of the mounting bracket using a hammer or vise. Use the top OEM hole and mount to the front side of the vertical ¾" frame tubing above and just forward of the passenger foot box.
2. Drill a second hole through the bracket and into the ¾" frame tubing.
3. Use kit fasteners to secure bracket.

Fuel Vapor Canister

Note: The emissions canister can be mounted to the right side of the engine bay on outside of the ¾" horizontal tubing just behind the mass air meter.

1. Drill two 3/16" holes through the canister bracket OEM holes. Mount w/ two #14 screws.
2. Attach the vent hose from the gas tank to the canister and the hose leading to the engine.



Emissions fuel vapor canister mounted.

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.*

1. Attach the 1/16" steel strips to the electric fan using the Philips head screws provided.
2. Remove the radiator reservoir using a 5/16" socket.

3. The fan will be attached to the fan shroud via the mount strips. Position fan assembly in the mouth of the fan shroud so that the fan and shroud are flush.

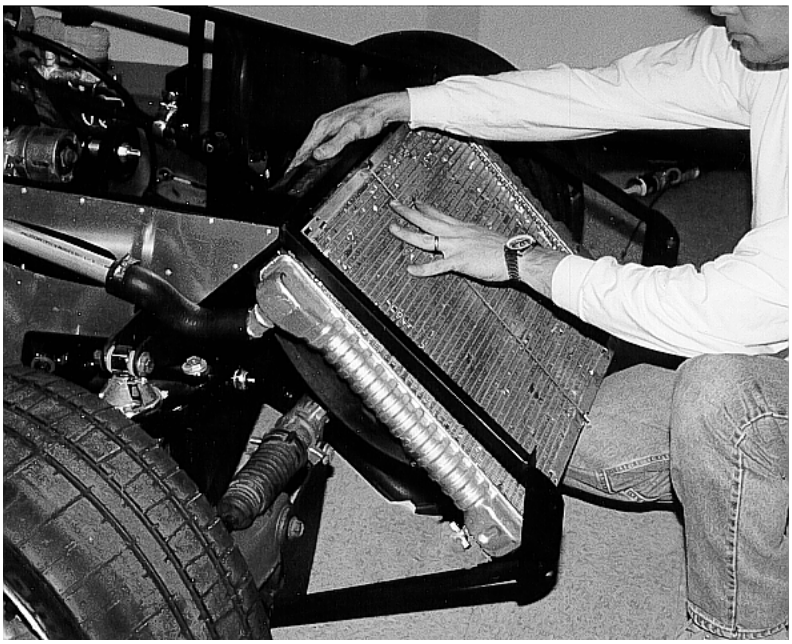
Fan attached to mount strips

Mustang fan shroud with kit fan and mount strips

4. Bend the tabs on the mount strips outwards slightly to hold it in place.
5. Mark the position of the mounting strip holes and drill guide holes into fan shroud with ⅛" drill bit.
6. Drill the holes through the plastic shroud until the drill touches the mounting strip tabs.
7. Reposition the fan assembly and mount using the #8 oval Phillips head screws, countersunk washers and flat nuts.
8. Remount the radiator reservoir with a 5/16" socket. Connect to the radiator using the donor hose.

Note: Make sure that the fan blades do not hit the sides of the fan housing once the fan is attached to the shroud. If they do make contact with the housing, loosen the screws attaching the mount bars, and bend the tabs of the mount bars so that the fan housing is not pulled out of round when the fasteners are tightened.

9. Mount the shroud and fan to the radiator using the fasteners that you removed earlier.
10. 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 inches so the front of the top lip is fully contacting the ¾" support.
11. 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.
12. 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.

13. The aluminum nosepieces that form a picture frame-like support for the entire lower edge of the radiator will be installed after the body is in place.
14. 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”.

15. 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.

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

Adapter hose pushed onto the tube.

19. Connect the lower radiator hose to the engine.
20. Run the hose next to the 4" main rail and under the steering rack.
21. Route the tube to the radiator.
22. Mark the tube where it needs to be cut so that the tube will just touch the attaching location.
23. Remove the tube/hose assembly from the vehicle.
24. 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.
25. Shake and blow the tube out so that no metal pieces are in the tube.
26. Remount the tube assembly and tighten the hose clamps on the mount locations.
27. Check to make sure that the lower hose is not hanging down. If necessary, zip tie the hose to the frame.
28. Double check the hose clamps on the tube.

Note: If using the stock Mustang radiator the radiator hose should be routed through the "F" panel. If the FFR radiator is being used, the upper radiator hose should be routed above the "X".

29. Push some grommeting onto the passenger side aluminum "F" panel slot to prevent any chaffing of the tube or hose.
30. Pass the upper radiator hose through the passenger side "F" panel and connect it to the upper radiator outlet.
31. Route the tube to the radiator.
32. Mark the tube where it needs to be cut so that the tube will just touch the attaching location.
33. Remove the tube/hose assembly from the vehicle.
34. 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.
35. Shake and blow the tube out so that no metal pieces are in the tube.Tighten the hose to the radiator.
36. Remount the tube assembly and tighten the hose clamps on the mount locations.

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

37. When filling the radiator, use the upper hose for coolant filling. Make sure to get as much air out of the system as possible.
38. Connect the fan after the wiring harness has been installed.

Wire Harness and EEC-IV

ATTENTION:

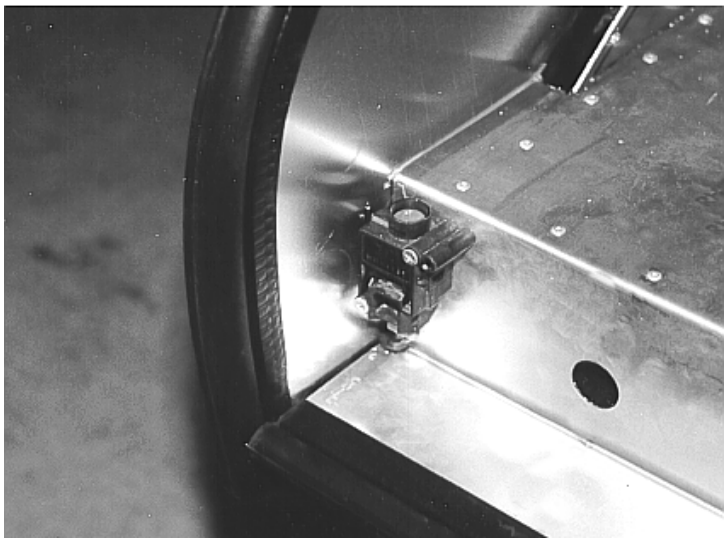
- *There are after-market harnesses available for both carbureted and fuel injection applications.*
- *Make sure that the battery is not connected any time you are working with the computer unit.*
- *If during this section, you decide to cut your harness, wait until after the car has been started then 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)*

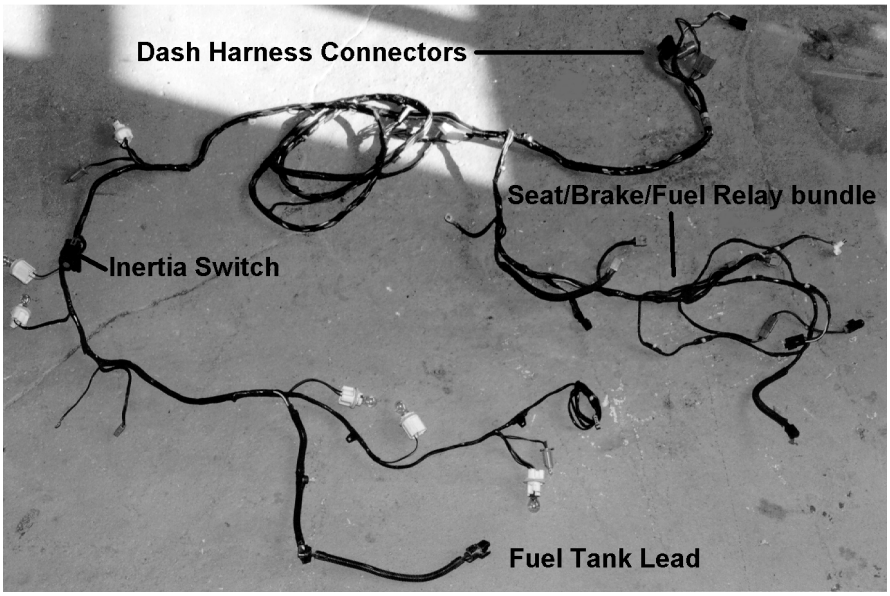
Rear Harness

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.



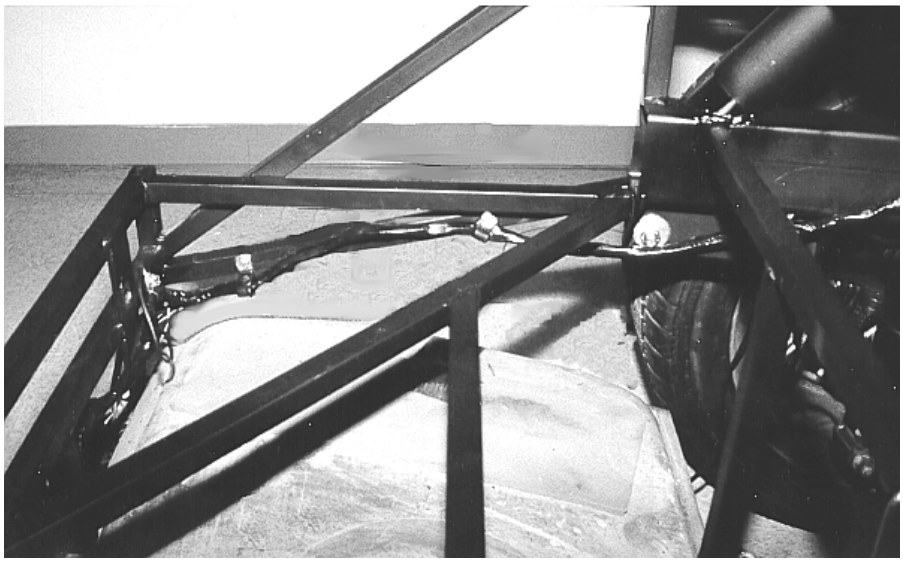
Mustang inertia cut off switch.

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.

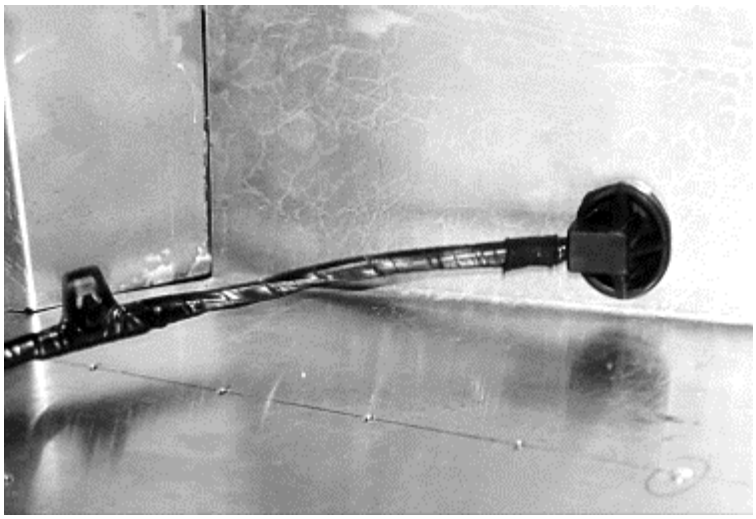


Rear trunk wiring harness attached along frame.

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

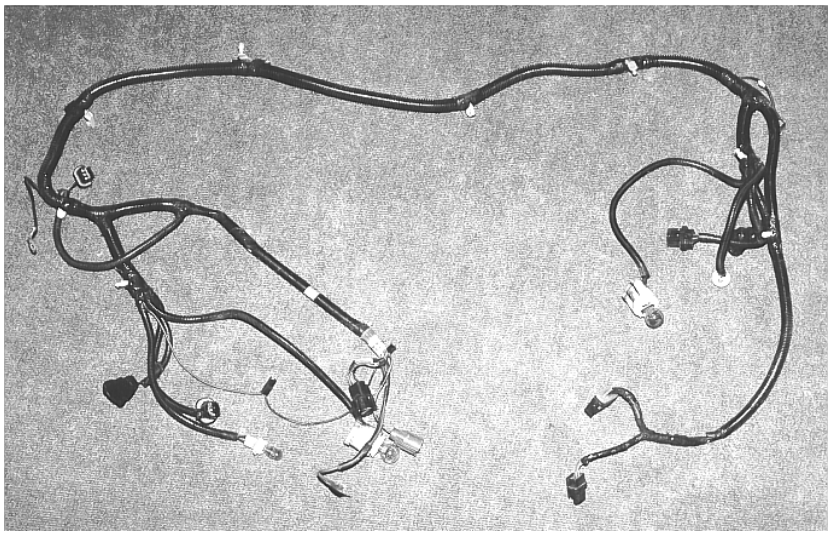
1. Push the harness plugs through the hole in the driver's side floor aluminum.



Harness plug in floor aluminum

2. Run the harness forward into the corner to the ¾" tube at the foot box front. Then go up and along the angled ¾" tube to its connector. Make sure that it does not get in the way of the accelerator pedal. Use the drilled holes and the zip tie trick to keep the harness in the corner along the floor.

Headlight Harness

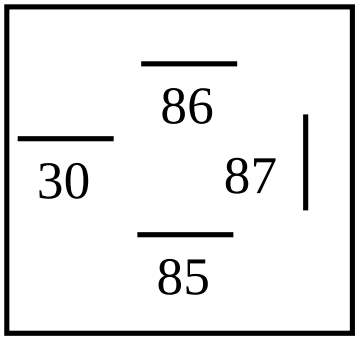


Headlight harness section.

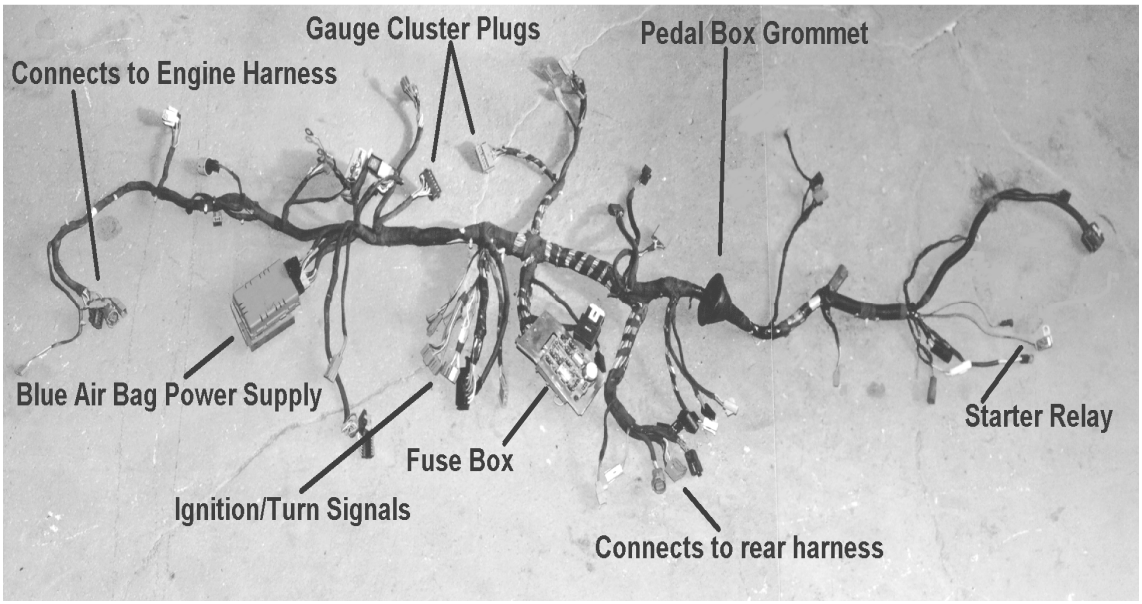
1. The headlight harness is started at the alternator and runs forward to the passenger headlight area, then goes under the fan shroud to the driver's side headlight area and then rearward to the coil and starter relay area.
2. The Mustang is wider than the FFR Roadster in front and there is extra wiring between the headlights.
3. 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.
4. Attach the harness to the channel on the bottom of the radiator using zip ties.

5. If using a 94-95 harness and computer, connect the electric fan to the stock factory fan connector. The fan will be controlled by the computer.
6. Using a 87-93 harness, wire the black electric fan wire to the frame. It serves as the ground.
7. Connect the other electric fan wire to one of the dash toggle switches through the relay provided. The fan is not needed all of the time. The 2-position toggle will serve as your on-off switch. If a thermostat control is desired, you can pick one up at your local auto parts store.

30 – Fan
85 – Ground
86 – Switched +12V
87 – +12V

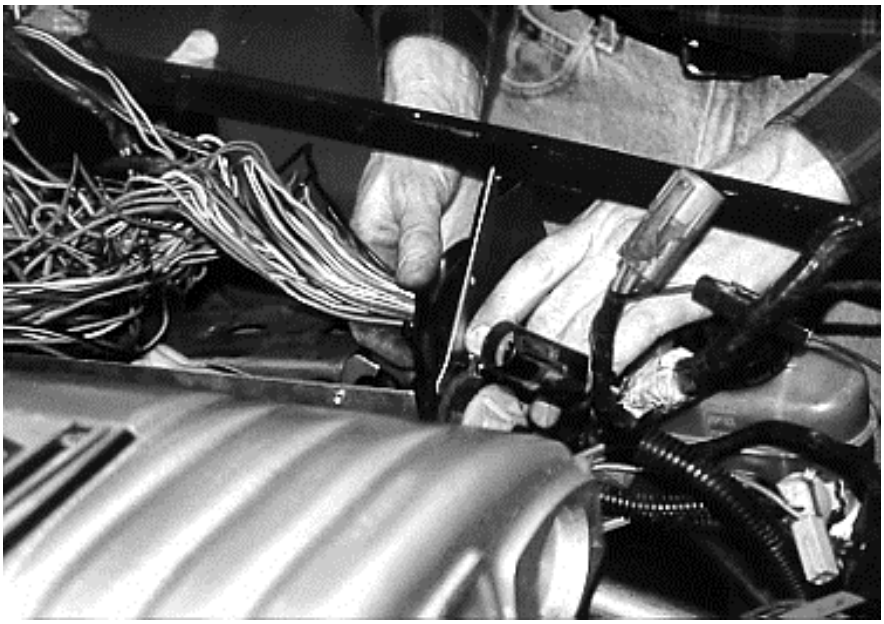


Dash Harness



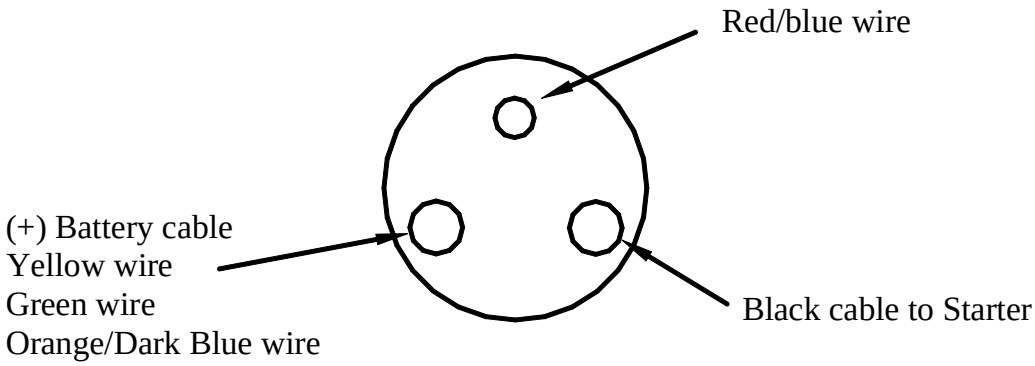
Dash harness.

1. The dash harness begins at the coil area and goes rearward to the large hole in the front of the driver's side foot box.
2. The key to routing the dash harness is to start on the inside of the foot box and push the smaller items through the large hole from the inside.
3. The connections for the coil, starter relay, and 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.
4. Remove 4" of the tape covering the harness wires on the outside of the dash harness grommet.
5. Pull enough of the harness through the grommet so that the coil can still mount on the outside of the ¾" tubing next to the master cylinder. By doing this, the amount of visible wiring in the engine bay is reduced.
6. Run the harness over the pedal box and through the large slot in the firewall.



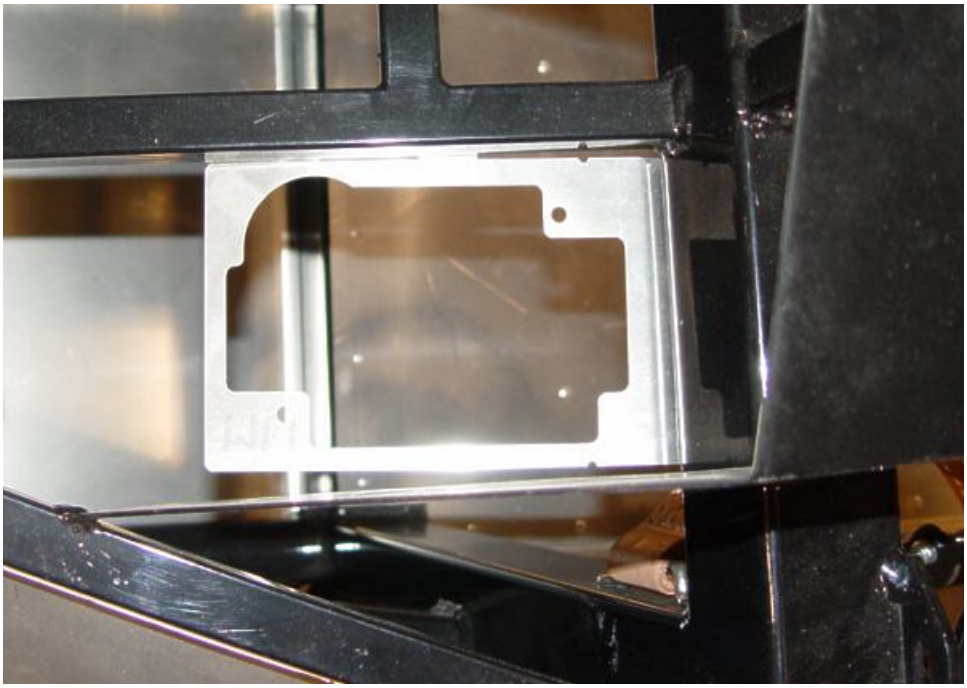
Dash harness going through laser cut hole.

7. The dash harness can then 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.
8. The starter wires can be hooked up now. There are two different starters that were used and the wires are run differently for each.
   - On the older starters the cable runs from the starter to the empty post on the solenoid.
   - On the newer starters the heavy starter wire connects to the same terminal as the body and the smaller 8-10 gauge wire runs to the empty terminal. The newer starters can be recognized by their smaller size and solenoid mounted on top.



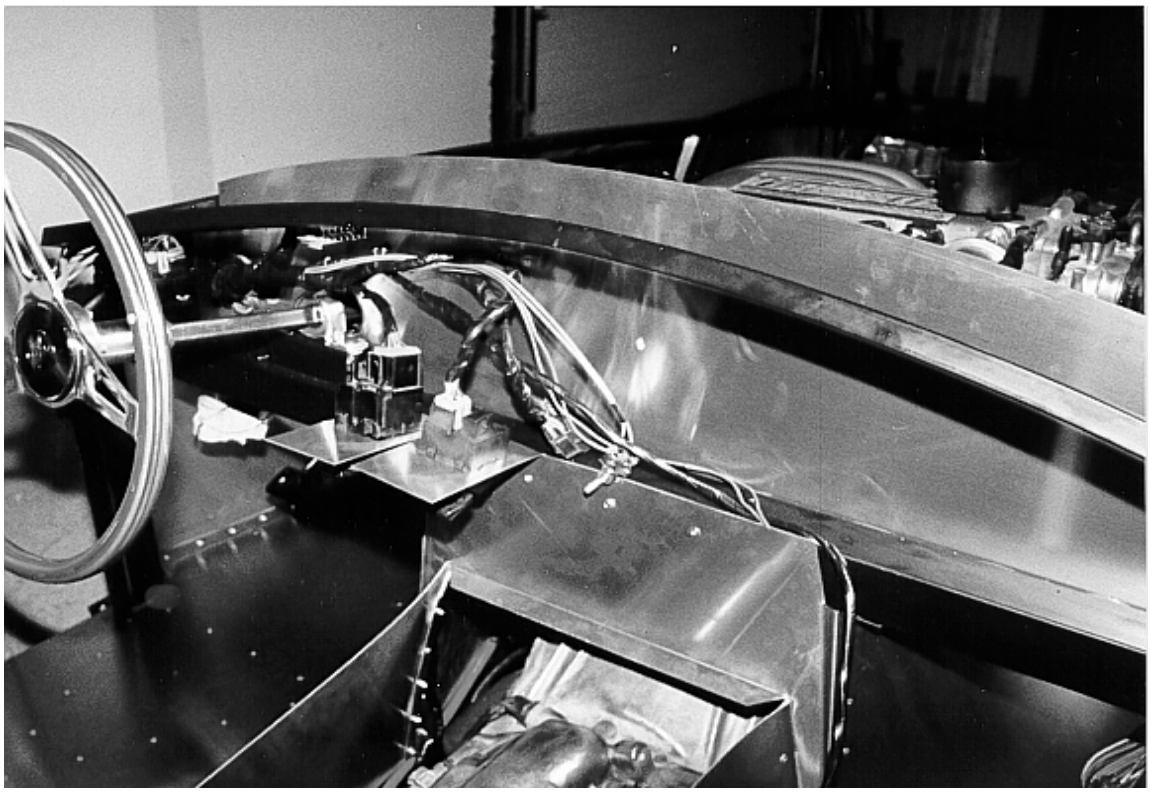
Starter Solenoid Wiring

9. 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.



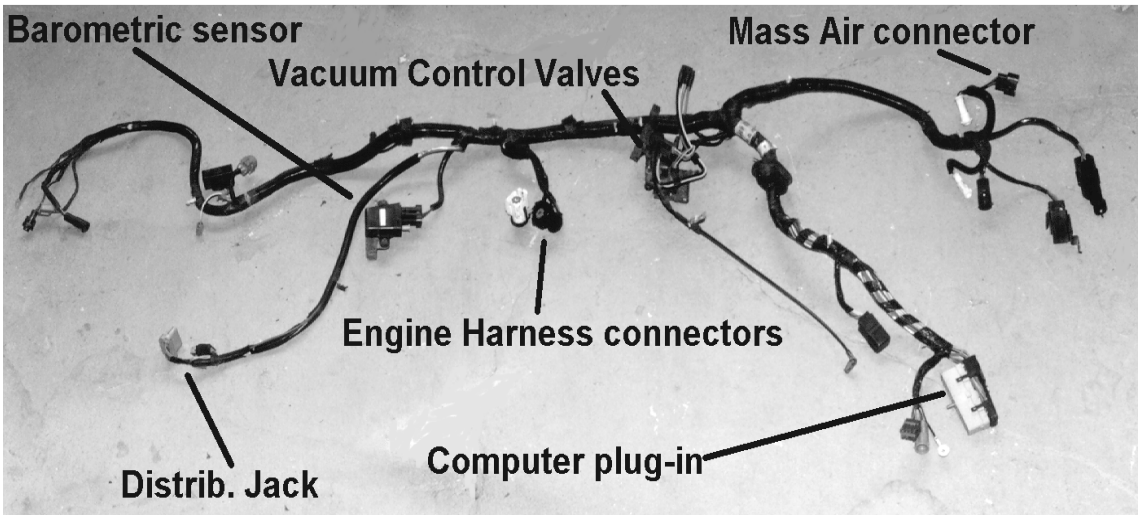
Aluminum fuse panel (87-98 only) mounted to the frame.

10. Mount the headlight and hazard switches using the aluminum pieces (FFR #'s 10566, 10638) in the center of the car just to the left of the transmission front cover.
11. Attach the harness across the 2"x 2" tube, using the insulated line clips.



Dash harness in place. Note the headlight and hazard switches mounted to the 2"x 2".

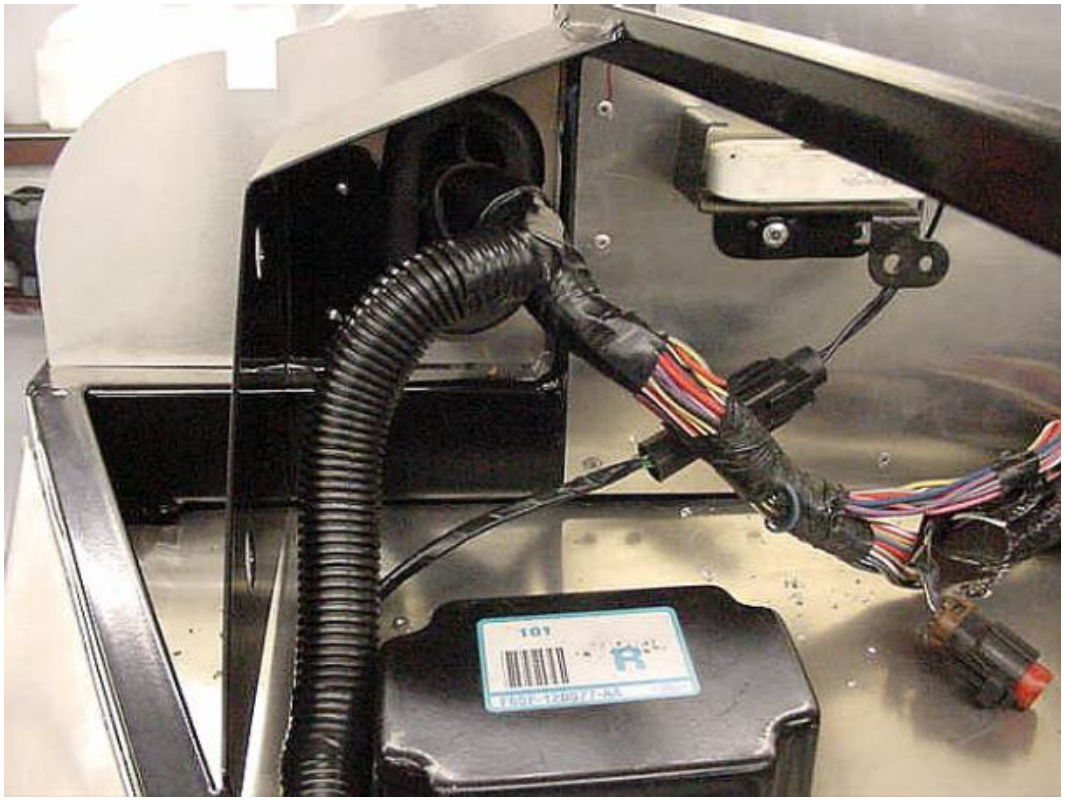
Engine Harness



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's foot box top from the engine bay side.
2. Attach the computer to the underside of the top of the passenger foot box 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.
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 short, smaller harness goes forward and connects to the mass air sensor and to the harness on the engine for the O_2 sensors and oil level sender. The other larger bundle goes along the firewall and contains the vacuum control lines for the EGR valve and engine, the connector to the distributor, the two large plugs for the fuel injectors, the to the dash harness connectors by the master cylinder, and the coil plug.

Engine harness plug mounted in firewall.

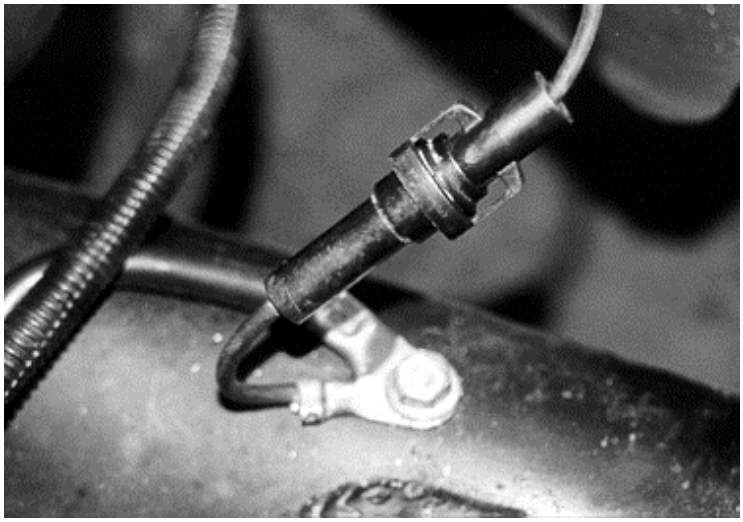


Engine harness passing through firewall extension.

5. Use screws provided with kit to mount the vacuum controls and BAP (Barometric Air Pressure) sensor to the firewall.

ATTENTION: *Note: The BAP sensor is similar to a MAP sensor used on speed density cars except it does not get hooked up to a vacuum source, it is left open to the air.*

6. Attach the computer connectors to the starter solenoid and the ground to the backside of the solenoid against the ¾" tubing. The ground looks like a female stereo jack (sort of). The other half of the connector is on the battery negative cable, so just cut the connector off and use the ring connector.



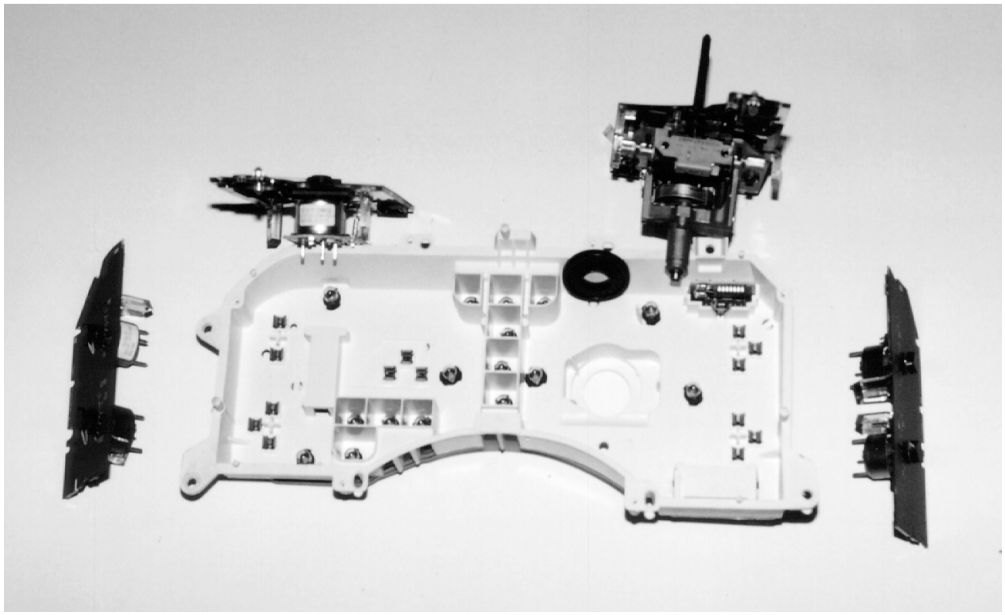
Computer ground near driver's foot box

Gauge Pod Installation

ATTENTION: *If you are using aftermarket gauges, skip this section.*

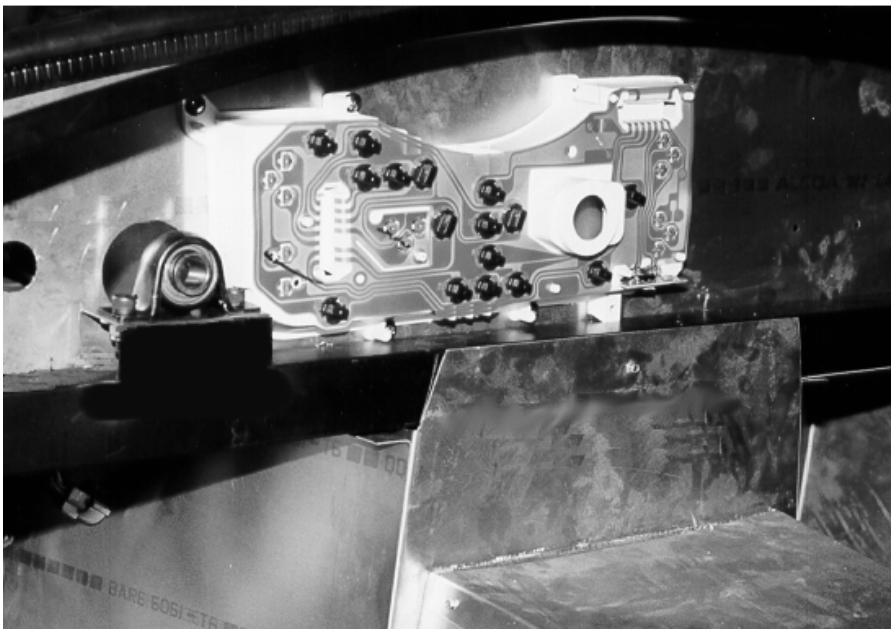
TOOLS: *Wire stripper, crimping tool, electrical tape, wire cutters, Phillips head screw driver, ⅜" socket head and socket wrench, razor knife, spray adhesive, silicone, caulk gun, scraper, tape, marker, 11/64" drill bit, drill, paper, five minute epoxy glue, small Torx screwdriver.*

PARTS: *Mustang donor gauge cluster, black vinyl trim (FFR# 13990), dash electrical components (FFR# 13327), misc. electrical components (FFR# 10975).*



Disassembled Mustang gauge cluster.

1. Remove the Mustang gauges from the white gauge pod with a small Torx screwdriver.
2. Cut the locating pins for the gauges off the white gauge pod so that the pod will lie flush against the firewall when mounted.
3. Use an 11/64" drill bit and a steady hand to enlarge the holes in the gauge connectors on the back of the gauge pod. This will help the jumper pins that come with the kit to seat in the holes.
4. Attach the male pin connectors in the kit to one end of the wire extensions using a crimping tool.
5. Attach the blue wire connectors to the other end of the wire extensions using a crimping tool.
6. With a razor knife, cut the blue plastic on the female blue wire connectors that overhang so that the metal part is flush with the end of the connector. This will give more contact area for the gauges to grab.
7. Push the wire extensions into the enlarged holes on the gauge pod so that they are tight.
8. Tape the wires for each individual gauge together to help prevent them from pulling out.
9. Mark on the tape, which gauge each wire, goes to. The name of the gauge is written on the back of the pod near each of the connectors.
10. Position the housing upside down and as far to the left as possible. More of the harness may have to be pulled through the firewall to make sure the harness plugs reach the connections on the pod. You can trim the corner nearest the steering shaft pillow block so that the housing is sitting over the bearing bolt and closer to the left if the harness is too tight.



Mustang gauge pod mounted to firewall. Note: Mk. II frame shown.

11. Use the pod as a template to mark and drill the mounting holes in the aluminum using a ⅛" drill bit.
12. Mount using the screws provided in the kit. Use flat nuts on the back of each screw. A cool way to mount the pod is with the screws coming from the engine bay side and the flat nuts holding the pod. This way you cannot see screw ends when looking into the engine bay and only see the chromed screw heads.
13. The dash harness gauge pod connectors can then be pushed into the pod connectors. These are tight, so click them into the white housing before drilling.

Ignition and Turn Stalk

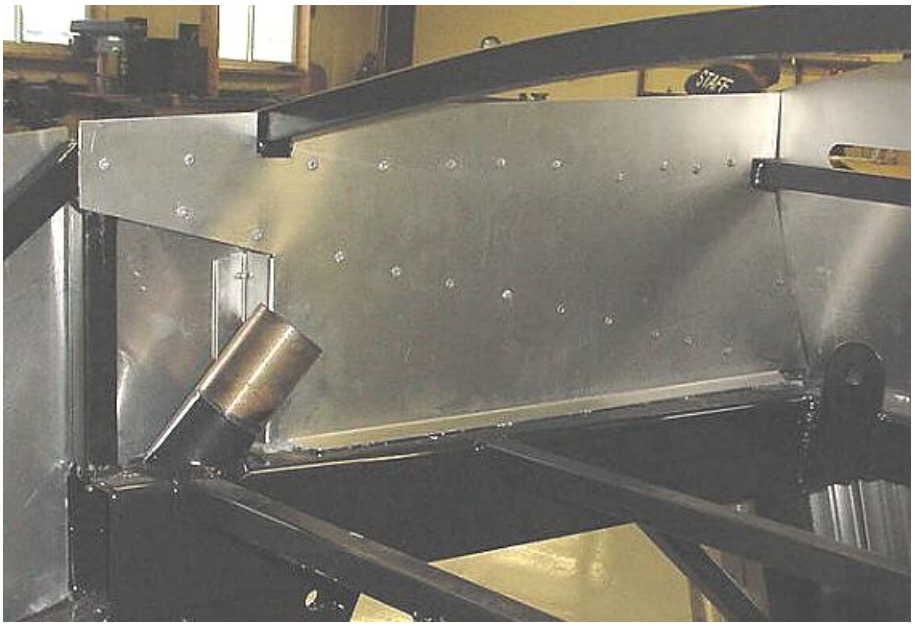
TOOLS: *Hack saw, 5/16" socket, 9/64" drill bit, drill.*
PARTS: ***D****ash Electrical Components (FFR# 13327), Mustang ignition switch and turn signal stalk*

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 mounts under the turn signal stalk on the 2"x 2" frame hoop that has the door hinge mounted to it. With the door closed, mount the switch as close to the hinge as possible without hitting it. Use two 1" screws and a 5/16" socket and 9/64" drill bit.
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. Position the rear trunk floor.
14. The rear trunk floor is riveted in the same manner with rivets spaced every 2 - 3 inches along the 3/4" tube framework. You can use the self-tapping screws to make this go faster, but final installation must be done with the rivets.
15. Silicone around the seat harness mounts in the trunk.

Emergency Brake Handle and Cables

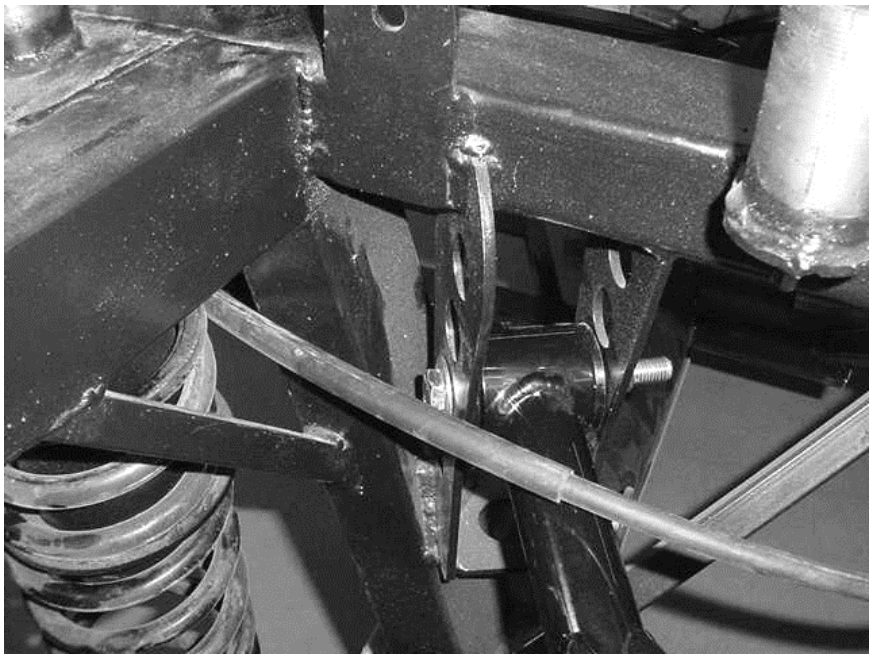
ATTENTION: *The 99-04 Parking brake handle has different mounting locations and "T" cable length than the older 87-98 handles.*

TOOLS: *½" deep socket, 3/16" hex key, marker, scissors, hacksaw.*

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

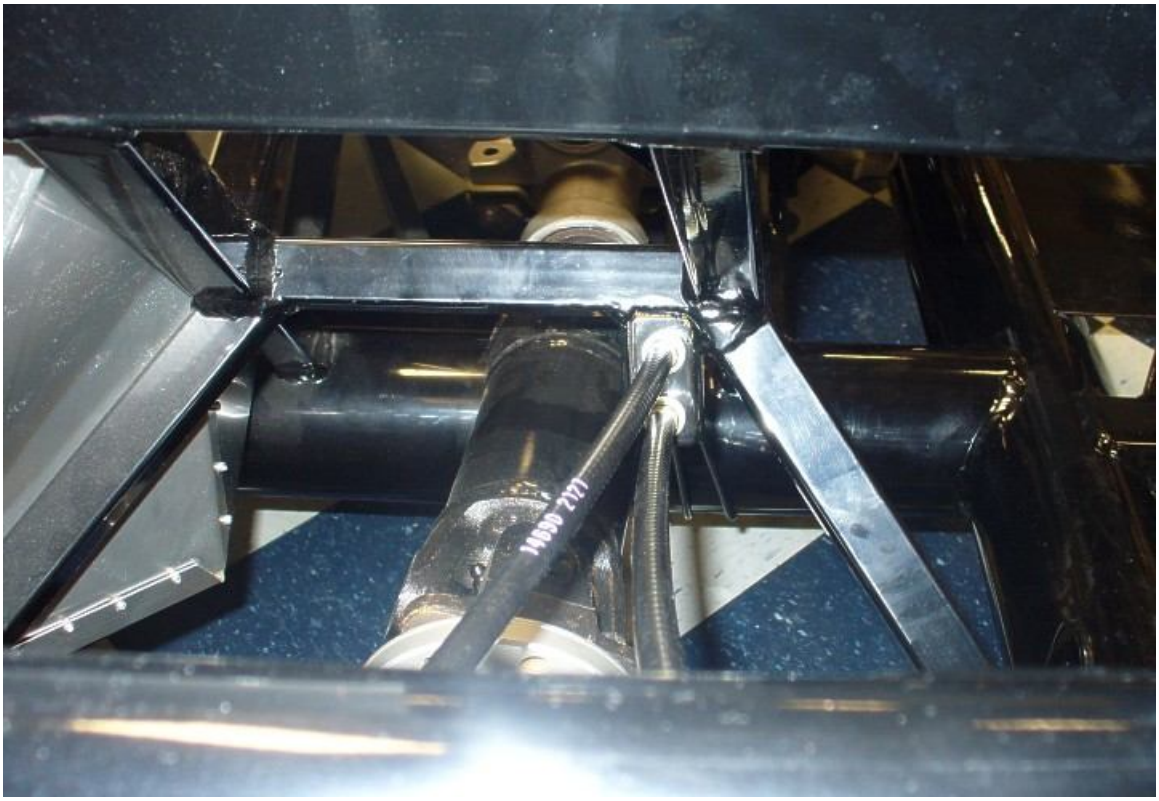
Emergency Brake cables

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.



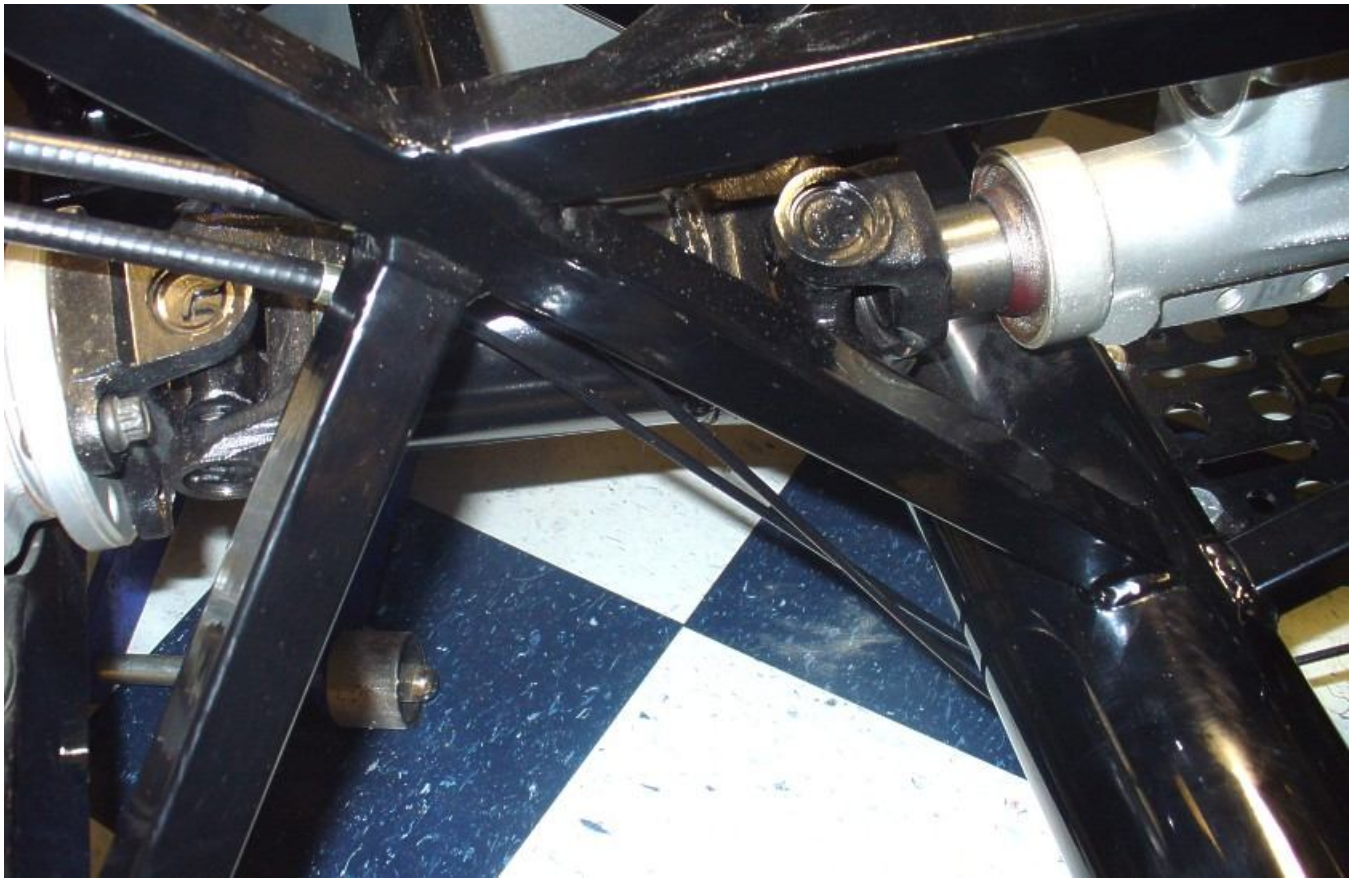
Parking brake cable passing through triangle and in front of coil spring on driver's side

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.**

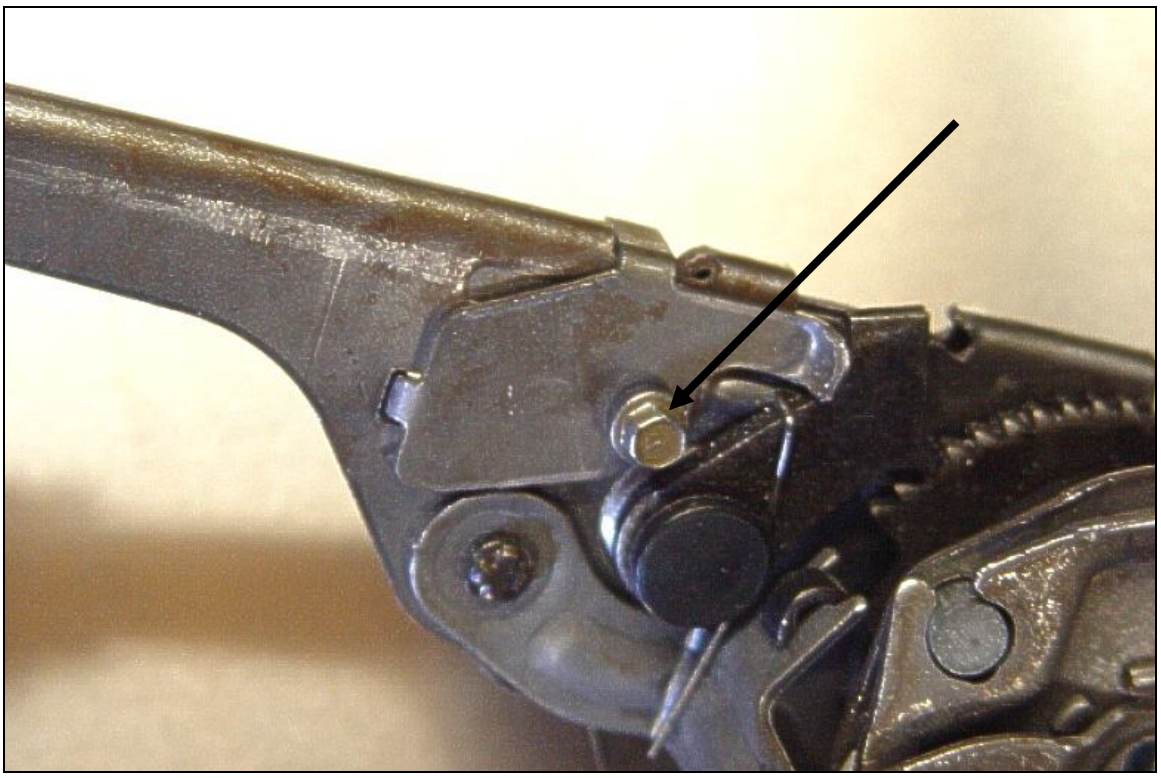


Brake cables running under the 4” crossmember.

Brake cables attached to the T cable

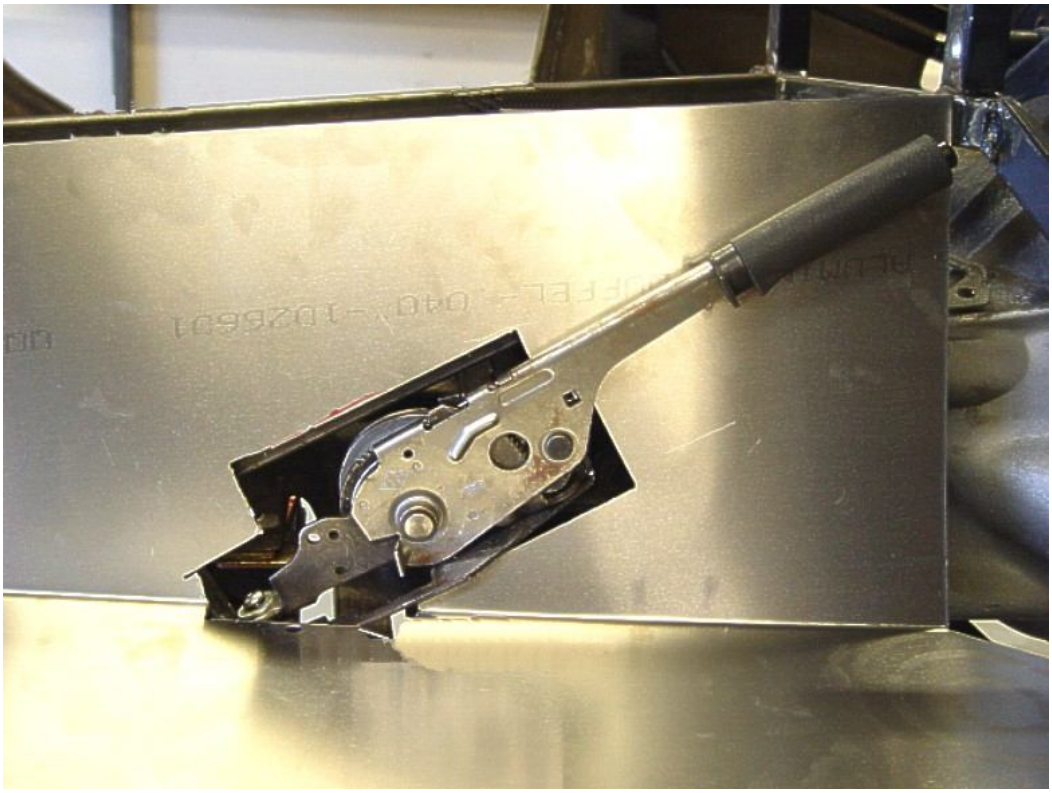
Emergency Brake Handle

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 ratcheting adjustment gear from turning.



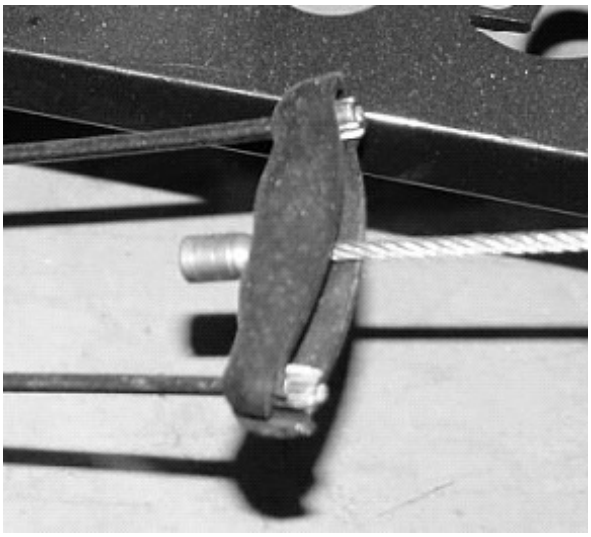
Ratchet gear stop bracket and screw.

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.

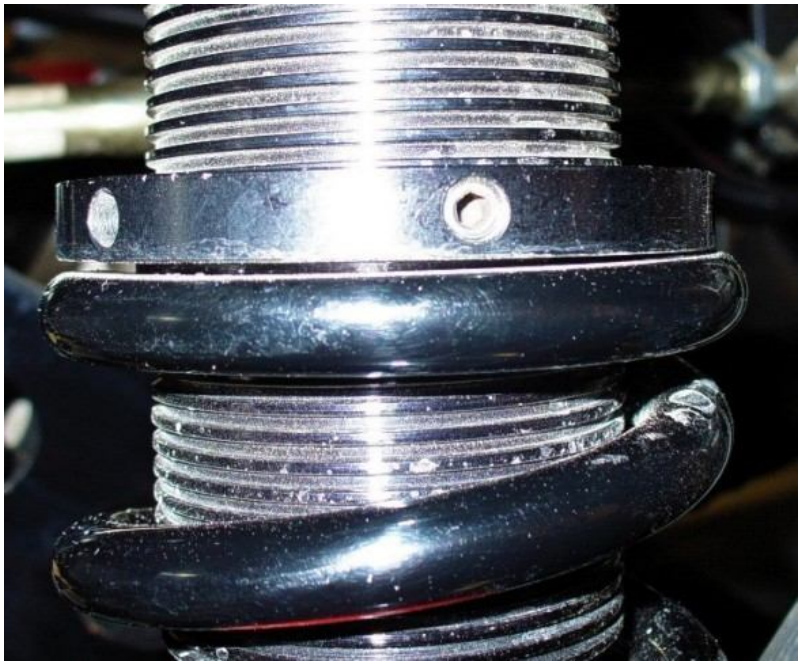
Transmission Top Cover

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. Silicon and rivet the panel in place.
7. If not already mounted, bolt on the shifter assembly to the top of the transmission.
8. Position the aluminum hole cover pieces so that the shifter hole is only as big as necessary.
9. Mark the locations on the aluminum.
10. Drill the rivet holes.
11. Silicon and rivet the panels in place.

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 relays 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 near the seat area
   - EEC IV computer ground near the computer
   - 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** and oil filter relocate hoses. Double-check the in/out relationship of the oil filter re-locate lines. Follow the arrows on the castings.

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.*

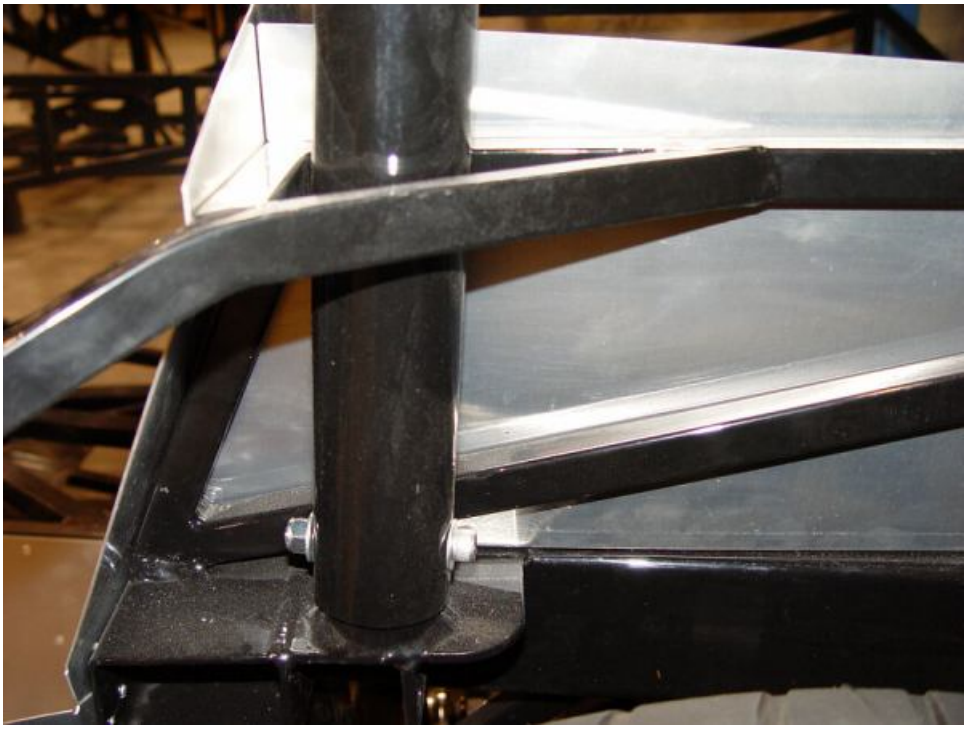
1. All wires should be inspected in the foot box area before the foot box top is installed. Double check the following areas:
   a. Clutch pedal movement. As the clutch pedal moves you don't want contact with any wires.
   b. Check the distance to the white gauge pod on the firewall. The length of the 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 aluminum

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 roll bar 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.

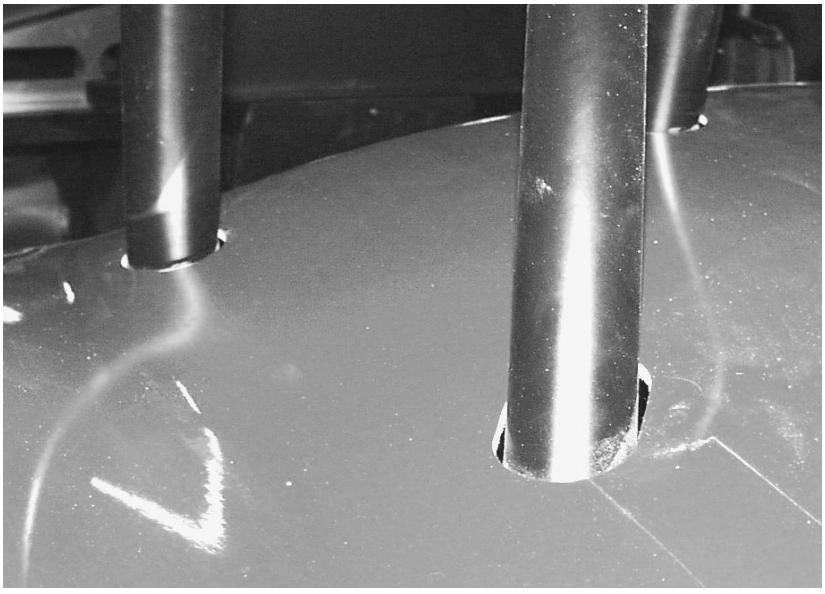
ATTENTION:

- *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

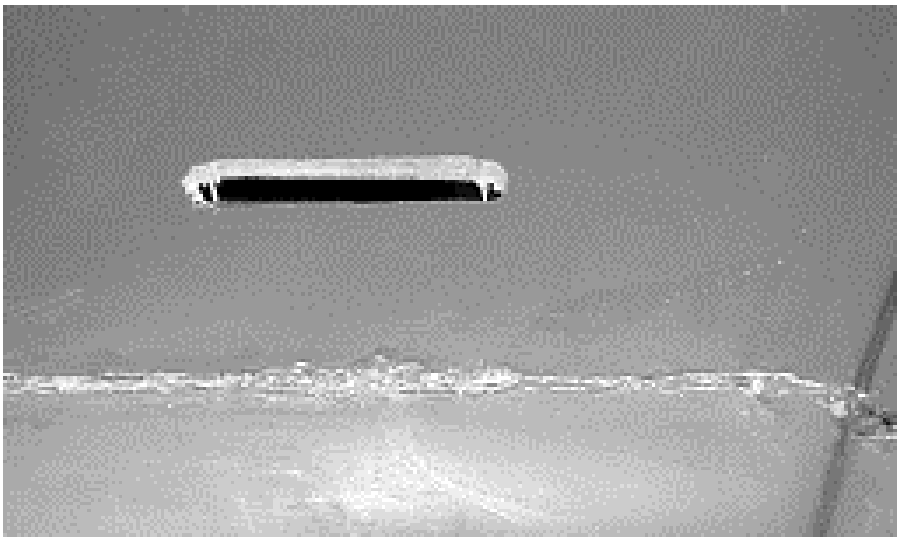
TOOLS: *3.50" hole saw*

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

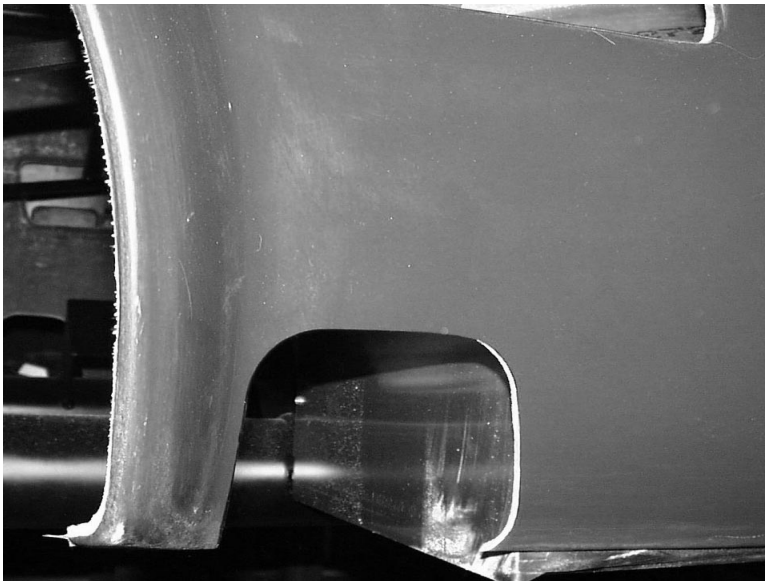
3. Repeat on the other side of the body. These ovals will be the slots through which the windshield bars will insert.

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.
8. 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.

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, tape, 7/16" drill bit.*

1. Using a 7/16" drill bit, drill the two holes marked at the headlight mount locations.
2. On the headlight template that follows, cut out the two small holes and the inner solid line circle. Leave the template attached to the paper so that it has extra support.
3. Tape the template to one of the headlight locations.
4. Draw around the inner circle with a marker.
5. Drill a 7/16" hole in the inside of the circle so that the edge of the hole is just touching the circle.
6. 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, 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 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.

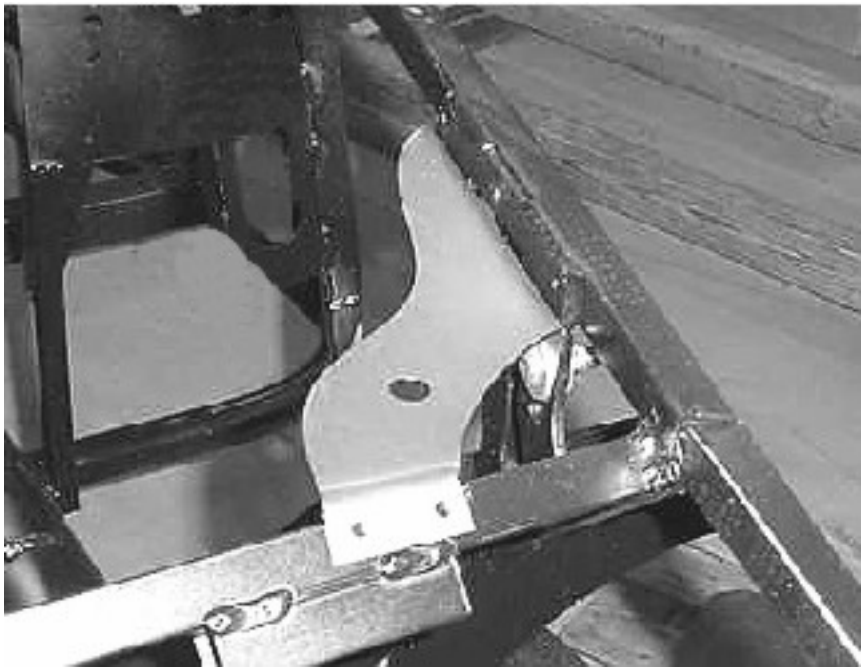
4. Use the 3/8" drill bit for the large hole.
5. Remove the template.
6. Test fit the part.

Hood Pins

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

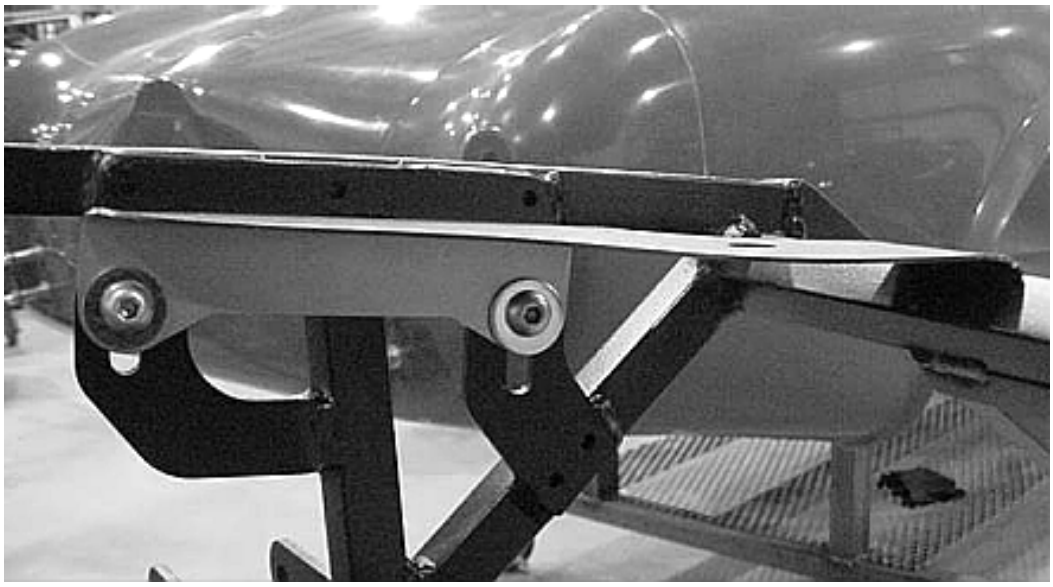
PARTS: *Three lock set and fasteners (FFR# 11019), hood/trunk fasteners (FFR# 10646).*

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

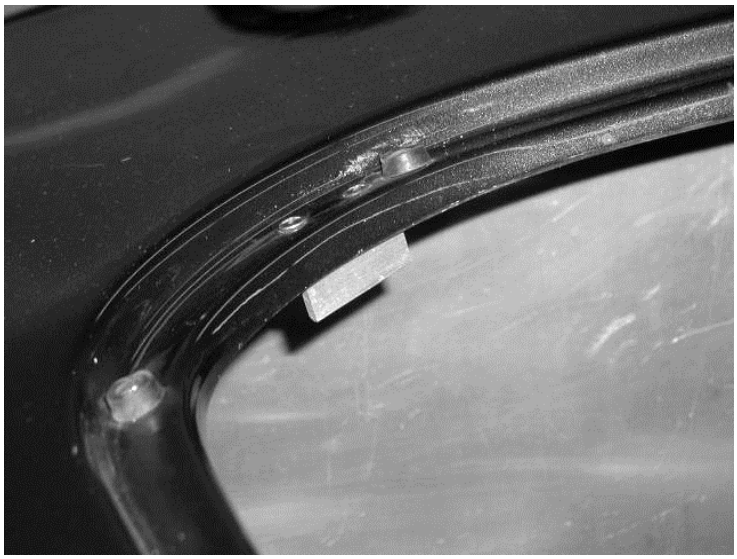
TOOLS: *Drill, ⅛"drill bit, ⅞" hole saw, Phillips head screwdriver, small hex key set, small square file, hack saw, masking tape.*

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.



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

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.
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. You'll get best results if you paint your body and panels at the very end of this entire project. Final mount and fit your body and panels, then remove them, perform bodywork and paint operations and mount the painted body/panels at the end ONCE.*

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.

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.

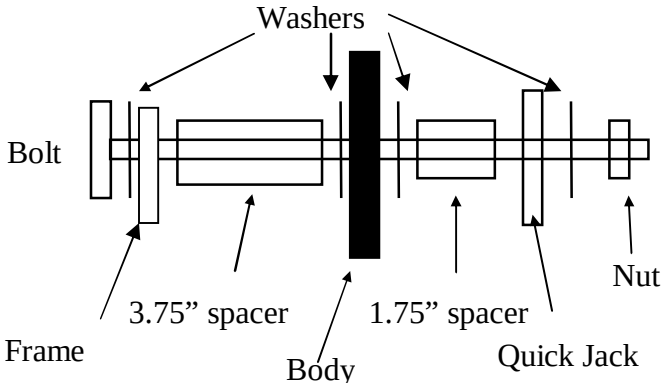
Slide the nose on first with the body up in the air.

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 5/8"combination wrenches, 5/8" 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 5/8" wrench and 5/8" 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.

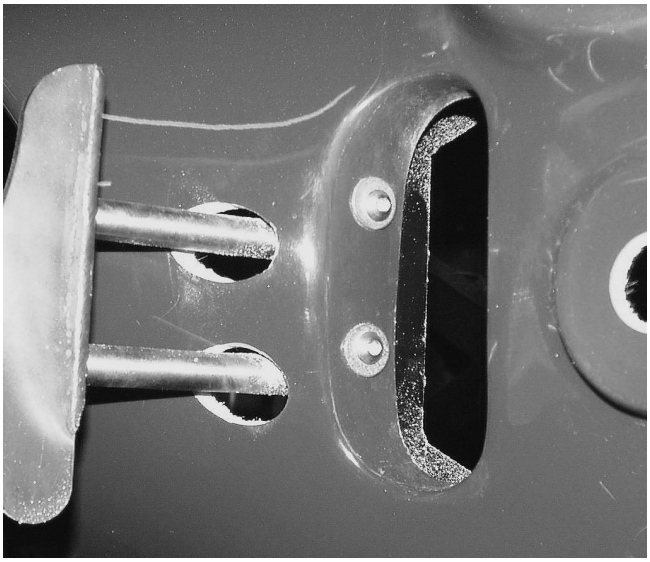
Side Body Mounts

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. Use a 3/16" hex key. Do not torque the Stainless bolts. Snug is good.

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.

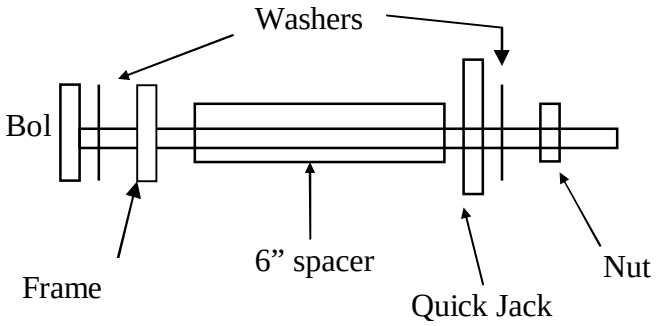
1. Center the body over the frame using a tape measure to measure from the lip of the body to the rear mounting plate of the front coil-over bracket. Check the line up with the front "X" member so that the tape measure is parallel. Make this measurement on each side of the body so that the front of the 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 5/8" socket and 5/8" 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, Windshield 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 1/8"- 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, roll bar, 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.

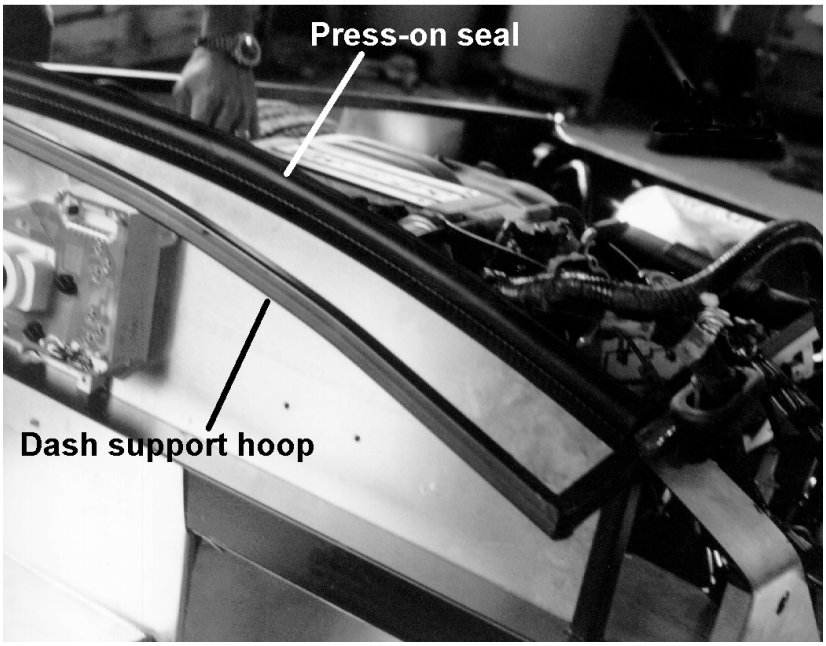
TOOLS: 8*0, 220, 400 grit sand paper, sanding blocks.*

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 80 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 weather-stripping (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 weather-stripping (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 weather-stripping on the passenger side footbox as well.

Note: The large weather-stripping 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.

5. Position the lower splash panels in place on top of the upper panel and in front of the floor lip.

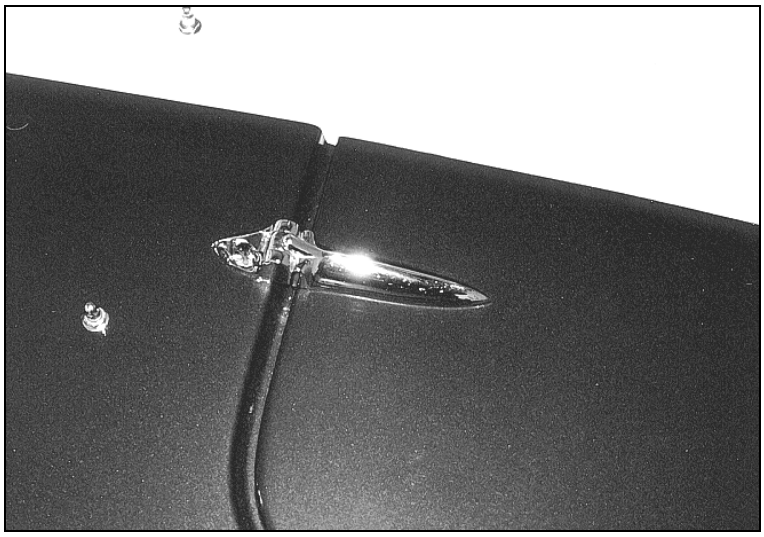
Rear cockpit lower splash panel.

6. Hold the panels in place with #8 screws.
7. Use a marker and ruler to mark the rivet holes on the aluminum panel.
8. Note where the panels touch each other and where they touch the frame. Remove the panels.
9. Apply silicone to the upper splash panels.
10. Install the upper splash panels with #8 screws.
11. Apply silicone to where the lower splash panels touch.
12. Install the lower splash panels with #8 screws.
13. Use ⅛" drill bit and drill the rivet marks.
14. 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.



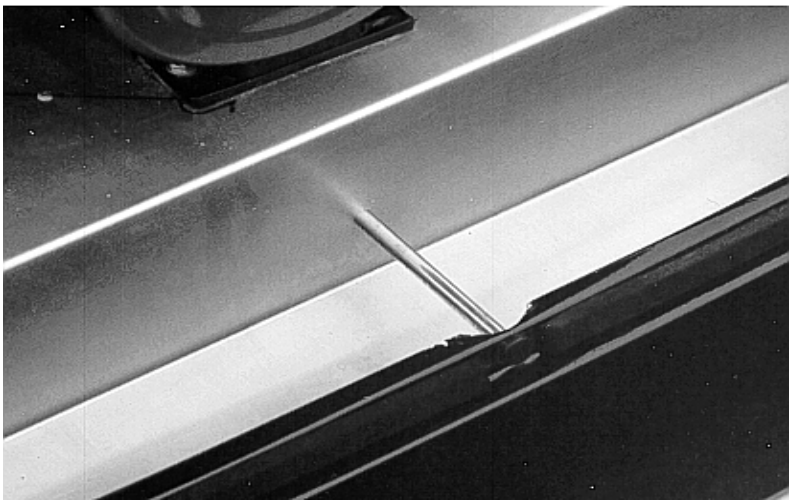
Driver's side hinge.

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. The trunk latch hook and mount are pre-assembled at the factory.
2. 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.
3. 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.

4. 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.
5. Put the washer and nut on the pin and tighten with a ⅜" wrench and regular screwdriver.
6. Engage the T-Handle and make sure that the latch hooks onto the pin securely.
7. 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. In 1999, Ford changed the style of the filler neck, a new Stainless steel neck has been provided for this application.*

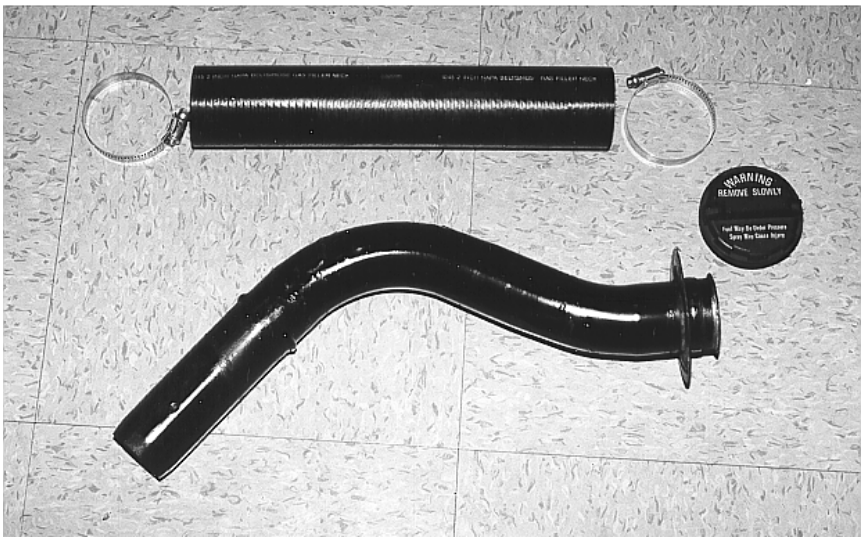
TOOLS: *⅜" deep well socket, hex key set, Phillips head screw driver, hack saw, drill, ⅛", 3/16" drill bit, safety goggles.*

PARTS: *Aston Lemans Cap Components (FFR# 14744), Fuel strap fasteners (FFR# 10896), 99-04 filler kit (FFR# 14005), Mustang Filler neck.*

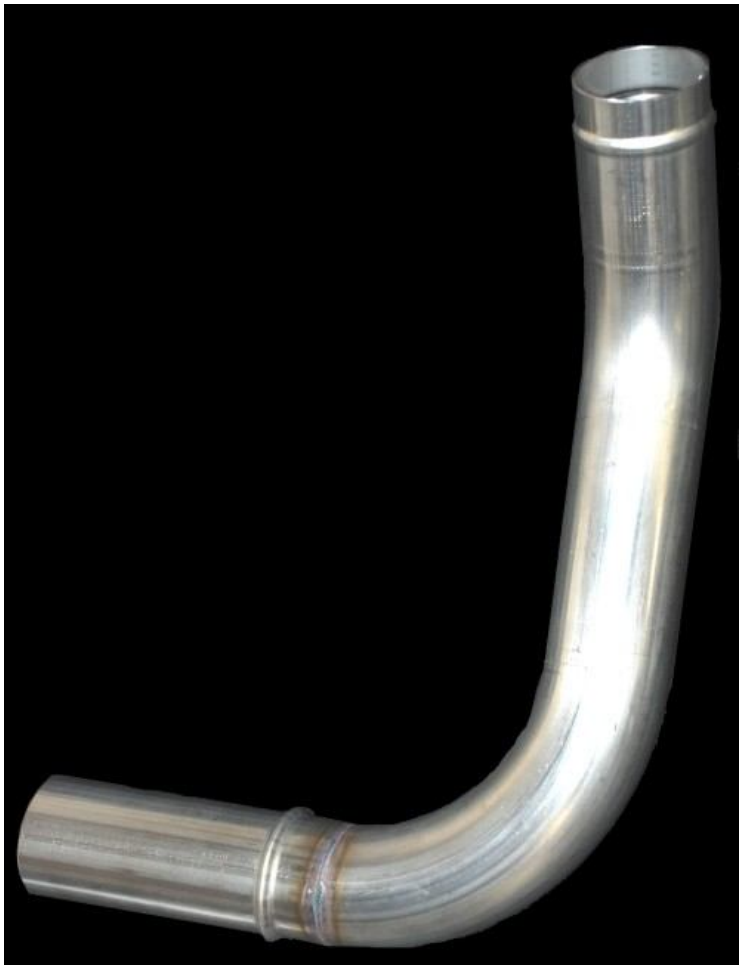
1. Remove the filler neck from the gas tank.

87-98 Fuel Filler Neck

1. Cut the Mustang steel fuel neck in the mid-section after the 90° bend. Leave enough straight tube, to attach a hose clamp to each side.
2. Remove the inner rubber hose.



87-98 Mustang fuel tank neck with kit extension tube.


Optional Stainless Steel filler neck

3. Use a hose clamp to attach the fuel neck extension tubing to the lower half of the Mustang filler neck.

Stock fuel tank filler neck with extension.

Optional Stainless Steel filler neck with extension.

4. Insert the neck back into the tank to prevent gas fume leakage and point the tube towards the ground to prevent anything from falling into the tank.
5. Place the Aston Lemans Gas cap and rubber gasket on the body. Align the holes in the cap and gasket and then open the cap.
6. Rotate the cap and gasket so that it opens with the cap towards the middle of the car and so that the cap does not hit the body when it opens. This allows easy fuel nozzle access at the pumps.

Gas cap located to open towards the center of the body. Note the ¼ turn gas cap.

7. Remove the gas cap leaving the rubber gasket. Use a marker through the gasket holes on the Gas cap flange to mark the drill hole locations then remove the gasket.
8. Use An ⅛" drill bit to drill all of the marked hole locations.
9. Drill the mount hole closest to the trunk wall with a 3/16" drill bit. This will be used with the bolt included to ground the gas cap to the frame.
10. Place the gas cap and gasket back on the body and screw the cap to the body.
11. Insert the bolt into the one 3/16" hole drilled and put one end of the ground strap provided onto the bolt followed by the large washer and locknut.
12. Tighten the bolt with the ground strap pointed towards the trunk wall.
13. Locate the vertical ¾" tube on the trunk wall and hold the loose end of the ground strap against the aluminum trunk wall where it is located and mark the center of the mounting ring.
14. Drill the mount location with a 3/16" drill bit.
15. Fasten the loose end of the ground strap to the ¾" tube using the #14 screw provided.

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

16. 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.
17. Push the second hose clamp onto the rubber filler neck.
18. 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.
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 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 enclosed small screws and a matching drill bit to start the hole.

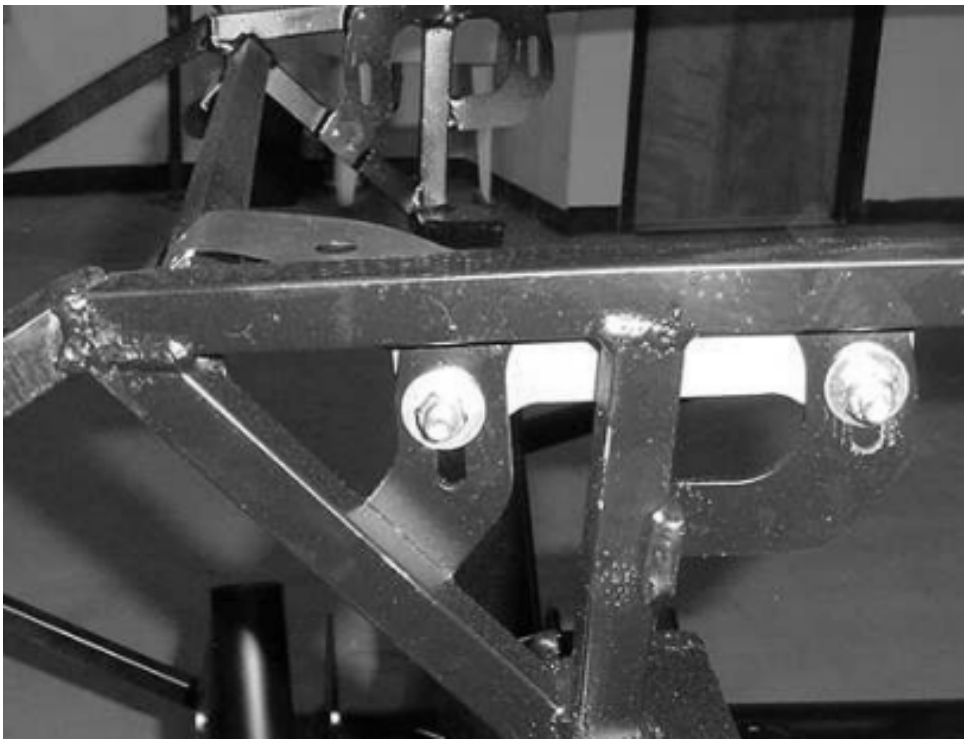
Base plate screwed to body.

Hood Pins

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.*

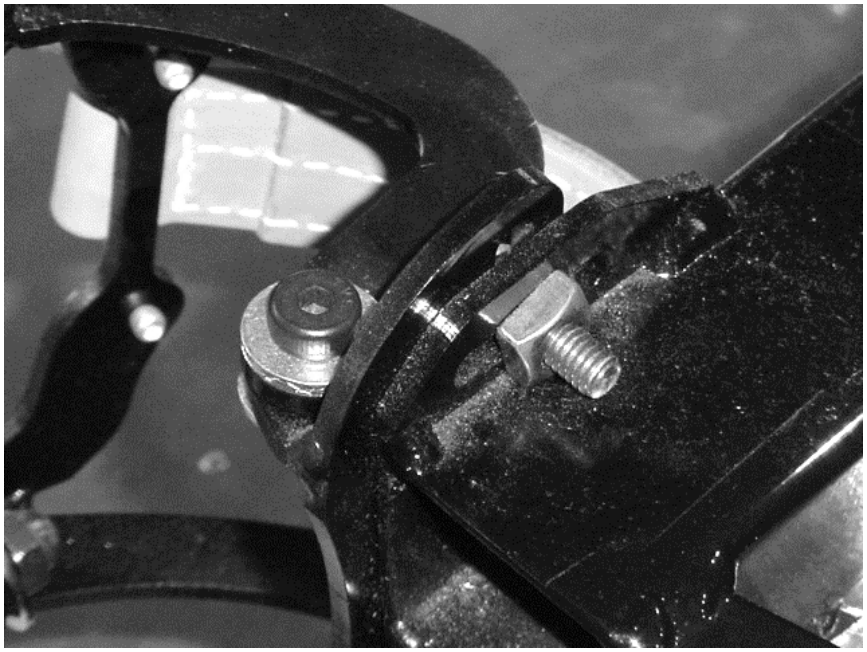
TOOLS: *½", $^{9}/_{16}$" deep socket, vise grips, drill, ⅛" drill bit, 13mm combination wrench, rivet tool, silicone, caulk gun, #8 nut driver, White lithium grease or WD 40.*

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

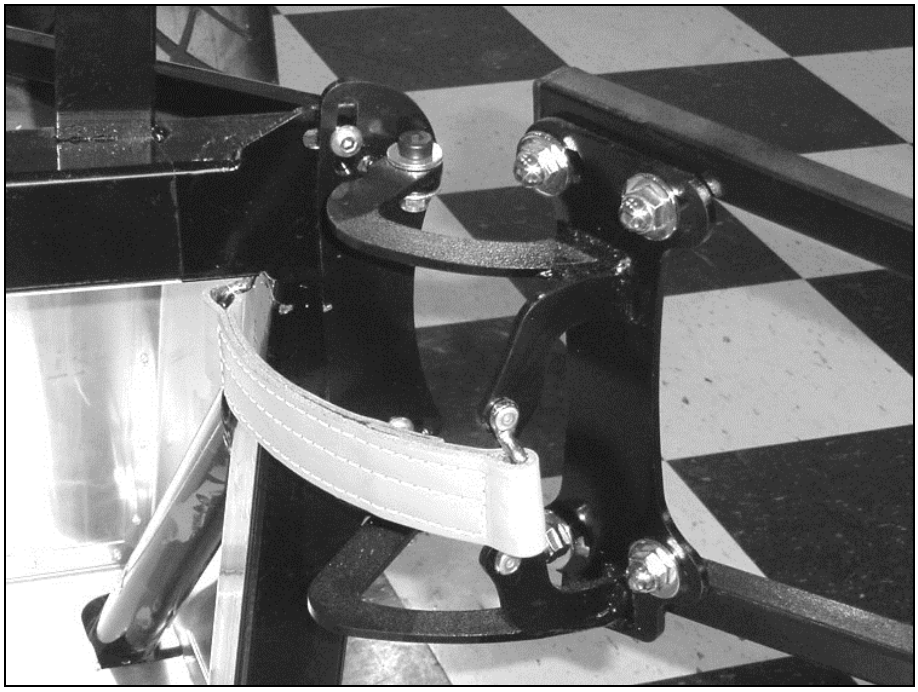
1. Remove the cover from the latch.
2. Apply lithium grease to the rotating plate and pin.
3. Work the latch until the action is smooth and easy.
4. Attach the latch to the door using four of the small screws.

Latch without cover mounted to door.

5. Bolt the door to the car and do a rough alignment (bolt in the center of the slot) 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.

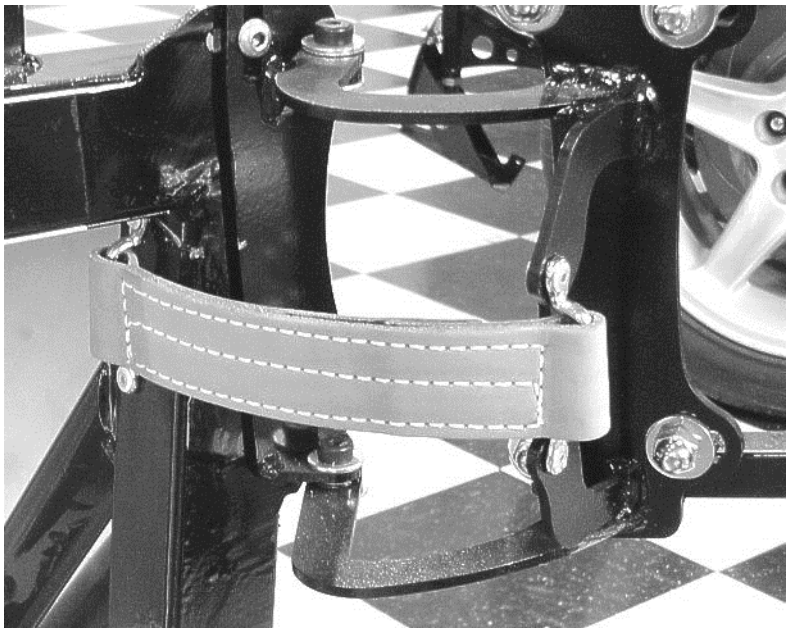
8. Shut the door slowly adjusting the striker to where it lines up with the latch. It may be necessary to shim the striker with washers to get the best alignment.
9. Finish the alignment of the door. Tighten down the striker once you achieve a good fit between the door and striker.
10. Check the door 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.

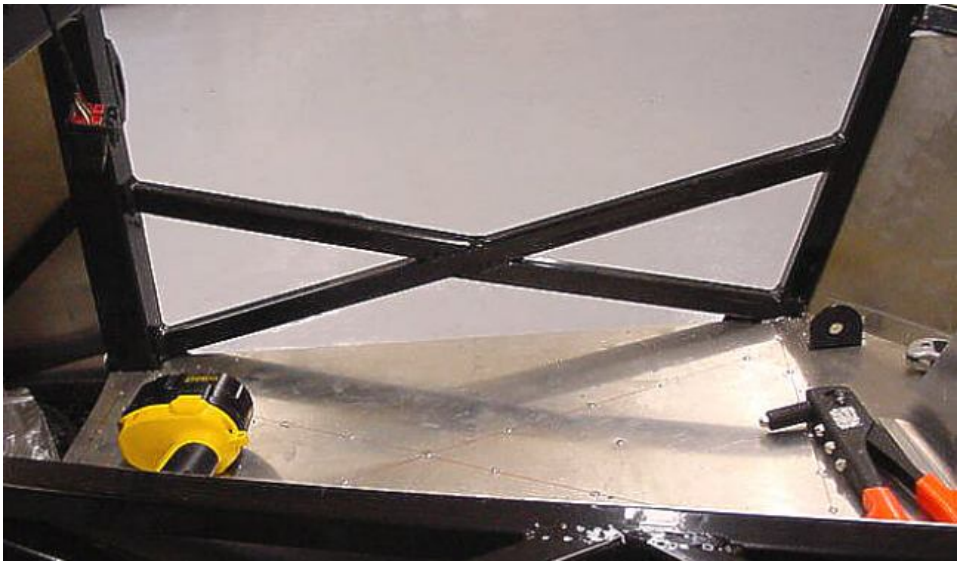
1. Attach a check strap to each door hinge with 3/16" rivets.
2. Open the passenger door wide but not enough so that the door hits the body. The straps will stretch slightly over time so allow enough room for this by closing the door slightly from the maximum.
3. While holding the door open pull the 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

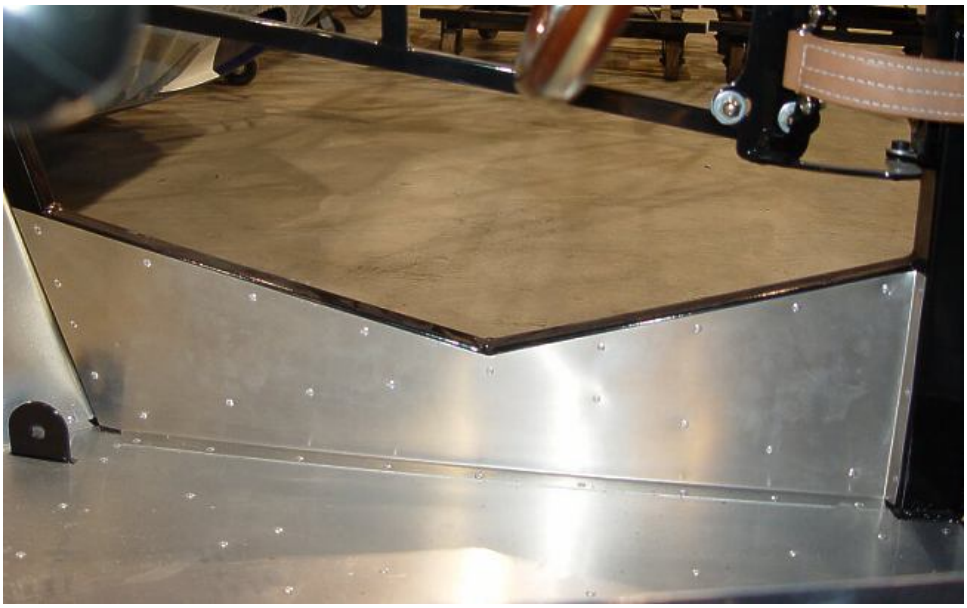
TOOLS: *Drill, #8 nut driver, 1/8" drill bit, rivet tool, silicone, caulk gun.*

PARTS: *Cockpit aluminum (FFR# 10890), ⅛" short 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.

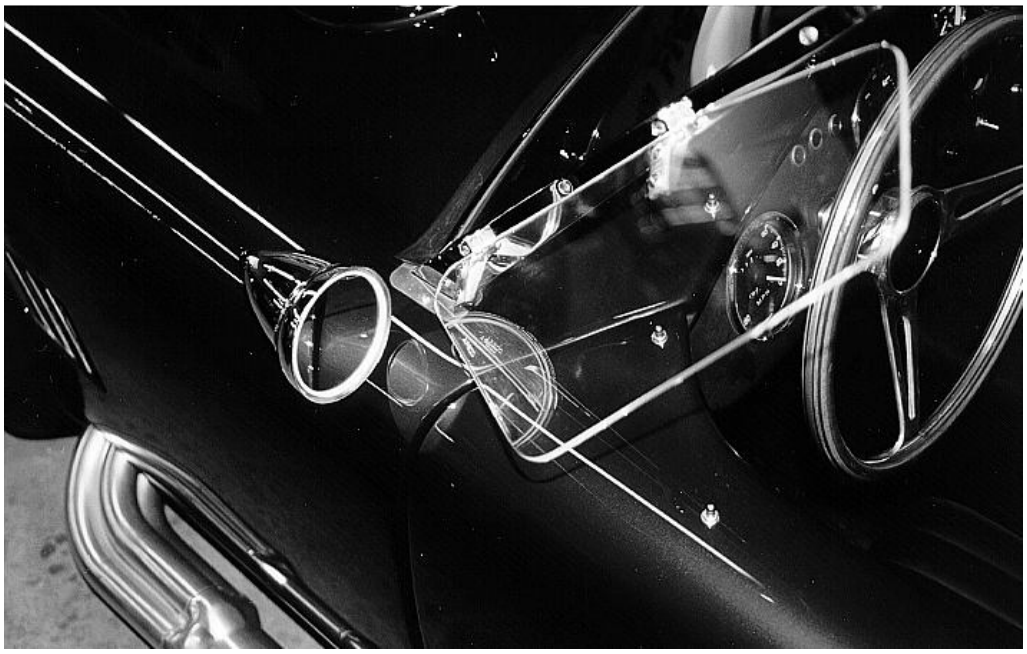
Side View Mirror

TOOLS: *½" Wrench, Drill, ⅛" drill bit, Philips head screwdriver, Flat head screwdriver.*

PARTS: *Rear view mirrors/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 w/the (2) screws and gasket provided.

Mirror attached near windshield.



Standard side view polished mirror installed.

Radiator Aluminum

ATTENTION: *Use care when handling aluminum, the edges are sharp and can cut you.*
TOOLS: *Drill, #8 nut driver, ⅛", 3/16" 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. 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.

8. Line up the edge of the radiator fins with the edge of the side aluminum.
9. The top angle of the sidepieces will not go all the way down to the top of the quick jack mount.
10. 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.

11. Remove the sidepieces, mark and drill the rivet holes.
12. Remove the floor aluminum.
13. Apply silicone to the bottom of the radiator where the aluminum will contact.

14. Insert and attach the radiator floor aluminum using either the screws provided or ⅛" rivets every 2".

Drilling the radiator and aluminum nose panels.

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

Side Exhaust

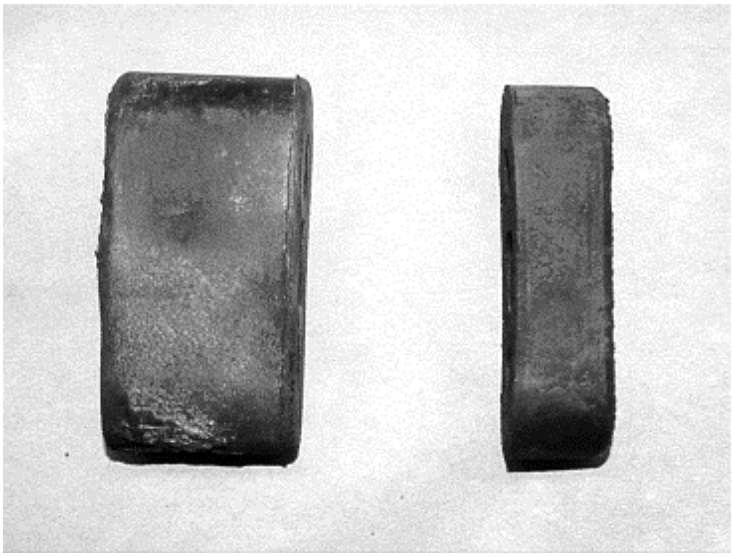
ATTENTION:

- *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.

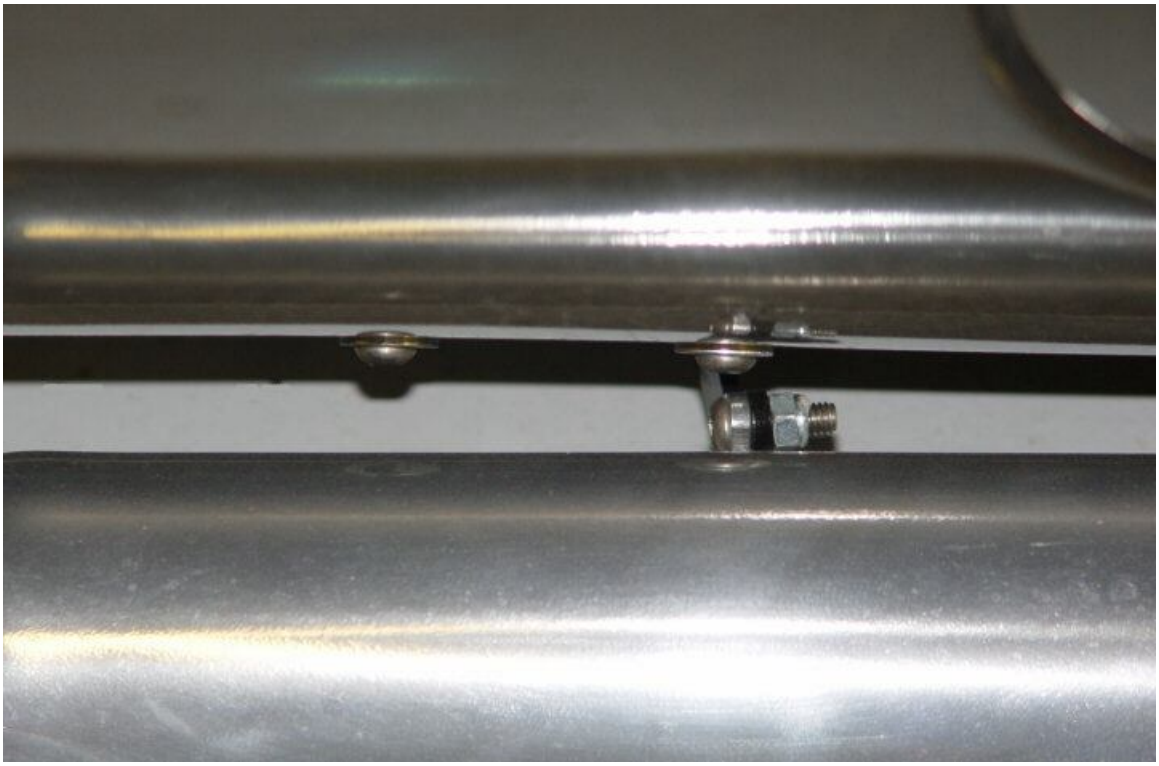


Exhaust mount cut in half.

2. Mount the straight pipes to the Mustang headers. *The passenger straight pipe is shorter.* 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.

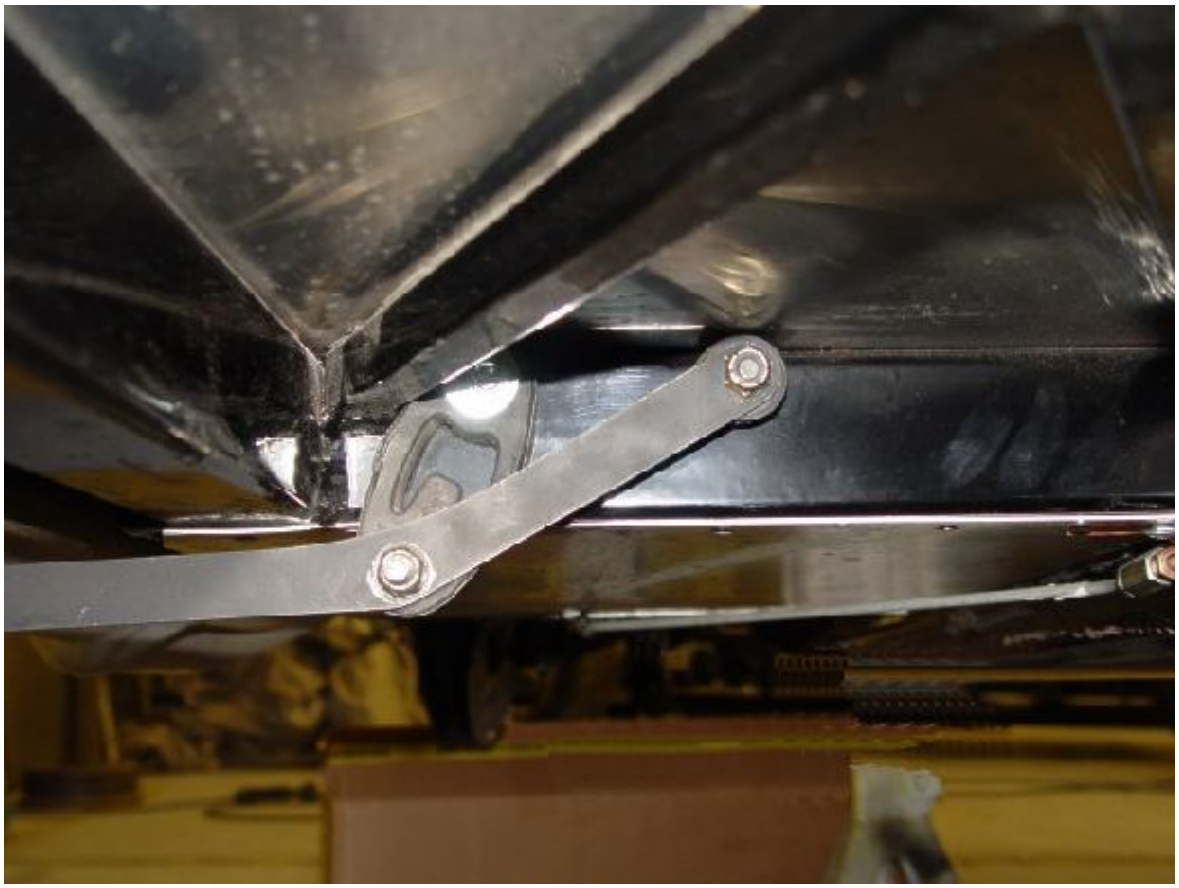


Side exhaust mount post and its relative position to the front side body mount bolts

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 large 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

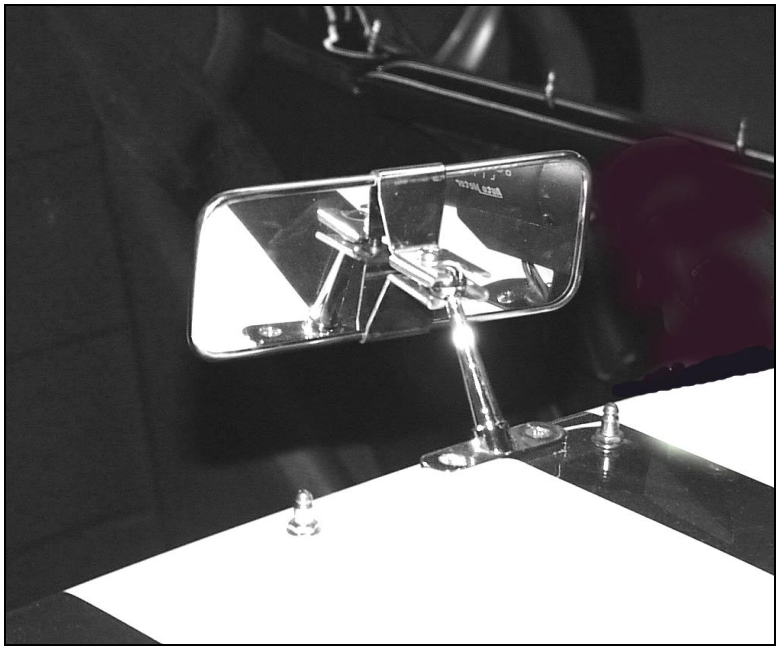
1. Slide the rear leg through the body onto its mount.
2. Slide the front tube through the body all the way down to the small knobs on the mounts.
3. Push the rear leg up onto the front tube.
4. Bolt the roll bar in place using the holes drilled earlier and kit fasteners (FFR#10829, 10830). Do not torque 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

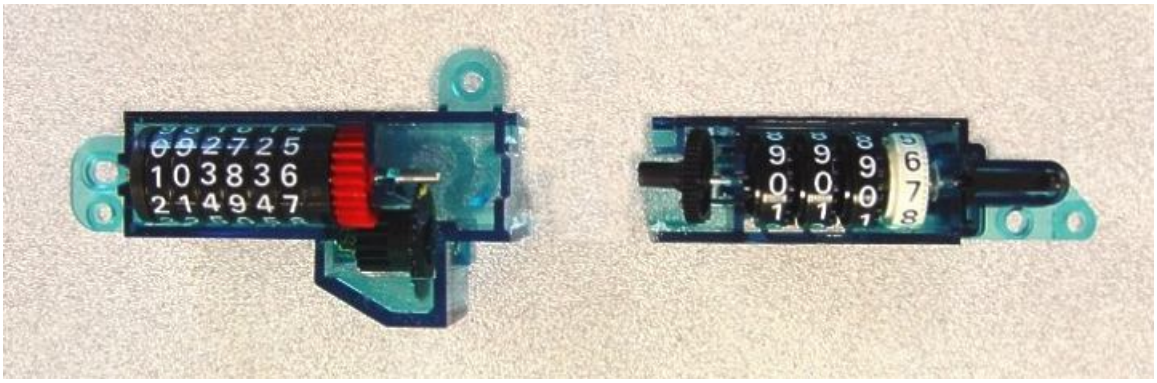
ATTENTION:

- *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.*
- ***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.*

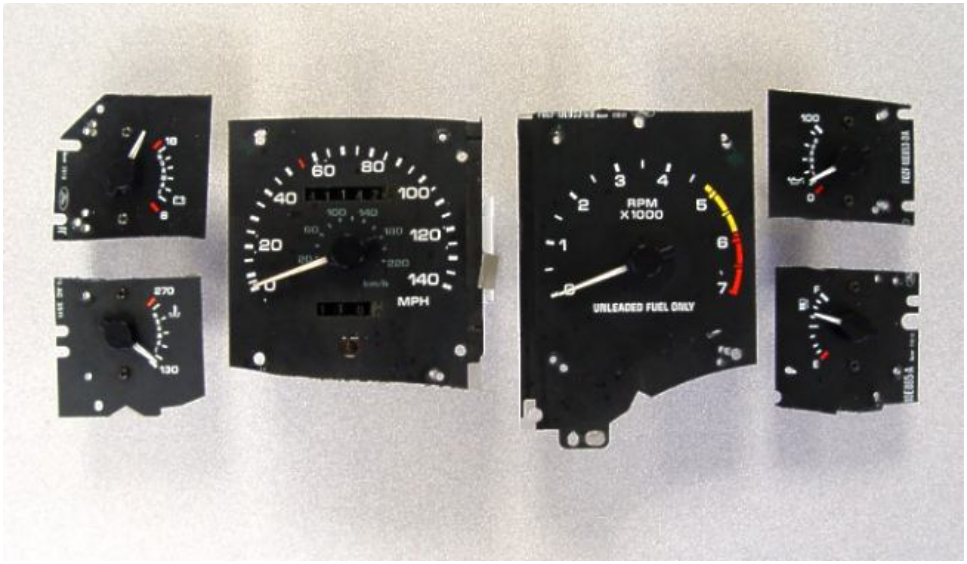
PARTS: *Dash electrical components (FFR# 13327), Mustang gauge conversion kit (FFR# 10893).*

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.

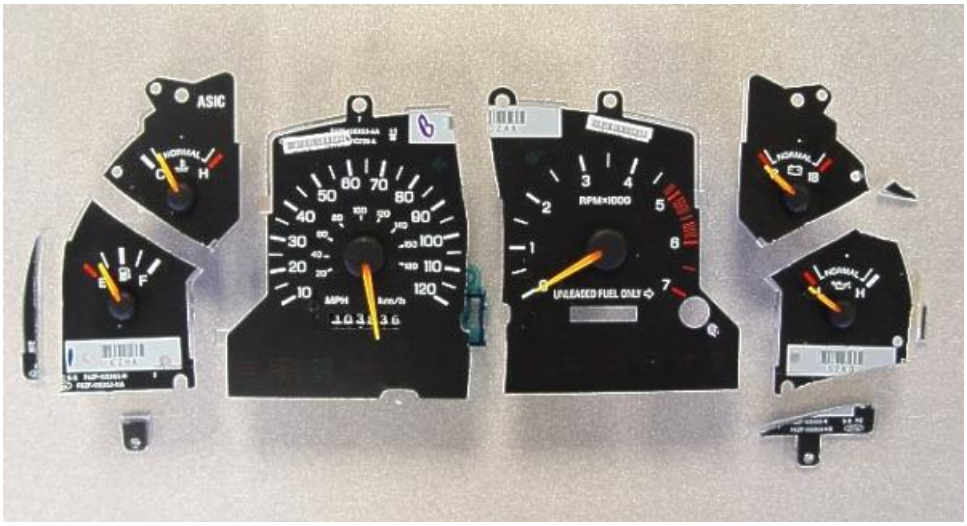


Odometer and trip meters.

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.

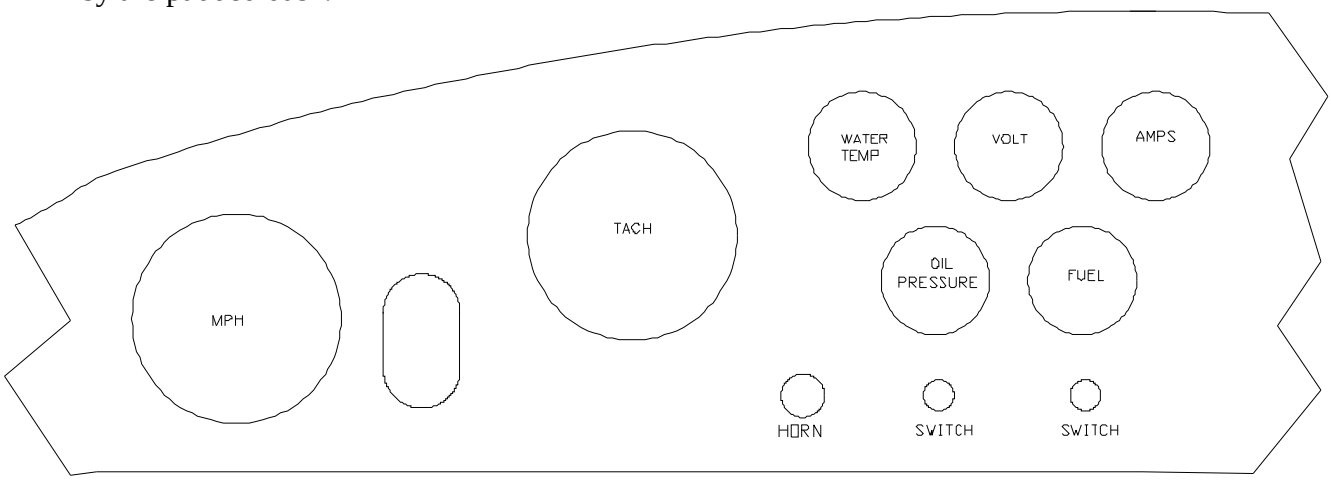


1987-1993



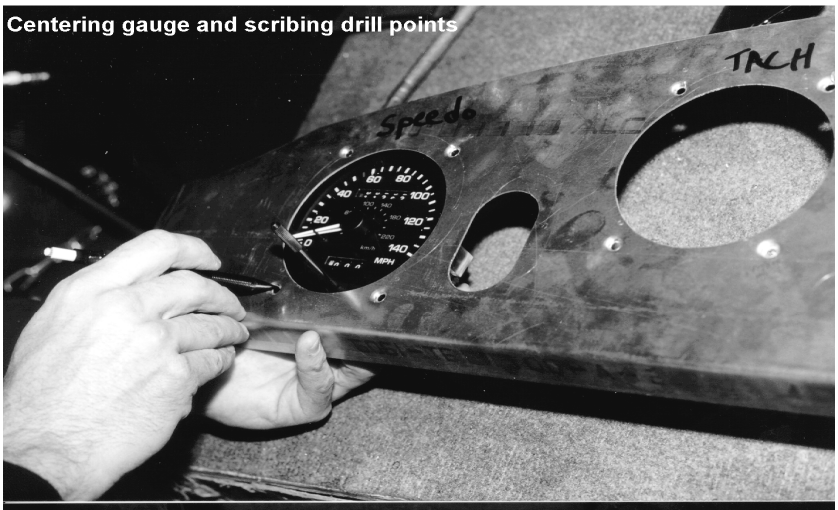
1994-1998

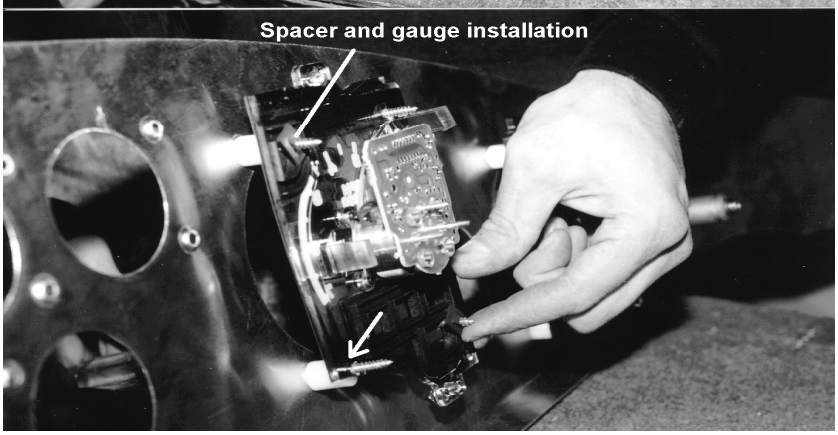
6. Drill the scribe marks on the gauges with the 5/32" drill bit.
7. The speedometer and tachometer holes in the dash are designed to work for two different size gauges. You will see a fine laser cut dashed line surrounding the cut out. These lines are at the diameter necessary for the Mustang gauges, 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.



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.

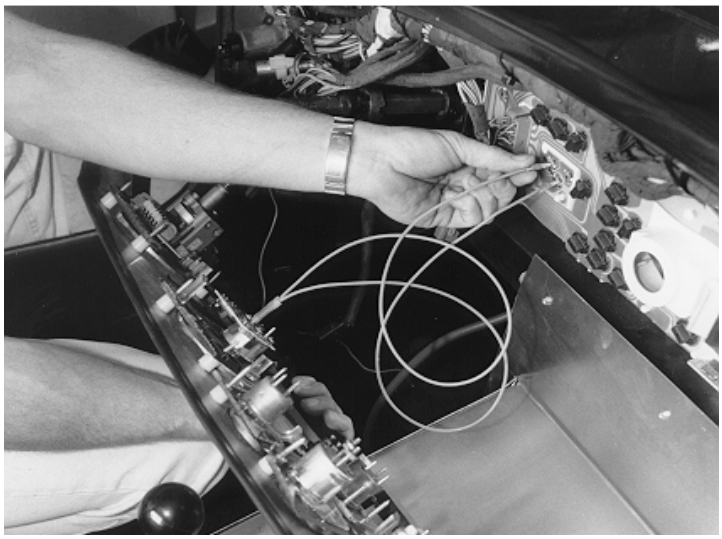
10. If you would like to install the three lights that are included in the kit, the original Roadster's had them positioned directly over the steering column in a straight line. Use a ½" drill bit for the holes.





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 the gray plug pin #2 (**Dimmer to High Beams**) using red connectors.
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.
14. 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.

15. Cover each gauge face with paper so that spray adhesive does not get on the gauge faces.
16. 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.
17. 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.
18. 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.
19. Trim the cover around the perimeter of the dash, leaving 1" of overlap on the tops side beyond the aluminum edge.
20. 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.
21. Press the material onto the adhesive covered edge on the backside of the dash.
22. 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.
23. Cut out the material in the center of each opening so that there is ¾" of material hanging into the hole area.
24. Press fit the 4" and 2" bezels into the dash by pressing on the outer rim section only. For 1987-1993 gauges pull out the trip counter button.
25. Using a razor, cut the switch holes.
26. 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.
27. The black push button is used for the horn and installs in the dash next to the switches.
28. Remove the upper steering shaft by pulling the steering wheel towards the cockpit.
29. 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.
30. 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.

31. 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.
32. 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.

33. Make sure the gauges do not hit the ¾" tubing.
34. Screw the dash to the center of the dash support hoop using a ⅛" drill and Philips head screw and countersunk washer.
35. Push the ends of the dash behind the top of the door hinge.
36. 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. Mark where the bottom of the splashguards needs to be bent in order to go into the rear fender area.
5. Bend the bottom edge of the splashguards.
6. Apply silicone to the bent lip on the F-shaped aluminum panel where it will meet the splashguards.
7. Attach each side to the F-shaped aluminum pieces with #8 self-tapping screw.
8. 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.
9. Drill and rivet the Splash Guards to the "F" pieces using ⅛" rivets.
10. 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.
11. Silicone around the splashguard from the exhaust side.

Rear Wheel Splash Guards

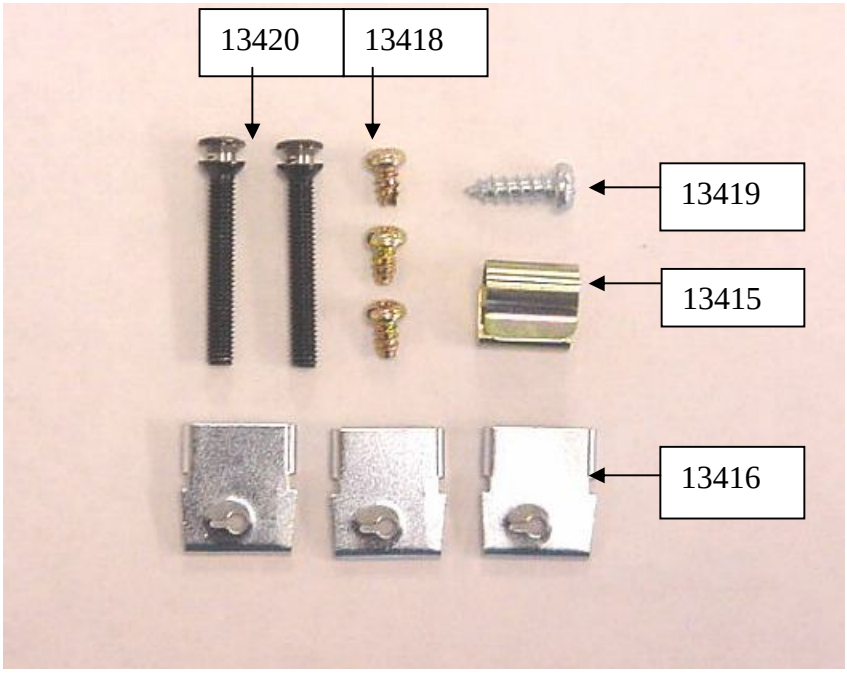
1. Push press-on trim onto the rear splashguards and hold in place in the wheel well. The small tab on the bottom faces towards the rear of the car and is on the bottom. The bent edge should be vertical and aligned with the trunk side pieces where they drop down, behind the quad shock mounts. It should 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

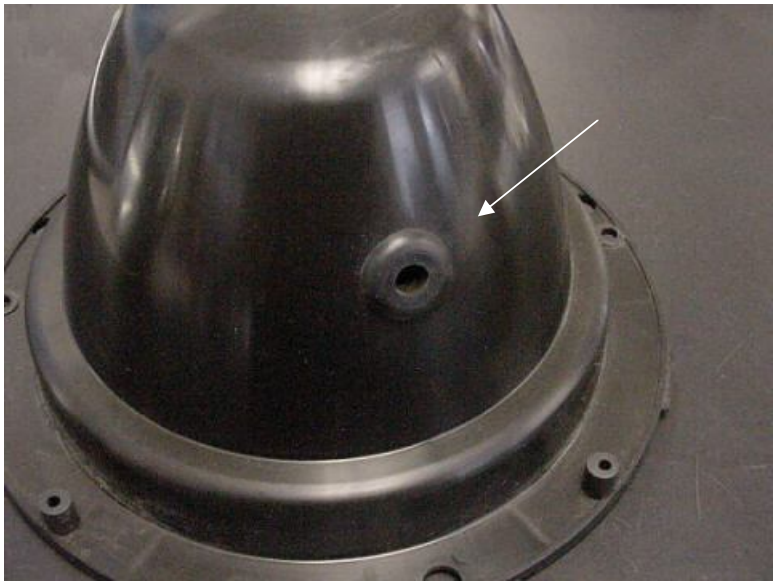
TOOLS: *Phillips head screwdriver, drill, ⅛"drill bit, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

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

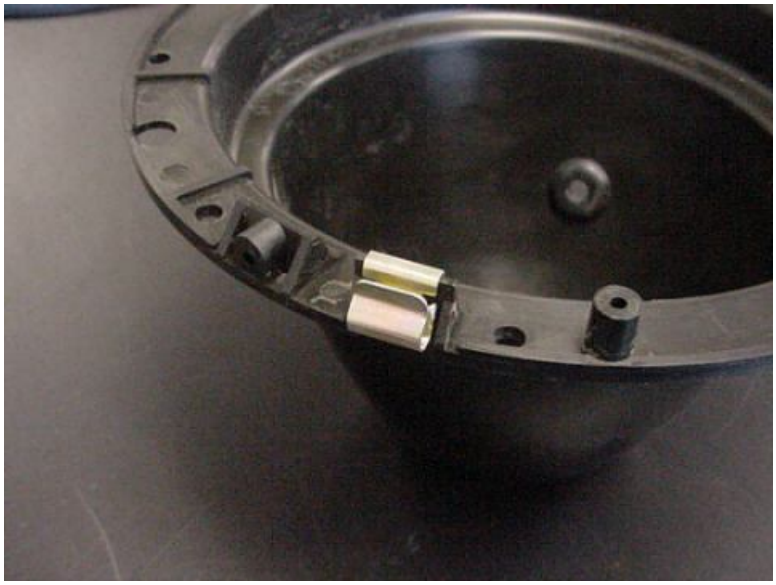


Headlight Fasteners.

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.

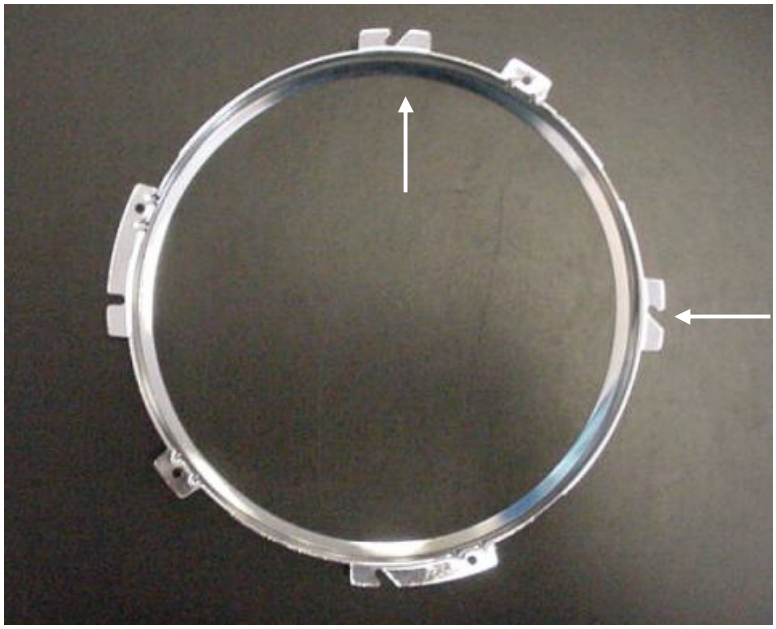


Chrome ring clip mounted.

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

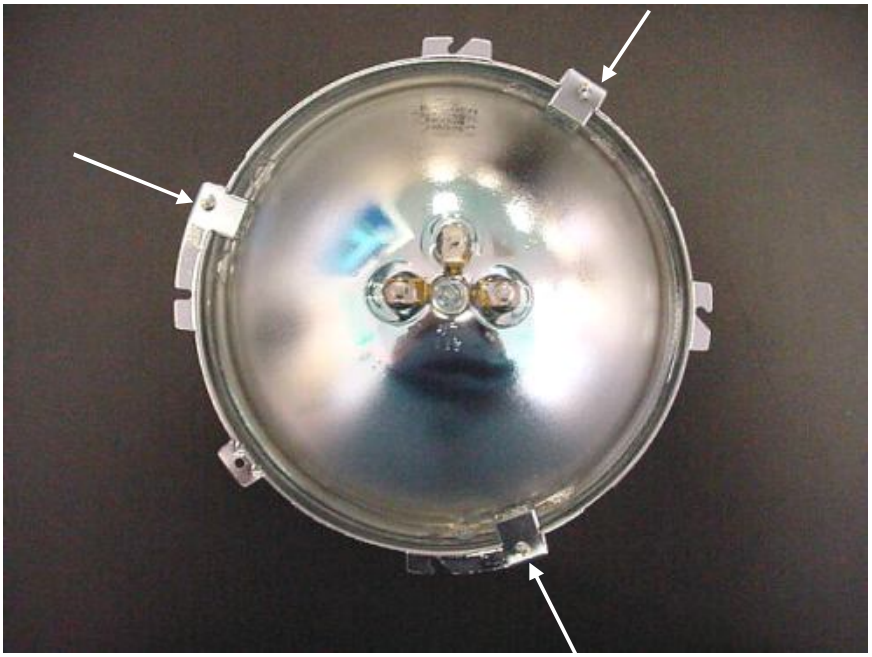
Adjustment screws installed.

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.

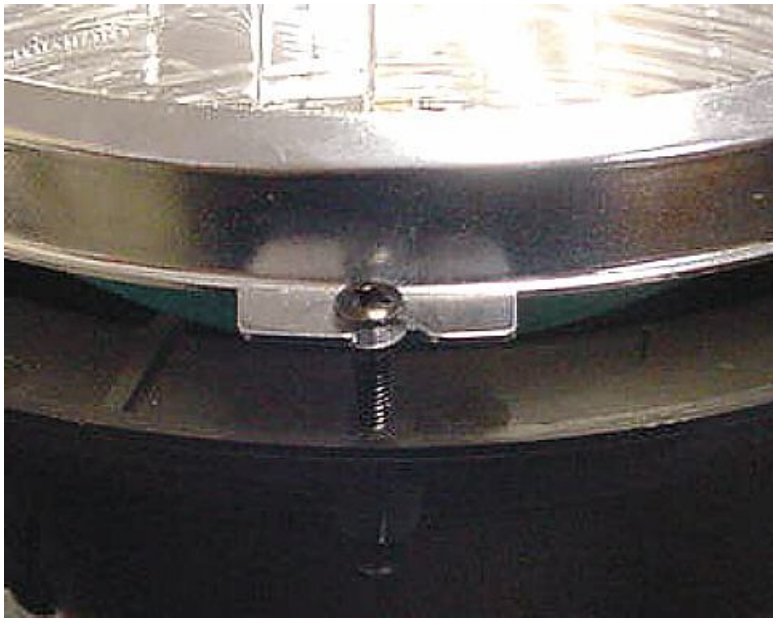


Headlight positioned and retaining tabs attached.

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: *8mm deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*
PARTS: *Front turn signals and hardware (FFR# 11044).*

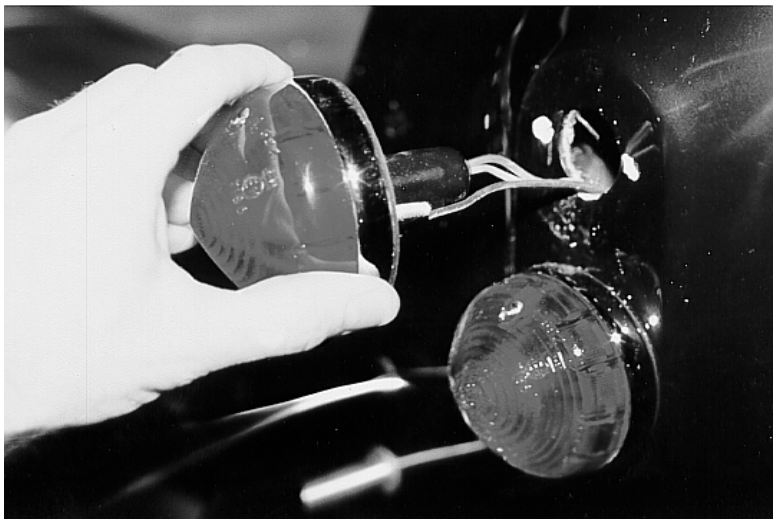
1. Mount the light to the body with the provided fasteners and an 8mm deep socket and ratchet.
2. Wire the turn signals up to the Mustang harness. The driver's side Mustang turn signal wire is light green/white. The passenger's side is white/light blue. The running lights are brown. On the light, the red wire is the dim light and the green wire is the bright light and the brass ring is the ground.
3. 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: *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

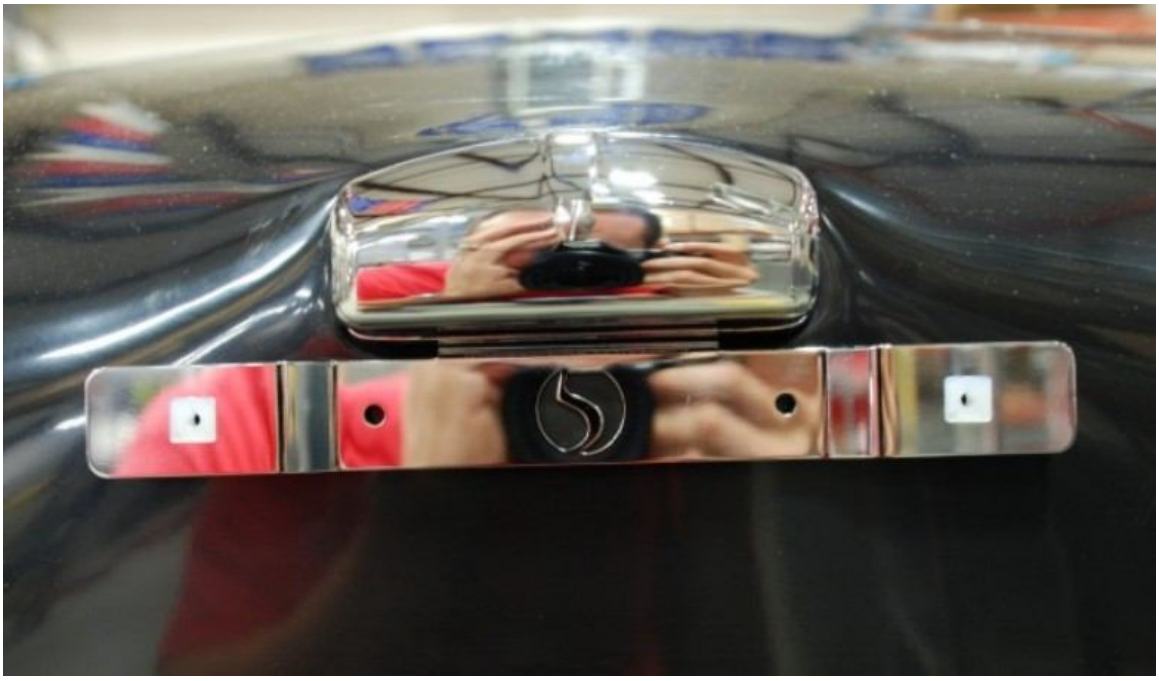
TOOLS: ***R****egular head screwdriver, drill, 3/16"drill bit, 3/8" deep socket, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

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.



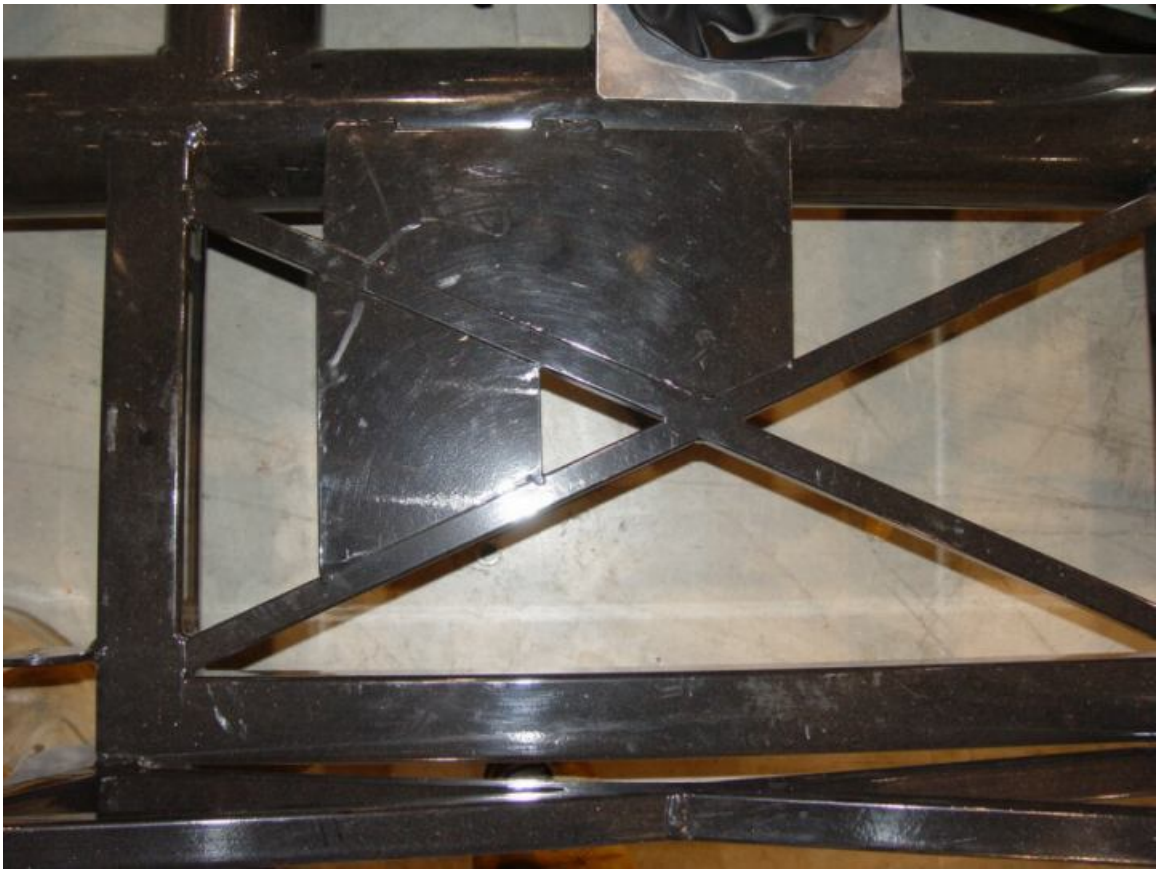
4. Connect the wires to the light.
5. Drill two 3/16" holes through the license plate bracket and the trunk.
6. Use two 3/16" rivets to attach the bracket to the trunk.
7. Put a small section (5"- 6" long) of adhesive backed foam (included with kit) on back lower edge of a license plate.
8. Attach the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



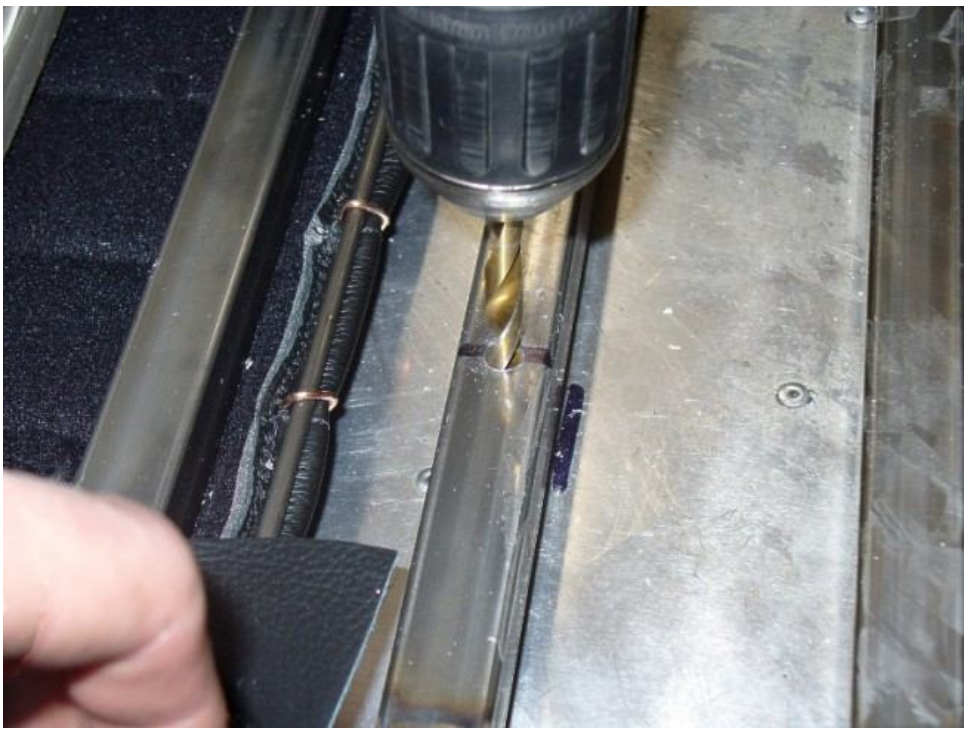
Seat mounting area on frame.

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.

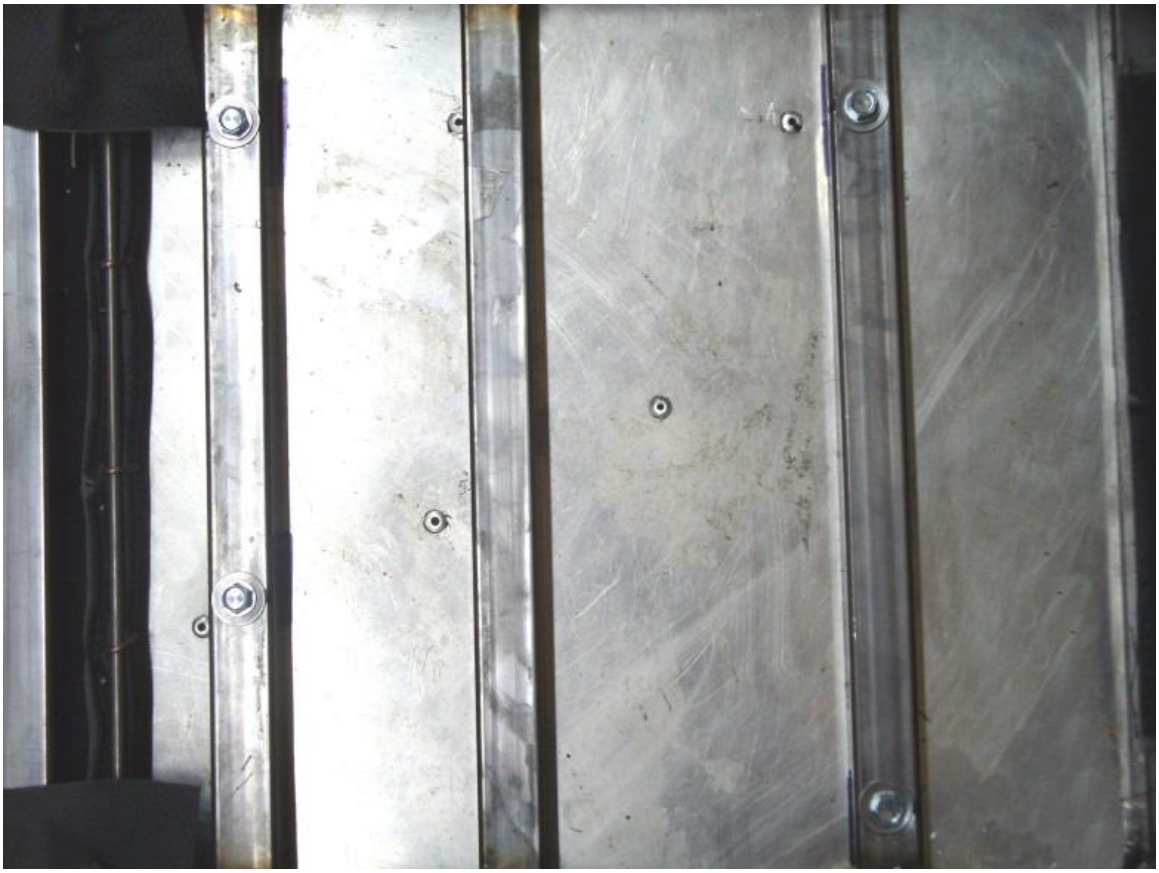
7. If the seat can not get mounted in four places, reposition the seat.

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 carpet (FFR# 13936)*

1. Install any remainder of the large adhesive self expanding weather-stripping 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 three 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.

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.

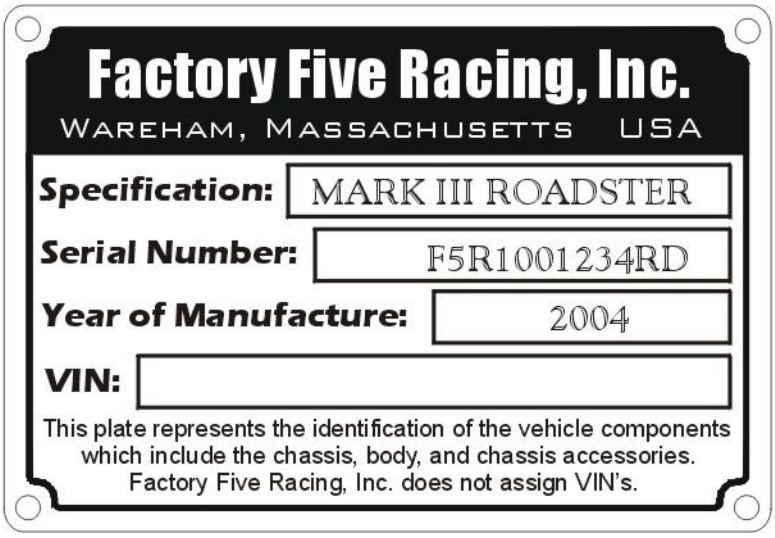
Shifter Installation

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. Below is an example of how the nameplate can be engraved with the serial number from the Certificate of Origin which also matches the number welded in the end of the 2”x 3” tube behind the driver seat. 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

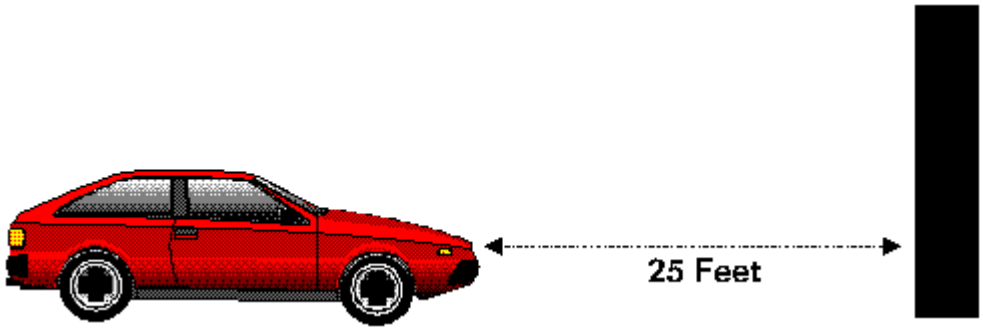
Headlight alignment

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.

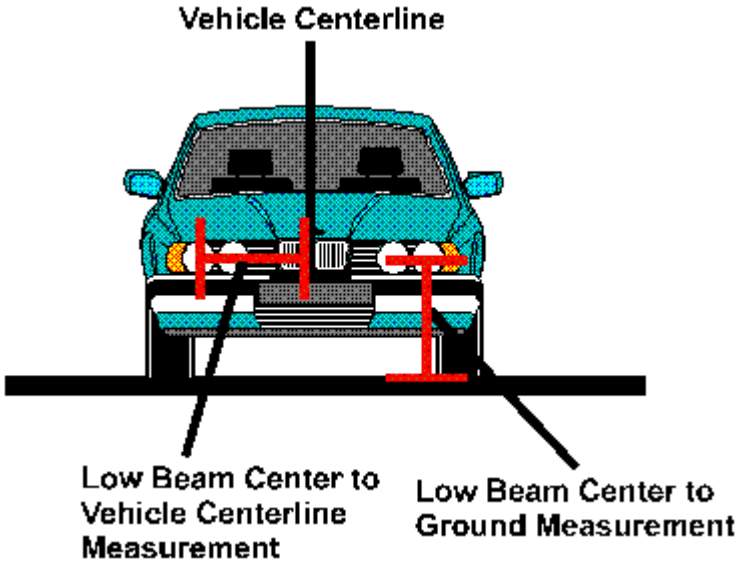
1. Find a *flat level* surface next to a *vertical white* wall where the car can be parked (a garage door is an ideal location at home).
2. Pull the car straight up to the wall as close as possible.
3. Using masking tape and a marker, draw a vertical line on the wall corresponding to the centerline of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



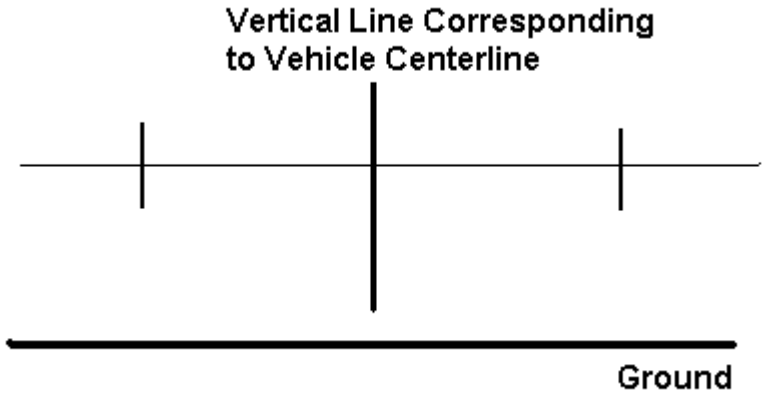
5. Make the following two measurements:

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

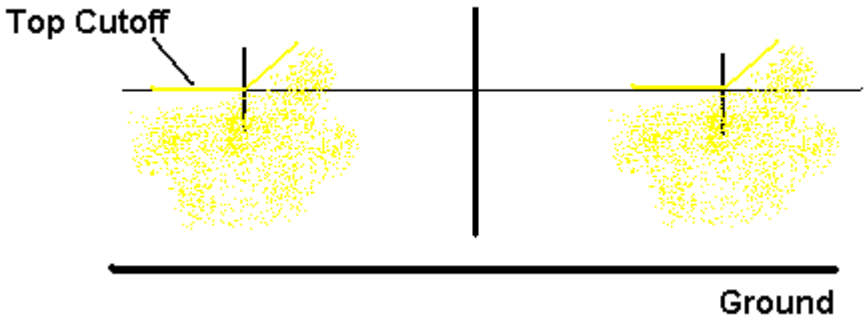
   Measurement B: From one of the low beam headlights to the vehicle centerline.
   (Also measure from high beam center to vehicle centerline for 4 headlight systems)
   Note these measurements.



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@factoryfive.com
Mail:	9 Tow Rd, Wareham, MA 02571

Left: 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

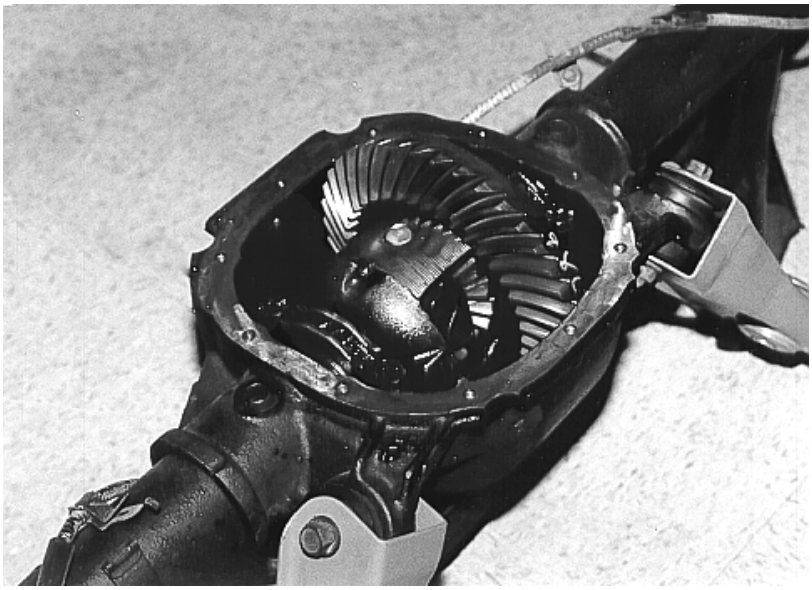
The following modifications and set-ups fall under the category of getting more horsepower from your engine and making your car perform better. You will find a hundred people a day that will tell you what you've got to have. We just want to start you out with the easy modifications that net large returns 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. Stock Engine w/supercharger.

Gears

The Mustang 5.0 manual transmission car comes with either 2.73 or 3.08 rear end gear ratios from the factory. If you can get a rear from an automatic car it will have 3.27 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 of the least expensive ways to improve your car's performance and it is easiest to do before assembly, since the rear is out of the car. If you know you are going to change the gears get the 2.73 rear since these are the most readily available, the least expensive and the least abused. 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.

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.

Throttle Body

Stock size: 58mm

A 65mm throttle body work well up to 350hp. Ford Motorsport sells a Cobra set-up that includes a 70mm mass air meter, 24 lb. fuel injectors, and a Cobra computer (different fuel curves). This set-up is about $400, which is very reasonable. It is good up to roughly 400hp.

Mass Air Meter

Stock size: 55mm

In order to increase the flow of air above 5000 rpm, upgrade from the stock mass air sensor. Aftermarket 70 mm or 75 mm mass air units are an excellent choice and have proven effective. If the mass air meter is changed make sure it is calibrated for the injectors you are using or you will have to change the injectors too. Pro-M or Ford Motorsport meters work the best. Usually the mass air meter is larger than the throttle body.

Fuel Injectors

Stock size: 19lb/hr.

The stock injectors are good for exactly that, a stock engine. If upgrading parts, step up to 24 lb/hr injectors. They are good up to about 400hp. Make sure that you have the mass air sensor calibrated to the injectors you use.

Upper Intake

The next logical step for breathing is a more free flowing intake manifold. There are a number of intakes available from different companies (e.g. Edelbrock, Trick Flow). Ford also makes a good intake, the cast 1993 Cobra intake from Ford Motorsport division.

Heads

The 5.0 Mustang aftermarket is full of aluminum and cast iron heads for the small block Ford. Our favorites are the *Edelbrock* Victor Jr. and the *AFR* aluminum heads. These both flow very well, have stock exhaust port heights which allows the use of our headers and not only give you extra horsepower but also remove 50 lbs. in the process.

Cams

If you need to pass emissions testing, use a cam with a CARB number. We like the Ford E303 cam. We have used it with success in our racecars both naturally aspirated and in boosted applications. If building a more radical engine, match the cam to the combination.

Headers

Stock: 1½" OD

We've found that the Mustang factory headers work well for the stock engine. If you want to go to an aftermarket set, the 1⅝" MAC shorty unequal length headers or Ford Motorsport 1⅝" unequal length headers fit as bolt on parts. They will reward you with an approximate 5-10 hp bump in the top end. All aftermarket headers use mandrel (smooth consistent bends) bent tubing. The stock ones are not and are restrictive on non-stock engines.

If using a 351W engine there are two options, use 351W engine swap headers from Ford Motorsport (M-9430-A58) or MAC (E358692) or if smog/catalytic converters are not necessary, use our full length 4 into 4 headers.

Timing

Most computer chips simply change the timing of the engine and slightly enrich the mixture. Using a timing light, advancing the base timing to 14° will do the same. Higher octane fuel will be needed.

Under-drive Pulleys

Yes. They work well on all cars.

Oil Cooler

Not really necessary on small blocks or cars that aren't raced heavily. They look nice when installed in the smaller opening below the radiator opening. For supercharged/turbocharged or big block track cars an oil cooler will help.

Factory Five offers an oil cooler with #8 Stainless Steel braided lines and mounting bracket for small block cars. For big block cars, #10 lines are recommended to prevent a drop in oil pressure.

High Horsepower Transmissions

Stock: T-5

The stock T-5 is good for the stock engine. If the engine is going to have some work done to it then an upgrade to a heavy duty, Ford Motorsport "Z" T-5 is all that is needed. The only time an additional change to a Tremec 3550 or TKO is needed is if a big block is used or racing slicks are used on a high horsepower engine. One unique feature of the Tremec TKO is it allows the shifter to be relocated 8" forward of the normal shifter location if a vertical shifter is desired verses a forward angled shifter.

Steering Rack

Stock: 15:1 ratio

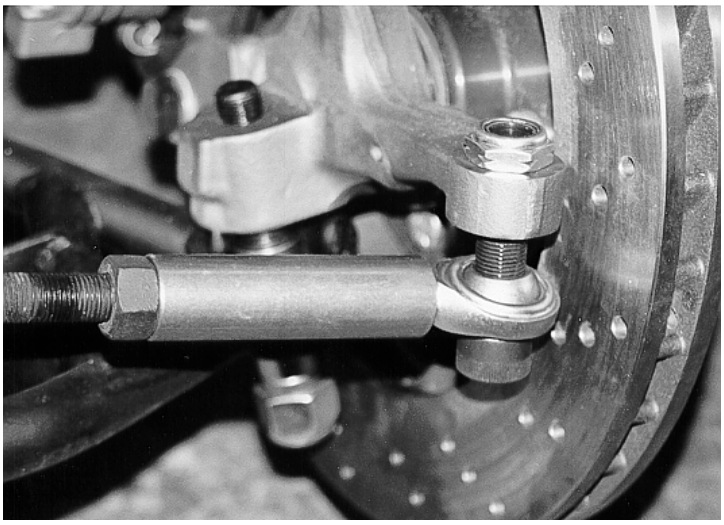
Once the car is rolling either a 15:1 or a 20:1 rack will yield about the same effort feel. The 20:1 ratio rack means the steering wheel will have to be turned more in corners. For those that like the easy power steering type feel, switching to a manual 20:1 rack will make parking easy. For road racers and autocrossers, use a 15:1 rack or some corners/cones will be really difficult. If changing to either a manual 15:1 or 20:1 rack, a universal joint with a different number of splines will be necessary in order to connect the steering shaft to the steering rack.
There are three possible racks to choose from:

1. A manual 15:1
2. A manual 20:1
3. A 1982-93 Mustang manual rack.

The stock steering set-up uses rubber steering rack bushings. Changing to polyurethane steering rack bushings reduces the amount of slop and provides better steering response. Factory Five offers a 15:1 manual rack and polyurethane bushings.

Bump Steer

The optional bump steer kit that we offer allows the adjustment/elimination of any bump-steer.



FFR competition bump steer kit.

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.

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 road racer, 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 350 lb/in springs.
- A road racing 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.

High Performance Manual Braking Systems

The braking systems recommended below are designed for those searching for higher performance braking capabilities. These are systems that have been used successfully by our customers and us. Each component below has been selected to optimize the capabilities of the system. If an attempt is made to utilize some of the specified components, but not all of them in combination, then braking abilities may not be satisfactory.

ATTENTION:

- For all manual braking setups use the brake pedal from a 1984 4-cylinder Mustang (Ford Part #08BZ2455A), this pedal can also be made by modifying the V8 Mustang pedal as specified in the FFR Manual (this modification should be done by a professional shop).
- Some of the setups may not clear some wheel sizes and designs.
- For all rear disc brake setups, use a proportioning valve on the rear brakes.
- We highly recommend using Porterfield R-4, Carbotech Panther Plus, or Hawk Blue brake pads. Though costly, you will find a significant difference in your cars ability to stop. If these pads are out of your price range, next in line would be Performance Friction Z-Compound pads.

4-lug (4.25" pattern)

11"Front - Spindle OEM 87-93 V8 Mustang front spindle
Rotor OEM 87-93 V8 Mustang 11" rotor
Caliper OEM 87-93 V8 Mustang 60mm caliper

10.5"Rear - Stainless Steel Brake Corp. 87-93 Mustang disc brake conversion kit (Part #A-112-1)

OR

Disc Brakes R' Us select FORD and FACTORY FIVE for options

OR

Rotor OEM 87-88 Thunderbird *Turbo* Coupe 10.5" rotor
Caliper OEM 87-88 Thunderbird *Turbo* Coupe 1.4375" caliper
Bracket (If attempting to purchase the parts above separately, be aware that the mounting brackets for the calipers from the Thunderbirds do not work with the 87-93 Mustang axles, and the brackets are **not** sold by any major manufacturer individually. There are a few small machine shops that sell custom brackets to make these calipers work.)

OR

Complete 87-88 Thunderbird *Turbo* Coupe rear axle (This axle measures 61.125" hub-to-hub where the 87-93 Mustang measures 59.25" hub-to-hub, so wheel offsets need to be made accordingly).

Master Cylinder - OEM 1982 Mustang Manual Brake ⅞" master cylinder, Bendix # 11764

5-Lug (4.5"pattern)

13"Front - Spindle OEM 94-newer Mustang front spindle (requires FFR Comp IFS bracket)
Rotor OEM 94-98 Mustang Cobra 13" rotor
Caliper OEM 94-98 Mustang Cobra 2 piston 1.5625" PBR caliper

11.65"Rear - Rotor OEM 94-98 Mustang Cobra 11.65" rotor

Caliper OEM 94-98 Mustang Cobra single piston 1.4375" caliper
(Some salvage yard will confuse these with '99 and newer IRS Cobra models, which do not have the same components)

Bracket OEM 94-98 Mustang Cobra caliper bracket

OR

Entire front and rear setup is available through Ford Motorsport (Part #M-2300-K)

OR

Stainless Steel Brake Corporation has a rear disc conversion kit in a 5-lug version using stock 87-93 stock width axles. This kit would use the Thunderbird Turbo Coupe 1.4375" calipers and 10.5" rotors. (SSBC Part #A-112-2)

OR

Disc Brakes R' Us select FORD and FACTORY FIVE for options

Master Cylinder - OEM 1994 Mustang Cobra $^{15}/_{16}$" master cylinder (Plastic)

OR

1984 Jeep Cherokee Manual Brakes $^{15}/_{16}$" master cylinder (All steel)

- The Cobra brakes do not clear most Halibrand style wheels.
- When using this setup, the '94 and newer rear axles have a hub-to-hub distance of 61.125" compared to the '93 and older rear axles that had a hub-to-hub distance of 59.25". Wheel offsets would need to be changed accordingly.

IRS Setup's

- Using the FFR Independent Rear Suspension with 89-97 Thunderbird *Super Coupe* rear disc brakes with the Cobra front brakes use the $^{15}/_{16}$" master cylinder. With the IRS, the rear discs are 5-lug, so vehicles need to have the front rotors converted to 5-lug to match. This five lug front conversion can be purchased from Ford Motorsport (Part # M-1102-C), or rotors from a '91 Lincoln Mark VII can be used. In both front conversions, the rotors bolt right on to the 87-93 front spindle, and use the 87-93 Mustang caliper.
- If using *Super Coupe* rear calipers and Mustang front calipers use a $^{15}/_{16}$" master cylinder. The *Super Coupe* caliper looks almost identical to the *Turbo* Coupe caliper. The *Super Coupe* caliper has a 1.6875" piston and uses a different e-brake cable attachment.

4 or 5 lug

12"Front - Baer Racing *Baer Claw System* E7FM-10119- (4 or 5) DN
Kit includes spindles, **$^{15}/_{16}$" master cylinder**, 12" diameter - 0.81" thick rotors, aluminum hubs that are separate from the rotor, 2 piston PBR calipers, stainless steel braided flexible brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

This setup will clear 17" Halibrand bolt on wheels where as Mustang *Cobra* brakes will not.

11.35"Rear - Bear Racing *Baer Claw System* F3FM-10610- (4 or 5) BN
Kit includes 11.35" - 0.81" thick rotors, single piston PBR calipers, **caliper brackets**, e-brake cables, flexible stainless steel braided brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

OR
Go a step further

13"Front - Bear Racing *Baer Claw System* E7FM-10159- (4 or 5) HN

Kit includes spindles, **15/16" master cylinder**, 13" diameter - 1.10" thick rotors, aluminum hubs that are separate from the rotor, 2 piston PBR calipers, stainless steel braided flexible brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

This setup does not clear Halibrand wheels.

12"Rear - Bear Racing *Baer Claw System* F3FM-10600- (4 or 5) DN

Kit includes 12" - 0.81" thick rotors, single piston PBR calipers, **caliper brackets**, e-brake cables, flexible stainless steel braided brake lines, and pads. This kit can be purchased in 4 or 5 lug versions.

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.

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	1 1/8

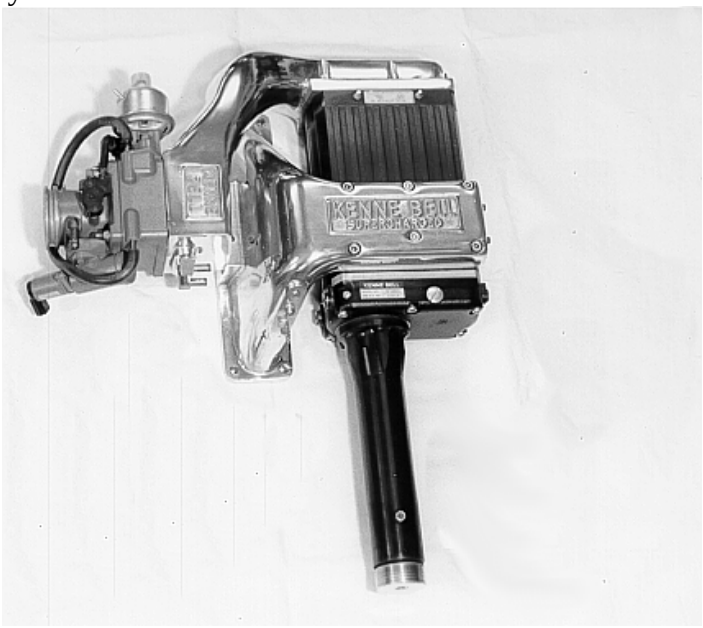
Baer Brakes	602-233-1411 www.baer.com
Stainless Steel Brakes Corporation	800-448-7722 www.ssbrakes.com
Disc Brakes R' Us	888-558-5757 www.discbrakesrus.com

Forte's Parts Connection, Inc. (Ford Motorsport 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.

Superchargers

Factory Five Racing customers have successfully installed *Kenne Bell, Vortech, and Powerdyne* superchargers in their cars. The key to any supercharger installation seems to be the side that the supercharger is hooked up on. Use the ones that mount on the passenger side. The drivers' side blowers may get in the way of the steering shaft if the blower is too big. Alternate brackets may be available from the manufacturer to remedy this situation.



Kenne Bell Supercharger.

Installed supercharger.

Seats

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

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

At the end of each of the books are reference lists that the authors recommend. Smith and Alexander give excellent sources for more information.

Must Reads

- Chilton's 1989-93 Ford Mustang Repair Manual. Part Number 8253. 1992. Chilton Book Company, Chilton Way, Radnor, PA 19089. Available at most automotive parts stores and some bookstores.
- www.FFCobra.com . The largest discussion forum for Factory Five Racing Cobra replicas. Also has many vendor links.

Helpful

- 5.0L Ford Dyno Tests. By Richard Holdener. Published by SA Design, Cartech. 11605 Kost Dam Rd., North Branch, MN 55056.
- 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.
- How to Understand, Service, and Modify Ford Fuel Injection & Electronic Engine Control, 1988-1993. By Charles O. Probst. Published and distributed by Robert Bentley Inc. Publishers, 1000 Massachusetts Avenue, Cambridge, MA 02138.
- The Official Mustang 5.0 Technical Reference and Performance Handbook. By Al Kirschenbaum. Published by BentleyPublishers.com. 1734 Massachusetts Ave, Cambridge, MA 02138

Catalogs/Parts

- **Ford Racing Performance Parts** - Catalog, current edition. Available at your local speed shop, an authorized Ford Racing distributor or www.fordracingparts.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

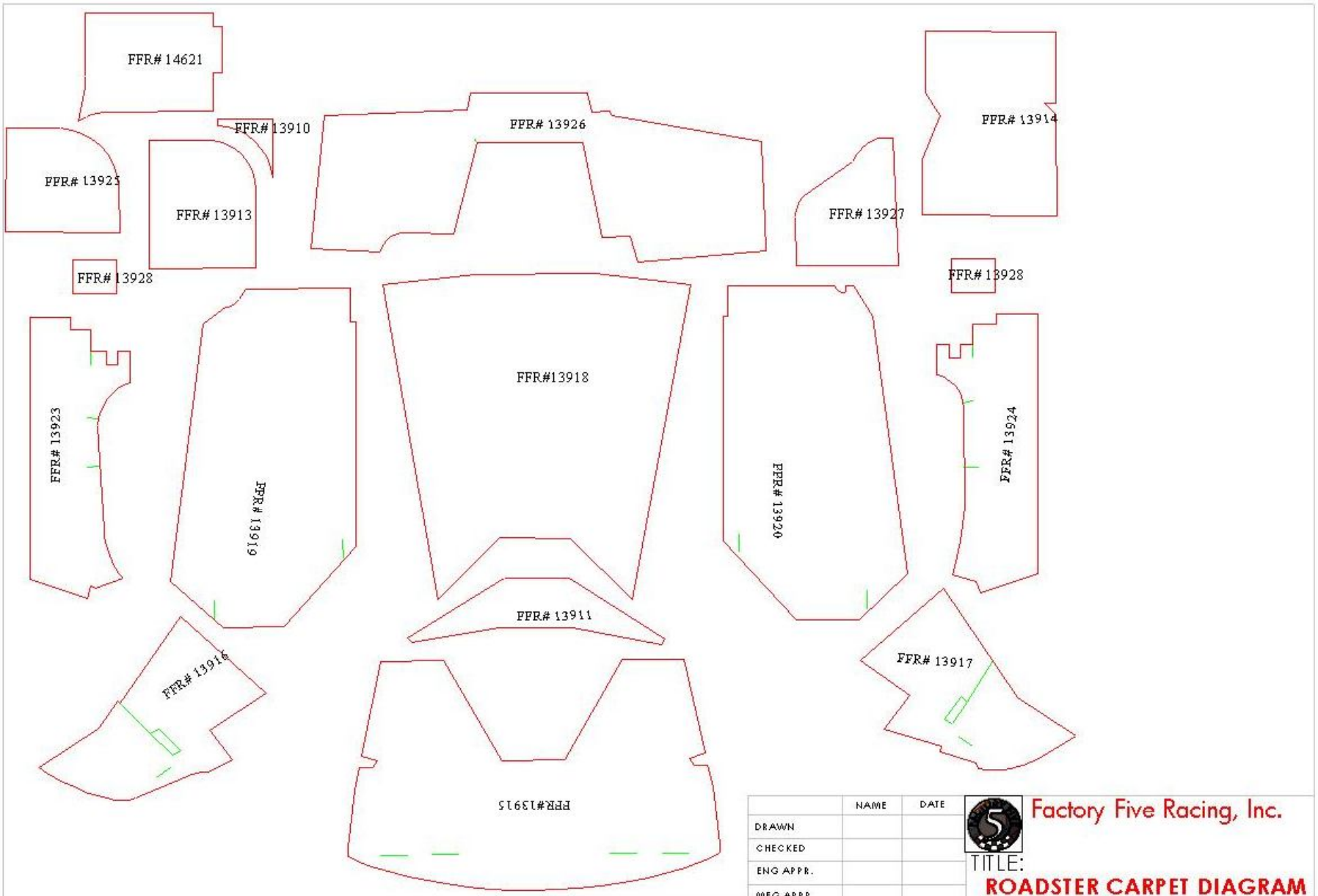
If you are reading this manual then you must be at least contemplating the task of building your own race car. Many component car companies offer services to those folks who find part or all of this too much to tackle. We don't.

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



	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

PRINTED 8/9/2007

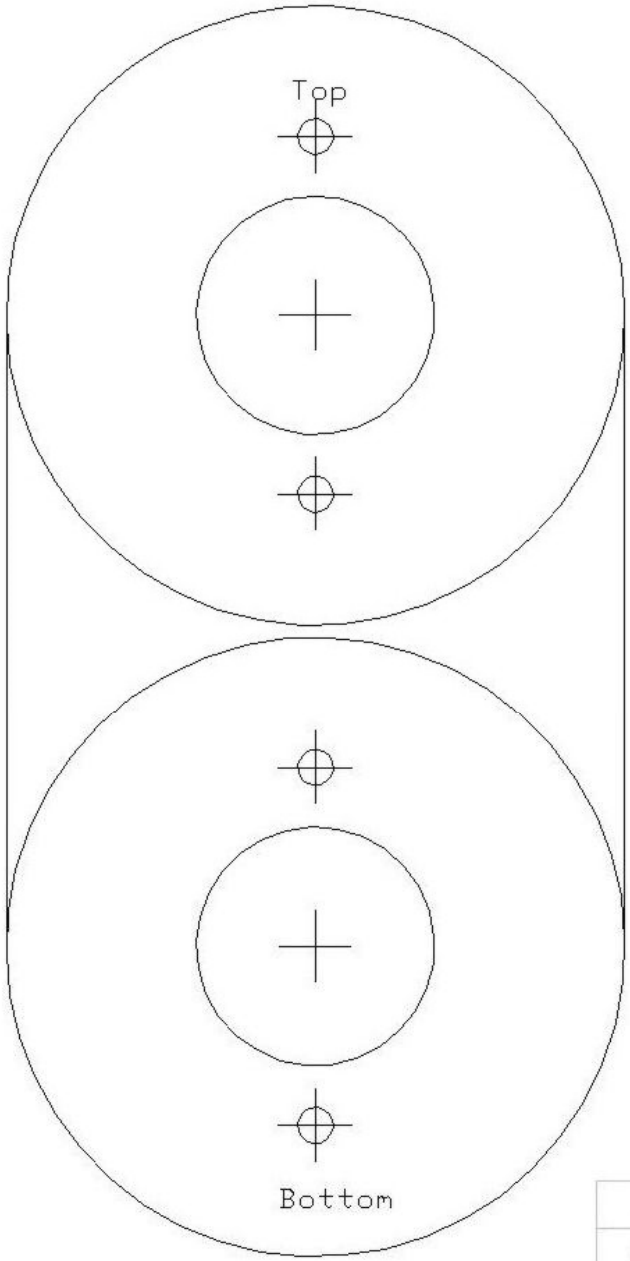
Factory Five Racing, Inc.

TITLE: **ROADSTER CARPET DIAGRAM**

SIZE	DWG. NO.	REV
A	13909	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	
SPEC CAR	
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

PRINTED 4/30/2009

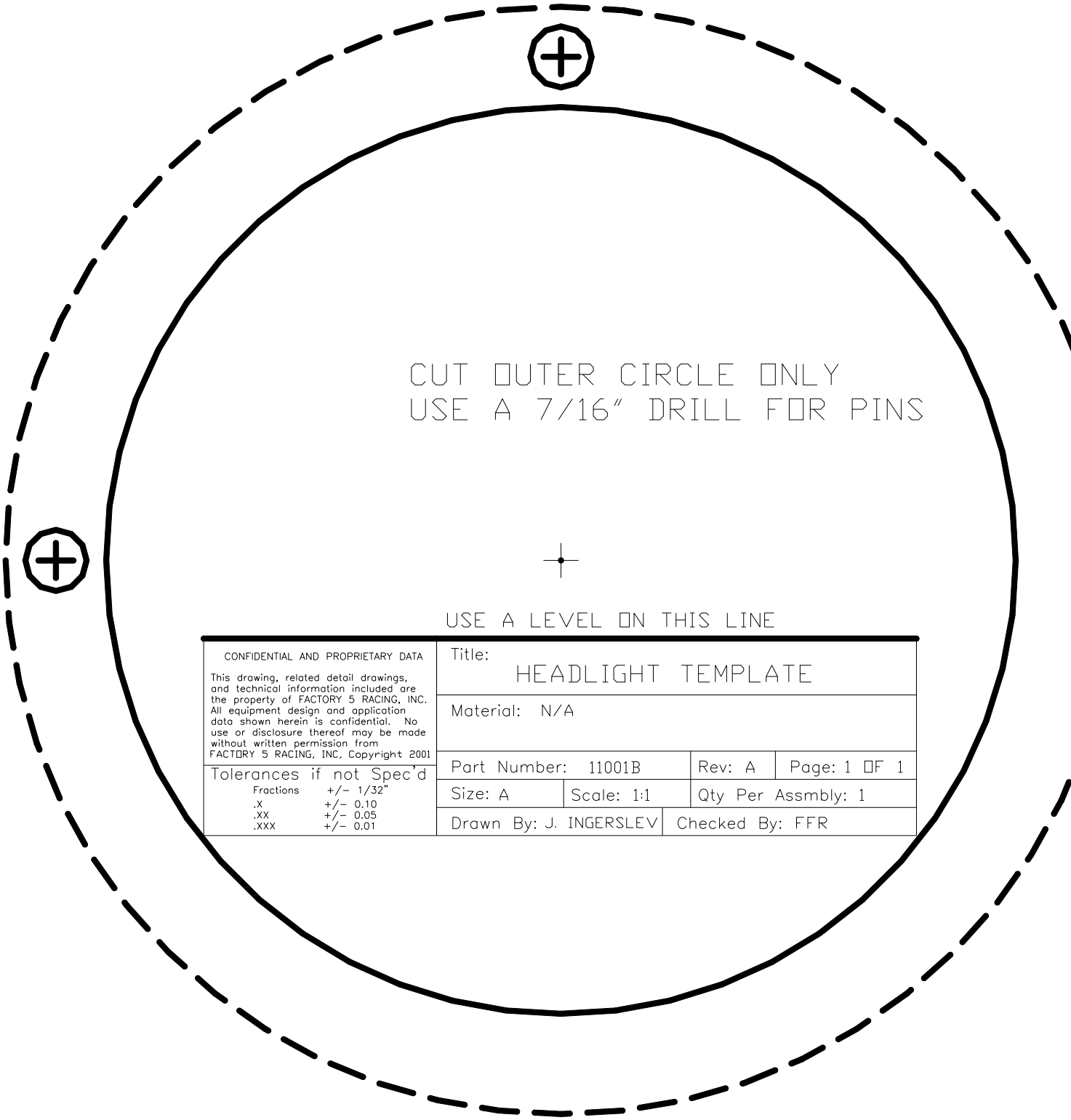
	NAME	DATE
DRAWN	D. SMITH	1995
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

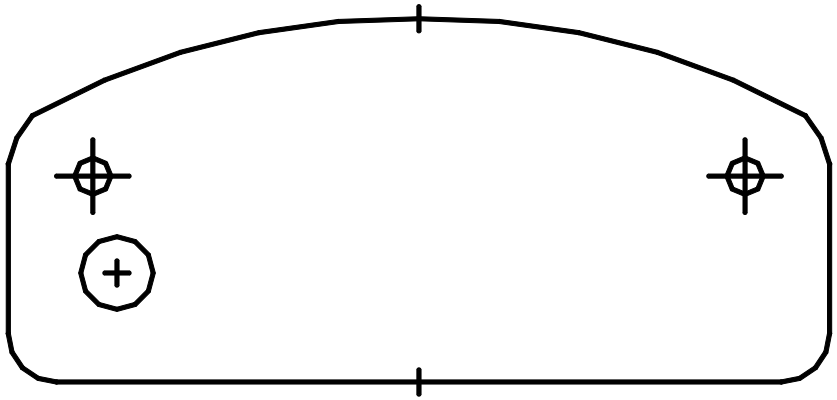
Factory Five Racing, Inc.

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	

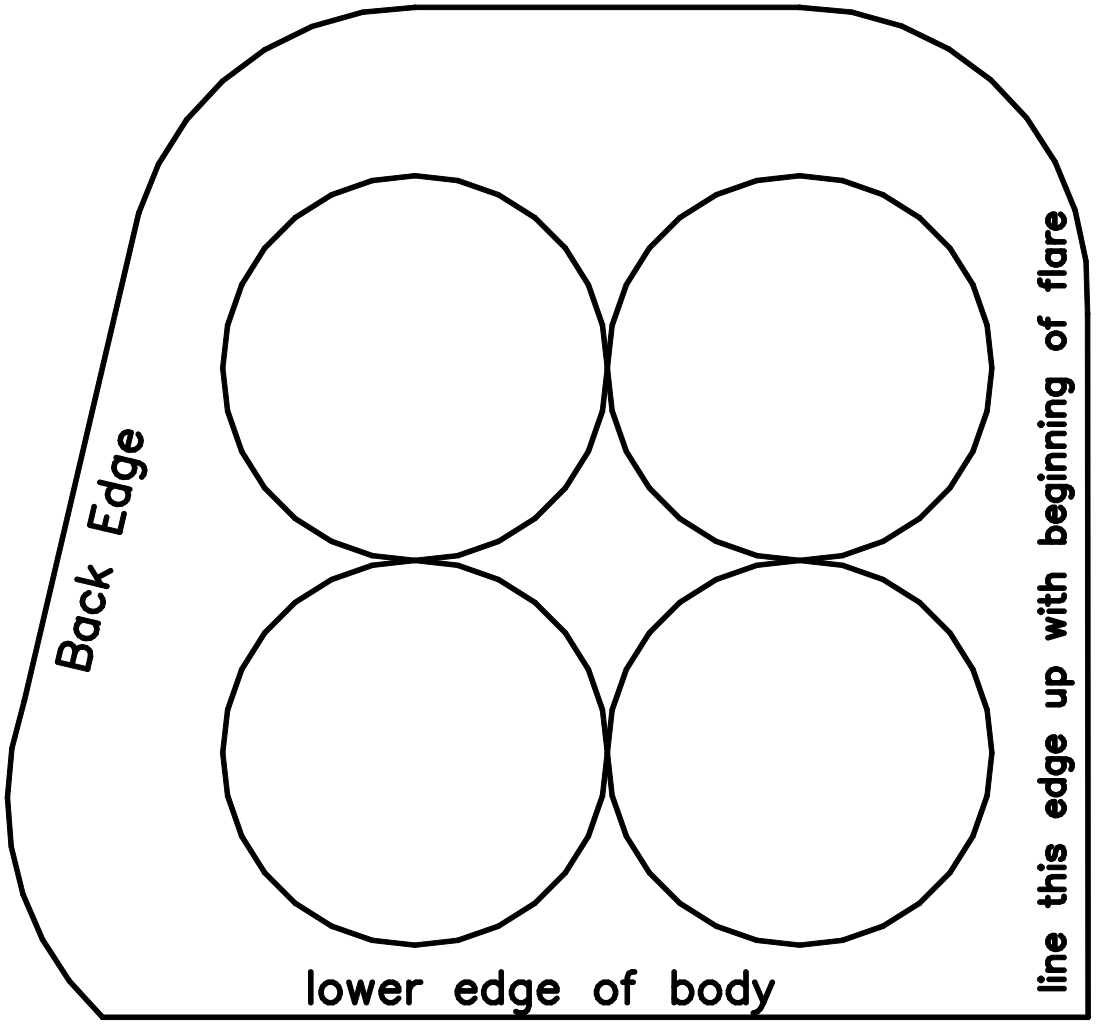


NOTE: Use 3/16" drill bit for smaller holes and 3/8" drill bit on large hole.

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

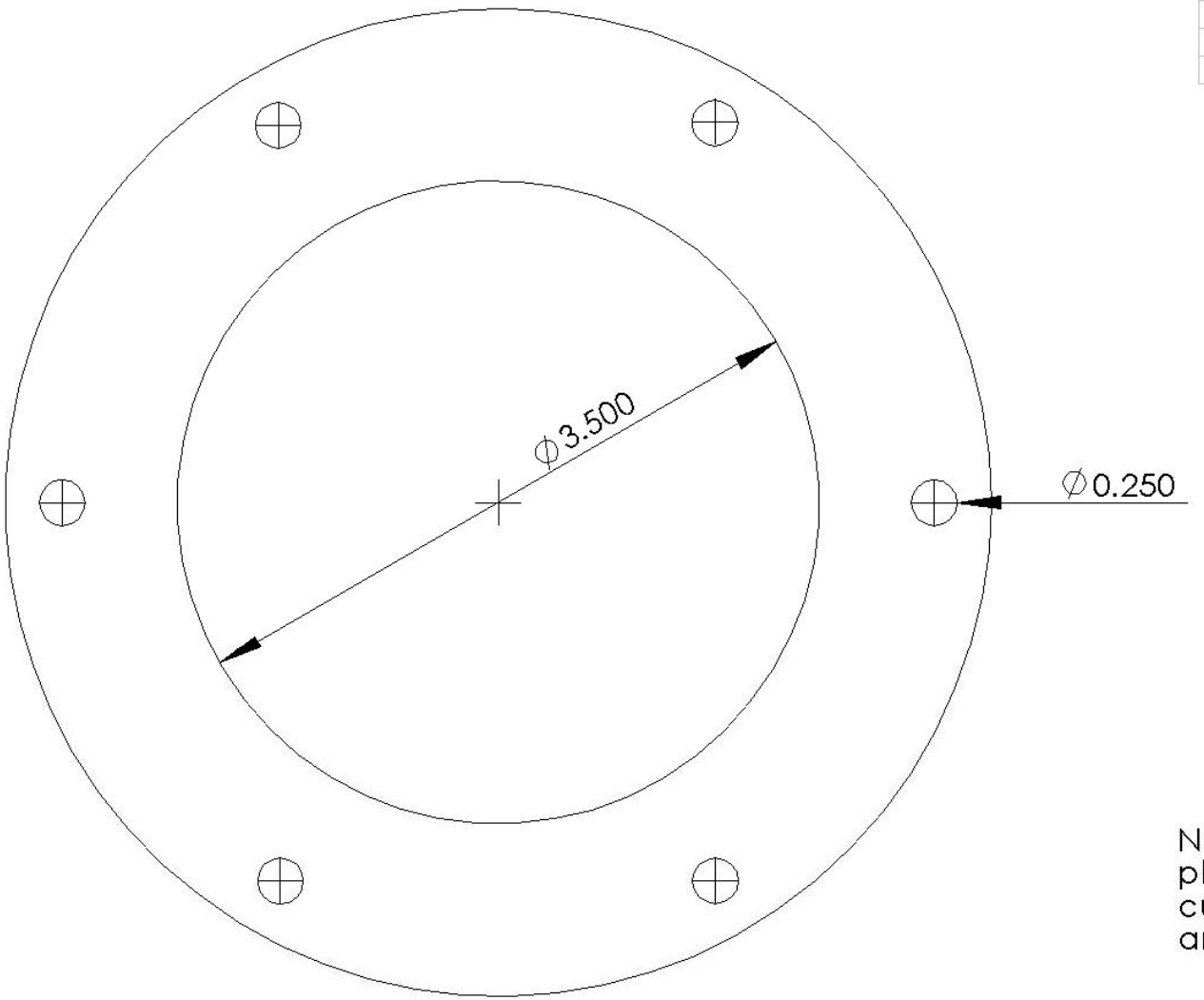
Material: N/A

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.

	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	JI	9/26/97	TITLE: FUEL NECK FLANGE TEMPLATE
COUPE		CHECKED			
		ENG APPR.			
	MATERIAL	MFG APPR.			SIZE A / DWG. NO. 11009 / REV D
USED ON	FINISH	Q.A.			
		COMMENTS:			

REV.	DESCRIPTION	DATE	APPROVED
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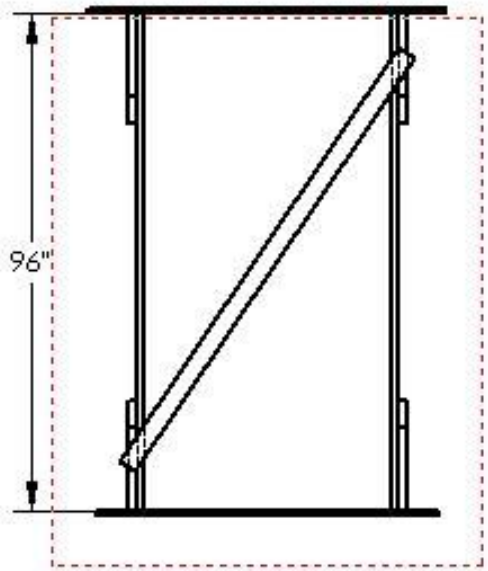
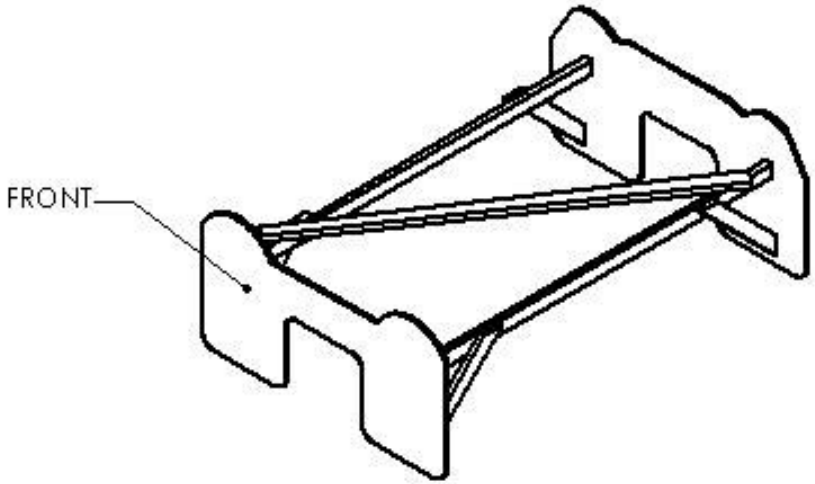
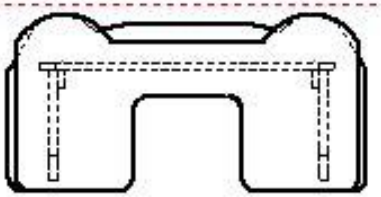
B	REDRAWN	1/21/04	







	UNLESS OTHERWISE SPECIFIED:	NAME	DATE
ROADSTER	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.005 FOUR PLACE DECIMAL ±.001	DRAWN	DR 1/19/04
		CHECKED	
		ENG APPR	
		MFG APPR	
	MATERIAL	Q.A.	
USED ON	FINISH	COMMENTS:	
APPLICATION			

Factory Five Racing, Inc.

TITLE: BODY BUCK

SIZE	DWG. NO.	REV
A	11190	B

SCALE: 1:20 WEIGHT: SHEET 1 OF 2

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
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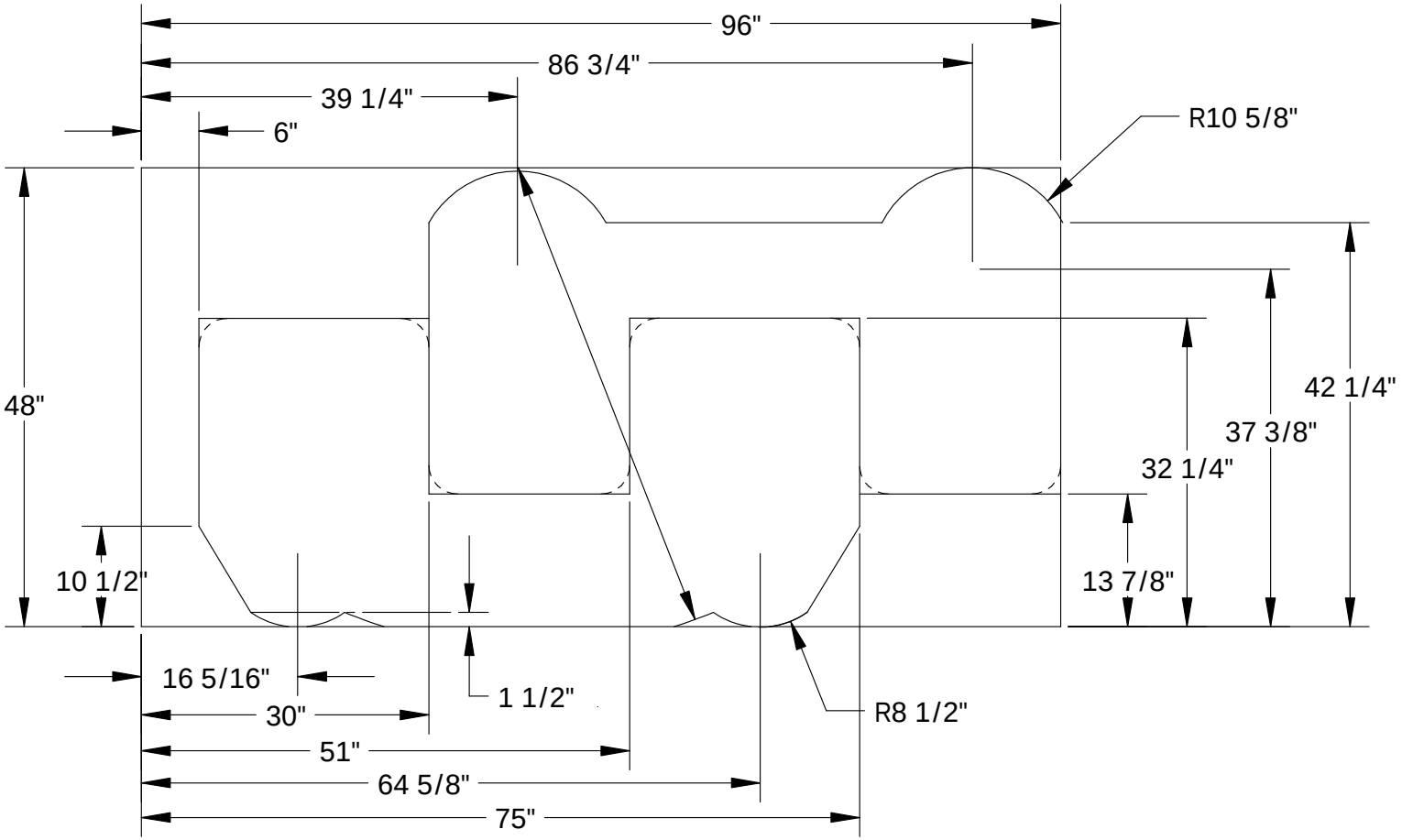
B	REDRAWN	1/21/04	



UNLESS OTHERWISE SPECIFIED:		NAME	DATE	
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	
	CHECKED			
	ENG APPR.			
	MFG APPR.			
MATERIAL 3/4" PLYWOOD	Q.A.			
FINISH	COMMENTS:			

ROADSTER

USED ON

APPLICATION

Factory Five Racing, Inc.

TITLE:
BODY BUCK

SIZE	DWG. NO.	REV
A	11190	B

SCALE: 1:16 WEIGHT: SHEET 2 OF 2

5 4 3 2 1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
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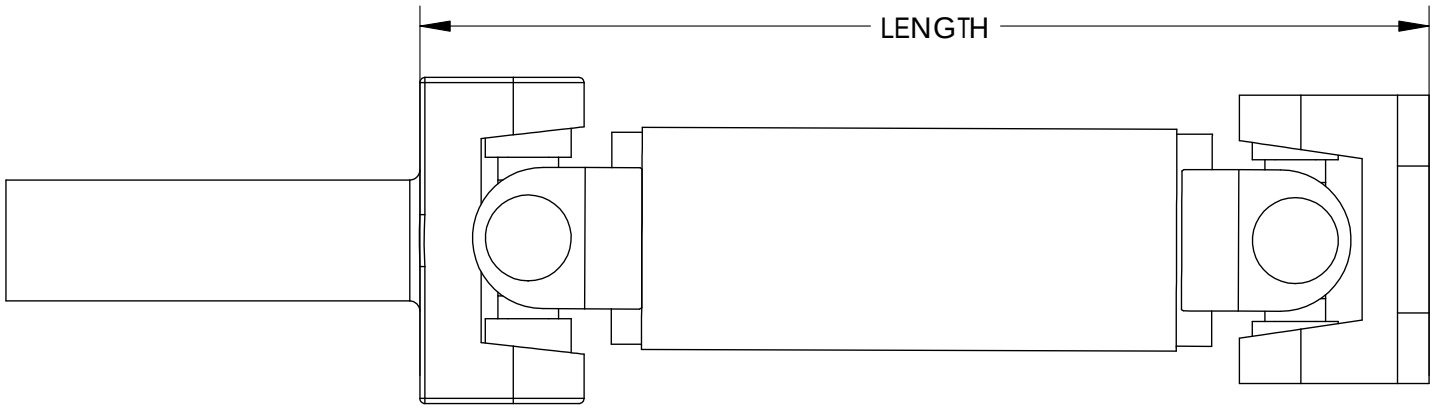
B	ALL SPECIFICATIONS ADDED	6/8/04	
C	SPECIFICATIONS ADDED	8/20/04	



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

ROADSTER
SPEC CAR
COUPE
SPYDER
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
MUSTANG DRIVESHAFT
FINISH

	NAME	DATE
DRAWN	JI	12/18/03
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

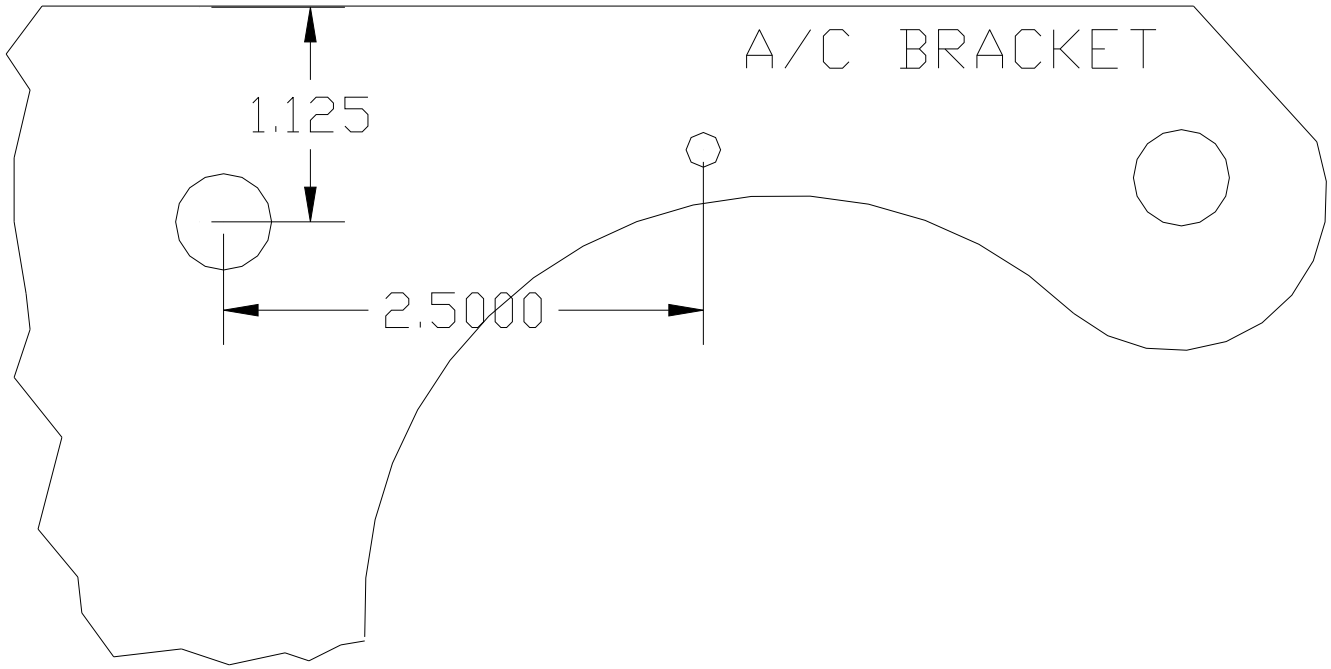
Factory Five Racing, Inc.

TITLE:
DRIVESHAFT DIAGRAM

SIZE	DWG. NO.	REV
A	13023	C

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

5 4 3 2 1



Tolerances if not Spec'd

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

Title: ALTERNATE DRIVE PULLEY HOLE TEMPLATE

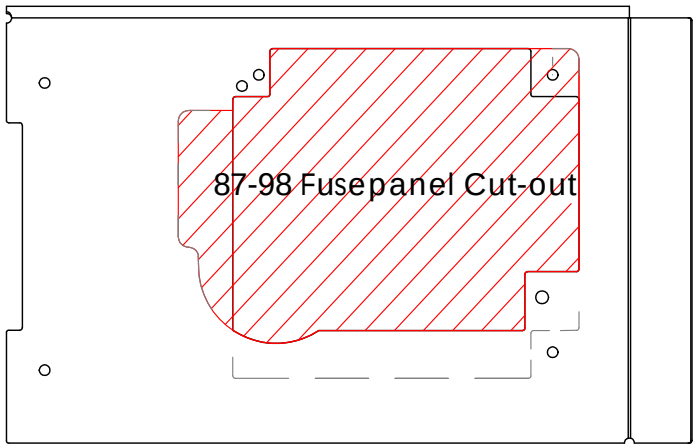
Material: N/A

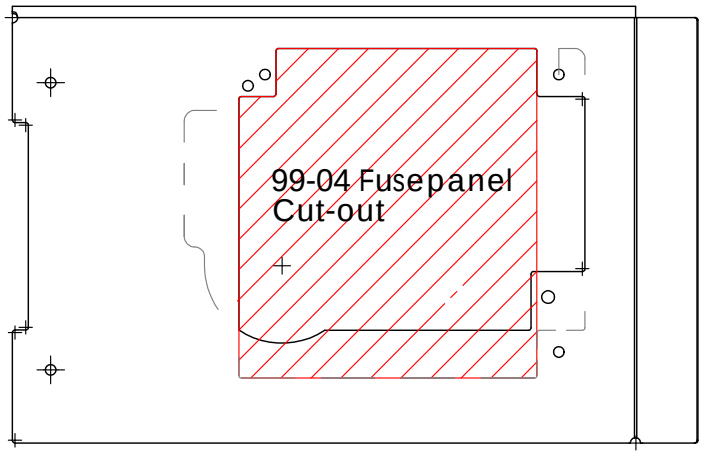
Part Number: 12117 | Rev: A | Page: 1 OF 1

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

Drawn By: JESPER INGERSLEV | Checked By: FFR

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 5.0, 1987 TO 1993

Assembly Name	Part Name	Quantity	Removed from donor
ENGINE/DRIVETRAIN	CLUTCH CABLE	1	
	ENGINE, 5.0L FORD & T-5 TRANS, W/BOLTS/NUTS	1	
	TRANSMISSION MOUNT W/BOLTS	1	
	DRIVESHAFT AND 4 ORIGINAL BOLTS	1	
	SPEEDOMETER CABLE	1	
	CIRCLIP, CLUTCH CABLE RETAINER	1	
	MOTOR MOUNTS, CLEAN STRAIGHT, W/OEM NUTS	2	
	MASS AIR SENSOR	1	
EXHAUST	OXYGEN SENSORS	2	
	EXHAUST HEADERS	2	
	FLANGE NUTS, HEADER	4	
COOLING	UPPER RADIATOR HOSE	1	
	HEATER HOSES, CUT AT FIREWALL, W/OEM CLAMPS	2	
	RADIATOR W/CAP	1	
	LOWER RADIATOR HOSE	1	
	FAN SHROUD W/OVERFLOW TANK MOUNTED	1	
FUEL SYSTEM	FUEL TANK W/CAP AND MOUNT STRAPS	1	
	FUEL FILTER W/BRACKET AND HOSES	1	
	HIGH PRESSURE FUEL LINE, TANK TO FILTER	1	
	LOW PRESSURE RETURN FUEL LINE TO TANK	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	
	EMERGENCY INERTIA CUT-OFF SWITCH	1	
BRAKES/WHEELS	BRAKE ASSEMBLY, FRONT, CUT 4" INTO STEEL LINES	2	
	MOUNT, REAR BRAKE LINE, RIVETED TO DONOR	1	
	MASTER CYLINDER, BOOSTER, DISTRIBUTION BLOCK, STEEL CONNECTION LINES	1	
	FRONT WHEELS, 15" ALUMINUM, FAN/TURBINE STYLE W/ 8 LUG NUTS	2	
	MOUNT, FRONT, FLEXIBLE HOSE TO STEEL LINE, MOUNTED TO BODY	2	
	EMERGENCY BRAKE HANDLE, CABLES, W/HARDWARE	1	
	BRAKE ASSEMBLY, REAR, W/LINES ON REAR AXLE	1	
	REAR WHEELS, 15" ALUMINUM, FAN/TURBINE STYLE W/ 8 LUG NUTS	2	
SUSPENSION	REAR QUAD SHOCKS W/ MOUNTS AND OEM NUTS/BOLTS	2	
	SPINDLES, FRONT	2	
	CONTROL ARMS, REAR UPPER W/BOLTS/NUTS	2	
	CONTROL ARMS, REAR LOWER W/BOLTS/NUTS	2	
	REAR AXLE ASSEMBLY, COMPLETE	1	
	COIL SPRINGS, REAR, W/OEM RUBBER ISOLATOR SEATS	2	
	A-ARMS, FRONT LOWER W/ BOLTS/NUTS	2	
STEERING	UPPER STEERING COLUMN, W/IGNITION, TURN SIGNAL STALK, NON-TILT ONLY	1	
	STEERING RACK W/TIE RODS, ENDS, BOOTS, NUTS, MOUNT BUSHINGS	1	
ELECTRICAL	WIRING HARNESS, ENGINE	1	
	HORNS	2	
	IGNITION CYLINDER WITH KEY	1	
	VACUUM RESERVOIR, CYLINDER SHAPED, BLACK PLASTIC	1	
	GROUND STRAP, BATTERY CABLE WITH TERMINAL	1	
	WIRING HARNESS, REAR	1	
	COIL, STARTER SOLENOID	1	
	WIRING HARNESS, DASH	1	
	WIRING HARNESS, FRONT	1	
	EEC IV COMPUTER W/ PLASTIC HOLDER	1	
	WIRING HARNESS, TRANSMISSION	1	
MISCELLANEOUS	PEDAL BOX, BRAKE CLIP AND (2) PLASTIC WASHERS	1	
	GAUGE CLUSTER	1	
	ACCELERATOR PEDAL	1	

DIFFERENT DONOR VEHICLE OPTIONS

We highly recommend NOT using these different donor cars for the average build. This list will help with those parting out individual items, and possibly for those not using all of the donor parts.

1982-1986 8 Donors

- Front brakes are 10" in diameter compared to the 87-93 11" diameter.
- Gauges will not work.
- Transmission is slightly weaker, and 82 and most 83's used a 4-speed called the SROD that will not work
- Rear axle has a 7.5" ring gear, so it is weaker (86-93 axles have the 8.8" rear axle)(the 7.5" rear also did not use quad shocks)
- Engines were carbureted up until and including 1985.
- Front Spindles will work by cutting the weld tacks and removing spacers on the IFS brackets that come with the kit.
- 1986 donor vehicles were fuel injected, though they were less powerful, and they had domed pistons that make performance modifications difficult.
- 1985 and 1986 V8's with automatic transmissions, were throttle body injected.

1982-1993 4 Cylinder Donors

- Front brakes are 10" in diameter compared to the 87-93 11" diameter.
- Rear drum brakes are 9" in diameter compared to the 87-93 10" diameter.
- Gauges will not work.
- Transmission is much weaker. The input shaft is smaller, so a different pilot bearing would be needed. It also has a lower first gear.
- Rear axle has a 7.5" ring gear, so it is weaker.
- Front Spindles will work by cutting the weld tacks and removing spacers on the IFS brackets that come with the kit.
- Fuel pump will not support a fuel injected V8.
- Engine section of the harness will not work.
- Steering rack has a 20:1 ratio compared to the V8 model 15:1 steering racks.
- Radiator is only a single core.

1994-1995 Donors

- These two years use a mixture of the older 87-93 parts and the newer 4.6L parts.
- Front spindles are 5 lug and can be used with 13" "*COBRA*" Brakes.
- The 1994-1998 rear axle is 1.5" wider than the older cars and must be taken into account when ordering wheels.
- If running emissions and catalytic converters, it is necessary to switch the front accessories, mounts and water pump with the ones from a 1993 or older car because the air pump will hit the catalytic converter.

Appendix C – Roadster Standard 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 – Big Block Instructions

Part Number: 12401	*Revision:* D	*Effective Date:* 03/12/03	*By/Date:* J. CAMIRE	
Document Type (indicate):				
	° Bill of Materials	° Drawing (may be attached**)**	° Specification	
	• **Assembly Instructions**	° Operating Procedure	° Other	

Big Block 390/427/428/429/460
Installation Instructions

These instructions are designed to supplement the assembly manual where the assembly process is different from the build up using a small block. Sections of the manual that deal with wiring and motor preparation of the small block will not apply and can be skipped. Read through these instructions before beginning assembly as some of the changes occur early on in the build up.

427

Shown here with fuel injection.

I. Disassembly of the Mustang

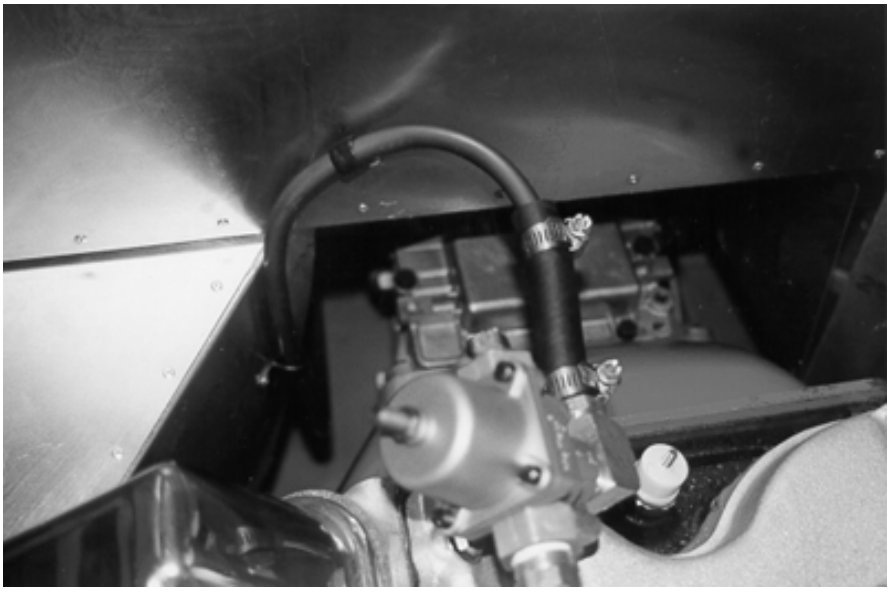
The following parts will not be required off of the Mustang donor parts list.

1. Engine and T-5 Transmission
2. Motor Mounts
3. Mass Air Sensor
4. Oxygen Sensors
5. Headers
6. Radiator
7. High pressure fuel line
8. Fuel evaporative canister
9. Wiring Harness
10. Ignition Cylinder
11. Coil
12. Computer
13. Gauge Cluster

The Throttle cable from the Mustang can be used with the Carburetor so make sure to remove and keep it.

II. Chassis Assembly

1. If you plan on using an external fuel pump, (the original pump runs to high pressure) the in tank pump will need to be replaced with either the suggested pickup or one from an earlier (1985) carbureted Mustang. The old Pickup is held into the tank with a metal ring that needs to be spun about ¼ turn to be removed. This is best accomplished with a punch (or screwdriver) and a hammer tapping a little at a time on opposite sides. The pickup can then be lifted out paying close attention to the alignment of the tubes so the new one can be mounted in the same location.
2. Larger fuel line is provided for all carbureted kits, the line routing is similar to what the manual describes for the back half of the car, however depending on the type of fuel pump you use (electric or mechanical) you may want to run the line differently. With a mechanical pump the line can be run to the front of the passenger side footbox the up as long as it is kept well clear of the header. If you are running an electric pump the line can run directly up the firewall to the inside of the footboxes and to the back of the carburetor.

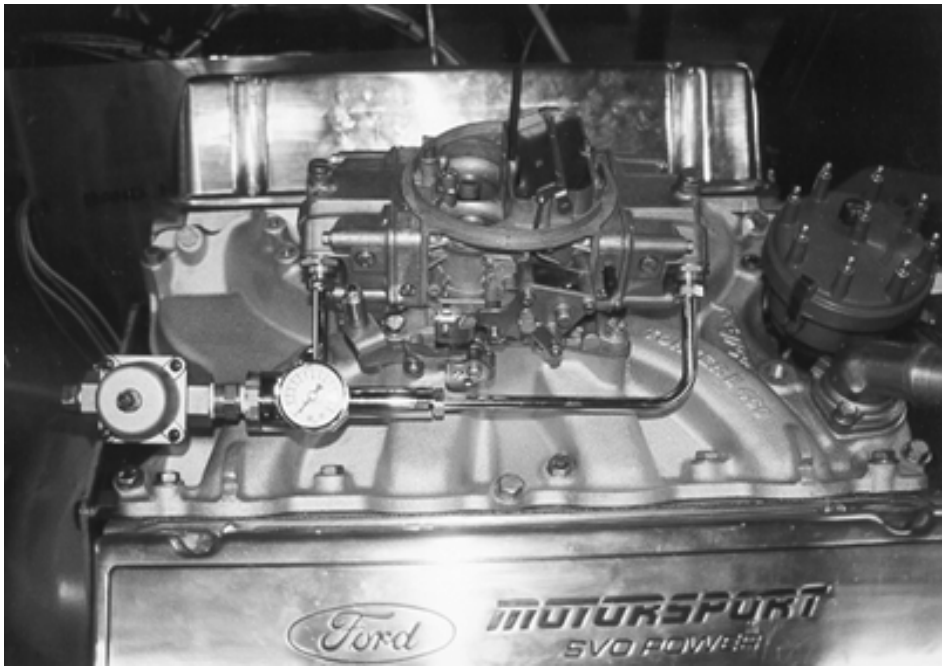


Fuel line and pressure regulator mounted at rear of engine (For carbureted applications)

3. The electric fuel pump should be mounted to a frame rail as close to the tank as is practical. The 2"x 3" is a good solid location, however, some pumps must be mounted below the pickup so a bracket may have to be made.

III. Engine Preparation

1. The intake manifold used must have sufficient clearance for the air cleaner underneath the hood scoop. The Edelbrock Torker II manifold will fit but it is about the maximum height useable. The high-rise intake that comes with the 460 crate engines from Ford will not fit under the stock hood scoop.



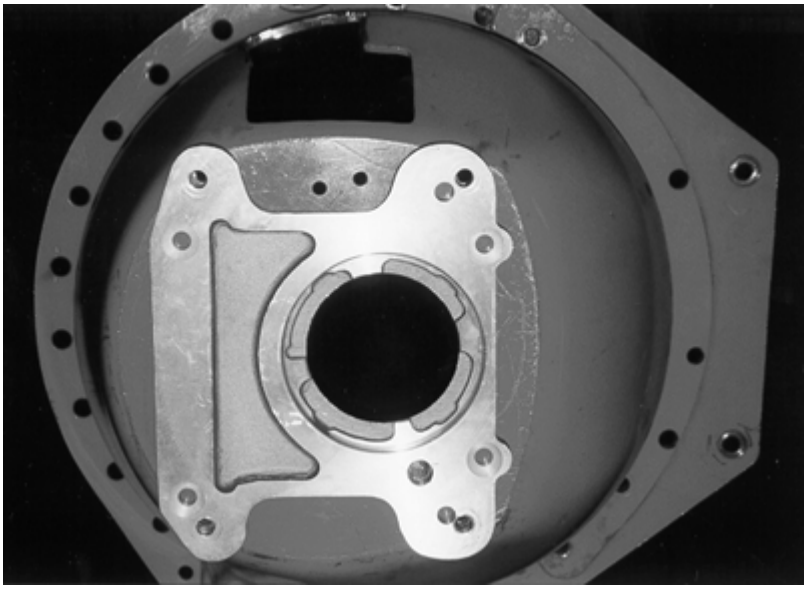
460 Single plane manifold with 850 CFM Carburetor

2. The throttle cable from the Mustang donor car can be used with a carburetor and most Holleys come with the correct linkage ball to snap on the cable. Use a universal throttle linkage bracket from Holley or equivalent to hook the cable up to the intake.
3. The oil pan that comes with the crate motor (along with most stock oil pans) is very deep and hangs downs below the frame, we suggest the canton flat bottom pan which gives sufficient ground clearance and also provides extra baffling and windage control. The pan may have to be clearanced slightly to fit the motor mount on the passenger side. This can be done by gently tapping the pan with a soft hammer or by removing some material from the mount.
4. The oil filter relocation kit is no longer necessary as the header clears the filter in its stock location, this segment of the manual can be ignored.

427 Engine Mount with rubber isolator.

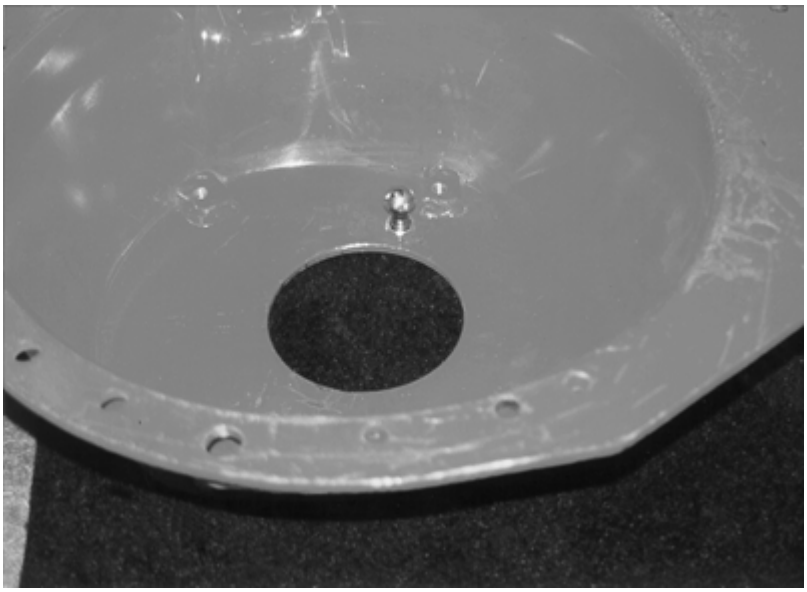
IV. Transmission Preperation

16. The transmission we recommend is a Tremec TKO heavy duty 5 speed that will fit the big block engines with a Lakewood bellhousing and the spacer mentioned in the suggested parts list. In order to use any manual transmission the clutch linkage will need to be converted for use with the pedals and cable from the Mustang. If you are using the spacer from Mcleod it comes with a pivot and jam nut, as well as a clearance hole where the pivot needs to sit. Mark the location on the bellhousing using the spacer as a template, the pivot is centered about the hole in the spacer, then drill and tap the hole to fit your pivot. The height adjustment of the pivot should be made with the clutch attached to the motor at the correct torque spec. If you are not using the spacer but still need a ball pivot, an adjustable one is available also from Mcleod.

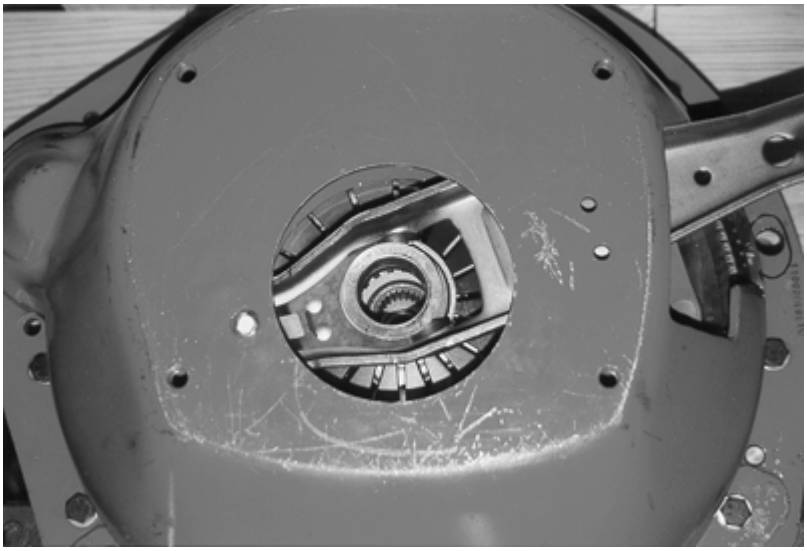


Bellhousing and spacer lined up to mark pivot hole

17. The Driveshaft will also vary in length depending on the transmission you select. Before you have your Driveshaft shortened, measure the distance between the end of the transmission and the rear axle flange with the car at ride height (4¾" from the ground to the bottom of the 4" round main rail). Make sure and include some room for the driveshaft to slide into the transmission with suspension travel, ½" is sufficient.
18. On the Lakewood scattershield there is a mount for the pivot on the driver's side for a mechanical or hydraulic linkage. This tab should be removed for extra clearance of the clutch fork. The slot for the fork should also be elongated to provide more clutch travel. Remove ½" of material toward the engine side of the shield. The last modification to the housing is to enlarge the hole for the clutch cable to pass through, the ½" bolt hole that is directly in front of the slot for the fork needs to be drilled out with a $^{41}/_{64}$" Drill.

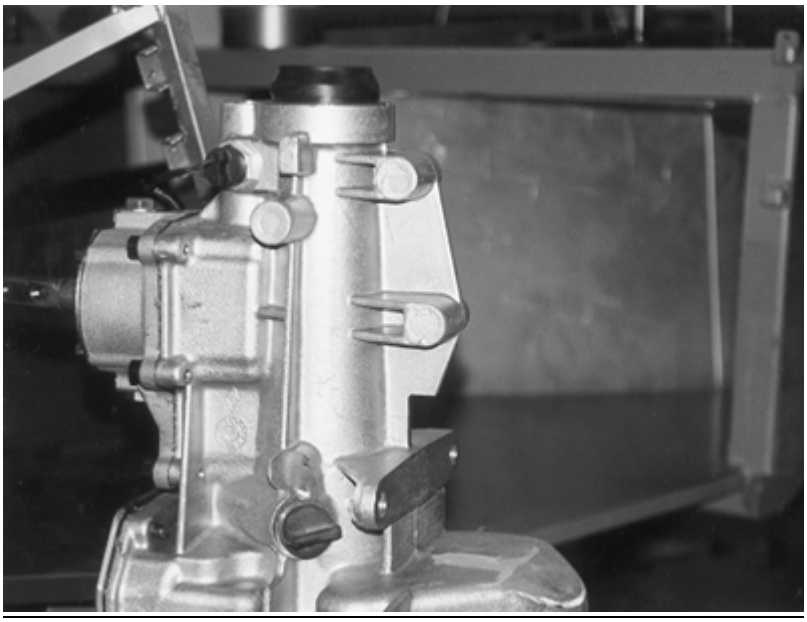


Pivot installed in bellhousing

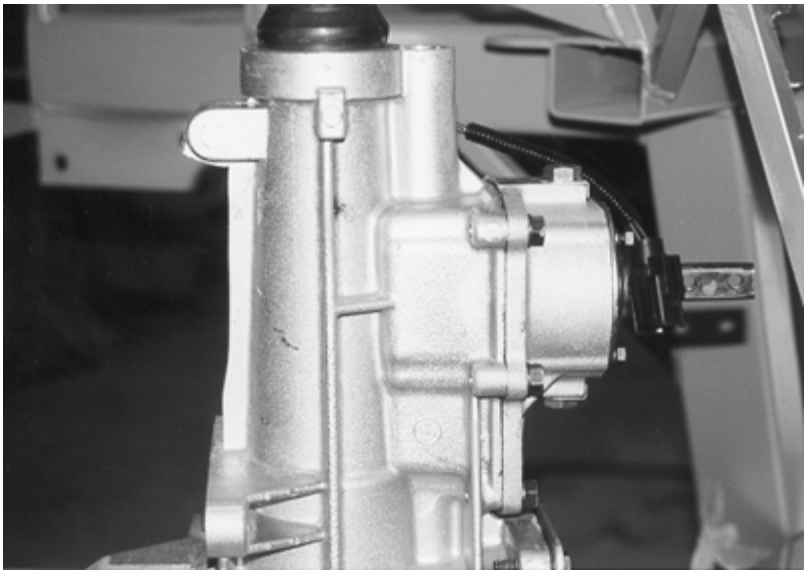


Clutch Fork installed awaiting transmission

19. The transmission mount to the crossmember must also be fitted with spacers. Two ¾" spacers need to be fit between the mount and the transmission, which raises the entire assembly. Even with this raise, 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 is trimmed off level as shown in the picture.



Tremec housing with torque arm mount



Torque arm mount removed for crossmember clearance

20. Level the motor using the intake manifold or the back of the bellhousing, this is important in order for the side exhaust to line up correctly with the body as well as for valve cover clearance on the drivers side.
21. The headers should be fitted to the engine after it has been lowered into place. Wait to mount the side pipes until after the body has been fitted. The exhaust gaskets for the side pipes will need to be cut from the material provided, it is all right to have excess material on the outside of the flange but try to keep the inside flush with the tubes.

V. Wiring Harness

1. The wiring harness that comes with the kit is labeled for all the circuits necessary to complete the car with the exception of an electric fuel pump. If you plan on running an electric pump and are not going to be installing a radio then this circuit can be used to trigger a relay for the pump. The remainder of the harness should be run according to the instructions.
2. The ignition switch provided is for mounting in the dash on the right hand side underneath the smaller gauges. The headlight switch can be place here as well or on the left side closer to the door.
3. Block off plates have been included in the kit for the holes where the fuel injection harness passes through the firewall and transmission tunnel. The blockoff plate for the driver's side footbox hole can be drilled to pass through the wires for the headlights and front turn signals. The grommet that comes with the harness can be used here to keep the firewall sealed around the wires.
4. The Starter solenoid, coil, and ignition system can be mounted to the firewall for an uncluttered look in the engine bay. There is a hole in the rear corner of the Drivers inside footbox wall for these wires, as well as the rear taillight wires to pass through.
5. The fuse box mounts easiest above the drivers' footbox using the mounting hardware provided with the harness. Wherever you mount the panel, make sure that you can easily access the fuses to replace them.

Suggested Parts

The following parts are suggestions based on a combination of parts that we know to work. These parts are not specifically required and some may be unnecessary depending on your combination.

Engine

Ford Motorsport 460	M-6007-C460 (SVO)
Intake Manifold	5066/Torker II (Edelbrock)
Flat Bottom 9 Quart Oil Pan	13-766 (Canton)
Oil Pickup	13-767 (Canton)
Starter	86 Ford F350 460 5 Speed
Aluminum V Belt Pulleys	1810 (March)
Alternator (single wire)	SUM-G1667 (Summit)
850 CFM Carburetor	0-4781 (Holley)

Transmission

5 Speed	Tremec TKO
Bellhousing	15220 (Lakewood)
Spacer	8607 (Mcleod)
Flywheel	463226 (Mcleod)
Clutch Disk	260873 (Mcleod)
Pressure Plate	360821 (Mcleod)
Throw-out Bearing	87-93 Mustang 5.0
Pilot Bearing	86 Ford F350 460 5 speed
Clutch Fork	94-95 Mustang 5.0

Miscellaneous

Fuel Pump	BG280 (Barry Grant)
Fuel Pressure Regulator	12-704 (Holley)
Fuel Pickup	8002045 (Paxton)
Aluminum Radiator	87-93 SVO

SUPPLIERS USED

Canton Racing	203-484-4900
Summit Racing	800-230-3030
Mustang Unlimited	800-243-7278
Holcomb Motorsport	800-475-7223

Appendix E – 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.
- The axle limiting straps are not required when using the 3-link suspension with the rear coil-over shock option.
- 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.

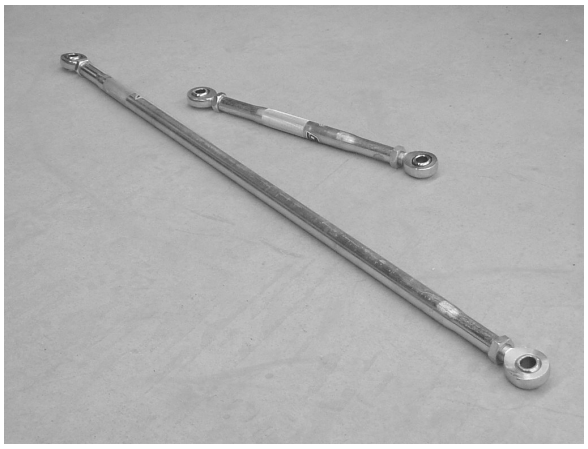
Installation Instructions

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. If using the Mustang shocks and springs, install one end of the axle limiting strap to the rear of the lower shock bolt as it exits through the competition bracket and tighten the nuts.

Panhard bar Axle mount bracket

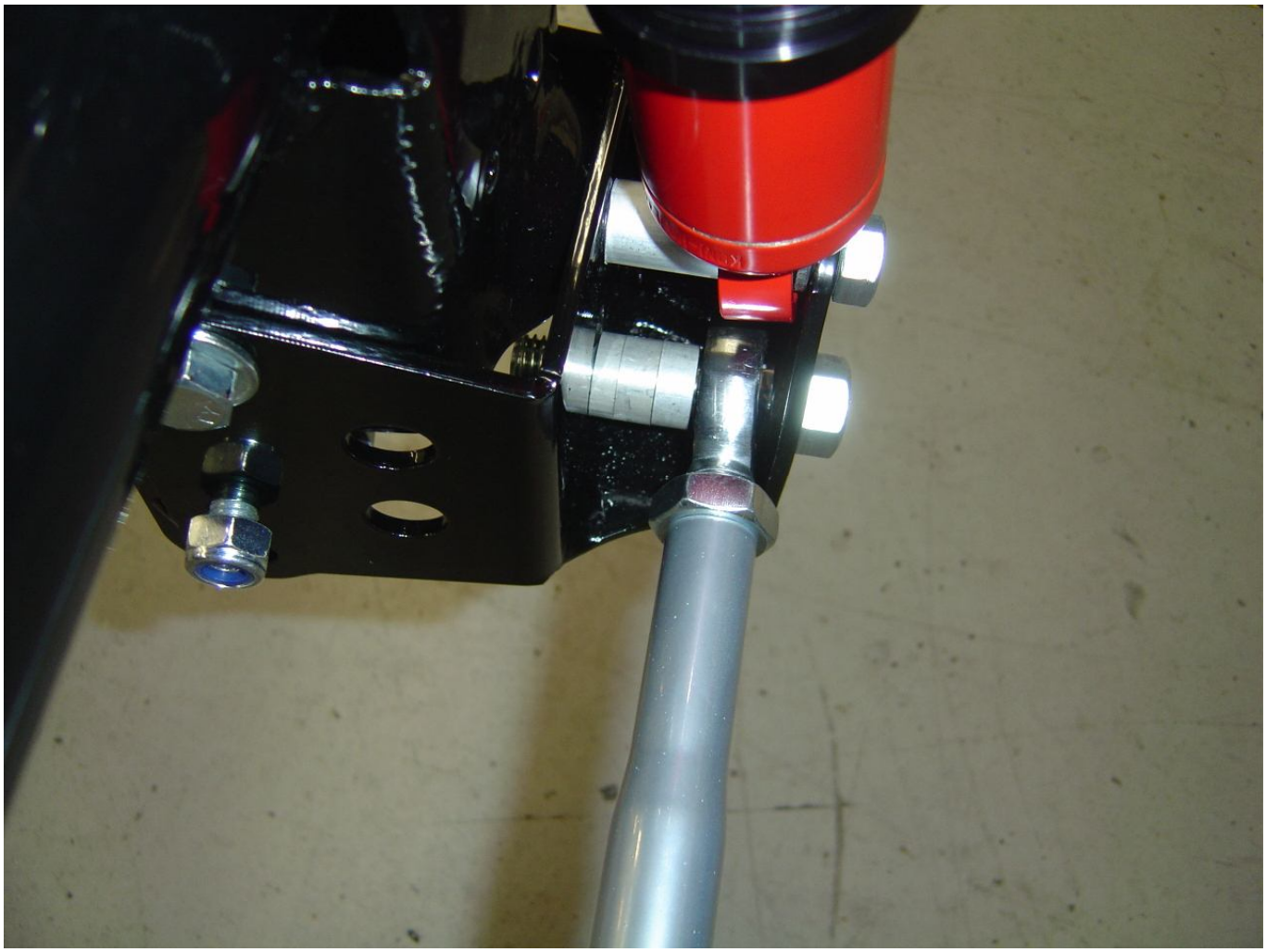
Driver's Side Competition Traction-lok bracket

5. Once the hole has been drilled, install the Panhard mount. 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.

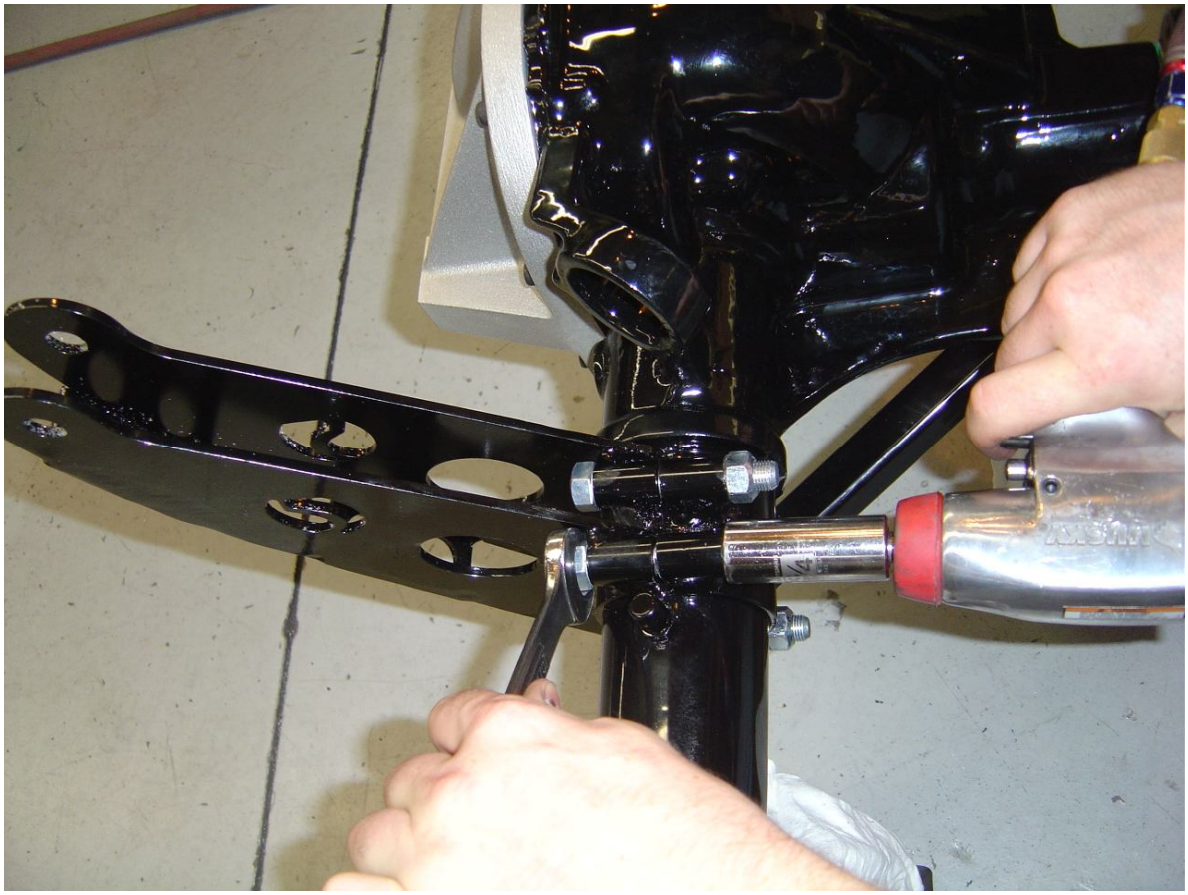


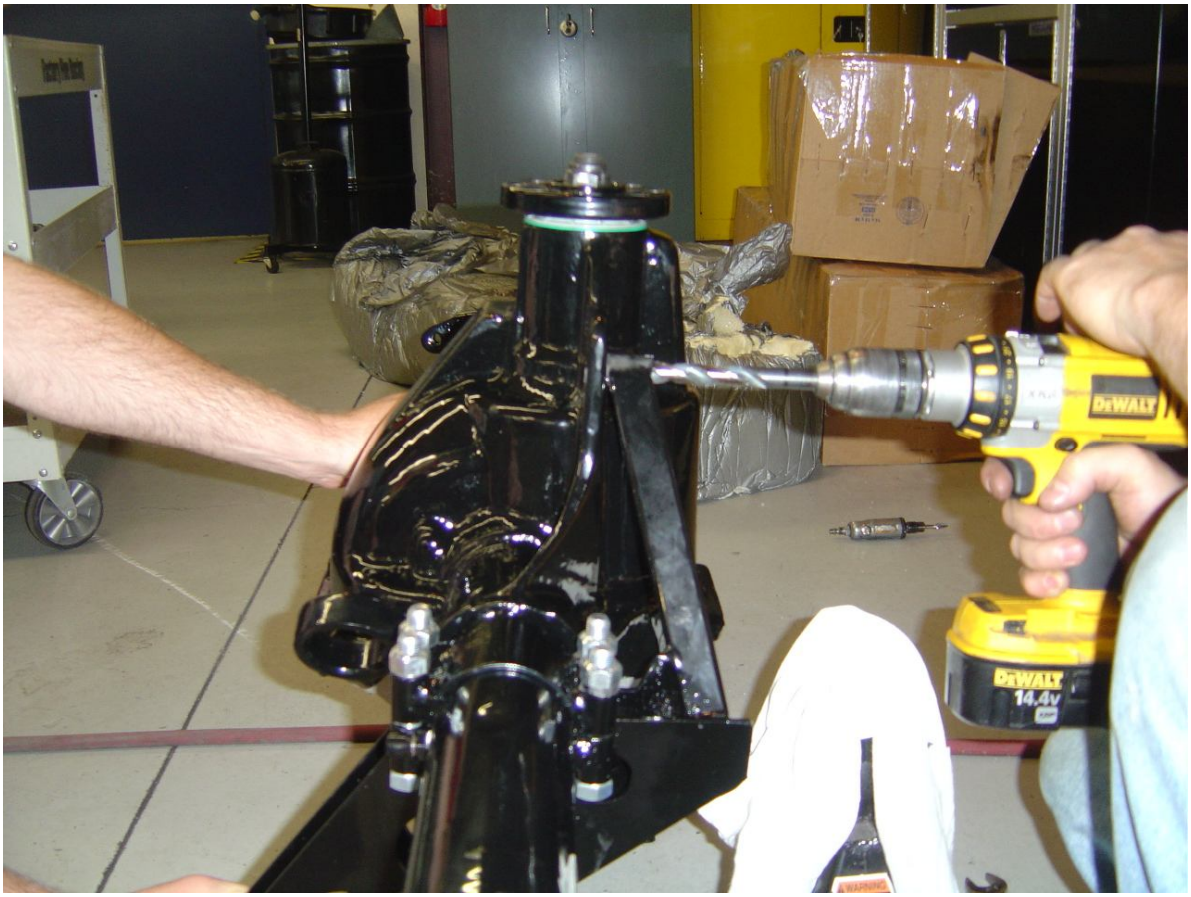
Panhard bar axle mount

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.

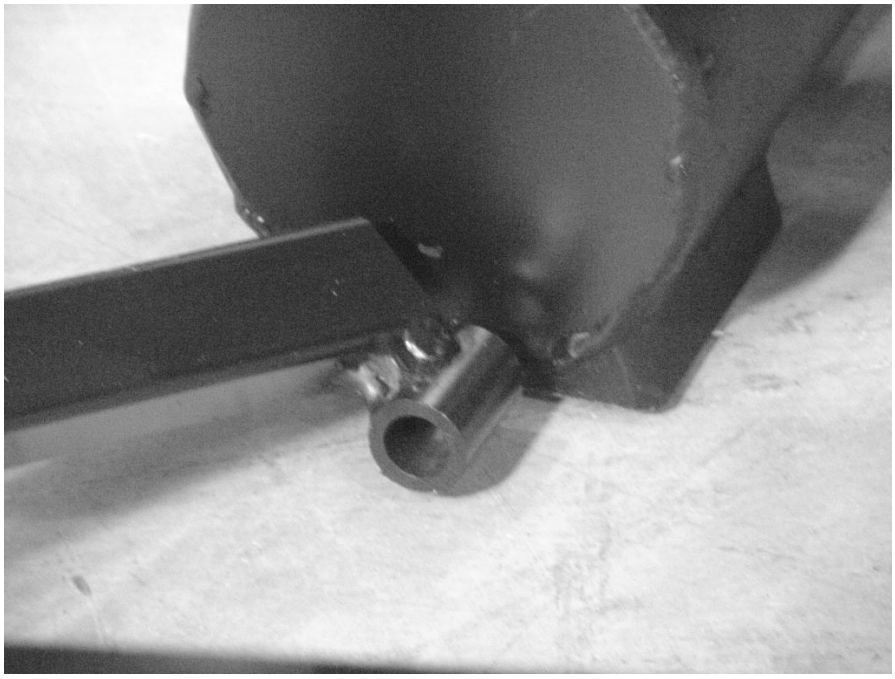
12. Attach the upper arm mount bracket to the axle for the new upper arm mount using the 4 ½"x 3" bolts.




DEWALT
DEWALT
14.4v


WARNING

13. 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.
14. 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

15. Bolt the Panhard bar frame mount to the back of the frame using the supplied ½"x 2.5" bolt and locknut.
16. 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.
17. The Panhard bar can also be set left to right, as well as leveled.
18. 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.

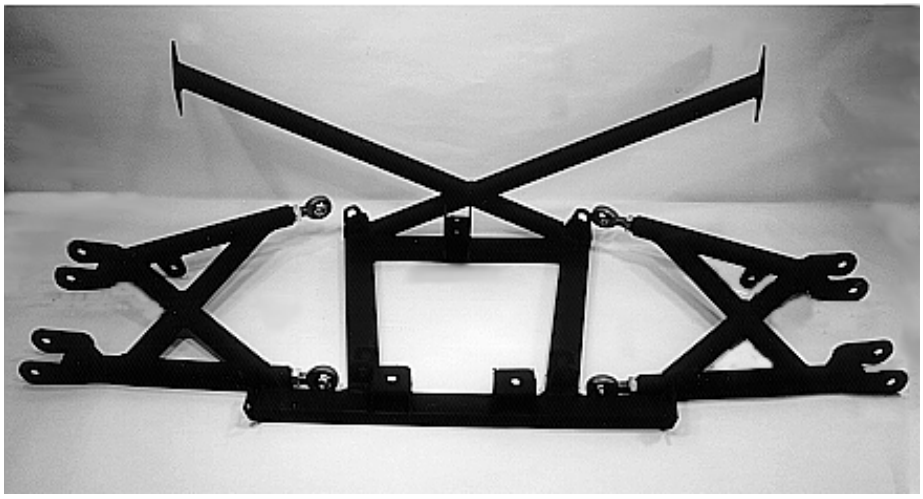
Appendix F – Independent Rear Suspension

Independent Rear Suspension
Installation Instructions

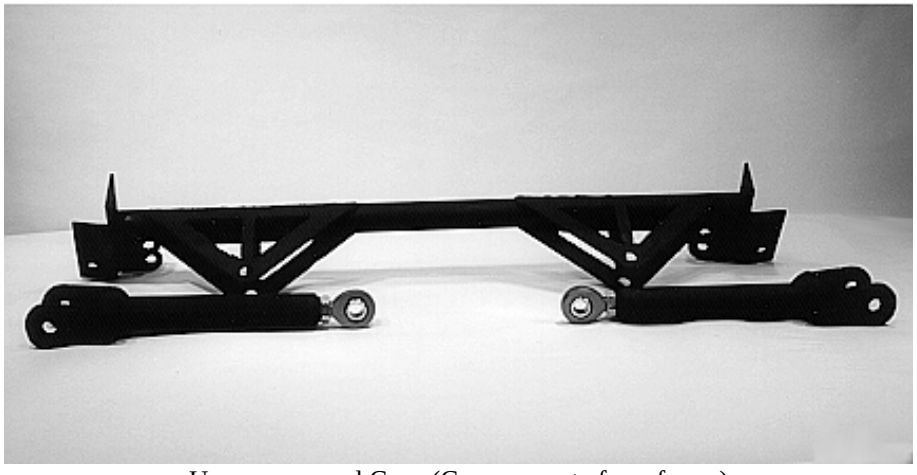
Note:

- 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:



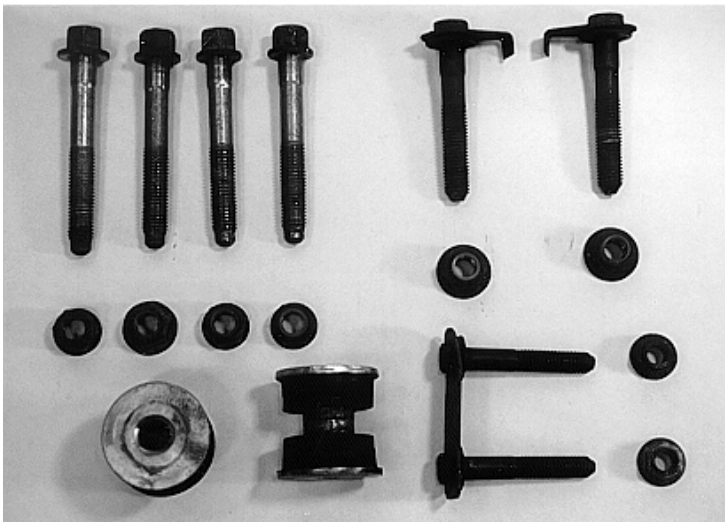
Lower arms and Cage (Cage separate from frame)



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
⅜", ¾", 15/16" sockets
⅜", ¾", 15/16" wrenches
⅜"-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
⅝"-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

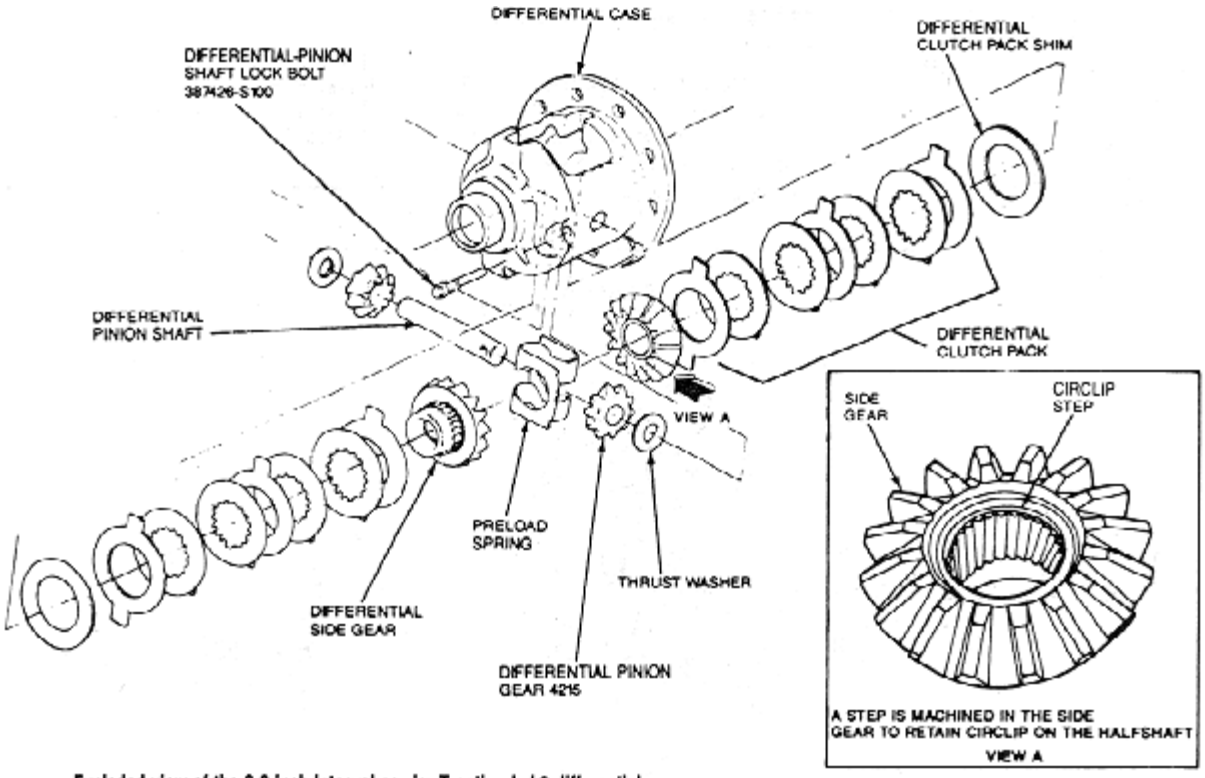
When selecting a donor vehicle, there are several important things to look for to avoid problems. Ford used the same IRS set-up for a few different cars. Thunderbirds between 1989 and 1997, Lincoln Mark VIII's between 1992 and 1999, and Mercury Cougar XR7's between 1989 and 1992. Only some of the cars 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 <u>will</u> 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

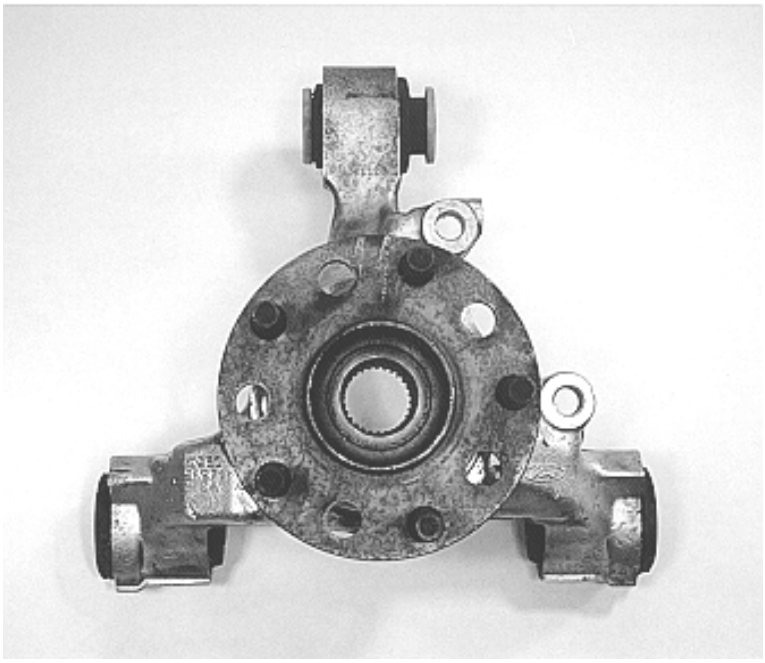
Note:

- Skip this section if using the IRS Completion Package and go to the Installation section
- <u>Do not throw away any parts from the IRS until the IRS is installed.</u>

- **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.

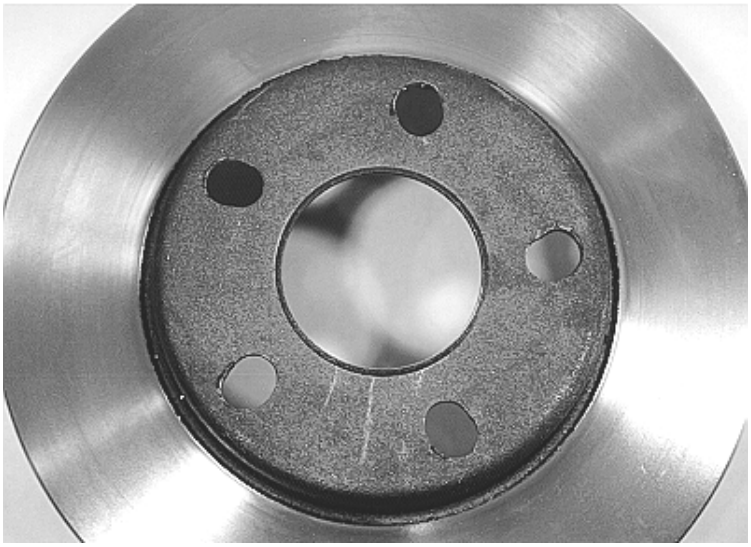
When you get the spindles back, check the hubs for slop in the bearings. There should be none. If there is, have the shop replace the bearings. Check the new bolt pattern in a wheel to make sure that it will go on.



Wheel studs in new location.

- **Rotors**

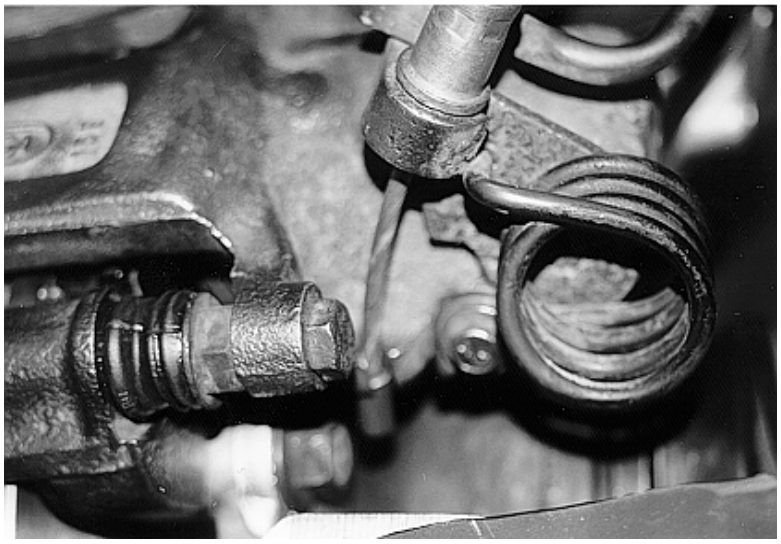
Once the spindles have been re-drilled, the rotors must be made to fit the new lug pattern. The easiest way to do this is using a Dremel tool or grinder to oval out the existing stud holes. Mustang 5 lug rotors can not be used as they have a different wheel mount surface to rotor surface distance.



Wheel Stud holes elongated

- **Brake Calipers**

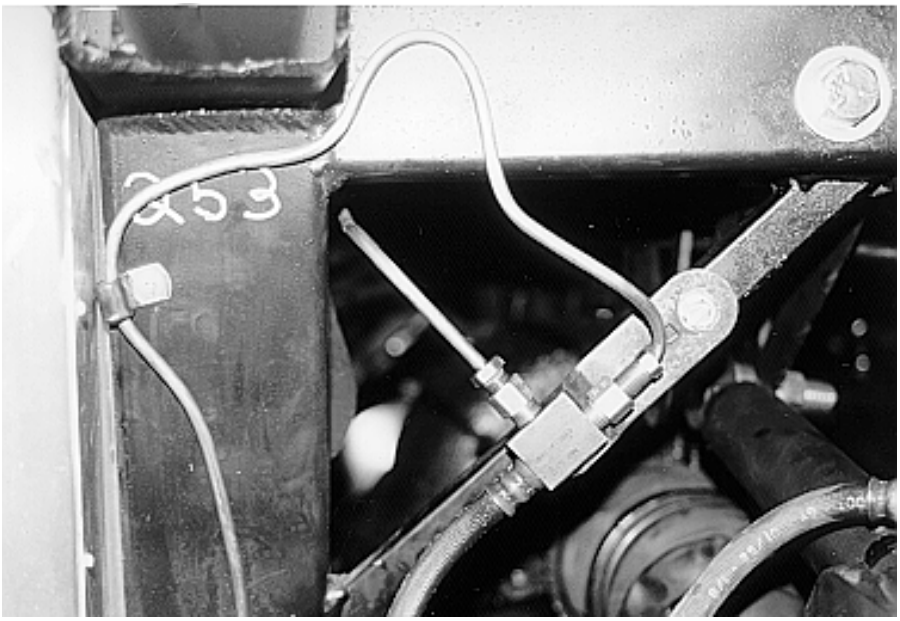
Unpack the included parking brake cables and find the smooth end of the cable (the end without the built in retaining barbs) and try in insert it into the bracket on the caliper. If necessary, use a screwdriver and bend the bracket until the cable end fits.



E-brake cable holder on caliper with cable sleeve inside

X. Installation

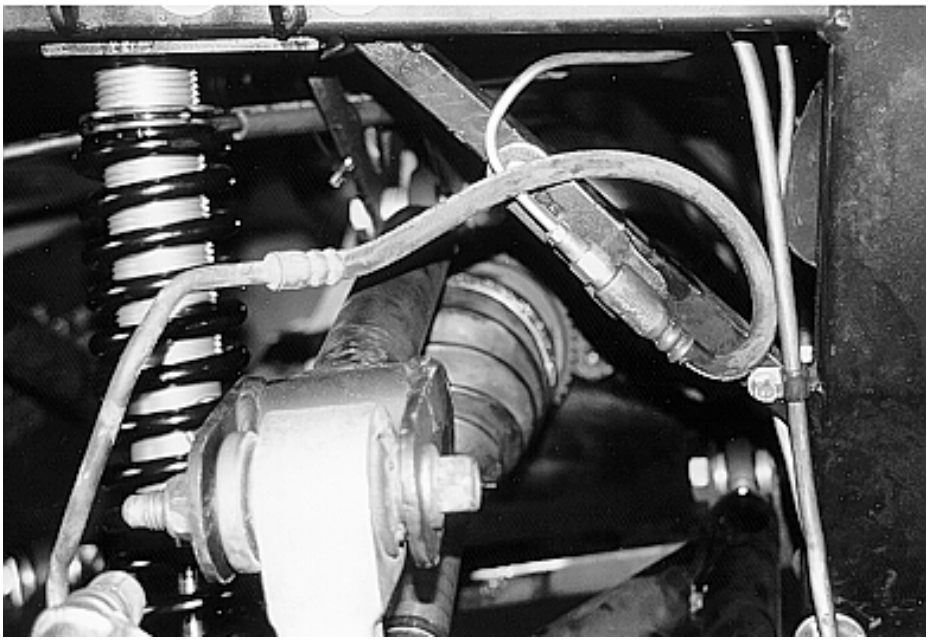
1. Using the Thunderbird flexible brake line with the “T” connection on it, hold it up to the ¾” tubing on the driver’s side that connects the two 2”x3” frame rails. Mark the location of the mount hole and the locating pin hole on the tube as shown in the picture.



Driver side brake line mount

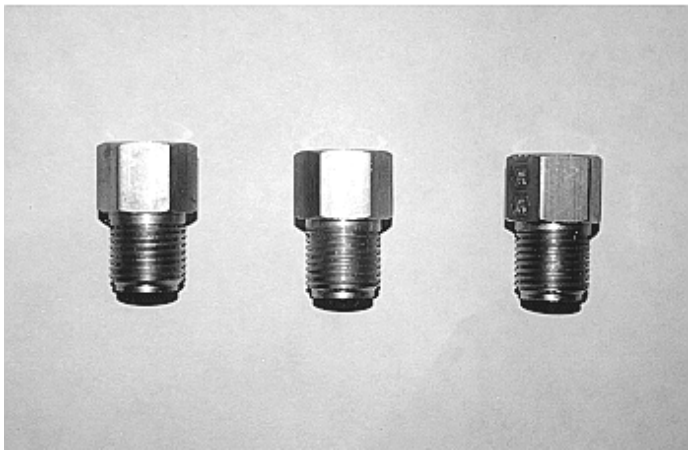
2. Drill two $^{3}/_{16}$" holes, one for the mount screw and one for the locating pin.
3. Mount the "T" junction to the tubing.
4. If using the Completion Package the brake line mount will attach to the frame in this location and support the “T” adapter.

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.



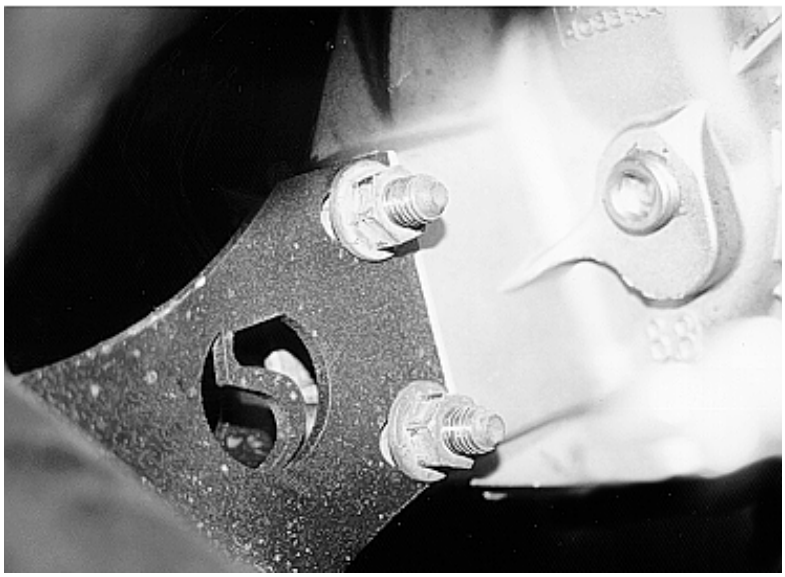
Brake line fittings

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.

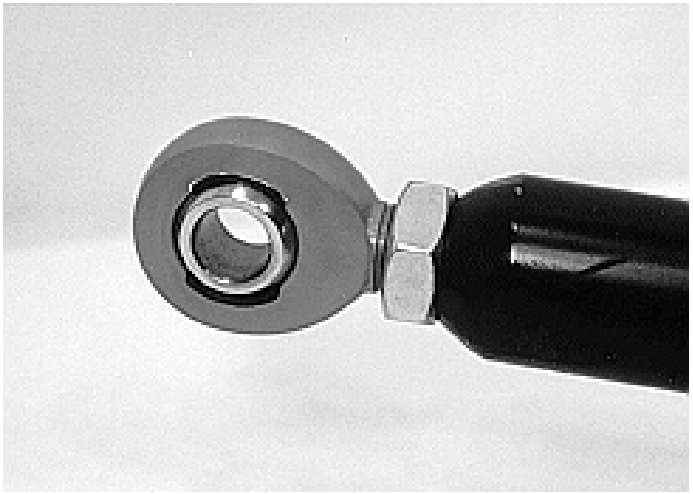


Rear of differential bolted in place.

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.

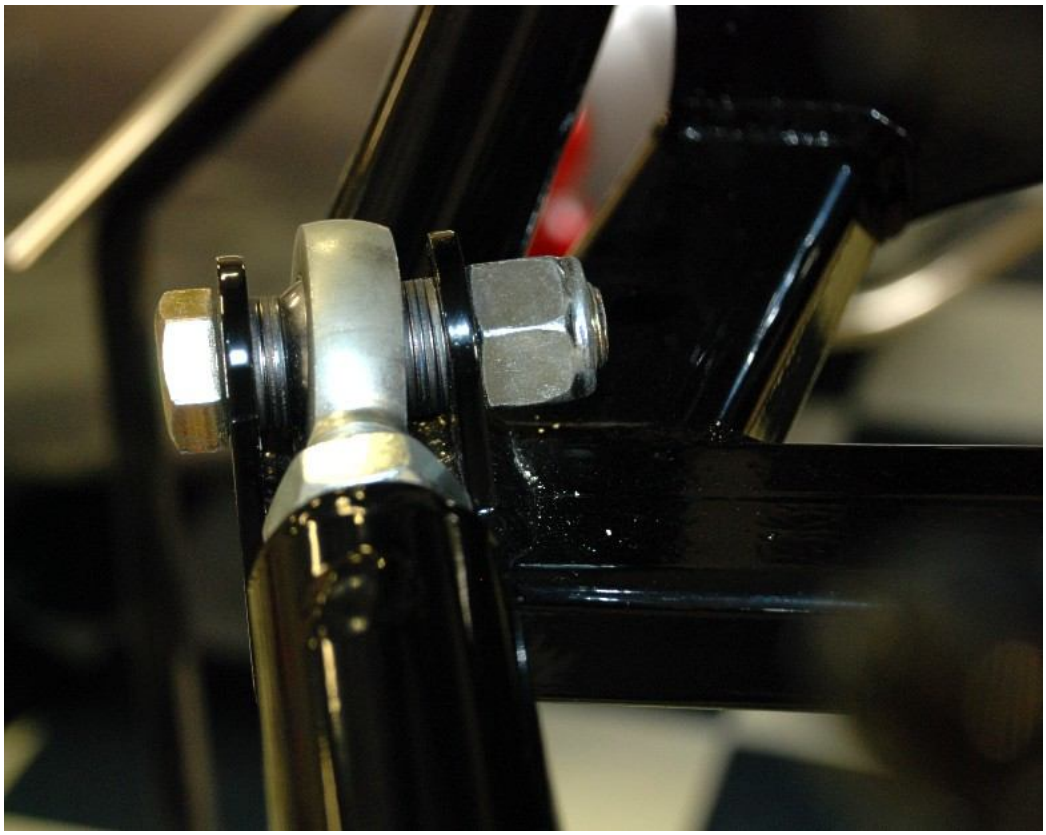
- **Lower Control Arm Installation**

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.

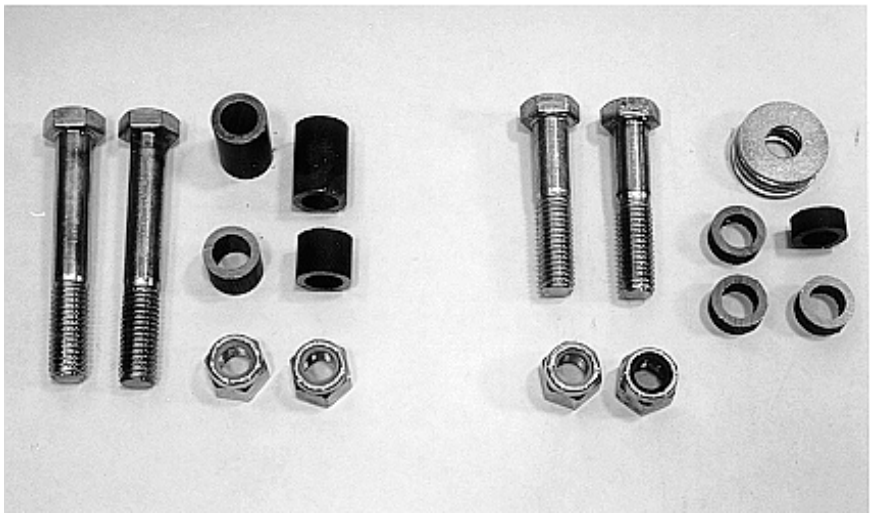
5. The coil-over hats have a snap ring which holds it in place. Remove this snap ring to assemble the coil over shock.

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.

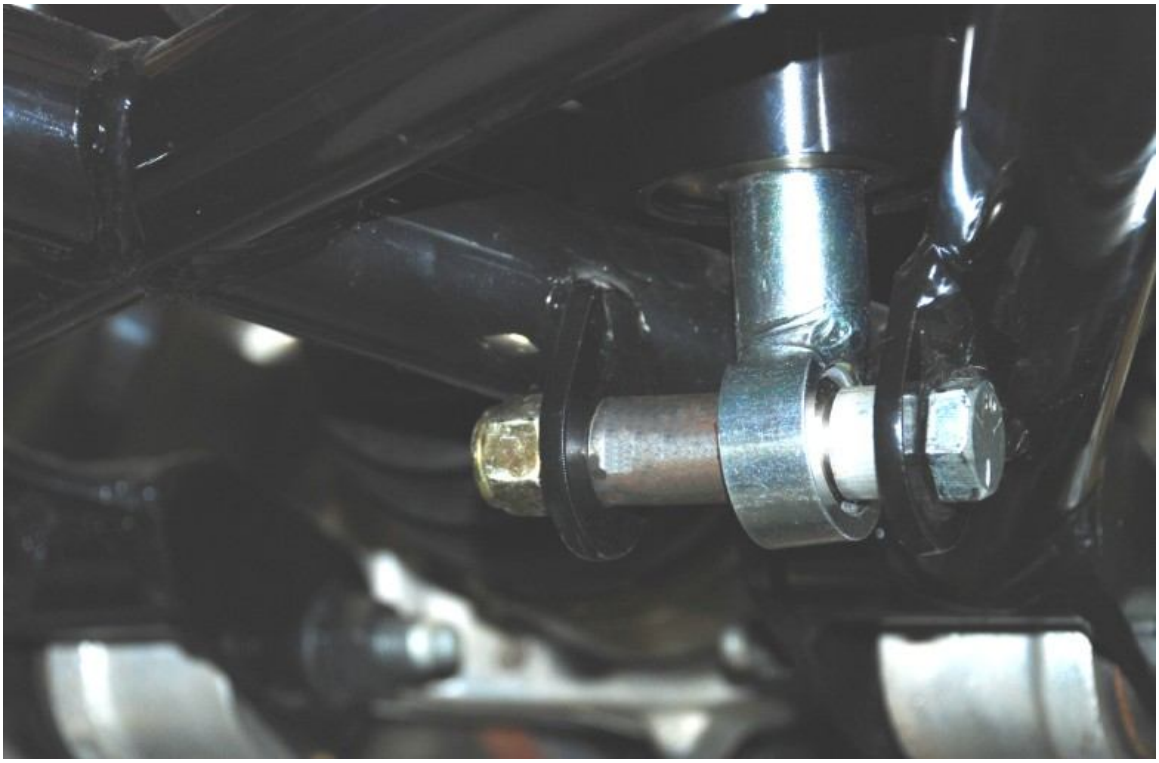
Assembled Koni coil-over shock.

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.



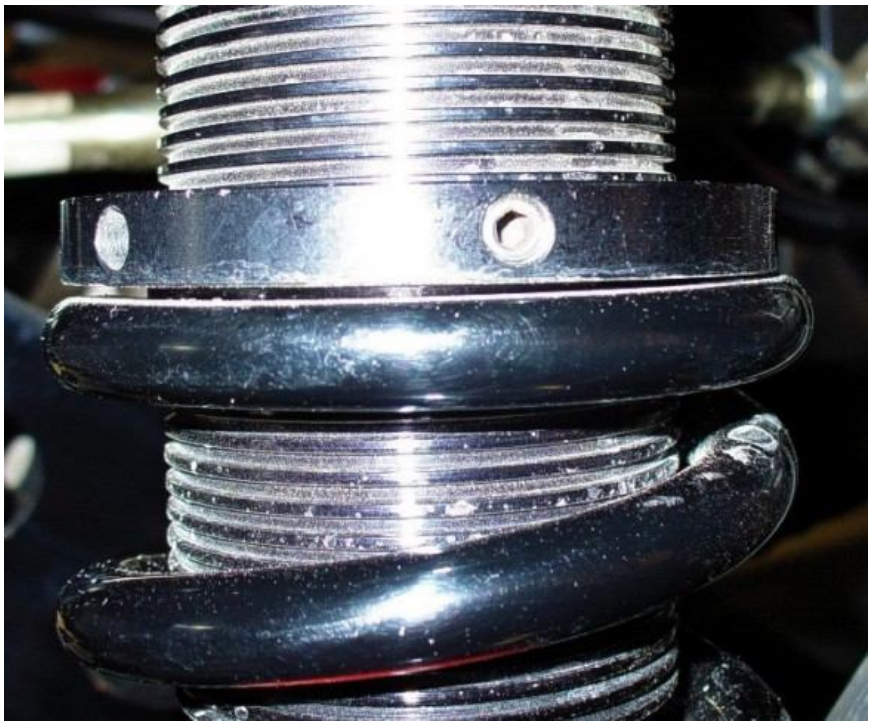
Lower shock mount.

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.

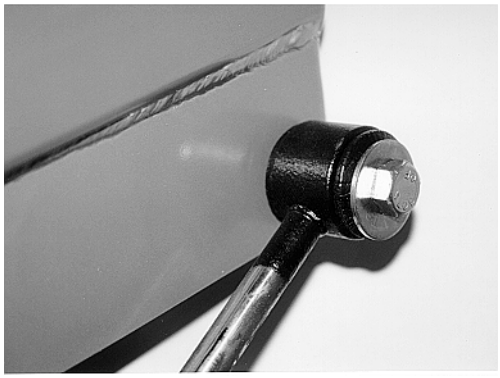
- **Upper Control Arm Installation**

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.

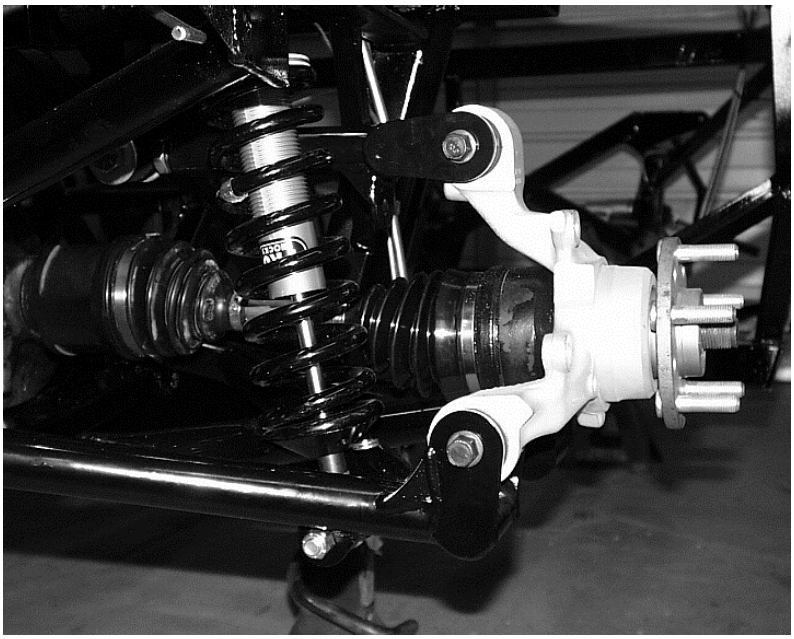


Quadshock mounted to frame bracket.

- **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:

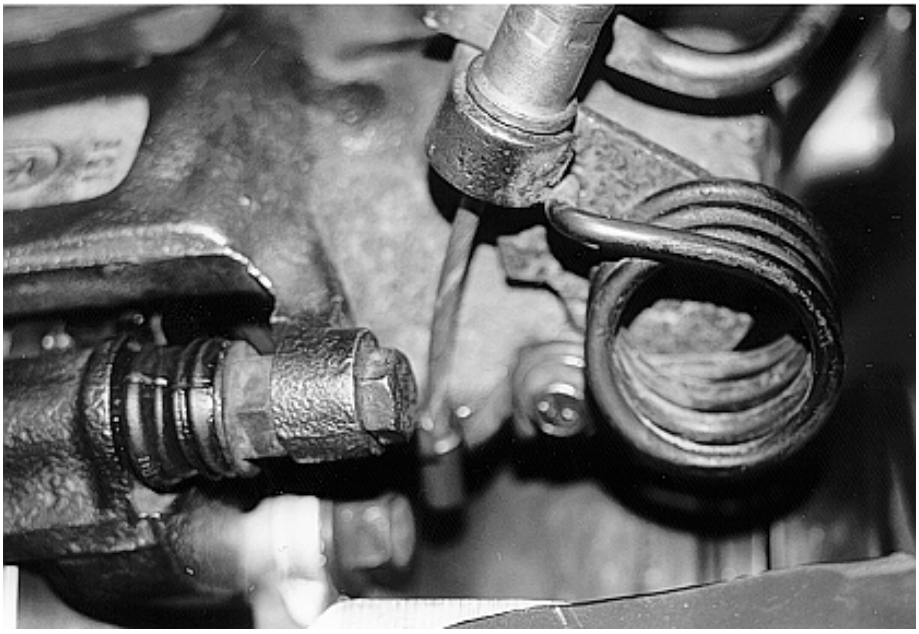
If using the IRS Completion Package, follow the IRS 11.65" brake instructions for the Calipers and Emergency brake cable installation.

- **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.

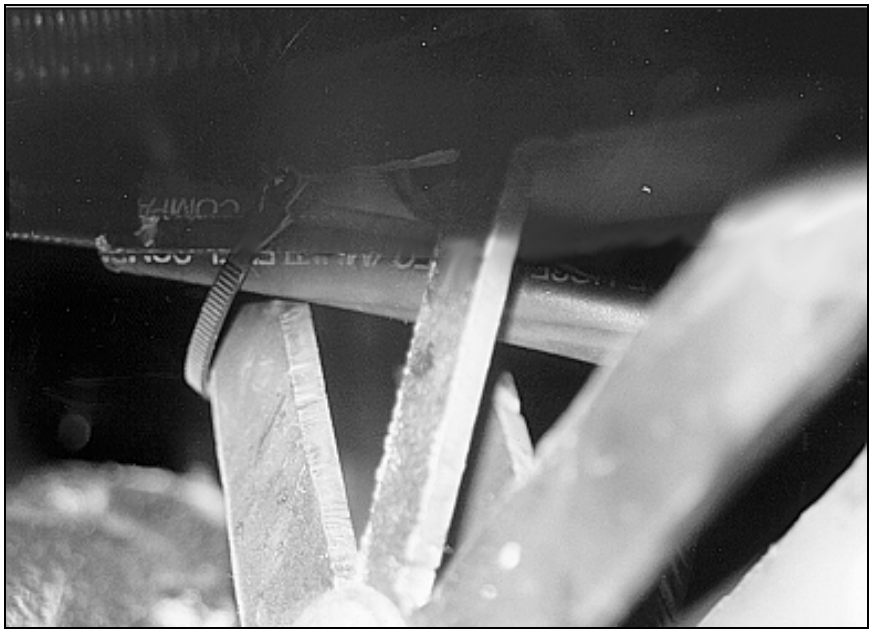
- **Emergency Brake Cable Installation**

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.

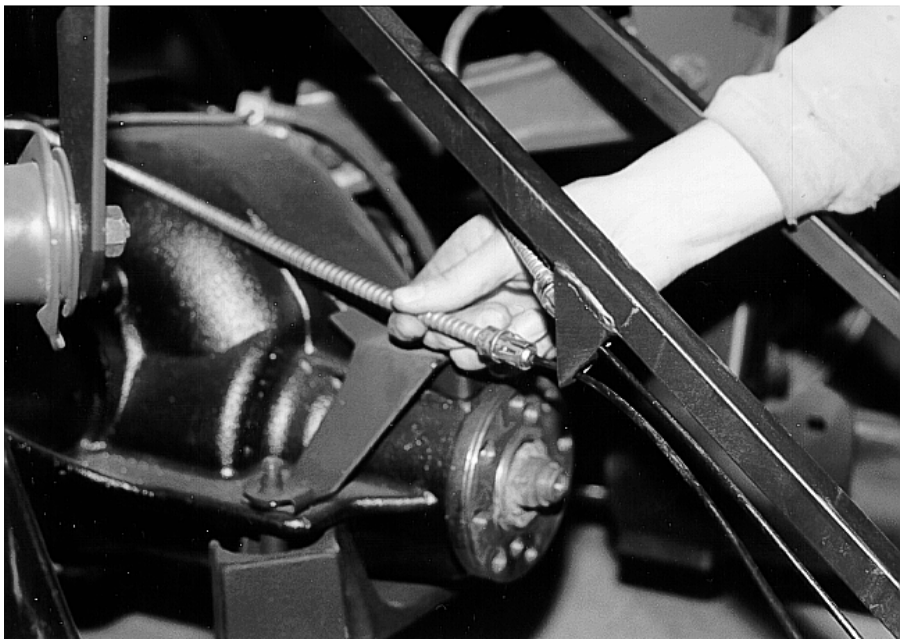


Emergency brake cable in caliper bracket.

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

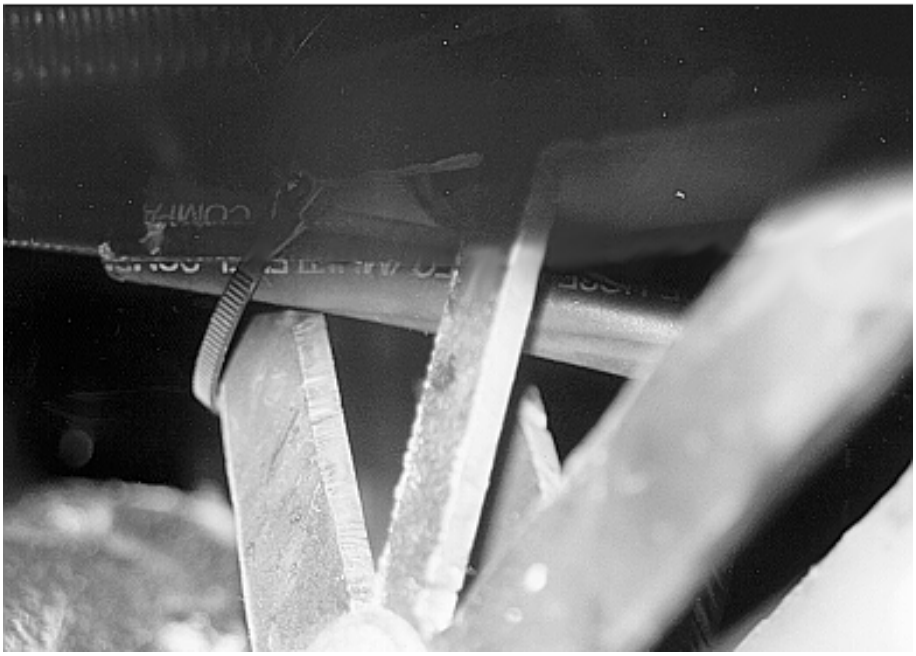


Emergency brake cable next to mounting bracket.

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.

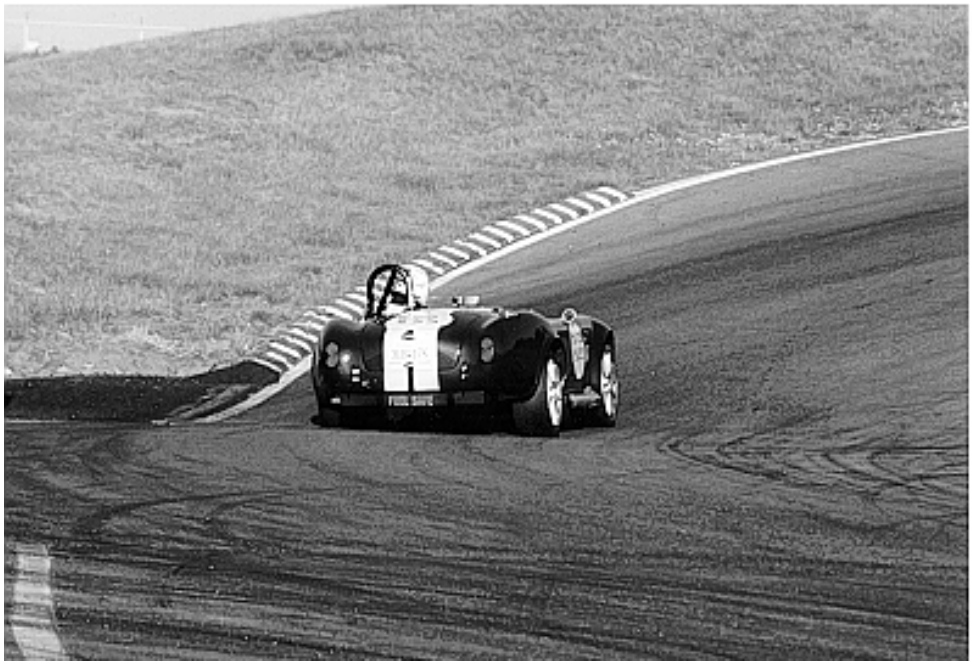


Old hose slit and covering new hose. Zip tied in place.

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 G – 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 H – 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

Year	Type	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 will clip right into a Factory Five kit. (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 Motorsport 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 accept 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 harnesses 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 I - 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.