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 great regret and not a small amount of resentment we include the following warning and statement of non-liability at the advice of our legal council.

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 replica, you should 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, Sate 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 installation 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, or other representation about the use of any of its products under specific applications. Factory Five products are expressly sold for racing and off-road use and are not intended to be used in conventional passenger or other legal highway applications.

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.

FFR Spyder GT Assembly Manual, Revision 1N

Foreword

This manual is designed only as a guide to help you assemble your kit. In order to perform the work efficiently and avoid costly mistakes, please read through the sections before starting any work. In preparing this manual, we divided it into three major sections. The first section deals with the donor parts. The second section covers the sequential assembly of the kit, which assumes all of the pre-requisite parts and assemblies have been purchased. The third section deals with things you may want to know after your kit is complete. At Factory Five Racing we are very proud of our product and are committed to providing you with the best parts and assemblies for your project. We have tried to make this manual a helpful guide, however it is assumed that the builder of this kit has a working knowledge of automotive assemblies and a familiarity with the tools and equipment used in automotive construction.

You will find the appendices at the end of this manual very helpful. They include a bill of materials for both the parts included in the kit, and the other mechanical and running gear parts that we don't sell or provide. It is a good idea to review the donor parts list to start planning ahead. At the top of each new work section there are the following helpful notations...

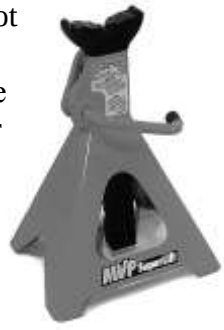
ATTENTION: *This indicates ideas, tips and areas that require special care and attention to avoid damage to the assembly or injury to you.*

TOOLS: *This precedes a list of tools needed for the particular task in that section.*

PARTS: *This indicates what specific parts are required from either the donor car or from our kit.*

Our goal is to help you build and drive your car without any problems, injuries or frustrations. The following are some simple, but important, safety tips that can help avoid costly mistakes.

- Read the manual. It is at least a good guide and place to start. Follow commonly accepted automotive recommendations. 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 single jack.
- Always observe good workmanship 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 cordon 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.

Keep in mind that most accidents are caused by carelessness and a lack of common sense. The aforementioned safety tips are in no way a complete list. Use common sense.

Building this kit is going to be a lot of fun, and we will be there for you if you hit any bumps in the road. Our ultimate success depends upon you completing and driving this car and relating your experience to others. Our name and reputation go along with every part we provide and sell. We want to hear from you and about your progress, positive and negative. Your feedback is invaluable to create a better kit and for out growth and success.

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
_____ Small square file
_____ Jig saw (Body cut outs)
_____ Brake line double flare kit
_____ 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 (SOHC), 6 Qts. (DOHC)
_____ 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)
_____ #6 hex driver attachment for cordless drill
_____ Adapter for cordless to use ¼" socket driver
_____ Wire brush or wire wheel attachment for drill
_____ Flare nut wrenches ($^{3}/_{8}$" x $^{7}/_{16}$")
_____ Flat file and round file
_____ Scissors
_____ Aluminum snips
_____ Friends
_____ Pizza and beer for previous line item

Chapter 1 - Donor Parts and Parts Needed

This chapter deals with the donor parts needed in addition to the parts that we included with our kit. Many people choose to use parts from a single Mustang donor vehicle. 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 Spyder GT is included in Appendix B of this manual.

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 lightweight small block with modern computer controls is one of the keys to our well-balanced vehicle. Our kit delivers the precise handling of a racecar along with the mechanical reliability of a modern Mustang without compromising 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 Spyder GT kit is designed to use parts from the 1987-1993 Mustang 5.0. 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 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 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. It is also easy to buy a complete donor car from a salvage yard for less than $3000.00.

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 drivetrain, 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 stuff, and doors are not needed. We believe it is usually better to take the parts off yourself, because you'll inevitably do a better, more careful job. If you are using parts that are already taken off, you gain the advantage of being able to cherry pick the best of those that are available.

Steering Columns

Select a Mustang that has a non-tilt steering wheel. If your donor does not have tilt, you can use one from a 4-cylinder model. The 1990+ models with air bags work great or get an 87-88 and change out the steering shaft. Older Mustangs with tilt-steering wheels have a larger gear assembly immediately behind the steering wheel. The larger assembly is not as original looking as the non-tilt or air bag column. The FFR Spyder GT kit does not use the entire Mustang steering column. We use just the upper inner shaft to mate up to our polished aluminum steering boss and lower steering shaft.

Running Gear

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

- Examine the **engine mounts**. Some small splits in the rubber area of the mount is 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 drivetrain 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.

ATTENTION: In 1993 the emergency brake cables were shortened and will no longer reach the handle in the FFR frame, if your donor is this year you will need to find a set of the earlier (87-92) cables.

- 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.
- Take a look into the **throttle body** of a low mileage car. There will be some black carbon immediately behind the plate when it is opened. A throttle body with 50,000 miles of use will have a film thickness equal to that of a piece of paper.

We'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 Car 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 motor 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.

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.*
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.

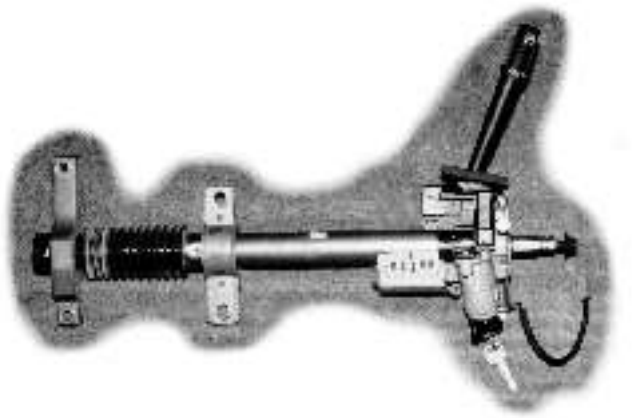
Speedometer Cable

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.

Upper Steering Column

TOOLS: *Socket set, extension, Phillips head screwdrivers, needle nose pliers.*
PARTS: *Mustang upper steering shaft.*



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 lower. Once it is free of the dash and the wiring connectors have been removed from the turn signal and ignition switches, pull it straight back. It may be difficult but it will come loose. The housing for the upper column comes with mounts for the turn signals and the ignition. This 1½" tube cover must be removed from the main steering shaft inside. Most of this large assembly will be discarded and you will only need the inner steel shaft.
2. Remove the steering wheel from the shaft with a steering wheel puller.
3. Remove the horn/airbag contact ring.
4. Remove the snap ring and pull the inner shaft from the tube assembly.
5. Remove the turn signal stalk and the ignition switches from the column.

Power Booster Push Rod

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.
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.
7. Remove the master cylinder from the power booster.
8. 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.
9. The brake push rod is on the cockpit side of the booster canister and must be removed for use.

10. 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.
11. 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.

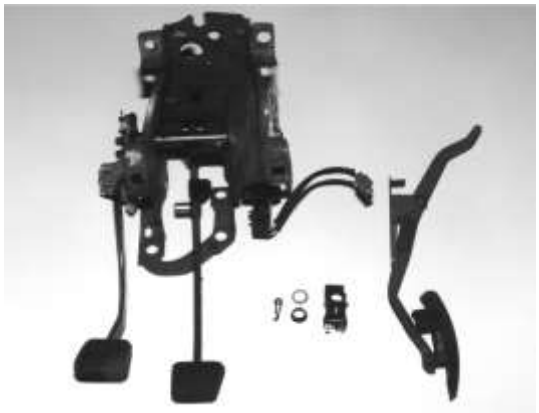
Power booster with the rod removed.

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.

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 #65 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.*

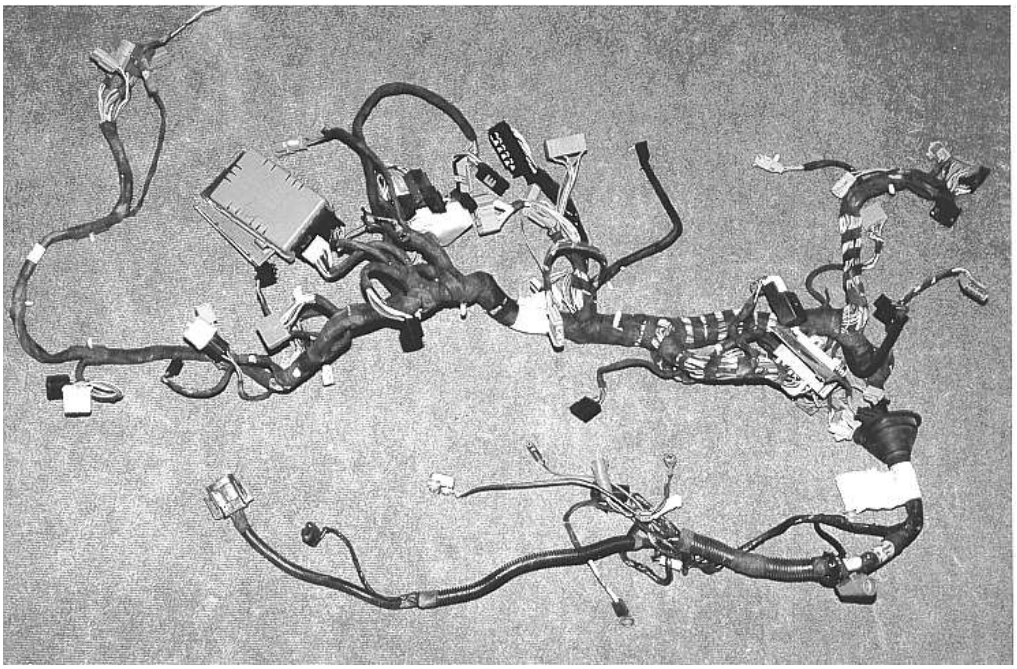
1. Remove the shifter knob from the handle.
2. Unscrew the plastic console that retains the boot.
3. Remove the shifter boot and unbolt the rubber boot below it.
4. Unbolt and remove the shifter and handle from the cockpit.

Wiring Harness

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

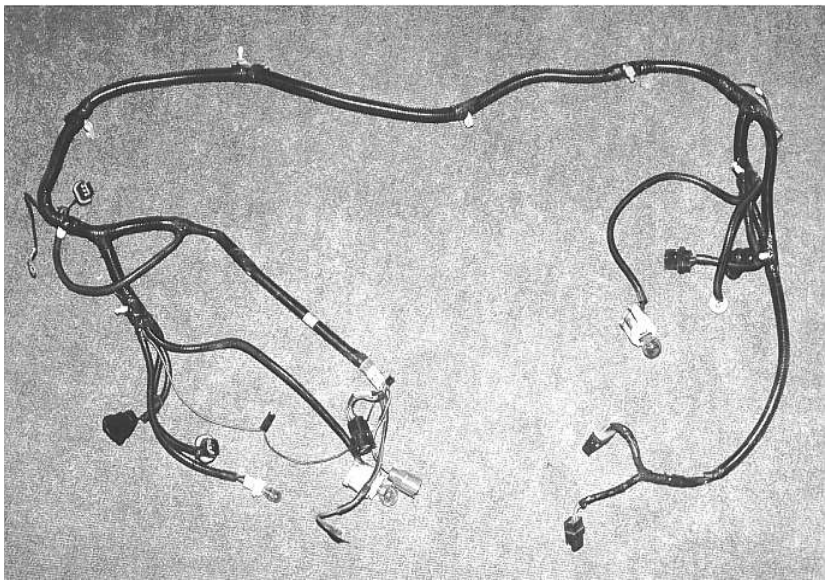
PARTS: *Donor car dash and front wiring harnesses.*

1. The wiring comes out in stages. You want to 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. Each connector is different in the car, so cross wiring is not a problem. Labeling will help speed up the job later.
2. 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.

3. The remainder of the dash can now be unscrewed so that it can be removed from the car. In order to remove the dash, it is necessary to disconnect some wiring connectors in the engine compartment that are part of the dash harness.
   a. Start at the firewall ahead of the driver. You will find a large bundle of wires covered in black tape with a rubber bushing in the firewall.
   b. Trace along this bundle and pull it away from the engine bay wall where it is attached with plastic press-in studs.
   c. At the starter solenoid and coil, disconnect the wires, labeling which wires connect to which screw.
   d. Disconnect the connectors from the headlights and engine harnesses.
   e. Try to keep the engine bay wires together and push the rubber bushing through the firewall with the wires into the cockpit.
4. Remove the front light harness in a similar but less complicated way 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.

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 is used in the car. In the Mustang, it is located on the 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.

Steering Rack and Column

TOOLS: *5/8" and 11/16" combination wrenches.*

PARTS: *Mustang rack assembly, mounting bolts, nuts and washers w/rubber bushings.*

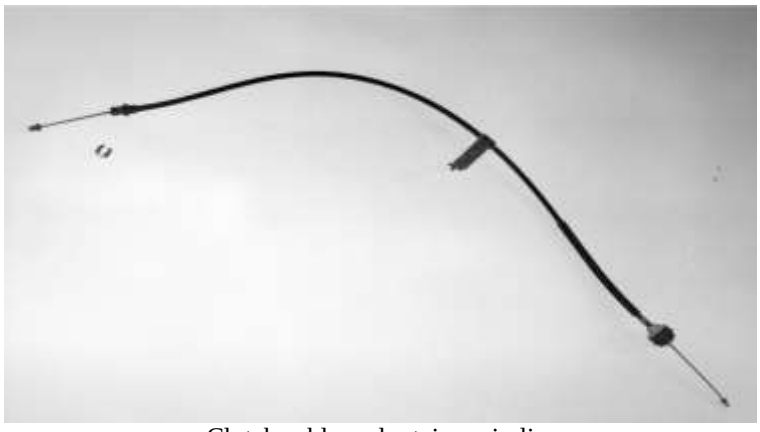
1. Remove the U-joint bolt from the steering column sleeve.
2. Remove the lower steering column by taking off the two bolts at the flexible collar in the area where the splined steering rack shaft begins.
3. Remove the steering rack outer tie rod nuts and cotter pins. If the tie rod will not come out of the spindle 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 gently out of the car.
5. Remove the hydraulic lines. Use 11/16" and 5/8" combination 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.

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

Speedometer and Clutch Cables

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

1. Before removing the engine, the speedometer cable must be disconnected. 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 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.

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. Remove the center consul cover the handle.
6. Unbolt and remove the emergency brake handle.

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.
15. Pull the engine harness, rubber firewall bushings, and computer connector out through the firewall.

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. If you*

are going to run a fuel injected engine, O_2 sensor bungs will be necessary and should be welded on one of the header tubes after the "Y". If the donor has more than 60,000 miles, new O_2 sensors are recommended. You can get them from any local auto parts store.

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 ⅝" pins inside rubber sleeves.
4. The air tube is connected to the H-pipe and must be loosened or cut off.
5. Disconnect the O_2 sensors from the engine harness.
6. Remove the nuts connecting to the headers so that the H-pipe can be moved rearward sliding the pins out of the transmission cross-member sleeves.
7. Lower the H-pipe assembly and remove.
8. Remove the O_2 sensors from the H-pipe with an adjustable wrench. Do not touch the ends. Store in a safe place.

Engine Removal

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

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

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

1. Remove the two large nuts that hold the engine mounts to the frame of the car. The driver's side bolt-hole is notched for ease of removal. The passenger's side engine mount has a single bolt hole.
2. Disconnect the drive shaft from the rear end pinion using a 12-point 12mm wrench or socket.
3. Remove the drive shaft carefully. Do not damage the front snout. Thread the bolts back into the rear end so you do not lose them.
4. Tape over the rear of the transmission so that it doesn't leak or drip fluid.
5. Undo the transmission from the cross-member.
6. Loosen the cross-member attachment bolts.
7. Disconnect the two remaining harness plugs from the transmission.
8. 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.

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

9. 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.
10. Take up the slack on the chain slowly. Check to make sure that no hoses or wires remain connected to the engine.
11. Remove the bolts from the transmission cross-member and remove the cross-member.
12. Check again to make sure that all wires and straps are removed.
13. 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!

14. Set the engine/transmission assembly on an old tire with no rim or on engine stands to avoid damaging the oil pan.
15. There is an exhaust H-pipe tube holder plate sandwiched between the transmission mount and the transmission that must be removed. All you want in place is the transmission mount with the two bolts sticking down.
16. Have the drive shaft shortened at a reputable machine shop that commonly does this. Ask a local auto parts store or search the yellow pages. See Appendix A for the drive shaft diagram to provide the shop with dimensions. Make sure your machine shop puts new U-joints on your shortened drive shaft. You shouldn't pay any more than about $100.
17. Remove the headers.

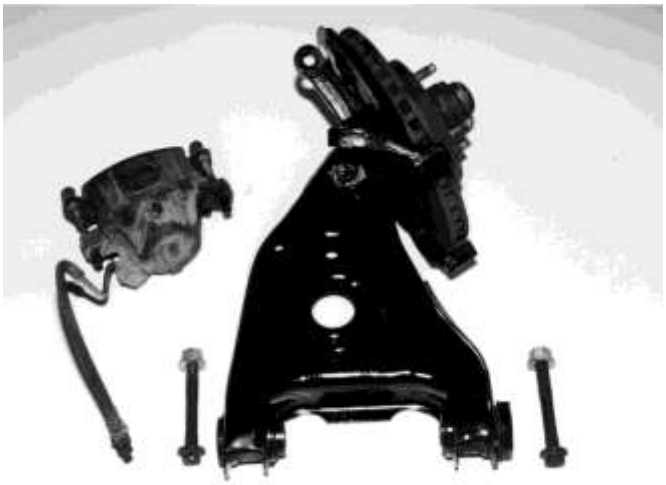
Front Suspension

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, $^{3}/_{16}$" drill, floor jack, tire iron and jack stands.*

PARTS: *Brake calipers, rotors, spindles.*

1. Raise the front of the car up with a floor jack, support with jack stands, and remove the front wheels.
2. Install a spring retaining/compression tool to hold the spring in the compressed position.
3. Remove the front sway bar and discard making sure to remove the bar mounts as well.



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

4. 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.
5. Remove the bracket from the body keeping it to use later.
6. Put a jack underneath the ball joint on the lower control arm.
7. Use a spring compression tool to remove the front springs or chain the spring to the chassis.
8. Remove the three bolts that retain the struts to the top mounting plate.
9. 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.
10. Remove the springs with extreme caution!

11. Remove the large bolts and nuts from the spindle to the strut. Put these aside for use later.
12. 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. The spindle/control arm assembly is heavy. Be careful.
13. Remove the spindle/lower control arm assembly 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. Raise the rear end of the car and place on jack stands.
2. Relieve any fuel line pressure by using the bleeder valve on the fuel rail just behind the alternator.
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. Remove the fuel filter, mounting bracket and connected lines from the body of the car.
17. You should have the tank, plastic cover, straps, fuel filter, fuel filter bracket and lines from fuel filter to tank. Store these items.
18. Lower the car onto the ground.

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.

- *Ford changed the parking brake cables mid 1992. If you have a 1993 donor you must get cables from a 1992 or earlier.*

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.*

Before starting, raise the rear of the car, place on jack stands and remove the wheels.

1. Remove the flexible brake line from the body-mounted bracket. 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.
2. Remove the emergency brake cables from the "T" junction below the handle in the transmission tunnel. Do this by pressing the handle all the way down. From the underside, pull the "T" and remove the cables. 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.
3. Put a jack on the flat part of the middle of the rear axle.
4. In the trunk/hatch area of the car, undo the nuts on the top of the vertical shock absorbers.
5. 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.
6. Lower the jack slowly with the rear end so that they come down together.
7. 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.
8. Remove the OEM bolts and nuts from the lower rear Mustang control arm, where the arms are mounted to the body/chassis.
9. Remove the OEM bolts and nuts from the upper Mustang control arm, where the arms are mounted to the body/chassis.
10. 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.
11. Remove the brackets that secure the quad shocks to the frame. Make sure you get the complete bracket and not just the shock.
12. Remove the emergency brake handle and "T" junction cable.
13. The entire emergency brake cable assembly should remain attached to the rear end and you should save all the OEM brake hardware including the handle.
14. 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.

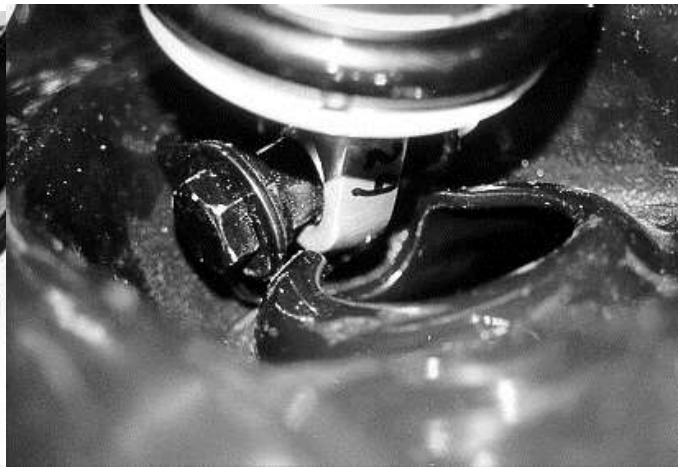
Donor Part Preparation

Front Lower Control Arms

The coil-over shocks that are included in the kit will mount to the lower arms through the small hole in the Mustang spring mount. The area, near the center of the spring mount, needs to be bent or removed to prevent

damage to the coil-over unit thru any contact whatsoever. Check clearance with the new shock and the new mount. These parts must move freely without contacting the control arm surface.

Section removed from front lower control arm.



Coil-over mounted in lower arm with clearance hole.

Rear Coil Springs

Rear coil spring.

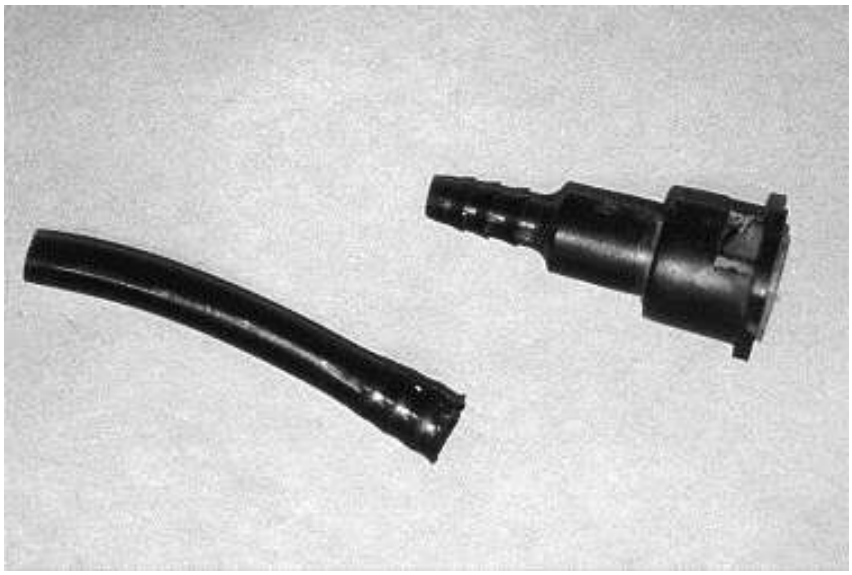
1. Change the rear end oil. Use 80W 90 and friction modifier. It is easier to do out of the car and probably hasn't been done for a while if at all. RTV is good to use to seal the cover.
2. Remove the rubber spacer from inside the coil.
3. Cut one full coil from the top of the spring for correct ride height setting.
4. 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.

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.

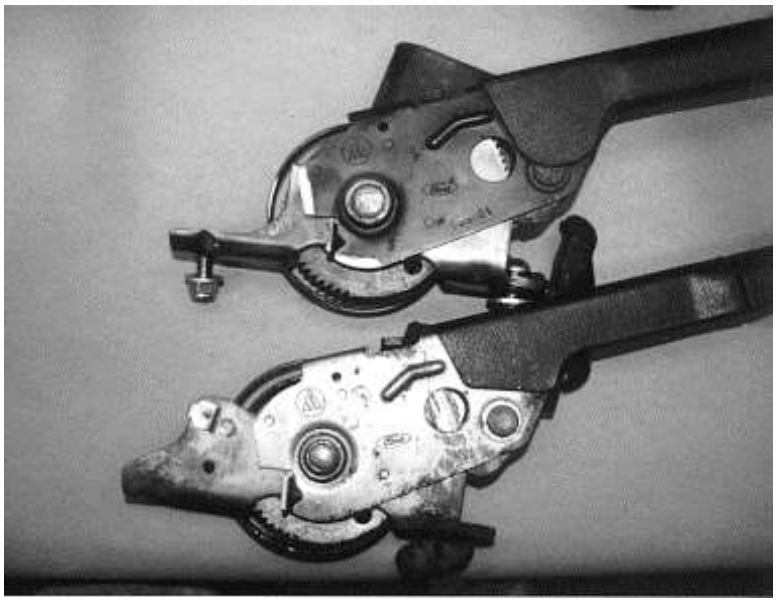


Barbed fitting removed from plastic hose.

Emergency Brake Handle

TOOLS: *Grinder, scissors.*
PARTS: *Refer to appendix A, emergency brake handle diagram.*

1. Cut the diagram in Appendix A out with scissors and mark where the emergency brake handle needs to be cut. This is done so that the passenger seat will not rub up against the back part of the emergency brake handle.



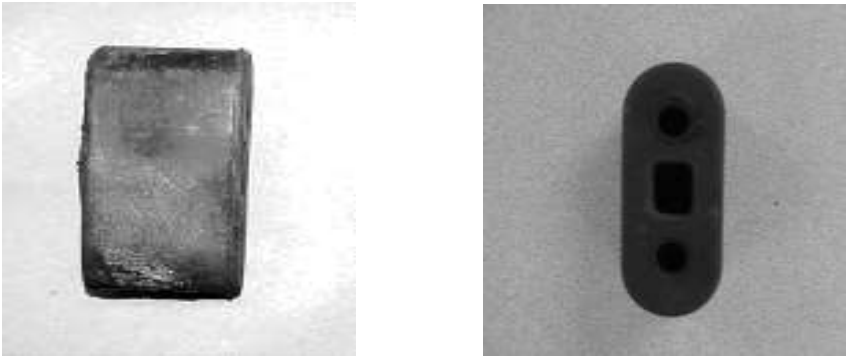
Top: Trimmed handle. Bottom: Untrimmed handle.

2. Trim the handle with grinder (it is very hard steel).

Exhaust Hanger

TOOLS: *Hack saw.*

1. The donor exhaust hanger parts are oval looking rubber parts with two holes at opposite ends.



Exhaust hanger.

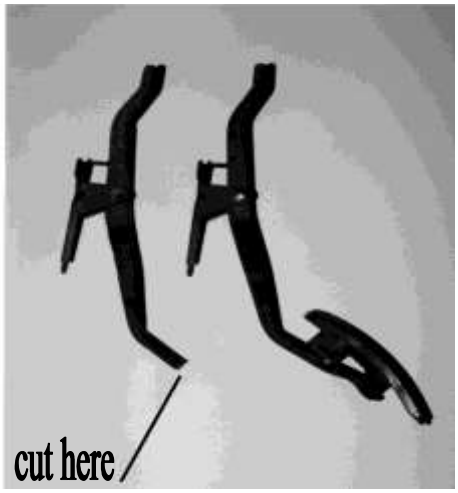
Pedal Box and Accelerator Pedal

The FFR Spyder GT 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, lowering the brake pedal, and bolting it in 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.

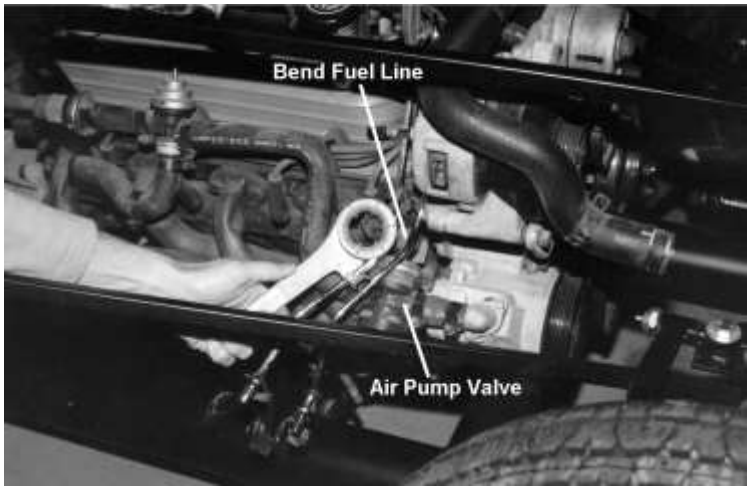
1. The Braking system requires the use of a different Master cylinder than the stock Mustang master cylinder in order to have the correct pedal pressure. The bore diameter of the master cylinder needed depends on the size of the calipers used for the front brakes.
2. Remove the throttle cable from the accelerator pedal.
3. Remove the accelerator pedal.
4. 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.

Engine Preparation

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



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.

Alternate Drive Pulley Preparation

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. If you are using under-drive pulleys, move the hole up and out ½" from the template location.
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.

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. Use aluminum polish on the intake and the valve covers. 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/Aftermarket	Stainless Steel Brakes
Spindles/brakes – Stock	Ford Dealer
Engine – crate 302/351	Ford Motorsport
Transmission – Heavy duty T-5	Ford Motorsport
Tremec TKO with mid shift	Forte's Parts
Bellhousing – Blow-proof	Lakewood or McCleod
Drive shaft	Local drive shaft shop

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. Links to these sites can be found on our homepage at *www.factoryfive.com*.

Different Parts 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.

V8 DONORS

- Front brakes are 10 inches in diameter compared to the 87-93 11 inch 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 inch ring gear, so it is weaker (86-93 axles have the 8.8 inch rear axle)(the 7.5 inch 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

4 CYLINDER DONORS

- Front brakes are 10 inches in diameter compared to the 87-93 11 inch diameter
- Rear drum brakes are 9 inch in diameter compared to the 87-93 10 inch diameter
- Gauges will not work.
- Transmission is much weaker. The input shaft is smaller, so a different pilot bearing is needed. It also has a lower first gear

- Rear axle has a 7.5 inch 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

- Front lower control arms will not work
- Gauges will not work
- Transmission and bell-housing will not work with a solid axle kit
- Steering column and shafts will not work
- Dash switches will not work
- Tie rod ends will not work
- Motor mounts will not work
- Smog pump mounting brackets will not work
- Gas tank will not work without modifications to the mounting straps
- Rear axle is 61.125 inches from hub to hub, where as the pre-93 donors were 59.25 inches. (A different wheel offset could be used to make up the difference)
- Front spindles are shorter (if you specify, we have brackets to make them work)
- Wiring harness will not work
- Pedal box needs spacers to raise it about ¾ inches
- The accelerator cable that comes with the kit will not work with the throttle body

Chapter 2 - Step By Step Chassis Build-up

This section is primarily intended for customers who have their kit shipped to them. If you have picked up your car at the factory, you may want to skip the crate disassembly section. For those of you who have had your kit shipped to you, let's walk through the delivery, unpacking, and disassembly of the kit.

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.*

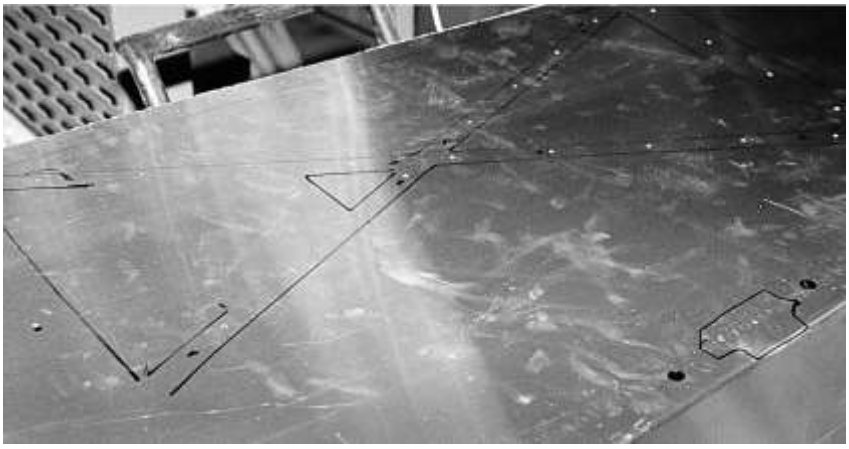
TOOLS: *¼" Socket, duct tape, marker.*

Body Removal

1. The body is shipped sitting on the frame.
2. Using two people, one person on each side of the body hold the body in the wheel well area.
3. The nose section removes easily from the front. Slide it forward before lifting off.
4. Carefully pull the front sides of the body out and up around the door hinge mounts while at the same time lifting the rear of the body.
5. Rotate the back of the body down and the front up once the back is clear of the frame.
6. Remove the body by walking towards the rear of the frame.
7. Store the body on the ground using two 43" long 2"x 4"s wedged over the doors to keep the sides from having a lot of weight on them.

Aluminum Panel Removal and Preparation

1. Mark each panel and take pictures of how the panels fit together (e.g. which lies on top of which).
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.
3. Remove any screws holding the panel to the frame and remove the aluminum panels. Keep the #6 screws to help with aluminum positioning later during build-up. Using a ruler and marker, mark every 3 inches along the centerline of the pen outline that you made on the aluminum.
4. Drill the marks with $^1/_8$" drill bit.
5. Position your frame in your workspace with plenty of room to move things around. Use jack-stands to place the frame on.
6. Frames are shipped either painted black or powder-coated semi-gloss black. After the freight ride there may be places that need a quick touch-up. Use fingernail polish or enamel model paint for powder-coat touch-ups and flat black spray paint for black paint touch-up. Frame paint is DP-90 Flat black.



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

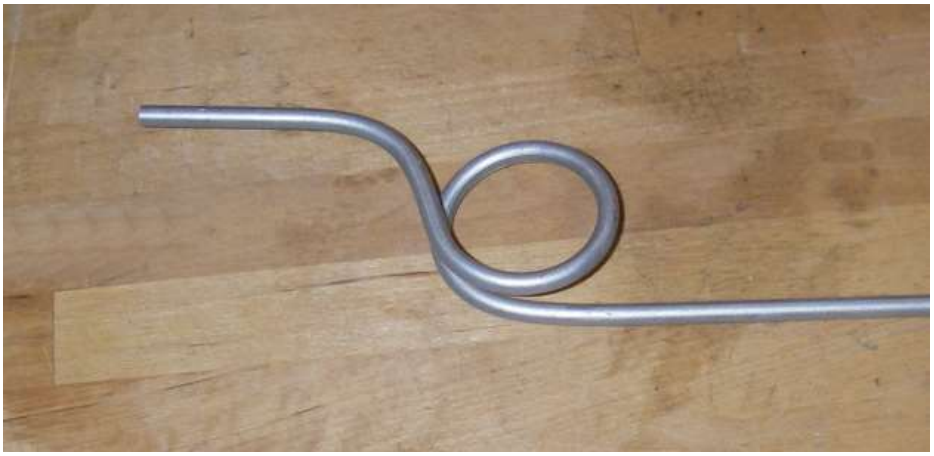
ATTENTION: *The spacing of the rivets is a personal preference. The kit includes enough rivets to space them every 3" except in the foot-boxes where spacing can be every 2".*

Assuming you have procured the remaining mechanical and donor parts and have prepared them for installation, you are now ready to begin assembly of your race-car. We will begin with the chassis and address each sub-assembly sequentially.

Brake Lines

- *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.



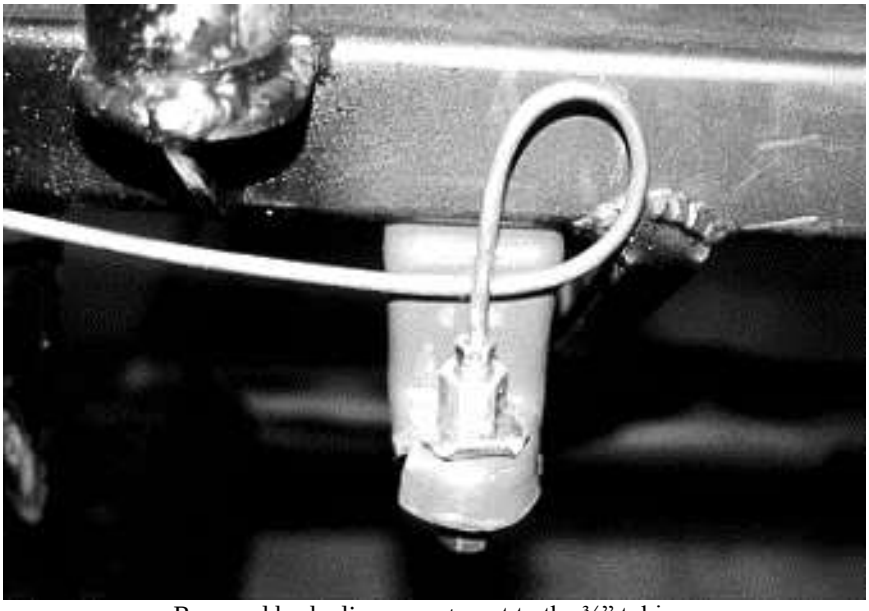
Brake line loop.

TOOLS: *3/8" socket, 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), 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.



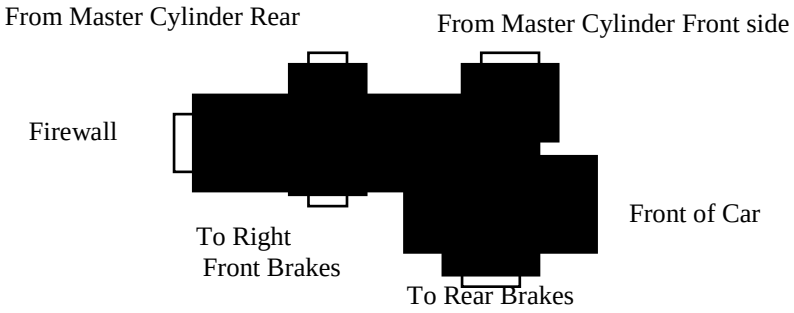
Rear end brake line mount next to the ¾" tubing.

6. Attach the brake line to the Mustang mount.

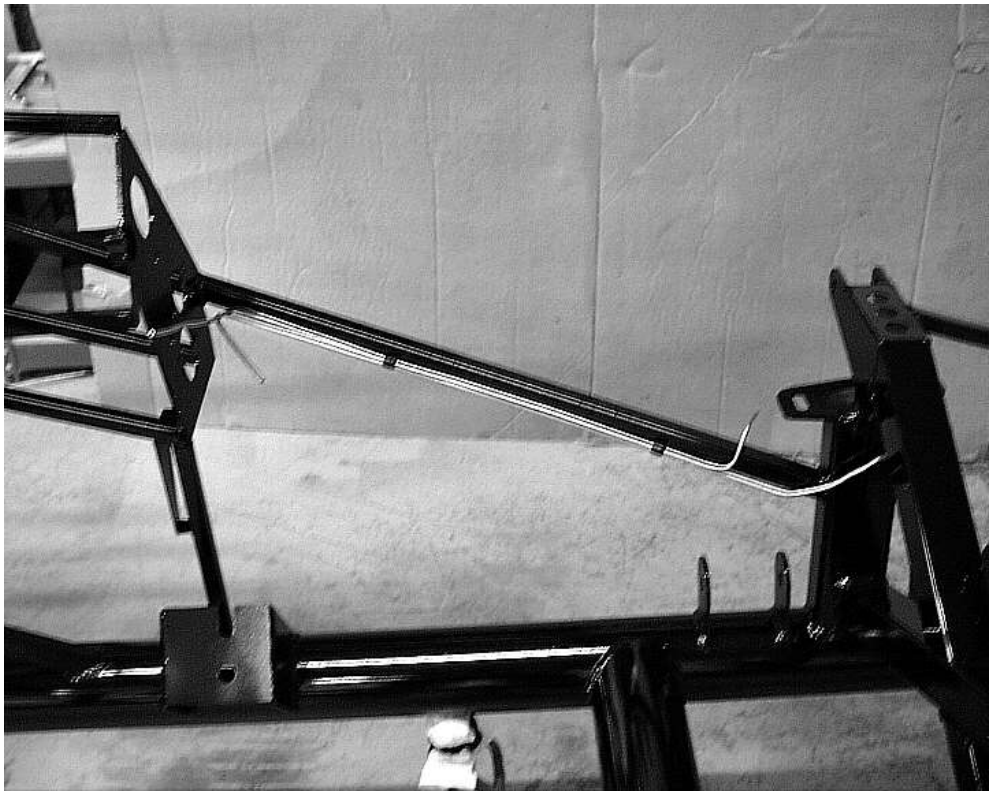
Front Brake Line

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 mount around if necessary.
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 and 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.

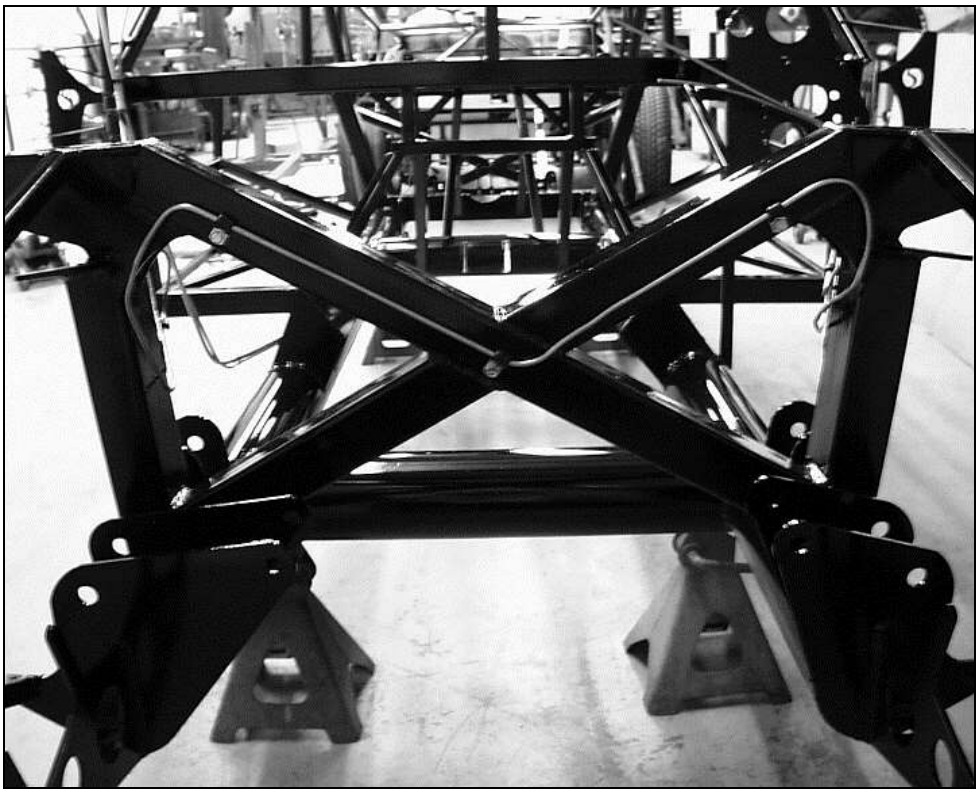
Brake Line Routing at Distribution Block



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



Front brake lines running to the front "X".

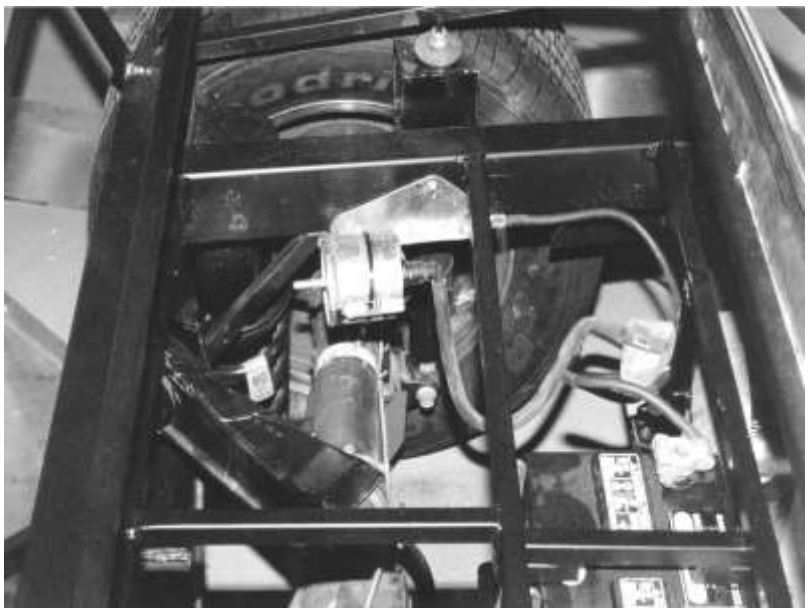


Brake line routing along frame X-member.

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. Mount the bracket and filter on the inside of the passenger side 2"x 3" rear trunk frame extension as shown in the photo below.



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

2. Make sure the fuel line will not get in the way of the tire. Fasten the lines securely to make sure there is sufficient clearance.

Fuel Lines

ATTENTION: *Some carbureted fuel pumps do not require a return line. Read the instructions from your pump and carburetor.*

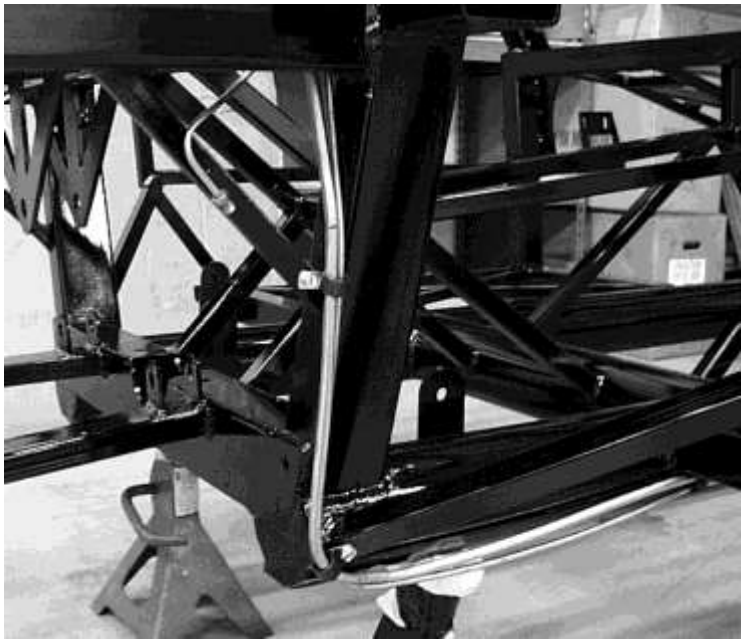
TOOLS: *3/8” socket, tube bender, double flaring set, tube cutter, 3/16”drill bit, drill, marker, tape measure, electrical tape.*

PARTS: *Insulated line clip assembly (FFR# 11029), ¼” fuel line (FFR# 10784), 5/16” fuel line (FFR# 10783).*

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. Temporarily install the passenger floor on the frame.
3. Measure four feet of both lines and mark with a marker pen. Use a tube bender of the appropriate size to make a 90° bend at the point marked as seen in the photo. This bend goes in the front middle of the passenger foot-box so that the lines stick straight up in the air. Leave sufficient length for engine type/placement.

Passenger foot-box with fuel lines in place.

4. From the passenger footbox, go towards the first 2”x 2” frame outrigger alongside the 4” round tube.
5. Fasten the lines to the 2”x 2” square cockpit outriggers with the insulated line clips.
6. In a similar fashion to the rear brake line, run the fuel lines up the outside of the 2”x 3” frame member. It may be easier to turn the frame on its side to do this.
7. Run the fuel lines to the inside of the frame after the lines pass the angled ¾” tube. See the photo below.

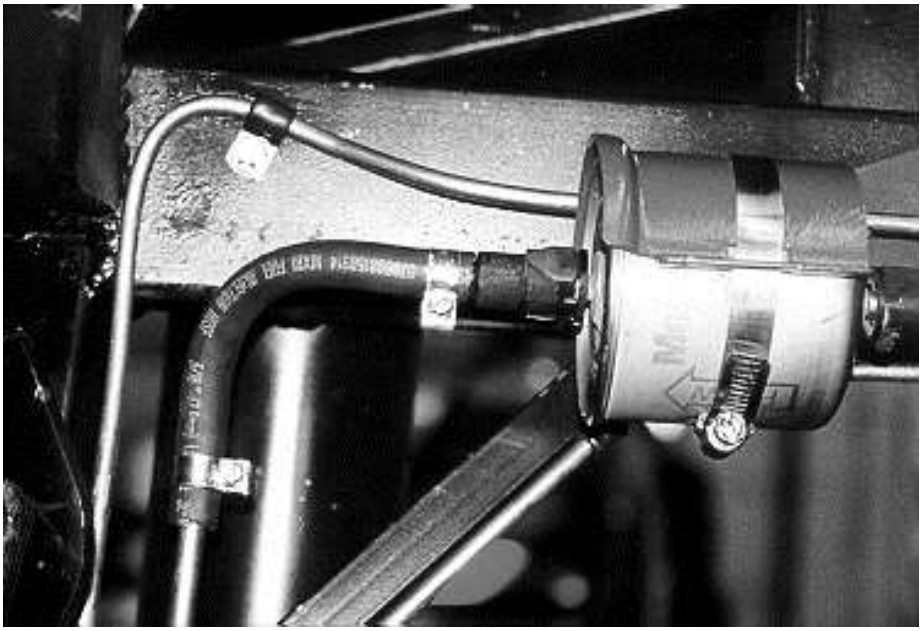


Rear fuel lines.

8. Run the 5/16" line to the fuel filter. Cut the 5/16" line three to four inches from the fuel filter.
9. Continue the ¼" line to the end of the 2"x 3" frame member.
10. Bend the line so that it will cross to the fuel return connector (the smaller tube) on the gas tank.
11. Cut the line four inches from the connector.
12. 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.

13. 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.

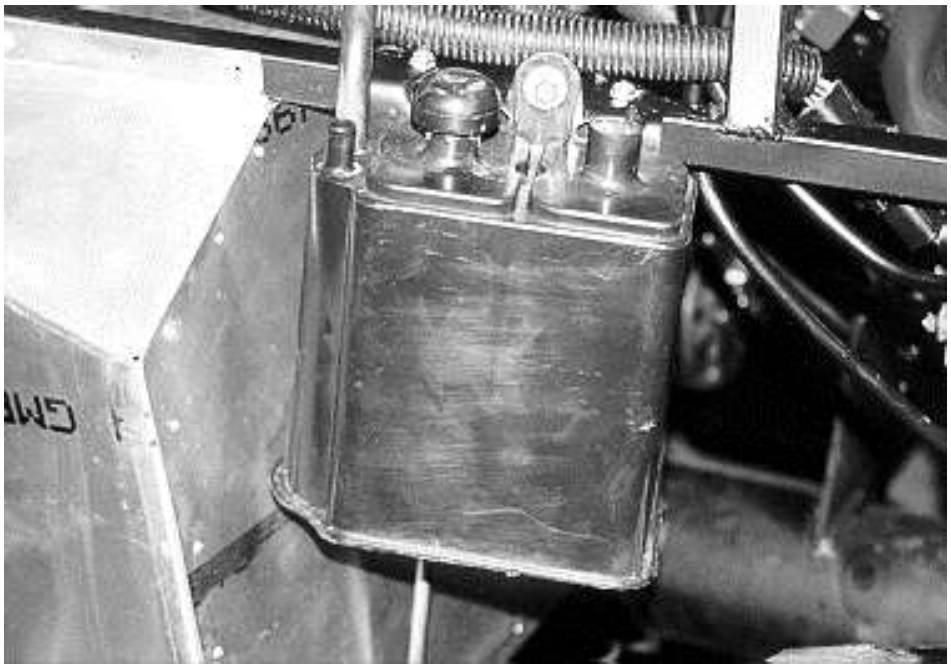


Rubber fuel line and Mustang connector on fuel filter.

14. Attach the connectors onto the fuel filter and fuel pump.
15. 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.

Fuel Vapor Canister

1. 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.
2. Drill two 3/16" holes through the canister bracket OEM holes. Mount w/ two #14 screws. See the photo below.



Emissions fuel vapor canister mounted.

3. Attach the vent hose from the gas tank to the canister and the hose leading to the engine.

Front Suspension Installation

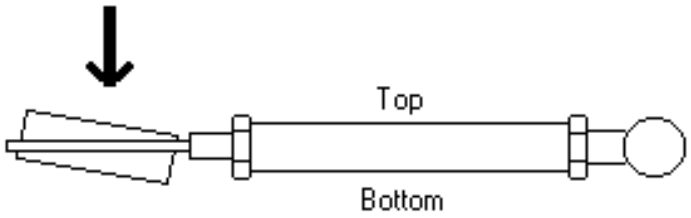
TOOLS: *Combination wrenches, coil-over adjusting tool (FFR# 10961), ⅜", ⅝", ¾", 11/16", 13/16", ⅞", 15/16", 1⅛", 18mm sockets. Rubber mallet, eye protection, drill w/#6 hex nut driver, ⅛", ½" drill bits, drill, rivet tool, torque wrench, silicone, caulk gun, #6 self tapping screws.*

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

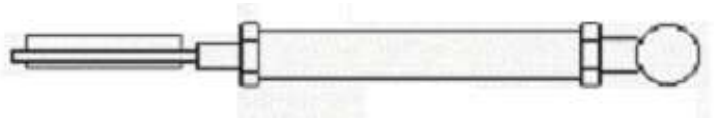
Front Upper A-Arms

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

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

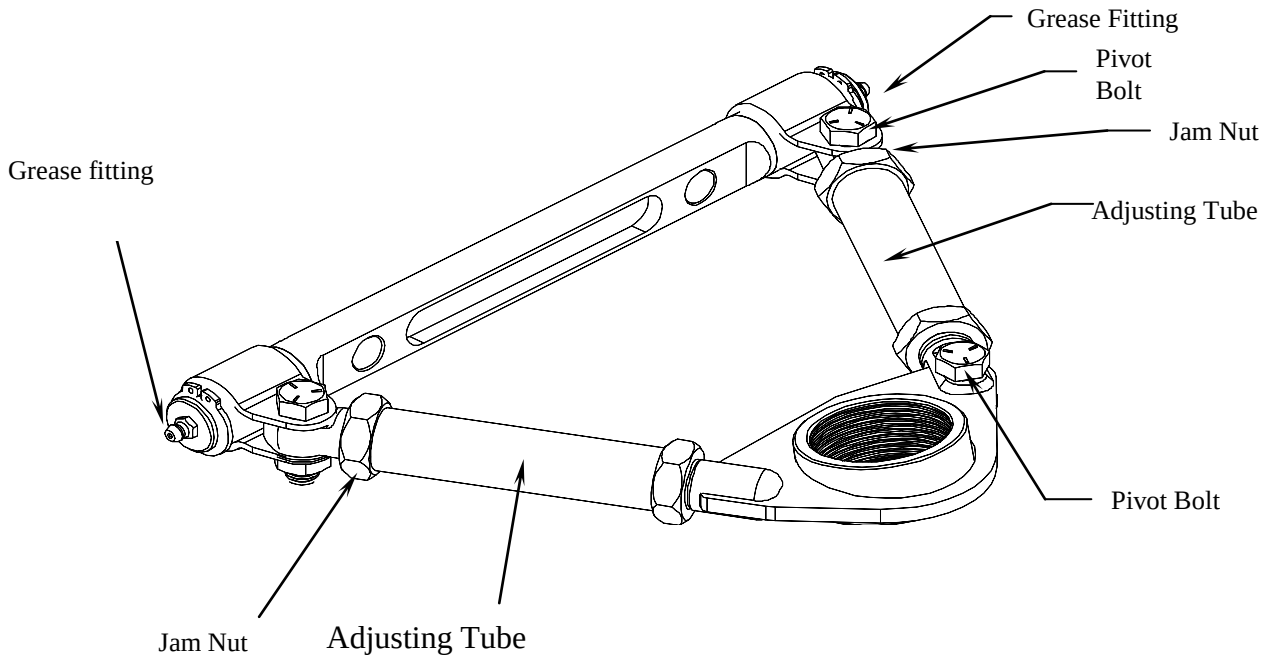


Or you may have



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

Adjusting the Arm - Use the diagram below for reference.



3. Slightly loosen the three pivot bolts using a ⅝" and $^{11}/_{16}$" wrench.
4. Loosen the jam nuts on both ends of each adjusting tubes using a 1⅛" wrench. Turn the adjusting tubes to lengthen or shorten the arm. **After** you have adjusted the arm to the desired length, tighten down the jam nuts against the adjusting tubes, and then tighten each of the three pivot bolts. If you are using the Gold colored arms torque the bolts to 60 lbft. If you are using the Black colored arms 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.

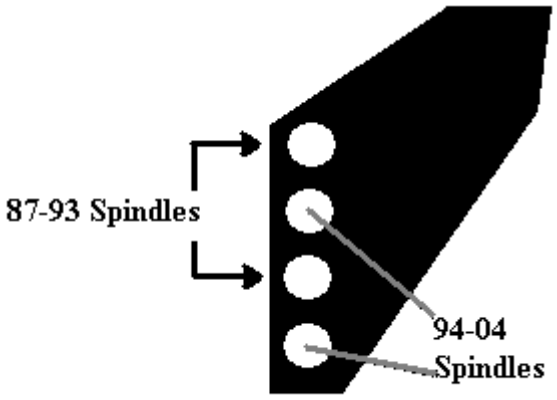
Note: The Pivot Bolts need to be loosened while the car is aligned and retightened afterwards.

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.

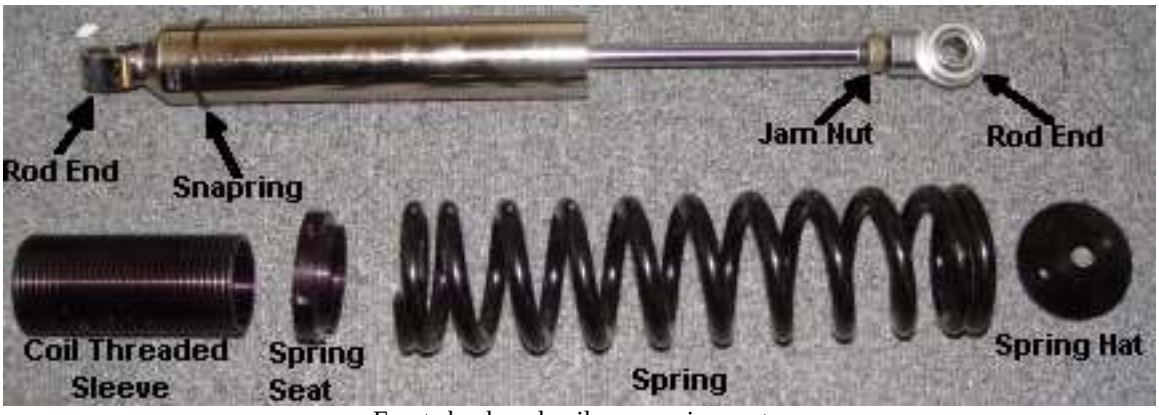


7. Install the front lower control arms on the frame.
8. While holding the arm parallel to the ground, torque the bolts to **135-149Nm (100-110 lbft).**
9. Attach the spindle assembly to the lower control arm on the frame. Removal of the brake caliper and disc along with the brake shield may be necessary. **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.

Front Coil-Over Shock Assembly

ATTENTION: *The front shock is pre-valved at the factory. We supply 450 lb. springs with the kit. Other springs are available for different ride characteristics.*



Front shock and coil-over spring parts.

1. Remove the rod end and Jam nut from the end of the shock.
2. Slide the coil-over threaded sleeve on the shock. It may be fairly tight. **Make sure that the end with the groove in it goes on first**. This covers the snap ring already installed at the factory.

Groove in threaded tube.

3. Check the spring seat on the sleeve to make sure that the taller part near the threads is on the top so that it keeps the spring from rubbing the threads and that it is not on the bottom.

Threaded tube assembled on shock with spring seat screwed on correctly.

4. Slide the spring on the assembly.
5. Place the spring hat on the shaft so it sits on the spring.
6. Screw the rod end back on the shaft and tighten the jam nut.

Coil-over shock assembled.

7. Secure the spring to the hat using zip ties through the side holes in the hat.

Spring hat attached to spring

8. 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.
9. Fasten the shock to the top mount with the fasteners and 0.675" spacers provided.

Rear-End

ATTENTION: ***U****se caution when working with the rear end assembly, it is heavy.*
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. 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. **Torque to Ford Specs 75-95Nm (55-70lbft)**.
2. Tighten the two short bolts.
3. Attach the lower control arms loosely to the brackets on the axle using the bolt provided. The lower bolt holes provide more traction than the upper holes.

Rear traction lock bracket installed with rear coil-over and 3-link options.

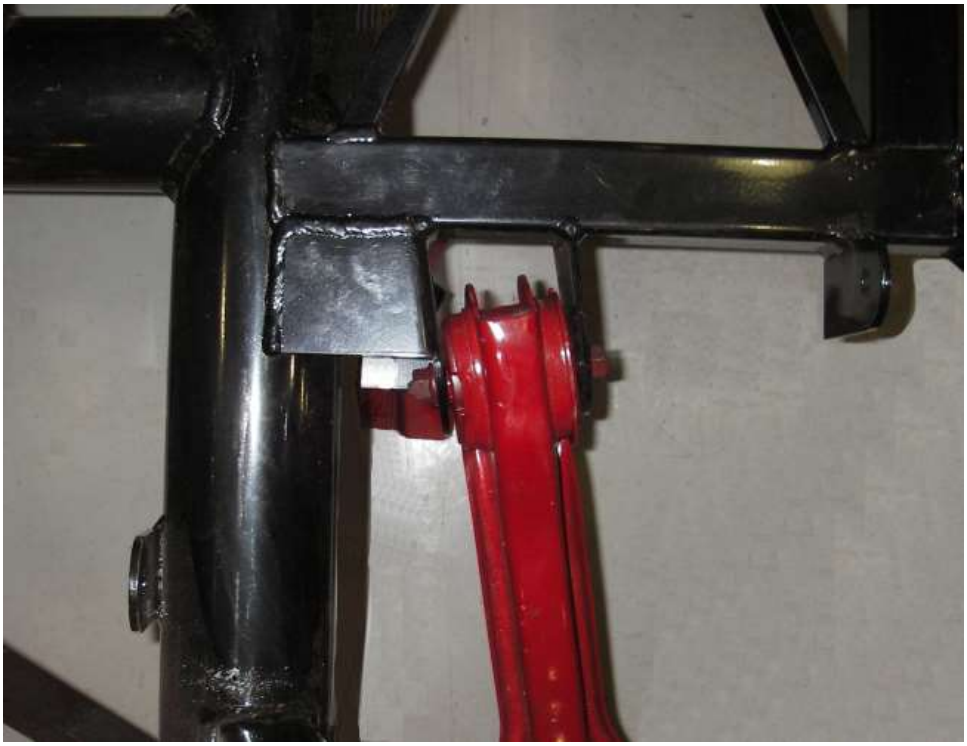
4. If not already on the axle, attach the Mustang upper rear control arms loosely to the rear end.
5. Attach the vertical shocks to the axle brackets. Insert the bolts from the inside out. Do not tighten the bolts yet.
6. If using the Mustang springs, hold the spring perches up to the frame so the vertical perch mount is in between the 2”x 3” tube and the vertical frame mount.
7. Mark the location of the holes on the bottom of the 2”x 3” tube with a marker.
8. Drill the two hole locations using a ½” drill bit.
9. Bolt on the perch using the ½” bolts provided.

Spring perch mount bolted on frame.

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

15. 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.
16. 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.



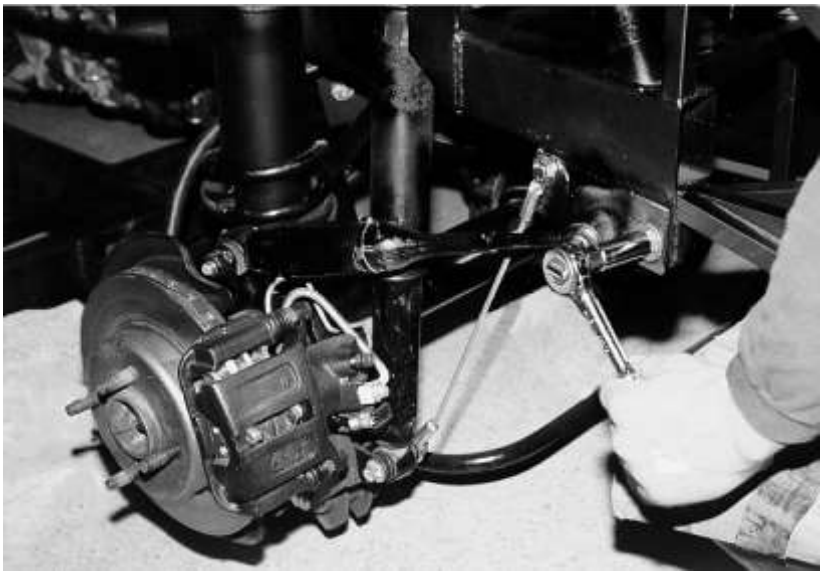
Passenger side stock rear lower control arm in the frame mount.

17. 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.

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

19. 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.
20. 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 (27lbft)**.
21. Mount the quad shocks and their brackets to the rectangular frame plate shown in the picture.
22. 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.

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

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

24. 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.
25. 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.
26. 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

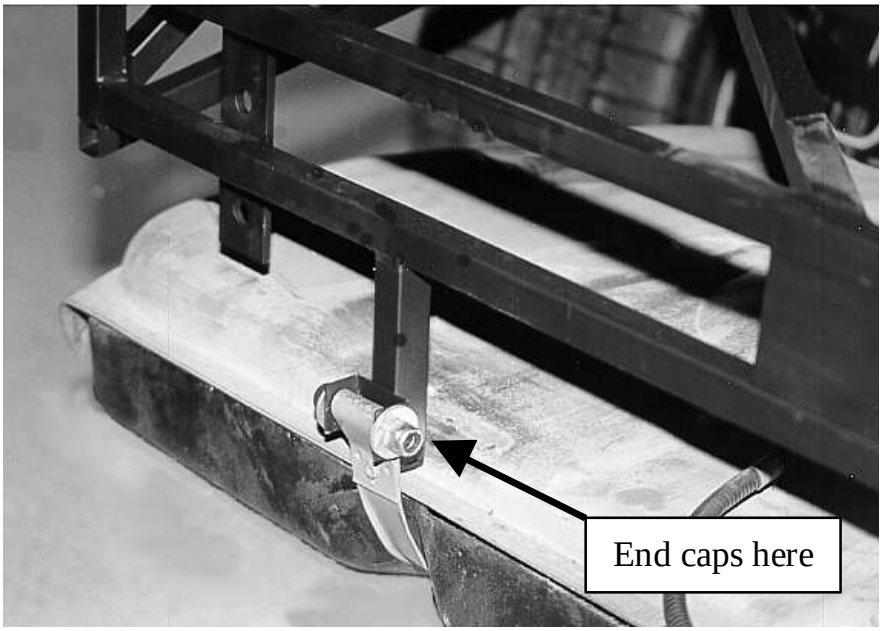
Fuel Tank Installation

ATTENTION: *Extreme caution should be used when handling and storing a fuel tank that contains fuel. Make sure to seal 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.*

PARTS: *Donor fuel tank, mounting straps, fuel line from tank to filter and fuel neck. Fuel tank assembly (FFR# 10896), fuel line assembly (FFR# 11078).*

1. Put the four square plastic plugs (FFR# 10996) 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.
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.
6. Don't tighten the rear strap fasteners (ends closest to the cockpit). The tank will have to be lowered slightly later in order to mount the body and the bumpers.
7. Attach the Mustang high-pressure line from the fuel pump to the fuel filter.
8. Attach the ¼" return line to the fuel pump return inlet using the ¼" fuel line and fuel injection hose clamps.

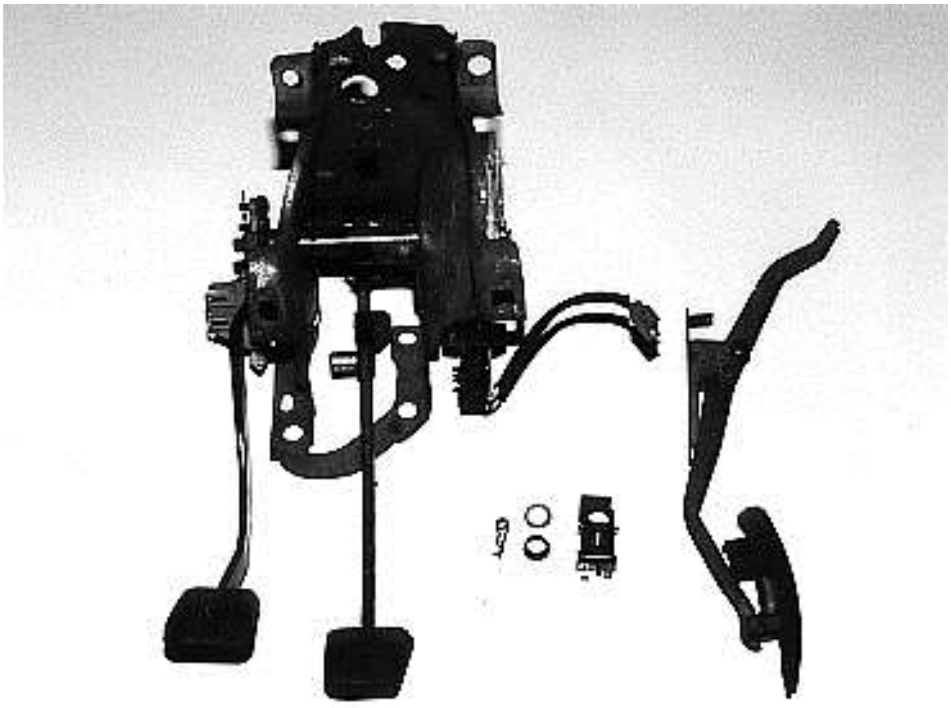


Fuel tank straps and end caps fastened.

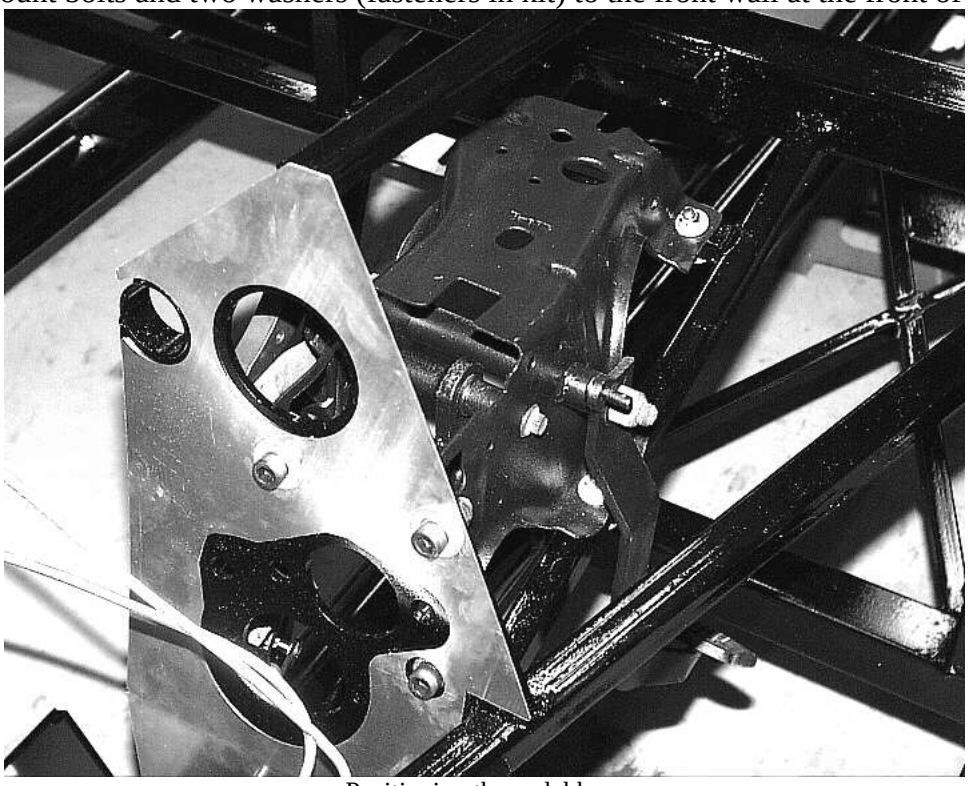
Pedal Box and Accelerator Pedal

TOOLS: *$^{3}/_{8}$", $^{9}/_{16}$" sockets, $^{3}/_{16}$", $^{5}/_{16}$" hex key, drill, $^{9}/_{16}$" combination wrench, $^{1}/_{8}$", ¼", $^{7}/_{16}$" drill bits, silicone, rivet tool, marker, hacksaw.*

PARTS: *Mustang pedal box, pedal box fastener assembly (FFR# 11023), aluminum cockpit assembly (FFR# 12838), $^{1}/_{8}$" rivets.*


Mustang pedal box and accelerator pedal.

1. Temporarily install the driver's side foot-box front vertical wall (FFR# 10904) using the factory screws to position it.
2. Position the Mustang pedal box on the two angled ¾" tubes over the driver's feet, and attach using two short upper mount bolts and two washers (fasteners in kit) to the front wall at the front of the foot-box.



Positioning the pedal box.

3. There are four holes on the Mustang pedal assembly on top of the ¾" tubing. Mark these holes. 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. Mark the corner of the pedal box that sticks out past the front foot-box plate. This will have to be trimmed. See the photo below.
4. Remove the pedal assembly.
5. Drill ¼" holes completely through the ¾" tubing for the pedal-box.
6. Use a $^{7}/_{16}$" drill bit to drill the bolt hole in the pedal box for the master cylinder bolt.
7. Trim the corner off the pedal-box using a hacksaw.
8. The front foot-box aluminum panel can now be bonded (silicon) and riveted in place with the $^{1}/_{8}$" long rivets.
9. Install the pedal box with the two $^{3}/_{8}$" 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 washers (FFR# 12337) on the underside of the tubing.

Pedal box installed.

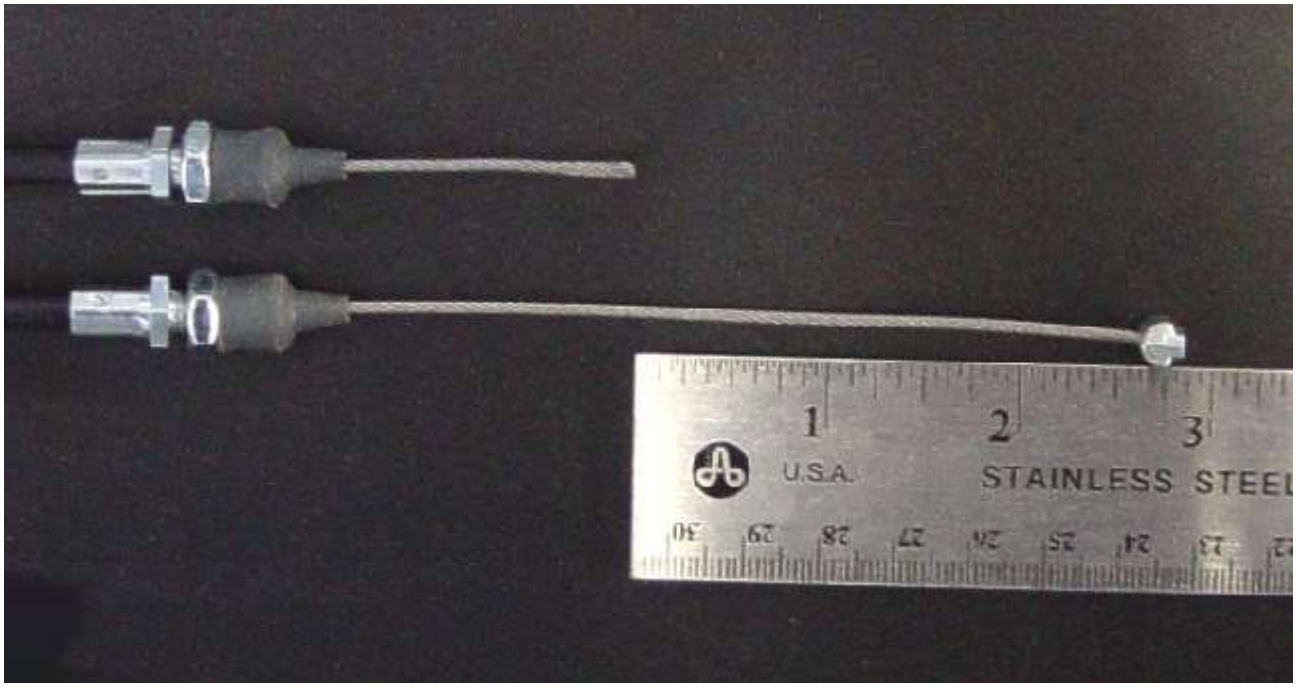
10. Attach the trimmed accelerator pedal using the kit fasteners [(2) $^{1}/_{4}$" x ¾" long bolts (FFR# 12335), washers and nuts (FFR# 10802)] to the bracket on the vertical ¾" tubing at the front of the foot-box.

Accelerator Cable

TOOLS: *$^{5}/_{64}$" hex key, ⅜", $^{7}/_{16}$", ½" wrenches.*
PARTS: *Pedal box hardware (FFR# 11023), Accelerator cable components (FFR# 13777).*

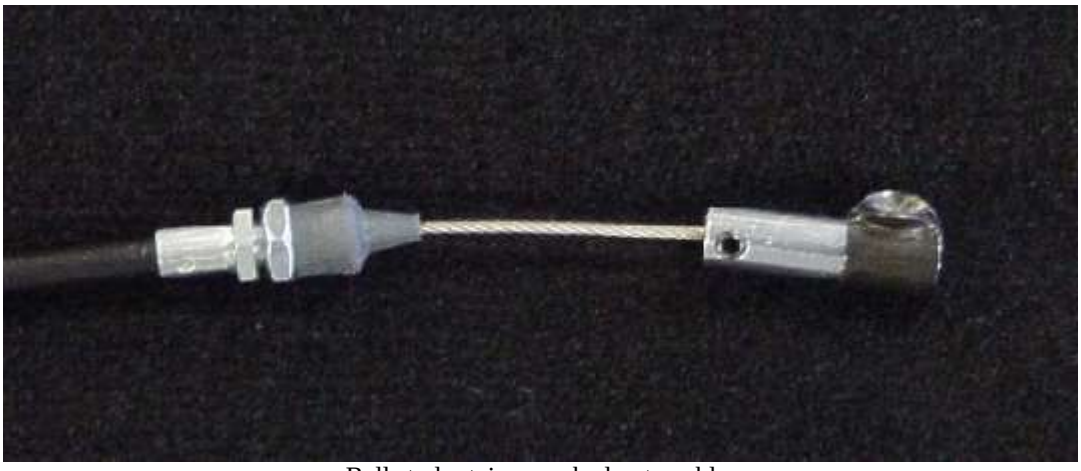
87-93 Fuel Injected Applications

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.

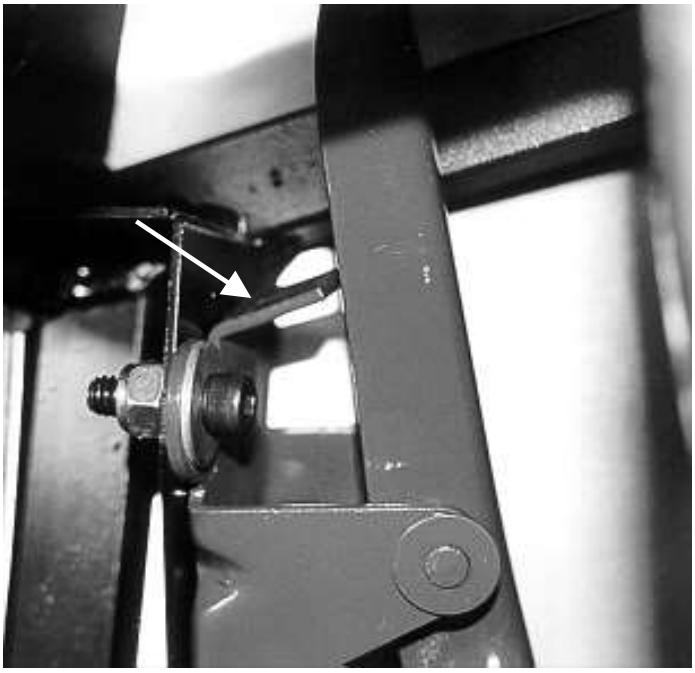

Ball stud retainer pushed onto cable.

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 as shown.

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

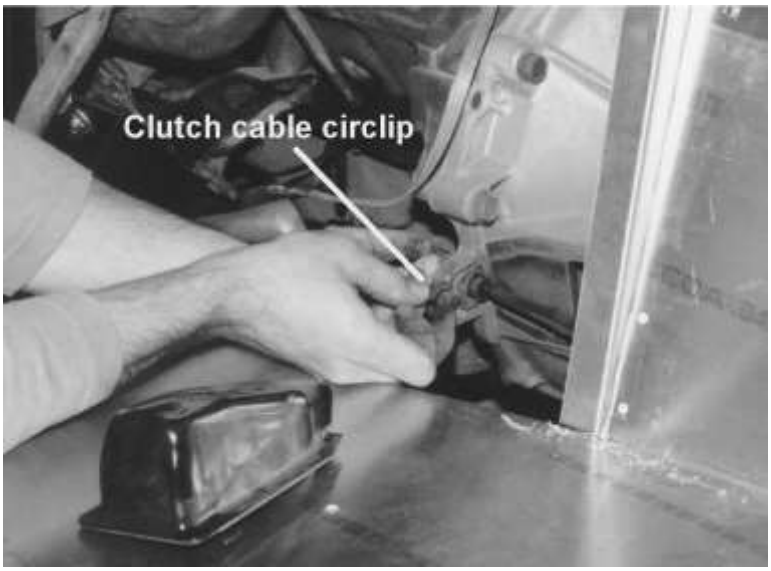
1. Insert the pedal end of the cable into the foot box.
2. Screw on and tighten the 5/16" locknut on the cable sheath inside the foot box using two ½" wrenches.
3. Hold the accelerator pedal up to the mount on the ¾" tube at the front of the foot box. The higher you can mount the pedal the better the 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 ⅜" 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.



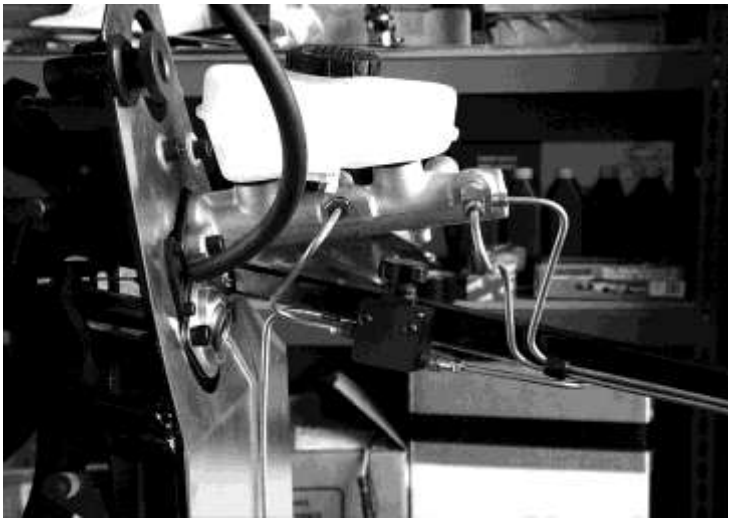
Installing the clutch cable.

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.

Master Cylinder & Push Rod

ATTENTION: *Avoid dripping brake fluid on any painted surfaces. Clean up spills immediately. The Master cylinder needed depends on the size and number of pistons in the brake calipers. <u>Use good brake pads</u>. An affordable brake pad that works well is Performance Friction brand pads.*
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 fastener assembly (FFR# 11023), proportioning valve.*



Master cylinder mounted and plumbed.

1. Use the $^{3}/_{8}$"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. Push the retainer clip through the hole in the pedal so that the push rod will not come off.
7. If you plan to race frequently, find some small springs and attach them to the brake pedal and pedal box to prevent the pedal from moving during severe acceleration.

Connect the brake lines to the Master cylinder. The front two connections go to the distribution block. The bottom rear connection goes to the front left brake caliper.

Cockpit Aluminum

ATTENTION: *Do one panel at a time. Be careful of the aluminum edges as they are sharp.*

PARTS: *Drill, $^{1}/_{8}$" drill bit, rivet tool, silicone, #6 self tapping screws, #6 hex nut driver, ruler, marker, Acetone or carburetor cleaner, rags.*

TOOLS: *Aluminum cockpit assembly (FFR# 12838), secondary body fasteners assembly (FFR# 12749).*

Aluminum Floor Panels

ATTENTION: *If you have not spaced and drilled the aluminum for the rivets, return to the aluminum removal and preparation section earlier in the manual.*

1. Position the pieces before doing any work to make sure you are familiar with placing them in the frame accurately and to see where the silicone needs to be applied.

2. Apply silicone to the frame on the main contact points of the 4” round tube, 2”x 2” floor supports, and the ¾”x ¾” tubes as shown.
3. Lay each floor piece into position and attach the panel with self-tapping #6 screws. Press firmly on all surfaces to squeeze the silicone out and along panel.
4. Drill through all of the holes previously made in the aluminum and into the frame.

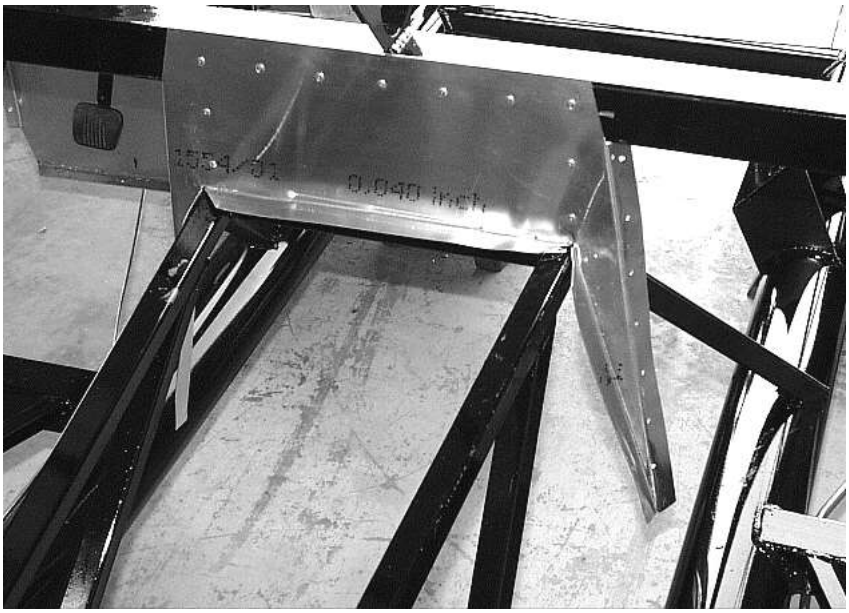
With the panel clearly marked, drill all rivet holes in advance.

5. Wipe and clean the aluminum panel using either acetone or carburetor cleaner.
6. Use the ⅛” short rivets wherever possible and ⅛” long rivets elsewhere.

Cockpit floors riveted in position.

Transmission Tunnel Front Vertical Wall

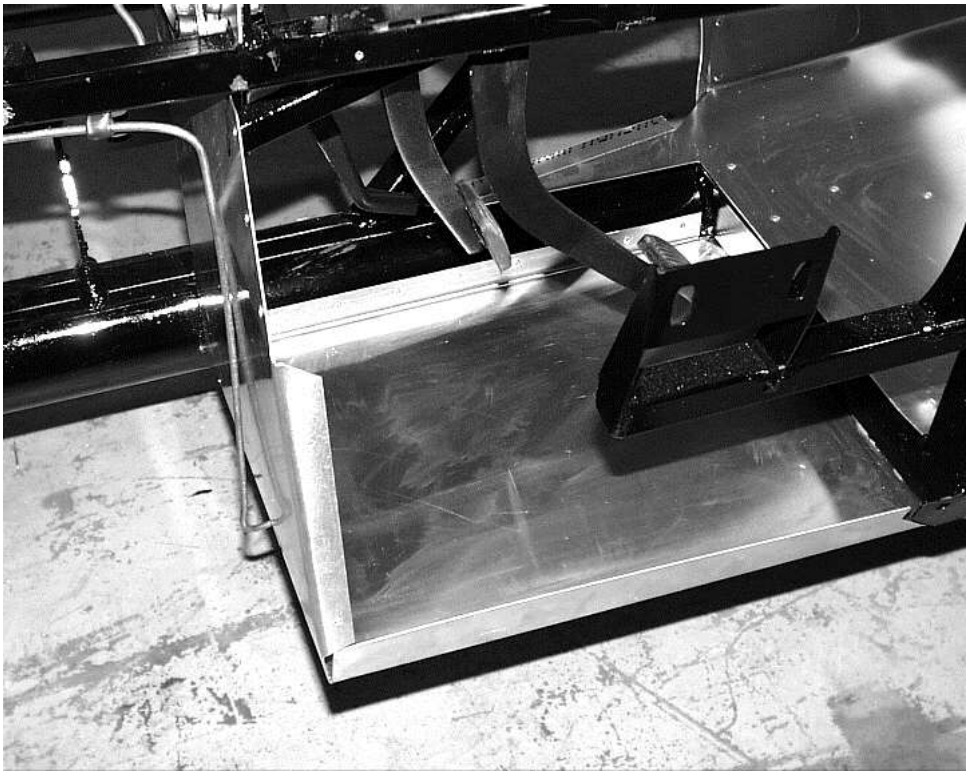
1. Position the panel on the frame as shown below.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panel with #6 self-tapping screws.
5. Rivet the panel in place.



Transmission tunnel front vertical wall.

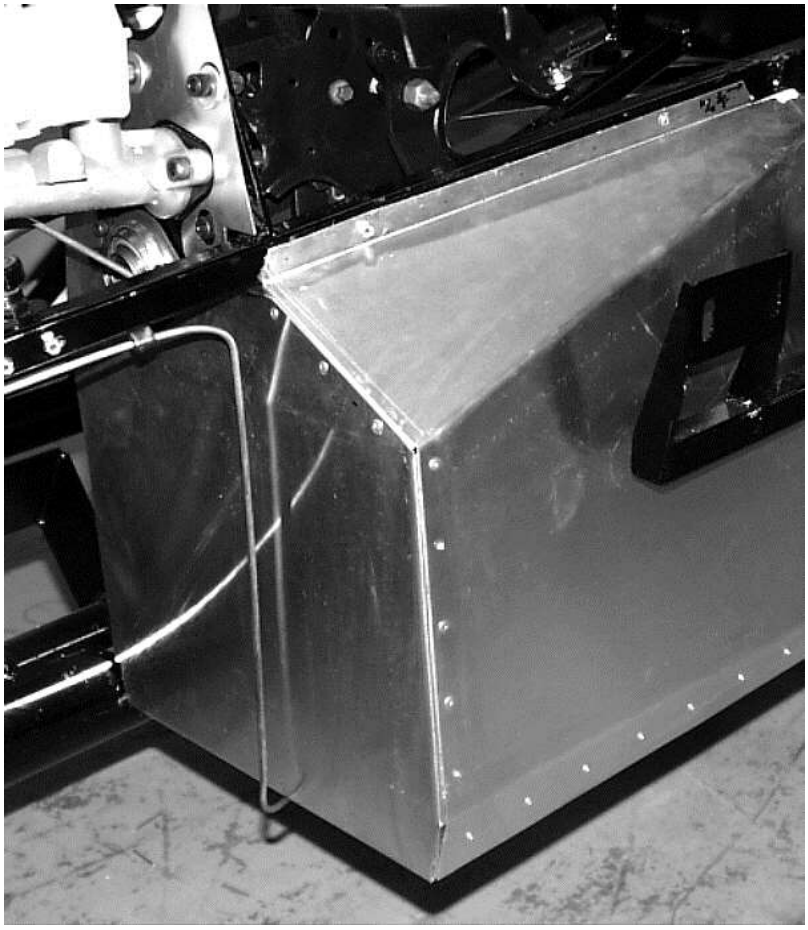
Driver's Foot Box

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.



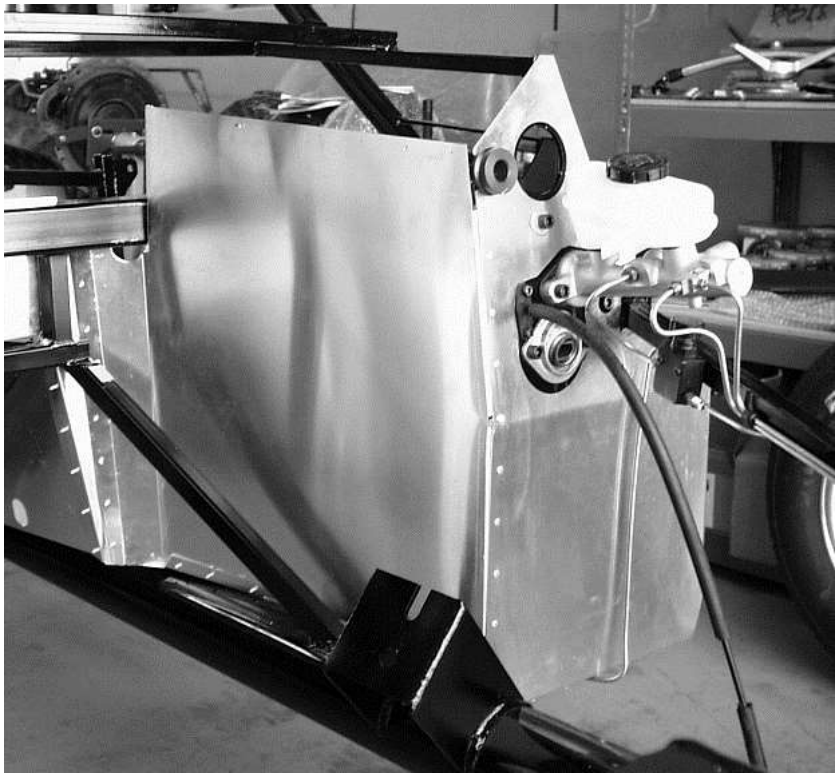
Foot box floor set in position.

2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panel with #6 self-tapping screws.
5. Rivet the panel in place.
6. Position the outside wall on the foot box. The tab on the front wall goes on the inside of the outside foot box wall.



Driver's foot box outside wall riveted in place.

7. Mark where the rivets will go.
8. Remove the panel and apply silicone to the frame.
9. Attach the panel with #6 self-tapping screws.
10. Leave the top edge of the panel that rests along the 1" tubing unattached so that the foot box top can fit underneath it later.
11. Rivet the panels in place.
12. Position the inside wall on the foot box from the engine compartment side. The bent tabs go behind the front wall.



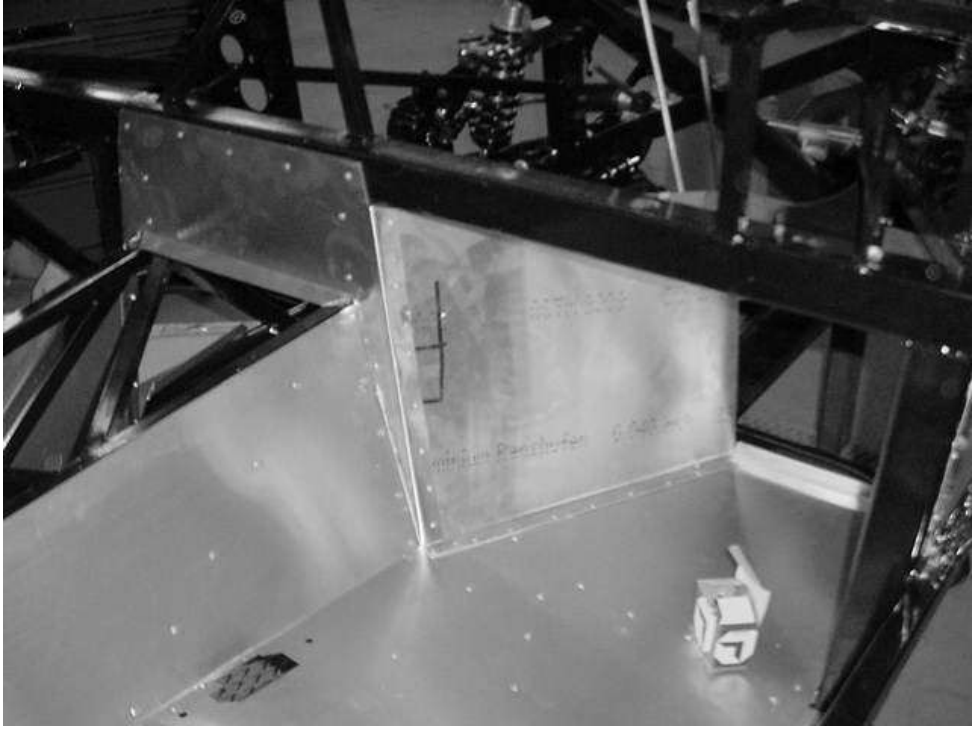
Inside wall riveted in place.

13. Mark where the rivets will go.
14. Remove the panel and apply silicone to the frame.
15. Attach the panel with #6 self-tapping screws.
16. Rivet the panel in place.
17. Position the top/inside panel.
18. Remove the panel and apply silicone to the inside wall, front wall and along the top ¾" frame tube.
19. Rivet the panel to the inside and front walls only.
20. Take a look at the completed footbox and floor for gaps between the panels and around the seat harness mounts. Use silicone to fill these gaps.

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

Passenger Foot Box

1. Attach the foot box top panel to the frame using the factory mounting hole and #6 self-tapping screws. Note where the panel touches the frame.
2. Remove the panel.
3. Apply silicone to the underside of the 2"x 2" frame tube where the panel will contact.
4. Install the top panel again with a #6 self-tapping screw.
5. Drill and rivet the panel to the underside only of the 2"x 2" frame tube.



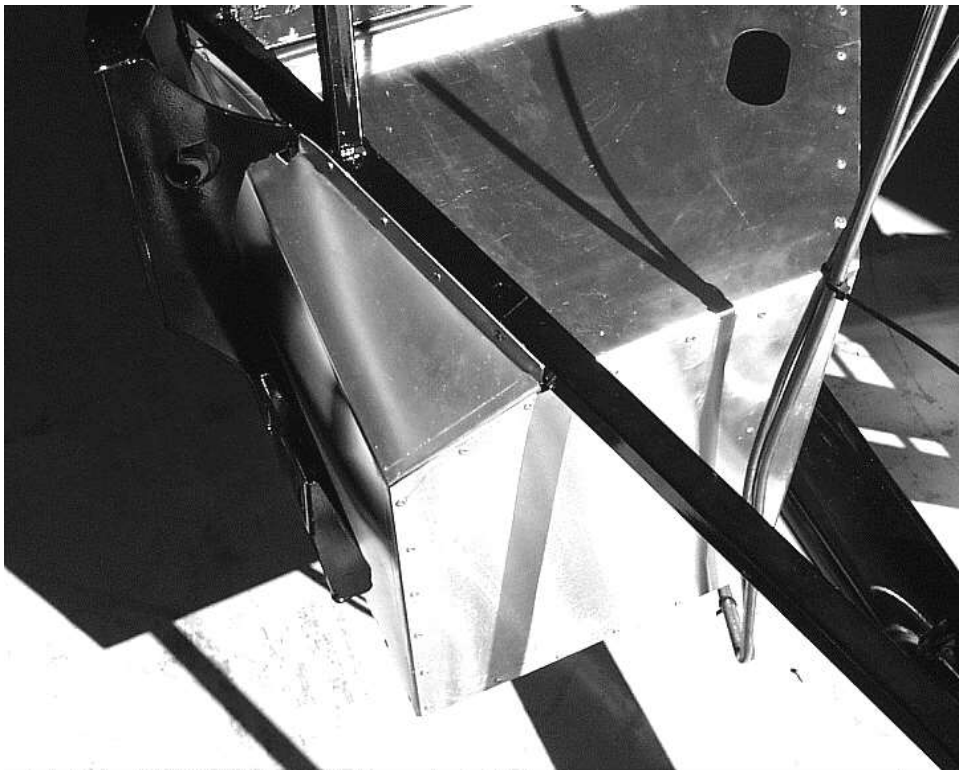
Passenger footbox vertical wall.

6. Position the foot box inside wall with #6 self-tapping screws in the factory holes. Note that the panel tabs go under the floor and top panel and to the inside of the transmission front wall.
7. Mark where the rivets will go.
8. Remove the panel.
9. Apply silicone to the inside wall tabs.
10. Install the inside wall with #6 self-tapping screws.
11. Rivet the panel in place.

Passenger's side foot box riveted together.

12. Position the outside wall with #6 self-tapping screws.

13. Mark where the rivets will go.
14. Remove the panel.
15. Apply silicone to the panels.
16. Install the outer wall and drill and rivet the panel into place. The entire passenger foot box should now be complete.



Outside of the passenger foot box.

17. 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.

Transmission Tunnel U-joint Cover

1. Position the panel on the frame.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the frame.
4. Attach the panels with #6 self-tapping screws.
5. Rivet the panel in place.

Cockpit Rear Wall

1. Position the panel on the frame. The panel sits on top of the floors and in front of the U-joint tabs.
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 #6 self-tapping screws.
5. Rivet the panel in place.

Trunk Walls

1. Position each panel on the frame.
2. Mark where the rivets will go by tracing around the tubes the same way previously done.
3. Remove the panels and apply silicone to the frame.
4. Attach the panels with #6 self-tapping screws.
5. Rivet the panels to the sides and back, do not rivet the bottom edge.

Trunk Rear Wall

1. Position the panel on the frame overlapping the side wall tabs.
2. Mark where the rivets will go by tracing around the tubes the same way previously done.
3. Remove the panel and apply silicone to the frame and side wall tabs.
4. Attach the panel with #6 self-tapping screws.
5. Rivet the panel in place.

Firewall

1. Position the panel on the frame, moving it as far to the driver side as possible.
2. Mark where the rivets will go.
3. Remove the panel and apply silicone to the 2"x 2"and ¾" tubes.
4. Attach the panel with #6 self-tapping screws.
5. Rivet the panel in place.
6. Silicone between the firewall and the top/inside panel.

Passenger Side Firewall Extension

1. Apply a section of the press-on weather stripping along the bottom of the panel.
2. Position the panel on the frame. The tab goes behind the main firewall and the weather stripping should seal against the top of the foot box.
3. Mark where the rivets will go.
4. Remove the panel and apply silicone to the aluminum tab and ¾" tube.
5. Attach the panel with #6 self-tapping screws.
6. Rivet the panel in place.
7. Apply silicone to fill any air gaps.

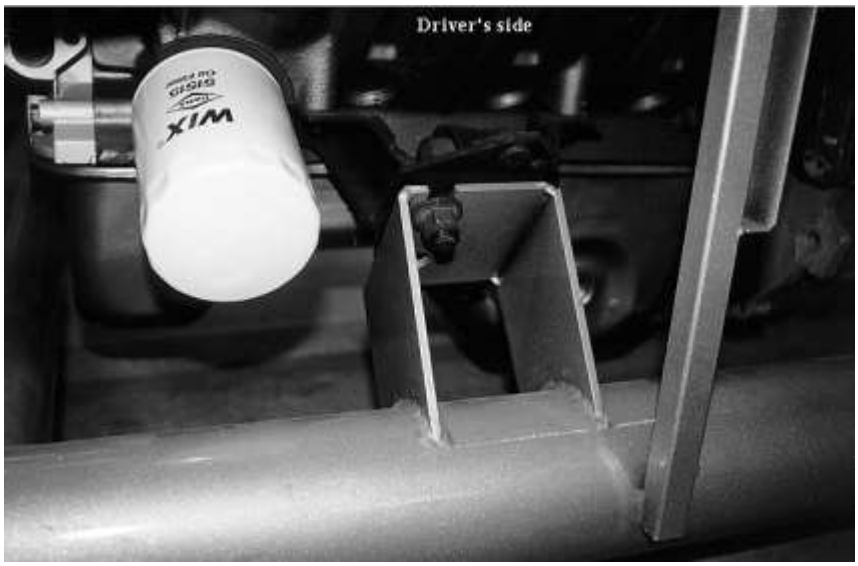
Engine/Transmission

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. The Engine and Transmission should be attached and lowered into the frame as one unit.*

TOOLS: *Engine hoist, $^{9}/_{16}$" deep socket, $^{5}/_{8}$", $^{15}/_{16}$" sockets, $^{3}/_{16}$", $^{5}/_{16}$" drill bit, drill, Bubble level, and friends.*

PARTS: *Engine/transmission, drive shaft.*

1. 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).
2. The engine/transmission assembly should be drained of oil to ease installation and so that the transmission oil does not leak during installation. Apply tape over the rear of the transmission to help reduce drips even if already drained of fluid.
3. Make sure that the Ford rubber engine mounts are installed on the engine.
4. Slowly lower the engine and transmission assembly into the engine bay.
5. 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 side engine mount is inserted into the engine mount hole first, followed by the driver's side mount into the slot.
6. Level the engine in the frame using the top two bell-housing bolts and a bubble level, not the intake manifold. The other way is to look at the engine mounts and note where the bolts are in the slots.

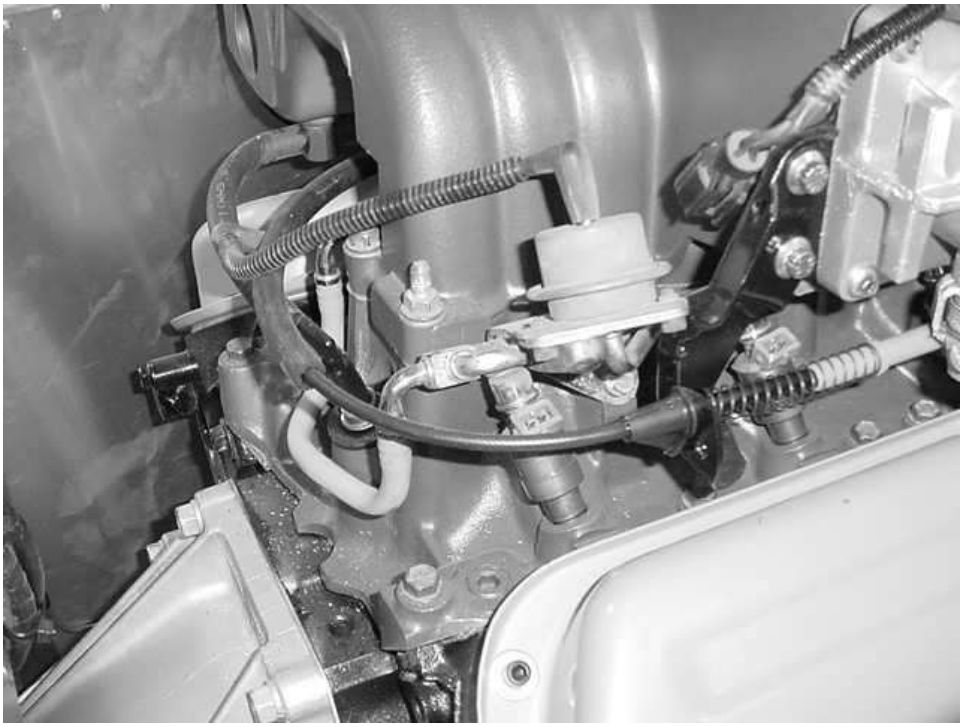


Engine mount on frame.

7. Tighten the large engine mount bolt on each side and secure the two smaller transmission bolts.
8. From above, slide the drive shaft into 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.

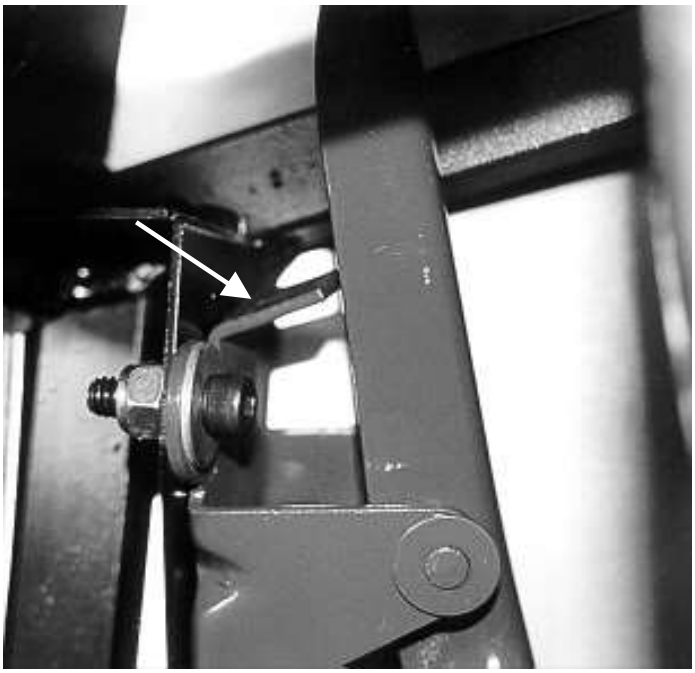
Accelerator, Clutch and Speedometer Cables

1. On a fuel injected engine attach the cable to the throttle body on the engine as shown and run the cable from the throttle body mount plate behind the EGR sensor, tightly against the intake manifold down tubes.



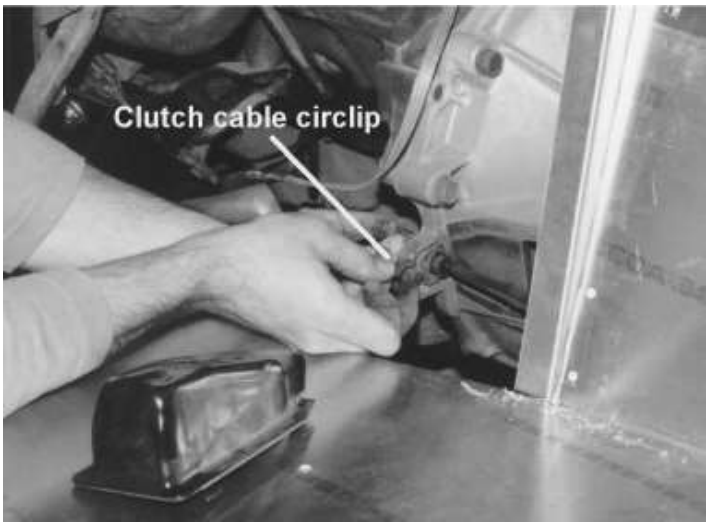
Accelerator cable attached to the throttle body.

2. On a carbureted engine we have found that Holley carburetors come with a variety of throttle cable connectors one of which works with the cable provided. Use a Universal Throttle Cable Bracket to attach the cable to the carburetor.
3. Check the idle screw underneath the throttle body to see if the throttle arm is hitting it. If it is not, the small tab behind the accelerator pedal may be stopping the plate from closing. Bend it up until the idle screw hits the throttle arm. You will notice a fairly high idle later when the car starts if this has not been done.



Tab behind the accelerator pedal.

4. 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 circle anchors the cable shielding to the bell housing. Be careful anchoring the cover as the aluminum threads can strip easily.



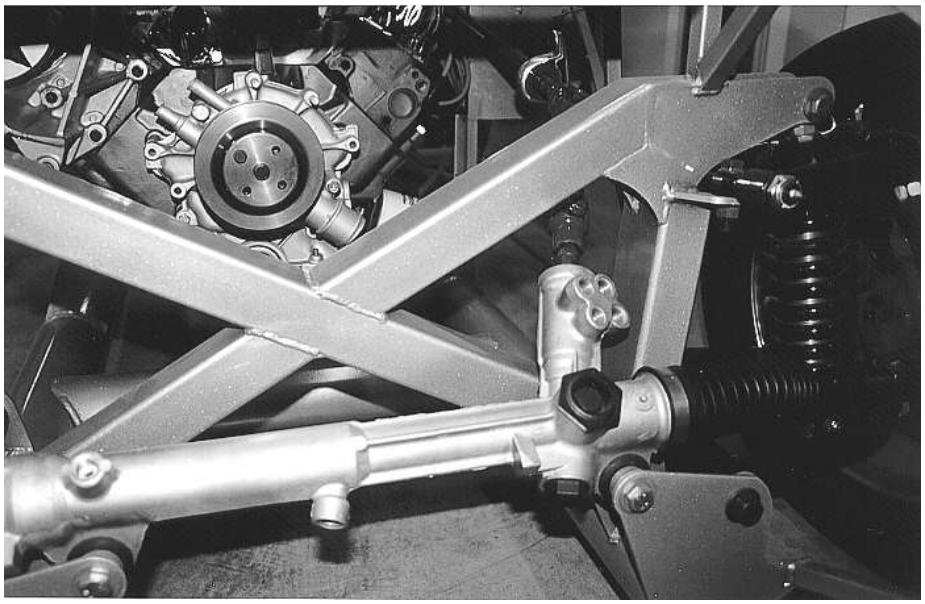
Installing the clutch cable.

5. Push the clutch cable into the mounting hole on the foot box front. The clutch cable is routed in front of and under the exhaust header. It can be fastened to the frame using the bracket on the cable.
6. Mount the cable so that it is clear of the hot exhaust header or the cable may fail prematurely. Make sure clutch and throttle cables line up with pedals.
7. Run the speedometer cable through the hole in the foot box top. The rubber grommet on the cable pushes into the laser cut hole.
8. Route the cable along the transmission tunnel to the transmission and push it into the sending unit.
9. When positioning the foot box top take care to keep the speedometer cable out of the way of the pedals and steering shaft.

Steering Rack

TOOLS: *¾" Socket, ¾" Wrench, Needle nose pliers.*
PARTS: *Steering rack/shaft assembly (FFR# 12753). Mustang steering rack.*

1. Place the steering rack between the rack mounts on the frame (above the front lower control arm bolt as shown in the photo below) making sure the rubber bushings and spacer sleeves are inside the rack mount.
2. From the front, pass the bolt through the front plate.
3. Place as many washers as possible between the mount bracket and the rack
4. Push the bolt through the washers, rack and the rear mount.
5. Attach the locknuts to the bolts.
6. Attach the tie rods to the spindles and secure with the nuts and cotter pins.



Installed steering rack.

Steering Shaft

ATTENTION: *Mount the bearings so that the ring collar is on the front side (towards the front of the frame) of the bearing.*

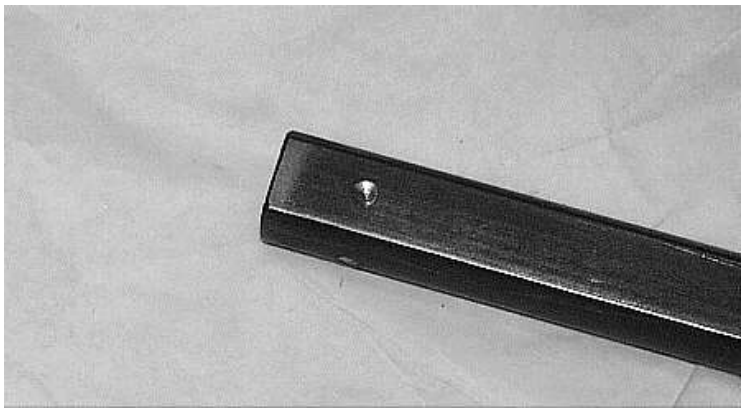
TOOLS: *$^{5}/_{32}$", $^{5}/_{16}$" hex key, ½", $^{9}/_{16}$", 10mm wrench, marker, drill, $^{3}/_{16}$" drill bit, Philips head screwdriver, 15mm deep socket.*

PARTS: *Steering rack/shaft assembly (FFR# 12753), Mustang upper steering shaft w/OEM clips, pillow block assembly (FFR# 12752).*

Top to Bottom: ¾" DD Lower Steering shaft, 1" DD tube, lower U-Joint, Upper U-Joint.

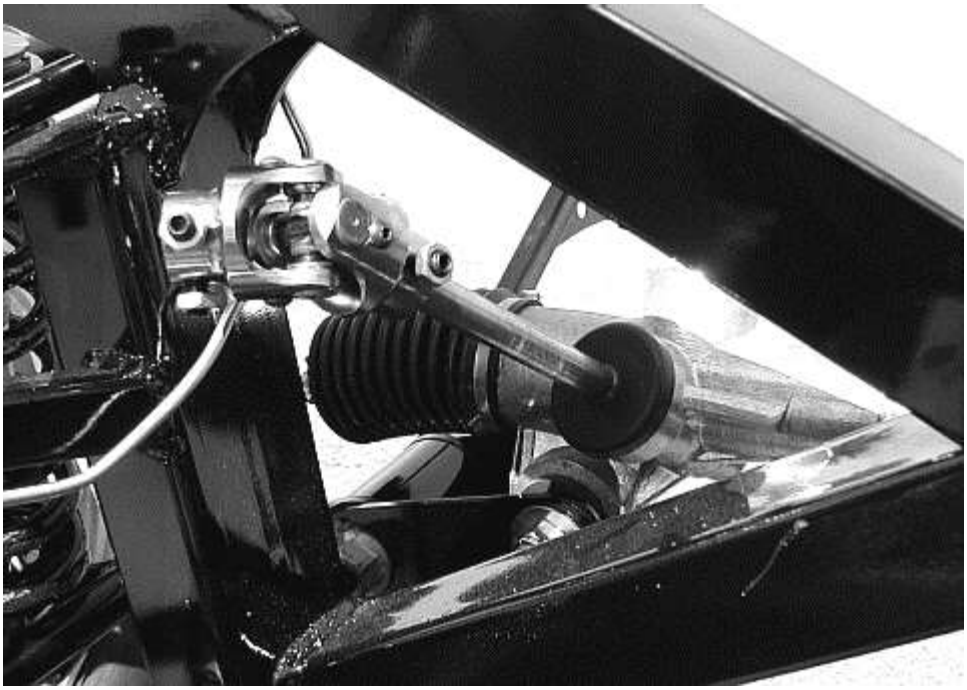
1. Remove the set screws from the U-joints.

2. One at a time, slide each U-joint onto the shaft until the shaft is flush on the inside of the joint. Use a marker to mark the center of each set screw hole. Remove the U-joint after marking. The 1" DD tube must also be marked at one end.
3. Use a $^{3}/_{16}$" drill bit and drill to put a small indentation in the shaft at the set screw locations previously marked. This is done to ensure that the shaft is locked in place in the U joints.



Indentations drilled in the shaft for set-screws.

4. Mount the 1" flange bearing on the front of the foot box (collar on the engine side 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.
5. Mount the ¾" upper pillow block to the bracket on the front of the 2"x 2" tube. Again, use a $^{5}/_{16}$" hex key, $^{9}/_{16}$" wrench and the kit fasteners. Do not tighten the bolts all the way, allow the bearing to swivel in the bracket.
6. Remove and save the two small OEM clips that are on the end of the Mustang upper shaft, as we are only checking the positioning of the column.
7. Slide the lower splined U-joint onto the steering rack shaft with the set-screw on the flat side.



Lower U-joint placed on steering rack shaft.

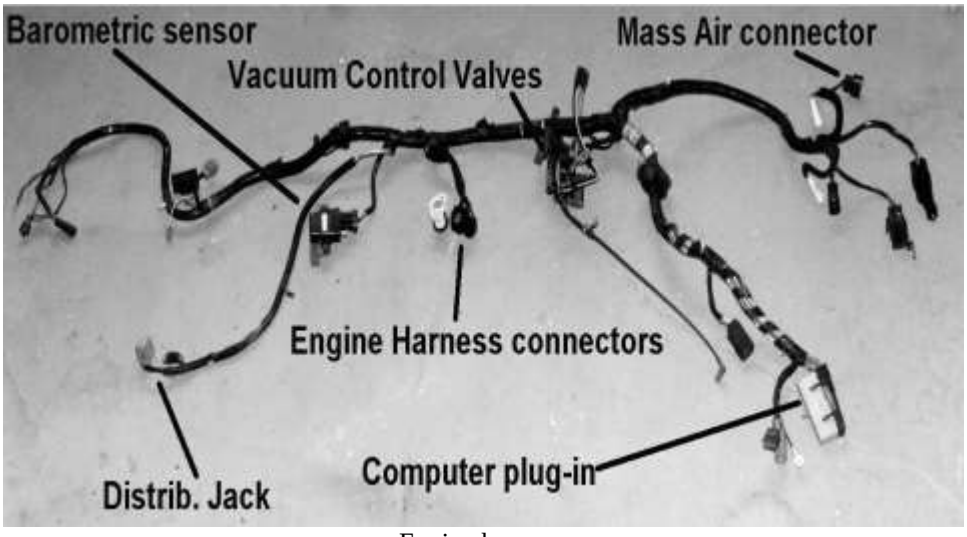
8. Slide the upper U-joint onto one end of the ¾" DD shaft. Do not tighten the set-screws.
9. Slide the 1" DD tube through the flange bearing on the foot box making sure that the set screw indentations made are in the engine bay side and not in the foot box.
10. Slide the collar for the 1" flange bearing onto the bearing from the front but do not tighten the set screw.
11. Slide the ¾" DD shaft into the lower U-joint and then slide the upper U-joint over the 1" DD tube.
12. Slide the Mustang upper steering shaft through the upper pillow block, into the collapsible shaft tube.
13. Adjust the U-joints and shafts until the shaft is flush on the inside of each joint. The upper U-joint will be tight against the locking collar.
14. Tighten the set screws and the jam nuts on both U-joints and the 1" locking collar.
15. Tighten the bolts holding the ¾" Pillow block and 1" flange bearing to the frame.
16. Attach the steering wheel boss to the Mustang upper steering shaft using a 15mm deep socket. 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.
17. Attach the aluminum steering wheel boss to the steering wheel. 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.
18. 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.

Engine Wiring Harness and EEC-IV

ATTENTION: *The aluminum is laser cut for the EFI (Electronic Fuel Injection) rubber grommets, the kit comes with block-off covers if a carbureted engine is used. If you are running a carbureted engine you do not need this section. There are after-market harnesses available for fuel injection applications. There are two ways to wire an EFI engine. One is to use the entire Mustang harness and transplant it. Another way is to use an engine harness from the Mustang and splice the power leads into an aftermarket car harness such as the Painless harness using Chilton's or Ford wiring diagrams. Make sure that the battery is not connected any time you are working with the computer.*

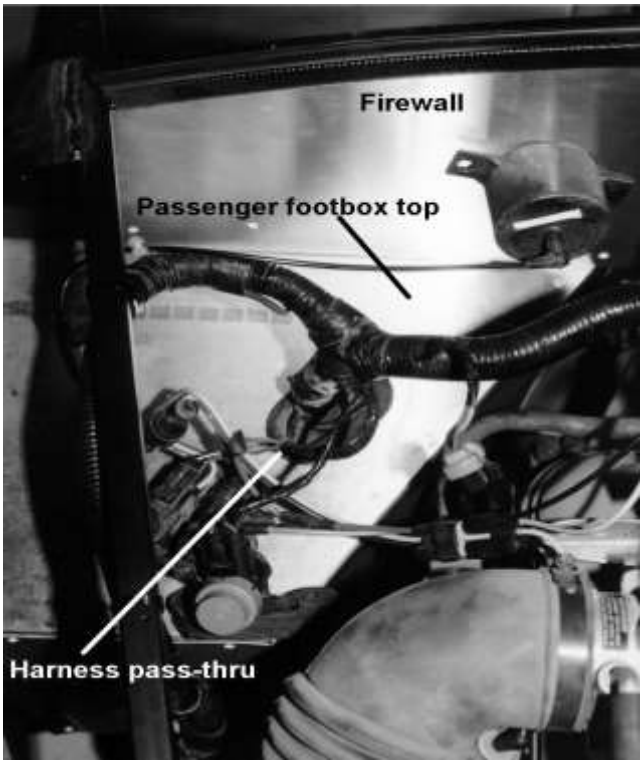
TOOLS: *$^{3}/_{8}$" socket, regular head screwdriver, slip joint pliers, $^{3}/_{16}$" and $^{1}/_{8}$" drill bits, drill, #6 nut driver, electrical tape, wire cutters.*

PARTS: *Mustang engine harness, engine harness assembly (FFR# 12874).*



Engine harness.

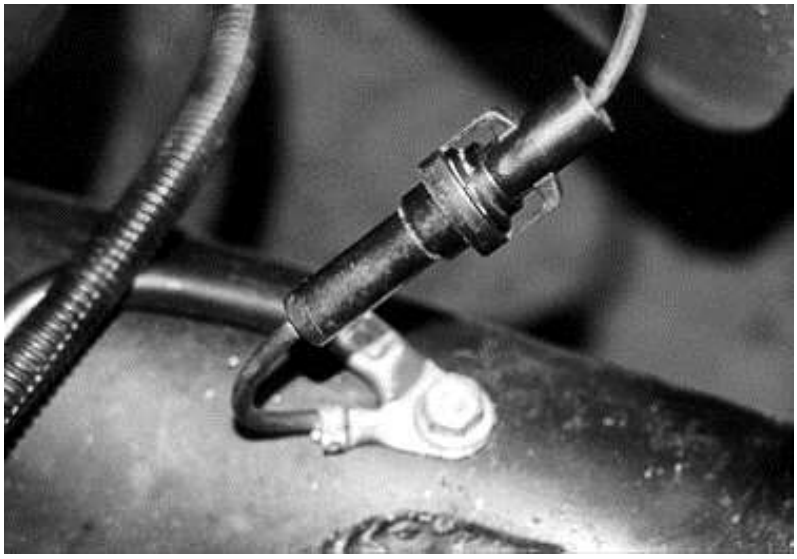
1. The engine harness begins in the passenger foot box. The computer hookup is pushed through the oval shaped hole on the passenger's foot box top from the engine bay side. See photo below.
2. Attach the computer to the top of the foot box or behind the dash area using the plastic bracket from the Mustang and the screws provided.
3. Cable ties can be used to secure the extra harness to the top panel by drilling two $^{3}/_{16}$" holes a ¼" apart and passing a zip tie through it.
4. The harness splits into two on top of the foot box. The short, smaller one of the two goes forward and connects to the Mass Air sensor and the harness on the engine for the O_2 sensors and oil level sender. The long bundle goes along the firewall and contains the vacuum control lines for the EGR valve and engine, the connection to the distributor, the two plugs for the fuel injector harness, and the power connectors to the dash harness by the master cylinder.



Passenger foot box in engine bay, shows firewall and insertion point for wiring harness.

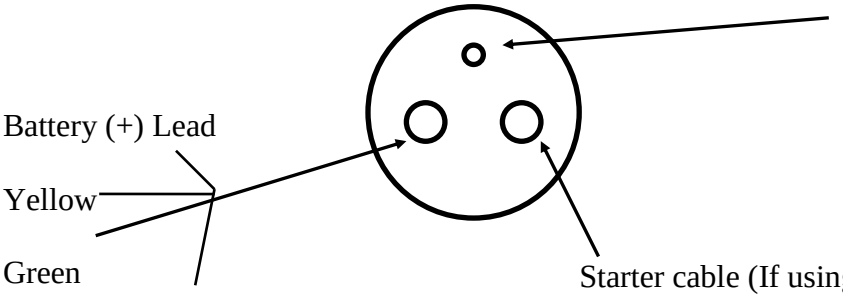
ATTENTION: *If you are running EFI without emissions equipment, the vacuum/electrical solenoids located on top of the foot box along with the vacuum reservoir on the firewall are not necessary. Plug the vacuum outlets on the intake remove the unused parts.*

5. Use the screws provided with the kit to mount the vacuum controls, BAP (Barometric Air Pressure) sensor, and starter solenoid. Mount the solenoid either to the 1" tube near the master cylinder or behind the engine for a cleaner looking engine bay.
6. Attach the computer connections to the starter solenoid and the ground to the backside of the solenoid against the 1" tubing as shown. The ground looks like a female stereo jack (sort of). Cut the connector off and use the ring connector provided.



Computer ground near Master Cylinder.

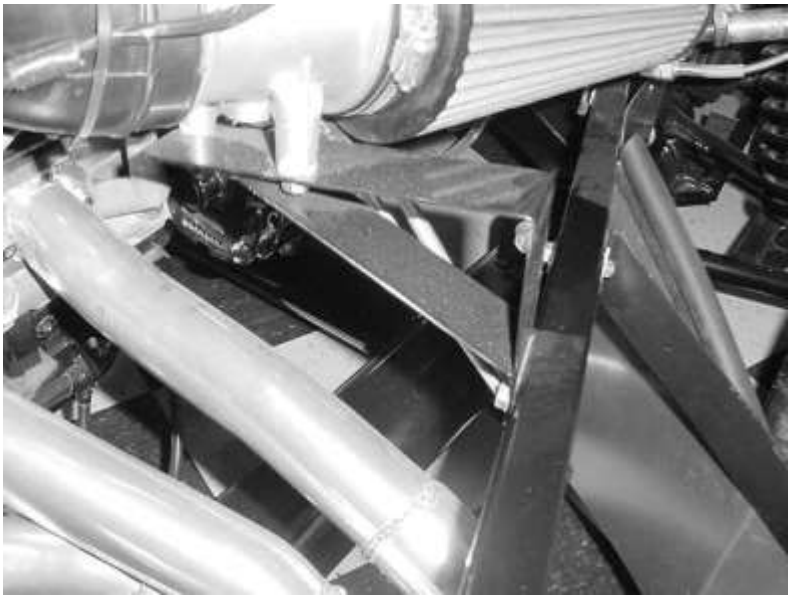
STARTER SOLENOID WIRING



Mass Air Meter

ATTENTION: *If you've chosen to run a non-fuel injected engine, this step is not needed.*
TOOLS: *Drill, 3/16" drill bit, 3/8" socket, flat head screwdriver.*
PARTS: *Mass air meter, air filter.*

1. Turn the Mass Air Meter on its side and attach the bracket to the 1" tube leading to the front suspension.



Mass Air Meter bracket.

Wiring Harness

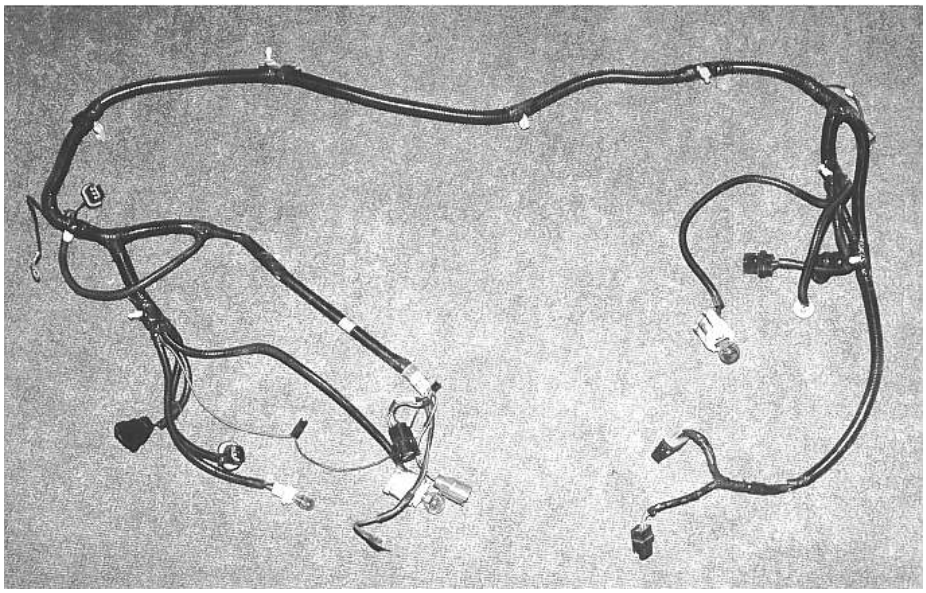
ATTENTION:

- *If you are running a carbureted engine in your car you do not need this section. Call us and let us know at time of purchase and we will delete the EFI gear and include a non-EFI wiring harness. Aftermarket gauges will have to be used.*
- *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 mean 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.*
- *There is more than one way to route the harness on the frame. These instructions only illustrate one way to accomplish this. We ran them to give the cleanest looking engine bay.*
- *Block off plates are included in the kit for the holes where the fuel injection harness passes through the foot box and transmission tunnel. The block-off plate for the driver's side foot box hole can be drilled to pass the wires through for the lights. The grommet that comes with the harness can be used here to keep the firewall sealed around the wires.*
- *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 foot box wall for these wires, as well as the rear taillight wires to pass through.*
- *Do not connect the battery!*

TOOLS: *⅜" Socket, regular head screwdriver, slip joint pliers, 3/16" and ⅛"drill bits, drill, #6 nut driver, electrical tape, wire cutters, wire strippers.*

PARTS: *Misc. electrical assembly (FFR# 10975), misc. electrical assembly (FFR# 12873), insulated line clip assembly (FFR# 11029).*

Headlight Harness

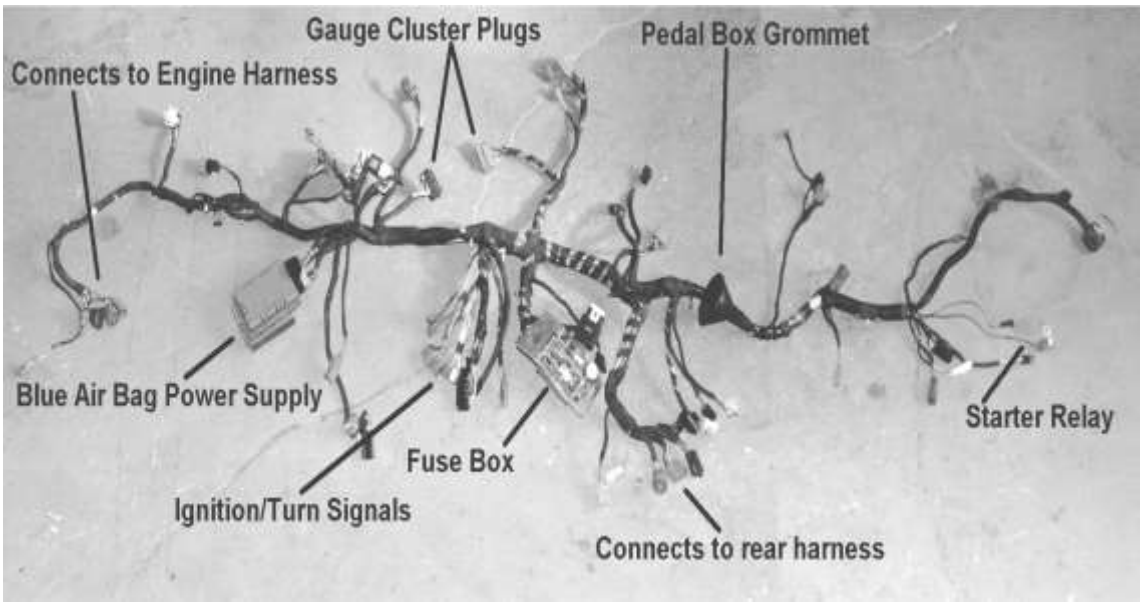


Headlight harness section.

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 Spyder GT in front so there is extra wiring between the headlights. Removing the tape from the harness, overlap the wires, re-tape and use the loom material provided in order to have a cleaner looking harness.
3. Run the harness along the front side of the "X" with the brake lines.
4. Run the harness down along the top of the 1" tube to the front "X". Use the insulated line clips, and the wire loom to hold the wires.
5. At the front "X" split the harness into two sections: Driver side lights and horns; Passenger side lights.
6. Run the driver side light wires along the outside of the 1" tube running to the nose hinge forward to the headlight area.
7. Run the passenger side light wires forward to the headlight area along the outside of the 1" tube running to the nose hinge.
8. The electric radiator fan ground should be grounded to the frame. Make sure to scrape down to bare metal before attaching the ground wire.
9. It is recommended that the relay included be used for the electric fan. Connect the relay as shown below. Use the electric fan wire in the harness as the switching wire. Run a separate wire to the hot side of the starter solenoid for the constant power. Connect the harness electric fan wire to one of the dash toggle switches. The fan is not needed all of the time. The 2-position toggle will serve as your on-off switch. If a thermostat switch is desired instead, you can pick one up at your local auto parts store.

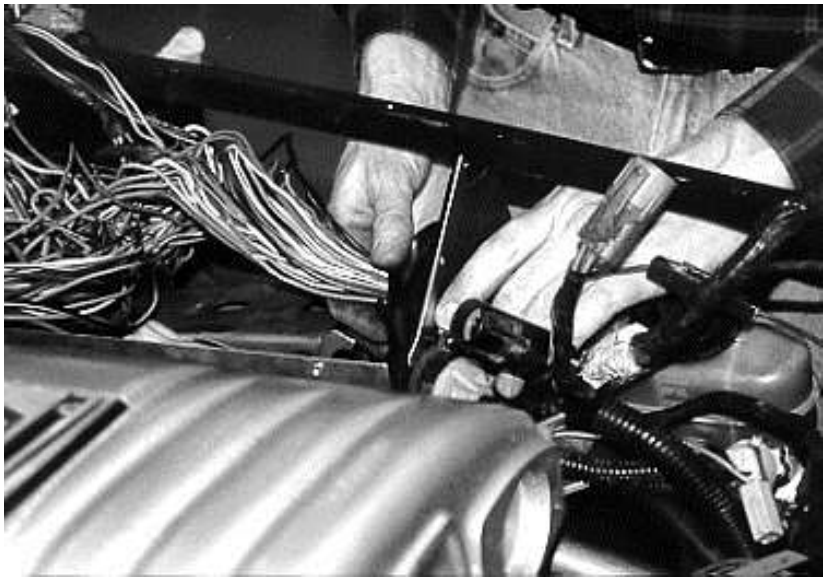
30 – Fan
85 – Ground
86 – Switched +12V
87 – +12V

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.



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 passenger side. Run everything loosely so that final positioning can be done. If running the A/C, leave the wires loose on top of the 2" x 2" until it is installed.
8. Connect the relays and snap connectors to their original spots along with all sensors and relays.
9. When the wire harness is installed, mount the fuse panel to the 2"x 2" dash hoop support and between the two ¾" x ¾" frame tubes in the driver's side foot box using the Mustang metal brackets and a couple of the #6 self-tapping screws.
10. Mount the headlight and hazard switches using the aluminum pieces (FFR #'s 10566, 10638) toward 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.
12. Run the dash area wires along the top of the 2"x 2" tube to the inside driver wall location.
13. Use the insulated line clips, and the wire loom to hold the wires.

Ignition and Turn Signal Stalk

TOOLS: *Hack saw, 5/16" socket, 9/64" drill bit, drill.*
PARTS: *Gauge/dash assembly (FFR #10893), donor ignition switch and turn signal stalk.*

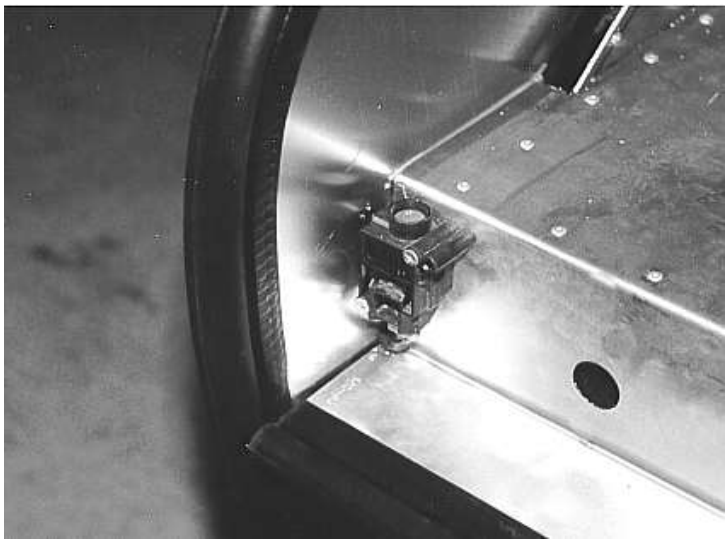
1. Mount the turn signal stalk with the stalk pointed towards the seat as high as possible between the plate steel that also holds the windshield and the vertical ¾" tubing next to it. The switch spans the gap. Use two 1" screws and a 5/16" socket and 9/64" drill bit.
2. The ignition switch mounts under 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.

Engine Bay Area

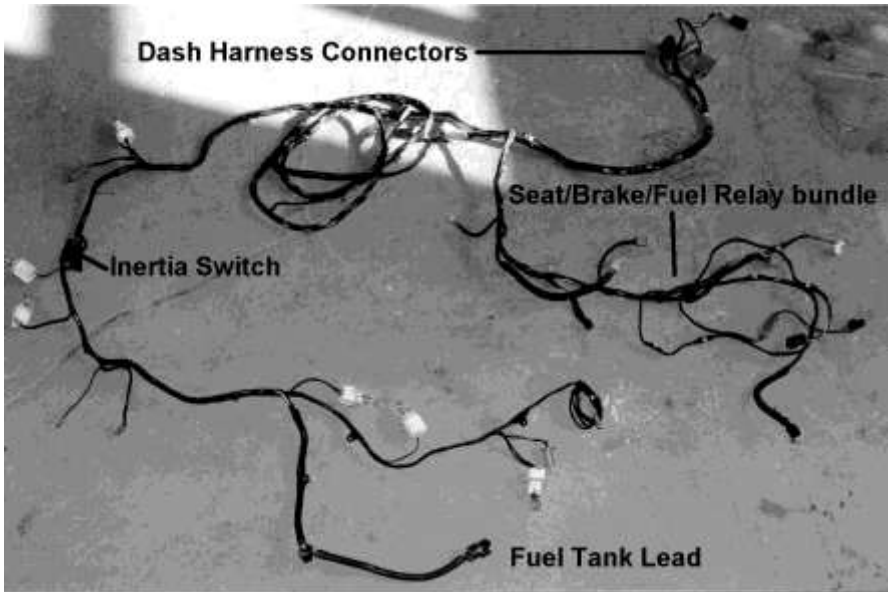
1. Place grommeting around the hole in the upper corner of the inside driver foot box wall.
2. Run the engine bay wires through the hole in the driver foot box inside wall.
3. Run the wires to the starter solenoid.
4. Bundle the wires for the Alternator, they can be run on the engine.

Rear Harness

1. Run rear harness from the hole in the driver foot box inside wall, along inside the transmission tunnel with the battery cable and straight back to the rear of the frame. Use zip ties, insulated line clips, and the wire loom to hold the wires and battery cable.
2. At the rear of the frame, run the wires low on the frame so that they are accessible after the body is mounted to the frame. Run the brake light wires to the far corners of the frame. The lights will mount to the $^{1}/_{16}$" plates on the rear of the frame.
3. Use the Mustang inertia cut-off switch inline with the fuel pump power.
4. Locate the switch out of the way but still accessible in case it is tripped.
5. 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.



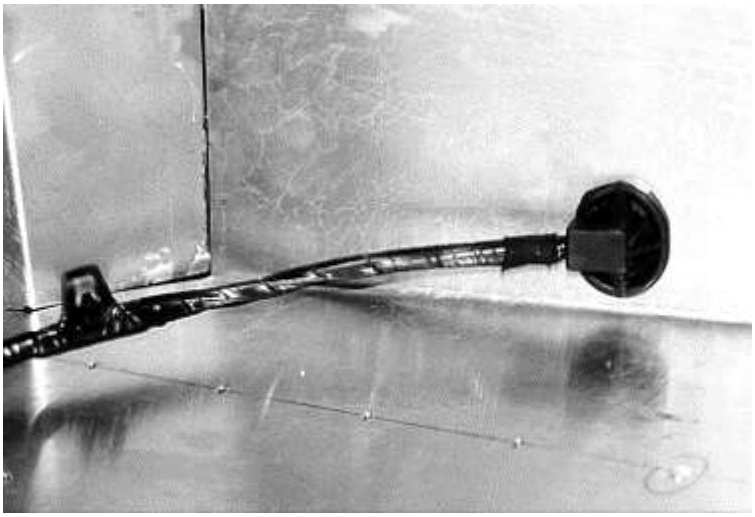
Rear harness.

6. 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.
7. From the battery forward, use some of the ¾" black plastic wire loom (included with kit) to cover and protect the rear harness and the battery cable.
8. Replace the cable ties that were used earlier during the battery cable install with the large insulated line clips where possible.
9. 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.
10. Place insulation grommeting around the ¾" hole in the upper corner of the inside driver foot box.
11. Slide the harness down the edge of foot box into hole.
12. 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.
13. 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.
14. Wrap the extra harness around the ¾" tubing in the foot box and zip tie it in place.

Transmission Harness

Transmission harness.

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



Harness plug in floor aluminum.

2. Push the rubber plug into the laser cut hole.

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.

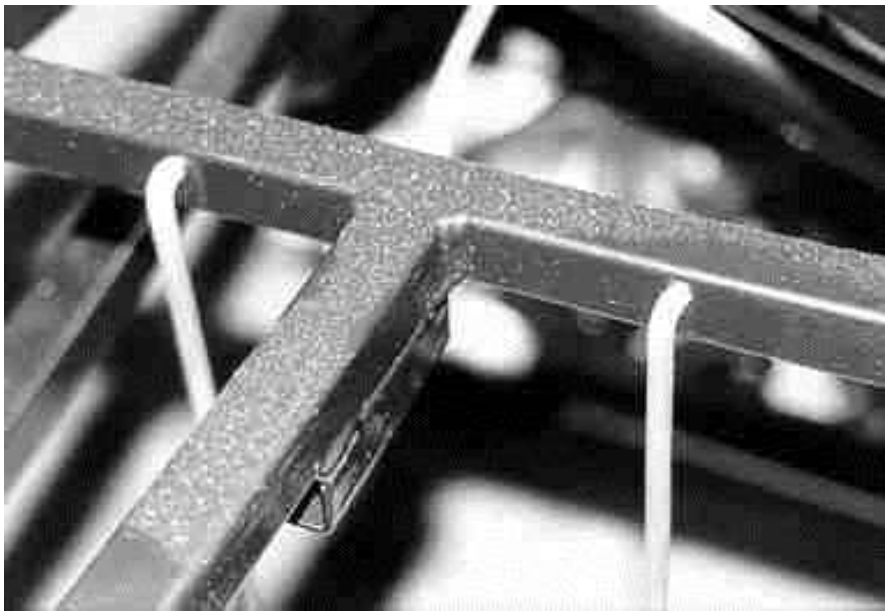
Battery Tray Installation

ATTENTION: *It is recommended that you purchase a new battery. The battery tray is designed to accept the standard Ford Mustang 5.0 battery. Do not expose the battery to any spark source. Do not connect the battery. There are two battery locations available. One is in the center of the car behind the solid axle. The other location is on the driver's side at the rear of the trunk area. The rear location must be used on IRS kits.*

TOOLS: $^{7}/_{16}$" deep socket, ¼" drill bit, drill, marker pen. Duct tape, silicone or JB weld.

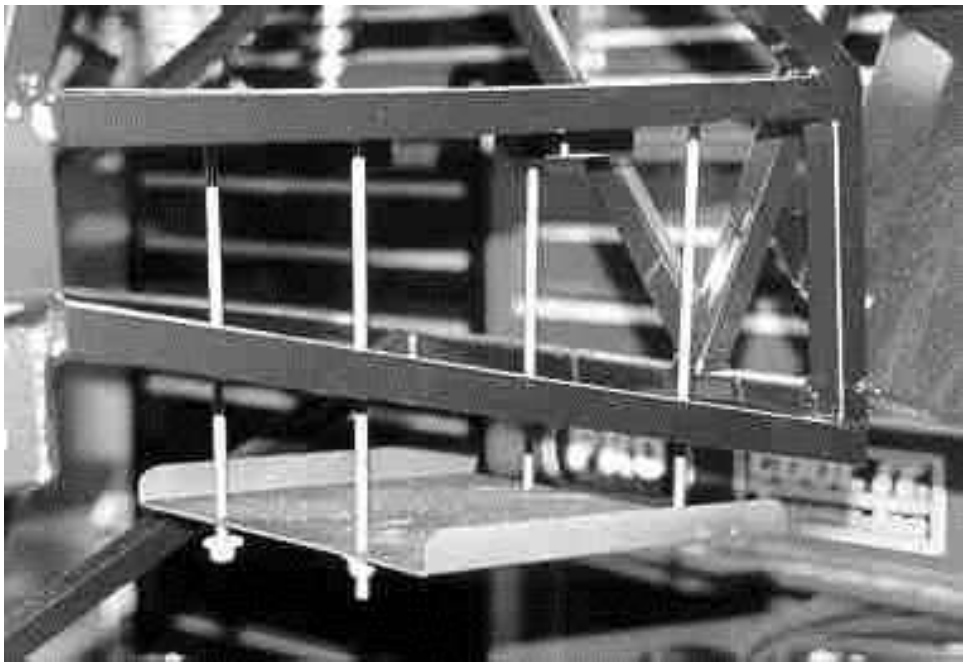
PARTS: *Battery/tray assembly (FFR# 13095).*

1. Place the battery tray, on top of the trunk floor, with half of the plate on each side of the cross brace located on the driver side of the trunk.
2. Mark where the holes line up on the rear facing side of the ¾" tubing.
3. Drill the holes for the hooks on the rear face of the ¾" tube.



Battery tray hooks.

4. With the bends on the battery tray pointed up, put the hook rods through the tray holes and thread the washer and nut onto the ends.
5. Hold the tray up to the drilled holes on the frame and insert the hooks into the holes as shown in the photo below.



Battery tray mounted in rear trunk corner.

6. Duct tape the hooks into the holes to help in the assembly process.
7. Place the battery onto the tray with the positive terminal on the driver's side.
8. One by one, wipe clean of any grease/oil on the hook bolt. Using *JB Weld* or silicone, cover each hook before they are inserted into the holes drilled for them. This will help prevent any hook from coming out if it is not tight.
9. As you tighten the battery plate upward, make sure that the battery brace is lined up with the depression on the battery and make sure the battery is straight.
10. Tighten the battery down until it is snug against the frame and does not move. Do not over tighten and bow the sides of the battery causing damage to the battery. The bolts should be tightened evenly and none should be loose.

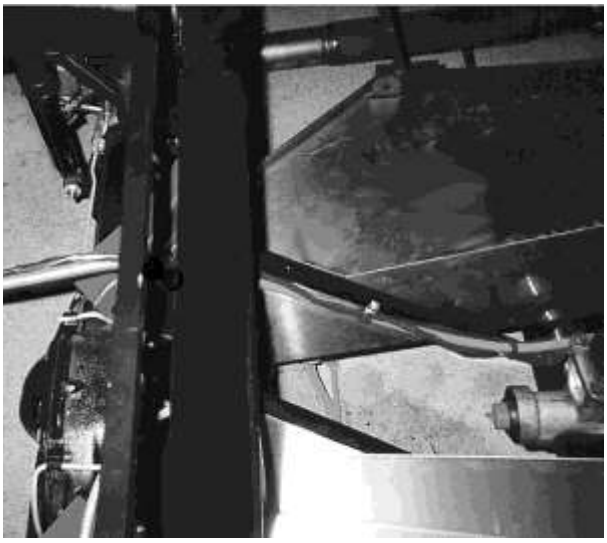
Battery Cables

ATTENTION: *Do not connect the battery yet. Leave the cable zip tied. The cable will need to be run through the trunk floor later.*

TOOLS: *3/8", ½" socket, ¼", 5/16" drill bit, drill, 3/16" Hex key, marker, tin snips/razor, sand paper.*

PARTS: *Battery ground cable assembly (FFR# 13005), engine ground cable assembly (FFR# 12717), OEM braided ground strap, engine/harness assembly (FFR# 12874), insulated line clip assembly (FFR# 11029), misc. electrical assembly (FFR# 12873).*

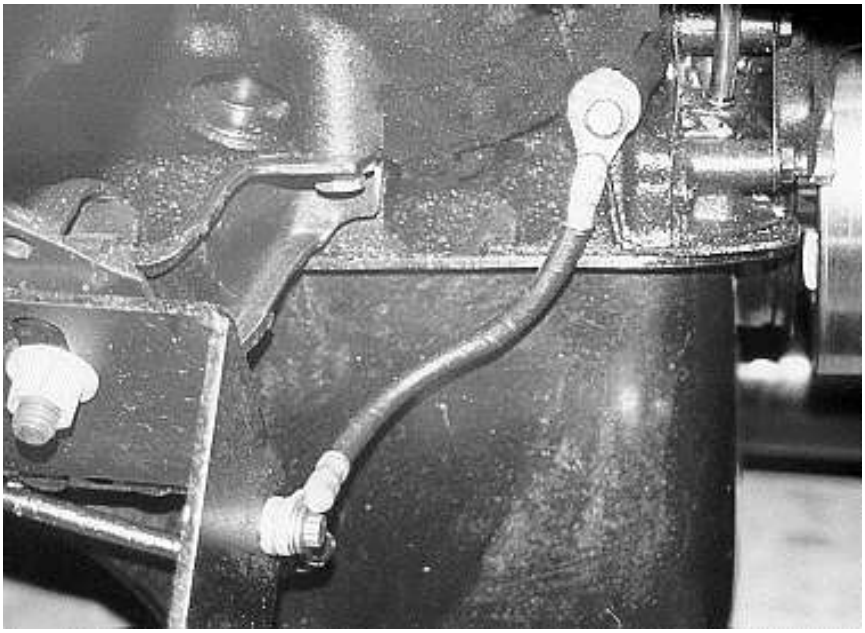
1. Run the battery cable (FFR# 10579) from the positive terminal of the battery straight forward, down the driver's side of the transmission tunnel as shown. Zip tie as you go.



Battery cable routing.

2. If the starter solenoid was mounted behind the engine, run the cable up the transmission tunnel front wall behind where the engine will sit and to the solenoid. If the starter solenoid was mounted to the 1" tube near the master cylinder, run the cable to the front of the floor/tunnel bend and along the edge to the front of the driver's foot box. Run the cable under the floor to the outside of the car and up to the starter solenoid.
3. Use the grommeting on the edge of the aluminum where needed to prevent cable damage.
4. 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 insulated line clips and screws for final assembly.

5. Drill a 5/16" hole in the side of the passenger frame engine mount in order to attach the engine ground cable.
6. Sand the contact area down to bare metal.
7. Attach the engine ground cable using a 5/16"x 1" bolt and nut on the frame and an engine mount bolt or other bolt on the engine.



Engine ground cable.

8. Attach the OEM braided engine ground strap on the back of the driver's side cylinder head to the 2"x 2" tube on the frame using a ¼"x ½" screw from the engine/harness assembly. Make sure to sand the contact area down to bare metal before attaching.

Radiator, Fan & Hoses

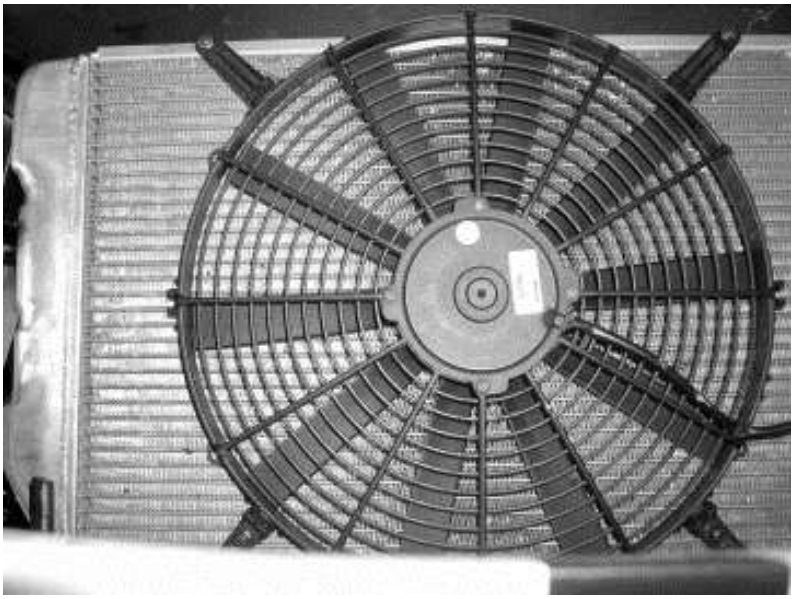
ATTENTION: *Avoid damage to the delicate radiator fins during handling.* ***Do not warp/distort the fan shroud it will make the blades break.***

TOOLS: *5/16", 3/8", ½" Sockets, 1/8", 7/32", 5/16" Drill bits, drill, tin snips, hack saw, razor knife, 1/8", 3/16" hex key, marker, silicone, rivet gun.*

PARTS: *Fan mounting assembly (FFR# 12875). Radiator hose assembly (FFR# 12876), radiator mounting assembly (FFR# 12878), OEM radiator cap, secondary body fasteners assembly (FFR# 12749), aluminum engine bay assembly (FFR# 12841).*

Fan Mounting

1. Attach the two plastic mount tabs to the top of the electric fan (FFR# 10668).
2. Attach the two metal strip mount tabs to the bottom of the electric fan.
3. Lay the radiator down with the front side down.
4. Center the fan left to right on the back of the Radiator.
5. Raise the fan as high as possible so that the fan mount nut can go on the bolt while sitting in the top radiator flange.

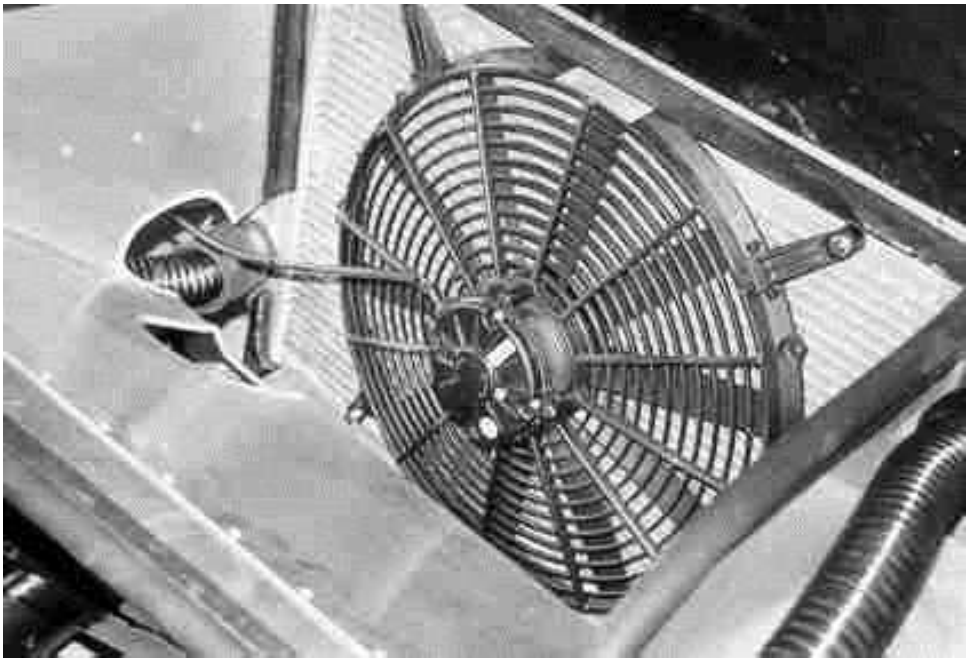


Top fan mount.

6. Angle the lower mounting tabs at a 45° angle outward then adjust them so that the mounting bolts will again go through the flange and the nut will go on the bolt.

Lower fan mount before trimming.

7. Mark the upper and lower mount tab holes on the radiator flanges.
8. Mark where the lower mount tabs can be trimmed.
9. Remove the fan from the radiator.
10. Drill the mount tab holes in the radiator using a $^{7}/_{32}$" drill bit.
11. Trim the excess off the lower fan mount tabs.
12. Attach the fan to the radiator using the black #10 x 1" screws on the top and the #10 x $^{5}/_{8}$" screws on the bottom.



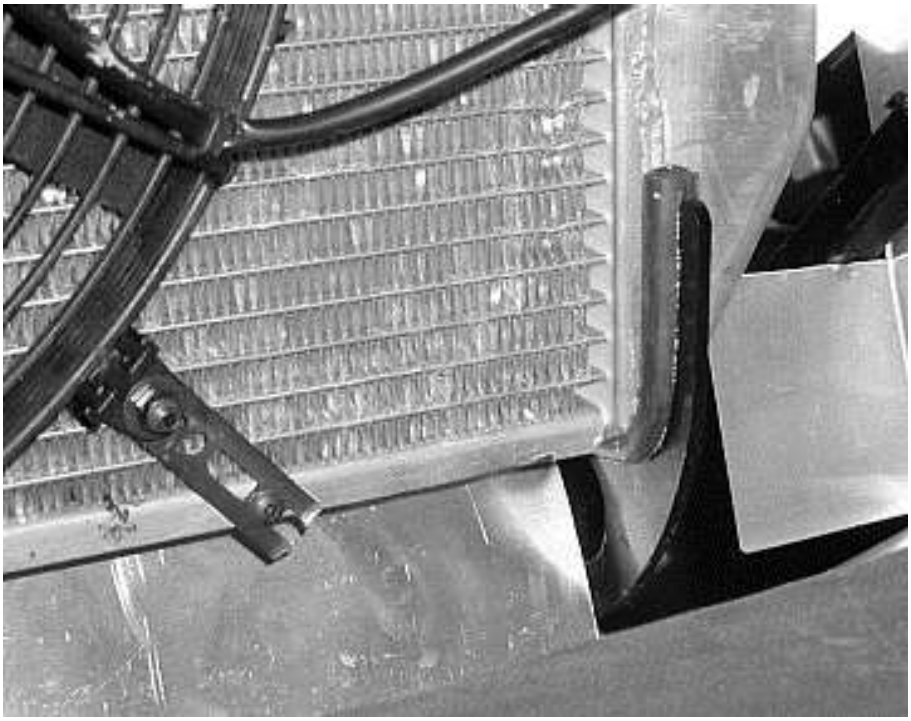
Fan mounted to radiator, mounted to frame.

Radiator

1. Use a razor knife and slit the 8.5” long sections of fuel line lengthwise.
2. Push the slit sections of fuel line onto the lower radiator frame mounts at the front of the frame and trim off any extra.

Lower radiator mount with fuel line pressed on.

3. Install the radiator from above the frame.



Radiator installed on frame.

4. Attach some stick on weather stripping to the underside of the radiator top mount bracket.
5. Position the top mount bracket so that the small tab sticking up is on the rearward side of the bracket.
6. While holding the bracket on top of the radiator, mark the location of the mount bracket holes on the 1"x 1" tubes. Do not let the end of the bracket overhang the tube, another piece of aluminum will be attached to the outside of the tube later (see picture below).
7. Remove the top mount bracket and drill through the 1"x 1" tubes at the marked locations using a 5/16" drill bit.
8. Attach the top radiator mount bracket using the 5/16"x 1.5" screws, washers and locknuts.

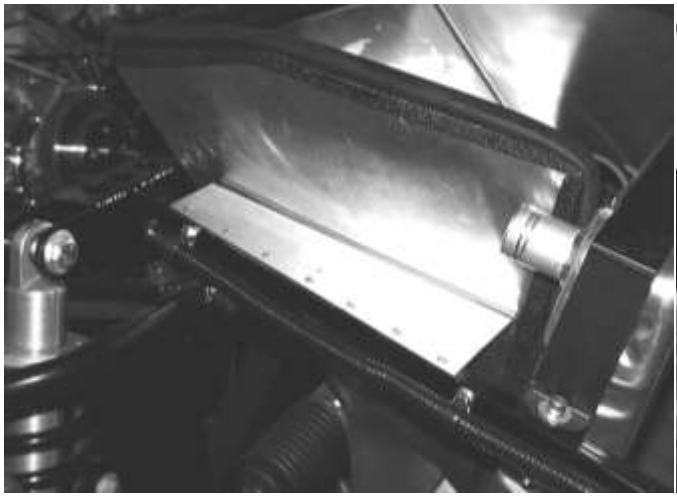
Top radiator mount bolt.

Radiator Aluminum

1. Rivet and silicone the radiator side aluminum to the center air duct panel. The side with the semicircle cut-out goes on the driver side.
2. From the secondary body fastener assembly, use some press-on weather stripping on the three top sides, the sides that will contact the radiator, and along the lower front edge of the large radiator duct. See the photo below.


Large radiator duct mounted.

3. Insert the radiator duct aluminum from behind the radiator.
4. Attach the driver and passenger side duct brackets to the top of the 1"x 1" tubes and the sides of the main duct using ⅛" rivets and Silicone.



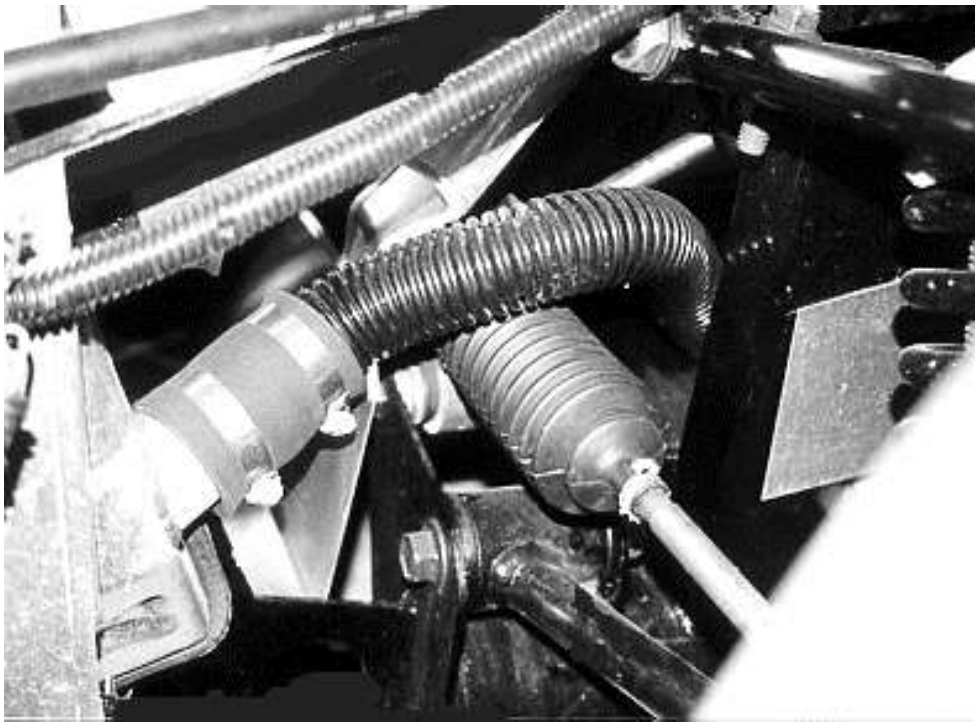
Passenger side bracket.

Driver side bracket.

Radiator Hoses

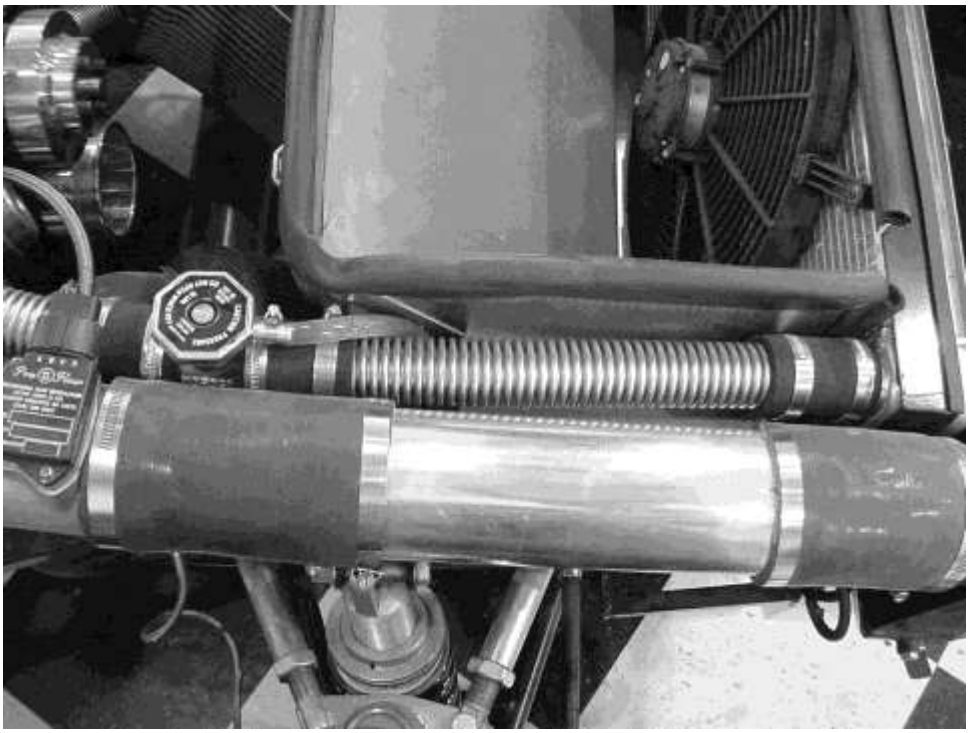
ATTENTION: *Follow the instructions included with the corrugated radiator hoses to attach the hoses to the radiator and engine. Don't discard any of the hose remnants as they are used for the fuel filler neck.*

1. Starting at the radiator, route the lower radiator hose over the top of the steering rack tie rod and under the steering shaft to the water pump.



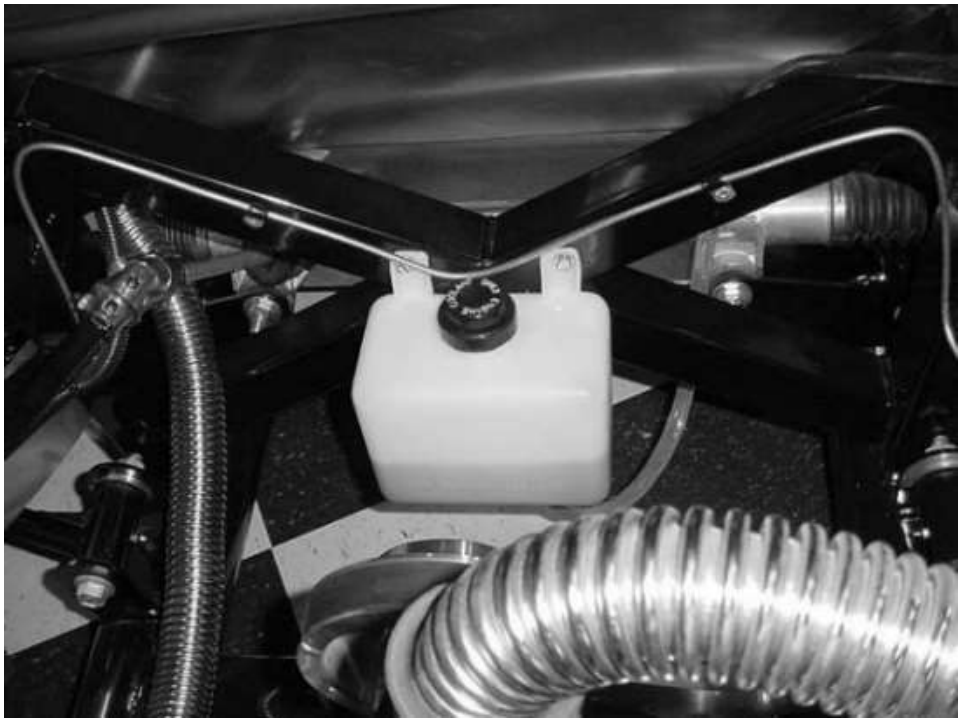
Lower radiator hose passing over the steering tie rod.

2. The upper radiator hose should be routed on top of the passenger side duct bracket. The kit includes a remote fill adapter that should be installed at the highest point in the cooling system which is the return hose back to the radiator.



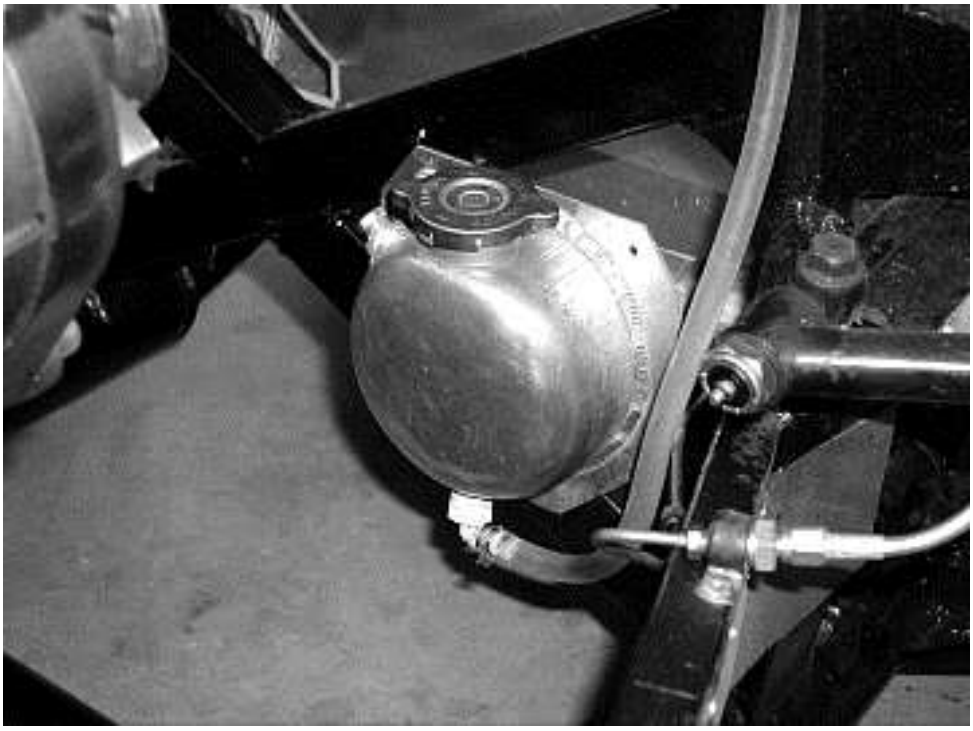
Upper radiator hose attached to radiator.
The large tube below the radiator hose is an aftermarket intake hose.

3. Install the remote fill adapter in-line with the upper radiator hose. Use either a section of the stock radiator hose or a section of the corrugated hose between the engine and the adapter.
4. Attach the overflow container to the front "X" using the supplied screws.



Standard overflow tank mounted to X member.

5. Attach the overflow tube and nipple to the overflow tank.
6. Zip-tie the hose to the corrugated upper radiator hose and run it to the radiator fill adapter.



Optional aluminum overflow tank mounted to front "X" member.

NOTE: Save all extra hoses and adapters as they will be needed for the fuel neck.

Aluminum Trunk Floor

TOOLS: *Drill, #6 hex head driver, 1/8" drill bit, rivet tool, silicone, caulk gun, marker, ruler.*
PARTS: *Secondary body fastener assembly (FFR# 12749), aluminum rear trunk assembly (FFR# 13014).*

1. Trial fit the trunk floor so that you know how when there is silicone on the frame. 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. Another person would also help with this install. If not marked and drilled for rivets, do this at this time.
2. Remove the trunk floor panel.
3. Apply silicone to the flat surfaces of the frame where the aluminum will contact.
4. Re-install the aluminum panel.
5. Use #6 screws to hold the panel in place.
6. Drill through the aluminum rivet holes and into the frame.
7. Wipe and clean the aluminum.
8. Rivet the panel in place with the 1/8" short rivets.

Emergency Brake Handle

TOOLS: *½" deep socket, 3/16" hex key, marker, scissors, hacksaw.*
PARTS: *Interior trim assembly (FFR# 12884), brake fastener assembly (FFR# 11076).*

1. Mount the emergency brake handle to the floor mounts with the fasteners provided.
2. Attach the cable 2-into-1 "T" connector to the handle if it is not already there.
3. Release the emergency brake handle using the button and make sure it is all the way in the down position.
4. Run the emergency brake cables under the 4" round tube transmission cross-member and up to the handle area.
5. Pull on the cables one at a time and slide them into the slots on the "T" connector.
6. Pull up on the emergency brake handle, so that the automatic tensioning cog can adjust the free play in the lines.
7. Check to make sure the cable does not rub on the aluminum.
8. Push the leather cover onto the handle.

Emergency brake handle mounted.

Wheels, Tires and Ride Height

1. Mount the wheels onto the car.
2. The ride height in the front is 4.25". 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 4.50". This is using 275/50R15 tires.
4. Adjust ride height with a driver in the car for proper weight loading on the suspension.

Checking the Running Gear

1. Secure loose and unused wires with cable ties.
2. Never cut a seemingly unimportant wire or bundle.
3. Starting problems are commonly due to a wire or relay not being hooked up or grounded properly. Sand through the paint/powder coating to bare metal whenever attaching a ground.
4. Before you start your engine. Check the following electrical connections:
   Battery ground strap
   Engine to frame ground
   Fuel pump/rear harness ground
   Fuel pump relay ground
   Computer ground near the computer
   Computer ground near the starter solenoid
   Lighting grounds at each corner where lights are
   Dash area grounds
   Any other black wires with circular toothed clips.
5. When the ignition is turned to the "on" position, the fuel pump should be heard whirring for about three seconds and then shut off. This sound is 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.

6. Various clicking and whirring sounds are a great indication that things are working well.
7. **Check the oil level**.
8. **Check the coolant level**.
9. Crank the engine for ten seconds with the coil connector removed so that the oil pressure can build up before starting the engine.
10. Reconnect the coil lead and start the car.
11. After running the car for two minutes at idle, turn off the engine and recheck everything for leaks and problems.
12. Several warm-up and cool down cycles are necessary before air in the coolant system is bled out. You will ruin your engine 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 overflow tank should be half full during all the test sessions so that it can bleed water into the system as the engine cools.
13. Turn the steering stop to stop to check for wheel rubbing. 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. 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.
14. If you are using the Ford alternator and not a GM one wire alternator, remember that the car does not charge the battery without the voltmeter hooked up and the battery will run down over time.

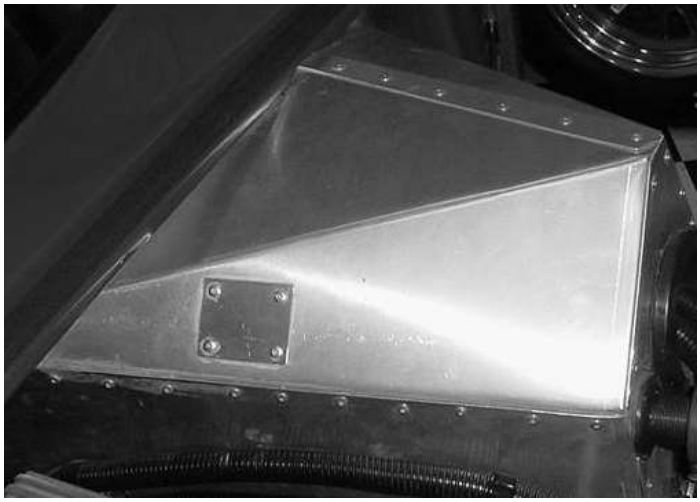
Foot Box Top Section

ATTENTION: *Make sure there are no electrical problems, it is easier to access and fix the problems now than later.*

TOOLS: *Drill, #6 nut driver, ⅛" drill bit, rivet tool, silicone, caulk gun.*

PARTS: *Aluminum cockpit assembly (FFR# 12838), secondary body fasteners assembly (FFR# 12749).*

1. All wires should be inspected in the foot box area before the foot box top is installed. Double-check the clutch pedal movement. As the clutch pedal moves you don't want contact with any wires.
2. Position the driver foot box top/outside panel so that it is inside the outer wall and on top of the top/inside panel and behind the foot box front panel as shown in the photo below.
3. Use #6 screws to position the panel.
4. Mark the panel for rivets.
5. Remove the panel and silicone where the panel will contact other panels and the frame.
6. Use the #6 screws to hold the panel while drilling and riveting the panel in place.



Driver Footbox Inside Top.

Driver Footbox Outer Top.

Chapter 3 - Body and Interior

Body Mounting

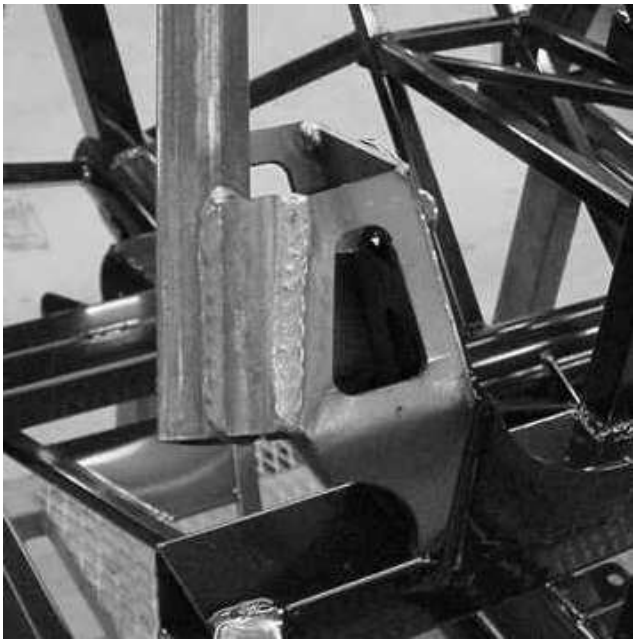
At this time you should be finished with the rolling chassis. This is an exciting time because the bulk of the real difficult work is behind you. From here on out, the time is really in the details.

ATTENTION:

- *The body will be trial fit/adjusted along with the doors to ensure everything fits before the body and parts are painted. All of the trim accessories will also be trial fit/adjusted. Since the rear clip is one piece, get two people to help when you're ready to position the body onto the frame.*
- *If body cut outs were ordered, the side exhaust, side louver, headlight, taillight, turn signal, wiper, gas cap, and side mount holes are done at the factory.*
- *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.*

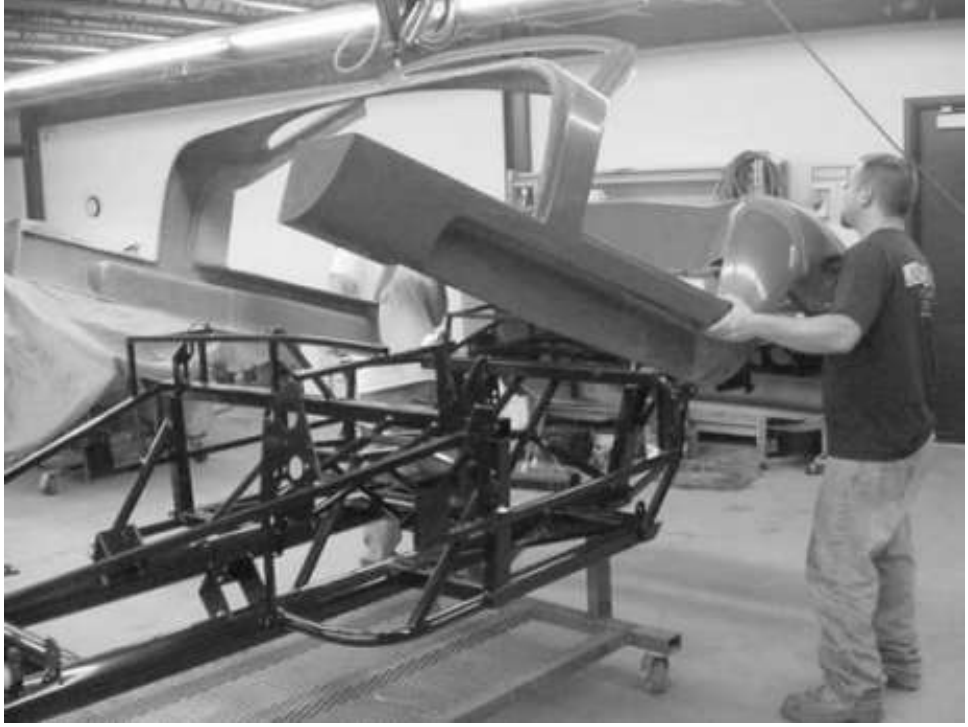
PARTS: *Body Assembly (FFR# 13505), windshield support brackets(FFR# 13510, 13511).*

1. Insert the windshield supports into the slots on either side of the windshield opening and use some duct tape to hold them in place temporarily while lowering the body onto the frame. The flat face should face toward the inside of the car.



Windshield support mounted to frame(to show location).

2. Using two people, one on each side holding the wheel well and side exhaust recess move towards the frame from the rear with the back slightly lower than the front.



Lowering a body down onto the chassis.

3. Pull the sides of the body out to clear the frame.
4. Watching the rear of the frame, move the body forward slowly lowering the front.
5. Pull the body out to get around the door hinge brackets.
6. Move forward until the rear of the body meets the rear mount and put the body down in place. Watch the door hinge mounts and striker post mounts on the frame.
7. Once the body is in position, it will be snug against the taillight plates in the rear, the lower rear corners of the door opening should be at the corner of the tubes for the door latch.

Tail Lights

ATTENTION: *Photocopy the template from the manual in case it gets ruined. Be careful with the lenses, they are glass and can break if dropped from a fairly low height.*

TOOLS: *Drill, 1¼" hole saw, $^{7}/_{32}$" drill bit, $^{3}/_{8}$" socket, flat head screwdriver, razor knife, marker, ruler, level.*

PARTS: *Taillight assembly (FFR# 12885).*

1. The rear taillights double as the rear body mount.
2. There is a plate mounted on the frame to receive the light mount screws.
3. Use the template in Appendix A to mark the body as shown in the photo below. Use a level to align the template.

Tail light template mounted.

4. Use a 1¼" hole saw to make the center holes and a 7/32" drill bit for the screw holes.
5. Take the lights apart and cut the protruding rubber part of the light off as in the picture below.


Cutting the protruding rubber seal.

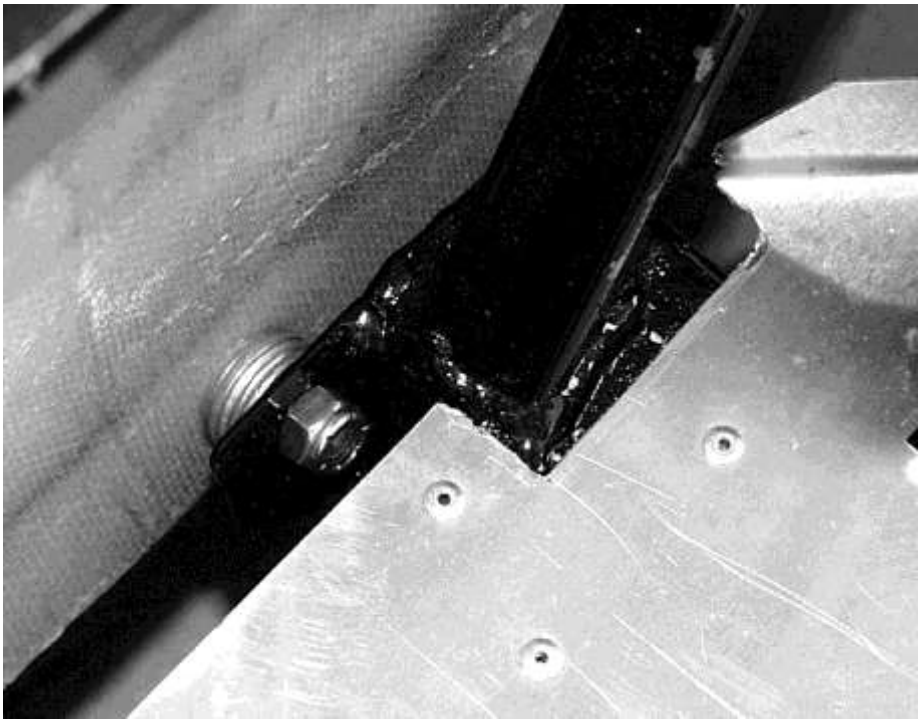
6. The lights mount from the outside of the body without the lenses and trim rings in place.
7. Test fit the lights. You may have to bend the ground tab slightly or file away a bit at the hole to make it fit perfectly.
8. Mount the lights using the supplied hardware.
9. This is a test fit so don't wire the lights yet.

Tail lights mounted.

Side Body Mounts

TOOLS: *Drill, $^{5}/_{16}$" drill bit, $^{3}/_{16}$" hex key, ½" wrench, marker, ruler.*
PARTS: *Secondary body fasteners assembly (FFR# 12749).*

1. The body sides are mounted using four stainless $^{5}/_{16}$"x 1" bolts with a washer next to the head.
2. The rear most side body mount needs $^{7}/_{16}$" worth of washers between the body and the frame so that the body is spaced correctly and there is enough thread left so the locking part of the nut is used. See photo below.
3. When you are fitting the doors the number of washers may have to be changed to ensure a flush door fit.
4. The edge of the body doorsill should be flush with the inside side of the doorsill 1"x 1" tube. Use a #6 self-tapping screw to hold it in place if necessary.
5. Work from the rear of the car towards the front.



Side rear body mount.

Body Cut-Outs

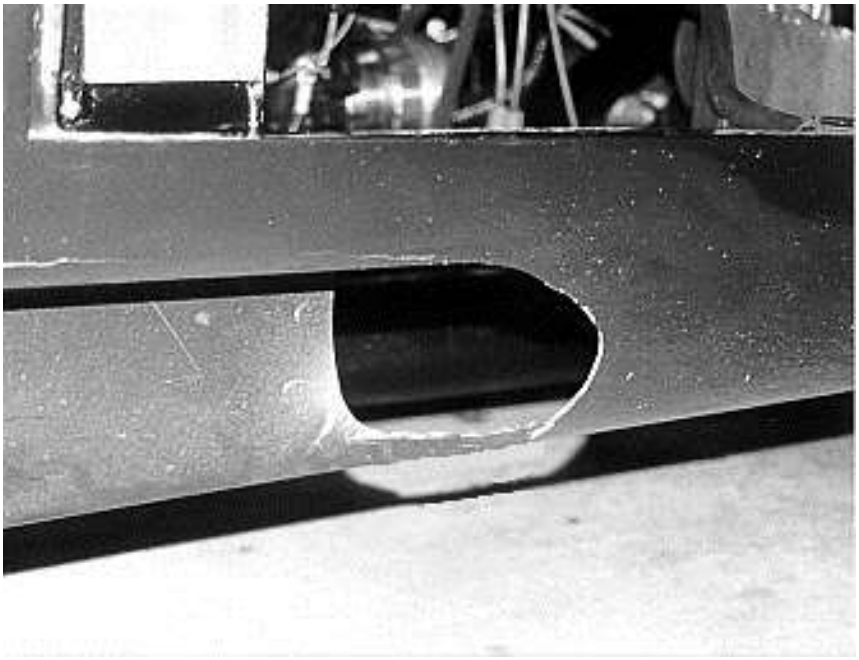
ATTENTION: *Use caution when cutting. Go slowly measure twice, and cut once. Make two photocopies of the templates (one for each side of the car) from Appendix A.*

PARTS: *Templates in Appendix A.*

Side Exhaust Cut-Outs

TOOLS: *Hand jigsaw, drill, marker, and tape.*

1. Cut out the side exhaust template.
2. The template goes down to the top edge of the body.
3. Tape or hold the template and mark around it with a pen.
4. Use a jigsaw to cut out the marked area.
5. The template is slightly tight. Enlarge the holes after fitting the side pipes later if desired.



Driver's side exhaust cut out.

Turn Signal Cut-Outs

TOOLS: *1" hole saw, drill.*

1. Only cut the outer lines of the shapes out.
2. Position templates on the body in their correct locations and tape in place.
3. Use a 1" hole saw to make the center holes and a $^{3}/_{16}$" 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.

Side Louver Cut-Outs

TOOLS: *Jigsaw, ½" Drill bit, drill.*

1. At the corners of the louver indentation, use a ½" Drill bit.
2. Use a jigsaw or hacksaw for the straight edges.

Headlight Cut-Outs

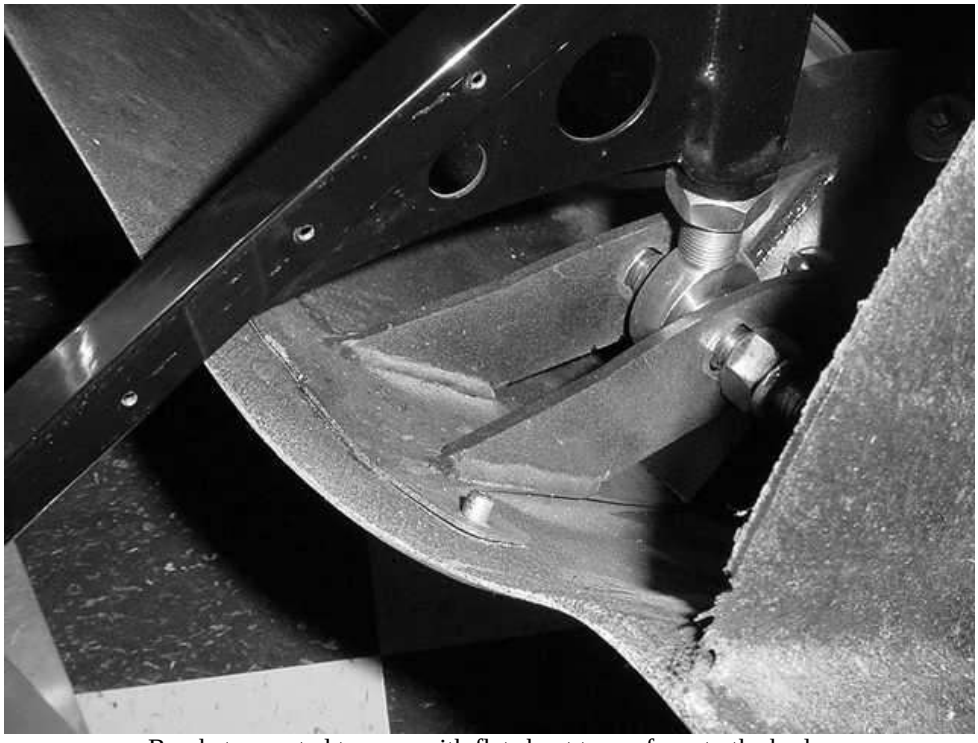
TOOLS: *Jigsaw, drill, marker, tape, $^{7}/_{16}$" drill bit.*

1. Tape the template to the headlight bucket.
2. Using a $^{7}/_{16}$" drill bit, drill the outer holes and make sure that they do not hit the circle.
3. Drill a $^{7}/_{16}$" hole in the on the inside of the circle so that the edge of the hole is just touching the circle. Use a jigsaw to cut the circle out.

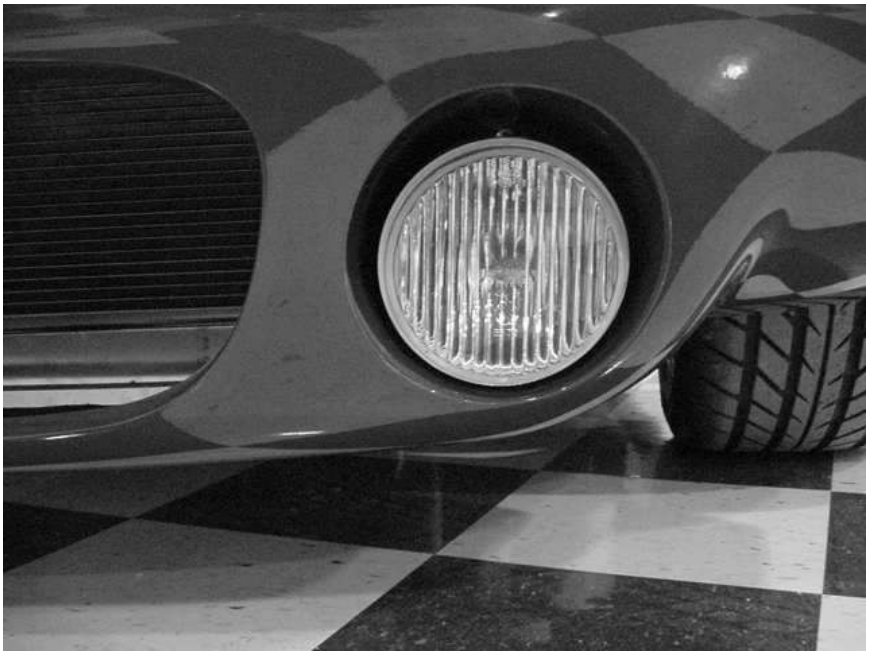
Front Nose Mount

ATTENTION: *It is smart to have some help when doing this step. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body.*
TOOLS: *5/16" drill bit, drill, 3/16" hex key, ½" wrench, tape measure, marker.*
PARTS: *Nose/trunk fastener assembly (FFR# 13016), body assembly (FFR# 12645), Mustang fog lights.*

1. The nose mounts double as the hinges for the nose, they attach to the backside of the fog light openings and the bottom of the nose.
2. The frame mounts for the nose hinges are 30⅝" apart center to center. This is how far apart on center the hinge mounts on the nose will need to be.
3. Using the lower radiator opening for reference, find the centerline of the nose and mark it on bottom on the inside.
4. Measure from this centerline 15 5/16" to determine the center mounting location for the hinge brackets.
5. The hinge brackets mount with the flat round face up against the fog light recess and the "T" shaped surface along the bottom of the nose. Bend the flats of the bracket so that they conform to the body.

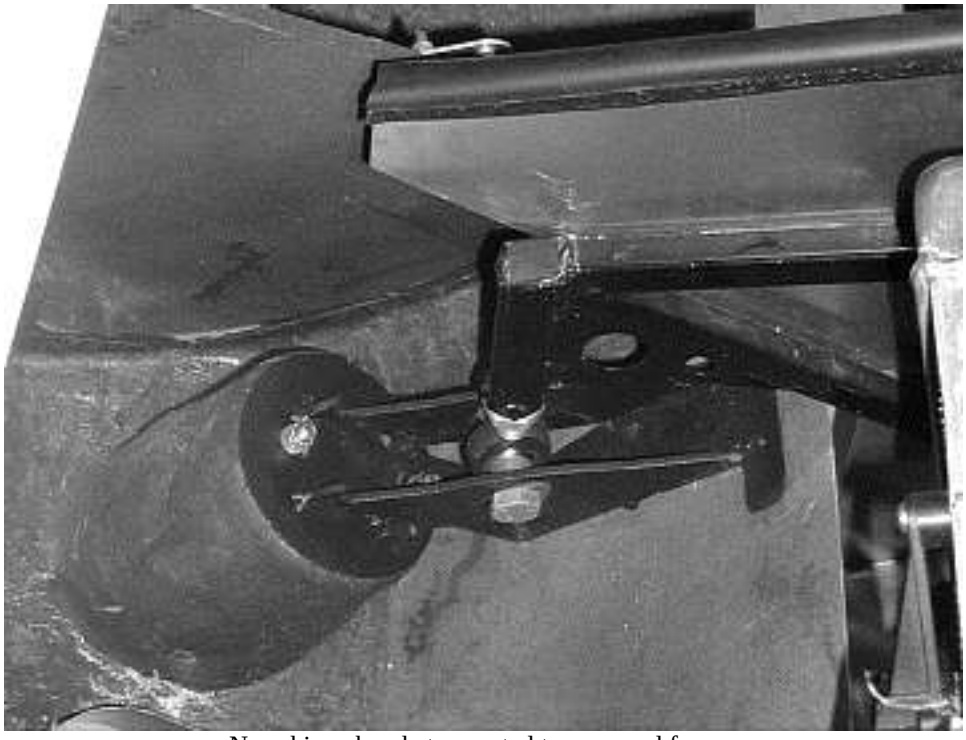

Bracket mounted to nose with flats bent to conform to the body.

6. Angle the fog light so that the stud mount points straight back.
7. Put a dab of silicone on the end of the fog light bolt.
8. Hold the fog light in the opening so that it is centered and the lines in the glass are vertical.



Fog lights mounted.

9. Push the light in so that the mount bolt touches the back of the light bucket and leaves a mark.
10. Drill the mark in the fog light bucket and one other hole in the nose for an additional mount bolt.
11. Line the hinge plates up against the openings with the angled supports as vertical as possible. These need to be as vertical as possible to prevent binding in the hinge.
12. Mark the brackets through the mount holes.
13. Remove and drill the hinge brackets.
14. Bolt the hinge brackets in position.
15. Use a couple of the #6 screws in the legs of the "T" to hold the bottom of the nose for positioning. Do not rivet these until after the nose has been painted.
16. Trim the stud on the fog lights to allow full adjustment of the hinges.



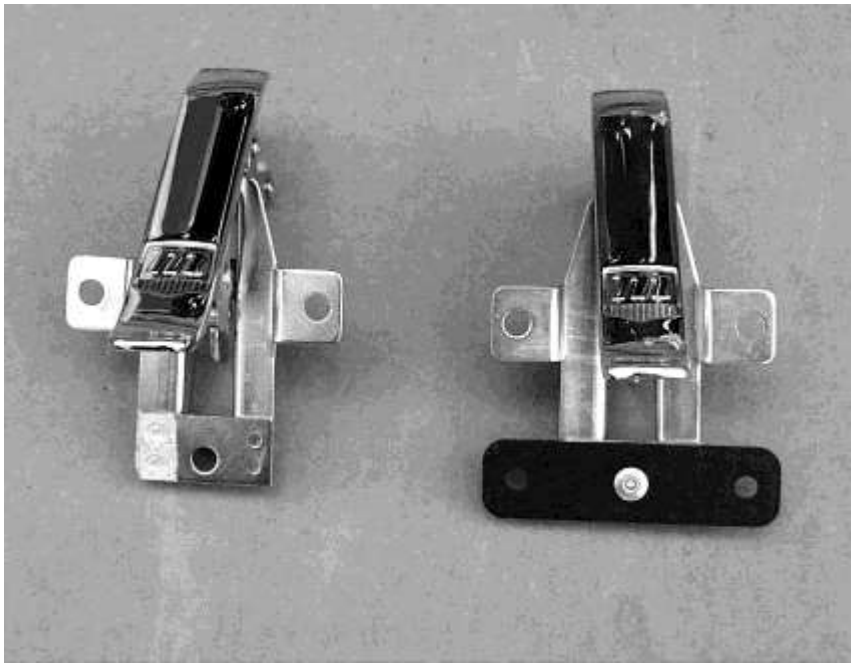
Nose hinge bracket mounted to nose and frame.

Hood Latches

TOOLS: *7/32" drill bit, drill, 1/8" hex key, 5/16", 9/16" wrench, 9/16" deep socket, jig saw, marker, chassis grease, rivet gun.*

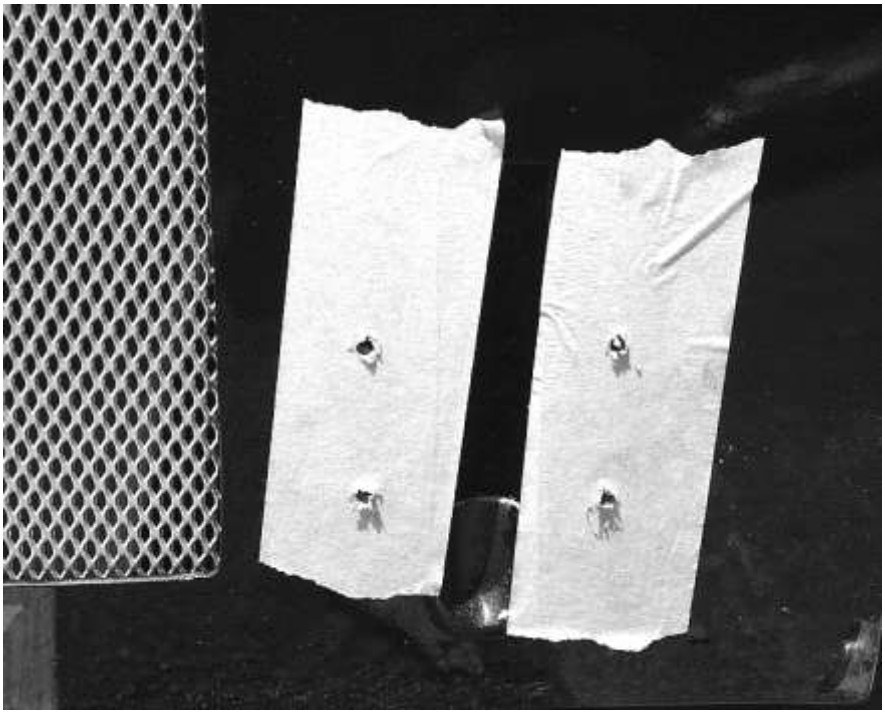
PARTS: *Nose/trunk fastener assembly (FFR# 13016).*

1. Open the latches and apply a little bit of chassis grease to the sides of the latch.
2. Work the latches a few times to help loosen them up.
3. Attach the latch mount plate to the front side of the latch as shown below.



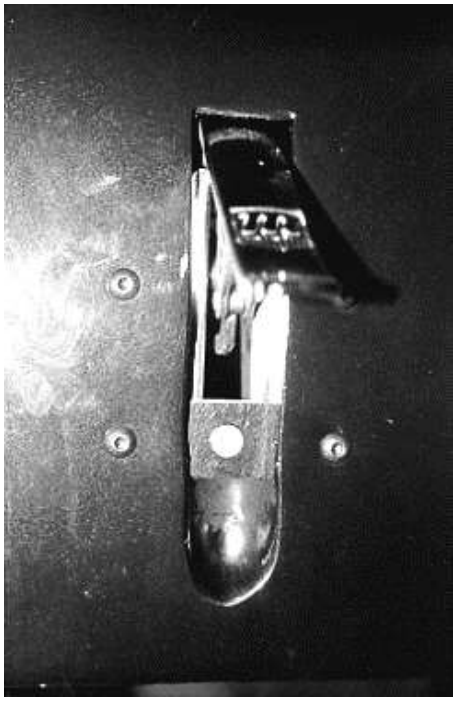
Mounting bracket attached to latch.

4. Cut the area for the latch on the nose leaving the lower finger recess for the bottom of the latch.
5. Position the latch from the backside of the body. Make sure the latch looks straight in the cutout and compared to the rear edge of the nose.
6. Drill $^{7}/_{32}$" holes for the mounting screws as shown. Use tape on the outside of the body if the body is already painted.



Holes drilled for mounting screws.

7. Mount the latches to the nose. Use the washers on the backside of the body.



Nose latch mounted.

8. Attach the "U" bolts to the nose latch striker mounts on the frame. Do not tighten them yet.

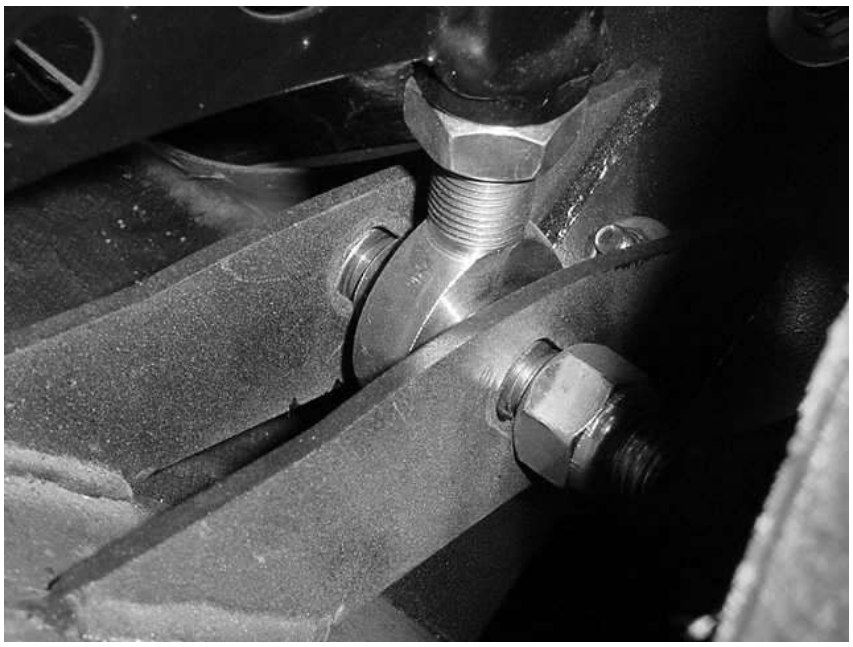
Nose latch striker mount.

Nose Hinge Alignment

ATTENTION: *It is smart to have some help when doing this step. The fiberglass edges can be very sharp. Wear gloves when lifting or holding the body.*

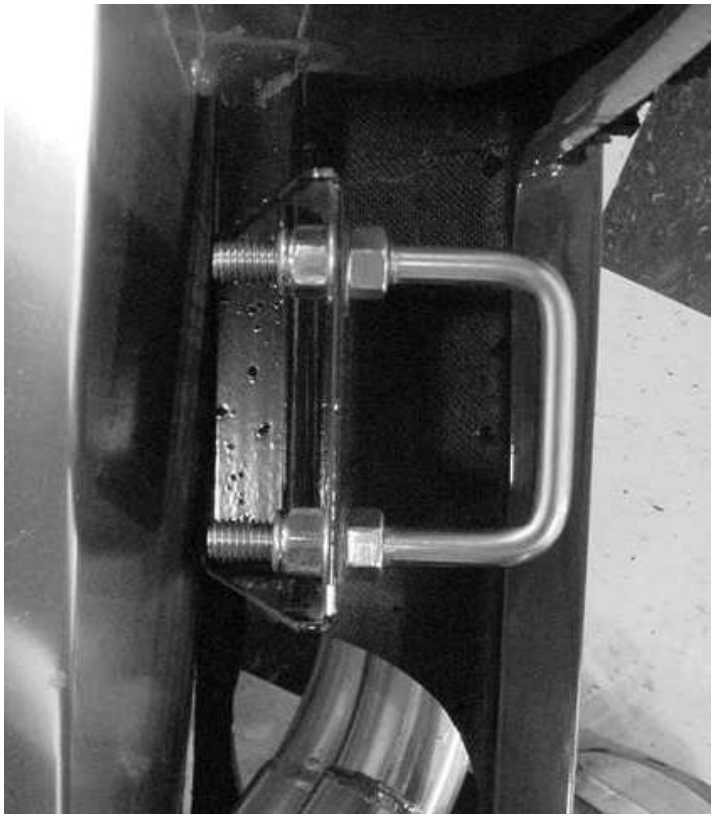
TOOLS: *5/16" drill bit, drill, 3/16" hex key, 15/16" wrench, 15/16" socket, tape measure, jack stands, marker, duct tape.*
PARTS: *Nose/trunk fastener assembly (FFR# 13016), secondary body fastener assembly (FFR# 12749).*

1. Screw the jam nuts onto the rod ends all the way.
2. Screw the rod ends into the vertical frame mounts so that there is 1¼" of threads total sticking out of the frame including the jam nut. This is just a rough setting.
3. Back the jam nuts against the frame but do not tighten, they may need adjusting. With the latches unlatched, position the nose on the frame so that the rod ends are in between the nose hinge mount brackets on the nose. See photo below.
4. Move the nose around so there is a small gap (i.e. ⅛") along the backside of the nose against the rear body clip and along the bottom edge of the nose. Use wood or washers in the gap to keep it consistent. Use jack stands in the front and duct tape on the back to keep the nose in place.
5. Either through the nose or from under the car, look at the alignment of the rod ends and the location of the rod ends (left to right) in the brackets.
6. Screw the rod ends in/out as necessary to align the hole with the slots. The nose gaps may also have to be adjusted.
7. Once the alignment has been made, use the included spacers and shims on either side of the rod ends.
8. Insert the bolts through the bracket, spacers and rod end.



Rod end installed.

9. Tighten the bolts and jam nuts.
10. At the back of the nose engage the latches around the "U" bolts and tighten the bolts so that the hood stays in position.



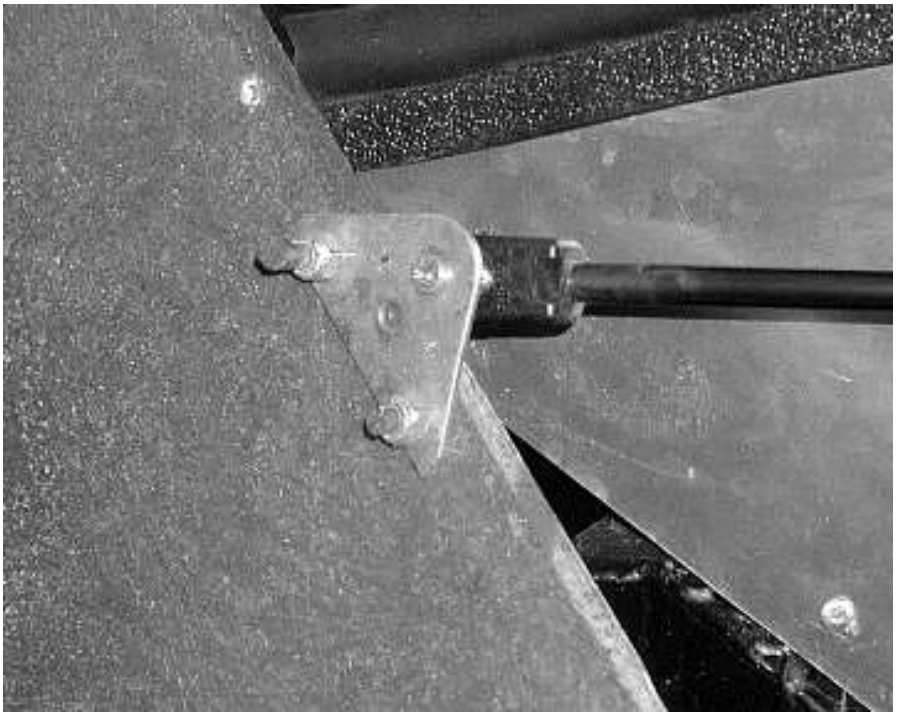
"U-bolt" for hood latch.

11. Remove the duct tape and jack stands looking for movement in the nose. Some readjustment may be necessary.
12. With someone on the other side of the nose, unlatch the nose and slowly raise it. You may have to pull out slightly on the latches so the bottom edge of the nose clears the "U" bolts. You can trim the nose if you like so that this is not necessary.

Hood Struts

TOOLS: *$^{7}/_{32}$" drill bit, drill,⅛" hex key, $^{5}/_{16}$" wrench, marker, measuring tape, ratchet strap.*
PARTS: *Nose/trunk fastener assembly (FFR# 13016).*

1. With the frame at 4" ride height in the front and the help of a friend, open the nose until the Fog light area of the nose is parallel with the ground. Use a ratchet strap or some rope to hold the nose in this position until the struts are in place.
2. The taller strut bracket for the nose should be positioned with the bracket starting $7^{1}/_{8}$" from the top of the nose support rib. The bracket should be on the outside of the rib with the strut ball pointing in. The stud should be $^{7}/_{16}$" from the side of the rib to allow clearance for the strut. Mark the locations of the mounting holes.
3. Use a $^{7}/_{32}$" Drill bit for the mounting screws.
4. Attach the strut brackets to the nose support. Tighten the locknuts but do not crush the support.



Strut mount on nose.

5. Attach the rod end of the strut to the nose-mounted bracket.
6. From the front suspension "X" member measure down the 1" tube towards the nose 4½". This is the starting location for the frame mounted strut bracket. The bracket should be mounted with the ball facing out. Mark the mounting holes.
7. Position the strut bracket by hand and hold the strut up to the bracket stud. If necessary, move and remark the bracket holes.

Nose strut mounted on frame.

Trunk License Plate Light and Bracket

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

TOOLS: *Drill, 1/8", ¼" drill bits, 2" hole saw, marker, level, Phillips head screwdriver.*

PARTS: *License light/ bracket assembly (FFR# 12835).*

1. The license plate light can be positioned anywhere on the rear of the body so long as it does not block the taillights.
2. Use the license plate bracket as a template for the mounting screws. Use a level to make sure the bracket is level since there are no straight lines on the rear of the car.
3. Use a ¼" drill bit for the mount screws.
4. Attach the bracket to the body using the two flat head screws and nuts.
5. Attach the license plate with the self-tapping screws.
6. Take the front cover off the license light to use as a template.
7. Mount the license plate lights on either side of the license plate.
8. Use the 1/8" drill bit for the side mount holes.
9. Assemble the light and attach it to the body using the two supplied screws as shown.

License plate light.

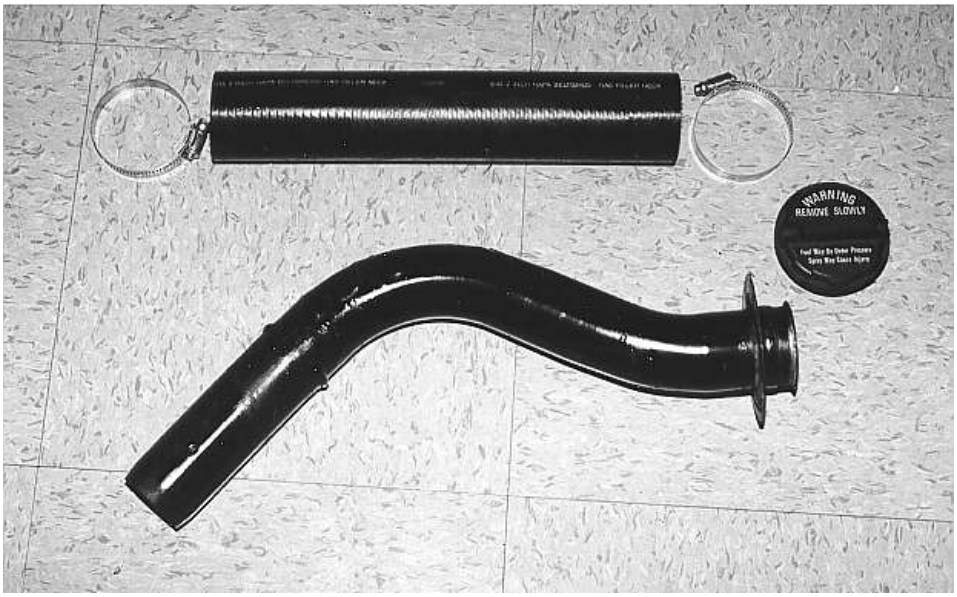
Fuel Neck and Gas Cap

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.*

TOOLS: *$^{3}/_{8}$" deep well socket, hex key set, Phillips head screw driver, hack saw, drill, $^{9}/_{64}$" drill bit, safety goggles, Template from Appendix A.*

PARTS: Fuel filler assembly (FFR# 13580), fuel tank assembly (FFR# 10896).

1. Remove the filler neck from the gas tank.
2. 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.



Mustang fuel tank neck with kit extension tube.

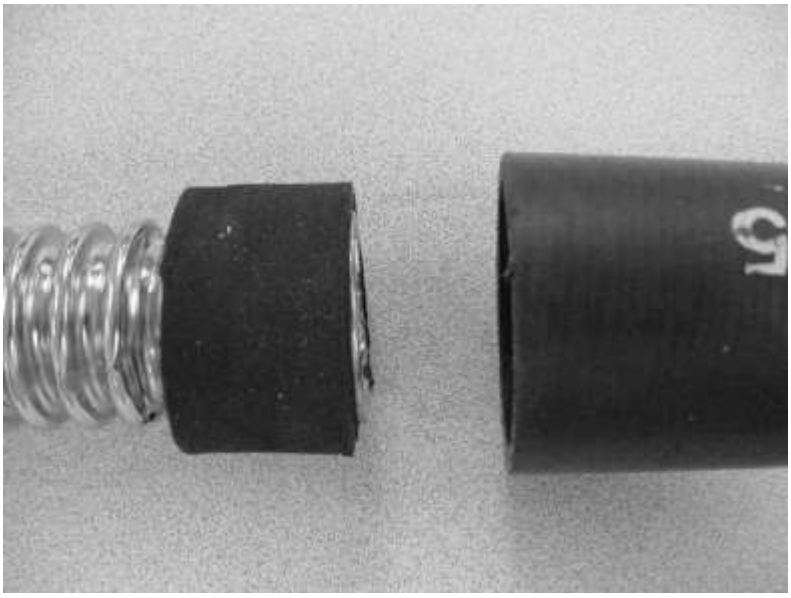
3. Insert the neck back into the tank to prevent gas fume leakage.
4. Drill a 2" hole in the body 5¼" up from the bottom edge of the trunk opening and 2 ¼" to the right edge of the trunk opening.
5. Push the filler cap through the body hole.
6. Mark the locations of the 6 mounting holes in the cap on the body. Remove the cap from the body.
7. Drill six $^{3}/_{16}$" holes for the mounting bolts.
8. Connect the ring connectors to the grounding wire provided.
9. Place one end of the ground wire to one of the filler neck mounting bolts and attach the other end to the frame.

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

10. Fasten the cap to the body using the kit mounting bolts.
11. Cut two 4½" long sections of the 2" rubber hose supplied with the kit. One section slips over the end of the gas cap and connects to a leftover section of the corrugated radiator hose. The other section connects the bottom of the corrugated radiator hose to the Mustang filler neck.

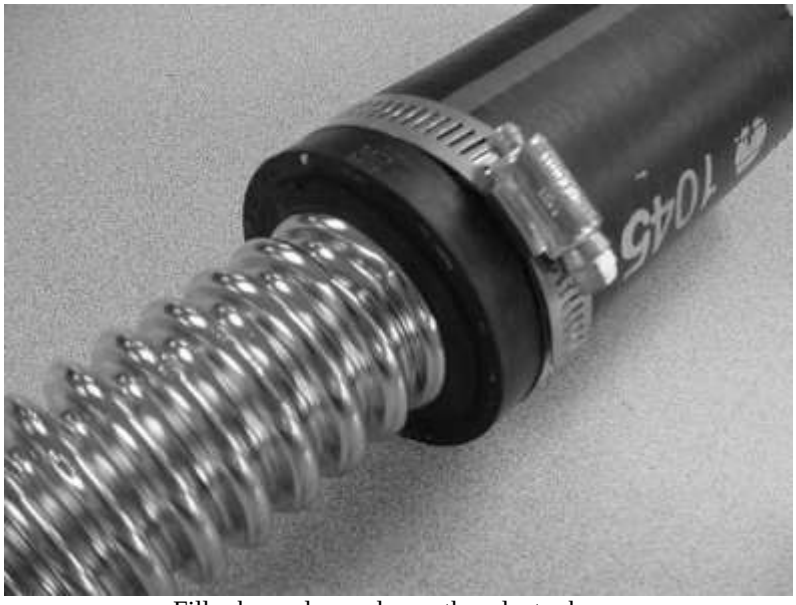
Note: To seal the 2" rubber hose to the corrugated hose, the extra adapters supplied with the radiator hose must be used.

12. Slip a section of the left over adapter hose from the radiator over the end of the corrugated hose as shown below.



Corrugated hose with adapter hose slipped over the end.

13. Slip the filler hose over the adapter hose until the ends of both hoses are flush. Fasten the filler hose to the adapter hose with a clamp.



Filler hose clamped over the adapter hose.

14. Repeat for the other end of the corrugated hose.

Gas cap mounted.

Doors, Handles and Hinges

ATTENTION: *Take your time to align the doors properly. There is plenty of built-in adjustability.*

TOOLS: *½" deep socket, (2) 9/16" wrenches, 3/16", 5/16" hex key, drill,⅛", 5/16" drill bits, 1¼" holesaw, Phillips head screwdriver, Loctite, 80, 220 grit sand paper, sanding blocks, marker, jig saw, vise-grip clamps.*

PARTS: *Door frame assembly (FFR# 12886), door latch/hinges assembly (FFR# 12894), body assembly (FFR# 12645).*

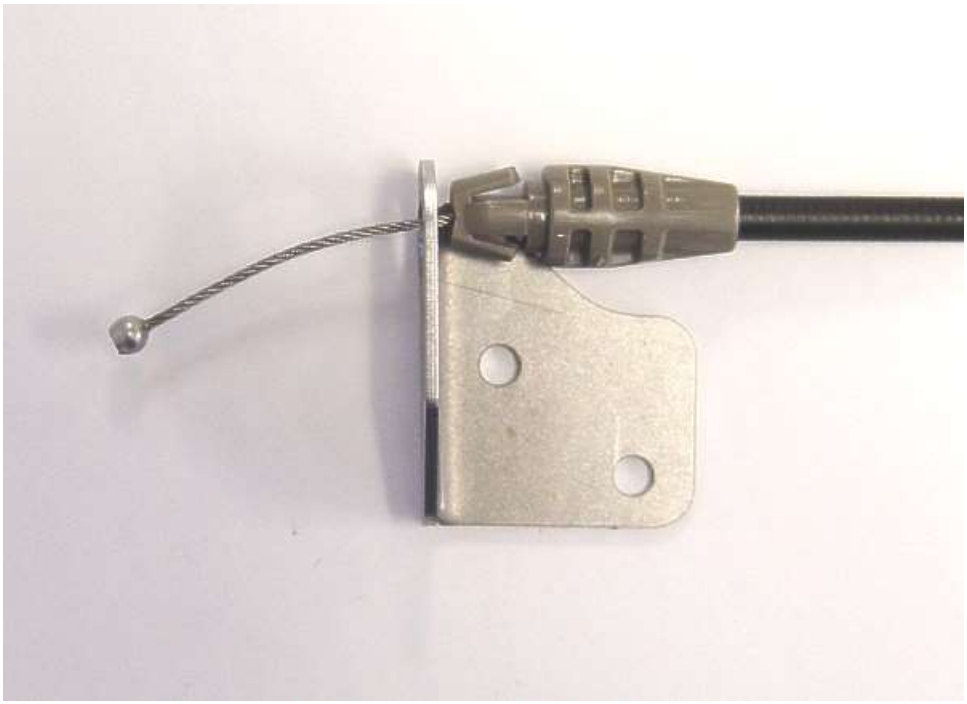
1. Use the diagram in the appendix and a marker to cut out the front of the doors.
2. Using a jig saw or other reciprocating saw cut out the area traced.
3. Draw a line ⅝" from the edge of the recessed area on the inside of each door.
4. Drill a ⅜" hole in one corner and use this as a starting point to begin cutting.
5. Cut and remove the inside face of the recessed area. Don't worry if the cuts aren't perfectly straight as you will install a cover over this area later.

Inside of the recessed area removed.

6. Attach the latch to the door frame using the 3 Phillips head screws.
7. Attach the cylinder end of the door handle cable to the door handle by inserting it into the slot and pushing the cable sleeve into the recess area.

Latch cable and sleeve inserted in handle.

8. Push the other end of the cable into the cable mount tab.



Cable going into cable mount.

9. Place the clevis on the end of the cable and attach it to the door latch using the black button head screw. Tighten the screw enough so that the clevis is not sloppy but so that it can rotate on the latch.

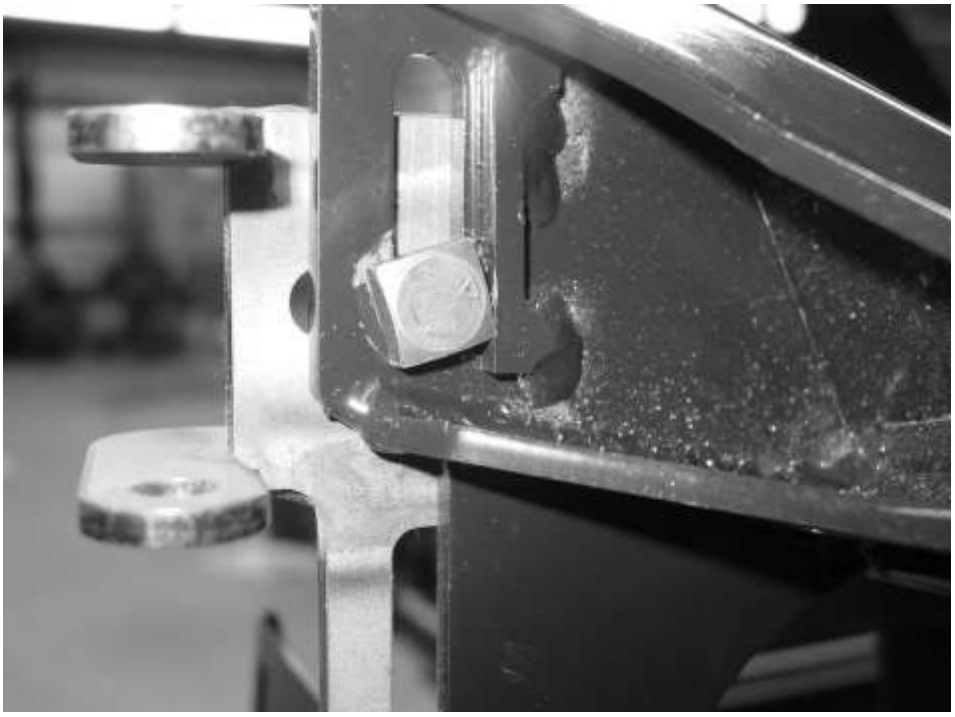
Cable inserted in clevis.

10. Locate the mount tab on the door frame so that the cable has no slack in it and so it will not get in the way of the door skin.
11. Mark the location of the mount on the door frame.
12. Drill and mount the tabs using the 3/16" rivets included.
13. Install the driver side door frame into the driver door through the hole in the front. To get it in you will have to start inserting it at an angle and once its part way in straighten it out and push it the rest of the way in.
14. Push the frame all the way in until it touches the back of the door. Clamp the frame to the door with two or three small clamps. Note: Make sure the inside surface of the frame is resting on the top edge of the recessed area of the door.
15. Using a straight edge draw a line along the top and bottom edges of the recessed area. Draw a line parallel to this line 5/8" above the top line and 3/4" below the bottom line.
16. Mark the door for drilling using the diagram for locations.
17. Drill through the door and frame with a 5/16" drill.

18. Bolt the frame to the door using the stainless steel button head bolts and nuts. Do not torque the stainless bolts, snug is good.
19. Remove the clamps.
20. Move the door handle around inside the door and find an approximate location that you would like to mount the handle. Mark the rough location on the door. Make sure that the cable will be able to reach.
21. Remove the handle from the cable by pulling the sleeve out of the recess and then removing the cable from the handle.
22. Use the handle upside down as a template for locating the necessary holes for both the screws and the handle body cut-out.
23. Cut the holes in the door for the handle.
24. Pull the cable through the hole and reattach it to the handle.
25. Attach the handle to the door using the oval head screws provided.
26. Using the door hinge cut out as a template and mark the cut out locations on the body as shown.

Hinge cut-out mounted to body.

27. Drill a ⅜" hole in each of the cut out locations and cut out with a jig saw.
28. Install the adjuster plates to the frame using the ⅜" square head bolts with nuts and washers but do not tighten yet.

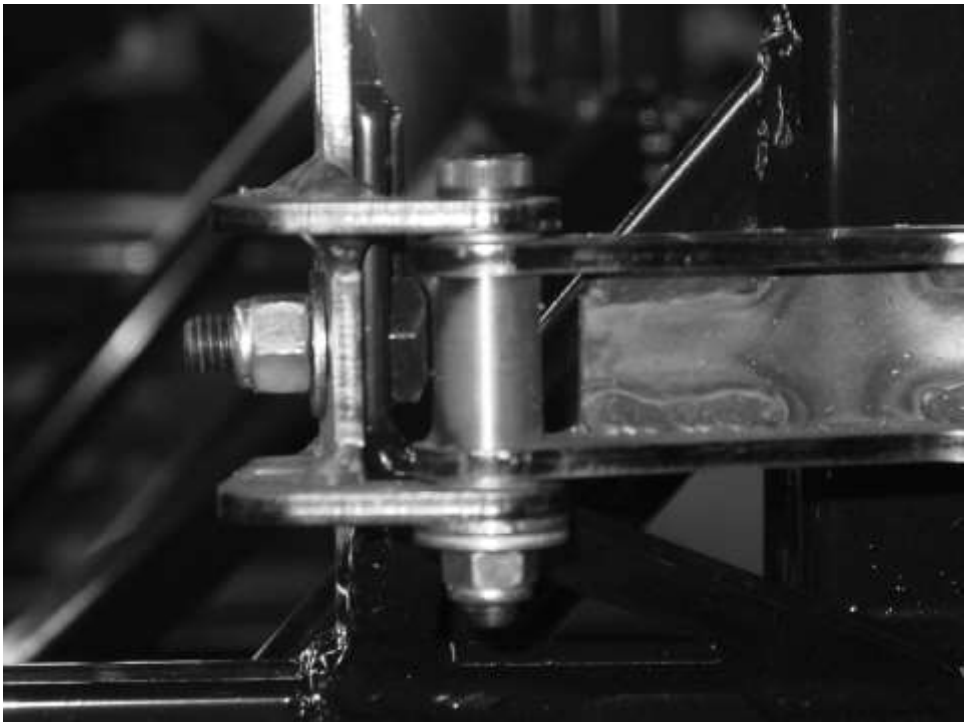


Adjuster plates mounted.

29. Press the bronze bushings into the ½" holes in the hinge arms.

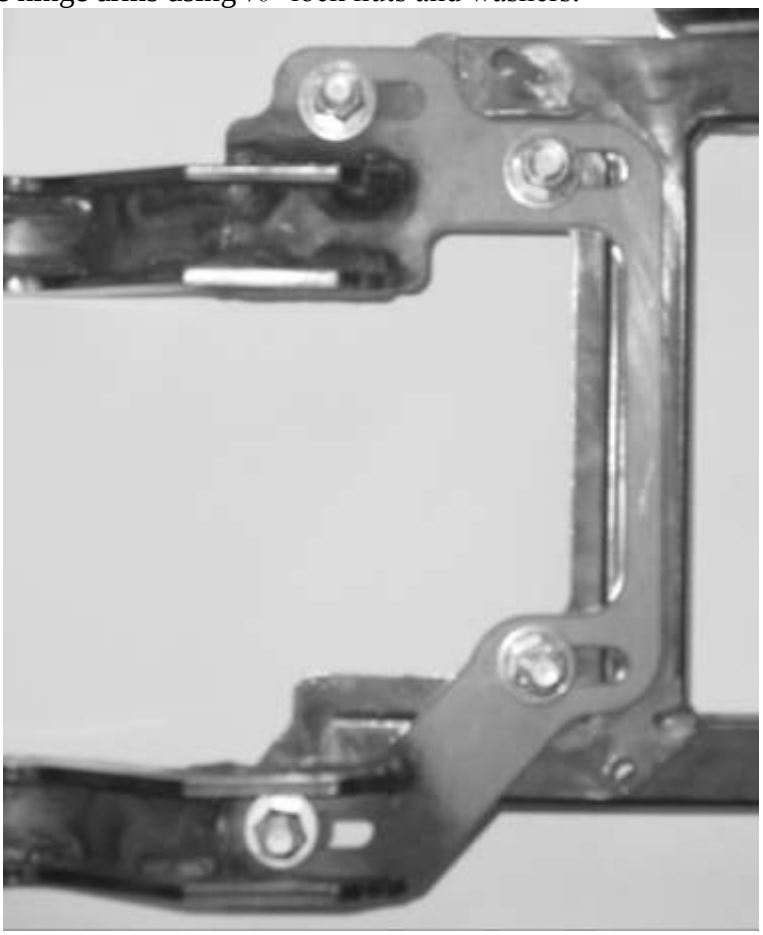
Bushings inserted into hinge arm.

30. Attach the hinge arm assembly to the adjuster plate using the 2" shoulder bolts, washers and 5/16" nuts. Tighten the nuts down until the arm is hard to move and then loosen slightly. Note: If you tighten the nut tight and you can still rotate the hinge easily then the washer is caught on the shoulder. Loosen slightly, adjust the washer and retighten.



Hinge arm mounted to adjuster plate. (NOTE: this photo was taken before the door was mounted to the frame to clearly illustrate the frame mounting procedure)

31. Attach the doors to the hinge arms using ⅜" lock nuts and washers.



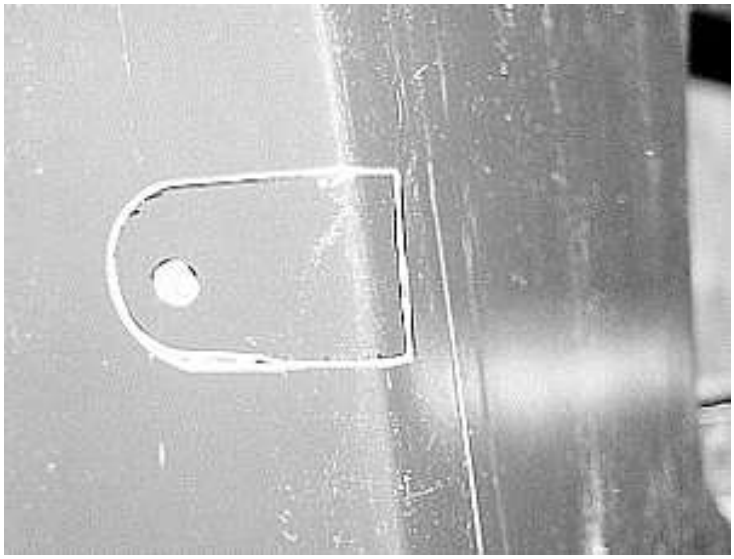
Door frame mounted to Hinge arm.

32. Align the door in the opening with 3/16" spacers under it. Tighten the nuts in the door, check the alignment, then tighten the nuts holding the adjuster plate.
33. Check door gaps and movement, adjust if necessary.

Striker Mounting

1. From inside the rear wheel well use a ⅛" drill bit through the center of the door latch striker mount to drill through the body.
2. Use the 1¼" hole saw to drill from the front side of the body through the hole just drilled.
3. Hold the door in the door opening.
4. Remove material from the doors if necessary to allow a good fit in the door opening. Allow ⅛"- 3/16" gap around the door.
5. Use a marker through the door latch striker hole to mark the location of the striker on the door.
6. Remove the door.
7. Using the aluminum rear cover as a template, center the door latch striker mark on the door in the rounded end of the latch mount. Mark the door with the shape on the template.

Striker hole cut.



Door latch area marked.

8. Use a jig saw to cut out the area marked on the door.

Door latch cut out.

9. Cut the front of the door with a jig saw on the line ½" in from the aluminum lines.
10. Attach the latch striker to the mount plate on the frame using two ⅜" washers next to the striker flange to space it out and one washer next to the locknut.

Latch striker.

Side View Mirror

TOOLS: *Drill,⅛" drill bit, Phillips head screwdriver.*
PARTS: *Mirror assembly (FFR# 12837).*

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. Sit in the driver's seat and determine a comfortable position for the mirror.
3. Once you have determined a comfortable position with ample clearance, mark around the base of the mirror with a pencil.
4. Disassemble the mirror by removing the screw from the back and the screw that holds on the base.
5. Position the base plate in the center of the marks you made for the mirror and mark the screw holes.
6. Mount the mirror to the base and adjust using the screw in the back.
7. Drill the holes with a ⅛" drill bit and install the base with the two screws and gasket provided with the mirror.

Side view mirror installed.

Windshield Area Body Mounts

ATTENTION: *There are three windshield area body mounts along the bottom.*
TOOLS: *$^{7}/_{32}$" drill bit, drill, $^{1}/_{8}$" hex key, $^{5}/_{16}$" wrench, duct tape.*
PARTS: *Secondary body fastener assembly (FFR# 12749), windshield assembly (FFR# 12811).*

1. Drill two holes through the windshield flange and the body mount tabs.
2. Use the supplied screws and plastic spacers to hold the windshield area in place.
3. For fitting purposes only, position some of the small rubber posts from the Secondary Body Fasteners Assembly in the windshield area using tape to hold them in place.
4. Position the windshield in the opening. There should be a gap all the way around the windshield.
5. If there is no gap, remove the windshield and add another spacer to the closest mount area. If there is too much gap, remove a spacer from the closest mount area.
6. Reposition the windshield. Check for fit and spacing.
7. Remove the windshield.

Body Removal

ATTENTION: *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.*

1. Remove all of the accessories (mirror, gas cap, lights, etc…) from the body.
2. Remove the nose.
3. Remove all of the parts (latches, lights, hinge brackets) attached to the nose.
4. Unbolt the sides of the body.
5. With the help of a friend, remove the body from the frame in the reverse order it was put on.

Body Prep and Painting

ATTENTION: *Take your time with the bodywork. During the bodywork, take care to look for any small flaws. Time spent here will pay off down the road. If you have never done body work before, talk to an auto-body person who is familiar with working on fiberglass first. Before painting your body and panels we recommend mounting the body, doors and nose along with all lights and accessories so if there is a problem with the panel it is easier to take care of it. After working with more than 1500 customers we have found the best results are found by painting the body at the very end of the build, after everything is tight and aligned properly. We suggest removing the body and painting it off the car. This eliminates overspray and keeps your nice work intact.*

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

1. Remove all trim, doors, windshield, etc. before beginning body work.
2. Take extra care to sand away the fibers and strands. 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. 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 seams and any area of body filler repair should be given at LEAST several days to cure. If you want to heat cure the bodies do not exceed 140°F. When the final paint is applied it is very smart to add several coats of clear to those areas where work was done so that years later you or the next owner can simply sand out and buff any imperfections that may develop.
5. Much time and energy was spent on the mold so that the parts line up evenly and don't have a different height when you begin sanding. Take your time at this final fitting stage and you'll be rewarded with a fine finish, and a perfectly straight body. Of all the areas to be a perfectionist this is the one.
6. Block sand the entire body surface with 100 grit sandpaper. For flat sections you can use a harder rubber sanding block. For curved sections, use a firm sponge at an angle to the curve that you are sanding.
7. Make sure the body is clean and grease/wax free before priming.
8. Allow the bodywork or repairs performed to sit for several days outside in the sun or at elevated temperatures to allow the repair materials to cure.
9. Paint the inside of the body 4" around the windshield opening a flat black. A spray can works great. This will make the any visible parts of the windshield flange "disappear".
10. Prime the body surface with a polyester primer/surfacer such as feather-fill. 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 top coat you will be applying.
11. Block sand with 220 grit paper.
12. 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.
13. 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.
14. 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.

15. 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.
16. 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 $8000.00 on the show car paint. If you are like the rest of the world, try to control the expense of the project. An average cost for painting a Spyder GT is ~$4000.00.

Remount Body

1. Using two people, one on each side holding the wheel well and side exhaust recess move towards the frame from the rear with the back slightly lower than the front.
2. Pull the sides of the body out to clear the frame.
3. Watching the rear of the frame, move the body forward slowly lowering the front. Watch the door latch posts.
4. Once the body is in position, it will be snug against the taillight plates in the rear, the lower rear corners of the door opening should be at the corner of the tubes for the door latch and the windshield mounts should be close.
5. The body sides are mounted using four stainless $^{5}/_{16}$"x 1" bolts with a washer next to the head.
6. The rear most side body mount needs $^{7}/_{16}$" worth of washers between the body and the frame so that the body is spaced correctly and there is enough thread left so the locking part of the nut is used.
7. When you are fitting the doors the number of washers may have to be changed to ensure a flush door fit.
8. The edge of the body door sill should be flush with the inside side of the doorsill 1"x 1" tube. Use a #6 self-tapping screw to hold it in place if necessary.
9. Work from the rear of the car towards the front.

Reinstall Tail lights

1. The lights mount from the outside of the body without the lenses and trim rings in place.
2. Wire the turn signals up to the wiring harness.
3. Mount the lights using the supplied hardware.
4. Attach the lenses and trim rings to the rubber seals.

Side louvers

TOOLS: *Silicone, caulk gun, duct tape.*
PARTS: *Louvers assembly (FFR# 12836).*

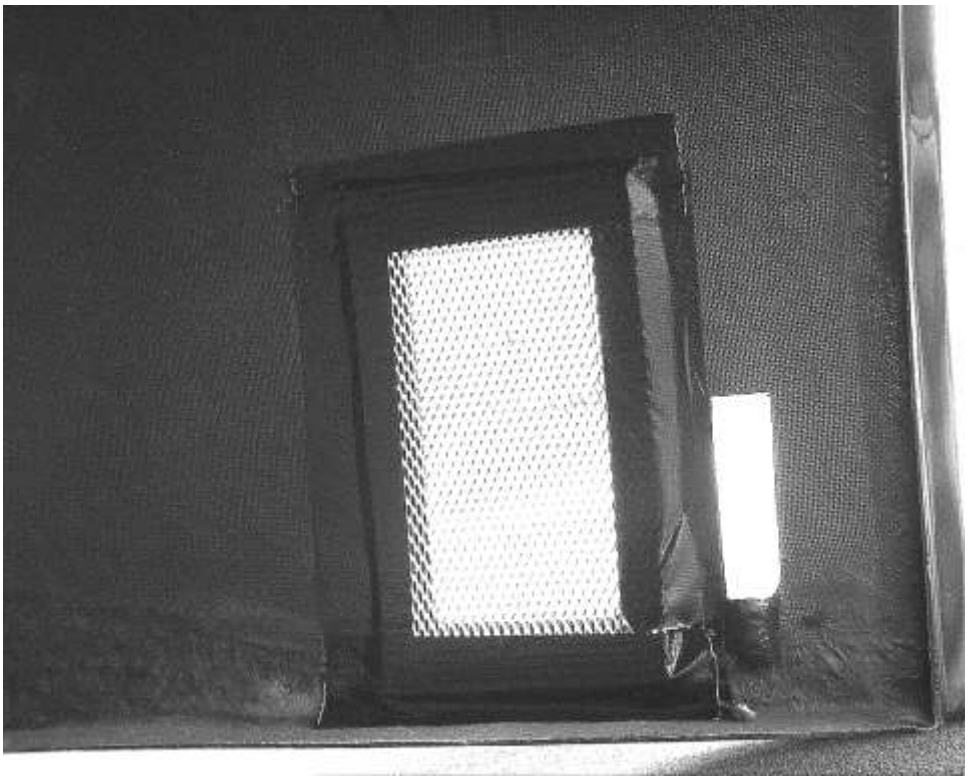
1. Position the mesh screen behind the louver cut-out area.

Positioning the mesh screen.

2. Remove the mesh and lay a bead of silicone around the cut-out so that it will contact the mesh.

Apply silicone bead in place for the mesh screen.

3. Reposition the mesh, pushing it into the silicone.
4. Use duct tape to hold the mesh in place until the silicone dries (usually overnight).



Duct tape in place on mesh.

Windshield

ATTENTION: *Handle the windshield with care and store in a safe place. We highly recommend having a professional windshield installation shop do this installation. Once the windshield is installed, the screws around the windshield are not accessible making the removal of the rear part of the body impossible without the removal of the windshield. Most glass shops prefer to use their own weather strip and materials to install the glass since they warranty the installation. Our local installer used ¼"x 3/8" tall foam dam tape and 409 T 102 weather stripping on our race car.*

PARTS: *Windshield assembly (FFR# 12811).*

1. Stick the foam dam tape around the windshield flange on the body.

Sticking the foam dam to the windshield flange.

2. Prime the windshield flange for the urethane.
3. Apply urethane around the windshield flange.
4. Attach the weather stripping to the windshield.
5. Push the windshield into place.
6. Do not move/touch the windshield for 24 hours.

Windshield mounted on the body.

Remount Doors

ATTENTION: Take your time to align the doors properly.
TOOLS: ½" deep socket, (2) $^{9}/_{16}$" wrenches, $^{3}/_{16}$", $^{5}/_{16}$" hex key.

1. Attach the door frame to the door hinge rod ends using the 1¾" long bolts. Insert the bolts through the hinge arms washers and rod ends. The upper hinge bolt is easier to install from the bottom up. Tighten the locknuts.
2. Slowly close and engage the door latch.
3. Open the latch and swing the door frame open.
4. Bolt the door skin to the door frame using the 1½" long $^{5}/_{16}$" stainless screws. If washers were used to space the skin away from the steel don't forget to put them on the screws.
5. Reach in the door and release the latch.
6. Slowly open the door and try closing it.

Door Weather-Stripping

TOOLS: *Razor knife, tin snips.*
PARTS: *Secondary body fastener assembly (FFR#12749).*

1. The weather stripping that is provided looks like a double D with adhesive on the back. This should be pulled apart into two D's. This is used around the bottom of the door and the front.

Check Straps

ATTENTION: *The check straps can either be mounted using screws or $^{3}/_{16}$" rivets.*
TOOLS: *Drill, $^{1}/_{8}$" drill bit, Philips head screwdriver, and marker.*
PARTS: *Door latches/hinge assembly (FFR# 12894).*

1. Sitting inside with the door closed, hold the check straps up to the door and the 2"x 2" tube and position the strap so that it will hit the framework in the door.
2. Use a marker and one of the check straps (FFR# 10820) to mark the two mounting holes on the middle of the inside face of the 2"x 2" vertical tube that the hinge is mounted on.
3. Use $^{1}/_{8}$" drill bit to start holes for the screws to attach the straps.
4. 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.
5. Open the 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.
6. Hold the loose end of the check strap up to the hinge.
7. Mark the locations of the drill holes.
8. Fasten the other end of the check strap to the door.

Cockpit Aluminum

TOOLS: #6 nut driver, rivet tool, silicone, caulk gun, drill, $^{1}/_{8}$" drill bit.
PARTS: Secondary body fastener assembly (FFR# 12749), aluminum cockpit assembly (FFR# 12838).

Transmission Cover

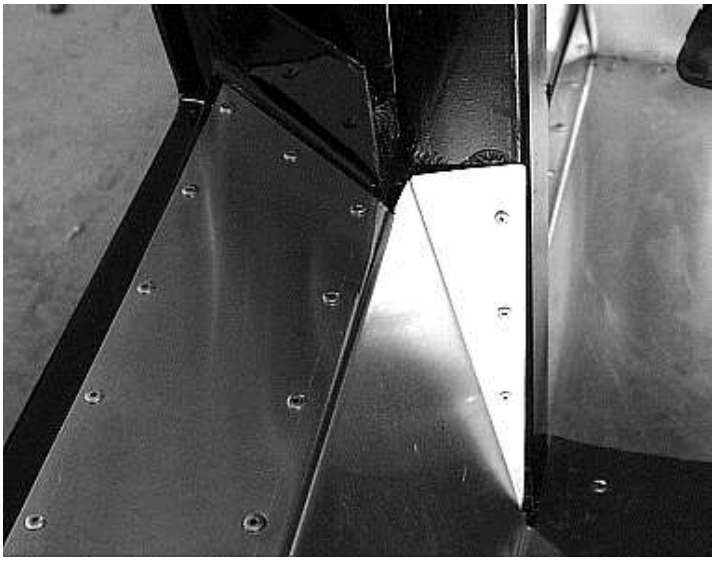
1. Slide the top cover under the rear U-joint cover, then forward and down as much as possible on top of the front cover flap.
2. Use a marker and ruler to mark rivet positions.
3. Remove the panel and silicone where the panel will touch the already mounted panels.
4. Reassemble the Transmission cover using a couple of #6 self-tapping screws to hold the top and sides in position.
5. Drill the rivet holes.

Transmission tunnel top panel mounted (FFR Coupe shown).

6. Rivet the panel in place.
7. The transmission/clutch are removed through this panel for service if necessary.
8. The photo above shows the shifter forward of the standard laser cut hole. The Tremec transmission can have a "mid-shift" shifter installed to relocate the shifter. This is how the originals looked with the shifter relocated, riveted cover plate and all!

Door Sills

1. Using the #6 sheet metal screws, position the Door Sill aluminum on top of the body and even with the edge of the 2"x 2" vertical tube. The side going down to the floor will be angled slightly.
2. Use a marker and a ruler to mark the location of the rivets to hold the panel in place.



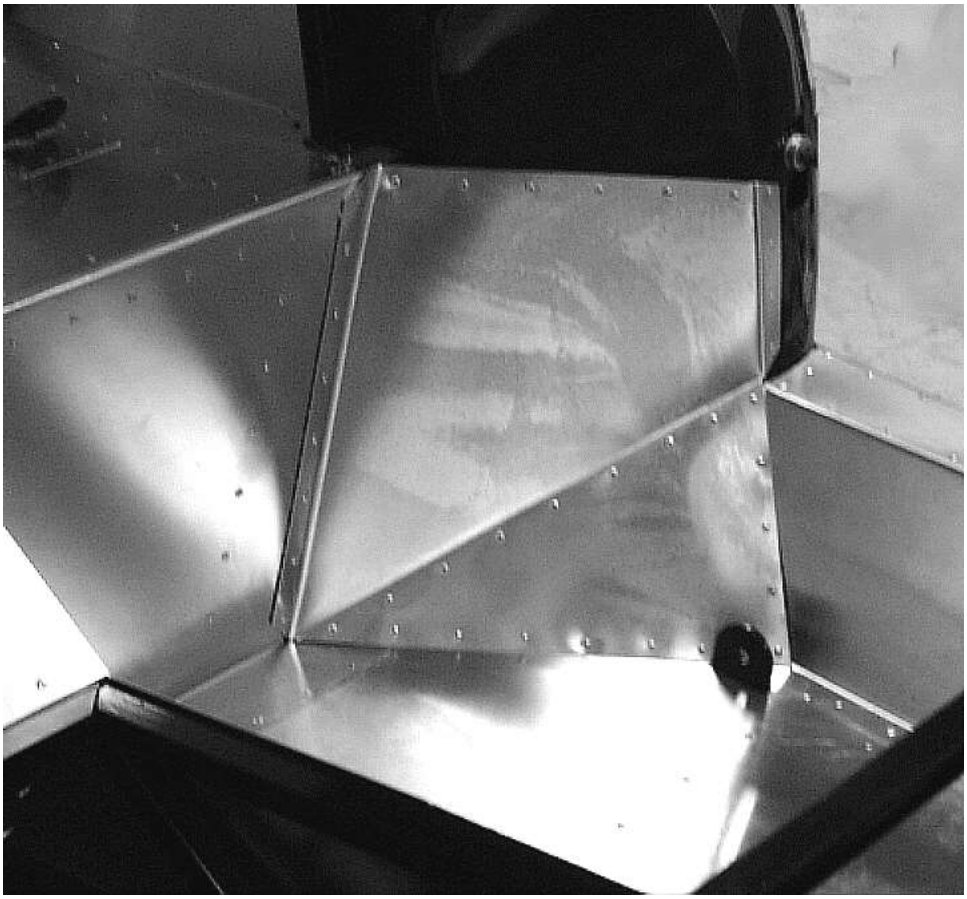
Driver side front of door sill.

3. Remove the panel and spread silicon between the body and the door sill 1"x 1" tube and where the aluminum will contact the frame and body.
4. Re attach the aluminum panel using the screws and drill and rivet the panel in place.
5. Repeat for the opposite side of the frame.

Driver side door sill.

Rear Splash Guards Behind Seats

1. Position the splash panels so that they are flat against the rear cockpit wall and the corner is against the aluminum panels.
2. Hold the panels in place with #6 screws.



Rear wheel front splash panels installed.

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

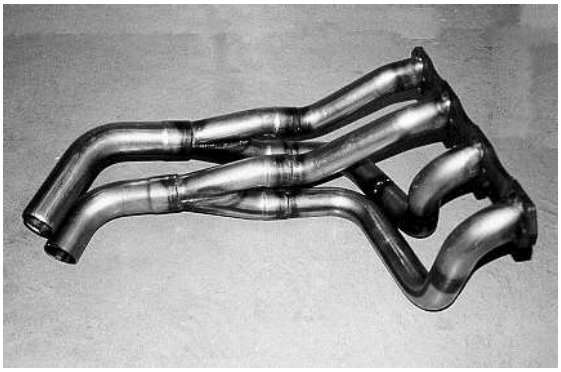
Splashguard riveted.

Headers and 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). The side-pipes are positioned with the rear mount on the bottom of the pipe facing the body.*

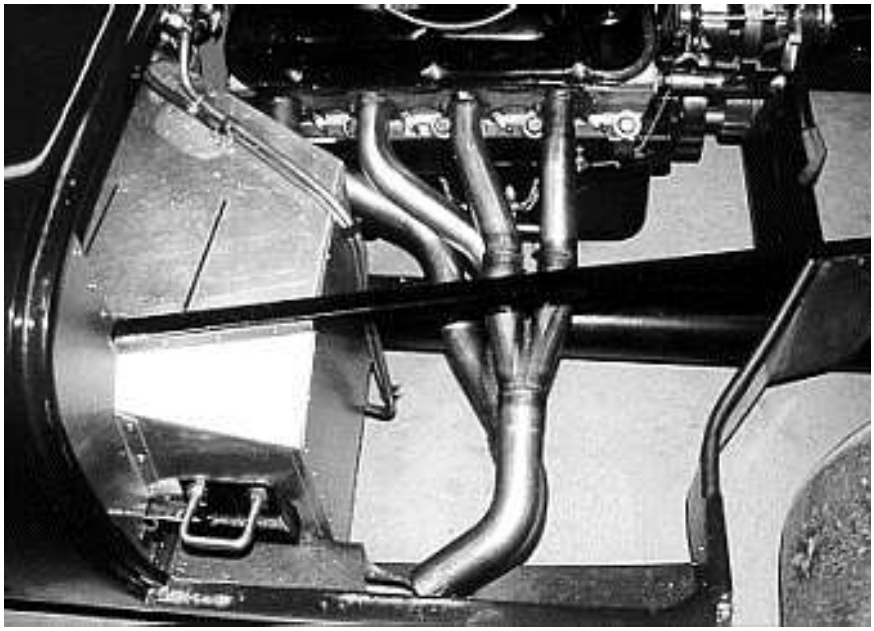
TOOLS: *$^{9}/_{16}$" sockets, ⅜" wrench, jack stands, jack, ¼", $^{5}/_{16}$" hex key.*

PARTS: *Header assembly (FFR#12899), side exhaust assembly (FFR#12829), Mustang exhaust hanger.*



Driver side header.

1. Mount the headers to the engine and fully tighten. The driver side is easiest to install from above the body but underneath the 1"x 1" tube. It will also fit from the bottom if the car is raised.



Passenger side header mounted.

2. Slide the band clamps for the side pipes onto the headers. The small diameter goes first.
3. Slide the side pipes into position over the header tubes. Align the pipes with the body.
4. Tighten the clamps. It helps to hold the rear of the tubes slightly upward. Torque the clamps to 75 **ft/lbs**.
5. Bolt through the top hole of the rubber and the frame bracket.
6. Line the bottom hole up with the slot on the side exhaust and tighten the bolt.

Shifter Installation

ATTENTION: *The kit includes a shifter for a T-5 or rear mount Tremec transmission. The pictures in this manual show a Tremec TKO with a mid-shift kit installed and a 289 style handle welded on.*
TOOLS: *Drill, ⅛" drill bit, Phillips head screwdriver.*
PARTS: *Shifter assembly (FFR# 10888).*

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.

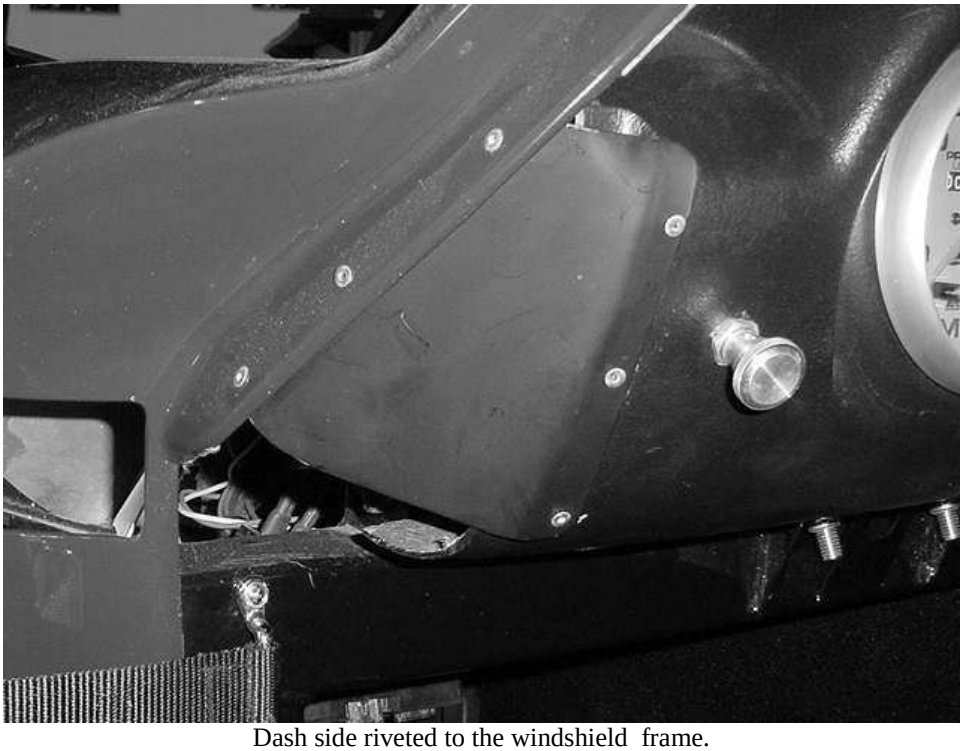

Shifter and ring installed.

Gauges and Dash

ATTENTION: *Read the instructions completely before starting. There is more than one way to run the wires for the gauges. The method described here uses wires to form a harness to run power and ground for the gauges. Another way is to use trailer plugs to allow easy dash removal later if necessary and for a cleaner wiring set-up. Mount the gauges in the dash before connecting the gauges to the engine.*
TOOLS: *Wire stripper, wire crimping tool, electrical tape, Teflon tape, Philips head screw driver, slotted screw driver, 5/16", ½", 11/16", ¾", 1" wrenches, hack saw, solder, soldering iron, pliers, ⅛", ½", ⅞" drill bits, drill, marker, ruler.*
PARTS: *Spyder GT Autometer brand gauge set (FFR# 13115), composite dash assembly (FFR# 13489).*

1. Decide on the location for your turn signal and alternator charge indicator and high beam lights. We chose to install them over the steering column. We spaced them out 1" on center. Use a ½" drill bit.

Turn signal lights.

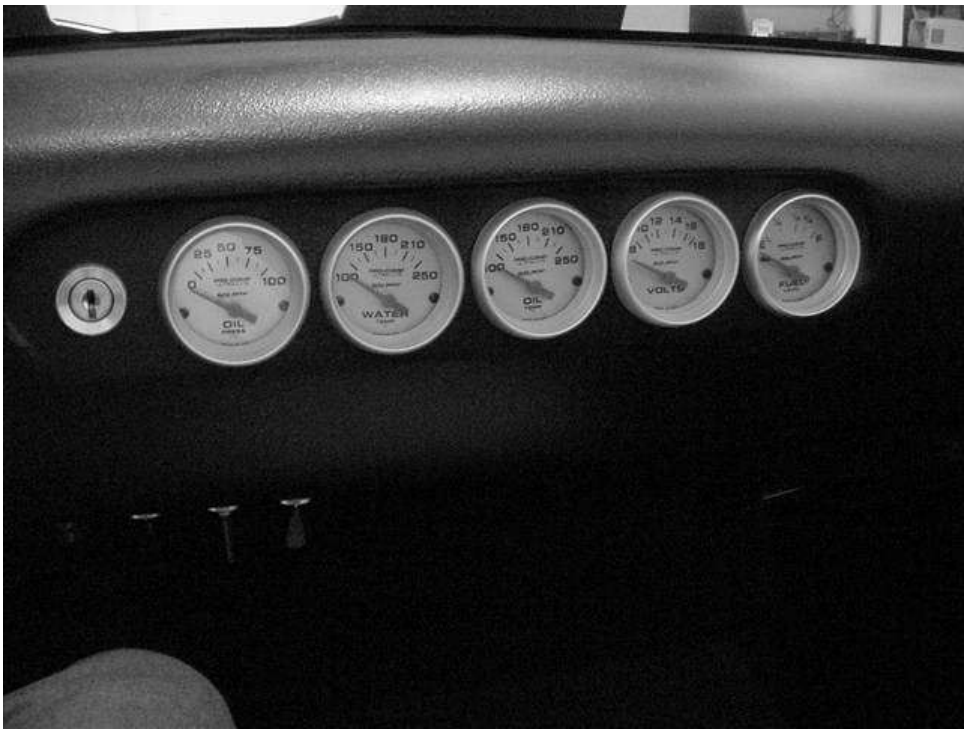

Dash side riveted to the windshield frame.

2. Position the dash in the cockpit. Check the fit where it meets the body at the lower edge of the windshield and trim if necessary.
3. Use the self-tapping #6 screws to screw the dash to the three dash support brackets. The final mount screws are the same size. The self-tapping ones create the threaded hole necessary for them.

Gauges

1. Test fit all of the gauges. Shown below are the gauge locations and gauges.

Speedometer and Tachometer mounted.



Optional ignition switch, Oil Pressure, Water Temp, Oil Temp, Volts, Fuel Gauges (Left to Right).

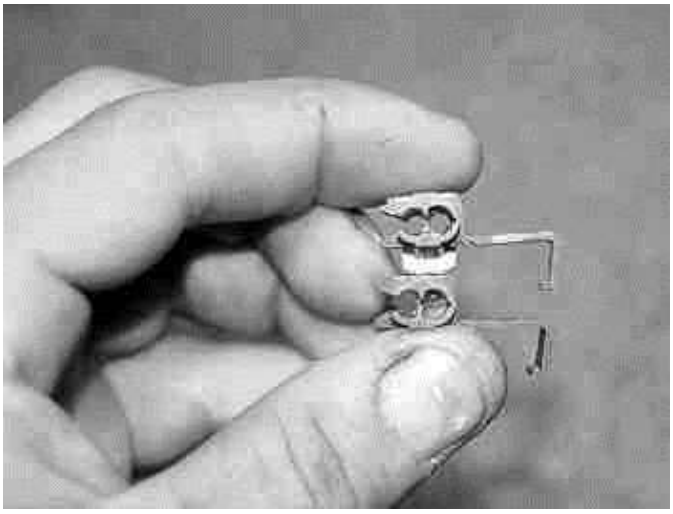
2. Remove the dash from the car.
3. Remove the gauges from the dash.

4. Cover/coat the dash, a matte finish or non-reflective finish is suggested. We chose spray on truck bed liner from Wal-Mart for its finish and ease of use. Make sure to prep the surface properly before covering so it will not peal off. If painting sand it then wipe clean. Do not get finger oils on it.
5. Install the gauges, lights and switches.

Gauge Wiring Harness

Included with the gauge kit are wires and connectors to create a simple gauge wiring harness.

1. Cut the 5' long blue wire into sections. (1) 2' wire, (1) 1' wire, (3) 8" wires.
2. Cut the 6' long black wire into sections. (1) 2' wire, (1) 1' wire, (4) 8" wires.
3. Cut the 5' long red wire into sections. (1) 2' wire, (1) 16" wire, (2) 8" wires and (1) 4" wire.
4. Mark the red and blue 2' sections at 4", 7" and 10" from one end.
5. Using a $^1/_8$" Drill bit, drill the wire blockage out of (7) of the tap connectors.



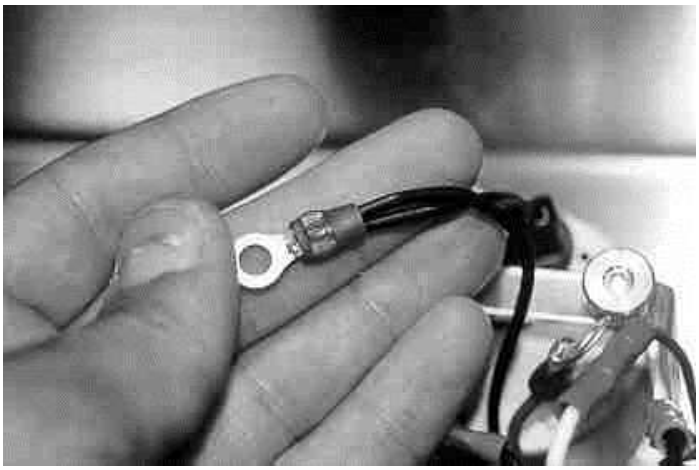
Upper connector has blockage, lower is drilled.

6. Lay the cut dash face down on a table.
7. Starting at the 4" mark, place one of the drilled tap connectors on the wire along with one of the 8" wires.
8. Center the 8" wire on the connector and squeeze the connector with a pair of pliers. Snap the cover on the connector with your fingers.
9. Repeat steps 4 and 5 for the 4" and 7" marks on the red, blue and the black wires.
10. For the black and blue wires at the 10" mark, use the 1' wire and an un-drilled tap connector. This wire will run over the top of the speedometer to the tachometer.
11. For the red wire at the 10" mark, use the 16" wire and a drilled connector. Mark the 16" wire 4" from the end and connect the two wires at the 10" mark.
12. On the blue 1' wire, attach remaining 8" wire using an un-drilled connector above the speedometer.
13. On the black wire, attach the two remaining 8" wires using drilled connectors centering the 8" wire on the connector. Position the connectors over the steering column for the small lights and so that one lead will reach the speedometer light.
14. Use zip ties from the kit to tie all three wires together.
15. Attach the loose end of the red wire to an ignition power source.
16. Attach the loose end of the blue wire to the instrument panel lamps feed.
17. Attach the loose end of the black wire to a ground on the frame.
18. Attach the short section of red wire on the 16" section to the horn button.

19. Use the remaining short section of red wire to jumper over from the horn button to the fan switch. The connectors for the switch are packed with the fan.

Instrument Lighting

1. Attach positive leads from the lights to the blue wire closest to the gauge using the red butt connectors. Attach the negative lead from the light (**except tachometer**) to the black wire closest to the gauge using a small ring connector. The ring connector will also act as the ground for the gauge.
2. Wire the tachometer lighting when wiring the remainder of the tachometer.



Ring connector attached to gauge light ground and wire harness ground.

Water Temperature Gauge

1. Remove Ford water temperature gauge sending unit from the lower intake manifold located next to the distributor on the driver's side with an $^{11}/_{16}$" wrench.
2. Wrap the adapter threads with Teflon tape.
3. Install the new water temp adapter (short end goes in the manifold) with a ¾" wrench.
4. Attach a ring connector to the water temp sender wire to the gauge signal post.
5. You can use the existing wire from the old sending unit. Attach the ground ring connector and positive wire using a ring connector to the gauge. Pick a color wire for the sending unit wire and connect it to the gauge using a ring connector. Attach the other end of the same color wire to the Mustang gray plug #3 (**Water temperature feed**).

Oil Pressure Gauge

1. Remove the Ford oil pressure sending unit from the driver side of the engine in front of the header with a ¾" wrench.
2. Assemble the new sending unit per the gauge instructions.
3. Wrap the threads with Teflon tape and install in the engine.

Oil Pressure and temperature senders mounted.

4. Attach the stock connector to the sending unit.
5. Attach the ground ring connector and positive wire using a ring connector to the gauge.
6. Pick a color wire for the sending unit wire and connect it to the gauge using a ring connector. Attach the other end of the same color wire to the Mustang Brown plug #8 (**oil pressure feed**).

Oil Temperature Gauge

There are many ways to mount the oil temperature sending unit. Use a "T" junction and put it inline somewhere in either of the hoses that run to the remote oil filter. Use an adapter to thread into the oil filter re-locater on the block. The harder way is to drain the oil from the engine. Remove the oil level sender with a 1" wrench from the driver side of the oil pan. Drill out the sending unit with a $^{5}/_{16}$" drill. Tap the remaining piece with a $^{3}/_{8}$" x 18 NPT pipe tap just enough for the short end of the adapter to attach. Wrap the adapter with Teflon tape and attach the adapter (short section pointed in) to the tapped piece with the ¾" wrench. Attach the adapter and piece to the oil pan. Run the 8' blue wire from the gauge through the dash and fire-wall and attach to the adapter to ensure proper operation.

ATTENTION: Don't forget to refill the engine oil. Note: a machine/tool shop can do the above drill and tap for about $25 if you don't have the tools.

1. Attach the ground ring connector and positive wire using a ring connector to the gauge.
2. Attach a ring connector to the temp sender wire to the gauge signal post.
3. Connect the other end of the sender wire to the gauge using a ring connector.

Tachometer

1. Twist the Tachometer ground wire and the lighting ground wires together, insert them into the same side of the blue butt connector and crimp.
2. Attach the black wire to the other end of the blue butt connector.

3. Connect the positive wires using a red connector.
4. Pick a color wire for the sending unit wire and connect it to the gauge using a red connector. Attach the other end of the same color wire to the Mustang gray plug pin #11 (**SW to Ign. Coil (-)**).

Volt Gauge

1. Attach the ground ring connector and positive wire using a ring connector to the gauge.

Speedometer

ATTENTION: *The color/number of teeth gear for the speedometer sending unit necessary depends on the year transmission you are using and the gears you are running in the rear differential. If the transmission is a **Tremec** or a 1983-1989 **T-5** then one gear is needed. If a 1990-1995 **T-5** is used then another gear is needed. The gears can be bought from your local Ford dealer or any aftermarket Mustang performance shop.*

Using the Mustang Cable

1. Trim ¼" off the metal gauge end of the Mustang speedometer cable, otherwise the shaft inside the cable will not reach deep enough to engage with the gauge receptacle.
2. Pass the cable through the hole in the top of the drivers' foot box cover and run it to the dash.
3. The Speedo cable doesn't have any threads to attach to the gauge. Cut a slit in each side of the end of the housing and use a small hose clamp. This will prevent the Speedo cable from coming off the back of the gauge.

Using an aftermarket cable

There are companies that make custom cables. A cable cost approximately $35. Ask for an Autometer brand gauge to 1992 Mustang sending unit, 65" long.

Fuel Gauge

1. Attach the ground ring connector and positive wire using a ring connector to the gauge.
2. Pick a color wire for the sending unit wire and connect it to the gauge using a ring connector.
3. Attach the other end of the same color wire to the Mustang brown plug # 10 (**gas tank sending unit**).

Battery Charging

ATTENTION: *If using a one wire alternator this step is not necessary.*

1. In order for the battery to charge, solder a 510 OHM resistor between the wires Ign. Sw. to Ign. Coil (BATT) and Ign. Sw. (ACC) to Alt. Reg. forming an H with the 2 wires. You may want to protect this junction with tape, etc. This resistor can be found on the Mustang white gauge pod. Carefully clip the resistor leads leaving them as long as possible.
2. Attach the other ends of the two wires to the brown plug pin #2 (**Ign. Sw. to Ign. Coil (BATT)**) and brown plug pin #14 (**Ign. Sw. (ACC) to Alt. Reg.**) using red connectors.

ATTENTION: *When starting the car, the light will turn on and then go off. The light is part of the circuit*

and <u>MUST</u> be present.

High Beam Indicator

1. Connect one lead from the blue light to the black wire and the other lead to the second 4 conductor 2' section.
2. Attach the other end of the same wire to the gray plug pin #2 (**dimmer to high beams**) using red connectors.
3. The blue light will light when the high beams are on.

Turn Signal Indicator

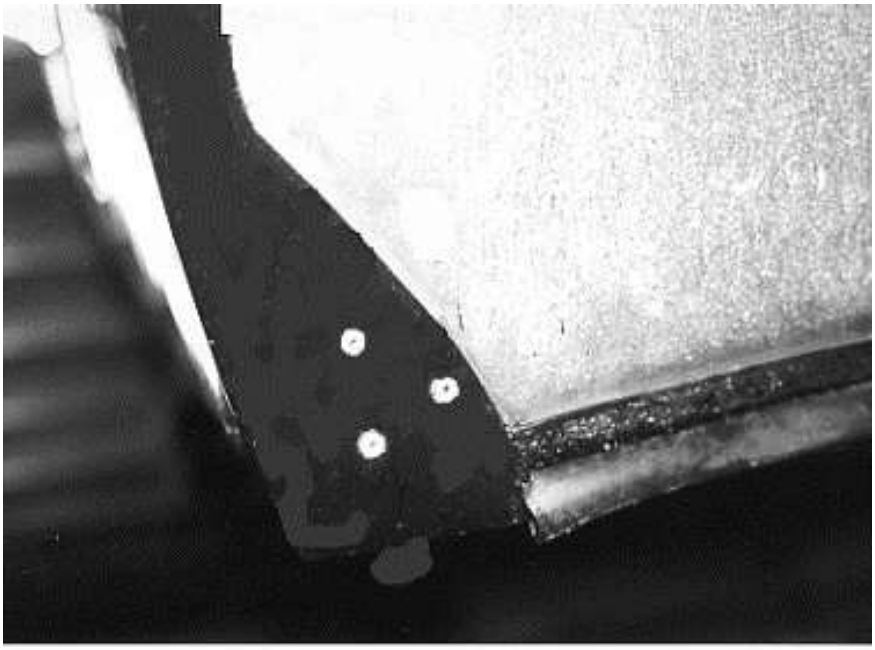
1. In order for the green light to flash when either the right or left turn signals are turned on, a 3-prong turn signal indicator is used.
2. Find the original 2-prong turn signal (probably round and light blue or aluminum) in the Mustang dash wiring harness in front of the passenger seat or near the center of dash. If it is not here, turn the turn signals on and follow the sound.
3. Remove the original flasher from the wiring plug and carefully cut the two wire 90 degree wire connector in half leaving the wires connected to each piece.
4. Put the wires on the left and right prongs of the 3-prong flasher. Run the four foot blue extension wire from the middle prong on the flasher to one of the wires on the green light. Attach the other wire on the green light to the black wire using a red connector.
5. Install the dash using the final mounting screws.

Splash Guards

TOOLS: *$^1/_8$" drill bit, drill, Silicone, level, marker and tin snips, masking tape, Rivet gun.*
PARTS: *Aluminum engine bay assembly (FFR# 12841), secondary body fastener assembly (FFR# 12749).*

Front Wheel

1. Put a wheel and tire on the front and turn the steering so that the rear of the tire is as close as possible to the frame.
2. Clamp the front lower half of the splash guard to the 1"x 1" tube and (from underneath) to the front part of the body. Use a level to make sure the surface that will be close to the nose is flat.
3. Adjust the clamp on the frame so that the aluminum splash guard will not contact the tire.
4. Put some of the press-on bulb seal around the outside edge of the upper aluminum splash guards.
5. Clamp the splashguard up against the nose. The upper splashguard attaches to the side of the nose radiator opening and the lower outside of the wheel well.
6. Remove the wheel.
7. Close the nose.
8. Use masking tape and a spacer between the nose and the body so they are aligned with each other.
9. Look at the two splash guard pieces and move them forward or back so they are aligned.
10. Use a marker and tin snips or move the lower splash guard if necessary to create an even gap between the upper and lower splash guards. Push-on weather-stripping will be used here after the pieces are located.
11. Put a wheel and tire on the car and check for aluminum clearance.
12. Apply silicone to the bottom outside edge of the splashguard and rivet through the fiberglass and the aluminum.



Lower outside corner of splash guard.

13. Apply silicone to the radiator opening and from the radiator opening side rivet through the fiberglass and the aluminum.
14. Push some press-on weather-stripping onto the splashguards where they can contact each other.
15. Silicone the weather-stripping around the splashguard to the nose from the backside of the wheel well.

Rear Wheel

1. Push press-on trim onto the rear splashguards and hold in place in the wheel well. The bent edge should be vertical and aligned with the backside of the quad shock mount. Use some of the self-tapping #6 screws to hold it in place.
2. Remove the panel and silicone where it will contact the trunk side and along the inside of the flange on the body.
3. Drill and rivet the panel in place along the trunk side and through the bottom corner of the body into the aluminum.

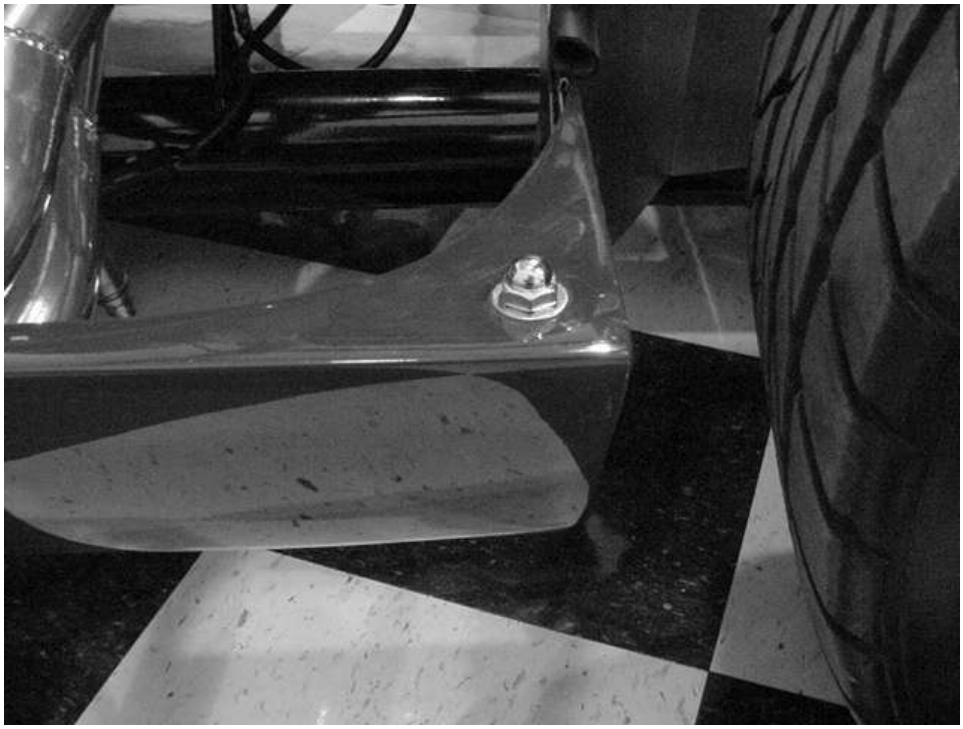
Nose Side Locator Brackets

TOOLS: *Drill, 1/8", 3/8" drill bit, 1.25" hole saw, rivet gun, silicone, 5/16" hex key, 9/16" wrench.*
PARTS: *Nose locator bracket assembly (FFR# 13100), secondary body fastener assembly (FFR# 12749).*

1. Hold the outside of the nose behind the wheel opening so that it is flush with the lower part of the body.
2. Clamp or hold the nose so that it will not move while drilling the locator hole.
3. Position the locator bracket on the backside of the nose so that it is aligned with the side of the nose.
4. Use a marker and mark all rivet holes and the large center hole.
5. Remove the locator bracket.
6. Drill a ⅛" hole through the center hole mark through both the nose and the lower body section.
7. Open the nose and drill the remaining rivet hole marks through the nose.
8. Enlarge center 1/8" hole with a 1.25" hole saw.
9. Drill the rivet location marks with a ⅛" drill bit.
10. Enlarge the hole drilled in the body section using the 3/8" drill bit.

11. Silicone and rivet the Locator bracket to the backside of the nose.
12. Place a washer on the $^{3}/_{8}$" locator bolt and pass it up from the under side of the body.
13. Place another washer on the topside of the body followed by the acorn nut.
14. Close the nose to test the locating pin height. Add or remove washers as needed to locate the side of the body correctly.

Underside view, nose locator mounted.

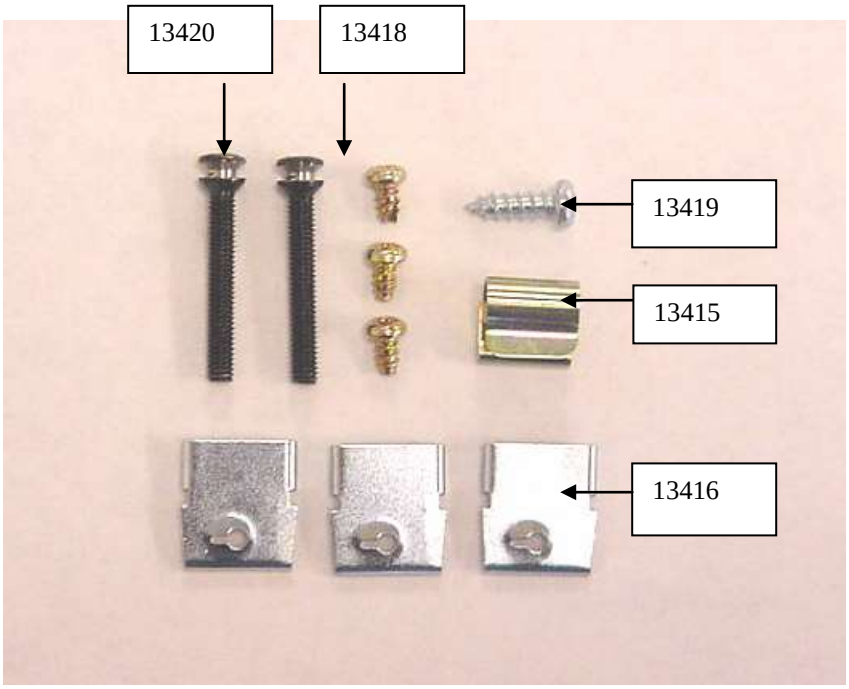


Top view. Acorn nut installed.

Headlight Assemblies

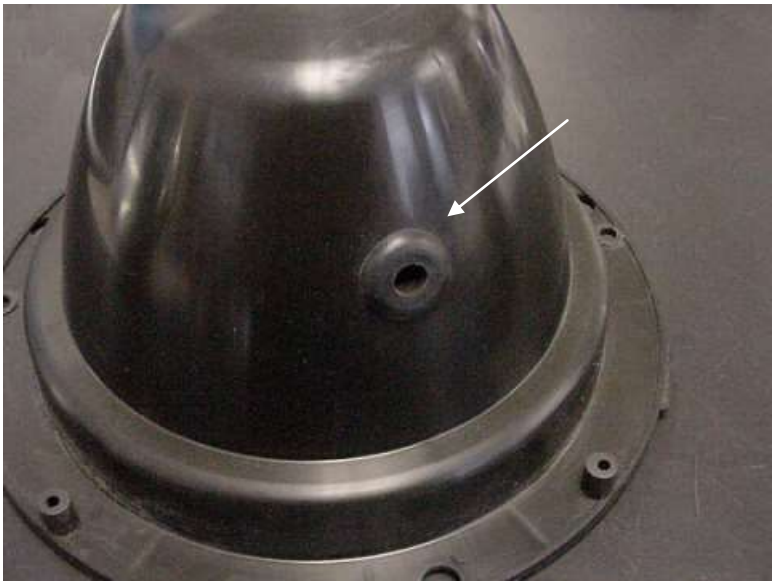
TOOLS: *Phillips head screwdriver, drill, ⅛"drill bit, wire strippers, wire cutters, electrical tape, marker, Chilton's manual.*

PARTS: *Headlamp Assembly (FFR# 12833).*

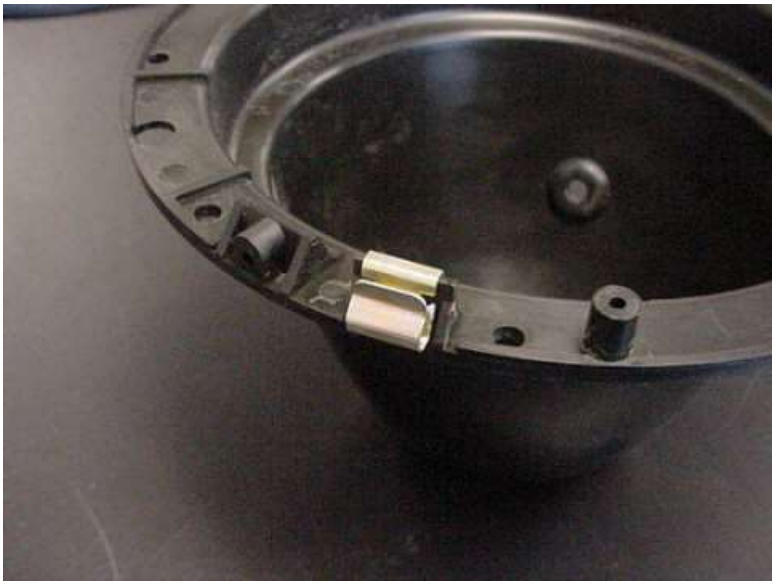


Headlight Fasteners.

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.

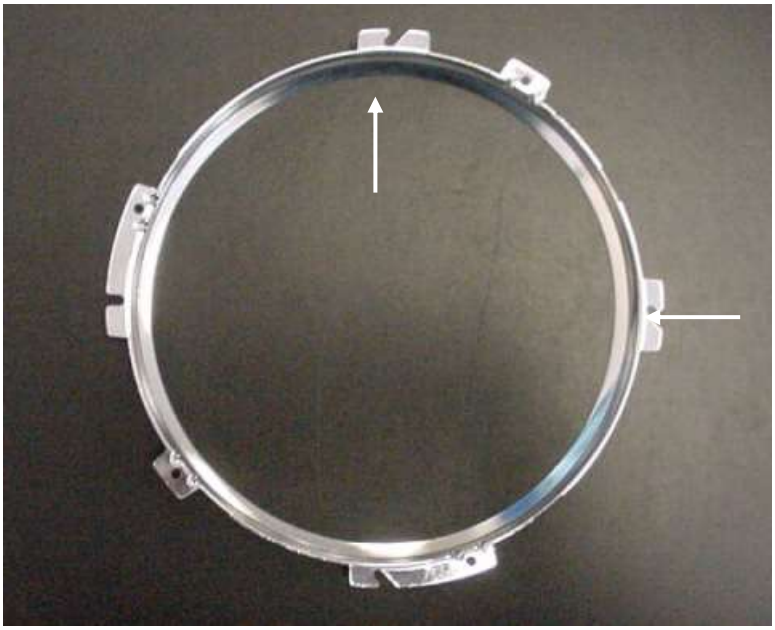


Chrome ring clip mounted.

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

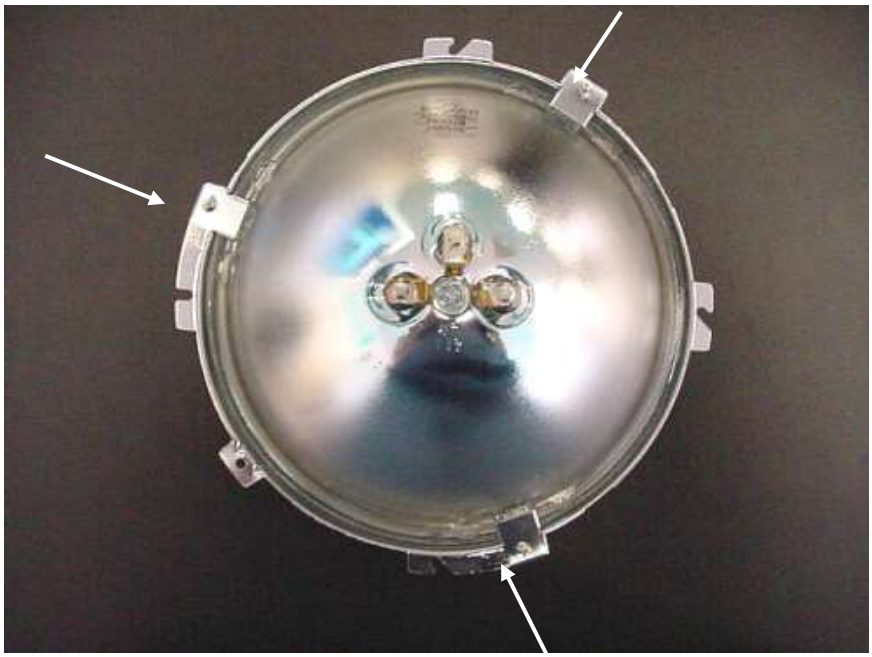
Adjustment screws installed.

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 retaing ring clips (FFR# 13416) to the retaing 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. Hold a headlight up to the body holes cut earlier and use the bucket holes as a template to mark the screw holes.
12. Drill ⅛" mounting holes.
13. Screw on each headlight with four screws.
14. 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.
15. 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 Signals

PARTS: *Turn signal assembly (FFR# 12832).*

1. Screw the turn signal lights into their holes as shown.
2. Attach the turn signal wires to the lights using the included connectors.

Left: Underside of turn signal light. Right: Turn signals mounted.

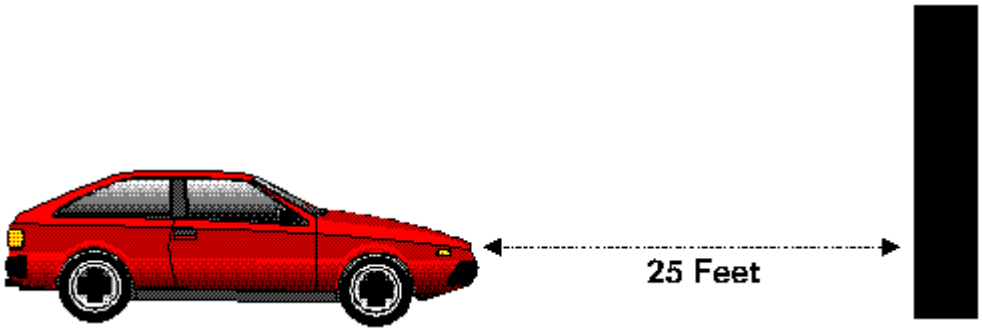
Headlight alignment

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.

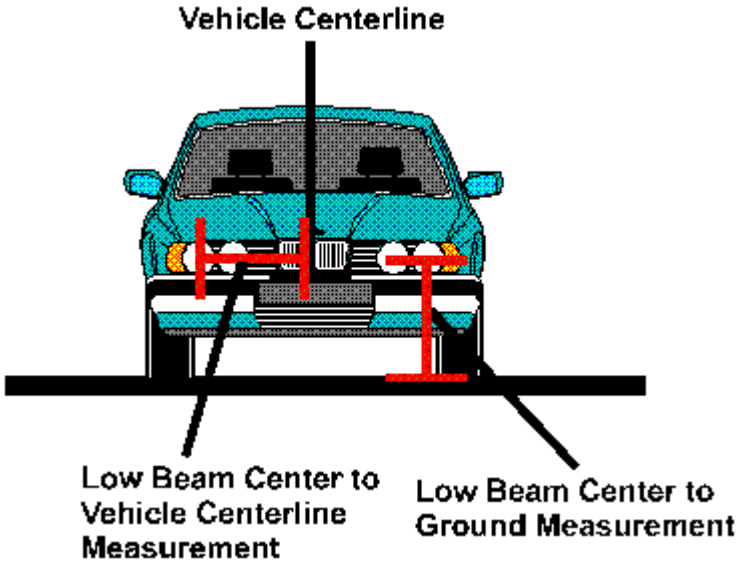
1. Find a *flat level* surface next to a *vertical white* wall where the car can be parked (a garage door is an ideal location at home).
2. Pull the car straight up to the wall as close as possible.
3. Using masking tape and a marker, draw a vertical line on the wall corresponding to the centerline of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



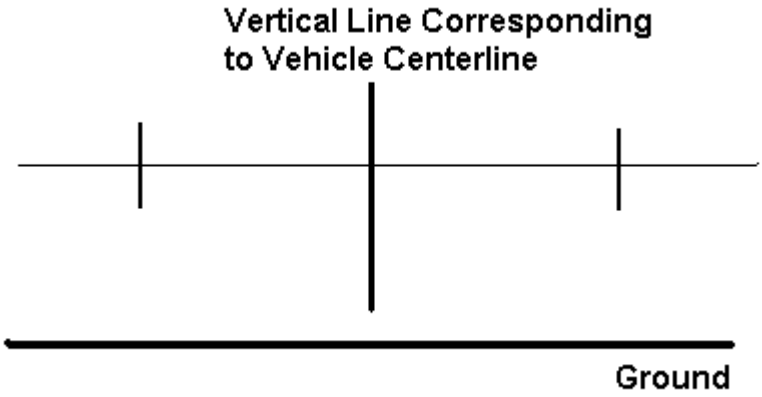
5. Make the following two measurements:

   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.

Headlight Covers

TOOLS: *Drill, ⅛" drill bit, Philips head screwdriver, masking tape, marker, ruler, and sandpaper.*
PARTS: *Headlight assembly (FFR# 12833).*

1. Stick masking tape around the edge of the headlight bucket so the paint will not be scratched.
2. Position the headlight cover in the opening with your hands as shown in the picture. Only press down at four points on the cover. Move your fingers as necessary so that the cover is flush with the body everywhere. If necessary use sandpaper on the edge of the plastic to shape the plastic.


Positioning the headlight cover.

3. Mark on the masking tape where your fingers were located.
4. Remove the cover.
5. At the points marked, measure down from the edge of the bucket ⅛" and mark the tape.
6. Tape four of the mounting tabs in the bucket opening at the points marked.

Mounting tabs taped to headlight bucket sides.

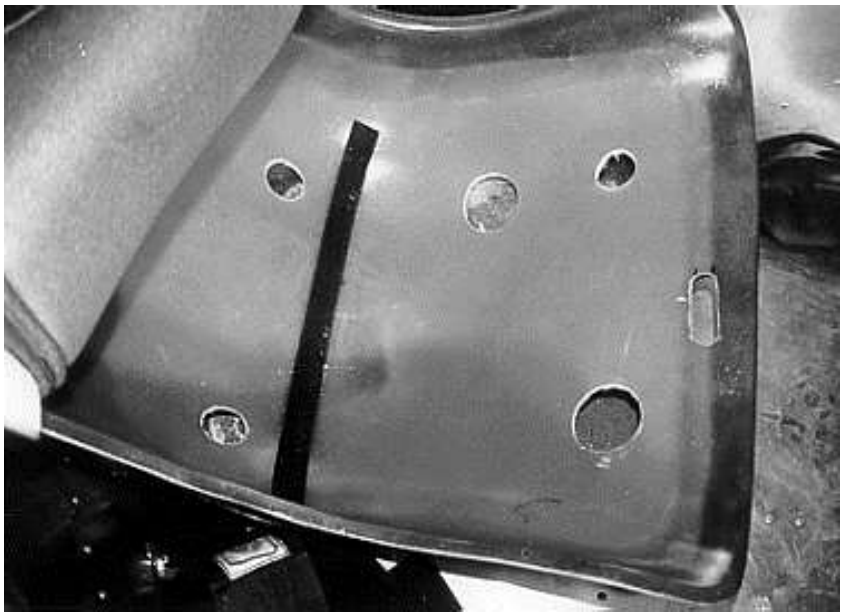
7. Reposition the cover carefully, the tabs may need additional bending to match the surface of the plastic.
8. Drill and Mark the location of the tab holes on the cover.
9. Drill the holes marked for the mounting screws.
10. Remove the masking tape from the body.
11. Attach the cover to the mounting tabs.

Seat Installation

TOOLS: *3/16" hex key, 9/16"socket, drill, 1/8", 5/16", 3/8" drill bits, marker, ruler, Philips head screwdriver.*
PARTS: *Seat assembly (FFR# 13358).*

1. 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. Both the clutch and brake pedals can be bent side to side if they are too close to each other or the gas pedal.
2. Outline the seat on the aluminum.
3. Remove the seat.
4. 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).
5. Use a marker and a ruler and measure 2" towards the outside of the car from the inner seat belt mount.
6. Mark a line from this point forward 2 feet. This is where the 4" round tube is.
7. There should be rivets along the 2"x 2" tube and ¾" tubing, so finding these is easy.
8. Look on the underside of the frame to find the steel plate between the "X". Mark this on the aluminum.
9. The seats are mounted in four places through the base into the frame. The frame points to hit are; the pad between the ¾" "X", the ¾" tubes, the 4" round tube, or the rear 2"x 2" outrigger.
10. Compare the lines drawn on the aluminum to the outline of the seating position.
11. The bolts need to be at least 1.5" in from the seat outline. Spread the bolts out as much as possible. If you are going to use the 4" tube, a tap and die set will be needed to tap the tube. If the seat does not hit any of these places, reposition the seat.
12. Drill 5/8" holes through the frame for the seat mount bolts.

13. Fasten the seat bolts into the holes you just made, using a $^{5}/_{16}$" hex key.
14. Put a small dab of silicone on each bolt head.
15. Carefully hold the seat above the screws and position it in the same spot that was outlined.
16. Place the seat down on the bolt heads.
17. Pick the seat up and place it on its front on the ground.
18. Use a long $^{5}/_{16}$" drill bit to drill through the seat base and the seat itself where the silicone is on the seat.
19. Use a 1¼" Hole saw to drill through the seat from above to gain access to the screws.
20. Open the small drilled holes up with a $^{5}/_{8}$" drill bit.



Holes drilled in seat for bolt access.

21. Remove the seat bolts from the floor.
22. Position the seat again and make sure the holes line up.
23. Remove the seat in order to put the cover on.

Seat Cover Installation

1. Pull the seat cover over the back of the seat then over the front lip.
2. The cover gets held on by four snaps, two on the sides and two on the front.
3. Sit in the seat so that the cover sits in the seat properly.
4. Pull the front snaps down and the side flaps and snaps down so that the cover is pulled tight. The hole in the cover and in the seat for the seat harness submarine strap should line up.
5. Use a marker to mark the locations of the snaps on the sides and on the front of the base.
6. Drill $^{1}/_{8}$" holes where marked
7. Use a Philips head screwdriver to attach the snaps to the base.
8. Snap the cover to front snaps.
9. Pull the sides back and down then mark the cover where the hole will be needed for the snap to go through the side flap on the cover.

Seat installed with seat cover.

Seat Harness Installation

ATTENTION: *The seat harnesses are frame mounted in five locations. Never drill a hole and attach these to aluminum alone.*
TOOLS: *¾"socket and ¾" combination wrench.*
PARTS: *Seat harness/fastener assembly (FFR# 13024).*

1. Follow the manufacturer's directions inside the seat harness boxes on how to loop the harness straps through the attachment brackets.
2. Attach the harness mounts to the frame mount plates that protrude up through the aluminum. Position the brackets at the correct angle before tightening. Use a ¾" socket and ¾" combination wrench to tighten the bolts.
3. The seat belt quick release latch should be on the right side if you are right handed, left if you are a lefty.
4. Once the seat harnesses are installed, you can adjust the belts and shoulder harnesses with the cinching tabs that are at the end of each rolling buckle.

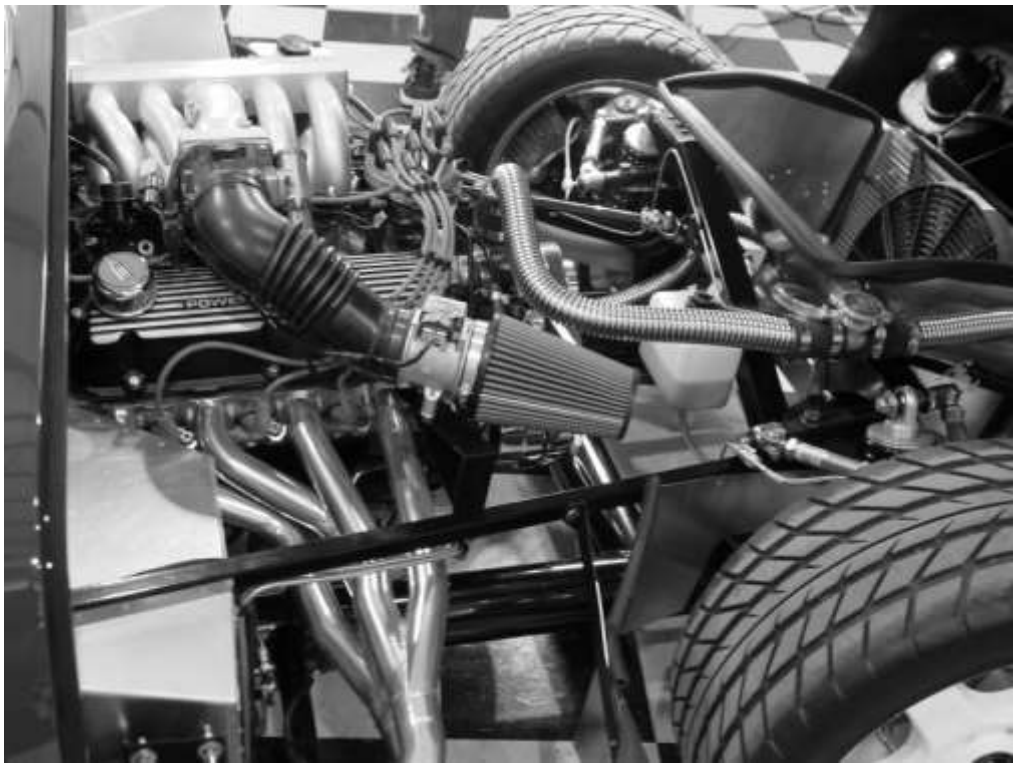
Nameplate

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.

Optional Installations

Instructions are included separately with each option when shipped.

Chapter 4 - Performance, Reference Material, 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:	Info@factoryfive.com
Mail:	9 Tow Rd, Wareham, MA 02571

Left: FFR's Dave Smith discusses "the line" at Sear Point Raceway with Legendary driver Bob Bondurant, Nov. 2002.
Right: FFR Engineer Jim Schenck racing at 1998 Run and Gun. If you have a problem he's one of the guys you can talk to.

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 "FFR" Number 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.

Tire, Rim and Alignment Details

Many aftermarket wheels and tire combinations work well with this kit. The Ford Cobra R wheels are very popular and affordable. For these wheels, use four (4) of the 5.95" Backspace wheels. Ford part # M-1007-R58. They work best with a 275/40-17 tire. The front of the car can accommodate up to a 10" wheel with 315/35R-17. The rear of the car can accommodate up to a 12" wheel with 335/35R-17

If you are using bolt-on aluminum Halibrand style wheel, we recommend using B.F. Goodrich® Radial T/A's, but in different sizes. The dimensions are the same 235/60/R15's up front, but bigger 275/50/R15's in the rear.

Tire	Best Rim Size	Acceptable range
235/60 15		6.5 – 8.5
245/45 17	8	7.5 – 9
275/50 15		7.5 – 10
275/40 17	9	9 – 11
315/35 17	10	10 – 12
335/35 17	11	11 – 13

Information from Pirelli.com, yokohamatire.com and bfgoodrich.com

IRS spindle with knockoff adapter and spinner.

ATTENTION:

- 17" GT-40 replica wheels fit larger brakes and enhance performance.
- The front of the car can accommodate up-to a 10" wheel with 315/35R-17.
- The rear of the car can accommodate up-to a 12" wheel with 335/35R-17.
- The max tire diameter that will fit is 26.50"
- The stock T-Bird IRS calipers stick out 7/16" from the mounting surface of the wheel. This must be taken into account when buying wheels or they will not fit.
- If aftermarket 10.5" Cobra R style wheels are used, a 1" wheel spacer will be needed. This can be bought from Maximum Motorsports.

Alignment Specifications

Take your new car to an alignment shop and have the car aligned properly. The alignment specs we recommend for the street are: As long as you're headed out to a shop, have your headlights aligned so you can drive at night.

Caster: 3°
Camber: -0.5°
Total Toe: $^{1}/_{16}$"

Wheel specifications:

		Best	Acceptable range
Front:	7.5" rim with ½" knock-off adapter only		3 ½" Backspace
	8" rim	5" Backspace	
	9" rim	5" Backspace	5"-6"
	10" rim	6" Backspace	

Solid Axle or Standard IRS

Rear:	9" rim	6" Backspace	4"- 6"
	10" rim	6" Backspace	4"- 6"
	11" rim	6" Backspace	5"- 6"
	12" rim	6" Backspace	

Pin Drive IRS

Rear:	9" rim	3 ½" Backspace	
	9.5" rim with ½" knock-off adapter only		3 ½" Backspace
	10" rim	3 ½" Backspace	
	11" rim	3 ½" Backspace	
	12" rim	3 ½" Backspace	

Coupe with 15" pin drive wheel.

Performance Modifications

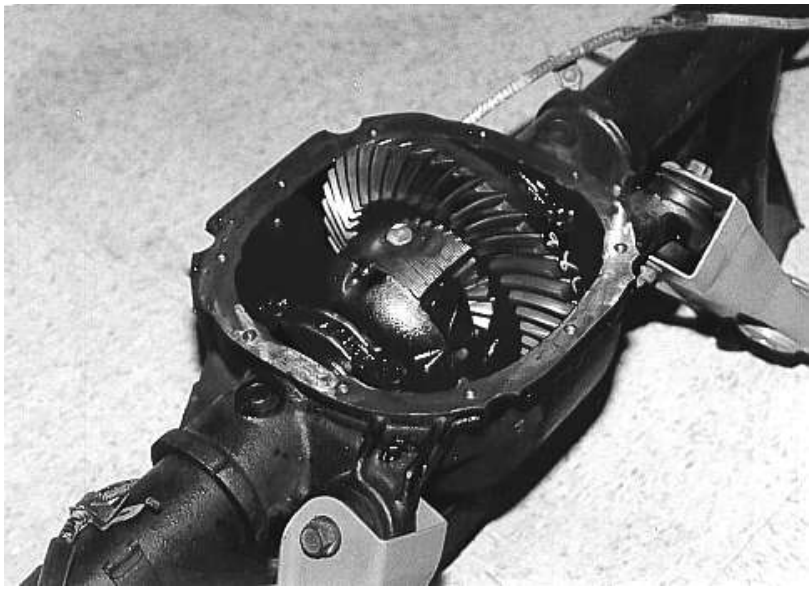
The following modifications and set-ups fall under the category of getting more horsepower from your engine and making your car perform better. You will find a hundred people a day that will tell you what you've got to have. We just want to start you out with the easy modifications that net large returns without large cash outlays or serious changes to the stock motor and drive train. Remember that a 2,300 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.

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 Motorsports 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 Motorsports 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 (ex: Edelbrock, Trick Flow). Ford also makes a good intake, the cast 1993 Cobra intake from Ford Motorsports 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 *Trick Flow* twisted wedge 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.

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. 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 the Roadster. This would have to be adapted to work in the Spyder GT.

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 Motorsports "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

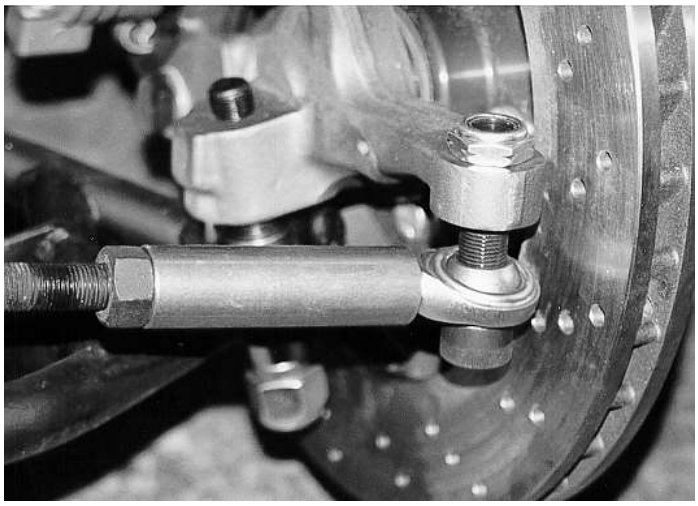
Once the car is rolling either a 15:1 or a 20:1 rack will yield about the same effort feel. The 20:1 ratio rack means the steering wheel will have to be turned more in corners. For those that like the easy power steering type feel, switching to a manual 20:1 rack will make parking easy. For road racers 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. The Flaming River 15:1
2. 20:1 racks
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 the 15:1 Flaming River rack and polyurethane bushings.

Steering Shaft

Stock: Rubber "rag" joint
The "rag" joint in the Mustang reduces any vibration transfer to the steering wheel. Replacing the "rag" joint with a universal joint reduces the amount of slop and provides better steering response. Factory Five offers a Flaming River shaft and universal joint kit to mate up to the Flaming River rack.



FFR competition bump steer kit.

Bump Steer

When using stock tie rod ends, a caster setting of 3° is good. For better performance and in order to get more caster (i.e. road race cars), the optional bump steer kit that we offer eliminates all bump-steer that is built into the stock tie rod ends.

Rear Suspension

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

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

Control Arms

Stock: Stamped steel with rubber bushings.

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

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

Shocks/Springs

Using the Mustang rear coil springs and shocks gives a comfortable ride. For a slightly stiffer suspension, replace the stock rear shocks with aftermarket units. We have found that KYB makes an inexpensive good replacement that roughly 20% stiffer than stock.

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

Factory Five offers a few different shock/spring packages.

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

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

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 Motorsports (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)

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 Motorsports (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.

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

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

Caliper Piston Area (in^2)	Master Cylinder Bore Diameter (in)
Up to 3.6	5/8
3.6 to 4.2	7/10
4.2 to 4.5	3/4
4.5 to 4.7	13/16
4.7 to 5.5	7/8
5.5 to 5.9	15/16
5.9 to 6.3	1
6.3 to 7.6 max	1 1/8

Helpful Reference Material

We have found the following books and reference manuals to be invaluable. Items are separated into two categories, 1. Must reads and 2. Helpful. 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.

Ford Motorsport Performance Equipment Catalog, current edition. Available at your local speedshop or authorized Ford Motorsport distributor. Call the Ford Motorsport Tech Hot-line at 810-468-1356 for your closest distributor.

Helpful

1. 5.0L Ford Dyno Tests. By Richard Holdener. Published by SA Design, Cartech. 11605 Kost Dam Rd., North Branch, MN 55056.
2. Engineer to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers Inc. PO Box 2, 729 Prospect Avenue, Osceola, WI 54020
3. Prepare to Win. By Carroll Smith. Published by Motorbooks International Publishers and Wholesalers, PO Box 2, 729 Prospect Avenue, Osceola, WI 54020.
4. 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.
2. 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.

Others

1. Autoweek Magazine
2. Muscle Mustang & Fast Fords Magazine
3. 5.0 Magazine
4. Kit Car Magazine
5. Grassroots Motorsport Magazine

A Final Note about Completed Cars and Car Builders

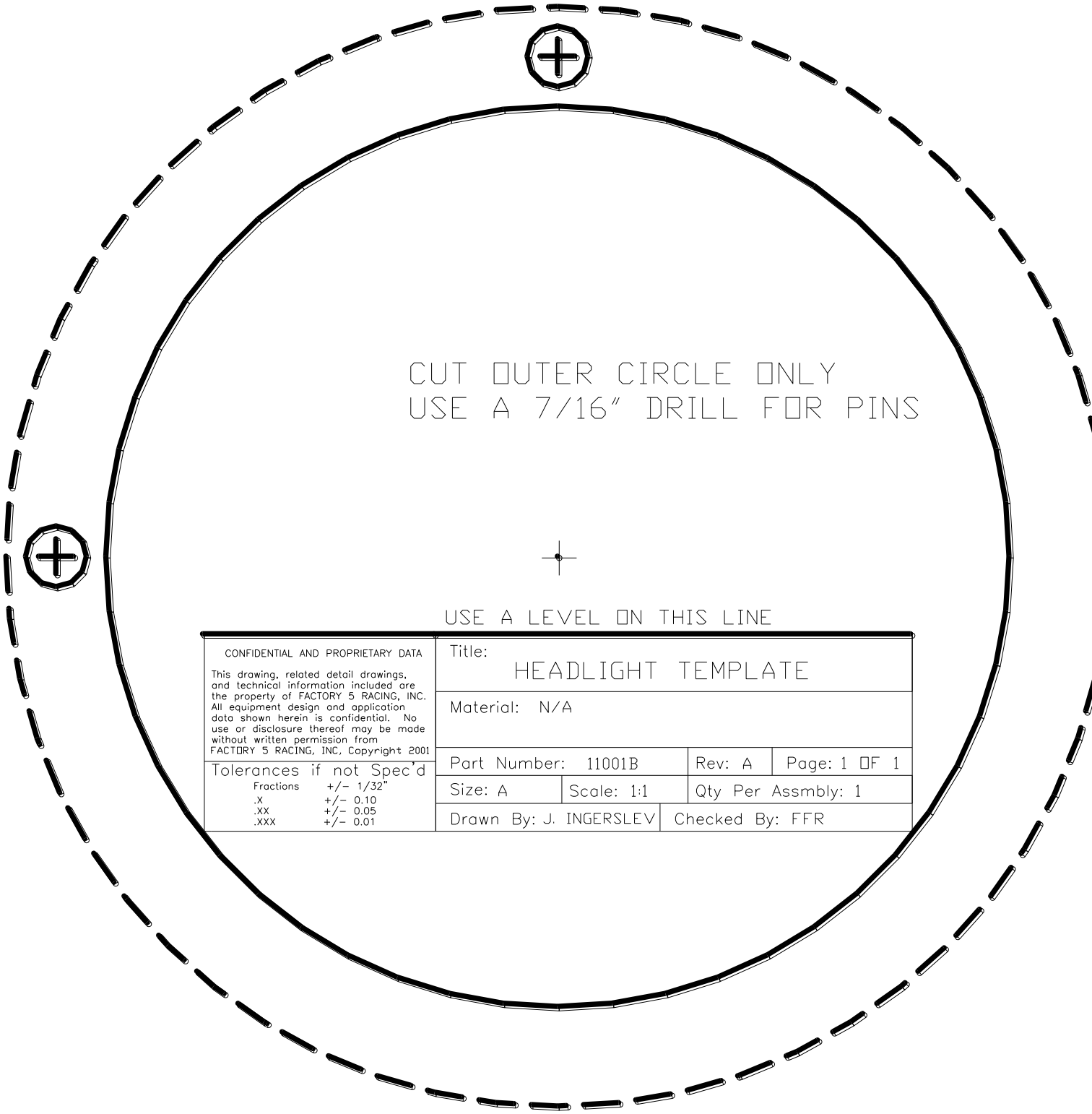
If you are reading this manual then you must be at least contemplating the task of building your own race car. Many component car companies offer services to those folks who find part or all of this too much to tackle. We don't.

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



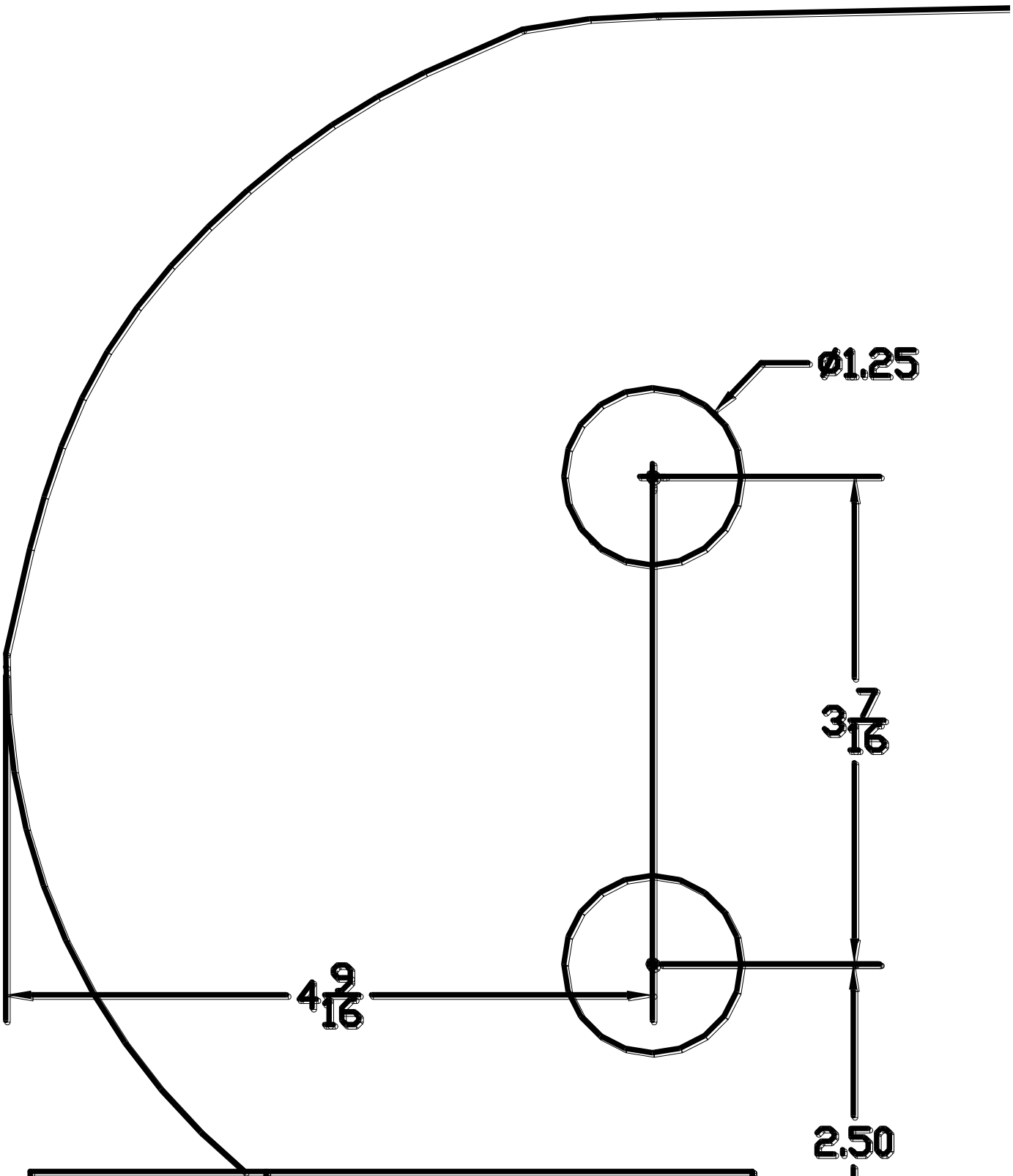
Tolerances if not Spec'd

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

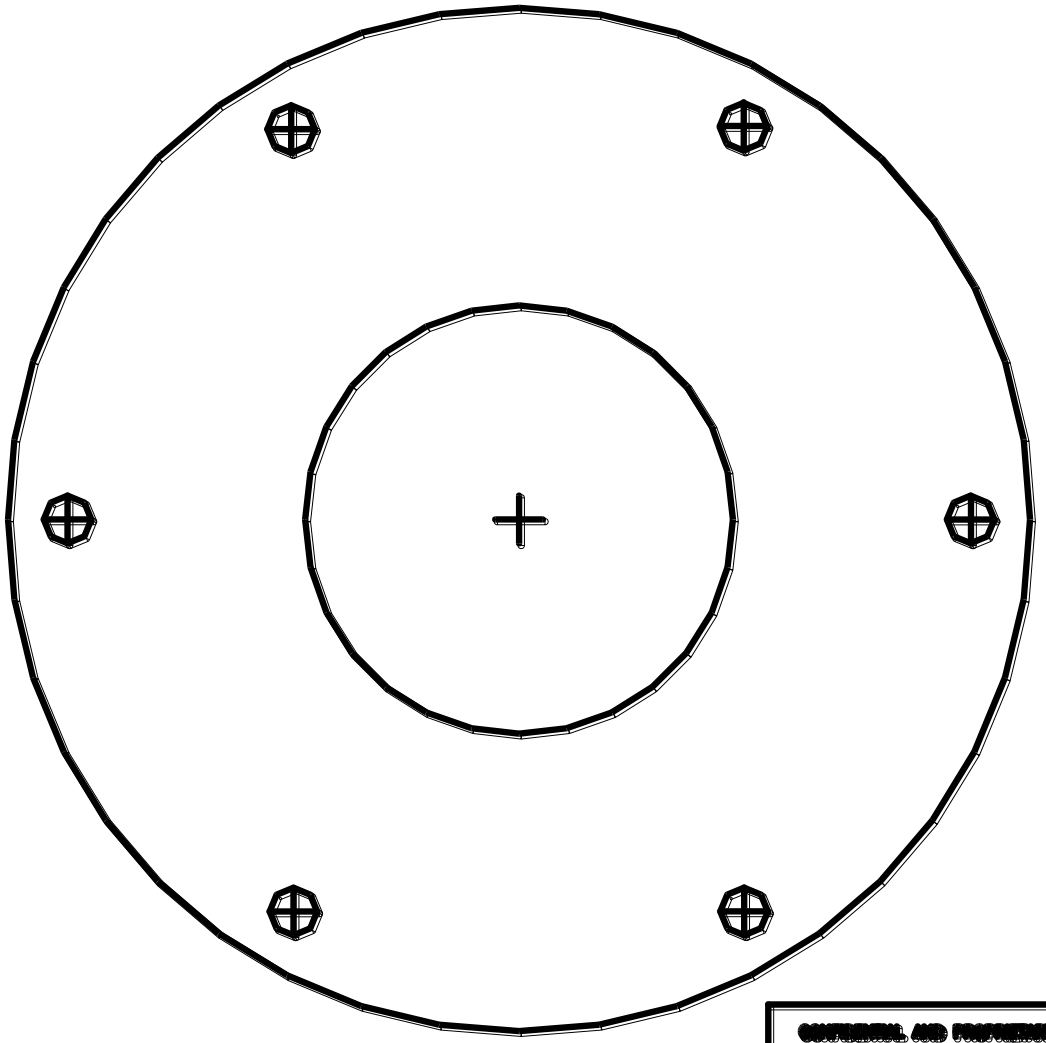
Title: HEADLIGHT TEMPLATE

Material: N/A

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	

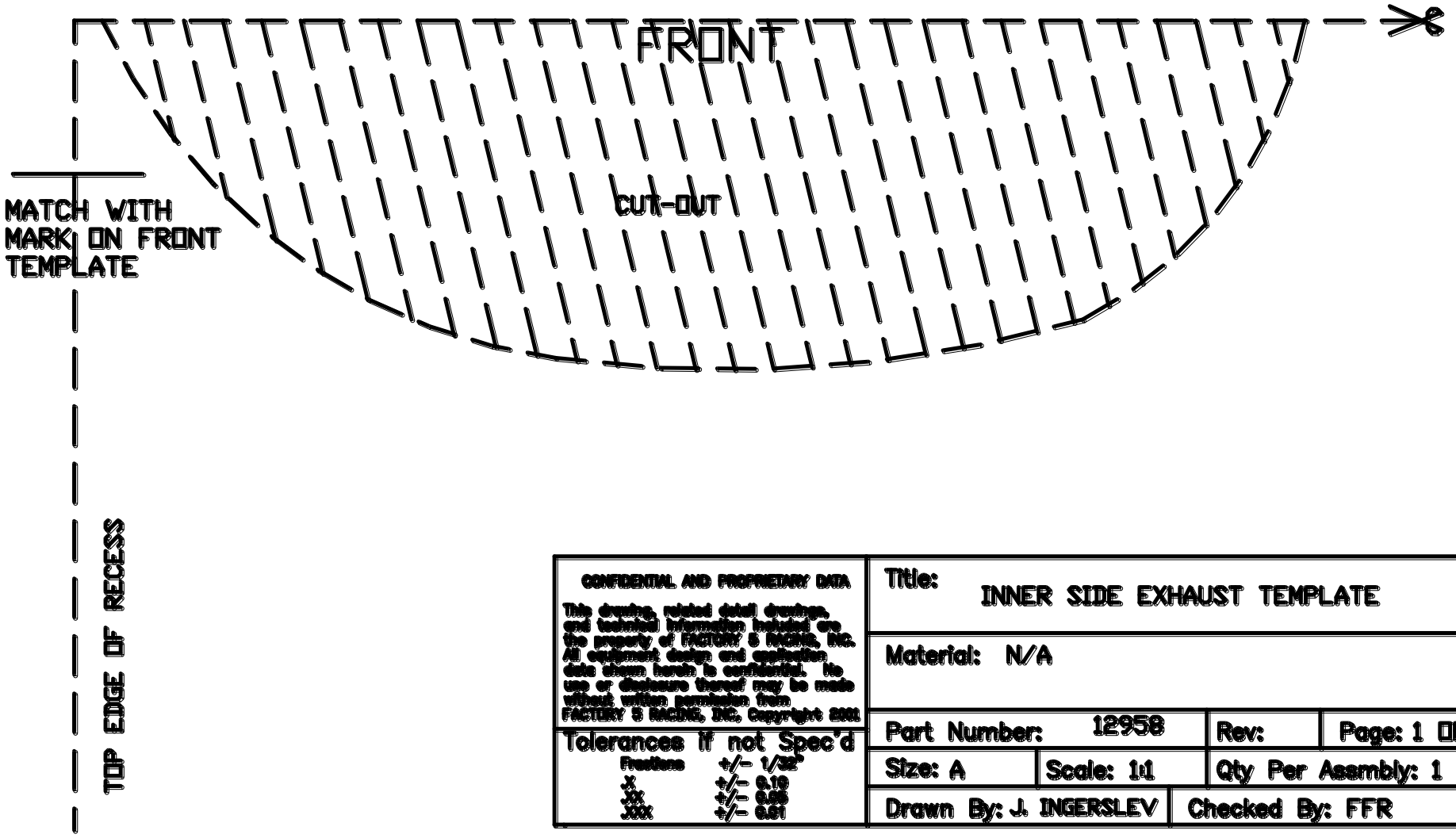


CONFIDENTIAL AND PROPRIETARY DATA [illegible]	Title: SPYDER TAIL LIGHT TEMPLATE		
	Material: N/A		
Tolerances if not specified [illegible]	Part Number: 14036	Rev: A	Pages: 1 OF 1
	Size: A	Scale: 1/1	Qty Per Assembly: 1
	Drawn By: J. CLARK	Checked By: FTR	



NOTE: Outside circle is shown for placement orientation only, do not cut. Use a 2.25" holesaw in center and 0.25" drill bit for small holes.

CONFIDENTIAL AND PROPRIETARY DATA [illegible]	Title: TEMPLATE, FUEL NECK FLANGE
	Material: N/A
Tolerances If not Spec'd Position +/- 1/32" X +/- 1/64" XX +/- 1/64"	Part Number: 11009 / Rev: C / Page: 1 OF 1 Size: A / Scale: 1:1 / Qty Per Assembly: 1 Drawn By: J. INGERSLEV / Checked By: FFR



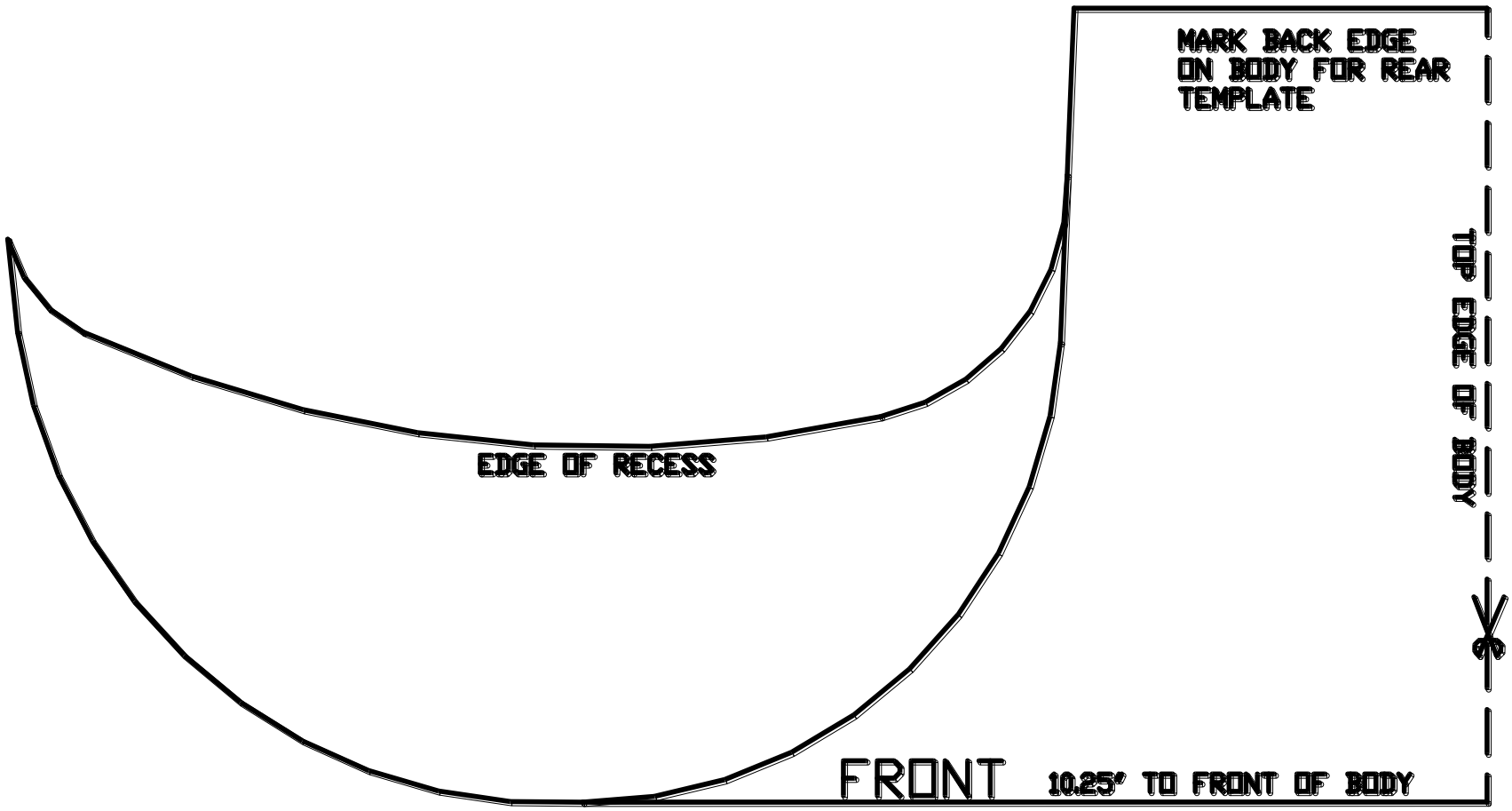
Tolerances if not Spec'd

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

Title: INNER SIDE EXHAUST TEMPLATE

Material: N/A

Part Number: 12958		Rev:	Page: 1 OF 1
Size: A	Scale: 1:1	Qty Per Assembly: 1	
Drawn By: J. INGERSLEV		Checked By: FFR	



Tolerances if not Spec'd

Fractions	+/- 1/32"
.X	+/- 0.13
.XX	+/- 0.05
.XXX	+/- 0.01

Title: OUTER SIDE EXHAUST TEMPLATE

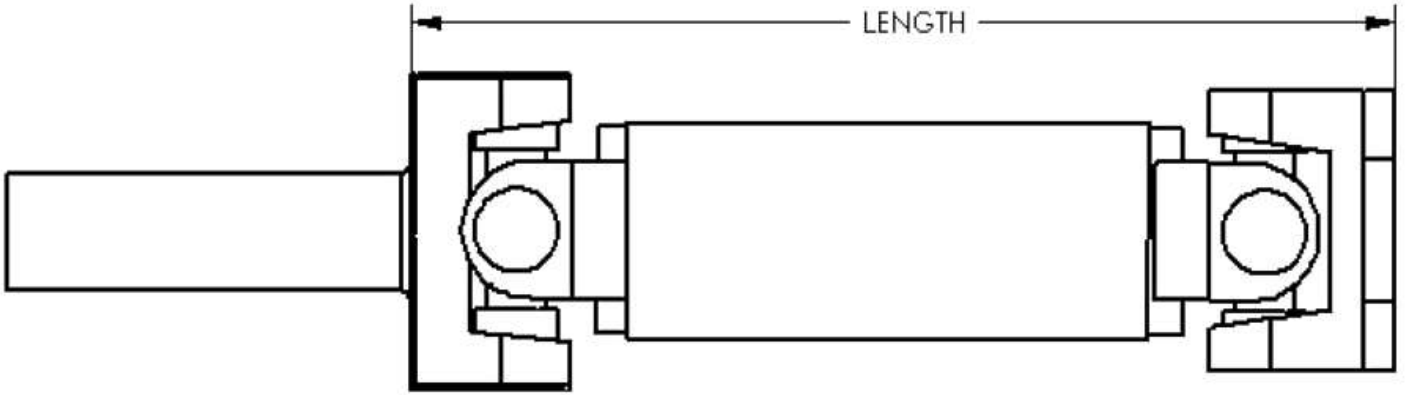
Material: N/A

Part Number: 12957 | Rev: | Page: 1 OF 1

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

Drawn By: J. INGERSLEV | Checked By: FFR

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



MODEL		LENGTH
Mk. III ROADSTER	1995 OR EARLIER FORD ENGINE USING A T-5 TRANS.	11.00"
Mk. III ROADSTER	PUSHROD ENGINE USING TREMEC 3550 AND TKO TRANS.	10.50"
Mk. III ROADSTER	4.6L DOHC ENGINE USING T-45 TRANSMISSION	13.00"
Mk. III ROADSTER	4.6L DOHC ENGINE USING TREMEC 3650 TRANSMISSION	13.00"
COUPE/SPYDER	PUSHROD ENGINE USING T-5 TRANSMISSION	12.50"
COUPE/SPYDER	PUSHROD ENGINE USING TREMEC 3550 AND TKO TRANS.	12.00"

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	12/18/00
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

Factory Five Racing, Inc.

TITLE:
DRIVESHAFT DIAGRAM

SIZE	DWG. NO.	REV
A	13023	B

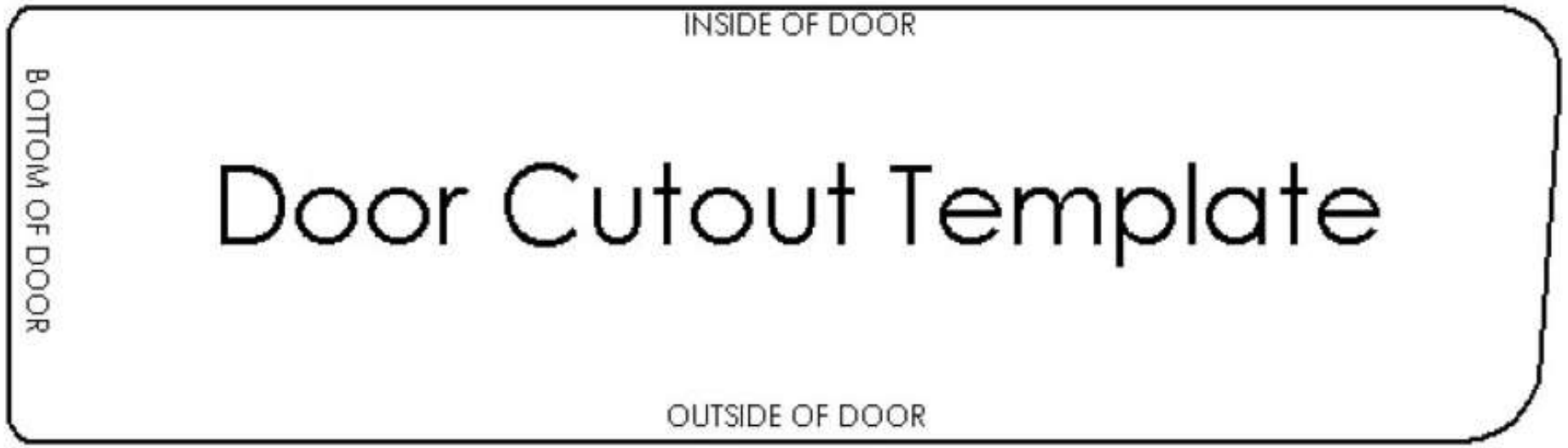
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

NEXT ASSY

USED ON

APPLICATION

5 4 3 2 1



	UNLESS OTHERWISE SPECIFIED:		NAME	DATE
COUPE	DIMENSIONS ARE IN INCHES	DRAWN	JC	11/19/00
SPYDER	TOLERANCES:	CHECKED		
	TWO PLACE DECIMAL ±0.01	ENG APPR.		
	THREE PLACE DECIMAL ±0.005	MFG APPR.		
	FOUR PLACE DECIMAL ±0.001	Q.A.		
	MATERIAL	COMMENTS:		
	FINISH			
NEXT ASY				
APPLICATION				

PROPRIETARY AND CONFIDENTIAL

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FACTORY FIVE RACING, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FACTORY FIVE RACING, INC. IS PROHIBITED.

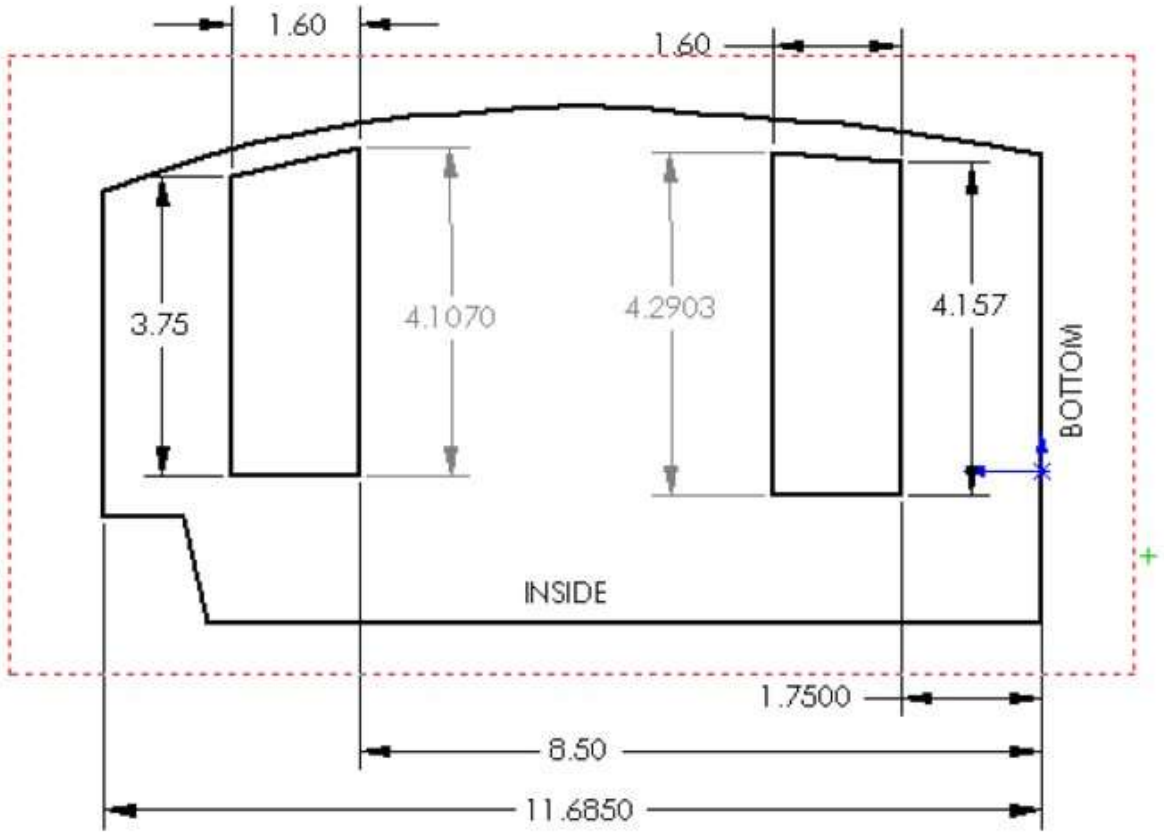
Factory Five Racing, Inc

TITLE:
DOOR CUTOUT TEMPLATE

SIZE	DWG. NO.	REV
A	13768	A

SCALE: 1:1 WEIGHT: SHEET 1 OF 1

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	11/19/00	



	NAME	DATE
DRAWN	JC	11/19/00
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		

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

COUPE
SPYDER

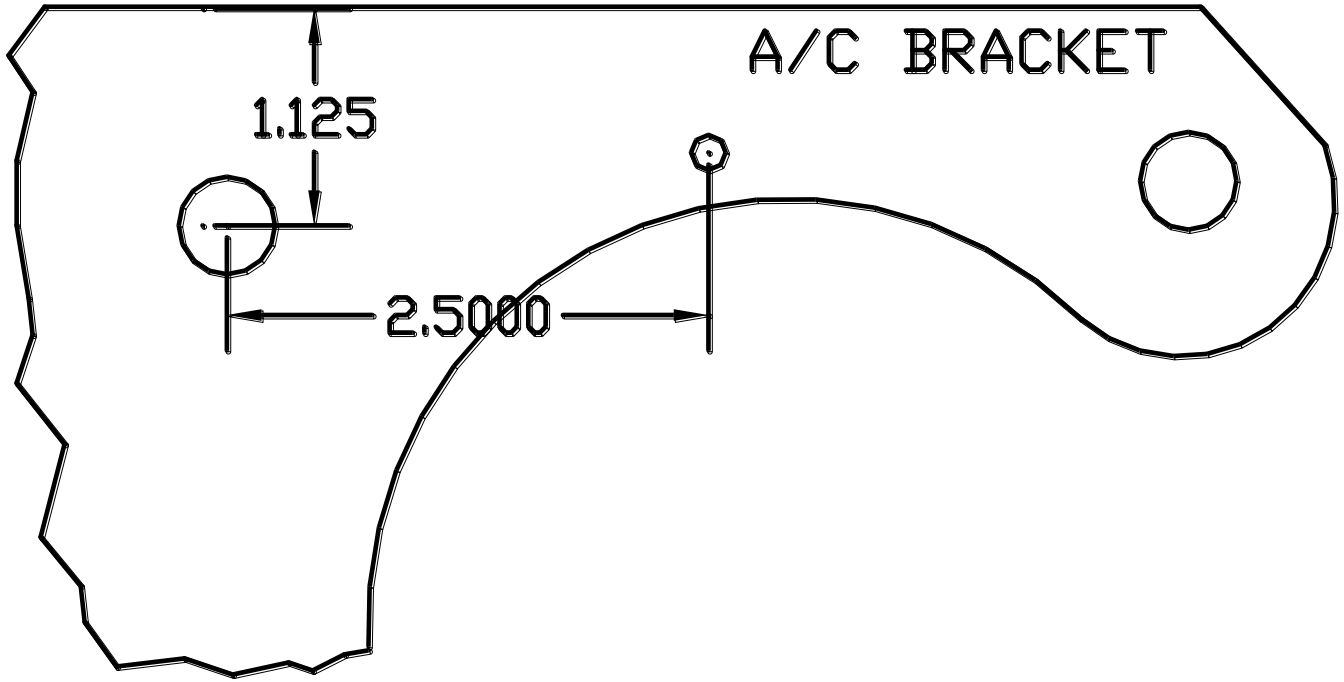
PROPRIETARY AND CONFIDENTIAL
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FACTORY FIVE RACING, INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FACTORY FIVE RACING, INC. IS PROHIBITED.

Factory Five Racing, Inc.

TITLE:
DOOR HINGE CUT-OUT DIAGRAM

SIZE	DWG. NO.	REV
A	14035	A

SCALE: 1:2 WEIGHT: SHEET 1 OF 1



Tolerances if not Spec'd

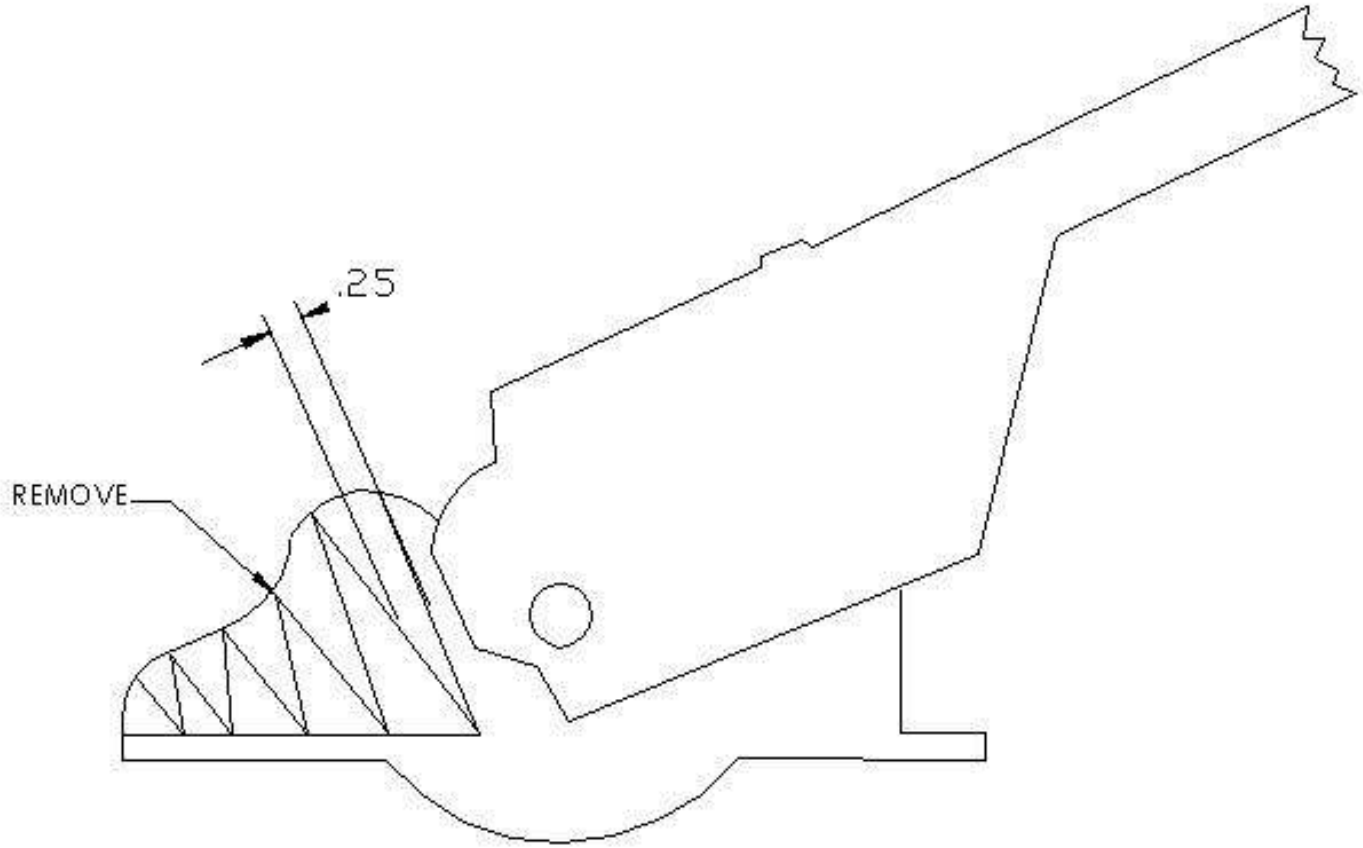
Fractions	+/- 1/32"
.X	+/- 0.10
.XX	+/- 0.05
.XXX	+/- 0.01

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	

REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE		



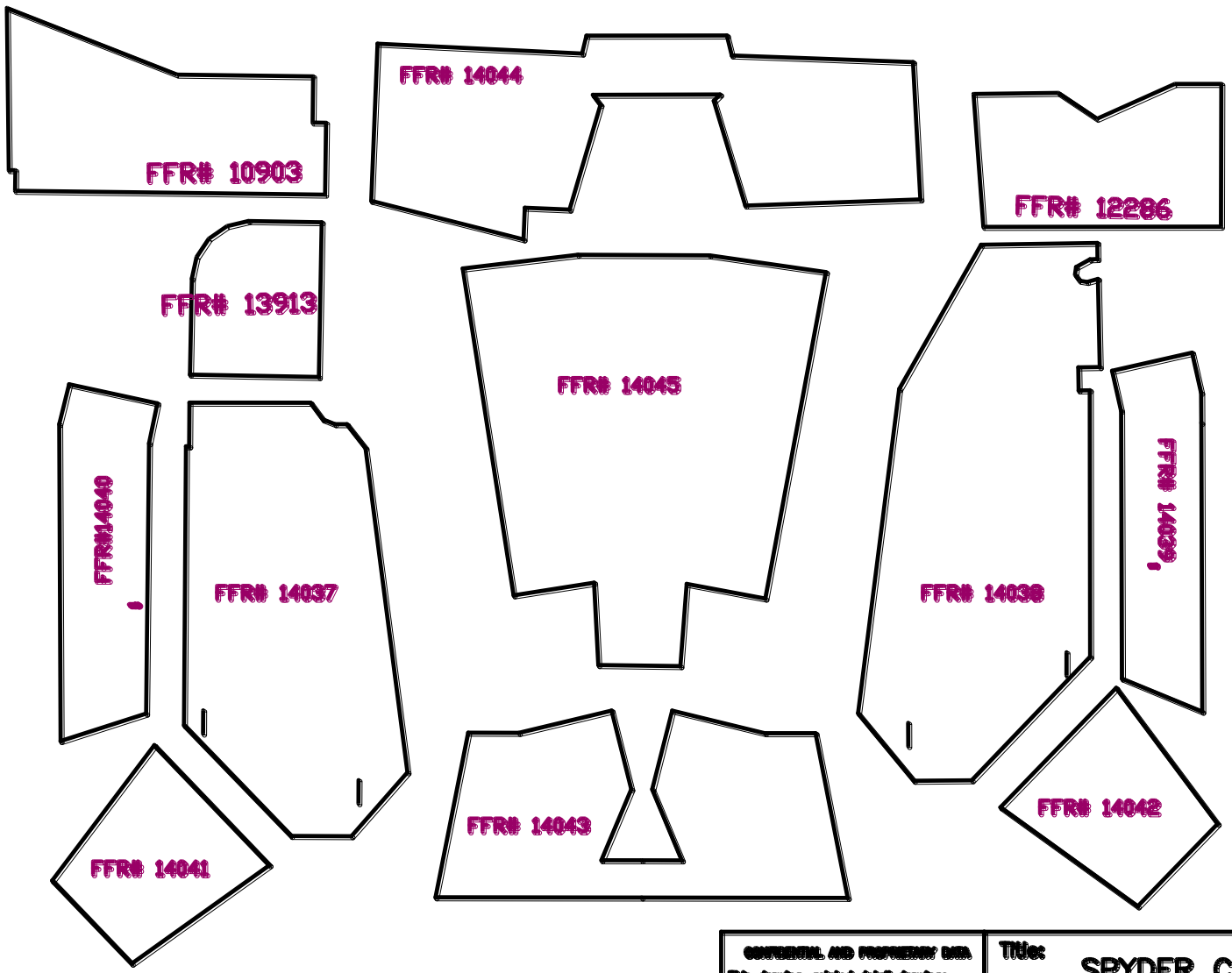
UNLESS OTHERWISE SPECIFIED:		NAME	DATE	
ROADSTER	DIMENSIONS ARE IN INCHES TOLERANCES: TWO PLACE DECIMAL +/-0.01 THREE PLACE DECIMAL +/-0.005 FOUR PLACE DECIMAL +/-0.001	DRAWN		
		CHECKED		
		ENG APPR		
		MFG APPR		
	MATERIAL	Q A		
	FINISH	COMMENTS:		
USED ON				
APPLICATION				

Factory Five Racing, Inc.

TITLE:
EMERGENCY BRAKE HANDLE
CUT DIAGRAM

SIZE	DWG. NO.	REV
A	12124	A

SCALE: 1:1 WEIGHT: SHEET 1 OF 1



CONFIDENTIAL AND PROPRIETARY DATA.

Tolerances if not Spec'd
Fractions +/- 1/32"
.x +/- 0.10
.xx +/- 0.01
.xxx +/- 0.001

Title: SPYDER CARPET DIAGRAM

Material: N/A

Part Number: 13821		Rev: A	Page: 1 OF 1
Size: A	Scale:	Qty Per Assembly: 1	
Drawn By: JJ		Checked By: FFR	

Appendix B - Donor Parts List

DONOR PARTS FROM FORD MUSTANG 5.0, 1987 TO 1993

Assembly Name	Part Name	Quantity	EFI ONLY	Removed from donor
DRIVETRAIN	CLUTCH CABLE	1		
	ENGINE, 5.0L FORD	1		
	BELLHOUSING W/ MOUNT BOLTS	1		
	T-5 TRANSMISSION W/ MOUNT BOLTS	1		
	TRANSMISSION MOUNT W/MOUNT BOLTS	1		
	DRIVESHAFT AND 4 ORIGINAL BOLTS	1		
	REAR AXLE ASSEMBLY, COMPLETE	1		
	SPEEDOMETER CABLE	1		
	CIRCLIP, CLUTCH CABLE RETAINER	1		
	ENGINE MOUNTS, CLEAN STRAIGHT, W/OEM NUTS	2		
	MASS AIR SENSOR	1	*	
EXHAUST	OXYGEN SENSORS	2	*	
	RUBBER BUSHING, REAR EXHAUST HANGER	2		
FUEL SYSTEM	FUEL TANK W/FILLER NECK, CAP AND MOUNT STRAPS	1		
	FUEL FILTER W/BRACKET AND HOSES	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 CALIPERS, FRONT, CUT 4" INTO STEEL LINES	2		
	BRAKE BOOSTER, DISTRIBUTION BLOCK, CONNECTION FITTINGS	1		
	MOUNT, FRONT, FLEXIBLE HOSE TO STEEL LINE, MOUNTED TO BODY	2		
	EMERGENCY BRAKE HANDLE W/ "T" CABLE	1		
	WHEELS	4		
SUSPENSION	REAR QUAD SHOCKS W/ MOUNTS AND OEM NUTS/BOLTS	2		
	SPINDLES, FRONT	2		
	FRONT SPINDLE BOLTS	4		
	CONTROL ARMS, REAR UPPER W/BOLTS/NUTS	2		
	CONTROL ARMS, REAR LOWER W/BOLTS/NUTS	2		
	COIL SPRINGS, REAR, W/OEM RUBBER ISOLATOR SEATS	2		
	A-ARMS, FRONT LOWER W/ BOLTS/NUTS	2		
STEERING	UPPER STEERING SHAFT, 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		
	RADIATOR CAP	1		
	FOG LIGHT	2		
	INTERIOR REAR VIEW MIRROR AND MOUNT	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 V8 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 AND 1995 DONORS

- Front lower control arms will not work.
- Gauges will not work.
- Transmission and bell-housing will not work with a solid axle kit.
- Steering column and shafts will not work.
- Dash switches will not work.
- Tie rod ends will not work.
- Motor mounts will not work.
- Smog pump mounting brackets will not work.
- Gas tank will not work without modifications to the mounting straps.
- Rear axle is 61.125" from hub to hub, where as the pre-93 donors were 59.25". (A different wheel offset could be used to make up the difference).
- Front spindles are shorter (if you specify, we have brackets to make them work).
- Wiring harness will not work.
- Pedal box needs spacers to raise it about ¾".
- The accelerator cable that comes with the kit will not work with the throttle body.

Appendix C – Spyder GT Standard Pack list

FFR #	Part Name	Unit	Qty
13584	SECONDARY BODY FASTENERS ASSEMBLY	EA	1.00
10983	SCREW, RUBBER NOSE POST	EA	20.00
11061	RUBBER NOSE POST, SMALL	EA	10.00
10701	RUBBER NOSE POST, LARGE	EA	10.00
10761	BODY RUBBER PUSH-ON TRIM	FT	45.00
12750	WEATHERSTRIP, RUBBER SEAL, ADHESIVE-BACK	FT	15.50
13021	DOOR, RUBBER-ON-SIDE PUSH-ON TRIM	FT	10.50
10857	WEATHERSTRIP, ADHESIVE-BACK, BOX	EA	1.00
11024	SIDE BODY MOUNT BOLT	EA	8.00
12908	WASHER, BODY MOUNT, STAINLESS STEEL	EA	8.00
10782	RIVETS, 1/8" SHORT	EA	1200.00
11290	RIVETS, 1/8" LONG	EA	300.00
11291	RIVETS, 3/16" LONG	EA	100.00
11005	WASHER, BODY MOUNT, ZINC	EA	16.00
13025	"U" NUT, SIDE BODY MOUNT	EA	8.00
13819	87-04 IFS BRACKET	EA	2.00
11074	IFS ASSEMBLY		
13662	SHOCK, FRONT	EA	2.00
13666	UPPER SPRING SEAT	EA	2.00
13665	LOWER SPRING SEAT	EA	2.00
13664	COIL-OVER THREADED SLEEVE	EA	2.00
10590	UPPER BALL JOINT	EA	2.00
13667	SPRING, FRONT COIL-OVER, BLACK, 1.875", 450#	EA	2.00
13067	ADJUSTABLE FRONT UPPER CONTROL ARM	EA	2.00
10961	TOOL, COIL-OVER ADJUSTING	EA	1.00
10810	BRACKET, COIL-OVER LOWER MOUNT, FORD	EA	2.00
10882	WASHER, COIL-OVER LOWER MOUNT BRACKET	EA	2.00
11027	LOCK NUT, NYLON, COIL-OVER LOWER MOUNT BRACKET	EA	2.00
10842	BOLT, COIL-OVER MOUNTS	EA	4.00
10834	LOCK NUT, NYLON, COIL-OVER MOUNT	EA	4.00
10882	WASHER, COIL-OVER MOUNT	EA	8.00
11038	LOCK NUT, UPPER TUBULAR A-ARM, GRADE 8	EA	4.00
13525	BOLT, FLANGE BOLT, GRADE 8	EA	4.00
12112	SPACER BUSHING, FRONT COIL-OVER SHOCK, TOP REAR 0, 0.62",0	EA	2.00
12113	SPACER BUSHING, FRONT COIL-OVER SHOCK, TOP FRONT, 0, 0.32", 0	EA	2.00
12114	SPACER BUSHING, FRONT COIL-OVER SHOCK, BOTTOM REAR AND FRONT, 0, 0.43", 0	EA	4.00
10937	SPINDLE TO LOWER CONTROL ARM COTTER PIN	EA	2.00
10789	AIR FILTER	EA	1.00
12753	STEERING RACK/SHAFT ASSEMBLY	EA	1.00
12642	17"x 1" DD TUBING	EA	1.00
12393	STEERING RACK BOLT	EA	2.00
10834	LOCK NUT, NYLON, STEERING RACK	EA	2.00
10937	COTTER PIN FOR TIE ROD ENDS	EA	2.00
10584	STEERING RACK SPACER	EA	2.00
10882	STEERING RACK BUSHING WASHER	EA	14.00
13354	SPYDER GT STEERING SHAFT ASSEMBLY	EA	1.00
12641	24.25"x 3/4"DD SHAFT	EA	1.00
13355	3/4"-36 x 3/4"DD UNIVERSAL JOINT	EA	1.00

12617	1"DD x 3/4"DD UNIVERSAL JOINT	EA	1.00
13095	BATTERY/TRAY ASSEMBLY	EA	1.00
10804	BATTERY TRAY	EA	1.00
10802	LOCK NUT, NYLON, BATTERY SUPPORT ROD	EA	4.00
11088	WASHER, BATTERY SUPPORT ROD	EA	4.00
10801	BATTERY PLATE SUPPORT ROD (THREAD END ROD)	EA	4.00
10579	BATTERY CABLE, POSITIVE, WITH TERMINAL, COVER & LUG	EA	1.00
13005	BATTERY GROUND CABLE ASSEMBLY	EA	1.00
10885	REAR TRACTION-LOCK ASSEMBLY, (R,L)	EA	1.00
10833	BOLT, UPPER, REAR TRACTION-LOCK EXTENTION	EA	4.00
12173	BOLT, LOWER, REAR TRACTION-LOCK EXTENTION	EA	2.00
13751	LOCK NUT, NYLON, GRADE 10.9, ZINC, 12MM x 1.75 PITCH	EA	2.00
10834	LOCK-NUT, NYLON, UPPER, REAR TRACTION LOCK BRACKET	EA	4.00
10882	WASHER, REAR END TRACTION LOCK EXTENTION	EA	12.00
10993	REAR TRACTION-LOCK, 3 SIDED BRACKET, DRIVER SIDE	EA	1.00
10994	REAR TRACTION-LOCK, 3 SIDED BRACKET, PASSENGER SIDE	EA	1.00
11075	QUAD SHOCK FASTENER ASSEMBLY	EA	1.00
11059	LOCK NUT, NYLON, REAR HORIZ QUADSHOCK MOUNT	EA	4.00
11058	BOLTS, REAR HORIZ QUADSHOCK MOUNTING	EA	4.00
10882	WASHERS, REAR HORIZ QUADSHOCK MOUNTING	EA	8.00
11196	REAR AXLE STRAP	EA	2.00
10896	FUEL TANK ASSEMBLY	EA	1.00
11020	BOLT, FUEL TANK MOUNTING	EA	4.00
11221	LOCK NUT, NYLON, FUEL TANK MOUNT	EA	4.00
10585	WASHER, FUEL TANK MOUNTING	EA	2.00
10996	CAP PLUG, FUEL TANK MOUNTING POST SURFACE	EA	4.00
11023	PEDAL BOX FASTENER ASSEMBLY	EA	1.00
11020	BOLT, PEDAL BOX TO FRONT PLATE, MASTER CYL. MOUNT	EA	2.00
10520	BOLT, PEDAL BOX TO FRONT PLATE, UPPER	EA	3.00
11221	LOCK NUT, NYLON, PEDAL BOX TO 3/16" STEEL PLATE	EA	5.00
10585	WASHER, PEDAL BOX TO 3/16" STEEL PLATE	EA	5.00
12336	SCREW, PEDAL BOX TO FRAME DOWN TUBES	EA	4.00
11088	WASHER, PEDAL BOX, THROTTLE PEDAL AND CABLE	EA	8.00
12335	SCREW, THROTTLE PEDAL AND CABLE	EA	4.00
10802	LOCK NUT, PEDAL BOX, THROTTLE PEDAL AND CABLE	EA	8.00
10629	MASTER CYLINDER BRAKE SPACER	EA	3.00
12281	ACCELERATOR CABLE	EA	1.00
12337	WASHER, PEDAL BOX TO FRAME DOWN TUBES	EA	4.00
11029	INSULATED CLIP ASSEMBLY	EA	1.00
10970	INSULATED CLIP, BRAKE/FUEL/TRUNK WIRING, 3/8"	EA	45.00
10971	INSULATED CLIP, BATTERY CABLE/WIRING, 5/8"	EA	30.00
13328	CABLE TIES, 8", BAG OF 100	BAG	1.00
11080	ALTERNATE DRIVE PULLEY ASSEMBLY		
10834	LOCK-NUT, NYLON, PULLEY MOUNT, (LOCATION OF A/C)	EA	1.00
10952	PULLEY MOUNT SLEEVE	EA	1.00
10882	WASHER, PULLEY MOUNT, (LOCATION OF A/C)	EA	2.00
12386	BOLT, PULLEY MOUNT, (LOCATION OF A/C)	EA	1.00
10775	PULLEY WHEEL, ADDITIONAL TO REPLACE A/C	EA	1.00
10781	FAN BELT, SIX RIB, SINGLE, CUSTOM LENGTH	EA	1.00
12875	FAN MOUNTING ASSEMBLY	EA	1.00
10942	WIRE EXTENSION, 16 GAUGE, FAN	FT	14.00

10941	ELECTRICAL WIRING CONNECTORS, BLUE	EA	6.00
11217	RING CONNECTOR, GROUND, 16 GAUGE	EA	2.00
11126	FEMALE CONNECTER, 16 GAUGE	EA	2.00
10984	SCREW, GROUND	EA	2.00
12455	FAN RELAY	EA	1.00
11180	FEMALE TERMINAL, 16 GAUGE	EA	4.00
12758	UPPER FAN MOUNT BRACKET	EA	2.00
12757	LOWER FAN MOUNT BRACKET	EA	2.00
12774	FAN MOUNT LONG MOUNT SCREW	EA	2.00
12775	FAN MOUNT SHORT SCREW	EA	2.00
10635	FAN MOUNT WASHER	EA	2.00
12768	FAN MOUNT LOCKNUT	EA	4.00
13125	HIGH FLOW 16" FAN W/185 DEGREE THERMOSTAT ASSEMBLY	EA	1.00
13126	HIGH FLOW 16" RADIATOR FAN	EA	1.00
13127	185 DEGREE THERMOSTAT	EA	1.00
12876	RADIATOR HOSE ASSEMBLY	EA	1.00
13883	STAINLESSRADIATOR HOSE ASSEMBLY	EA	1
10664	HOSE CLAMP, RADIATOR HOSE	EA	10.00
13392	CORRUGATED METAL HOSE	FT	7
13393	RADIATOR HOSE CONNECTOR HOSE	FT	1.00
13394	RADIATOR HOSE 1.75" TO 1.50" REDUCER	EA	4.00
13395	RADIATOR HOSE 1.50" TO 1.25" REDUCER	EA	3.00
12912	RADIATOR HOSE FILLER	EA	1.00
13338	PLASTIC OVERFLOW TANK	EA	1.00
13352	OVERFLOW TANK TUBING	FT	4.00
10984	SCREW, OVERFLOW TANK MOUNTING	EA	3.00
12956	OVER FLOW TUBE HOSE CLAMP	EA	2.00
12878	RADIATOR MOUNTING ASSEMBLY	EA	1.00
12776	SCREW, UPPER RADIATOR MOUNT	EA	2.00
12908	WASHER, UPPER RADIATOR MOUNT	EA	4.00
11265	NYLON LOCK NUT	EA	2.00
13352	LOWER RADIATOR ISOLATOR, 2 x 6"	FT	1.00
12879	RADIATOR TOP MOUNTING BRACKET	EA	1.00
12771	ALUMINUM RADIATOR	EA	1.00
12873	MISC ELECTRICAL ASSEMBLY	EA	1.00
10972	3/4" FLEXIBLE WIRE LOOM TO PROTECT WIRING BUNDLES	FT	10.00
12754	1/2" FLEXIBLE WIRE LOOM TO PROTECT WIRING BUNDLES	FT	28.00
10973	FLEXIBLE SERRATED POLYETHYLENE GROMMETING	FT	5.00
12874	ENGINE/HARNESS ASSEMBLY	EA	1.00
10984	SCREW, SOLENOID MOUNT	EA	2.00
10984	SCREW, COIL MOUNT	EA	2.00
10984	SCREW, BRAIDED GROUND STRAP	EA	1.00
11217	RING CONNECTOR, COMPUTER GROUND, 16 GAUGE	EA	1.00
12215	SOLENOID RING CONNECTOR, 10 GAUGE	EA	4.00
11024	GROUND CABLE BOLT	EA	3.00
11265	GROUND CABLE NYLON LOCK NUT	EA	3.00
12717	ENGINE GROUND CABLE ASSEMBLY	EA	1.00
12881	STEERING WHEEL ASSEMBLY	EA	1.00
12239	STEERING WHEEL, 14" MOTO-LITA, MAHOGANY	EA	1.00
12346	CENTER SECTION STICKER	EA	1.00
10634	ALUMINUM CENTER SECTION	EA	1.00

11008	STEERING WHEEL BOSS	EA	1.00
12338	STEERING WHEEL BOSS SCREW	EA	6.00
12339	STEERING WHEEL BOSS NUT	EA	6.00
12752	PILLOW BLOCK ASSEMBLY	EA	1.00
12640	1" FLANGE BEARING	EA	1.00
10577	PILLOW BLOCK, 3/4" ID	EA	1.00
11040	BOLT, PILLOW BLOCK MOUNTING	EA	4.00
11221	PILLOW BLOCK LOCK NUT	EA	4.00
10585	WASHER, PILLOW BLOCK MOUNTING	EA	4.00
13016	NOSE FASTENER ASSEMBLY	EA	1.00
12966	NOSE HINGE BRACKET ASSEMBLY	EA	2.00
12763	NOSE LATCH	EA	2.00
12775	NOSE LATCH SCREW	EA	8.00
12156	NOSE LATCH WASHER	EA	16.00
12768	NOSE LATCH LOCKNUT	EA	8.00
11291	NOSE LATCH RIVET	EA	2.00
12895	NOSE LATCH MOUNT BRACKET	EA	2.00
12348	NOSE HINGE ROD END	EA	2.00
12380	RODEND JAM NUT	EA	2.00
12376	ROD END SPACER	EA	4.00
12896	NOSE HINGE SPACER SHIM	EA	4.00
12209	GAS STRUT	EA	2.00
12207	GAS STRUT BRACKET, FLAT, SHORT	EA	2.00
12924	GAS STRUT BRACKET, FLAT, LONG	EA	2.00
12774	GAS STRUT SCREW	EA	12.00
10635	GAS STRUT WASHER	EA	12.00
12768	GAS STRUT LOCKNUT	EA	12.00
12756	NOSE LATCH STRICKER	EA	2.00
11221	NOSE LATCH STRICKER LOCK NUT	EA	4.00
12907	NOSE LATCH STRICKER WASHER	EA	4.00
12382	NOSE HINGE BOLT	EA	2.00
12383	NOSE HINGE LOCKNUT	EA	2.00
11024	NOSE HINGE BRACKET BOLT	EA	2.00
11265	NOSE HINGE BRACKET LOCKNUT	EA	2.00
13099	NOSE SIDE LOCATING NUT	EA	2.00
11124	NOSE SIDE LOCATING BOLT	EA	2.00
12907	NOSE SIDE LOCATING SHIM WASHER	EA	8.00
10616	VINTAGE HINGES, TRUNK, L&R, PAIR	EA	1.00
11088	FLAT WASHER, VINTAGE HINGES, 1/4"	EA	4.00
11212	LOCK NUT, NYLON, VINTAGE HINGES, LARGE	EA	2.00
11213	LOCK NUT, NYLON, VINTAGE HINGES, SMALL	EA	4.00
13100	NOSE SIDE LOCATING PLATE ASSEMBLY	EA	2.00
13580	FUEL FILLER ASSEMBLY	EA	1.00
11030	FUEL NECK EXTENSION TUBING	FT	1.00
12774	BOLT, MUSTANG FUEL NECK	EA	3.00
13490	FUEL CAP, W/FLANGE NECK, FLUSH MOUNT	EA	1.00
11050	HOSE CLAMP, FUEL NECK EXTENSION TUBING	EA	4.00
10942	FUEL CAP GROUND WIRE	FT	2.00
12223	GROUND, RING CONNECTOR AT CAP	EA	4.00
11217	GROUND, RING CONNECTOR AT FRAME	EA	1.00
10984	SCREW, GROUND	EA	1.00

13790	INTERIOR DOOR HANDLES ASSEMBLY	EA	1.00
13789	DOOR HANDLE	EA	2.00
13771	CABLE MOUNT TABS	EA	2.00
11291	RIVET, CABLE MOUNT TAB	EA	4.00
12775	CLEVIS SCREW	EA	2.00
12768	LOCKNUT, CLEVIS SCREW	EA	2.00
10983	SCREW, HANDLE MOUNTING	EA	4.00
12894	DOOR LATCH/HINGE ASSEMBLY	EA	1.00
12776	DOOR SKIN TO DOOR FRAME SCREW	EA	10.00
11265	DOOR SKIN TO DOOR FRAME LOCKNUT	EA	10.00
11005	WASHER, BODY MOUNT, ZINC	EA	10.00
12408	LEATHER CHECK STRAP	EA	2.00
10983	SCREW, CHECK STRAP	EA	8.00
13622	3/8" SQUARE HEAD HINGE ADJUSTING BOLT	EA	4.00
11221	DOOR HINGE LOCK NUT	EA	12.00
13564	SHOULDER BOLT	EA	4.00
11265	5/16" NYLON LOCK NUT	EA	4.00
13183	HINGE BUSHING	EA	8.00
12777	DOOR LATCH MOUNTING SCREWS	EA	6.00
11059	DOOR STRIKER MOUNTING LOCK NUT	EA	2.00
12909	DOOR STRIKER MOUNTING WASHER	EA	6.00
12913	DOOR LATCH (L,R)	PR	1.00
12914	DOOR LATCH STRICKER	EA	2.00
13566	ADJUSTABLE HINGE ARM ASSEMBLY-DRIVER	EA	1.00
13567	ADJUSTABLE HINGE ARM ASSEMBLY-PASSENGER	EA	1.00
13565	HINGE ADJUSTER BRACKET	EA	2.00
12886	DOOR FRAME ASSEMBLY	EA	1.00
12892	DOOR FRAME ASSEMBLY, DRIVER	EA	1.00
12893	DOOR FRAME ASSEMBLY, PASSENGER	EA	1.00
12837	MIRROR ASSEMBLY	EA	1.00
10614	MIRROR, SIDEVIEW, STREET (POLISHED BULLET), W/FASTENERS	EA	1.00
12833	HEADLAMP ASSEMBLY	EA	1.00
13546	HEADLIGHT WIRE GROMMET	EA	2.00
10939	HEADLAMP CHROME RING	EA	2.00
10983	SCREW, 7" HEADLAMP MOUNTING	EA	8.00
13545	HALOGEN HEADLIGHT	EA	2.00
10619	7" HEADLAMP BUCKET ASSEMBLY	EA	2.00
13413	HEADLIGHT BUCKET	EA	1.00
13414	HEADLIGHT RETAINER RING	EA	1.00
13417	HEADLIGHT MOUNT GASKET	EA	1.00
13737	HEADLAMP BUCKET FASTENER ASSEMBLY	EA	1.00
12634	HEADLIGHT COVER, DRIVER	EA	1.00
12635	HEADLIGHT COVER, PASSENGER	EA	1.00
12834	HEADLIGHT COVER MOUNT TAB	EA	8.00
12780	HEADLIGHT COVER MOUNT SCREW	EA	8.00
12885	TAIL-LIGHT ASSEMBLY	EA	1.00
12764	REAR LIGHT, RED, TWIN FILAMENT	EA	4.00
12774	REAR LIGHT. SCREW	EA	8.00
10635	REAR LIGHT. WASHER	EA	8.00
12768	REAR LIGHT, LOCK NUT	EA	8.00
12832	FRONT TURN SIGNAL ASSEMBLY	EA	1.00

12766	FRONT TURN SIGNAL LIGHT, AMBER	EA	4.00
12416	TURN SIGNAL CONNECTOR	EA	8.00
13577	LICENSE LIGHT/BRACKET ASSEMBLY		
10623	LIGHT, LICENSE PLATE	EA	2.00
10635	WASHER, LICENSE PLATE LIGHT	EA	4.00
10867	LICENSE PLATE BRACKET, REAR, W/FASTENERS	EA	1.00
11082	SEAT ASSEMBLY		
11005	WASHER, SEAT MOUNT	EA	8.00
10620	VINYL SEAT, ROADSTER STREET VERSION, BLACK	EA	2.00
10851	SCREW, SEAT TO ALUMINUM FLOOR/STEEL FRAME	EA	8.00
10888	SHIFTER ASSEMBLY	EA	1.00
10601	SHIFTER BOLTS (SHIFTER TO HANDLE)	EA	2.00
10824	SHIFTER KNOB	EA	1.00
10606	SHIFTER RING	EA	1.00
10637	BOOT, GEAR SHIFT	EA	1.00
10983	SCREW, SHIFTER RING	EA	4.00
10875	FLAT NUT, SHIFTER RING RETAINER	EA	4.00
10790	CHROMED SHIFTER ROD	EA	1.00
13623	INTERIOR TRIM ASSEMBLY	EA	1.00
10879	BOOT, EMERGENCY BRAKE, BLACK VINYL	EA	1.00
12962	SCREW, DASH MOUNT	EA	8.00
13621	CARPET SET, PRE BOXED	SET	1.00
11078	FUEL LINE ASSEMBLY	EA	1.00
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, 14"	FT	1.16
11051	FLEXIBLE FUEL LINE, 5/16" ID, HIGH PRESSURE, 6"	FT	1.00
10784	FUEL LINE, 1/4" O.D. X 25' COIL	EA	1.00
10783	FUEL LINE, 5/16" O.D. X 25' COIL	EA	1.00
10984	SCREW, FUEL FILTER	EA	2.00
10984	SCREW, FUEL VAPOR CANISTER	EA	2.00
13750	BRAKE FASTENER ASSEMBLY		
11024	BOLT, EMERGENCY BRAKE HANDLE MOUNTING	EA	2.00
13025	"U" NUT, EMERGENCY BRAKE HANDLE	EA	2.00
11005	WASHER, EMERGENCY BRAKE HANDLE MOUNTING	EA	2.00
10984	SCREW, DONOR BRAKE LINE BRACKET	EA	3.00
10983	SCREW, DONOR BRAKE LINE BRACKET	EA	3.00
13738	BRAKE LINE, 3/16" O.D.x 60"	EA	3.00
13740	BRAKE LINE, 3/16" O.D.x 20"	EA	1.00
13743	BRAKE LINE UNION	EA	1.00
13581	SEAT HARNESS/FASTENER ASSEMBLY		
10833	BOLT, SEAT HARNESS MOUNT	EA	6.00
10882	WASHER, SEAT HARNESS MOUNT	EA	12.00
10834	LOCK NUT, NYLON, SEAT HARNESS MOUNT	EA	6.00
12415	SEAT HARNESS, BLACK	EA	2.00
12829	SIDE EXHAUST ASSEMBLY	EA	1.00
13020	SIDE PIPE BAND CLAMPS	EA	4.00
11020	BOLT, EXHAUST MOUNTING	EA	4.00
11221	LOCK NUT, SIDE EXHAUST MOUNT	EA	4.00
10585	WASHER, SIDE EXHAUST MOUNT	EA	8.00
13551	EXHAUST FRAME MOUNT ASSEMBLY	EA	2.00

12830	PASSENGER SIDE SIDE EXHAUST	EA	1.00
12831	DRIVER SIDE EXHAUST	EA	1.00
12836	LOUVER ASSEMBLY	EA	1.00
12769	ALUMINUM MESH LOUVER	EA	2.00
13582	BODY, ASSEMBLY	EA	1.00
12646	BODY PANEL, DOOR, DRIVER	EA	1.00
12647	BODY PANEL, DOOR, PASSENGER	EA	1.00
12648	BODY, NOSE	EA	1.00
13505	BODY, REAR	EA	1.00
13489	BODY PANEL, DASH	EA	1.00
13624	BODY PANEL, TRUNK LID	EA	1.00
13625	WINDSHIELD ASSEMBLY	EA	1.00
12812	WINDSHIELD, TINTED	EA	1.00
13510	WINDSHIELD SUPPORT, DRIVER	EA	1.00
13511	WINDSHIELD SUPPORT, PASSENGER	EA	1.00
13570	WINDSHIELD SUPPORT FASTENER ASSEMBLY	EA	1.00
10833	BOLT, WINDSHIELD SUPPORT	EA	4.00
10834	LOCK-NUT, NYLON, WINDSHIELD SUPPORT	EA	4.00
10882	WASHER, WINDSHIELD SUPPORT	EA	24.00
13547	AUTOMETER ULTRA LIGHT GAUGE SET-SPYDER	EA	1
10942	OIL TEMP GAUGE WIRE EXTENSION, 8' SECTION	FT	8.00
12223	RING CONNECTOR, GAUGE WIRING	EA	14.00
10942	TURN SIGNAL INDICATOR WIRE EXTENSION, 4' SECTION	FT	4.00
13491	SPEEDOMETER, 5" ULTRA-LIGHT	EA	1.00
13492	TACHOMETER, 5" ULTRA-LIGHT	EA	1.00
13118	OIL PRESSURE GAUGE	EA	1.00
13119	WATER TEMPERATURE GAUGE	EA	1.00
13120	FUEL LEVEL GAUGE	EA	1.00
13121	VOLTMETER	EA	1.00
13122	OIL TEMPERATURE GAUGE	EA	1.00
10817	HIGH BEAM INDICATOR LIGHT, BLUE, DASH MOUNT	EA	1.00
10816	TURN SIGNAL INDICATOR LIGHT, GREEN, DASH MOUNT	EA	1.00
10815	WARNING INDICATOR LIGHT, RED, DASH MOUNT	EA	1.00
10983	SCREW, DASH MOUNTING	EA	5.00
10936	TRIM SCREW RING, DASH MOUNTING	EA	5.00
11288	FLASHER, 3 PRONG	EA	1.00
11053	HORN BUTTON, ORIGINAL, DASH MOUNTED	EA	1.00
10942	WIRE EXTENSION, 16 GAUGE, DASH, 3 x 2' SECTIONS	FT	6.00
10941	ELECTRICAL WIRING CONNECTORS, BLUE	EA	1.00
11180	FEMALE TERMINAL, 16 GAUGE	EA	1.00
10596	SWITCH, TOGGLE	EA	2.00
13158	TAP CONNECTOR, 16-14 GAUGE	EA	12.00
10942	DASH LIGHT POSITIVE LEAD, 16 GAUGE, 5' SECTION	FT	5.00
13159	POSITIVE IGNITION LEAD, 16 GAUGE, 5' SECTION	FT	5.00
13160	NEGITIVE LEAD, 16 GAUGE, 5' SECTION	FT	5.00
13161	FOUR CONDUCTOR MULTICOLOR WIRE, CUT 2' SECTION	FT	4.00
10940	ELECTRICAL WIRING CONNECTOR, RED	EA	27.00
13579	ROLLBAR ASSEMBLY		
13509	MAIN HOOP, ROLL BAR, 180 DEG	EA	1.00
13578	ROLLBAR FASTENERS ASSEMBLY		
10829	BOLT, ROLLBAR	EA	2.00

11265	LOCK NUT, NYLON, ROLLBAR	EA	2.00
13576	TRUNK LATCH ASSEMBLY	EA	1.00
13464	TRUNK LATCH	EA	1.00
12838	ALUMINUM COCKPIT ASSEMBLY	EA	1.00
12983	ALUMINUM PANEL, DOOR, LATCH COVER	EA	2.00
13669	ALUMINUM PANEL, DOOR, FRONT COVER, DRIVER	EA	1.00
13670	ALUMINUM PANEL, DOOR, FRONT COVER, PASSENGER	EA	1.00
12803	ALUMINUM PANEL, COCKPIT REARCORNER, DRIVER	EA	1.00
12809	ALUMINUM PANEL, COCKPIT REARCORNER, PASS	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
13364	ALUMINUM MOUNT, DASH/SWITCH (HEADLIGHT)	EA	1.00
13365	ALUMINUM MOUNT, DASH/SWITCH (FOUR WAY FLASHERS)	EA	1.00
12805	ALUMINUM PANEL, U-JOINT ACCESS PANEL, (REAR TUNNEL COVER)	EA	1.00
12791	ALUMINUM PANEL, REAR COCKPIT VERTICAL WALL (BEHIND SEATS)	EA	1.00
12790	ALUMINUM PANEL, COCKPIT WALL, UNDER DOOR, DRIVER	EA	1.00
12810	ALUMINUM PANEL, SIDE COCKPIT WALL, UNDER DOOR, PASSENGER	EA	1.00
12806	ALUMINUM PANEL, TRANSMISSION TUNNEL FRONT VERTICAL WALL	EA	1.00
12792	ALUMINUM PANEL, TRANSMISSION TUNNEL TOP COVER	EA	1.00
13472	ALUMINUM PANEL, TRANS TUNNEL, REAR CORNER, DRIVER	EA	1.00
13473	ALUMINUM PANEL, TRANS TUNNEL, REAR CORNER, PASSENGER	EA	1.00
12959	ALUMINUM PANEL, TRANSMISSION TUNNEL TOP COVER BLOCK-OFF PLATE	EA	1.00
12841	ALUMINUM ENGINE BAY ASSEMBLY	EA	1.00
12842	ALUMINUM PANEL, ENGINE BAY WALL/SPLASH GUARD, UPPER, DRIVER	EA	1.00
12843	ALUMINUM PANEL, ENGINE BAY WALL/SPLASH GUARD, LOWER, DRIVER	EA	1.00
12986	ALUMINUM PANEL, FIREWALL, EXTENSION, OUTSIDE, PASSENGER SIDE	EA	1.00
12987	ALUMINUM PANEL, FIREWALL, EXTENSION, OUTSIDE, DRIVER SIDE	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
12793	ALUMINUM PANEL, RADIATOR FLOOR/SIDES	EA	1.00
12800	ALUMINUM PANEL, RADIATOR DUCT, CENTER	EA	1.00
12844	ALUMINUM PANEL, RADIATOR DUCT MOUNT, DRIVER SIDE	EA	1.00
12845	ALUMINUM PANEL, RADIATOR DUCT MOUNT, PASSENGER SIDE	EA	1.00
12991	ALUMINUM PANEL, RADIATOR DUCT, DRIVER	EA	1.00
12992	ALUMINUM PANEL, RADIATOR DUCT, PASSENGER	EA	1.00
13295	ALUMINUM PANEL, ENGINE BAY WALL/SPLASH GUARD, UPPER, PASSENGER	EA	1.00
13296	ALUMINUM PANEL, ENGINE BAY WALL/SPLASH GUARD, LOWER, PASSENGER	EA	1.00
13575	ALUMINUM REAR TRUNK ASSEMBLY	EA	1.00
13497	ALUMINUM PANEL, TRUNK REAR WALL	EA	1.00
13496	ALUMINUM PANEL, TRUNK WALL, DRIVER SIDE	EA	1.00
13495	ALUMINUM PANEL, TRUNK WALL, PASSENGER SIDE	EA	1.00
13506	ALUMINUM PANEL, REAR SPLASH GUARD, DRIVER	EA	1.00
13507	ALUMINUM PANEL, REAR SPLASH GUARD, PASSENGER	EA	1.00
13499	ALUMINUM PANEL, TRUNK FLOOR ACCESS COVER	EA	1.00
13500	ALUMINUM PANEL, TRUNK WALL ACCESS COVER	EA	1.00
13512	FRAME, SPYDER GT, COMPLETE ASSEMBLY, PAINTED	EA	1.00
	HEADERS, SPYDER ENGINE: 302 OR 351	PAIR	1.00
	MOUNTED COMPONENTS		
12838	ALUMINUM COCKPIT ASSEMBLY	EA	1.00
11192	SCREWS, SELF TAPPERS, KIT BUILDING	EA	100.00
12787	ALUMINUM PANEL, DRIVER FOOTBOX, TOP/INSIDE SECTION	EA	1.00

12788	ALUMINUM PANEL, DRIVER FOOTBOX, TOP/OUTSIDE SECTION	EA	1.00
12984	ALUMINUM PANEL, DRIVER FOOTBOX, VERTICAL WALL, INSIDE	EA	1.00
12981	ALUMINUM PANEL, DRIVER FOOTBOX, VERTICAL WALL, FRONT	EA	1.00
12789	ALUMINUM PANEL, DRIVER FOOTBOX, VERTICAL WALLS, OUTSIDE	EA	1.00
12985	ALUMINUM PANEL, DRIVER FOOTBOX, DROPPED FLOOR	EA	1.00
12990	ALUMINUM PANEL, COCKPIT FLOOR, DRIVER SIDE, W/TUNNEL WALL	EA	1.00
12989	ALUMINUM PANEL, COCKPIT FLOOR, PASS SIDE, W/TUNNEL WALL	EA	1.00
12804	ALUMINUM PANEL, PASSENGER FOOTBOX, TOP	EA	1.00
13142	ALUMINUM PANEL, PASS FOOTBOX, VERTICAL WALL, INSIDE	EA	1.00
13143	ALUMINUM PANEL, PASS FOOTBOX, VERTICAL WALL, FRONT	EA	1.00
12797	ALUMINUM PANEL, PASS FOOTBOX, VERTICAL WALL, OUTSIDE	EA	1.00
12841	ALUMINUM ENGINE BAY ASSEMBLY	EA	1.00
12798	ALUMINUM PANEL, FIREWALL	EA	1.00
12799	ALUMINUM PANEL, FIREWALL, EXTENSION, PASSENGER SIDE	EA	1.00
13575	ALUMINUM REAR TRUNK ASSEMBLY	EA	1.00
13494	ALUMINUM PANEL, TRUNK FLOOR	EA	1.00

Appendix D – 3-Link Instructions

Installation Instructions – Initial Build with Frame Prepared at Factory

Parts Included in Kit:

13321	3-LINK REAR SUSPENSION ASSEMBLY WITH KIT	EA	1.00
13760	3-LINK REAR SUSPENSION INSTRUCTIONS	EA	1.00
13269	3 LINK HARDWARE ASSEMBLY	EA	1.00
10833	BOLT, FRAME MOUNT TO FRAME	EA	4.00
10882	WASHER, FRAME MOUNT TO FRAME	EA	10.00
10585	WASHER, DIFFERENTIAL MOUNT	EA	2.00
13167	PANHARD BAR	EA	1.00
13166	JAM NUT, LEFT HAND THREAD	EA	2.00
13165	ROD END, LEFT HAND THREAD	EA	2.00
12380	JAM NUT	EA	2.00
12348	ROD END	EA	2.00
12376	ROD END SPACER, 0.375"	EA	2.00
13209	ROD END SPACER, 0.25"	EA	7.00
12382	5/8"-11 x 3" BOLT	EA	4.00
12387	5/8" WASHER	EA	10.00
12383	5/8" LOCKNUT	EA	4.00
12113	SHOCK SPACER BUSHING, 0, 0.32", 0	EA	1.00
12332	REAR COIL-OVER LOWER MOUNT BOLT	EA	2.00
10834	LOCK NUT, NYLON, REAR COIL-OVER MOUNT	EA	7.00
13210	SHOCK SPACER SHIM	EA	2.00
12218	CLAMP LOCKNUT, 1/2"-20	EA	4.00
12217	CLAMP BOLT	EA	4.00
11020	BOLT, DIFFERENTIAL MOUNT	EA	1.00
11221	LOCK NUT, NYLON, DIFFERENTIAL MOUNT	EA	1.00
12385	2.5" LOWER FRAME MOUNT BOLT	EA	1.00
13200	PANHARD BAR AXLE MOUNT (PASSENGER SIDE)	EA	1.00
13201	COMPETITION TRACTION-LOK BRACKET	EA	1.00
13211	UPPER LINK TUBE	EA	1.00
13203	UPPER LINK AXLE MOUNT	EA	1.00
13322	UPPER LINK, AXLE CLAMP ASSEMBLY	EA	1.00
13206	PANHARD BAR FRAME MOUNT ASSEMBLY	EA	1.00

Tools: *$^{3}/_{16}$", ⅜", ½" drill bits, ⅝", ¾", $^{15}/_{16}$", 1" wrenches, ⅜", ⅝", ¾", $^{15}/_{16}$" sockets, Ratchet, Drill, Ruler/Tape measure, Pliers, Flat head Screwdriver, Tin Snips/scissors/razor, Marker*

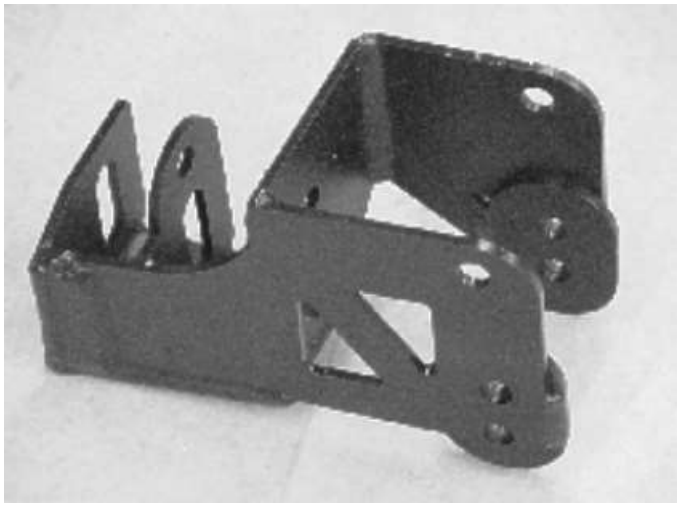
Note: For participants in the Factory Five Challenge several of these components should be welded in place. (This also applies to street cars used on the track with race compound tires.) Specifically the panhard bar mount on the frame, and the upper control arm mount on the axle. Care should be taken when welding to the axle housing to ensure that no warping of the axle tubes occurs.

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

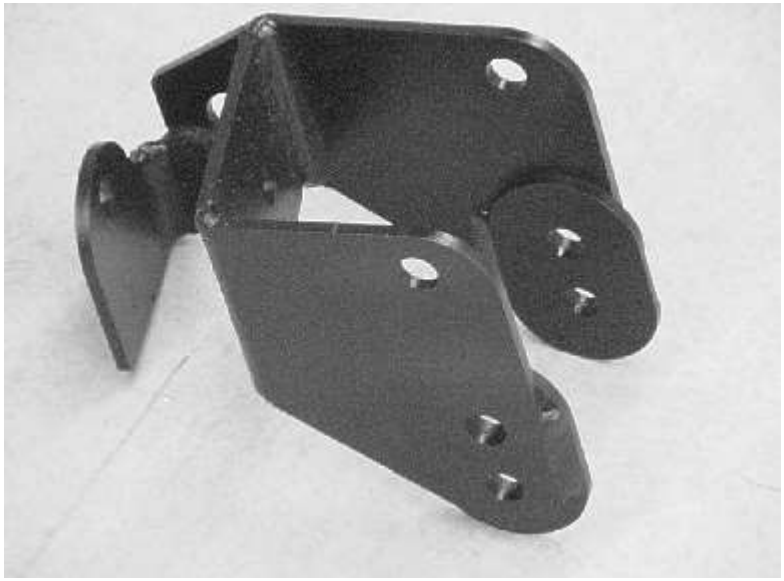
Installation Instructions

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. The two thicker (⅜") spacers are used on the frame mount and two of the thinner ($^1/_4$") spacers are used on the axle mount. 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.
9. Attach the new upper arm bracket to the axle for the new upper arm mount. The bracket clamps around the axle, with the lower leg attaching to the hole where the counter weight was attached on the right front of the differential. If you still have this weight on your axle, you will have to remove it.
10. 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 allen head bolt on the lower leg first, then tighten the four bolts on the axle clamp.

Upper axle mount attached to axle.

11. 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.
12. 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.
13. The panhard bar can also be set left to right, as well as leveled.
14. 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 3 Link Competition front/rear shock and spring assembly which uses a stiffer shock and spring combination.

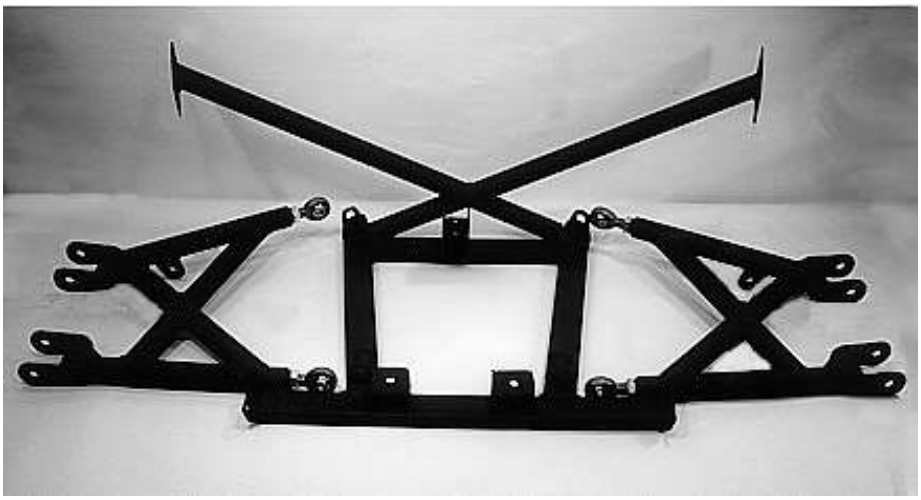
Appendix E – Independent Rear Suspension

Independent Rear Suspension
Installation Instructions

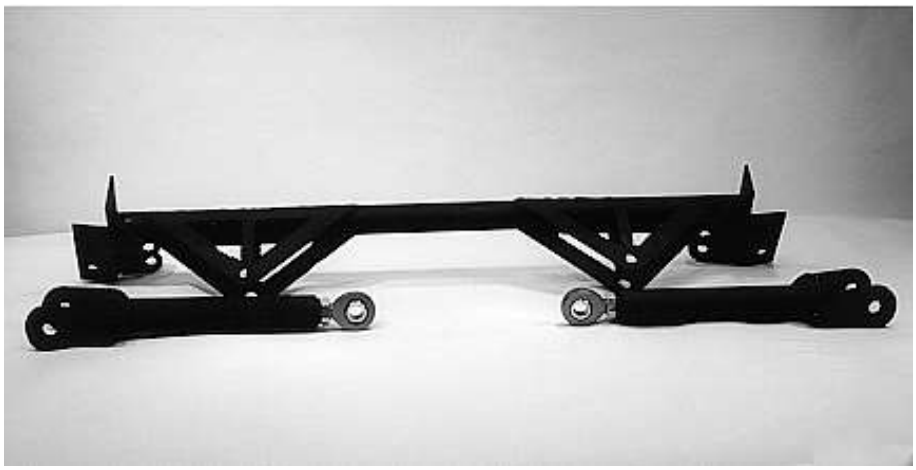
Note:

- These instructions are designed to supplement the Assembly manual where the assembly process is different from the build-up using a live 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.
- 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)

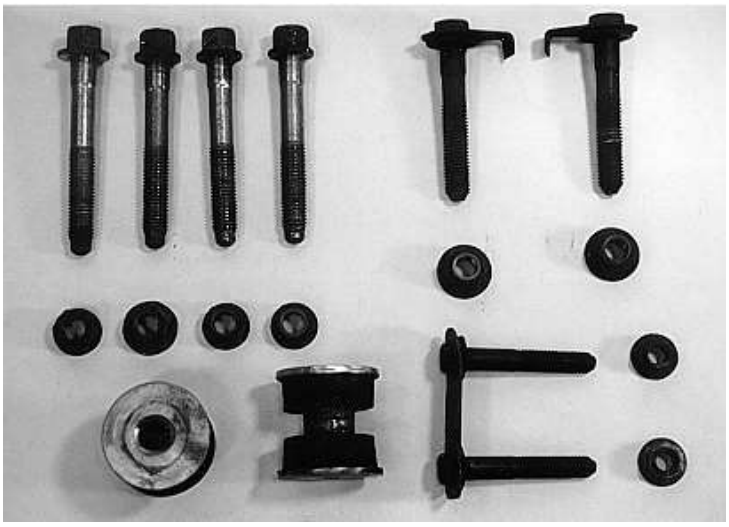


Upper arms and Cage (Cage separate from frame)

I. Thunderbird Parts needed

- 8.8" Center section and front mounting bushings
- CV joints

- Spindles and attaching hardware
- Brakes with flexible lines and mounting brackets



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

- Mustang Quad shocks – Do not use aftermarket KYB shocks
- ½" Lug nuts

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 double flare tool
Brake line cutter
Brake line bender
Ruler/Tape measure
Snap ring pliers
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:

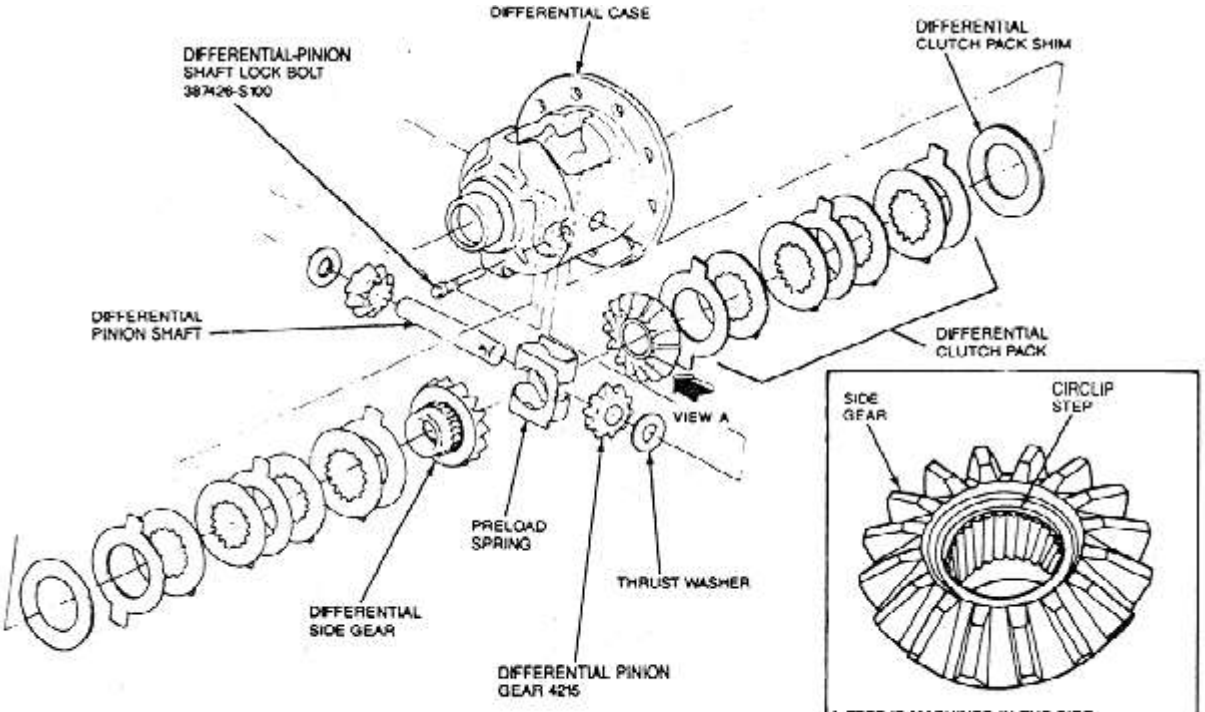
1. The first and most important item to check when looking at different rear ends is the diameter of the CV shafts. The V6 and some V8 cars came equipped with a smaller diameter CV shaft. These CV joints will not work with the new shorter shafts provided or with the Torque/Horsepower that can be made from a 5.0L HO so they should be avoided. To check for the proper shaft size, check the diameter of either side. **The correct diameter is 1.2 inches**, measured between the inner and outer CV boots. If you are using a Super Coupe, the axles will be correct even if the passenger side is considerably thicker. Under the boots, it necks down to the correct size.
2. 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.
3. 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 just 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 rearends we have found work the best are from Thunderbird Supercoupes. We have found them for between $300-$350. Lincoln Mark VIII's go for around $600.

Limited slip (Posi-traction/Traction-Lok) and Open Differentials

- Early Mark VIII center sections do not have a limited slip differential.
- The Thunderbird Supercoupe does have a limited slip differential.

- The IRS is an 8.8 center section and it can use the same gears that the solid axle 8.8 from the Mustang uses but, it can not use the same differentials. The IRS differential has a step cut in the side gears to hold the CV joints in the center section. Without this step there is nothing holding the axles from coming out.



Exploded view of the 8.8 inch integral carrier Traction-Lok® differential

- There are only three differentials that will work in either the Mark VIII or T-bird center section, the stock Supercoupe traction-Lok, an *Auburn Gear* differential and a Torsen differential. *Auburn* offers two units that will work. The high performance unit (part # 542079) for standard OE replacement(~$250), and the pro series unit (part # 542080) for better traction and faster engagement (~$350). The *Torsen*, sold by *Ford Motorsport* is the best differential around and is used by many performance car companies (*Porsche*) as standard equipment. It is all gears inside and never wears out. It isn't designed for a life of drag racing though, its designed for roadracing. The *Ford Motorsport* part number is M-4204-T28 (~$500).

- Parts can be bought new if desired.

Aluminum 8.8" Center section with 3.73 gears - $675	Ford Motorsport
CV joints – $120/ea	Autozone parts store
Spindles - $600/ea	Ford dealer
Brake caliper - $100/ea	Napa parts store
Spindle bolts and center section mounts -	Ford dealer

Master Cylinder Selection Chart

Front Calipers	MC Bore Dia.	MC Source Vehicle	Part Source	Part Number
Lincoln *Continental/Mark VII*	1"	1993 Mustang *Cobra*	Ford, Parts Store	Bendix# 12669
Cobra Mustang	$^{15}/_{16}$"	1994 Mustang *Cobra*	Ford	
Stock Mustang	$^{7}/_{8}$"	1982 4 cyl. Mustang	Parts Store	Bendix# 11764

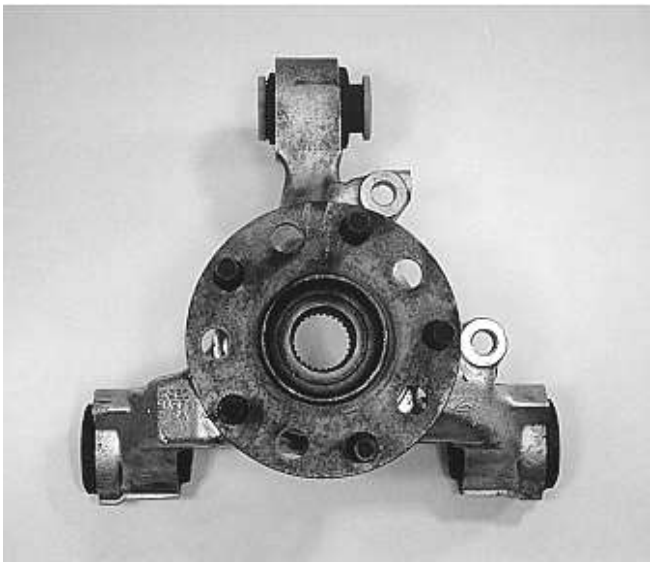
IX. Modification of IRS parts

Attention: <u>Do not throw away any parts from the IRS until the IRS is installed and the axles have been changed.</u>

- **Spindles**

Attention: *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.*

- *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 redrilled, 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

- **CV Joints**

Attention: Do not cut the CV Boots*, they may have to be reused. Some joints have one side that is bigger than the boots we supply. If you need a replacement for the larger boot they are available from your local Ford dealer.*

1. Cut the clamps that hold the boots to the CV joints and pull back the boots toward the center of the axle shaft. **Do not cut the CV Boots**, they may have to be reused.
2. Slide the larger joint off the shaft and set to the side.

3. The two remaining pieces, the fixed joint and the inner plunge joint, need to be tapped off with a hammer. Be very careful not to damage any of the moving parts, work from all sides to be sure each piece comes off straight.

4. Once the joints have been removed, the “C” clips can be slid off the old axles using a pair of snap ring pliers.
5. Inspect the CV joints for any damage or obvious wear and re-grease.
6. Test fit the new CV boots on the joints to see if they fit. If they do not you will have to reuse the old boots.
7. Slide the boots onto the new axle shafts with the narrow openings toward the center.

Boots pushed onto the new shaft

8. Replace the “C” clips in the same grooves on the new axle shaft and tap the joints back onto the shaft. (The shaft is symmetrical so either joint can go on either end)
9. Slide the larger CV joint back into position and pull the boots up over both ends.
10. Install the boot clamps tight to prevent grease from creeping out, make sure on the larger CV joint that there is room for the joint to plunge without crushing or stretching the boot.

Old axle

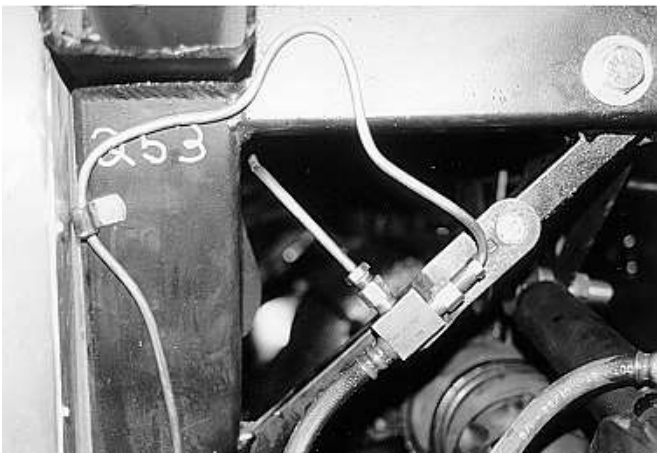
New axle

- **Brake Calipers/Lines**

1. 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. Use a screwdriver and bend the bracket until the cable fits.

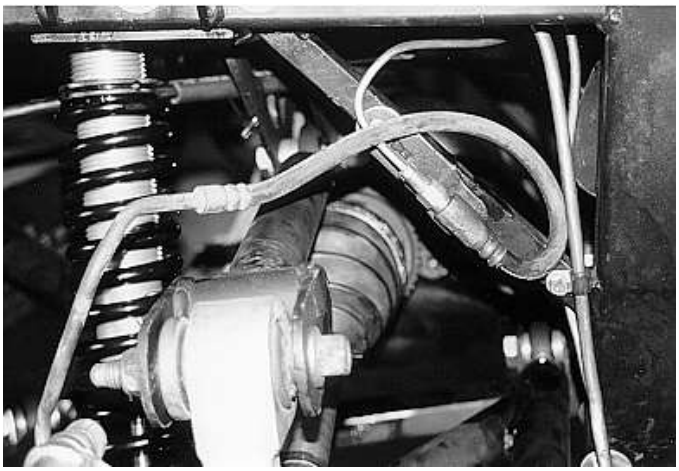
E-brake cable holder on caliper with cable sleeve inside

2. 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

3. Drill two $^{3}/_{16}$" holes, one for the mount screw and one for the locating pin.
4. Mount the "T" junction to the tubing.
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.

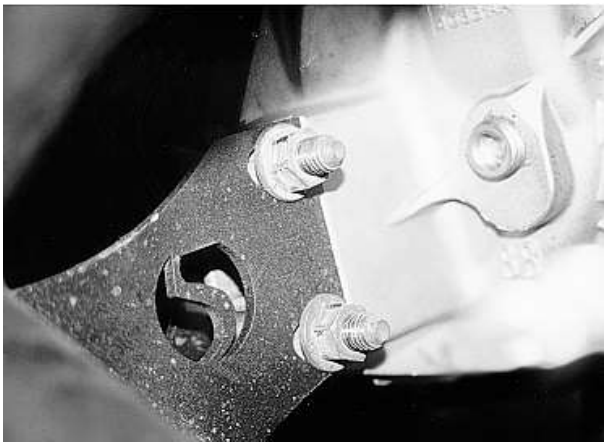
Brake line fittings

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.

X. Bolt-On Parts

- **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.

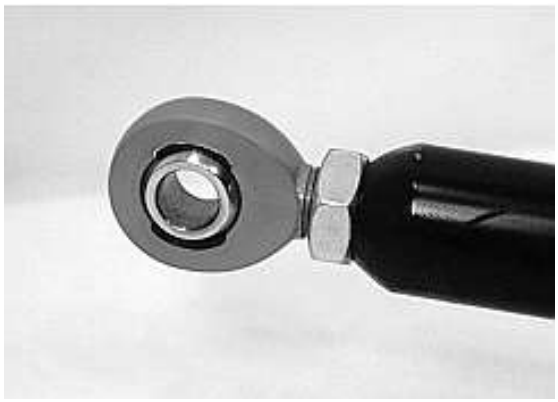


Rear of differential bolted in place.

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.



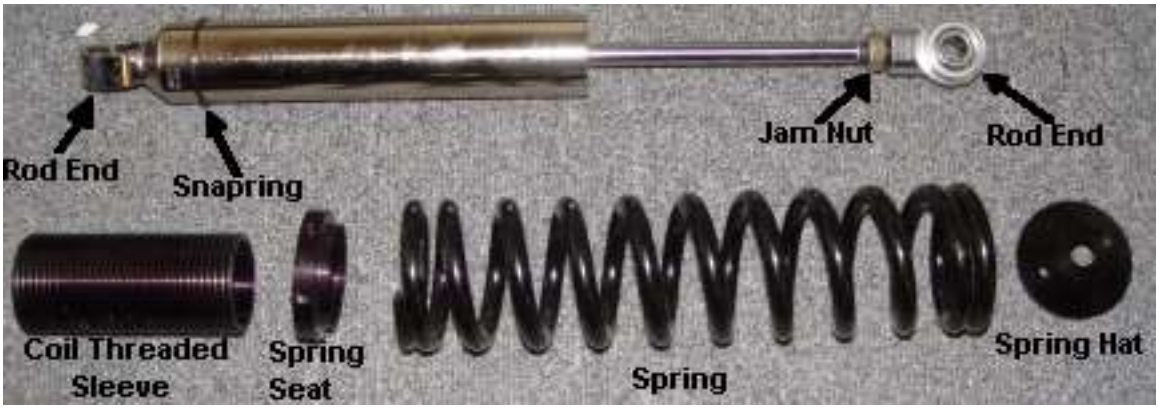
½" of threads sticking out of arm.

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.

- **Shock and Spring Installation**



Shock and coil-over spring parts.

1. Remove the rod end and Jam nut from the end of the shock.
2. Slide the coil-over threaded sleeve on the shock. It may be fairly tight. **Make sure that the end with the groove in it goes on first**. This covers the snap ring already installed at the factory.

Groove in threaded tube.

3. Check the spring seat on the sleeve to make sure that the taller part near the threads is on the top so that it keeps the spring from rubbing the threads and that it is not on the bottom.

Threaded tube assembled on shock with spring seat screwed on correctly.

4. Slide the spring on the assembly.
5. Place the spring hat on the shaft so it sits on the spring.
6. Screw the rod end back on the shaft and tighten the jam nut.

Coil-over shock assembled.

7. Secure the spring to the hat using zip ties through the side holes in the hat.

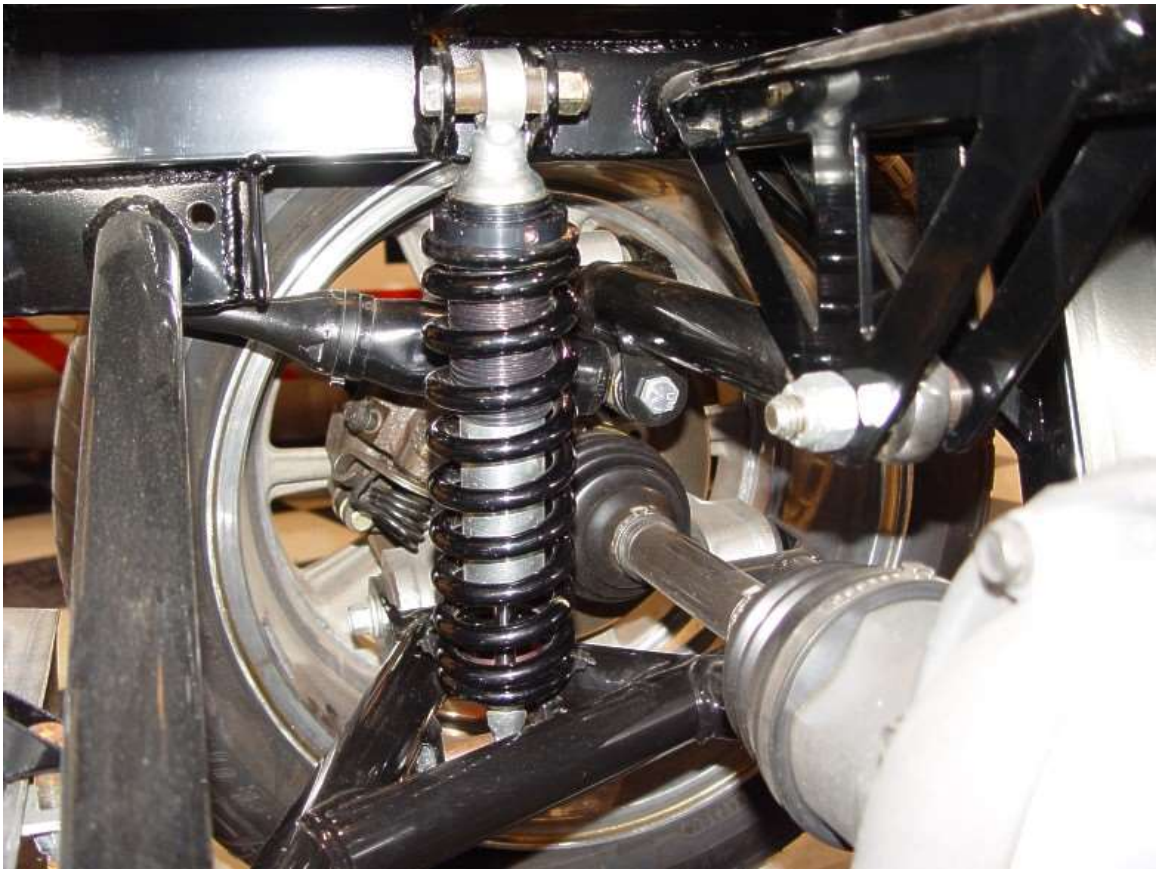
Spring hat attached to spring

8. 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.
9. Fasten the shock to the top mount with the fasteners, washers and spacers provided.

(Left) Lower shock-mounting fasteners/spacers. (Right) Upper shock mounting fasteners/spacers.

10. 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.



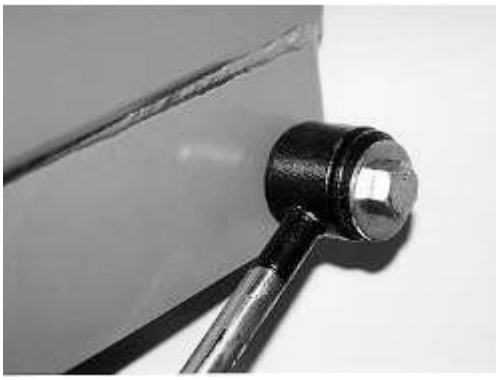
IRS Shock mounted

- **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.

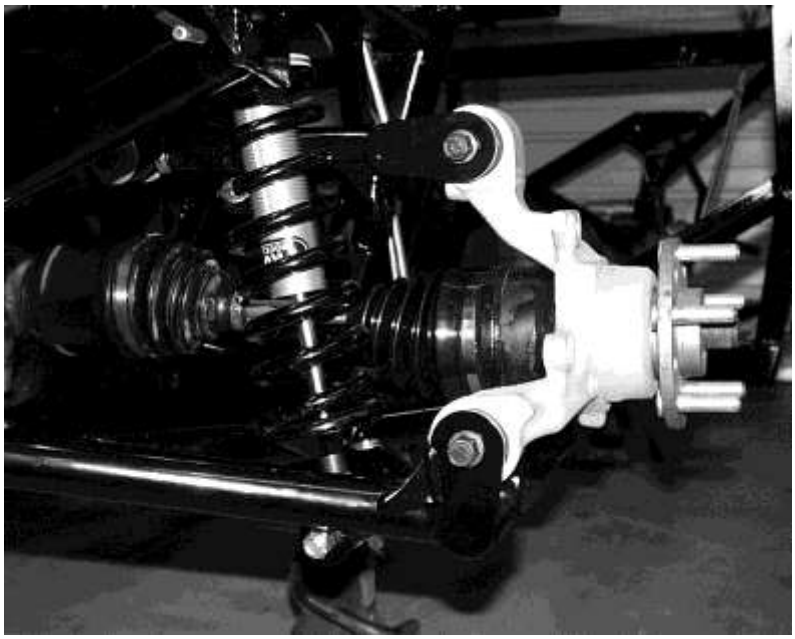


Quadshock mounted to frame bracket.

- **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.**

- **Rear Calipers and Rotors**

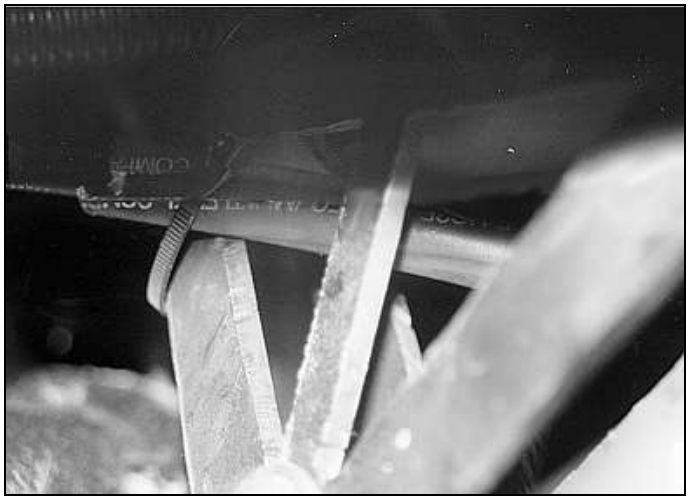
1. Push the slotted rotor onto the spindle.
2. Attach the caliper to the spindle using the OEM T-Bird bolts.

- **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.



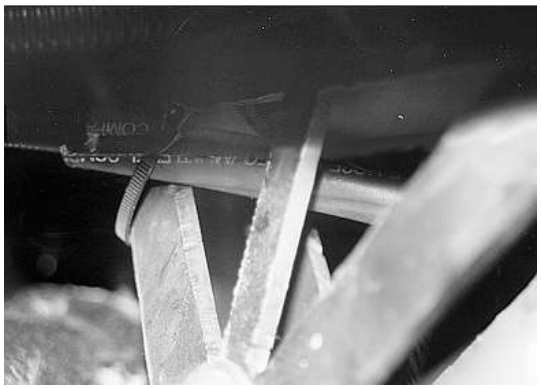
E-brake cables attached to triangles

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

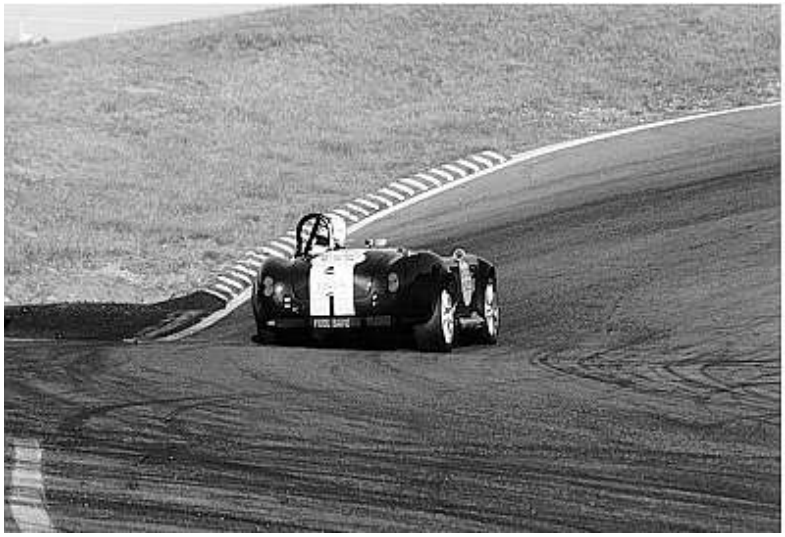
1. Double check that all of the bolts are tight.
2. Mount your wheels and tires.
3. Lower the car off the jack stands.
4. Set the ride height in the car as specified in the manual
5. Zip tie through the slot in the shocks or tape the threaded collar so that the settings do not change.
6. Align the car 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.
7. 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. If you are racing the car, call for alignment and spring suggestions.

8. The IRS was designed so that the 5.95” Backspace, 9” Cobra “R” and Bullitt wheels will bolt on. These are fairly inexpensive and look good on the car.
9. Check the rod end jam nuts to make sure they are tight on a regular basis.

XII. Aftermarket parts availability

Check www.FFcobra.com for possible brake kits.
Stainless steel braided hoses can be found.
Stiffer shocks and springs are available.

XIII. Pictures



Initial testing at New Hampshire International Speedway

Mark Drag racing the twin turbo/IRS prototype car at Run & Gun 1999.
seconds at 127mph

Appendix F – 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.**