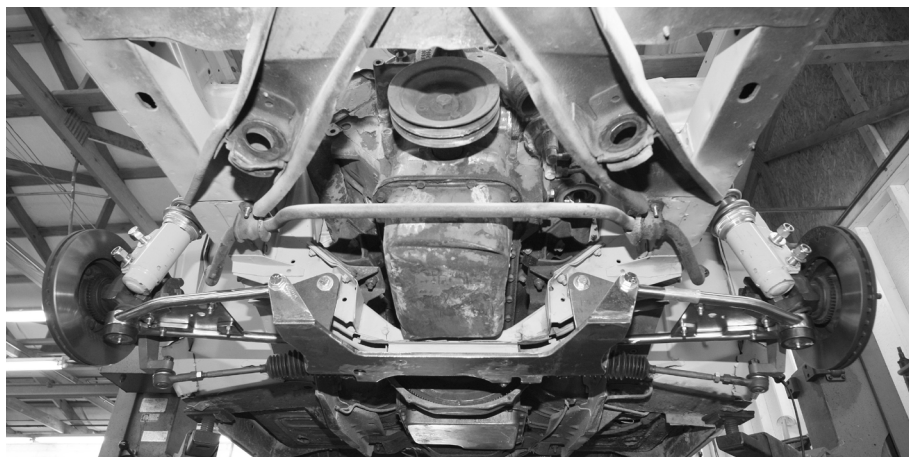
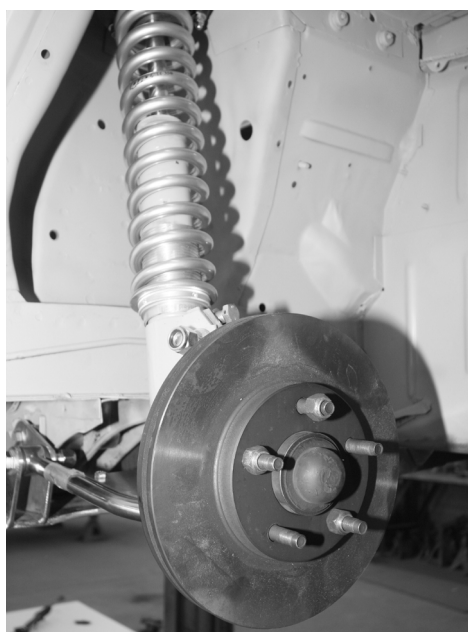


Instructions for 1966-71 Fairlane/Torino Strut Suspension Kit



kit. Have all your parts prepped, rebuilt, and painted ahead of time. Then, the actual installation will go more smoothly and quicker, without stops for needed parts.

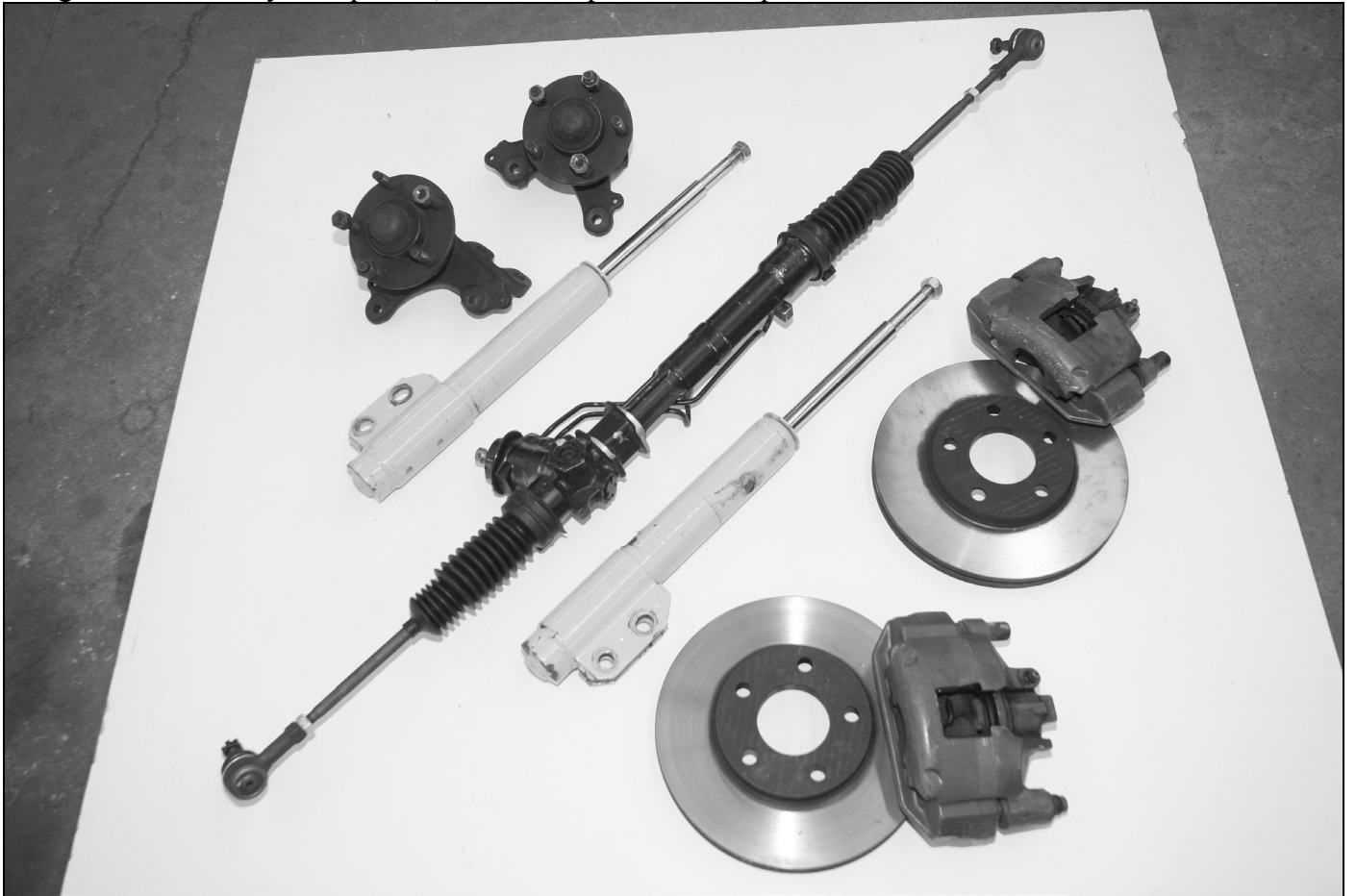


Figure 2 OEM parts required, showing OEM Mustang disc brakes



Figure 3 OEM parts used to install conversion kit, showing optional Wilwood calipers

This kit is designed to work with stock oil pans for the V-8 versions of these cars.

The stock oil pan has a front sump about 8 ½" long, while later pans with longer sumps and dual or rear sumps will create problems with rack and pinion clearance. The correct pan is available from Ford, or the various Mustang restorer parts houses. You need the early style pan with the dipstick in the front timing chain cover. If you have a later style engine with the dipstick in the pan, and its oil pan won't fit, you can get a new front timing cover from Ford, #M6059-D351. That cover will accept standard and reverse rotation water pumps (found on serpentine belt drives) will need a dipstick and tube added, and will fit 289/302/351W. The 351W will not accept 302 oil pans due to a larger rear main seal diameter. Since the longer pans really don't have anything in the way internally, you could also alter your long sump pan with some simple tin work if you prefer.

We have not tried all the different Ford engines in this chassis, but the key is a front sump oil pan with a short sump. The larger Ford engines may fit OK once the shock towers are trimmed for clearance, and the appropriate oil pan used. The new Modular 4.6 and 5.4 engines have a rear sump and may be more difficult to fit.

EXHAUST

This kit was prototyped using an original 390 with '66 Fairlane cast iron manifolds. They clear the steering shaft very well. Since we are eliminating the original steering box it is best to use a header that puts the exhaust right where the old steering box sat. Therefore, most headers designed for this chassis won't fit well. We are running the steering shaft near the block, with the advantage of keeping heat out of the engine. You will want to use a header that drops the outlet between the third and fourth cylinder back on the driver side. A good option for the FE series engines is part #FF390 from Sanderson Headers. The best fitting short header for the Windsor engines we have found is the Sanderson FF-3F, which is their standard FF-3 modified so that the exhaust is swung out near the frame rail rather than tight to the engine. Hedman's #88-660 long tube header for '65-'73 Mustang generally fits OK. Some installers have said it fit directly, while others have had to modify one tube. It's probably best to order the Hedmans uncoated in case mods are needed. ANY header we've seen is very tight to the shock towers and may require trimming those for decent clearance. Since the upper control arm is now removed, there is plenty of room to trim the shock tower at the bottom all the way to the subrail, gaining 3-4". To keep the body totally uncut, the cast iron manifolds work best.

SUSPENSION

You will need the complete spindles and brakes from a 94-04 Mustang. Replacement struts for 94-04 can be used, but we recommend using the 79-93 Mustang strut as they allow more compression travel. The tabs on the 79-93 struts are ¼" wider than the 94-02 version, so we have supplied 1/8" shims to take up the difference, as well to add an additional point to allow precise adjustment of camber settings on our strut suspension kits. The kit normally obtains camber settings that work well for a road driven car, but some users go to a more radical camber setting for optimum handling, accepting increased tire wear. The two 1/8" thick shims used between the spindle and the strut attachment tabs are now welded together, using a ½ NF nut. That nut accepts a 1/2NF x 1 ½" long bolt which can be used to change the angle between the spindle and strut. It will bear against the strut body and take up slack in the 5/8" bolt holes. This normally allows adjustment to the

camber setting specified for the '94-'04 Mustang spindles. If you require more adjustment, the upper 5/8" holes in the strut mounting tabs can be elongated to allow for angular travel. The bolt can then be run in or out to allow camber change. After setting alignment, use a drop of Loctite to aid in keeping the camber adjustment bolt from backing out.

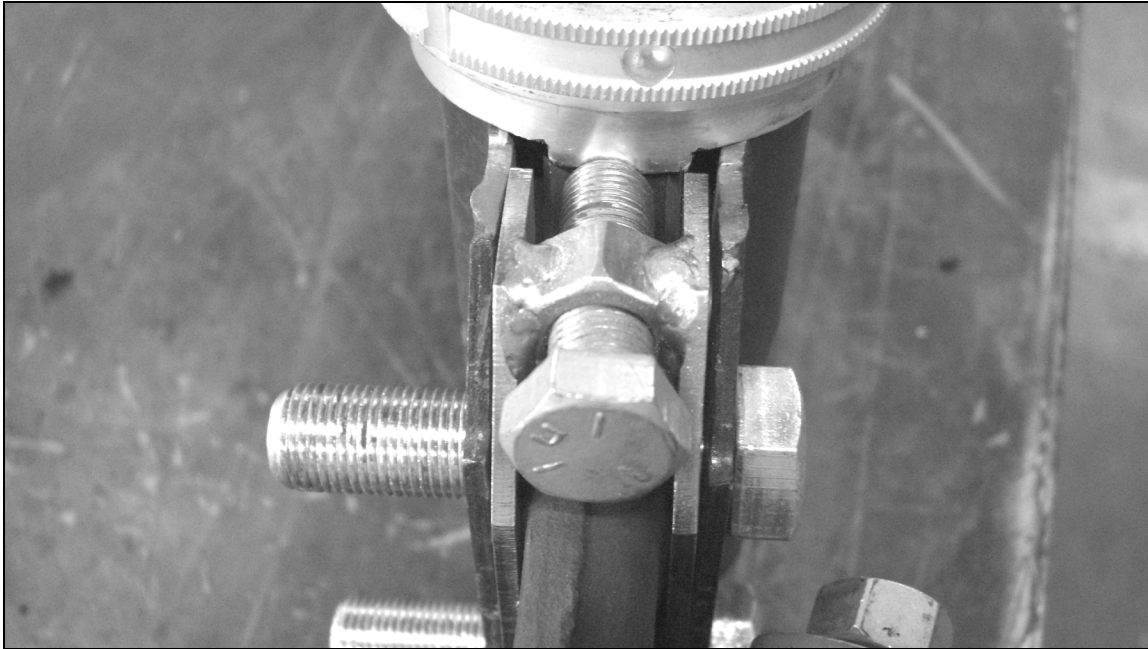


Figure 4 shims in place, with camber adjustment

Be sure to get all the attaching bolts from the salvage yard, as you will be using most of them here. Should you need to replace them, the strut to spindle nuts are 5/8NF x 2 1/2" long, with Nyloc nuts. 9/16" USS flat washers fit best over the bolts. The nuts for the top of the strut are 16MM x 2 and must be a self locking type. You will find that a 1/2" drive air impact tool does a great job of working with the upper strut nuts.

A machined aluminum collar and nut supports the new coil spring mounted on the shock strut body. We normally supply the correct diameter collar for the 2 1/4" OD 79-93 struts. The 94-04 struts are 2" OD and we can supply those if you prefer. The struts all have an upper "shelf" spot welded on for the original bumpstop. It's best to reduce that diameter with a grinder so that the spring collar can slide over the strut body. Drilling or chiseling the welds will damage the shock.

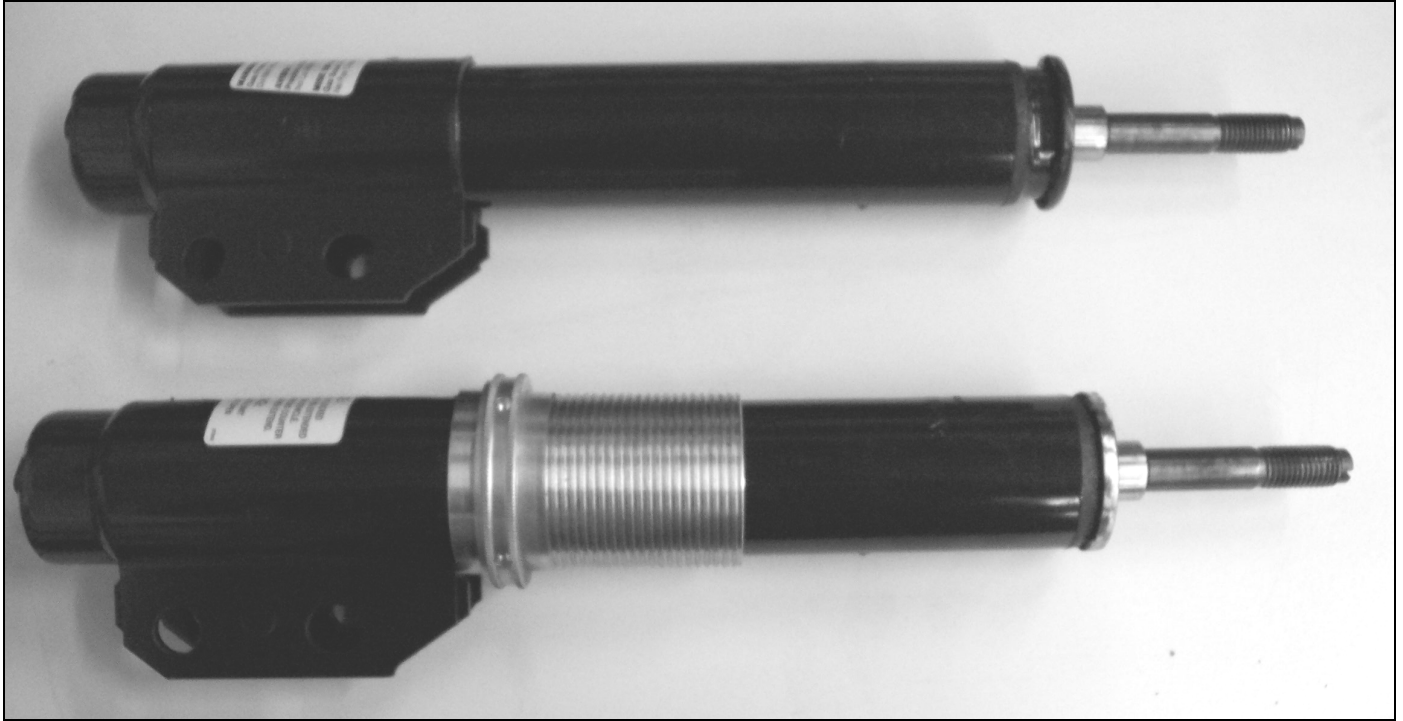


Figure 5 note tab on collar to prevent rotation, and “shelf” diameter ground to allow collar to pass over

New steering arms are supplied in the kit and attach to the spindle, using the caliper brackets threaded holes, with the supplied 12mm x 1.75 x 60mm bolts and split lockwashers bolts replacing the shorter original caliper bracket bolts. The new steering arms bolt to the rear side of the spindles to accommodate the rear mounted rack & pinion . The original front steering arms will be sawn off per the photos to save weight, since they will not be used. The original iron calipers mount to the rear, over the steering arm. Note that the bleeder screw **MUST BE ON TOP!!!!** The other spindle shows the optional Wilwood brakes, which mount toward the front of the car. The aluminum caliper bracket for Wilwood brakes is mounted with the machined relief toward the inboard side of the spindle. The Wilwood caliper has bleeder screws on each end, the lower one being replaced by the brake hose 90 degree adaptor fitting.



Figure 6 before.....after removing original steering arm from 94-04 spindles

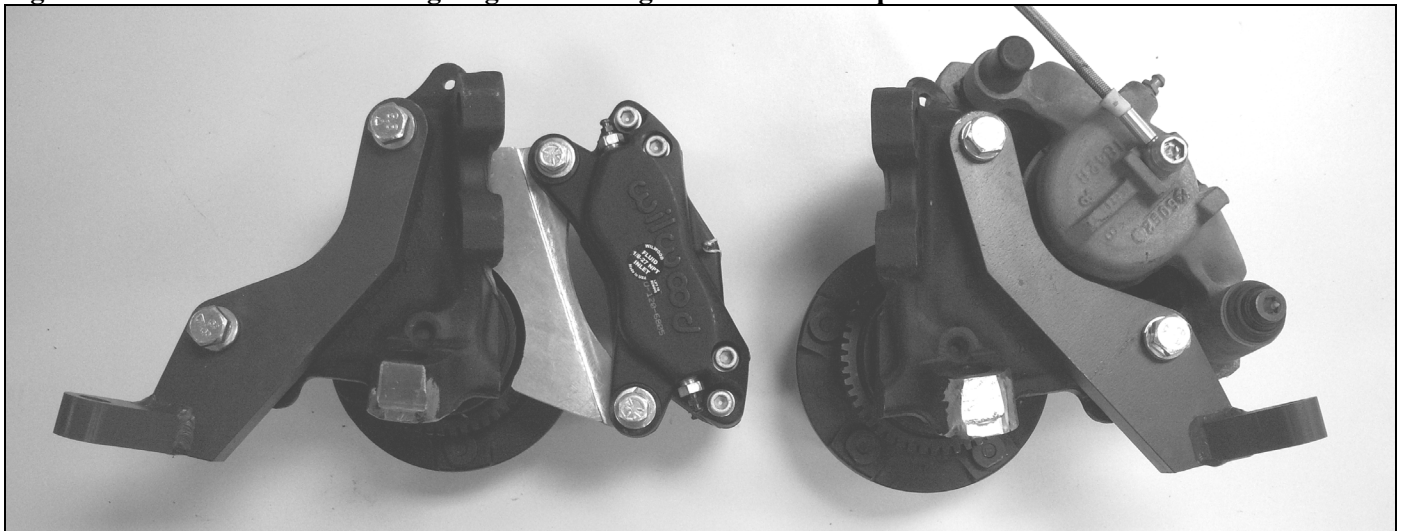


Figure 7 LH spindle and steering with Wildwood brakes RH shown with stock caliper and bracket

Rotors were left off to clarify the caliper and steering arm mounting positions. In the actual installations, the rotor is installed over the hub, with a couple lug nuts to hold it in place. Then the caliper and bracket assemblies, and steering arms are attached permanently.

There is also a bit of grinding needed to the lower ball joint boss in order to clear the control arm, following the pattern seen in the photos below. This is necessary to prevent pinching and damaging the lower ball joint boot when the suspension is at full droop.



Figure 8 grind bottom of spindle back to 7/8" height on the inboard side



Figure 9 another view of grinding on spindles lower ball joint boss

These large calipers will generally require a 16" or larger wheel. Some 15" will fit with a little work, or a small disc brake spacer as found in wheels shops. Since the suspension is essentially 94-04 Mustang, wheels with offsets designed for that car work best. Our own car uses a 16 x 7 front wheel with a 5" backspace, mounted with a 205/55 x 16 tire. Remember that these cars were designed for a 14" wheel and tire. Extremely large tires may not have sufficient clearance without modifying the fenders. Wheel Vintique how has GT style wheels in the proper sizes for a real stealthy style.

The wheel bearings are designed to be sealed and not disassembled for service. If yours do need to be cleaned and regreased, a 36mm socket and impact wrench will remove the nut. The stacked bell washers hold the proper torque, rather than the cotter pins we usually see.

Since we are installing a much more capable suspension, you will likely drive it harder. In a unibody car, the cowl structure acts much like the center hoop in a 6 point cage, supporting the opposing forces from the front and rear suspensions. That's why convertibles flex more, lacking the roof to carry support to the cowl. (It's also one of the reasons we are adamantly opposed to Mustang II IFS conversions that cut the subrail and change the way stress is applied to the unibody) This kit still carries the front suspension loads to the cowl, as originally designed. The

diagonal firewall braces must be retained. The addition of a brace across the engine compartment from the left to right shock tower will add greatly to the chassis strength as well. since so many combinations of intakes and carb placement exist, you will likely have to make your own using round tubing and plates bolted to the shock towers.

BRAKES

You will need to change to a dual master cylinder, for disc/drum or disc/disc if you go to rear discs. Booster and master cylinder swaps are available from Master Power, or through us if you prefer. For non power brakes, a good swap is to use a 74-78 Mustang II master cylinder, connecting the large reservoir to the front disc brakes.

The 94-04 Mustang calipers used here are a little unusual. The caliper goes on slide pins on the caliper bracket, and must be mounted to the spindle as a complete assembly after the rotor is installed. We suggest that you disassemble one side at a time in order to use the other as a guide. An experienced mechanic or a good manual may be helpful as well, but they really aren't any problem once you figure them out. Figure 6 does a good job of showing how the caliper assembly mounts up to the spindles.

You will need new brake hoses, which can be 67-73 Mustang, NAPA#36959 (originally for '85 Buick Riviera) or our braided stainless hoses for more safety and style. If your 94-04 calipers are missing their hollow banjo bolts which attach the hose they can be replaced at Ford dealers, or by NAPA #82703. New copper washers are used on each side of the hose fitting at the caliper, NAPA # 1243.

If you have the optional Wilwood brakes, they are supplied with the correct braided stainless hoses. Since they attach to the caliper with 1/8" pipe thread, Teflon pipe tape must be used on the threads. The large aluminum bracket is tapped to accept the same bolts that attach the new steering arms to the spindles. The caliper now goes to the front of the spindle, bolting to the aluminum bracket on the side relieved by the milled area. Close examination of Figure 6 will clarify the assemble spindles.

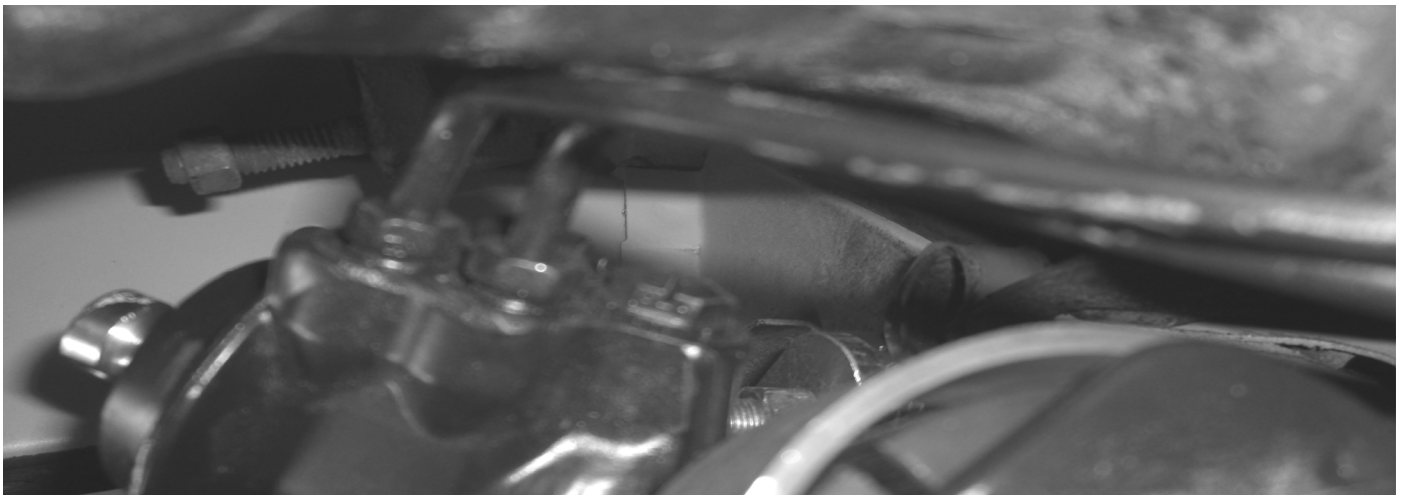
STEERING

We use the rack & pinion from a '90-'03 Ford Escort, normally in a power assisted version. Manual racks exist but are hard to find, and not available rebuilt. The NAPA # for a rebuilt power rack is 22-230, and we supply new mount bushings and straps in the kit. The rack inner tie rods must be cut off 1". There will be enough thread to still accept the outer tie rod ends.

If you bought the complete OEM parts package, the rack has already been modified, and ready to install.



It will be necessary to work with the routing of the exterior fluid transfer lines on the power rack so that they will clear the rack mounts and oil pan. We have found that a nylon tipped hammer works very well to move the lines without any kinks. The vent tube running from the left boot to the right boot needs to be rotated to a different position. The easiest way to do these steps is by mounting the rack to the K member while on the bench, rather than in the car.



The rack mounts are designed to allow you to rotate the rack & pinion slightly to ease the steering u joint connection. In order to allow this, the rack housing must be ground as shown in the next photo.



You will also use '90-'03 Escort outer tie rod ends NAPA 269-2741 or MOOG #ES-3048, which are supplied with 12mm x 1.25 jam nuts for the adjustment ends. They mount into the steering arms from the bottom with the castle nuts on the top. We have included a 12mm x 1.25 die and die handle, as the male threaded outer end of the inner tie rods must have their threads extended 1" to allow toe in to be set. Then cut a matching 1" off the end of the threads. If you ordered our completion kit, we have already done that for you.

The power steering hose fittings at the rack are a little unusual in that they seal the nut to the rack body with an O-ring at the base of the nut, NOT down inside the rack. (the O-ring must be Teflon as rubber O-rings will roll out under pressure) OEM hoses have a steel tube inside the nut with a rubber O-ring to seal between them. Even when properly tightened, they will still allow the steel tube to swivel. **DO NOT ATTEMPT TO TIGHTEN OEM SWIVEL FITTINGS SO THAT THEY WILL NOT ROTATE.** Doing so will crack and ruin the rack.

Both the return and pressure fitting on the rack are 16MM, although 5/8 -18 thread fits perfectly and is used on aftermarket fittings. The pressure supply is routed to the port nearest the U-Joint splined shaft, closest to the driver in other words. If hooked in reverse, the rack will oscillate rapidly! Shut down the engine before the reversed flow can damage the rack!

You can begin with OEM hose for '90-'03 Escorts and change the upper end of the pressure side to match your PS pump. Since the fitting size for this rack is the same as the return side on '79- '04 Mustang power rack, hose kits common to the street rod industry will work, when you are supplied with two large fittings for the rack (the Mustangs use a 9/16 pressure and 5/8 return). These kits are really nice since you can easily cut the hoses for a nicer fit. We offer the kit in braided stainless AN hose as an option. That kit has 4 different pump fittings to cover most combinations.

We supply a V shaped Borgeson U joint to connect to the rack input shaft, an upper joint to connect to the column you specify, and a length a DD flattened shaft to connect the joints. . That V joint can be pretty tight. A few passes on the rack input shaft with a flat file will help. A small flat screwdriver can also be lightly tapped

into the U joint gap to expand it just a little. With a hot rod oriented project, a tilt column is often used, and provides the easiest way to make the connection as it readily accepts a U joint. Different companies use different spline columns so be sure to identify yours. The original column and steering wheel can be retained but it is more work. You will need to cut the mast jacket outside tube so that it ends as close to the fire wall as possible. (this is necessary to minimize U joint angles) Then the inner primary steering shaft has to be cut off a little longer so that it can be machined to a DD shape to accept a U joint. You will also need to machine a Teflon bearing to center the shaft in the mast jacket, and use a 1/4" shaft collar (from the hardware Store) to retain the shaft position. A DD shaft is actually a 1/4" round shaft, with flats machined .10" from each side, leaving a .550 net shaft width.

MOUNT THE RACK & PINION

Begin with the rack extension on the RH side of the rack, prefitted to the K member, the plastic mount bushings in place, and now add the mounting straps to hold it in place. The LH and RH bushings are slightly different. The LH bushing has a flange on each side, but only in the wider section of the mating flanges on the rack. The RH one has the flange relieved on just one side to clear a fitting on the rack. The following photos will help you see the proper position of the mounting bushings. Note that the bushings are relieved for the features of the rack, the driver side one both sides, and one side on the passenger bushing to clear a fitting.

Use the 5/16NC x 1" bolts, nuts and lockwashers to complete the rack mount clamps. Tighten the fasteners to complete this step. The line that connects from one boot to the other is simply a vent to equalize pressure in the boots when you turn quickly. It is best removed during the mounting of the rack, and then replaced after. It is totally acceptable to rotate the rack boots and bend the vent line for a good fit.



Passenger side shown above



Driver side

The actual installation can now begin!

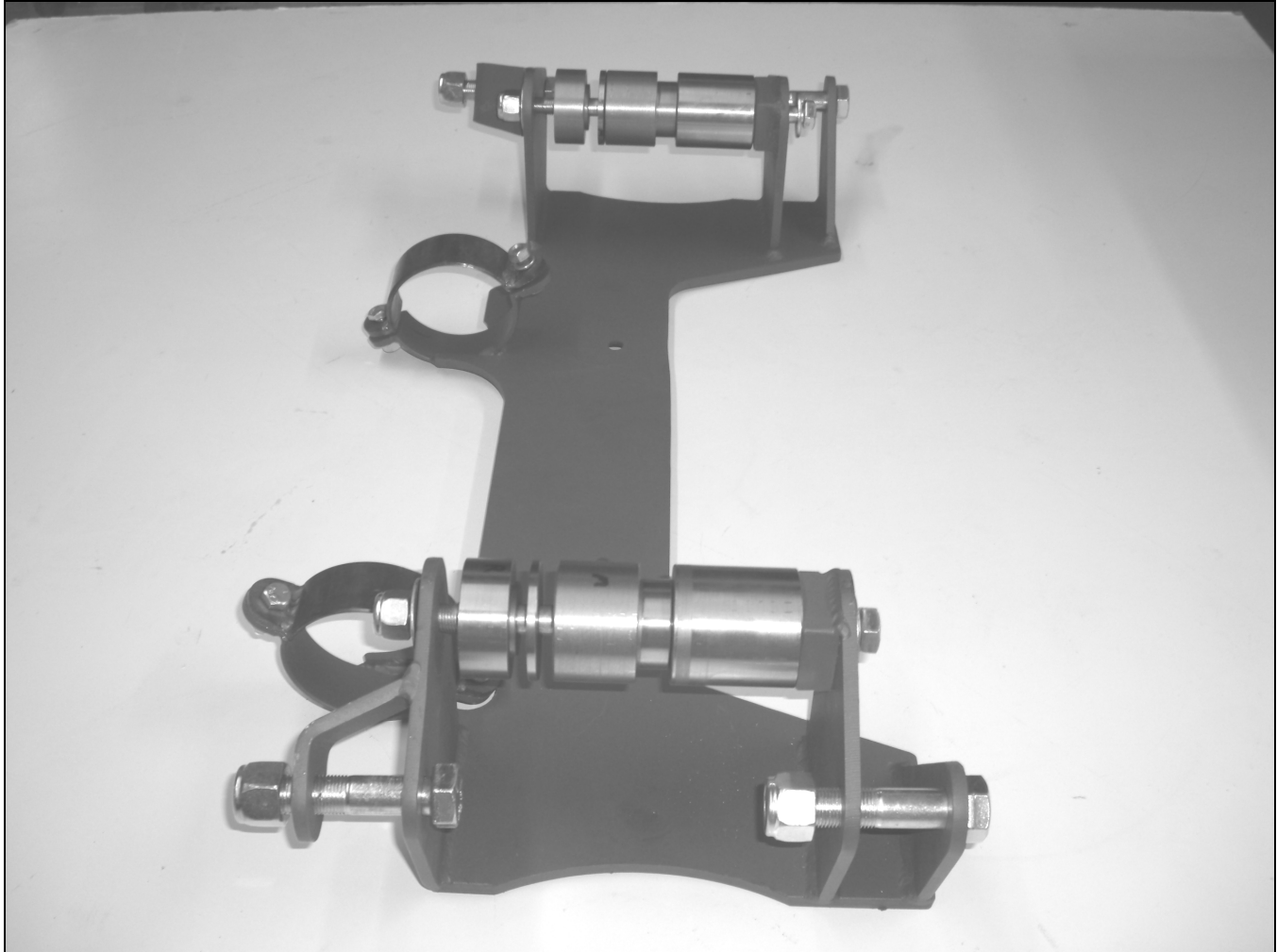
Having read all the above, and having all the parts ready, it's time to put your car on a good set of secure jackstands-not the muffler tubing cheapies! Disassemble the old suspension and steering completely. The coil springs store a lot of energy and can hurt you on the way out! They are best removed with a spring compressor, or you can gradually loosen the upper control arm shaft bolts from the body, and then use a long pry bar to ease the upper arm out of position. BE SURE to run a length of chain thru the spring and fasten those ends to keep it under control. We leave the shock in place at the lower end to help contain the coil spring.



The sway bar will be retained so now is a good time to inspect the bushings and end links, replacing them as necessary.

INSTALL MAIN K-MEMBER

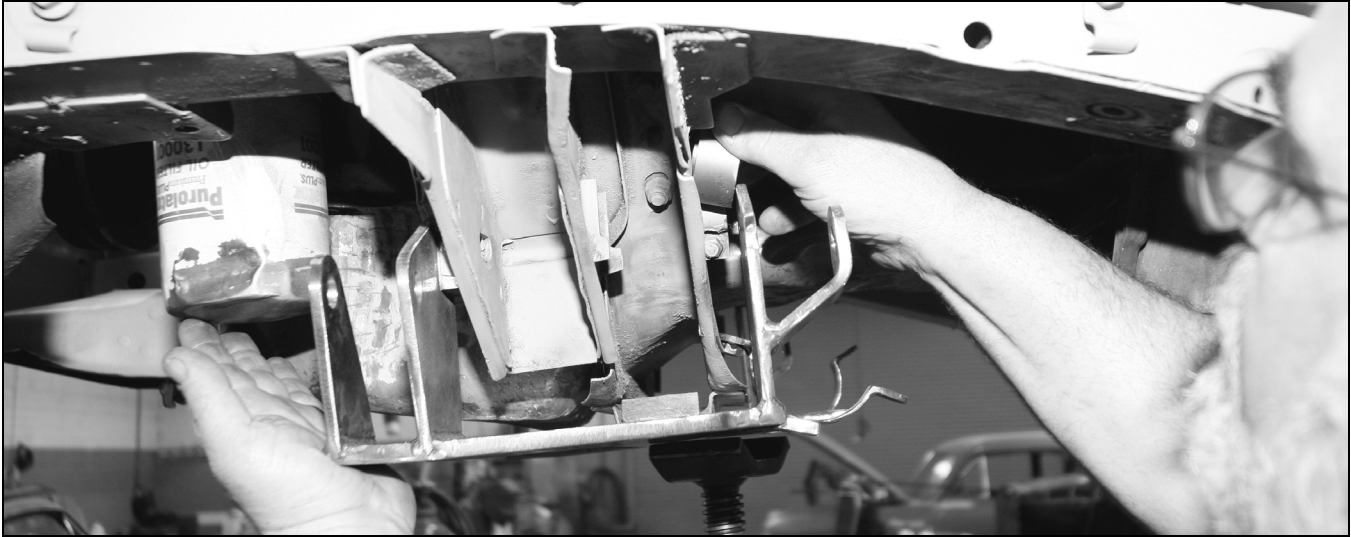
The main K member does an excellent job of mounting the control arms and rack& pinion, while tying the frame together for much improved chassis stiffness. If you didn't pre-mount the rack earlier, refer back to that section and do it now. We will use the supplied 1/2NF x 8" bolts, lock and flatwashers to fasten the K member to original lower control arm holes in the Fairlane engine mount boxes. Use a jack and some stands to hold it in place, starting all the bolts before tightening any. We have found that these holes move around a little from car to car so we made them oversize. Add the spacers on the 1/2NF x 8" bolts, starting by putting the extreme rear one first. It has to engage the original slotted hole, and is most easily done first. Then work from front to back, advancing the bolt as you proceed.



Note sequence of stepped spacers, front shown at right in the picture.

Later versions of this crossmember will have two sets of holes for the $\frac{1}{2}$ " bolt shown above, mounting the round spacers. The 66-67 cars will use the inner holes, the outer holes being for the 68-71 cars. All aother parts are the same for both applications.

The square spacer (shown welded to the front mounting tab at the right hand side of the picture above) Has been changed to a 1 $\frac{1}{2}$ " diameter x $\frac{5}{8}$ " thick x $\frac{1}{2}$ " bore round spacer, no longer welded in place. This change makes the crossmember easier to get in place on the car. Revised 11/9/10



Inserting rear spacer first.



Then add the front spacer and begin to insert the bolt.

The middle spacer is made in two pieces so that the larger one can be installed first, allowing it to clear the flange on the stock lower control arm mount. Then add the thinner spacer to take up the rest of the space.



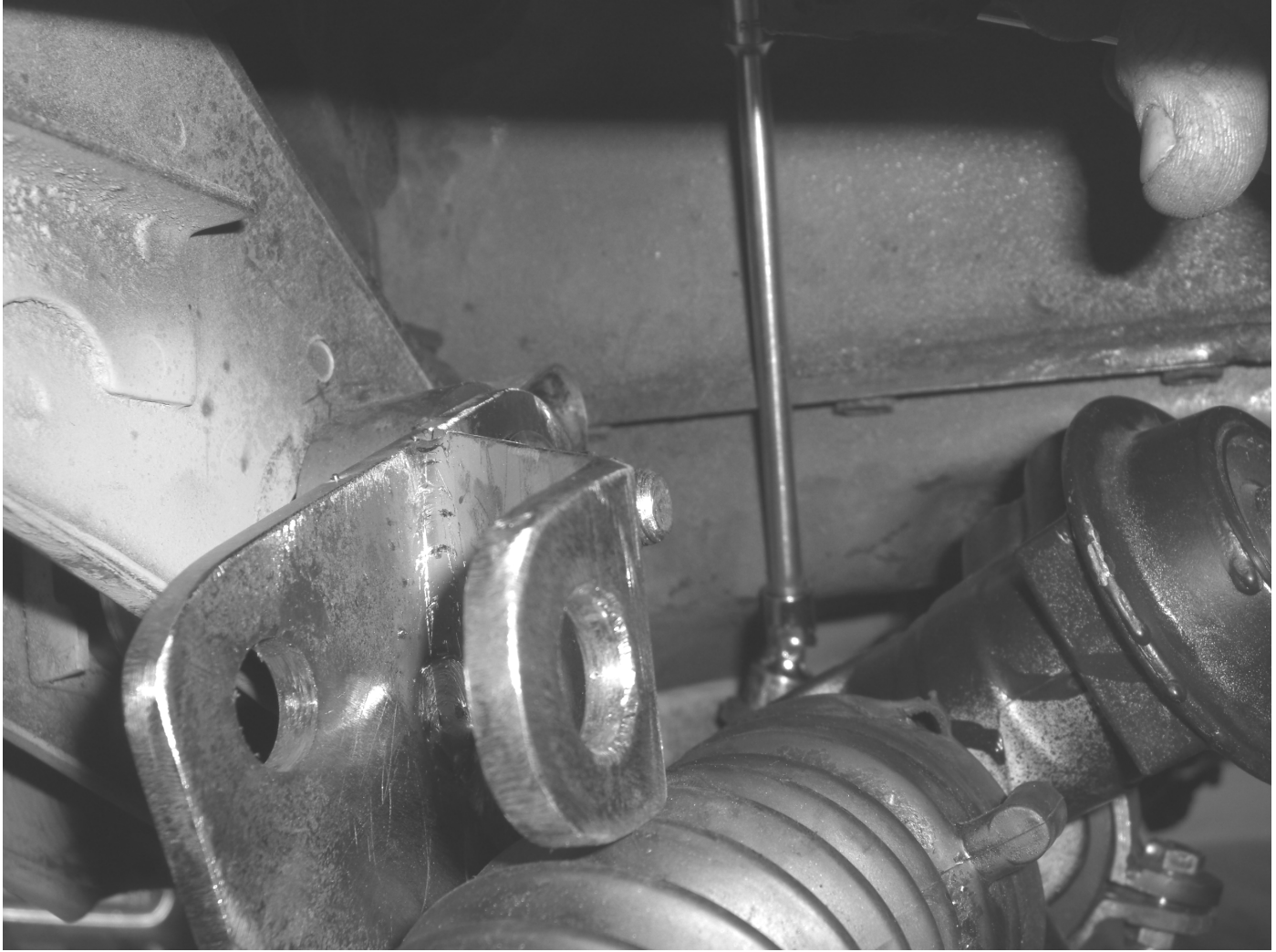
Finally, add the rear spacer, being sure that the machined step properly fits into the oval hole in the original crossmember.

The small stock crossmember must be drilled to accept the 2" x 8" clamp plate. It is tapped to accept the two 3/8 x 1 flat head socket head bolts coming thru the main plate. Drill thru the mainplate with a 3/8" drill bit, guiding on the holes countersunk for the flathead bolts. Then insert the clamp plate within the stock cross member, lining up the tapped holes and adding the flathead socket head bolts. Once all the bolts are started and then tightened, the K member will be securely mounted.



MOUNT THE RACK & PINION

Begin with the rack prefitted to the K member, the plastic mount bushings in place, and now add the mounting straps to hold it in place. It seems that every car has a couple bolts that are hard to get at. On this one, it's the left hand upper rack clamp bolt. We have welded the bolt in place at the driver side upper mount to make it easier to accomplish. Lay the strap over that bolt and add the nut and lock washer. Then add the other strap and bolts, using the socket head 5/16NC x 1 bolt thru the hole in the main plate on the passenger side for easier access. Tighten the fasteners to complete this step.



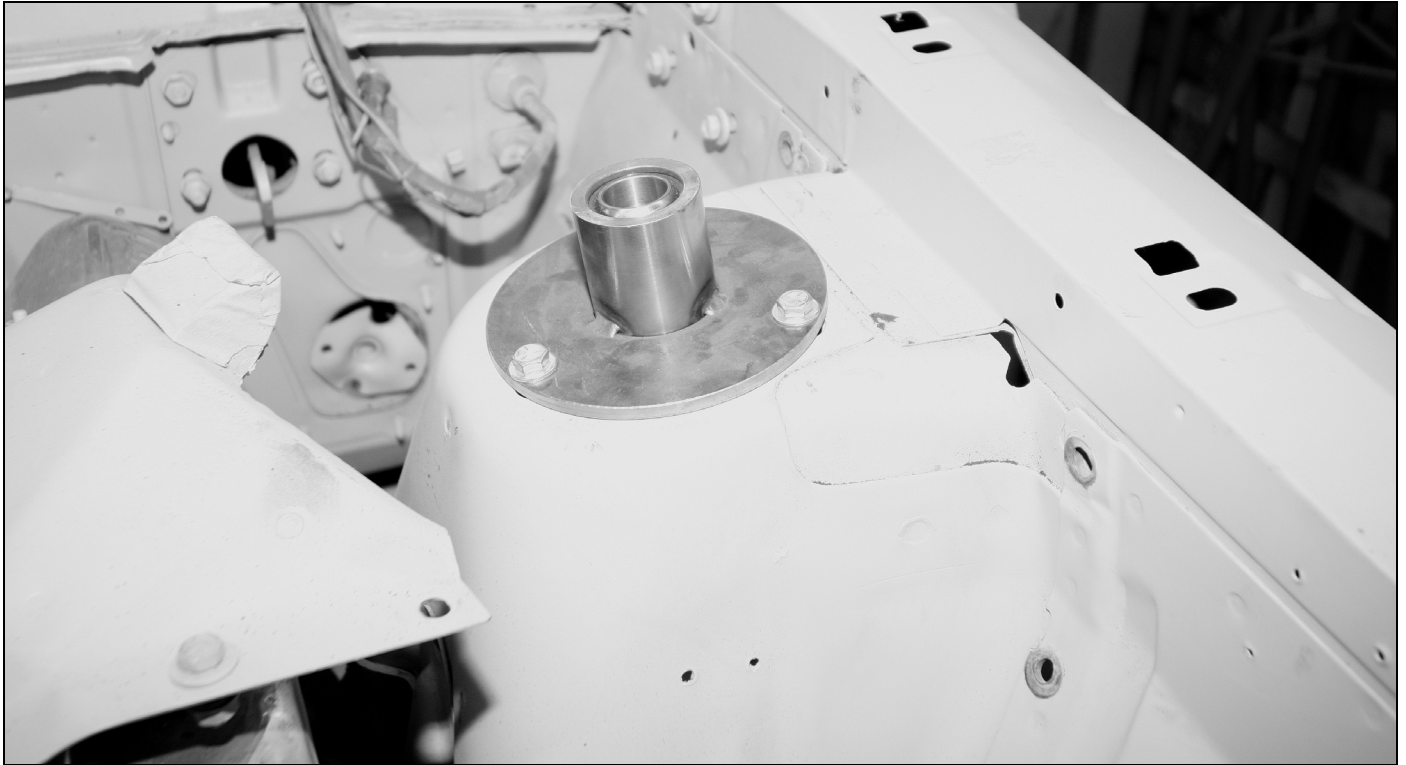
Tightening the driver side upper rack mount bolt with a 1/4" socket, universal, and extension



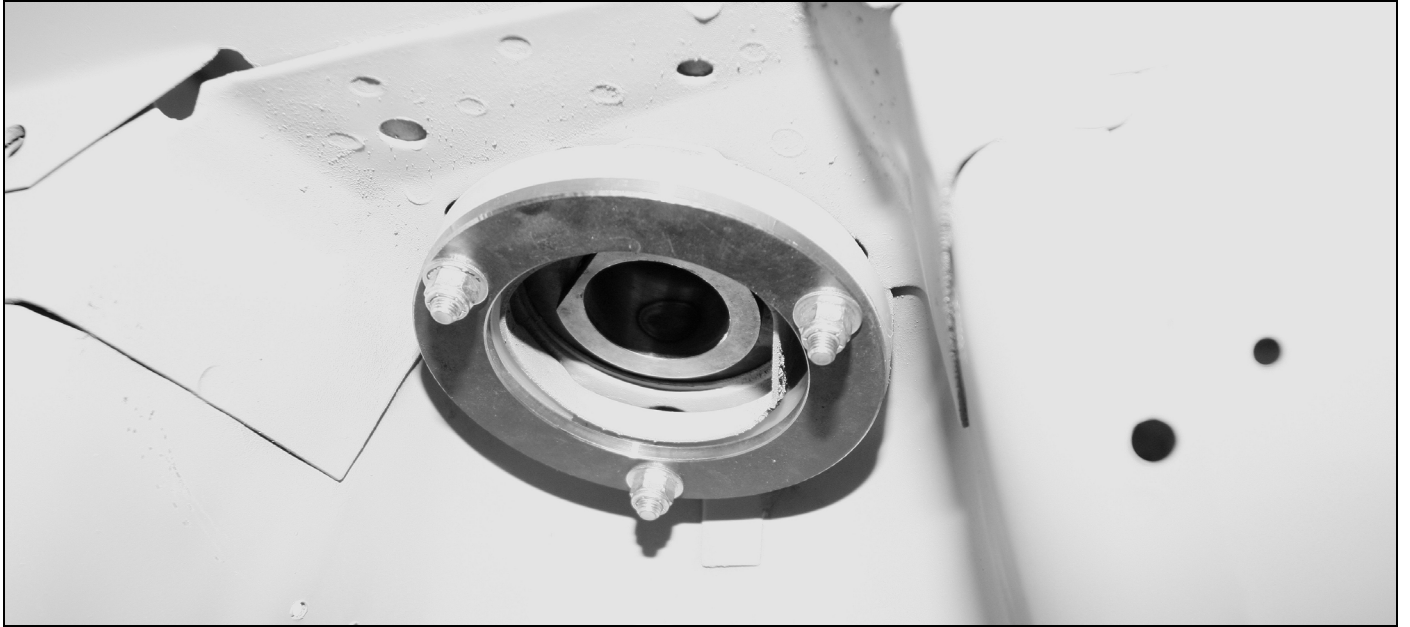
STEERING HOOKUP

The steering hookup can be the trickiest part of this installation due to fairly tight U joint angles. We'll tackle it now while little else is in the way. Begin with the column you have chose mounted in place. Add the U joints to the bottom of the column and to the rack input shaft. We occasionally find a very tight fit at the rack. A small screw driver tapped lightly into the split U joint collar will open it enough to slide on more easily. The u joints will accept angles up to 40 degrees to make the connection. It is helpful to bend a piece of coat hanger wire to that 40 degree maximum angle and use it as a comparative gauge to the actual shaft. The connecting shaft has been made long to help you get your particular combination right. It is important that the shaft enter the U joint exactly 3/4". More can cause the joint bearing spider to interfere, and less will be unsafe. A nifty trick is to put a small punch mark at the 3/4" point so you can see where you are. It's not a bad idea to mock it up with a wooden dowel if you are unsure of the needed length. Be sure the steering turns freely with no "lumps" or binding, and we're done.

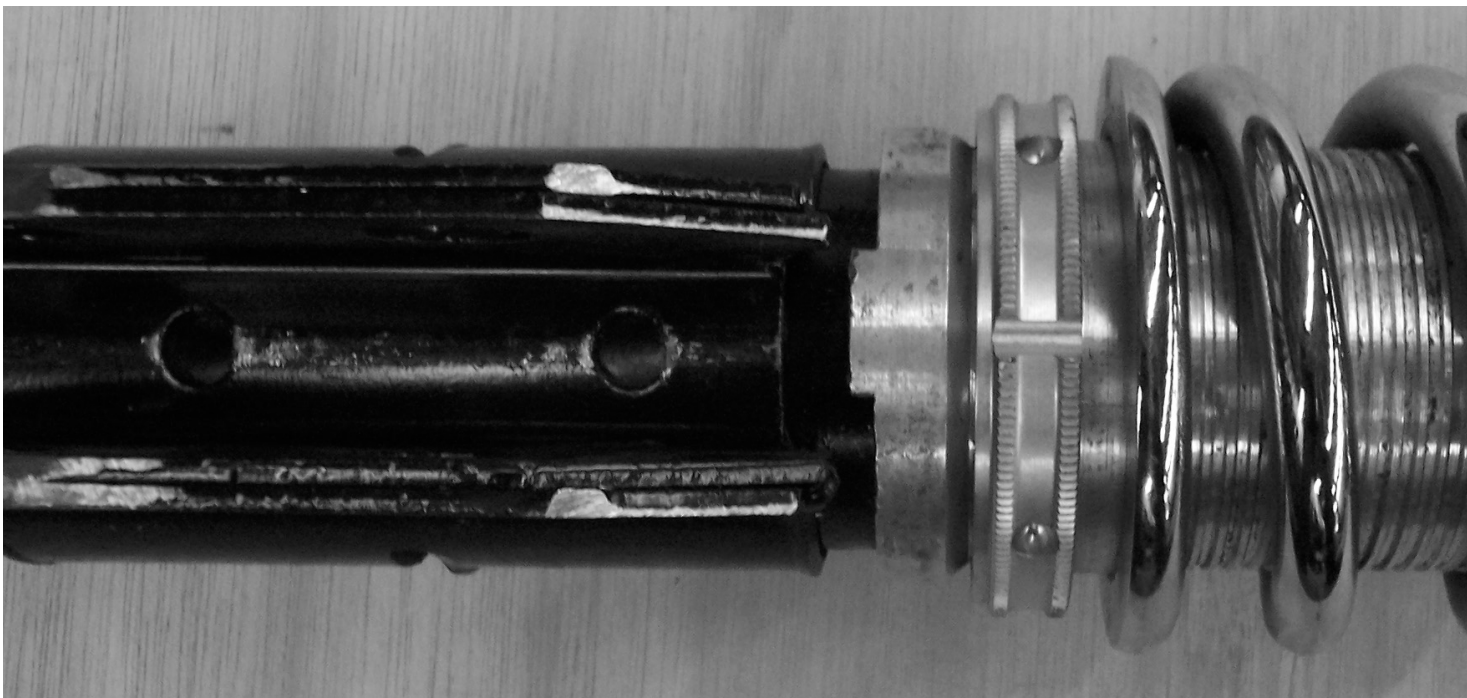
SUSPENSION INSTALLATION

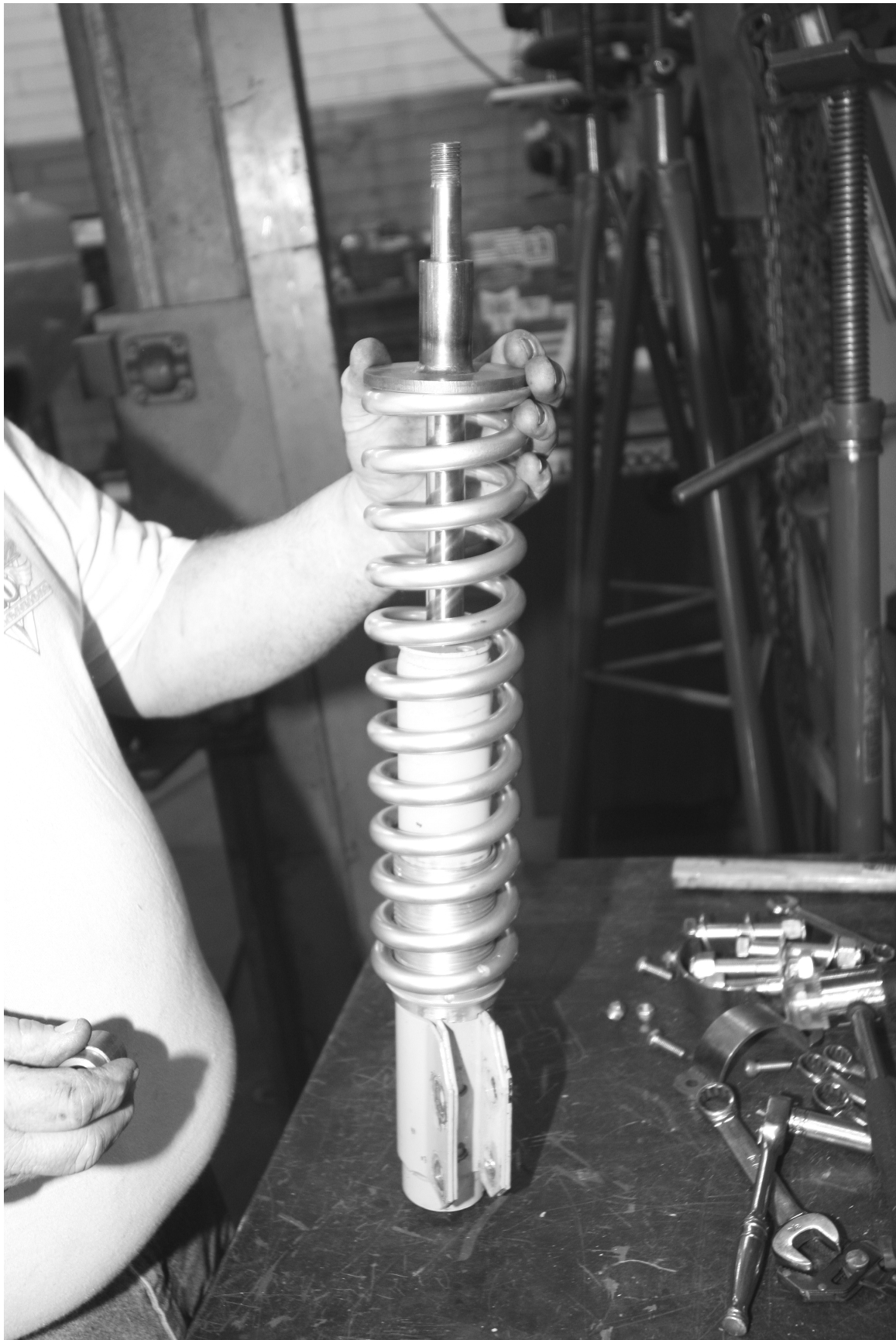


Start the suspension installation by mounting the top bearing plate assemblies. The lower plate goes under the Fairlane upper shock mount. Drop the 5/6NF x 2 bolts and washer in from the top, with the bottom flat washers and Nyloc nuts holding it all together. The plastic cup is used to seal out water after final assembly.



Slide the threaded aluminum spring adjustment collar over the shock strut body. Note that the tab engages the spindle mount bracket to prevent rotation on the strut. Begin with the adjustment nut all the way down for no spring preload. The spring then slides over the strut, followed by the shorter stepped bushing that engages the top bearing. Add the stepped upper spring seat on top of the spring, with the 1 1/4" long stepped bushing on top of it. That bushing will engage the inside of the 1" bearing in the top plate. Expect to need a little upward push to slightly compress the coil spring as you raise the strut assembly into place, guiding the upper strut shaft thru the top bearing. Note that the shorter 11/16" bushing goes on top, after you insert the assembled strut package up thru the top bearing. Add the strut top nut next, using an impact wrench as an easy way to tighten it.







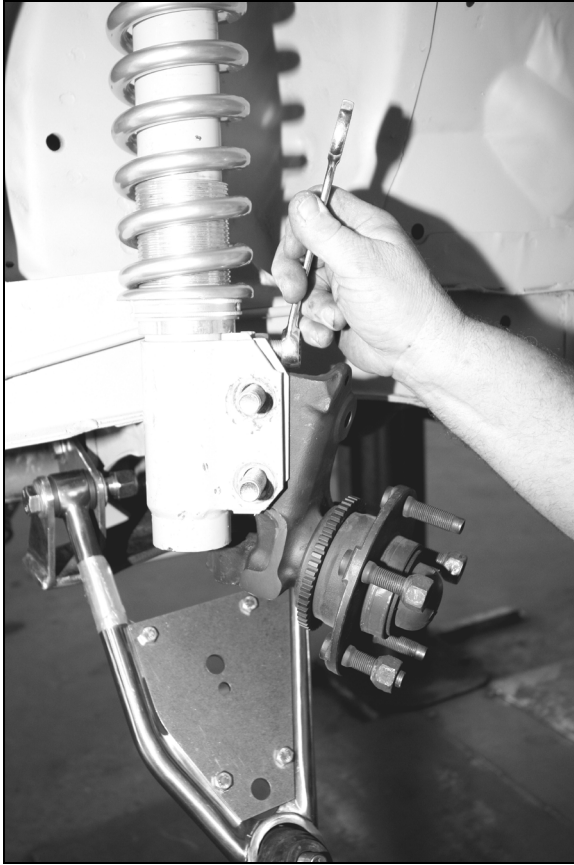
Some brands of shock struts have a slightly shorter thread for some reason. We supply a 5/8 split lockwasher to take up that gap, as seen below.



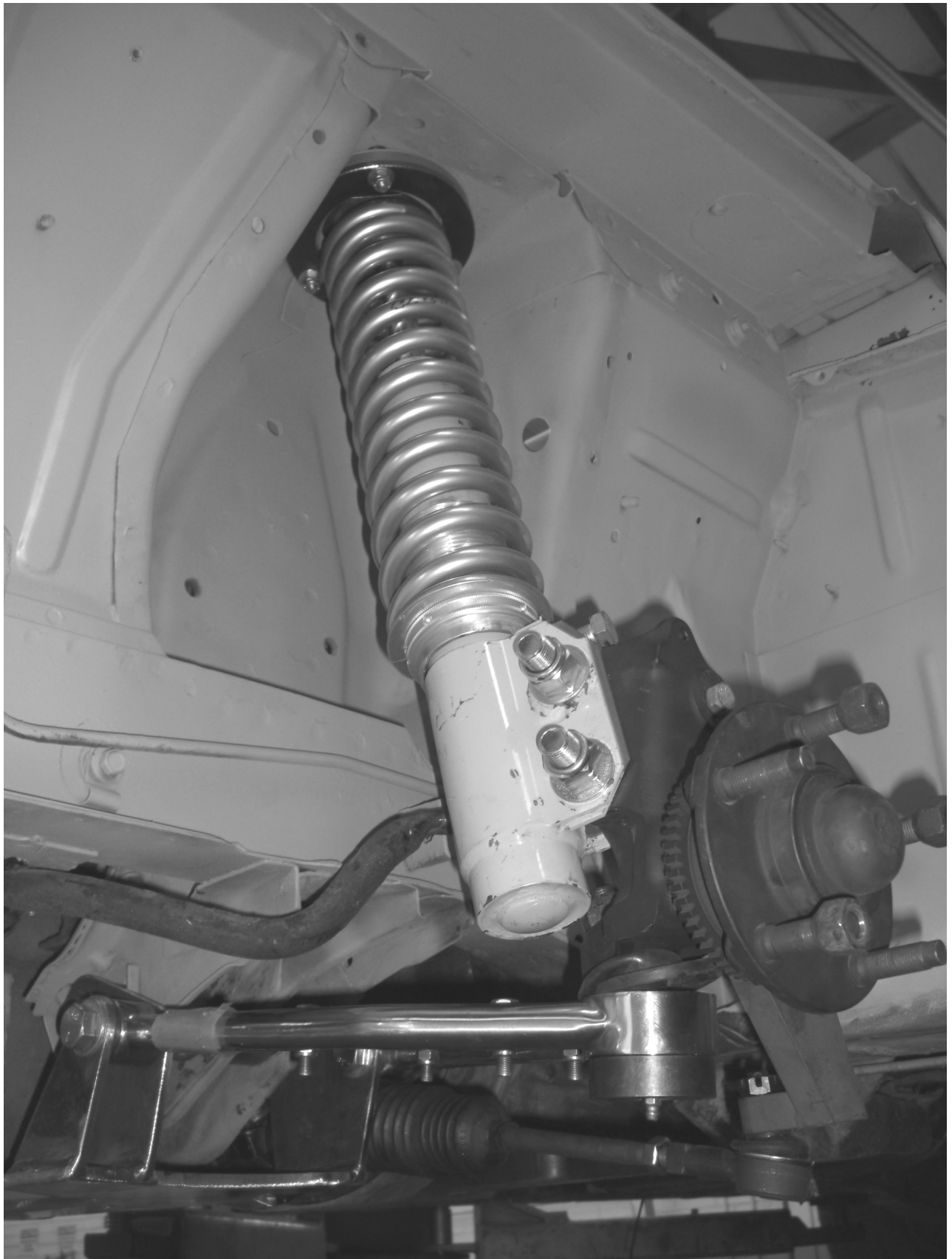
The lower control arms are added next. (shown with optional chrome lower control arms...TIG welded steel arms are standard in the kit) They install with the ball joint nearer the front of the car than the rear. In other words, with the longer wheelbase (matching the stock wheelbase).



Support the lower arms and add the spindles to the lower ball joints. The 5/8NF x 3 bolts are inserted from the back with the Nyloc nuts to the front. No cotter pin is used on the ball joint nuts, so an impact wrench works well to get proper tightening on them. If you lack the impact wrench, be sure to retighten these nuts once the car is on the ground, providing enough resistance to allow a good snugging up. A 24mm socket is required, with 100 pound-feet of torque.



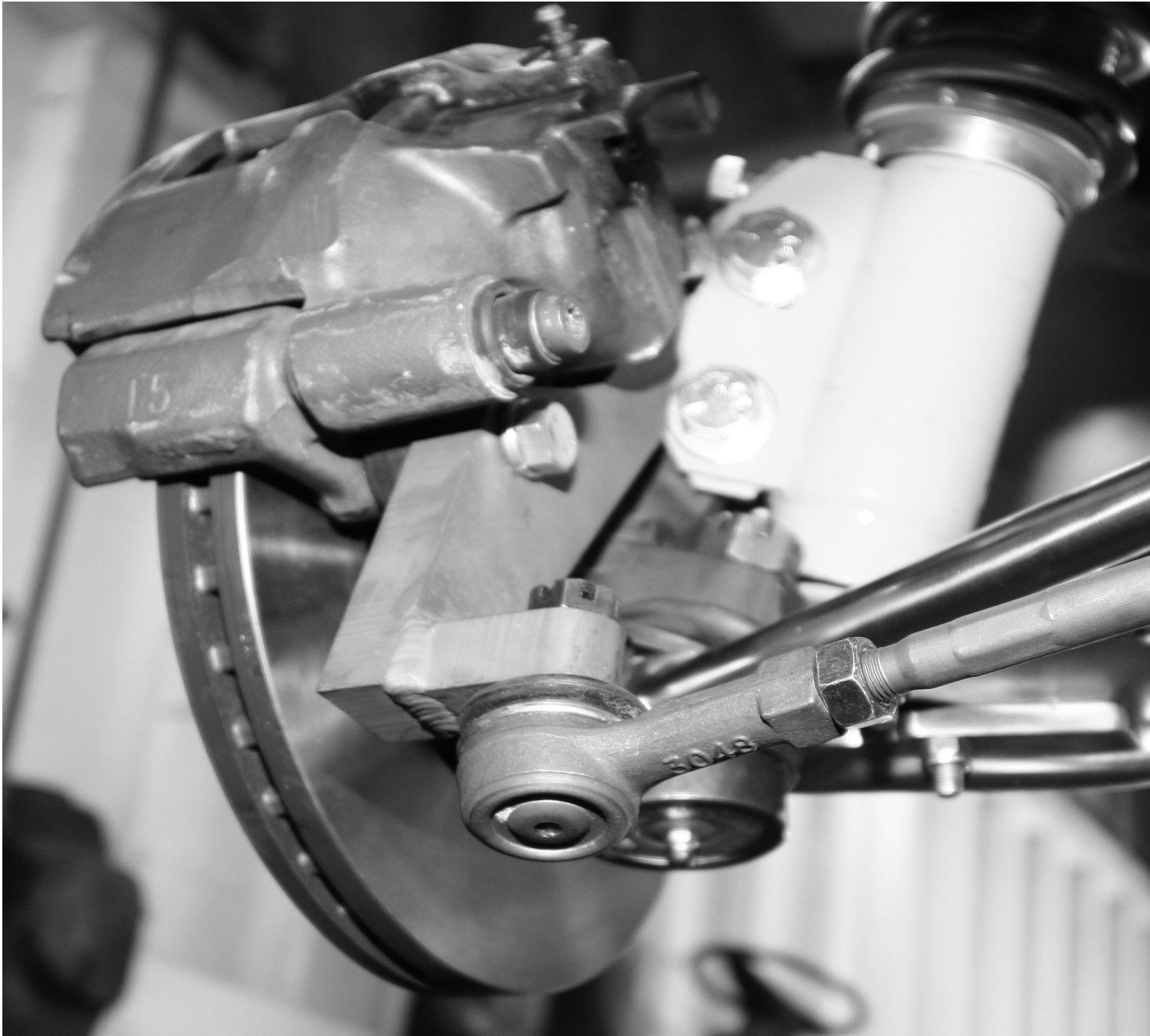
Now attach the spindles to the strut assemblies, using the 1/8" thick shims/camber adjuster assemblies. Note that the head of the 5/8NF x 3 strut to spindle bolts will be to the rear, with the nuts away from the caliper toward the front of the car for clearance. Torque the bolts to 100 pound-feet.



The sway bar can be reinstalled now. You will see a 5/8" hole on the lower arm plate that will receive the lower end of the sway bar link.



Now go to the rear side of the spindles and add the rotors, calipers, and brake hoses. The final step is to connect the outer tie rod ends to the steering arms, setting the width for zero toe in. If you missed the earlier instruction to use the supplied die and handle to extend the male threads 1" and then cut off a matching 1", you will not be able to set the toe in. Just estimate the toe in for now. It's important to keep the number of exposed threads the same on each side so that the rack will turn equally left and right.



Bleed the brakes as usual, and check the position of the brake hoses for any possible damage from interference. Remember that the bleeder screws must be on the top side of the caliper!!! Set the car on the ground and see how the coil spring adjustment looks. You want the lower control arms roughly level when properly set. To adjust the nut, raise the car to take the load off the springs and use the wrench to turn the nut up to raise the car. A little spritz of WD-40 penetrating oil works very well to lubricate the aluminum parts and prevent galling the threads.

ALIGNMENT

The preferred alignment specs call for 1/8" toe in, and zero to .5 degree negative camber. The caster is preset as with most strut suspensions.

If your alignment shop has any difficulty getting proper camber settings, the spindle to strut bolts can be loosened and their angle shifted. In some cases, as with many types of lowered strut suspensions, the upper bolt holes on the strut mount tabs can be elongated beyond just round. In fact many aftermarket performance struts already come with this slotted feature. Our combination strut to spindle spacer/camber adjuster will aid you in setting and holding the camber. To get your car close enough to go to the alignment shop, use a simple level to set the wheels vertical, with all the weight in place and the coil spring adjustments made.

Recheck all bolts for tightness and hoses for leaks and clearance after your first test ride. Enjoy your new suspension! You'll find it much more responsive and controllable than ever before!





These are the OEM parts required to complete the installation. They are typically supplied by the installer, or as an optional package with the Fatman kit.

PARTS LIST FOR 66-71 FAIRLANE/TORINO STRUT SUSPENSION OEM PARTS

(2) '79-'93 Mustang struts/shocks NAPA #201828

(2) '94-'04 Mustang spindles with original steering arms removed, and lower ball joint boss ground per instructions

(2) '94-'04 Mustang hubs with greased bearings

(2) '94-'04 Mustang new rotors

(2) '94-'04 Mustang calipers pads and brackets

OR

(2) #FSS-WWA billet aluminum caliper brackets with (4) 3/8NC x 1 1/4" bolts with flatwashers and split lockwashers

(2) #120-6805 Wilwood calipers and #15Q6824K pads

(1) SS braided brake hose kit with Metric banjo bolts

OR

With -3 x 1/8 NPT adaptors when using Wilwood calipers

(1) '90-'03 escort rack and pinion (power NAPA #22-230 or manual NAPA #24-2646 per order)

With outer tie rod ends NAPA 269-2741 or MOOG #ES-3048, with inner tie rod ends shortened per instructions