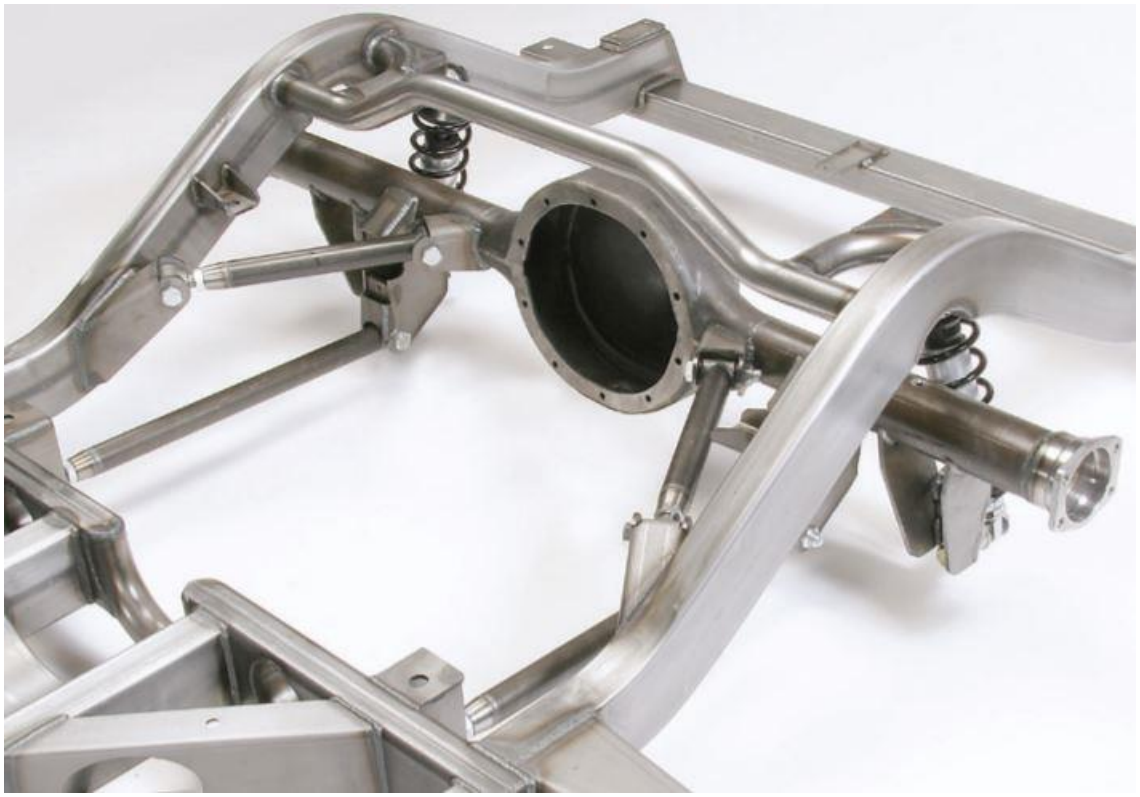
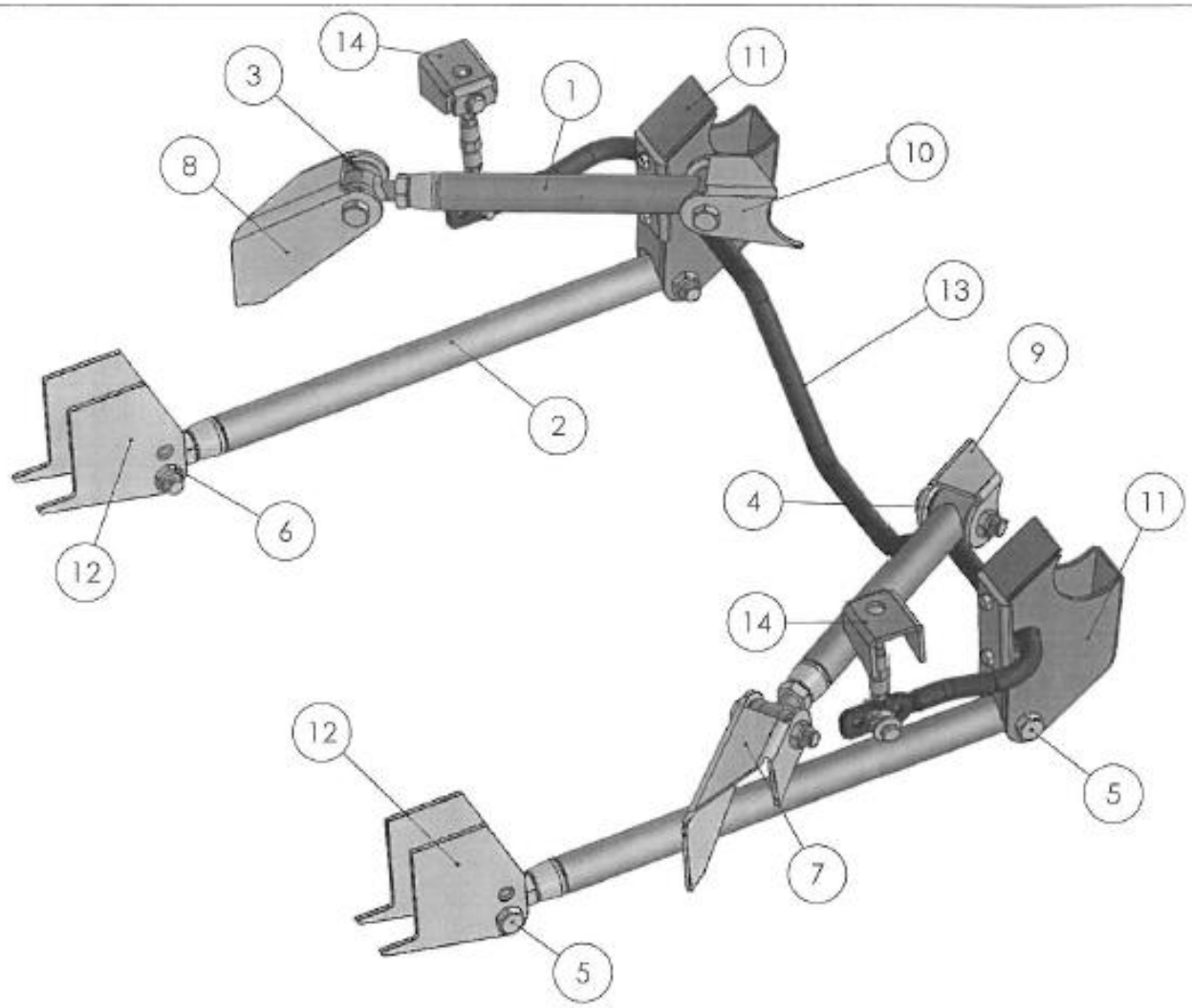
Morrison 4-bar triangulated rear end kit for Tri-Five Chevy



This is a supplement to aid in the installation of the Morrison 4 bar kit which has been adapted to the stock 1955-1957 Chevrolet passenger car frames. This guide references a 1956 Nomad, but your frame may be built differently with slight modifications. Chevrolet used three different chassis' and there are minor differences in each one, convertible (X frame), sedan and wagon. When adapting modern afterpart parts to a chassis that is over 60 years old there will be several issues, mainly welding on such an aged chassis. The sheet metal thickness on this frame is only 13 gauge or .090 so it's easy to blow through if caution is not used.

We have used screen captures of the current 2019 Morrison catalog to aid in the views necessary to understand how the pieces work together. For further information and specific views, please refer to the included Art Morrison Engineering Drawings that provide specific details, dimensions and angles.



ITEM NO.	PART NO.	DESCRIPTION	QTY
1	14154511	TRI 4/B UPPER BAR	2
2	14154512	TRI 4/B LOWER BAR	2
3	89890800	POLY RH R/E ASSEMBLY 5/8X3/4	4
4	89890850	POLY R/E BUSHING KIT	4
5	70711250	5/8 X 3" NF GRADE 5 PLATED BOLT	8
6	71711200	5/8" NF NYLON THIN NUT	8
7	14154585	TRI 4/B SIDE FRAME MOUNT BRACKET LH	1
8	14154586	TRI 4/B SIDE FRAME MOUNT BRACKET RH	1
9	14154570	TRI 4/B UPPER HOUSING MOUNT BRACKET LH	1
10	14154571	TRI 4/B UPPER HOUSING MOUNT BRACKET RH	1
11	14154560	TRI 4/B LOWER HOUSING MOUNT ASSEMBLY	2
12	32555626	TRI5 4/B FRONT FRAME MOUNT BRACKET	4
13	14154643	TRI 4/B ADJUSTABLE SWAY BAR 32-1/2" KIT	1
14	14154522	TRI 4/B ADJ. SWAY BAR FRAME MOUNT	2
NS	14154582	1-7/8" X 12" X 1/8" UNIVERSAL PLATE	2

MORRISON PERFORMANCE AM SHOP

Tri-5 Triangulated 4/B Unwelded Kit Bill of Materials

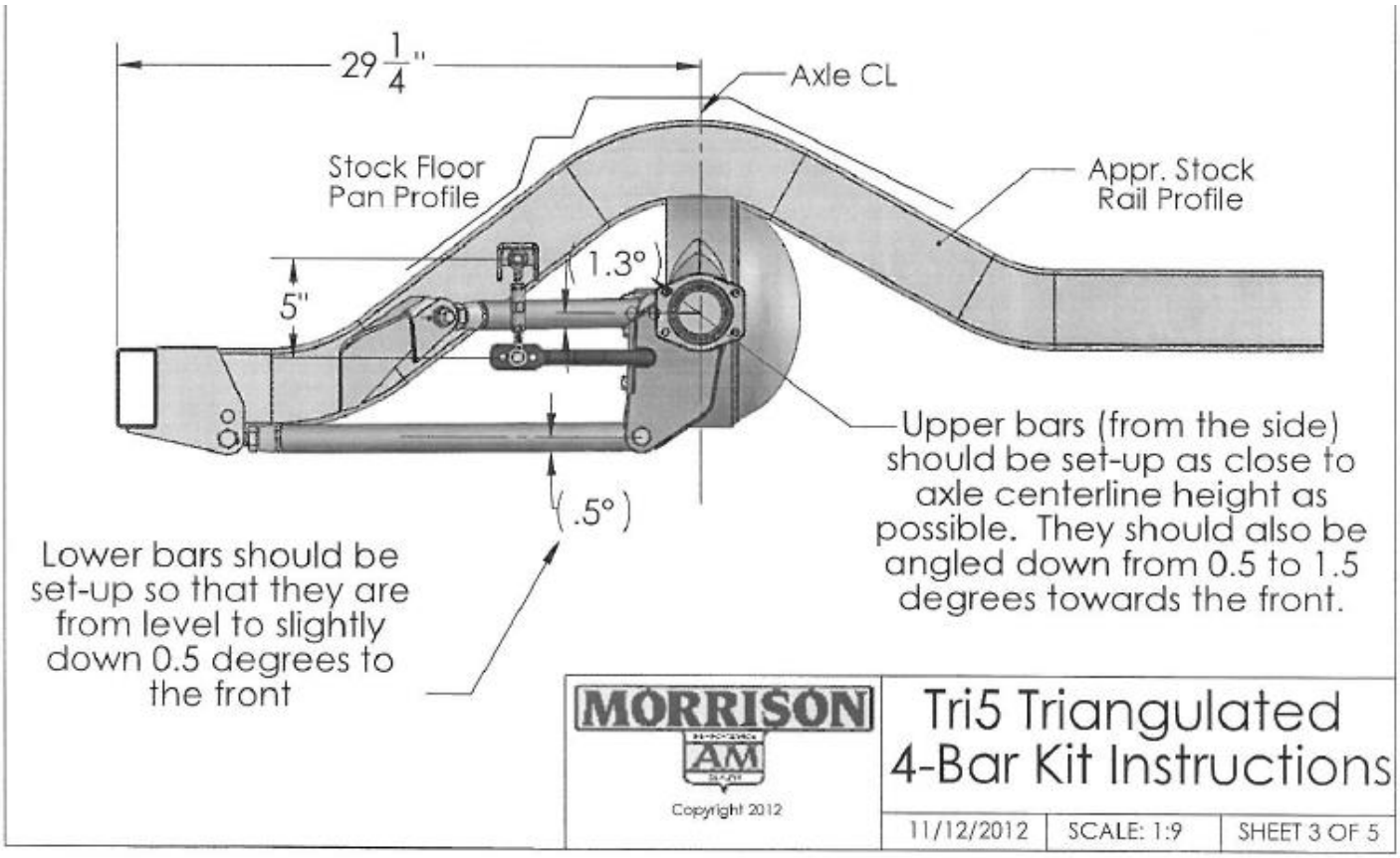
11/12/2012	SCALE: 1:6	SHEET 2 OF 5

Tools needed:

1. Transmission Jack and Jack stands
2. Digital magnetic protractor or digital level
3. 220 V Mig Welder capable of handling 1/4” thick material or thicker
4. Mini-grinder that includes cut-off wheels, grinding wheels and sandpaper flap wheels.
5. Assorted large sockets up to and including 15/16ths.
6: Drift or assorted tapered punches to add in aligning bushings
7. Welding Vice-grips or metal clamps
8. 4’ spirit level
9. Sawzall or reciprocating saw
10. Assortment of normal mechanics tools

We started with a complete rear end housing that is designed for a Ford 9” inch third member. We also requested that all the brackets and shock mounts be welded in place. This is the easiest approach to installation since the factory has already calculated the necessary angles and locations. If you’re going to reuse an existing rear end, you’ll have to weld all the brackets to the axle housing.

This view shows the bare housing with one side of the upper and lower bars shown as reference. Measure the width of your frame to locate the front crossmember, ours measured 34 3/4”. The front of the crossmember is 29 1/4” from the centerline of the wheel arch on the frame. We used a plumb bob and approximated the centerline of the wheel arch and then measured back. Since this is an arbitrary point, we used factory holes and rivets on the frame to reference our location so that both sides matched.



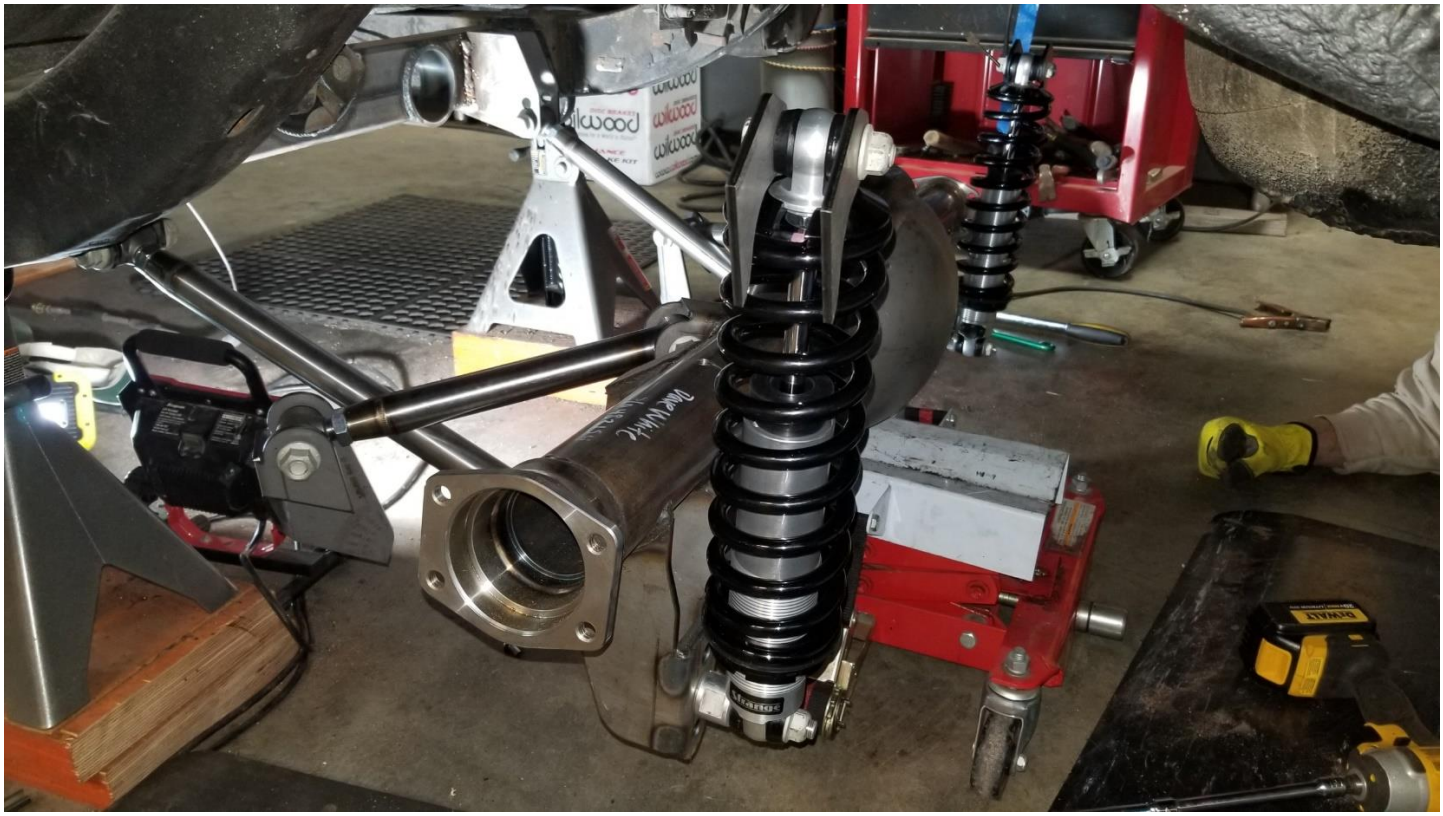
Take the 2” x 4” large crossmember with welded 1/2 donut and 3” exhaust holes (#33330143) and slide it up against the axle housing, with the half round facing up. Center it and then calculate the amount to remove. With a chop saw, Sawzall or cutoff wheel, cut the crossmember to length taking equal amounts off each side. With a grinder, clean up the cut lines and prepare for welding. These welds are critical as most of the torque is transferred to the lower bar.

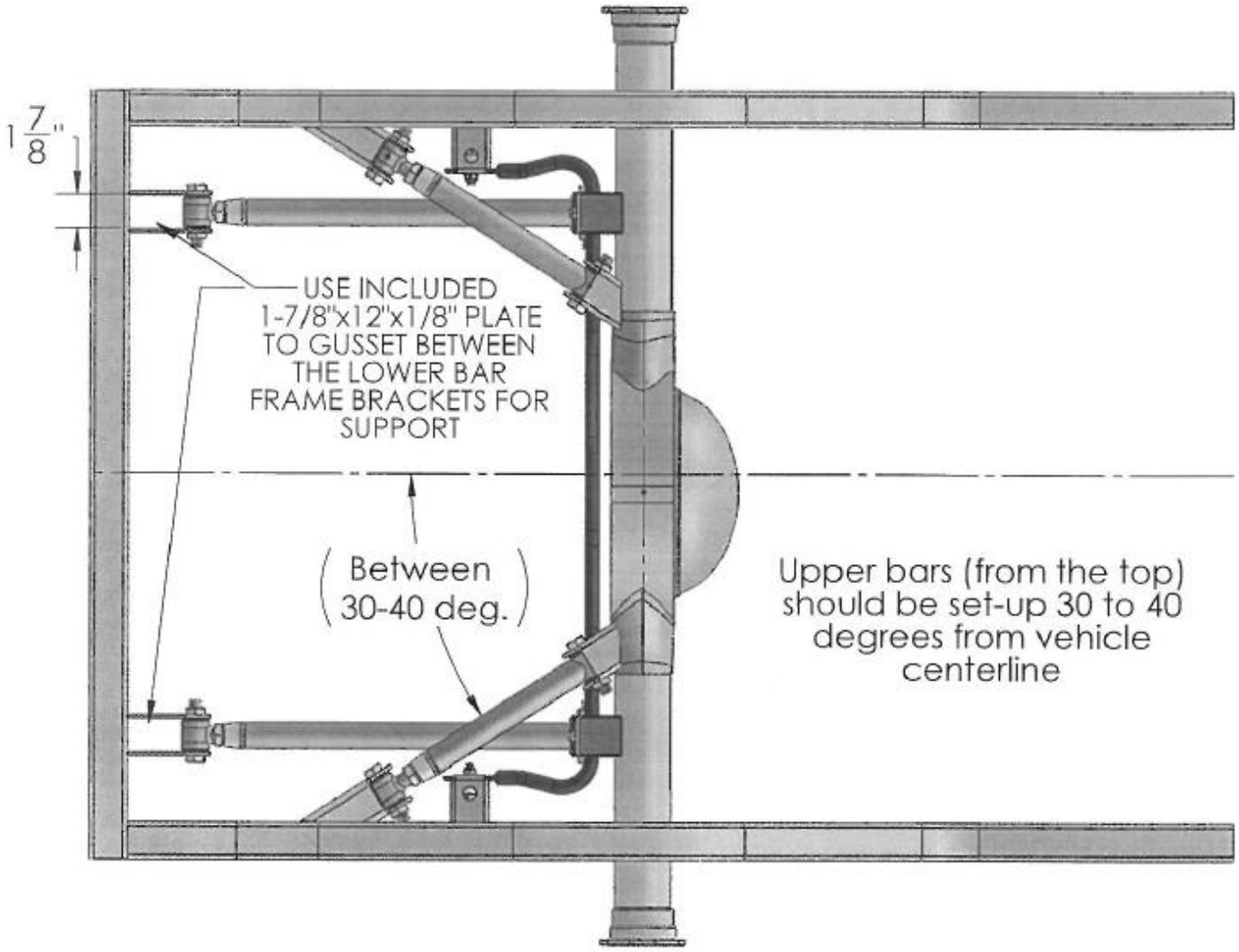
Use the flap wheel on the grinder and remove all undercoating, paint or debris that has accumulated. Use a solvent or cleaning agent to remove as much as possible to avoid contamination. Go back over the area again with a fresh flap wheel to make sure you get clean bare metal.

Install the lower bars on both sides, insert the bolts but don't tighten all the way, leave plenty of slack for now. This will give you a rough idea of how your rear end will line up.

Assemble the upper arms and loosely attach to the upper mounting bracket on the axle assembly. Also add the frame brackets and attach with bolts.

You can add the shocks and mounting brackets at this point, but it's not necessary. Slowly jack into place, making sure there is clearance for all parts. The upper bars are difficult to position at this point, so carefully attempt to slide them up against the frame. In our case the upper arms were too long, so we reduced their length by 1 ¾" by cutting off the ends and rewelding them (see photo below).



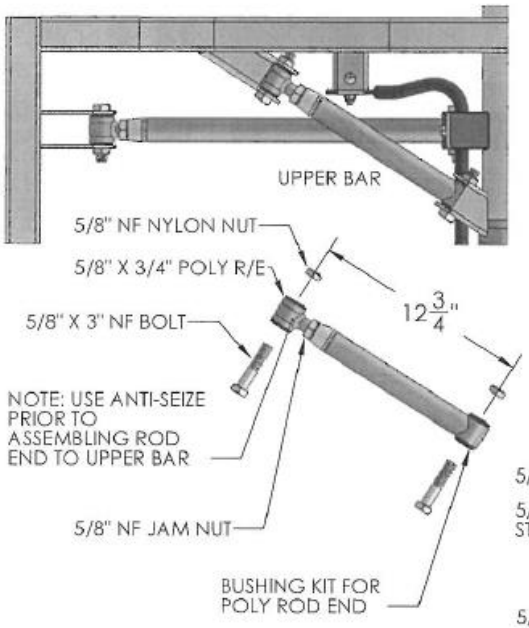


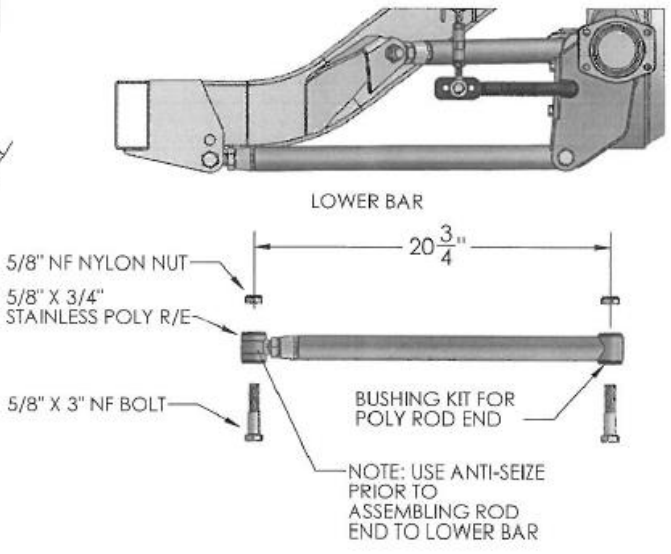
The challenge at this point is to try and maintain your angles called out on sheet 3 from above. The lower bars should be from 0d to -.05D, the upper bars should be between 0.5 -1.5d and the axle housing face should be 90d.

This is where a magnetic digital protractor or angle finder is essential. Measure the angle of your frame and try to get it as level as possible, just make sure you use this included angle when calculating the rest of the angles. Take your time and work on each piece until you get close to the right angles, it takes a while. We chose to use clamps to hold the upper brackets in place until we got close to where we wanted to be.

Our preference would have had the upper bar end use an articulated spherical joint (Johnny Joint or equal) to take up any discrepancies with the bracket fitting up against the frame. You're working on a 60+ year old frame that may have suffered any number of issues over the years, so there is bound to be issues regarding how it fits.

These photos show our first attempt using the stock upper arms. You do not want any deflection on the bushing if possible because they will wear rapidly and deteriorate (shown on the left above). We also had a hard time getting the upper bracket to lie flat against the frame, grinding may be necessary to get things to line up properly. Once we reduced the overall length of the upper arm the bracket fit much better. We also elected to tack weld the nut on the bracket to make it easier to thread in the bolt because there is very little clearance up against the frame.



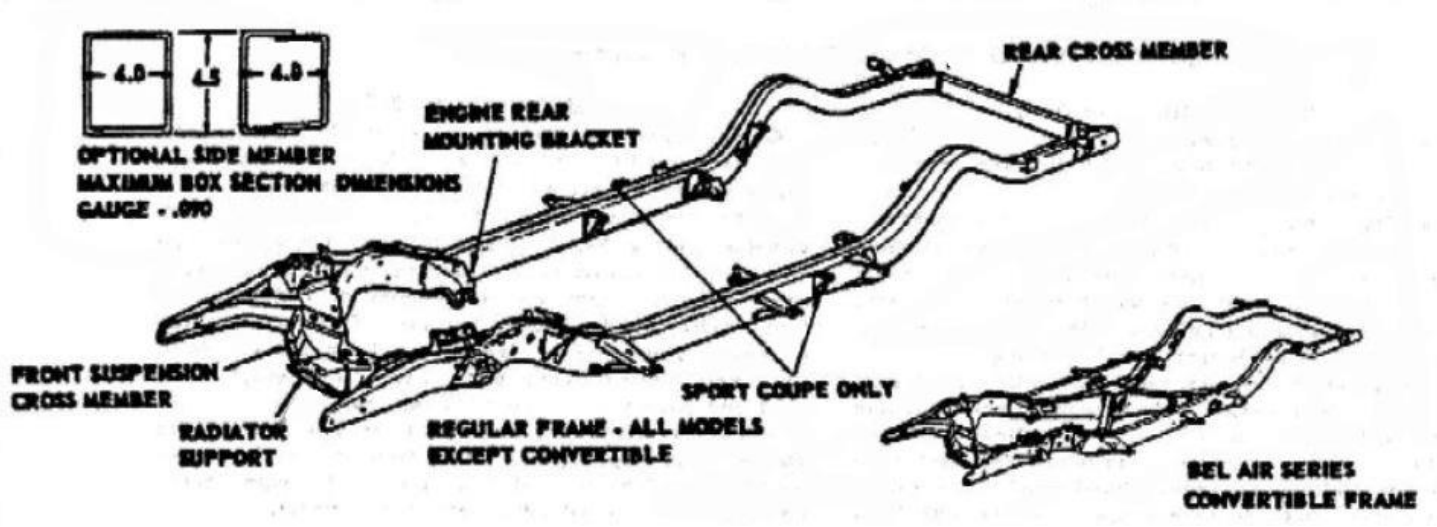


Once the upper bars are tacked into place, assemble and install the rear shocks and mounting tabs onto the lower shock mount. Grind away any existing frame undercoating or paint and prepare for welding. The upper shock mount location is undefined in terms of geometry, make sure the angle of the shock

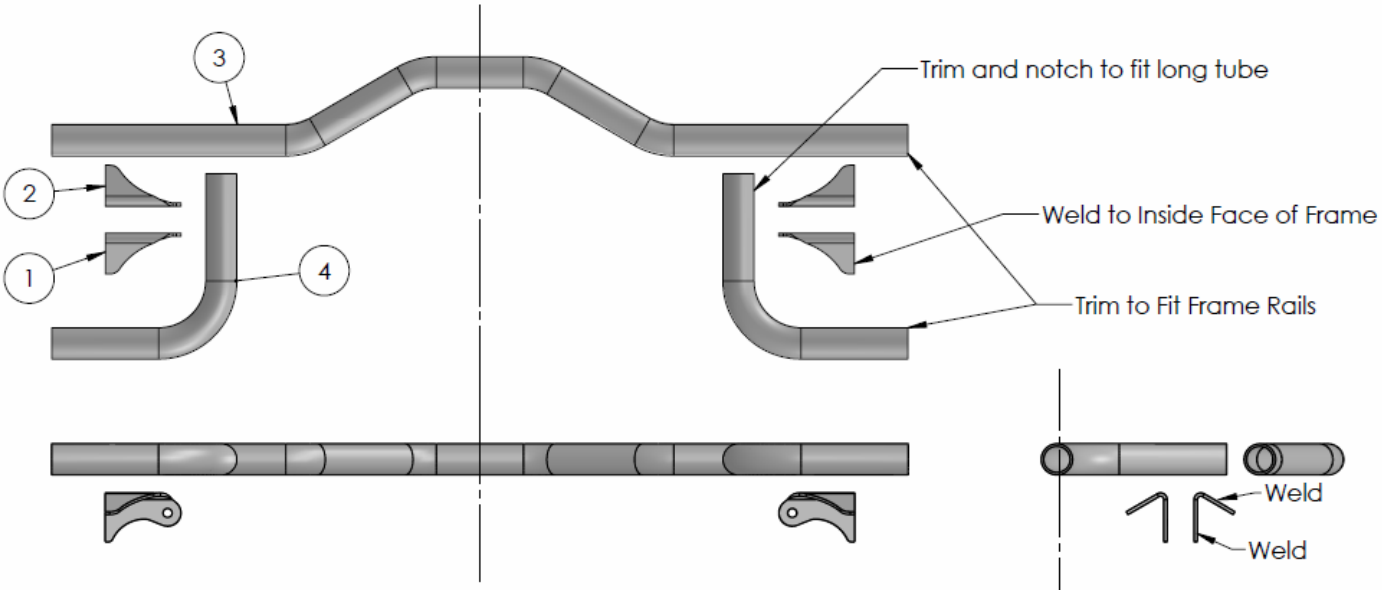
ce springs provides sufficient clearance to clear the bracket.

Raise the rear end up to where the shock brackets lie flush with the bottom of the frame. Make sure that both shock springs are in the same position, about 1/3 the way up the threaded portion. There are three lower shock mounting positions that will allow you to lower or raise your ride height.

Lay the shock back enough to clear the lower bracket, then tack in place.



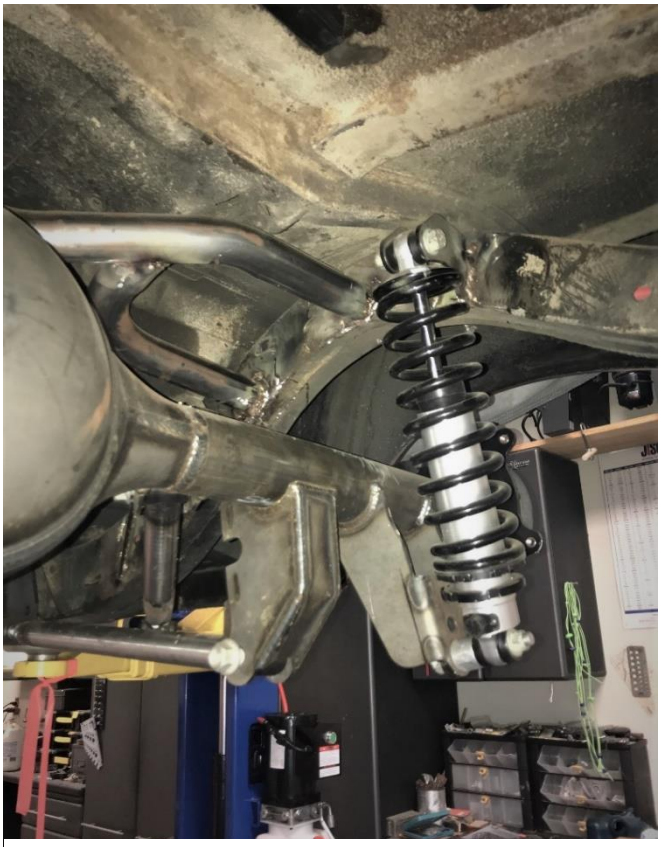
After everything is tacked into place, go back several times and verify that your angles are as close as possible to the design angles shown on Morrison's engineering drawings. Each movement on each piece will affect all the others. Verify the centering of the axle stubs vs your body to make sure your wheels will clear. Once you are satisfied with the bar angles, weld all the brackets in place. Try to alternate from side to side on each bracket when welding to minimize the heat build up and potential distortion to the frame itself.



Installation Notes:

- Locate Double Shear Shock Brackets and mock up with the car and housing at the desired ride height. Refer to your shock specifications for installed height specification. Tack and weld shock brackets at specified installed height.
- Trim and notch small tubes to fit long tube, and trim welded assembly to fit inside the frame rails. These tubes are to support the frame rails around the shock brackets. This creates a desired load path through the suspension to the frame structure.

The rear crossmember does not have any specific measurements or geometric reference because it's simply there as added support and provides torsional rigidity (*see note above). You can weld it in based up the photo on the opening page or the included photo shown below.



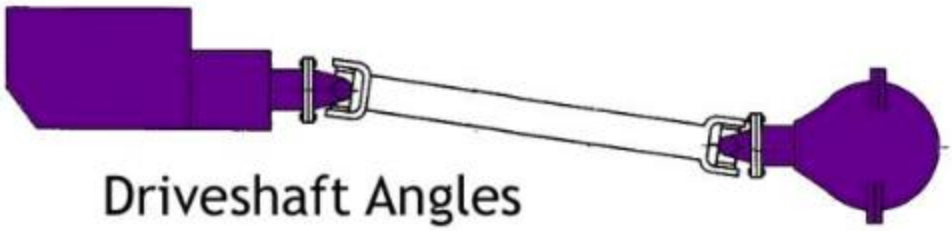
Once everything is welded into place you can lower your car and adjust the ride height using the three different lower shock mounting locations. You can verily the spring height a bit, but do not use it as the primary adjustment for ride height.

Drive line angle

If you have access to a 4-post lift you can get easy access to adjust the lower or upper bars. If that's not available you can use jack stands in front and 6-8 ton jack stands in rear, but they need to be placed under the axle itself.

You can also you 2"x4" cribbing and place 2 or 3 sets under each wheel to create enough space to slide under the car to measure the angles.

Place your digital level protractor on the driveshaft about halfway between the transmission and the Differential. Read and record the angle shown on the protractor scale and note whether the driveshaft points up or down at the front.



Record the angle as "3 degrees up" or "2 degrees down, etc. Next, measure the transmission and differential angles, locate a machined surface on the transmission and differential. The surface must be clean and true, free of any nicks and burrs. Record the angles and note whether the angles are up or down.

Once all the components have been measured, calculate the operating angles to see if the angle alignment is correct. The preferred angle is around 3 degrees with a maximum of 6 with no more than 1-degree difference between each u-joint.
For example:
7 deg. driveline angle – 4 deg. Front U-joint = 3 deg. total operating angle for the first joint
7 deg. driveline angle – 3 deg. rear U-joint = 4 deg. total operating angle for the second joint.

The rear angle housing drive line angle can be adjusted by moving the upper bars in or out. Remove the bolt and drop the bar down to clear the bracket and screw the rod end in or out to adjust your angle. Once all adjustments have been made, double check each bolt for tightness and test drive the car to make sure your new suspension operates correctly.

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