

Steppin' Up to the AirBar

Installing a new AirBar rear suspension in the venerable '67 Camaro – and all Gen-1 F-body cars.



by Doc Frohmader

Like every other guy, when the Camaro debuted I was immediately in love. The family Biscayne wagon was getting tired and held no mystique for either other car guys or the girls we ran with. A Corvette was both out of the price range of working guys like me and (even if I could finagle the cash) demanded insurance rates that would stagger the wallet. But there was the Camaro, a smaller, lighter, zoomier car that used the same Chevy running gear that made our hot rods and race cars go fast. I wanted one. I never got one of my own.

However, one of my buddies' mother happened to buy one and he regularly got custody. So did I. If mom knew what we did with that car it would have ended the fun real fast and given her a conniption fit. We didn't just push it a little, we beat that thing like a rented mule. There were two pedals in that car and only two positions for them – all the way up or flat to the floor. It was a ball to drive, but in retrospect it was probably a blessing that it had the small baseline V-8 engine because ven as it was we could easily outrun the handling capacity of the car.

The original rear suspension in the first series Camaro consisted of a monoleaf spring and tube shock. No sway bar, no locator bars, and not much to make you think performance. GM sold a lot of these cars to people who wanted a sporty look but a soggy ride.



The upper shock mount is removed with two bolts to get the shock bayonet mount loose. This was used on a number of unibody GM cars of the era.

Later an uncle (a few years older and a real drag-racer) assembled one of these cars with a big-block with plenty of juice and by a combination of great luck and a lot of begging I got hold of that car for a weekend. On the way home I passed through a town where the local cop was a bit twisted in that he liked to pick on other performance cars and it was understood if you could outrun his hot rod HD Pontiac you walked free. His car was fast and most got caught, but this time I had what I thought were the goods. As it turned out, I was VERY lucky

the Camaro had all that big block because while I could walk away from the Pontiac on the straight, I had to REALLY backpedal through each corner. With a combination of typical understeer making muscling the wheel heavy work and a rear end that just couldn't find enough grab, it was a ride that still makes my palms sweaty. If I was a little older, a little more experienced, or even a little smarter, I would have realized just how far out on the plank I'd perched that night. It was just flat scary – but then I kinda liked scary.



The lower shock mount uses a mount stud for the shock eye. This type mount served very well and, as you'll see later, ART uses it for some applications because it is tested and reliable.

U-bolts hold the spring to the axle. Remove them and you not only set the axle free but drop the lower shock mount. Notice that someone added a leaf at some point – probably trying to stiffen the rear suspension and cure some wallow.



I returned the car with a big \$%!*-eating grin on my face a great tale to tell. The uncle (name withheld to protect...) acknowledged the car was a handful and before it was turned over to the owner a LOT of suspension work was done. I think that decision was made about 200 feet from the shop when the owner made a turn and spun the car. It was like driving on ice. He brought it back, laid down some more cash and this time the suspension got tamed a bunch.

My lust for the Camaro cooled a bit after that. I owned and or drove quite a few

performance cars starting around that time, and soon discovered the joys of handling to go with muscle. It ruined me. While I still liked the look and the idea of the Camaro, I just never got around to spending the time and money to get them to perform the way other cars would. Besides, even the modified cars ended up being kidney-busting stiff to where my street prowling would have been excessively uncomfortable. I'm deeply ashamed...

The front spring mount is removed with the three bolts shown. You can't get the spring off of the mount until it is out of the car. Do not damage the mount because it is reused in the AirBar installation.



The rear spring mount is a conventional bolt-through shackle. You can remove the entire shackle unit as it will no longer be needed. By this time, you will have supported the car and axle properly so nothing gets loose and hurts someone or damages parts.

Anyway, this whole tirade was inspired by the introduction of Air Ride Technologies' new AirBar rear suspension setup for these cars. It brought back the whole litany of issues that plagued these cars. The factory gear typically was so soft (an effort to make it possible to ride in them without an on-board chiropractor) that ride was acceptable but handling was abysmal. The aftermarket stuff was aimed at race application and while handling improved a lot, the ride sucked. No one really looked at the idea of a performance street combination. I am convinced that this is largely because the

technology was not yet available to get the job done.

Air Ride has turned two great tricks to get there. First was the invention of the ShockWave. This is a combination of an air spring and a race-type adjustable billet shock. Compared to a steel spring and conventional tube shock – well there just isn't a comparison. Air springs simply do a more efficient job of absorbing energy and isolating vibration and harmonics. One way to get the idea is to take hammer to a piece of steel, and then do the same to a chunk of rubber.



With the springs out you can get to removing the mount from the front end of the spring assembly. You need to save the mount, the large washer, and the bolt.

All these cars came with a pinion snubber. This was required equipment because axle wrap was so prevalent something was needed to stop the pinion travel. This will be removed because the AirBar removes the need for it and for lowered cars it will be in the way.



Better yet, if you could hammer a steel coil and then hammer an inflated air spring. There is a reason NASCAR rides use the kind of shock inside the ShockWave, so that point needs little argument.

The second invention is the AirBar setup. What ART has done is work with the existing unibody construction, including existing mounting points, to allow the use of a triangulated four-bar setup and ShockWaves instead of the leaf springs. The inherent flex and distortion found in leaves that we've used any number of patches for

over time (ladder bars, etc) goes away with the four-bar, making the rear suspension much more stable. By creating structural elements that attach to key points on the body and sub-structure, and that fit into the limited space available, it was possible to emulate what most of the race cars found necessary – but without major body and floor modifications.

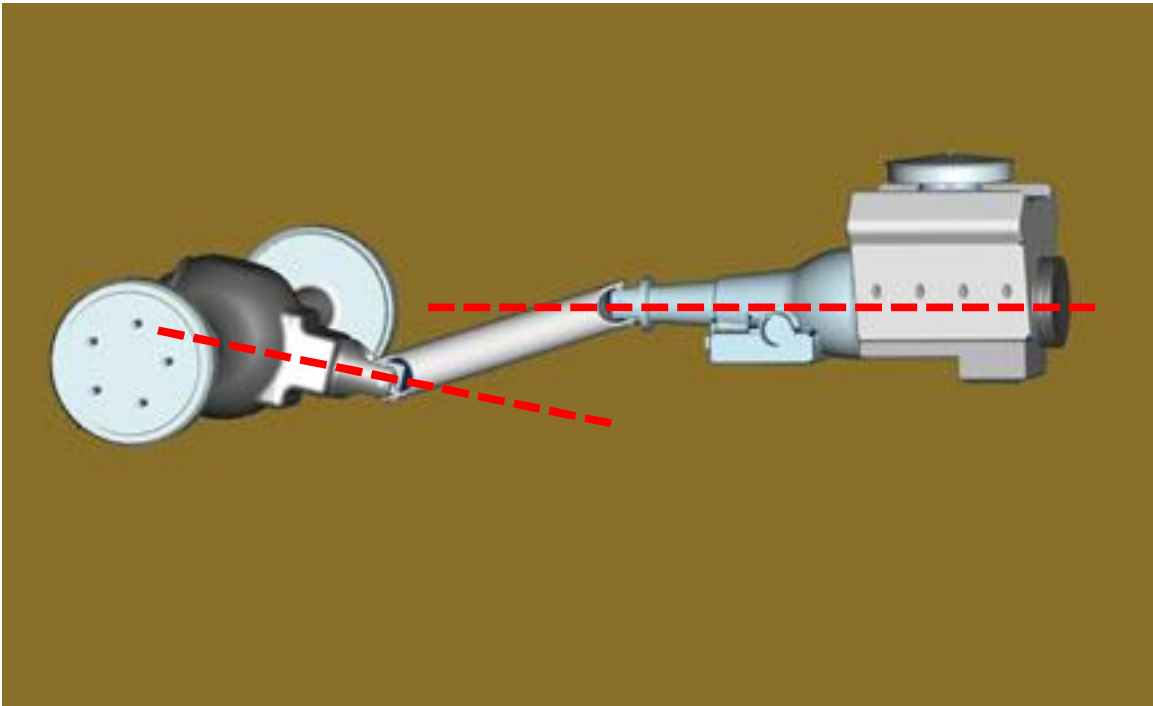
Cut the snubber mount like this, so the remaining area is flush and looks somewhat factory. If you worry about such things, you can save the part and weld it back on for a concours-type resto.



Rodney likes to cut two lengths of tubing to use as spacers while he's building. If you align the axle side to side, front to rear, and set the pinion angle (all at ride height), then tack these in place and the axle will stay where you want it while you work. Remove them later.

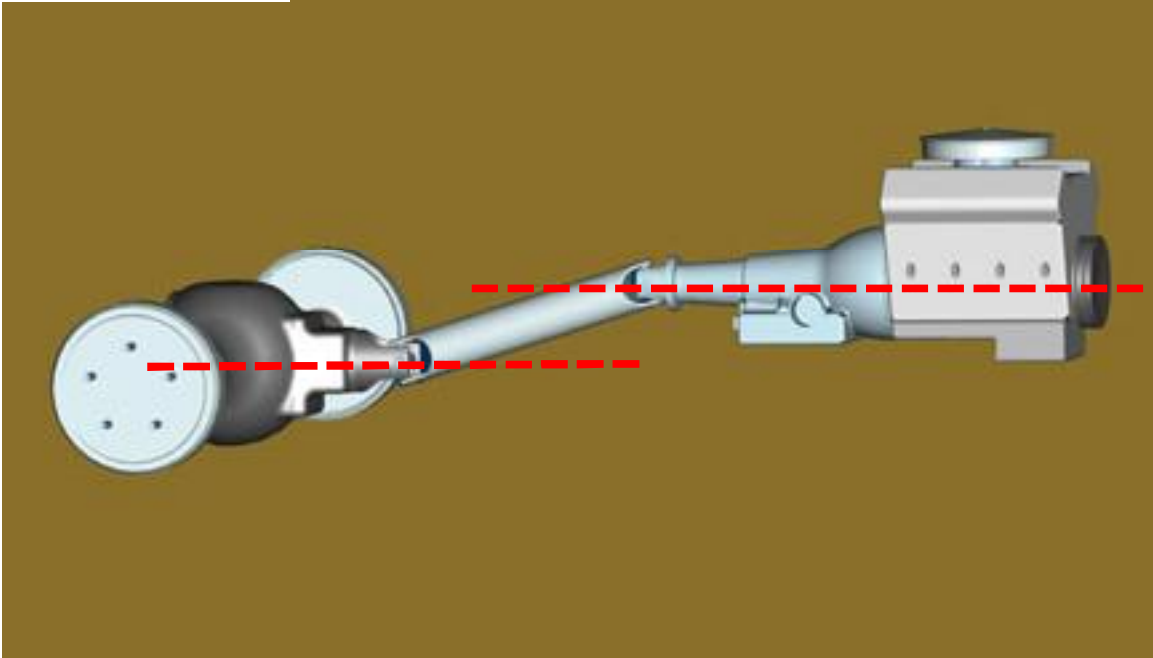
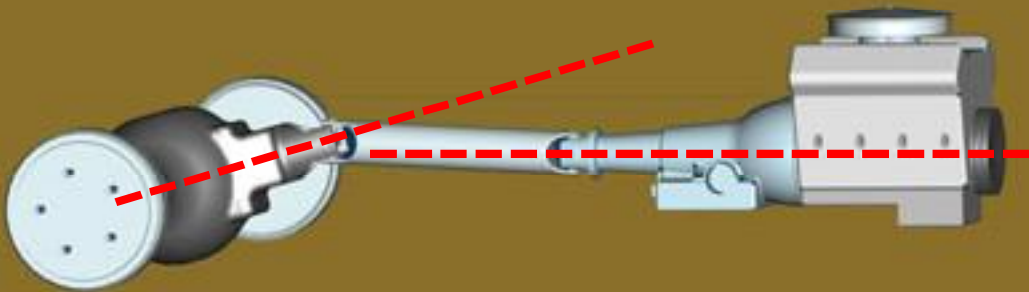
Key to making it all work is the ShockWave, again. Getting a separate spring and shock into the limited space is a lot tougher than the combined unit. Add to that the ability of the ShockWave to adjust to load and handling requirements by simply altering air pressure, and you can see how dialing the suspension in for max handling and ride is a snap. Can you imagine having to swap out spring and shock combos until you get the right set?

The AirBar/ShockWave rear suspension we'll show installed here is a true street performance package or even road course suspension. It takes the best attributes from the race-bred suspensions such as the four-bar for stability, and adds the control, the adjustability, and the smoothness of air suspension.



The pinion is pointing DOWN compared to the engine/trans centerline.

The pinion is pointing UP compared to the engine/trans centerline.



The pinion angle and engine/trans angle through the centerlines are the same. The lines are now parallel to each other.

SETTING PINION ANGLE

How do you set the pinion angle? On a single-piece shaft you want to set it up where a line drawn through the center of the engine crankshaft or output shaft of the transmission and a line drawn through the center of the pinion are parallel to each other but not the same line.

A simple way to do this is to place a digital angle finder or dial level on the front face of the lower engine pulley or harmonic balancer. This will give you a reading that is 90 degrees to the crank or output shaft unless you have real problems with your balancer. At the other end, you can place the same level or angle finder against the front face of the pinion yoke that is also at 90 degrees to the centerline. If you rotate the yoke up or down so both angles match, you have perfect alignment.

Road testing will tell you if you have it right. If you accelerate and you get or increase a vibration, then the pinion yoke is too HIGH. Rotate it downward in small increments of a degree or two until the problem goes away. If you get or increase a vibration when decelerating, then the pinion yoke is too LOW. Rotate it upward to correct it.

Source:
Air Ride Technologies
350 S. St. Charles Street
Jasper, IN 47546
812-482-2932

The new lower bar bolts into the original mount using the original hardware. I suggest this is a good time to bead blast and paint the parts. I make a LOT of use of my ACE blaster while I work – I'll have to speak with Rodney about this...





The bar and mount are bolted back into place just like factory. Reusing mount locations is a goal at ART that not only limits modifications but simplifies the kits and keeps costs down.

The rear lower mount uses the original U-bolts and attachment points. Because the bars are set to length from the factory (always check, though) you should have the axle located at the right distance and the same dimension side to side.



The AirBar cradle uses a series of self-tapping 3/8 bolts to hold it in place and spread the energy load. One bolt (circled) is a stock axle bump stop bolt and is used to properly locate the unit. Drill all the other holes with a 5/16 bit and run the new hardware in place.

The upper bar is bolted in place along with the axle mount ears. For the moment, rest the unit on top of the axle. Note that the effective length of the bar was increased by fabricating the cradle so the mount is moved forward.



After double-checking side to side, ride height on both sides, and pinion angle, the rear mount ears are tacked onto the axle. Remove the bar to weld them solid or you will damage the urethane bushing material.

The ShockWave lower mount is a billet piece that bolts to the lower bar mount to make it both strong and compact. Use the two lower holes.





The upper ShockWave mount is part of the AirBar cradle. Just a simple bolt-in deal, but because the cradle is designed for several functions it takes up less room in the crowded Camaro rear.



Removing the original shock and upper mount leaves a hole that must be filled. Is this up to you? NO.



As just one of the many small and large components of a very complete and well-thought-out kit, ART includes such small but important parts like this block-off plate. The more you have to fabricate, the more time it takes...



The completed AirBar and ShockWave assembly, ready to go. Some day I'm gonna figure out how to get a buck for ever time one of these kits hits the road and the proud new owner cracks a grin at how smooth and stable his ride has become. I really want to retire rich, you know!