

1968-74 Nova Rear AirBar

Air Ride Technologies scores big again with a rear suspension conversion that makes the original slink away and hide



by Doc Frohmader

If you ever forget that the Nova was designed as and sold as a low-end entry-level commuter car, riding in one will remind you. It's a small, fairly light little car that even at its best rode a bit rough and had mediocre handling. GM tried to help the handling out with sway bars, stouter springs and stiffer shocks, but while this marginally improved handling it did nothing to help the ride. If you added any power under the

hood you quickly learned what axle wrap and wheel hop were all about. Those of us who ran them socked on ladder bars and put up with whatever we had to, focusing on straight-line runs because cornering was not the car's forte. There's no way I'd want to run a car in this condition today, but back then we had little or no choices. Today we have.



This was a pretty pristine car, but even at that there were indications that someone tried in vain to improve the handling. The basic rule back then was to stiffen things up to stop body roll and pinion wrap so here's a multiple leaf spring installed on an mono-leaf axle pad (and a spacer to make it fit. The axle ended up crooked in the car.

Yep, that's an air shock that could be inflated to stiffen things up. Do you like that notorious H-mount at top that is used on lifted cars? Unless you had the little six and drove like a little old lady going to church, you either tried or wanted to try to alter the rear suspension to get the wheel hop and axle wrap to stop every time you hit the go-pedal.



Air Ride Technologies has been engineering a series of rear suspension upgrades called AirBars that incorporate an upper reinforcement and mount cradle, a set of triangulated four-bars, and ShockWave combination air springs and race-style billet adjustable shocks. The results have been remarkable. AirBars use a true triangulated four bar arrangement so the axle hop and spring wrap we all hated is just simply gone. The stability and strength of the rear suspension components outdoes the OEM parts so dramatically that it is hard to describe.

If you've been to any of the GoodGuy Autocross events, you might have seen this little yellow 1970 Nova SS tearing up the track. As I write this, the car has been running some of the best times of any competing street driven car. Even given that the drivers have been reasonably well-skilled, it is quite a testament to the ART suspension that a car so notorious for poor handling in stock form could even approach this level of performance from a simple kit.

The exhaust on his car, and perhaps on yours, must be checked to make sure you'll have clearance. In many cases you'll at least have to drop the tail pipes to get the new hardware installed.



On either side you'll find an axle bump stop that gives a relatively soft landing when the axle bottoms out on the leaf springs. These are removed, but as you'll see the mounting holes are an important part of this installation.

I got there too late, but on your car you may still see the original pinion snubber that was on the bottom of the body ahead of the axle. It was there so when the axle rotated hard under acceleration something would limit the pinion rotation. It will no longer be needed and must be removed.





There was little remaining after the leaf springs, shocks, and the rest were removed, so the ART guys opted to slide the axle completely out and clean up and paint the bottom of the car before installing the new AirBar suspension system. Something to consider if you have time.

The axle back under, you'll see that nothing needed to be done to alter the axle mounts other than using the shorter U-bolts supplied with the kit. Throw a little anti-seize on those U-bolt threads and you'll have better results tightening them and getting the nuts loose later should you need to.



Why this is such an achievement revolves around the fact that these cars were of unibody construction, meaning that all the original suspension mounting locations were engineered into the body, providing specific points where enough strength was developed to support the energy transfers. It limits where any altered parts can be secured. As we discovered years ago in trying to build street racers and drag cars, it was often necessary to back-half the car (cut the old out and create a new frame for the rear) to get sufficient strength for mounting conventional components capable of handling big power.

The ingenious AirBar cradle uses stock rails but reinforces them. It also provides strong location points for both the air springs/shocks (ShockWaves) and the upper triangulated bars without having to weld. Using the original front leaf spring mounts to accommodate the lower bars, it was possible to structure the race-bred advantages of a triangulated four-bar without any major alterations to or fabrication on the car. Cars like the ART Nova SS are not the kind you cut up.

If the radical improvement in suspension control and stability were all you got from this

One key to the new triangulated four-bar design is this bracket. It attaches where the old leaf springs did and provides the rear mount for the lower bar and the lower mount for the ShockWave units in one.



Tighten the new mounts on, keeping the same amount of thread showing at the bottom of each so you don't cock the mount or distort the U-bolts. Snug, then tighten each evenly side to side.

installation, it would certainly be enough to make you happy. However, because the ShockWaves are calibrated for this car and then adjustable for both spring rate and shock rate, you can dial in not only a very aggressive handling level but a silky smooth ride - or whatever balance gives you the ride and handling you are most comfortable with. It's pretty hard to whine about that, I'd say.

To illustrate this point, the guys at ART set up the Nova just as you see it here and did nothing more than dial in about eight more clicks of shock rate than they knew it needed. I drove

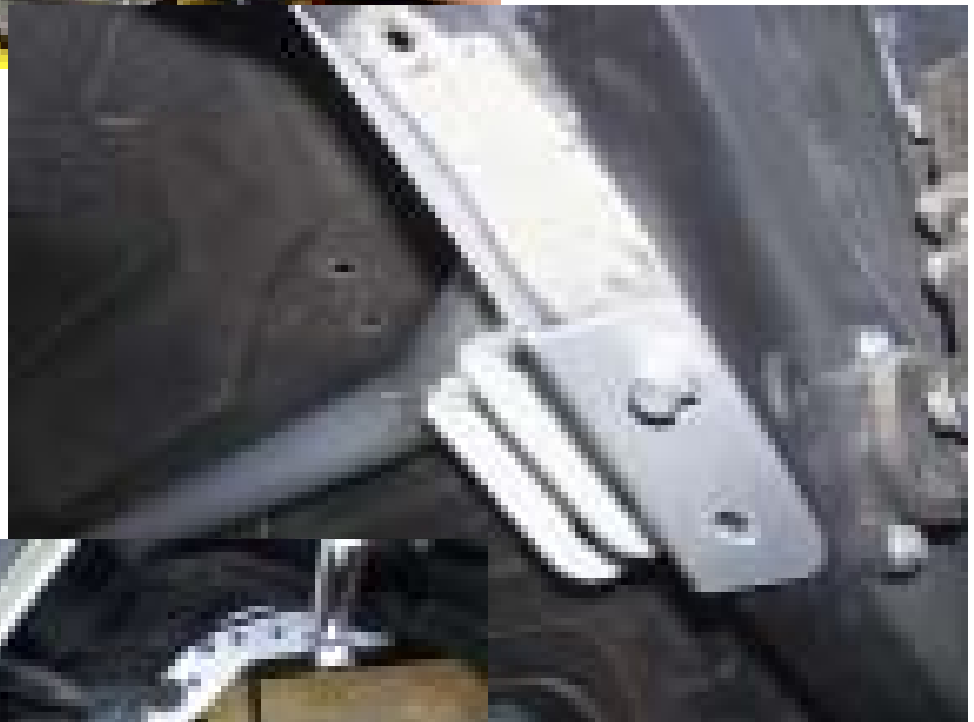
the car through a series of nice sharp curves out in the Indiana countryside and found the car handled like it was on rails. However, it rode like carnival ride or an unruly horse. I brought it back, the shock adjusters were reset to the proper level (found by a little experimentation earlier) and went back out.

This time the handling was still great - I noticed no loss on the course I took - but the ride was now much improved from either the stock



The cradle unit slides up and over the rear axle like this. This unit is designed to not only provide the mounting points for the new hardware (upper top bar front mount and upper ShockWave mount) but to add considerable strength to the rear of the car's unibody construction.

Remember those original axle bump stop mount holes? The FRONT hole in each side is side to align the cradle accurately. Unless your car has been damaged enough in an accident to distort the rear of the body, this is a very precise locator point to use.



There are now 7 more holes in the cradle unit that need corresponding holes in the chassis drilled. Make sure the cradle is pushed tight to the body and start with the bottom bolts – drill and install at least one bolt up front before moving on. Use a 5/16 bit for the 3/8 self-tapping hardware.

Make sure that the self-tapping bolts are started square so they don't thread in crooked. This one bolt on either side can't be reached with a socket and so must be done with a box wrench. It takes a little extra attention to get started straight.



One side completed with all 8 bolts. There is a 9th bolt hole at the rear on the rail side but depending on your floor pan it may not be reachable with a drill and can be deleted.

suspension or the first shock setting on the new AirBar suspension. If there was any doubt about how well the shock adjustments work on the ShockWave units, this dispelled it forever.

As for installation, you will have to raise and support the car well to stay safe and be prepared to remove a lot of parts. The original springs and shocks are history. You will have to be able to lift and position the rear axle where you want it independently from the body. So from that perspective it does take some patience and

some care in setup.

You will need a good dial level/angle finder to set the pinion angle and will need to understand what setting the pinion angle means. There are four small ears that must be welded to the rear axle, so you need a welder and know how to make good welds.

Just to make it clear, ART designed this weld-on mount configuration because most people building them no longer use the original



10-bolt axles, but 9-inch or 12-bolts, and it gets expensive to try to accommodate all possible combinations. In addition, each car is unique within factory tolerances and most installers will want to zero in on ideal axle placement and pinion angle for best performance.

A number of holes get drilled to facilitate the self-tapping bolts that secure the cradle to the original unibody rails. The original pinion bump stop is no longer needed to prevent axle wrap and is actually in the way of the cradle, so it is removed. You can drill the spot welds out that hold it if you want to save it for possible reinstallation later. Overall it is a fairly simple operation that can be done in a single day by most competent amateurs. I'll let you be the judge, though.

Sources:
Air Ride Technologies
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The AirBar cradle was well designed to fit close to the floor pan and take up as little room as possible while still getting the job done. Remember, you still have the bars and ShockWaves to install and an exhaust system to route through this area.



The front mount for the lower bar is the original leaf spring mount. This is one of the strongest parts of the unibody and a perfect place to locate this critical component. You can't just attach suspension anywhere on a unibody car – it must be done at reinforced locations.

The rear mount for the lower bar is on that axle mount plate installed earlier. Use round punches to draw the bushings into proper position and then slide the hardware through.



To get the rear axle installed and the new bars in the right place you have to make sure the car is at ride height and leveled side to side. Here the side to side angle is checked on the cradle bar.

Then the axle is set so it is leveled side to side. The digital levels come in really handy for this and you can now buy them for as little as 30 bucks these days. Don't guess about this as getting these angles right make a huge difference in look and function later.





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The axle is rotated to set the pinion angle to match that of the engine and trans. A line drawn through the centerlines of the pinion and the trans output shaft should be parallel when you have this right. Now go back and check that your other setup steps haven't changed.

Make sure the axle is centered side to side. This is done by laying a straight edge on the face of the brake drum or rotor and measuring inboard to the frame rails. I must be the same distance on both sides. Again, go back and double-check the other dimensions and angles to make sure you've moved nothing.



All of this is done to get the weld-on mount positioned. Install the top bars on the cradle mounts, add the weld-on ears, and rest the bars on top of the axle housings so it looks like this. Make sure the bar mounts are squared and tack them in place. Pull the bars out and weld them in solidly.



This is what the top rear bar mounts looked like just after welding. The axle location and pinion setting was done first because once these bar mounts are on and welded you'll find that the axle won't move side to side or rotate any more. Obviously, getting them on in the right place and having the axle in the right place is the most important part of this whole installation.

The ShockWaves can be installed just like you'd install shock absorber and can be flipped so the shock rate adjuster know points in or out. Place it where you can get to it and so it is protected from road rash.





The finished installation. This not only fit well and looks great but until you've planted yourself behind the wheel of a strong Nova with this setup in it you won't have any concept of how much improved the handling becomes and how smooth the ride can be. ART really hit one out of the park on this kit!