

BARS AND **BAGS**

FOR

CLASSIC F-100's

Air Ride Technology's new parallel four-bar and air springs for the 1953-56 F-100

by Doc Frohmader

I can remember when air suspension was still in its infancy and other than some basic parts and instructions, you were on your own. If you didn't have a fair amount of technical and fabricating skill, the result was certainly not a lead-pipe cinch. For that matter, there really wasn't a lot of reliable experience with air suspension and a lot of us just didn't know

whether air ride would be a boon or a bust. Time has shown just how well it works in a wide variety of applications. The obvious stuff like variable ride height, variable spring rate, and improved ride quality can often overcome the somewhat higher cost of a quality air suspension. In some cases your money will buy not only quality parts, but good service, a worthwhile warranty, and intelligent personal help when you need it. Of course there is still some really junk stuff out there as well as vendors and manufacturers more than happy to sell you as much as you can stand without any intent or capacity to get your back when you run into problems. Oh well, there's one born every minute they say...



There are four rivets on the side of each front leaf spring mount and two on the underside that hold the crossmember. All need to be removed and then drilled out to 7/16 inch. You might find some corrosion under the mount, but in most cases the new 4-bar mount will both sufficiently reinforce the frame and hide the damage - it uses only original holes. For severely damaged rails, these brackets can be welded in as repair sections.

The rear mounts also get removed. In general, all the old suspension is deleted at original mount locations.



Rodney Mason tightens the front bar bracket. Because it uses only OEM holes, there is no problem with aligning the bars up front.

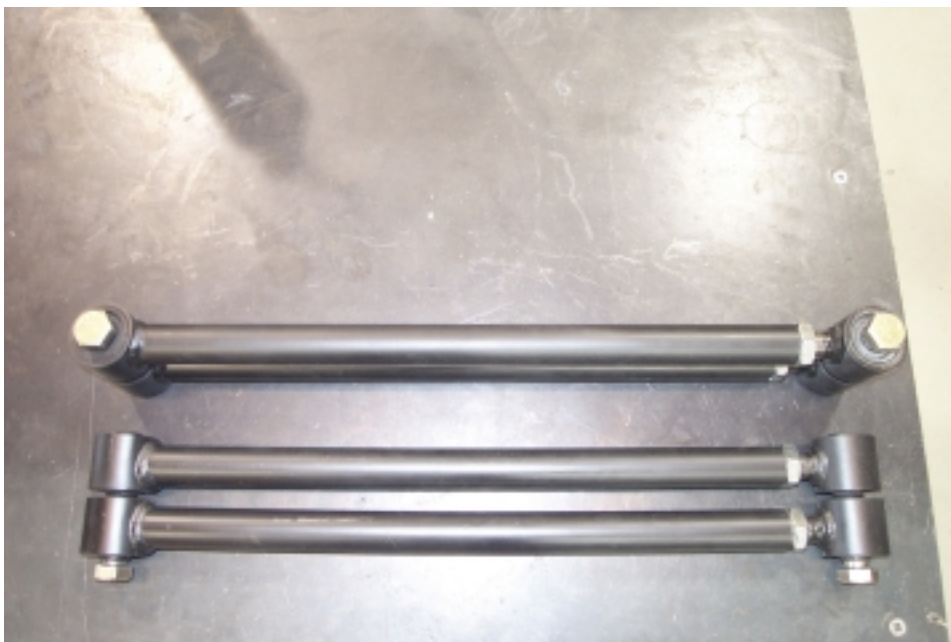


The two bolts underneath unite the bracket, frame rail and crossmember. There's no need to weld at all.

Another change in air suspension components is the trend toward more and more kits designed specifically for an application. It seems that most of the more popular trucks have at least one and sometimes several different types of kits - it really helps to have what you want all neatly packaged up, especially when it has been adequately designed and tested so you don't end up reinventing the wheel trying to make it work on your truck.

Such is the case with Air Ride Technology's new parallel four-bar rear air suspension kit. It includes bars and brackets that use original frame locations to make set-up simpler and more reliable. The rear bar brackets are welded to the axle and make it possible to use this kit on any axle I've ever seen. The shock mounting is compact and makes good use of the relatively limited space around a typical F-100 axle. The new kit has been thoroughly checked out and all components verified functional and effective through the most obvious means - it's been installed and road-tested.

I was at Air Ride's new shop and manufacturing facility recently and at that time the boys in back were installing one of these kits on a customer's 1956 F-100. I grabbed my camera (hey, it's what I do) and followed along as Rodney (Welding Rod) Mason walked through the installation process. In the course of this exercise, he managed to come up with a few different tricks to make an already simple operation go even more smoothly. Even an old dog like me can learn and I'm gonna share with you.



Although the bars are all set to 20-1/4 inches center to center as shipped, you want to double-check. Use the large mount bolts and check in pairs. Bolts should fit easily.

Assemble the bars in the front mount and attach the rear mount. You're ready to position the axle under the rails.



Set the pinion angle to match the trans output angle. I generally use a third jack stand and shims to maintain the angle while working on the rest. If working on a bare frame, set the pinion angle to match the frame rail angle.



Prep

I've worked with Bret and the guys at ART for some time now. As a matter of fact, some of the projects I've put together have been joint ventures between Bret and I. One thing this cooperation convinced me of is if you do enough suspension work, preparation is essential to a satisfactory conclusion. In my home shop, I've invested in such important things as a good set of safe jack stands, a dial level for measuring angles, and a welder capable of doing solid welds. I use an HTP MIG-160 unit that has both the amperage (160 amps) and the duty cycle to make welds that properly penetrate and flow out to make something that looks professional and I can feel comfortably safe with. Whatever you select, make sure that your equipment is up to the job. If you aren't sure, make sure.

The same goes for your skills. I would hope that between the people at ART and what you see here that you will have enough information to complete the job, but not everyone can claim to have all the skills. I wouldn't suggest you pass on this simply because you haven't done it before, but I will say that welds on suspension parts are critical and can be life-and-death stuff, so if you have doubts, get help. It isn't worth getting hurt or killed to massage your ego and not ask for help when you need it.

That said, the first step is to strip off all the old part you won't use. This includes springs, hangers, shocks, brackets, axle snubbers, and brake lines. This particular truck will retain the original rear axle, so it was salvaged.

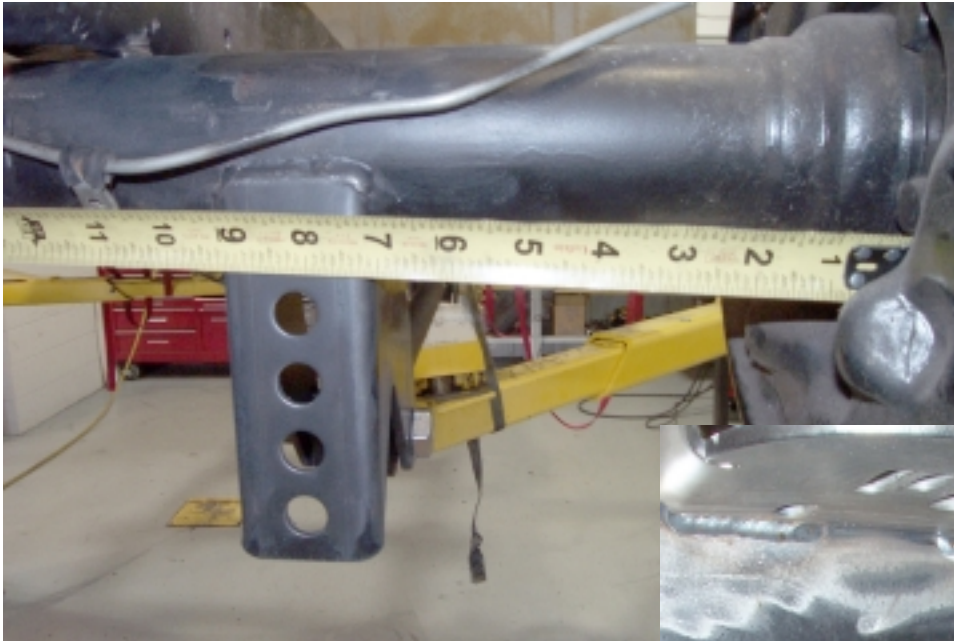


The axle also has to be set square in the rails on the axle centerline front to rear, and so it is centered between the rails side to side. Because this is a 4-bar setup and within the range of operation the bars keep the pinion angle consistent, you can do this with the axle tight to the bottom of the rails. Once set, tack the axle to the rails.

Swing the bar and brackets up against the bottom of the axle and set them at 42 inches apart outside to outside edge. On these trucks, this will align the lower spring bracket centers with the upper bracket centers.



Use a pair of clamps and a section of angle steel to hold the brackets the right distance apart.



Now center the whole rig so either side bracket is the same distance inboard of the backing plates.

Use a dial level or angle finder to set the brackets so the back faces are at 90 degrees (all this when the chassis is at ride height and at the right angle front to rear).

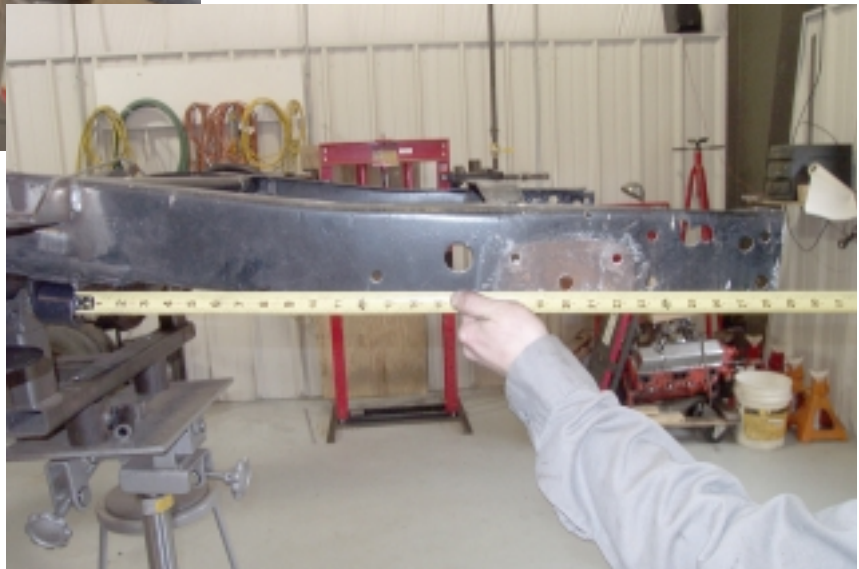


Finally, make sure the brackets are at 90 degrees to the axle centerline and you are ready to tack the brackets to the axle tubes. Tack them and check dimensions before moving on.



Rodney prefers removing the axle and brackets from the truck and bench-welding the brackets. You'll find it easier and the welds will look much better as well as more likely to have no weld flaws.

The frame end of the panhard bar bracket is set so the rear edge is 28-1/2 inches ahead of the rail end. Because this is a custom weld-on unit, these dimensions can vary a bit and still work just fine - you may have different components that could require alteration. The goal is to get the panhard as level as possible at highway ride height.



If you are going for a 9-inch or other option, there really isn't any difference in assembly. The rear spring hardware is held on with rivets and those are ground off and knocked out, or in some cases where they are stubborn, drilled out. There are rivets in both side and bottom locations. Up front there are more rivets. There are four holding the bracket, and two more on the underside which are used to fasten the crossmember. All six are removed and the holes are enlarged to 7/16. The new bar brackets bolt through these original holes. The original rear bracket holes are not used.

I've found that it's a good idea to make any repairs to the rails that are needed before moving on. I built a similar F-100 a couple years ago and was disappointed to find that although the rails looked perfect they were walked off to one side. In that case, I found the problem by cross-measuring the rails and corrected it with a little judicious jacking. You might be surprised how easy it is to fix such things early on and how hard they are to hammer through after the new parts are installed. My own '56 is now straight within about 1/16 in any direction and I don't think I spent more than a couple hours making it happen.



The panhard bar bracket is welded to the bottom of the rail and a gusset is welded into the inside of the rail to strengthen the area.



The lower air spring bracket bolts to the rear bar mount using the lowest holes.

Four Bars

The new front bar brackets bolt into the same location as the old spring brackets, plus the two bottom crossmember rivet holes. All are drilled out to 7/16. Air Ride made these brackets a bit large to cover an area where a good many F-100's have rust damage. The new brackets cover the problem and reinforce the frame over this area.

The bars are all the same length - 20-1/4 inches - and the easiest was to get them all the same is to use the mounting bolts. Set two up so they have about 1/2 inch of threads beyond the nyloc nuts and lay them side by side. If they are the same length, the bolts will fit through both bars. When you get two right, use the same procedure to get the other two to match. It's easier than using a tape. Now you can bolt the bars to the front brackets and also to the axle brackets and be sure you will have good setup and enough room for final adjustments later.



Rodney has a jig welded up for this as you can see. You can duplicate it as I did or just squarely cut a piece of 4x4 and mark centers on either end. After cutting the tack welds between axle and frame rails, reposition the axle to ride height. The top mount should be 8-1/2 inches above the lower and square with it. Because air springs have some range variation for installed height, you can add spacers to the jig if needed. Also, make sure the brackets are in alignment front to rear and side to side.

You can see how the center of the upper mount aligns with the jig (later the spring) when the jig (spring) is centered in the lower mount. Tack the brackets on.



Now that the axle is at ride height and located side to side, swing the panhard bar and bracket up to the axle housing and align so the bar is as close to level as possible. Tack the bracket.



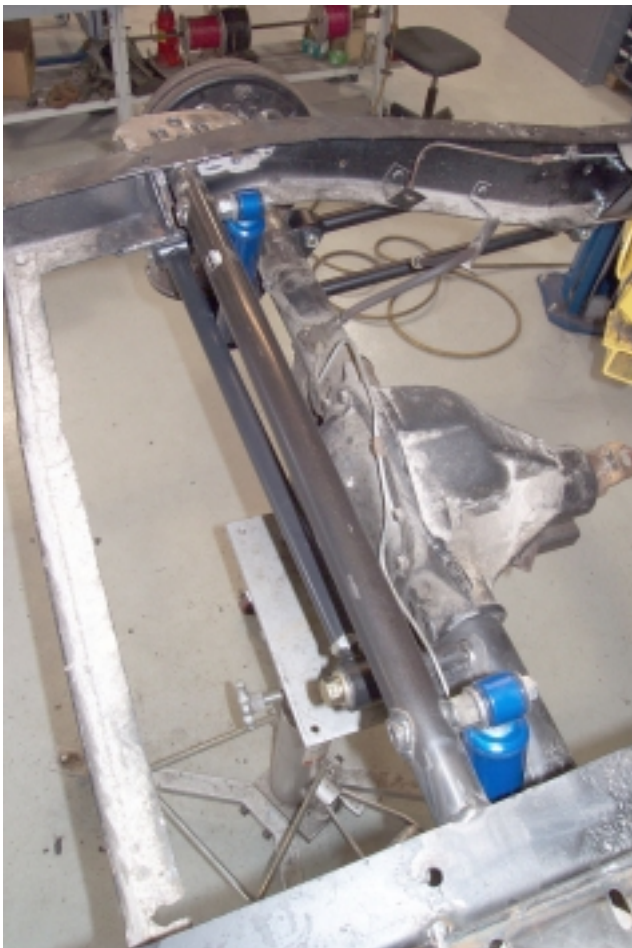
Rod uses the fact that a parallel 4-bar will keep the pinion angle fairly close to consistent throughout the suspension travel range to set of the final axle location. He lifts the axle up tight against the bottom of the frame. Then he sets the axle so it is centered side to side in the frame. He also sets the pinion angle to match the trans output shaft and supports the pinion end to keep the axle located.

If you are working on a bare chassis, you can still set the initial pinion angle. Check the angle of the frame rails and align the pinion at the same angle. While this will probably not be dead on, there is enough adjustment in the bars to rotate the pinion where you want it in final assembly.

To get the axle brackets mounted correctly, Rod lifts them up against the bottom of the axle housing and locates them so they are 42 inches apart to the outside edges and centered on the axle. Because the axle was centered before, he measures in from the backing plates to make sure the brackets are the same distance in on both sides. He clamps a piece of steel across the two brackets to help position them. Finally, both brackets are leveled using a digital level on both rear and outside faces of the brackets. At home, I use a simple dial level for the same purpose. The point is to align the centers of the upper bag brackets with the centers of the lower brackets.



The lower shock mounts bolt to the inside of the lower spring mount.



Assemble the shocks and upper shock bar into a unit and lift it against the underside of the top surface of the frame rails. Make sure the bar is the same distance front to rear on both sides and there is clearance for the shocks and then tack in place.

After checking all the measurements, tack the brackets and then remove the axle to fully weld them on.

The panhard bar is used to keep the axle from moving side to side, so while the bars prevent rotation or movement front to rear, you want to drop the axle down to ride height without altering the side to side location. The frame end gets a mount welded at 28-1/2 inches from the end of the frame rail to the back of the bracket. Bolt the bar and axle end bracket on and rotate the assembly so it is tight to the axle and as level as possible at ride height and tack it in place. Pull the bar so you don't cook the bushings and weld the brackets. ART can supply a bolt-on panhard bracket for 8, 8.8, and 9-inch Ford axles and 10 or 12-bolt GMs if you prefer one. On the frame end, ART supplies a gusset to reinforce the frame above the bracket. Once cooled, the bar can be installed and the entire assembly is now stable and moves through normal suspension travel smoothly.

Air Springs

At the lower end, ART supplies a pair of spring mounts that bolt on using the lowest holes in the axle bar mounts. I found that the 53-56 F-100 trucks are somewhat hard to get down in the weeds without a C-notch, so there are limits. The last two I built and this one all used the lowest mount locations.

The upper mounts weld to the side of the frame rails. They have to be set up so there is 8-1/2 inches between the upper and lower mounts at ride height. They also need to be aligned so centerline of the upper bracket is aligned with the lower bracket. Check both front to rear and side to side.



The air springs can now be bolted into place and the air lines and fittings run.

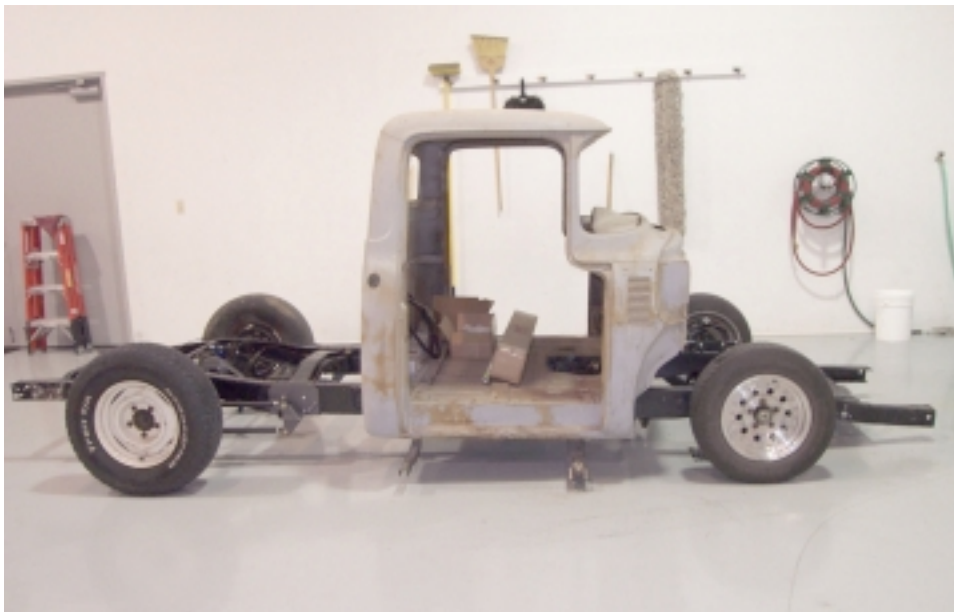
Air springs work best when they are not made to work in a bias.

Rod has a pair of spacers he uses to set of the upper mount, and if you like the way he did it, I'd make a set up. If you want to go quick and dirty, cut two sections of 4x4 (square cut ends) and use them for alignment. When aligned correctly, tack the mounts and then trial fit the air springs. Bolt the bottom in first since it is fixed, and then center the top before tightening the spring mounting bolts. If all is satisfactory, remove the springs to prevent weld damage and then weld the mounts on solid.

Shocks

The lower shock mounts bolt to the side of the lower spring bracket. Attach the shocks to these mounts and then slip the shocks over the studs on the shock mount crossmember. The crossmember fits under the top edge of the frame rails. Move the crossmember front to rear until you can see adequate clearance for the shock between the axle and between the panhard bar. You also want this crossmember aligned so it is the same distance front to rear on both sides. Tack it first, then check for position and clearance throughout the full range of travel, and only then weld it fully.

You can use either the standard shocks ART supplies with this kit and that were selected for use in the majority of applications for a good average ride. An option is a set of QA-1 adjustable shocks. These will allow you to dial in the shock rates for an even better ride. They are also rebuildable so if they ever wear, they can be refurbished and used again at a fraction of the original cost.



Low enough? This is the truck with the air out and setting on the bump stops. Ride height will be about 3 inches higher.

Air ride controls include a compressor, storage tank, air valves (shown are the RidePro solenoids), fittings, air line and gauges. In addition to the analogue gauges you can also go for a digital gauge unit made for Air Ride Technologies by Dakota Digital (you can match to your DD dash!).



So you know... The front suspension is a Fatman Fabrications' Mustang II assembly with Air Ride installed. That's how we got so low.



Controls

After running the air lines and fittings (make sure the lines are tight and can't vibrate or interfere with moving parts), you have to have some means of setting and adjusting air pressure to the springs. You can go as simple as Schrader fittings and a shop compressor. Most people want self-contained compressor, storage, and controls, so a manual gauge and valve arrangement is the next best bet. Depending on your needed and preferences, you can use two or four valves. Gauges are typically double needle units. If you want to go all out, you might want to look into ARTs Ride Pro solenoid operated air valves and digital gauges.

To complete the installation, you'll need an air pump, storage tank, line, and fittings. Air Ride offers quite a few options, so you can decide what works best for you. The guys on the sales line are well-versed in the tech side of things so you can expect an intelligent answer and some honest help with designing a system to do what you want.