

Putting an 81-85 GSL disc brake/limited slip rearend into a 79-80  
RX-7

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DISCLAIMER: If you are stupid and/or have no mechanical ability, don't blame me if you get hurt attempting anything I describe. Get help from someone who knows what they are doing. You are on your own, I set this forth for informational purposes only. Just be careful, OK? And for God's sake, get a good set of jack stands and chock the wheels when you jack the car up! Your mileage may vary, close cover before striking, void where prohibited by law.

WHY WOULD I WANT TO DO THIS?

Well, for one, drum brakes on '79 RX-7s are not self adjusting. This is annoying: every so often you have to go under the rear and adjust each shoe. What the hell was Mazda thinking? I have a 1970 Oldsmobile with self-adjusting drums, so I know the technology was available. Whatever. Anyway, discs are, obviously, self adjusting, easier to change pads, are more fade resistant, have more braking area for the same size rotor, and besides, they look cool. All rear disc brake RX-7s were also equipped with a limited slip differential, the benefits of which have been documented endlessly elsewhere (it's a good thing!).

SOUNDS GOOD, WHAT DO I NEED?

Here's the fun part! You thought you were just going to swap a rearend, didn't you? This is the way it works if you are swapping into an 81-85 GS with drums (with a couple caveats), but they changed a couple details between 80 and 81. 79 and 80 RX-7's use course threaded hydraulic fittings on the brake system, while 81-85s have the same thread diameter, but a fine pitch. Result: the rearend itself is a bolt-in, but the brake lines are a no-go. That means you need to change the master cylinder, prop valve, all the hard brake lines, and, of course, the front brakes and lines as well. This is actually a good thing! Why? Well, the 79s have a goofy wedge block caliper mounting system that, frankly, sucks.

They fixed that in 80, which uses the same two-pin mounting system as the later models, but there's still another advantage, even if you have an 80: the struts. The strut housings are slightly shorter on the 81-85 cars. This only matters because there are more strut cartridges available for the 81-85, most notably Tokico Illumina adjustables. The strut assembly, like the rearend, is a bolt in (six bolts and a brake line, to be exact). There is one slight advantage to using 84-5 struts: the outer bearing is a larger bearing shared with the GSL-SE and second gens, but I've heard of no problems with the earlier, smaller bearing.

Of course, you're going to need the GSL rearend, calipers, rotors, etc. Don't forget to get the emergency brake cables as well, just the portion from the "frame rail" to the caliper. There should be a clevis and pin secured by a cotter pin just inside the "frame rail" on both sides to detach the rear portion of the e-brake cable from the front part. One final caveat, if you grab an 84-5 rearend, get the driveshaft as well; the driveshaft flange on the rearend is different from that on 79-83 models. Or, you can swap the drive flange from the old rearend to the new to mate with your existing driveshaft. Good time to replace the pinion seal, too. This can be done without having to reset the pinion preload, just retorque the pinion nut to 90-110 lb.ft. when you put it back on, and it should be fine (so says the factory manual). I had no problems.

So, the final list:

GSL disc-brake LSD rearend, with e-brake cables, rotors, calipers, etc.

Driveshaft, if 84-5 rearend.

All hard and flexible brake lines (good time to upgrade to stainless steel braided).

Master Cylinder, with proportioning valve.

Strut assembly, with rotors, calipers, etc.

All those little clips and things, just so you have spares.

The toughest part of all of this is getting the hard brake lines loose from the flex lines. After twenty years, those soft fittings stick pretty tight, and it's a job getting them loose without mutilating them. Forget the flare nut wrenches; they'll destroy the flare nuts just as well as regular wrenches. I used copious amounts of Liquid Wrench, and a set of Channellocks. The Channellocks allow you to get a good grip, and added leverage. Worked for me, even after I made a couple of the fittings round.

HAT'S A LOT OF STUFF, AND THAT REAREND WAS BLASTED HEAVY, BUT I GOT IT ALL. NOW WHAT?

If you don't have one, get a service manual. Hayne's or Clymer's will work, Factory manual's even better. I like to have several different publishers; sometimes one will cover something better than the other. This is not going to be a comprehensive step-by-step, that's what the manual is for. Besides, if you got this far, you already know how to get the rearend and struts out, don't you?

You may want to clean and pack or replace bearing, seals, etc., resurfacing or replacing rotors and brake pads, replace third member gaskets, change rearend lube. etc. on your replacement stuff. Better put new cartridges in those struts, too, while they're out. Easier to do it all now, and you'll know when it was last done.

REMOVAL:

From this point, there's nothing really difficult, just remove the original struts, rearend, master cylinder/prop valve, and all brake lines. Actually the most difficult part for me was breaking loose the fittings on the brake lines. Good idea here is to soak the fittings with Liquid Wrench once or twice a day for about a week before you try to crack 'em. The hard lines take a little finagling to get out without tweaking them too hard, but it can be done.

Another tip: jack the car up as high as you can at both ends and put it on jack stands; you want plenty of room underneath to work, and you'll need the jack to get the rearend up and down.

OK, now put it all back, only use the 81-85 stuff. don't forget to connect the emergency brake cables. Since you're working on the front end anyway, why don't you replace all the bushings with polyurethane? Check tie rod ends, idler arm and ball joints while you're under there; it's easiest to replace them now, while it's all apart. Double check all fasteners, flush and bleed, put her back on the ground, and \*carefully\* test. Troubleshoot as needed. Get an alignment.

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#### MORE INFO :

##### Rear Suspension I/O

It would be easier to just remove the rear I think, it's next to impossible to get the watts back together with the rear attached to it. Here is my system for rear ends. It may help you.

##### Removal:

Disconnect drive shaft and break lines of course.

Remove strut's and upper and lower control arms from rear end only.

Unbolt the large stud on the rear, then slide your rear off.

Now do all your bushing/new control arm work.

Then reassemble all the watts and control arms.

##### Then for installation:

Put the rear end stud back into the watts link, jack rear in center and on each side as needed until you get the struts and upper and lower control arms bolted in.

It's that easy. Less than an hour with air tools and assistance, not including bushing work.

I don't know if this helps or not, but's the easiest way I've found, and I would think most others as well.

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The good news is that I took everything apart, and found that by putting in the lower control arm on one side followed by the

upper on the other side, I got the axle aligned properly. The other two control arms then went in without a fuss or a fight, and everything is all lined up correctly. I popped the watts link arms into their respective frame mounting brackets, long on to the left side, and was able to slide the watts bracket right into place. Part of the problem, I think, is that I was attempting to put the watts bracket on with the studs.

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You're leaving all the bolts loose, right? They should only be tightened when the suspension is at ride height.

MORE INFO:

REAR DIFF AXLE SWAP:

Removing Park Brake Cables:

From: "Simonovich, Michael"

<MichaelSimonovich@NC.SLR.com>

Subject: RE: (sa22c) rear brake job

The guy I bought my GSL rearend off of said he was old Mazda mechanic and he showed me an "old trick". Anyway, when I helped him remove the rearend from the donor car he bent the little tongs apart that hold the ebrake cable ends. This way you only have to pull the ebrake cable end about 1/2 way out of the tongs then you can turn the end and slide it out the tongs.

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Well...the e-brake cables really suck in trying to get them off/on. I have found no easy way to do that other than brute muscle and having three hands. Make sure that you totally adjust the e-brake in the drivers cockpit out so that it gives you a lot of slack in the cables.

There is a turn screw right by the handle and turning it out (counter-clockwise) loosens the slack. You will have to readjust them after installing them but that's the only way that I have found to do them. Other than that the rear brakes are a snap.

:)

### **Swap info:**

Proportioning valve: Up to you. I, personally, change them because I am paranoid and assume any problem will arise at a point where my life is at stake; not just tooling around town. However, I just checked the parts microfiche and, at least from 81-83, the drum and disc proportioning valve part numbers were the same.

E-brakes: whoever said they suck apparently did something wrong, as mine have always shown improvement, including the swap I did last weekend. The trick is to get one of the notches over the brake pad pin, as the e-brake rotates the cylinder to wedge the pad against the rotor...at least that's how I understand it to work. Also, if you don't align the pin and one of the notches, the cylinder will push only on the pin, causing very uneven wear of the pad and rotor. One other tip is that the longer of the two e-brake cables goes on the driver's (left) side.

Other notes: 81-82 pumpkins have the early companion flange pattern while the 83-85 pumpkins have the later companion flange pattern. Seems strange that they would change it in 83 and carry it forward, when the axle size change didn't come until 84. Anyway, the 81-82 LSD/disc rear ends require a 79-82 driveshaft and the 83+ rear ends require an 83+ driveshaft. Also note that the earlier "small axles" rear ends are actually stronger than the later "big axle" rear ends because the earlier housing is beefier. Not a big deal unless you are drag racing or running a turbo setup. You can also reinforce the housings, if necessary.

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The easiest way to tell the condition of the third member is to try to spin the input yoke (the one that driveshaft attaches to) while holding one of the axles. First of all, you should not be able to turn the yoke while holding one of the axles. If you can, that is a good indication that the LSD is going out. Second, there should not be more than a quarter inch of play at the yoke when holding an axle from moving. If there is, that is a pretty good indication that the ring and pinion has an unacceptable amount of lash in it. This would necessitate a new ring and pinion and therefore a complete rebuild. If none of these issues are present, I would remove the third member and of course axles, thoroughly clean

the axle housing and reinstall everything with new gaskets and fresh gear lube.

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Nylocks for rear arms  
M14x 1.5 x 9 of them  
M12x 1.5 x 4 of them

The only real problem is the brake line. As far as the driveshaft is concerned, just swap your pinion flange from your old rear to the new

one. That's what I did on my '82 so I could retain my replaceable U-joints. We did the same thing for this '80 and I've never had any problems with this. Air tools do make it a lot easier. With a friend it took about 2.5 hours in my driveway (not counting for the brake line but you have that covered).

The brake cables aren't bad if you make sure to loosen it at the handle first. The fuel pump gets in the way but if you drop the 3 10mm bolts, you can just let it drop and hang while you get the driver's side cable fixed up.

Everything else just bolts up.

The pin for the brake cable on the passenger side is a little tricky if you have the factory heat shield. It ends up on top of the heat shield. If you undo the driver side and loosen all of the slack out of the brake adjuster you can get it out from under the heat shield to a decent workable area.

Hardest part is usually getting the bolts out of the control arms/watts link. You will need the rear brake cable for both sides and maybe the driveshaft, depending on if your car is an early/late 83. Small flange driveshafts have bolts, large flange have bolts and nuts, difference is in the pinion flange. Hand tighten all suspension bolts, do not torque them until the full weight of the car is on the ground. Allow for a full day for the swap, in case things get stubborn, soak all bolts, nuts and brake lines with PB Blaster a day or 2 before you start.

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