XJ Big Brake Upgrade DIY - 12/30/21

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Overview: My daily driver is a '96 XJ that sees around 20k miles a year. It's lifted 4" on 32"x11.50's. I'm running a V8 ZJ tie rod swap, Moog tie rods ends and a Rough Country dropped track-arm with a Moog TRE in place of the RC provided unit. I'm content with my setup and it's met my needs for over 60k miles. The brakes however were showing signs of overheating after a year and were marginal given the amount of commuting I do. Additionally my rear drum brakes were warping.

For the front brakes; I initially considered doing the standard WJ knuckle/brake swap, but when I started looking into the amount of work involved and how much of what I'd already replaced would need to be replaced again, I wasn't too enthused. I found the **15" DIY Big Brake Kit for XJ/MJ/TJ/YJ/D30/D44** on **www.cherokeeforum.com**. The DIY was originally written 5 years ago and CobraMarty did an amazing job, but I did run into a couple surprises and was able to find actual caliper mounting bolts and aftermarket alternatives to several parts he listed.

For the rear brakes; I rebuilt and swapped a set of KJ Liberty disc brakes. This swap is effectively the same as a ZJ rear disc swap. There were some curveballs I'll discuss. I cleaned/blasted/painted all the used parts, but that's totally up to you.

What follows is a description of what parts I used, their cost and the procedures to install them. I also included a list of helpful links at the end. Some of these things I had to source locally due to figuring things out as I went. I included the local sources. Of course you can choose other sources, brands, etc. This is just what I used and what is working for me. After the upgrade, I went on a 500 mile round trip without an issue and wow was it worth it. Keep in mind that in '96 the XJ got a better master cylinder and a dual diaphragm booster. Upgrading to a WJ booster/master might not be a bad idea for pre '96 models; I can't say for certain.

Good luck!

Front Brake Upgrade:

- **'84-'89 XJ/MJ or '87-'89 YJ Dana 30 knuckles**: These knuckles are designed for bolt-on style calipers and are no longer available new. The later knuckles have cast 'wings' for the brake pads. You will need to enlarge the caliper mounting holes to 14mm to accommodate the calipers for this swap. These SHOULD include the early-style tapered ball-joint pre-load bushings. If not, you'll need to get a pair. More about that later.
    - Salvage yard found on www.car-part.com and they included the hub-bearings: $125 shipped
- **'04 Ford Explorer 4wd rotors**: These rotors are spec'd for a few Ford models.
    - Raybestos 680027R from Rockauto: $32.99 x 2

- **'11-'15 WK2 Grand Cherokee or '11-present Durango calipers**: Be sure you get the complete caliper with it's bracket and anti-rattle clip.
    - Salvage yard found on Car-Part; off a '18 Durango with 31k miles: $110 shipped
- **'11-'15 WK2 Grand Cherokee or '11-present Durango brake pads**: I re-used the oem pads that came with my low-mile used calipers: $0
    - Raybestos PGD1629AM on Rockauto: $25.79
- **M14 flat washers (0.45mm-0.55mm thickness)**: Depending on which hub-bearings you have (I think the break year is '99.5) you will either need 8 or 16 of these. Get good washers for this.
    - Pack of 25 stainless on Amazon: $14.39
- **M14-1.50 Caliper Bolts**: Depending on your hub-bearing thickness, you will either need shorter (late) or longer bolts (early). O'reilly's “BrakeBest” hardware is relabeled Carlson.
    - Carlson / BrakeBest H817 (late): $3.06 / $5.09 x 2 (sold in pairs)
    - Carlson / BrakeBest H835 (early): $4.54 / $6.69 x 2
- **M10-1.0 Banjo Bolts**: Spec for a 2009 Dodge Ram 1500 and others. As far as I can find, factory Mopar is your only choice.
    - Mopar 06508914AA – $16.40 for a 4 pack on Rockauto, singles at the dealer
- **M10 Copper Sealing Washers**: Rockauto wanted $4.16 per Mopar branded washer and you need 4 of them (Mopar 06502114). I instead bought Carlson/BB Banjo Bolt kits for a different model car that included the washers I needed.
    - Carlson / BrakeBest H9506-2: $2.62 / $3.99 x 2
- **14mm drill bit**: This bit will be used to enlarge the 4 caliper mounting lugs on the early style knuckles. Get a quality bit and cry once is my advice. Screwing up the knuckles will cost more.
    - Cle-Line 14mm reduced shank drill bit (rated for stainless steel/iron/steel) from McMaster-Carr #6154N13: $19.82+ship
- **25/64” drill bit**: This wasn't mentioned in the CherokeeForum DIY I referenced as being needed, but was in my case. My '96 XJ was/is running longer YJ brake hoses up front and I found it necessary to drill the banjo bolt blocks larger to fit the metric Durango banjo bolts.
    - Irwin 3016025 Cobalt 25/64” bit (SS rated) from Ace Hardware: $11.99

Cost: $125+$66+$110+$0(pads)+$14.39+$13.38+$16.40+$7.98 = **$353.15**

Procedure:

- **Drill out the caliper mounting ears to 14mm**: I did this with a drill press, but in lieu of one; I'd recommend using a vise, clamping the knuckles to a bench or mounting them to your axle and using a hand drill.
- **Remove wheels, brakes, hub-bearings/axles and knuckles**
- **Install early knuckles:** This gets a little tricky. ‘84-’89 models had static upper ball-joints. That meant that when you installed the knuckle, you would tighten down the upper ball-joint nut, then take a special socket that slipped over the lower ball-joint stem

and keyed into the pre-load adjustment bushing. You'd then torque that bushing to 50 ft/lbs, install the lower ball-joint nut and be done. That changed in '90 when they went to the later style knuckles. Those used telescopic upper ball-joints and the pre-load bushing was no longer needed. In fact, attempting to tighten it will only result in the upper bj telescoping downward. From what I've read, the bushings should be approximately 0.200-0.208” inset from the bottom face of the knuckle. I made the mistake of replacing my bushings thinking I'd need to set pre-load and later realized I couldn't, found the spec and set both bushings to it. **More than likely, your salvaged knuckles will have the bushings in them, they will be set close to spec and you can just install them like any '90+ knuckle and avoid the above bs.**

- **Drill the caliper mounting ears to 14mm if you didn't earlier**
- **Reinstall hubs/bearings and axles**
- **Fit the rotors**: There must have been some variance in hub-diameter over the years because I had to carefully grind off 1/16-1/8” of material from the outer edge of my hub-faces to fit the rotors over them, but the hubs that came with my '88 YJ knuckles dropped right in with tons of room to spare. It wasn't a big deal, I just used my angle grinder. Hopefully you get lucky. Once they're on, tighten them down with a couple lugnuts for the time being.
- **Fit the calipers/pads/rattle clips**: Remember back to what I said about the number of M14 washers you need. If you have the early hub-bearings, you will need 8 per side. Later models will need 4. These washers are used to space the caliper outwards from the mounting lugs on the knuckles. They center the caliper over the disc. I found 4 on each caliper bolt, nailed it on my '96.
- **Drill/install brake hoses**: I left my old calipers connected as long as possible to keep the system sealed. So remove the hoses, clamp them down in a vise grip and drill them out to 25/64”. Alternatively, take the entire hose off and clamp it up in a vise to do this. Then connect the hoses with the new larger metric banjo bolts and copper washers.
- **Test-Fit Wheels – Grind Calipers (if needed)**: I'm running 15x8 YJ Gambler wheels with a 5.25” backspacing on 1.5” spacers which results in an effective 3.75” BS. I've read that 4” is about the bare minimum with alloys. Steel wheels have more clearance. My wheels bolted on fully, but had the slightest amount of caliper rubbing. Literally they were rubbing the dirt on the inside of the wheels but not scratching the powdercoating. I ground off a little of the caliper bracket at it's top and bottom edges and all was good to go with even clearance all the way around.
- **Bleeding**: The front calipers will gravity bleed, so do yourself a favor and crack both bleeders open and wait a few minutes until fluid is overflowing from them. Then bleed the system using your preferred method.

Rear Brake Upgrade:

- **‘03-’07 Jeep Liberty KJ rear disc brakes:** The KJ debuted in ‘01, but didn’t get rear discs until 2003 or 2004. You can salvage the whole shebang including rotors, calipers, banjo bolts and even parking brake cables or you can get just the essential parts used and restore/replace everything else, which is what I did. At minimum you’ll need the

backing plates, caliper mounting brackets and the longer backing plate mounting studs/nuts.
    - I bought a complete donor axle to make things easy, but you could pull the brake parts off a salvaged car. Donor axle: $75
- **'95-'98 ZJ Grand Cherokee rear disc brake proportioning valve internals**: You'll need the plunger, spring and cap from the front of the proportioning valve.
    - $2.00 at my local U-Pull-It yard for 2 of them (they look like random hardware)
- **KJ Calipers**: I've had good luck with Centric parts in the past, but I did have to exchange one of the calipers because it had the wrong piston and wouldn't fit the pads. Rockauto handled the return no problem. They included new caliper & banjo bolts too.
    - Centric 14165516 (RL) from Rockauto: $26.79 + $5.00 core = $31.79
    - Centric 14165515 (RR) from Rockauto: $25.79 + $5.00 core = $30.79
- **KJ Rotor & Pad Kit**:
    - Raybestos 981CH780134R from Rockauto: $68.79
- **KJ Parking Brake Hardware Kit**: If you don't live in the Rustbelt, you may not need this. I live in NE Ohio and my donor axle was from Western PA, I needed it.
    - Raybestos H7328 from Rockauto: $16.77
- **KJ Parking Brake Shoe Set**:
    - Raybestos 745PG from Rockauto: $13.67
- **KJ Parking Brake Levers**: Mine were seized due to rust, but I was able to free them up with a multi-day soak in PB Blaster. New ones are annoyingly expensive.
    - Dorman 926293 on Rockauto (if needed): $25.79 x 2
- **XJ front Dana 30 wheel studs**: The thickness of the rotor requires longer wheel studs than the old drums. They're a direct fit for the rear hubs.
    - Dorman 610109 from Rockauto: $1.35 x 10
- **'95-'98 ZJ Grand Cherokee rear brake hoses**:
    - Sunsong 2203837 (includes banjo bolt washers) from Rockauto: $9.50
    - Sunsong 2201229 (includes banjo bolt washers) from Rockauto: $9.58
- **Chrysler 8.25" or Dana 35 axle seals and bearings**: You have to remove the diff cover and axles to do the swap, so you might as well do the seals at the least 'while you're in there'. I like SKF and FAG bearings, and what were supplied were actually US made. I have a Dana 35.
    - SKF R1563TAV for Dana/Spicer 35 from Rockauto: $13.30 x 2
    - BCA NS8660S seal for D35 from Rockauto: $1.81 x 2
- **Chrysler 8.25" lock bolt issues, etc**: The 8.25" axle is pretty notorious for the diff lock bolt breaking while in use and it has to be removed to take out the axles. The one in my donor axle was actually broken. If you have a 8.25", I would suggest getting a new lock bolt ahead of time and maybe even buying an extraction kit just-in-case. The smaller lock bolt in my D35 with 221k wasn't broken, maybe I got lucky.
    - Dorman 81048 from Rockauto: $1.62
    - Skyway Tools Deluxe Differential Pinion Shaft Lock Bolt Extractor Kit: 28.99
        - There's an excellent video explaining it's use here https://www.skywaytools.com/deluxe-differential-pinion-shaft-lock-bolt-extractor-kit/

- **Parking Brake Cable Options**: From my research, there are a few options:
    - KJ Cables - You have to remove the console to unhook them and you'll need to coil the slack for the ds cable above your axle, but they will work. I was tired the day I pulled the donor axle and just cut them.
    - XJ Cables - There are ways to cut off part of the spring at the end and then loop the end with a cable clamp so it will attach to the brake lever
    - KJ right side cable and Ford Explorer Driver's side cable: I can't recall the specific year Explorer, but apparently it's a direct fit
    - XJ disc brake swap cables - Crown makes conversion cables for pre and post '97 XJ's - $24.99 x 2 on QuadraTech
    - Ford 8.8 swap e-brake cable adapters. These will work with the KJ brakes.
        - $32.99 from the Flop Shop https://www.theflopshopoffroad.com/products/ford-8-8-swap-e-brake-cable-adapters
- **80w90 Gear Oil and Limited Slip Additive**:
    - Your preferred brand, 3qts req'd
- **Ultra Gray RTV or LubeLocker Gasket for Diff cover**

Cost: $300 (approx. including rebuilding the parking brakes)

Procedure:

- **Remove wheels, brakes, wheel studs and axle studs**: As soon as you get the wheels and drums off, hammer out the old wheel studs. Then remove the diff cover and follow standard procedure to remove the axles. Finally, tear apart the brakes enough to remove the parking brake cable, unbolt the brake line (bend it upward to keep it from draining) and finally remove the backing plates and hammer out the backing plate mounting studs.
- **Replace axle seals and bearings as necessary**: I've found that freezing the bearings overnight and heating the axle tube prior to installation helps a lot.
- **Install KJ brake mounting studs**: Use the mounting stud nuts to pull them into their bores.
- **Install KJ caliper bracket / backing plate onto axle**: Unlike the ZJ brake swap, you do not need to enlarge the backing plate hole to fit a 8.25" axle.
- **Install new parking brake hardware and shoes if necessary**
- **Install new Dana 30 wheel studs in rear axle hub-faces**
- **Reinstall axles and diff cover:** Use blue loctite on the diff lock-bolt and let the RTV dry overnight before refilling the diff.
- **Refill axle with 80w90 and limited slip additive**
- **Install rotors, pads and calipers**
- **Install ZJ brake hoses**: I used the left hose on the right and vice versa after drilling the mounting tabs on the hoses to fit the ½" u-bolt studs. It works great assuming you have enough excess length on the studs to fit them. And of course you'll need a couple nuts that fit the studs as well.

- **Replace XJ drum brake prop. valve internals with ZJ disc brake internals**: It's easy, just unscrew the cap from the end of the proportioning valve under the master cylinder, remove the spring and plunger (may need needle nose pliers to grab it), then install the ZJ parts.
- **Bleeding**: Bleed the system using your preferred method. The rear calipers won't gravity bleed, I tried. I also tried to bleed the proportioning valve without any luck.

Go for a test-drive / break-in and enjoy your upgraded brakes. I'm still adjusting to mine. The stops are easily modulated, not overly grabby or lock-up prone even on slushy roads. I keep finding myself braking too early, because I'd grown used to giving myself extra space realizing that most cars around me in traffic could stop faster than me. That's not really an issue anymore.

Thoughts on ABS: My '96 came with 4 wheel abs. It hasn't worked in about 3 years and I haven't really missed it. 80s/90s abs technology wasn't amazing and I grew up learning to pump the pedal during a slip. There are no provisions in the front brake upgrade to retain abs. As for the rear brakes, if you have a Dana 35 with factory rear abs, you could swap on ZJ disc brakes and retain abs if you kept your factory front brakes intact. The KJ brakes won't work because the KJ tone ring and sensor are in the differential, not at the wheels. At the end of the day, my actual brake performance is miles and miles better than what it was and they don't easily lock-up/slip even in bad weather. I'm not overly concerned about it.

Links:

Front Brake Upgrade DIY video and forum thread:
https://youtu.be/zyJgxpNu4Pw
https://www.cherokeeforum.com/f67/15-diy-big-brake-kit-xj-mj-tj-yj-d30-d44-227121/

Rear Brake Upgrade DIY video and forum thread:
https://youtu.be/zLJcdN9zRQ4
https://www.cherokeetalk.com/threads/kj-liberty-rear-disc-brake-conversion-write-up.18160/

https://www.moparpartswebstore.com/ is a great resource to cross-reference Mopar part numbers with vehicles they were used on. For example, you could snag the front banjo and caliper bolts off a whole mess of cars in your local yard and save a good bit.

https://www.theflopshopoffroad.com/products/ford-8-8-swap-e-brake-cable-adapters

www.car-part.com (full-service salvage yard search engine)

https://www.skywaytools.com/deluxe-differential-pinion-shaft-lock-bolt-extractor-kit/