

Tool List

- Gloves
 - Parts trays
 - Bags
 - Sharpies
 - Foam pads
 - Trash bags
 - Safety glasses

 - PB Blaster
 - Soapy Water
 - Isopropyl Alcohol
 - Loctite
 - Antiseize
 - Grease
 - Wipes

 - Painter's tape
 - Tape measure

 - Flashlights
 - Plug in lights
 - Extension cord(s)

 - Prybar
 - Soft mallet
 - Hard Mallet
 - Electric Impact
 - Pick
 - Vise
 - Batteries
- Battery Charger
 - Drill
 - Drill bits
 - Step drill bit

 - Floor Jack (with pipe handle)
 - Jack stands
 - Ratchet straps
 - Bungee cords

 - Breaker bar
 - Channel lock pipe wrench
 - Needle nose pliers
 - Vise Grips

 - Allen Keys
 - 10 mm gear wrench
 - 12 mm gear wrench
 - 14 mm gear wrench
 - 17 mm gear wrench
 - 19 mm gear wrench
 - 10 mm standard socket
 - 10 mm deep well socket
 - 17 mm standard socket
 - 19 mm box wrench
 - Wheel Lock key
 - Lug nut socket
 - Torque Wrench (45 ft lbs)
 - Torque wrench (55 ft lbs)
 - Torque wrench (84 ft lbs)
 - Torque wrench (96 ft lbs)

Resources:

- Ironman 4x4 Suspension Install Video: <https://www.youtube.com/watch?v=lcA5z4YPUTk>
- Moustache Man Suspension Install Video: https://youtu.be/IE_dm3NTOgM
- SPC Control Arms: https://www.spcalignment.com/instructions/25480-INS_WEB.pdf
- Dobninson's Install: <https://www.dobinsonsdirect.com/pages/instructions>
- Exit Off Road KDSS Spacer Install: <https://exitoffroad.com/installing-a-kdss-spacer-kit-from-treaty-oak-offroad/>
- Treaty Oak Spacer Instructions: https://docs.google.com/document/d/1-ZhC3wgO_AgsXDt86f7xRI65HS0UtzwE98H8TKX3KZc/edit

Nearest Auto Parts Store:

O'Reilly's: O'Reilly Auto Parts, 1213 W Carson St, Torrance, CA 90502
 Autozone: 1433 W Carson St, Torrance, CA 90501

Measure Vehicle Ride Height

- Mark the vehicles 4x fenders with painter's tape
- Measure the pre-lift height from center hub to painter's tape. Record here:
 - Driver Front: 97.5
 - Driver Rear: 92.1
 - Passenger Front: 98.5
 - Passenger Rear: 93.1

Crack lug nuts

- Use breaker bar with socket and wheel lock key

Pull Battery (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=553s>)

- Remove 1x 10 mm nut (socket) from positive terminal
- Remove 1x 10 mm nut (socket) from negative terminal
- Remove leads (negative first and then positive)
- Remove 1x 10 mm nut (deep well socket) from J-Hook hold down clamp / battery strap
- Remove battery and battery tray vehicle
- Remove 1x 10 mm bolt (socket) from wiring harness hold down behind battery tray

Fastener Reinstall

Lift Vehicle

- Need ample room for axle articulation (estimated about 2-3 tires height)

Disengage KDSS (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=140s>)

- Cover plate is located on the middle of the driver-side door
 - Remove 2x 12mm bolts (12mm standard socket) and remove bracket
 - Mark the 2x shutter valve bolts with a sharpie (ground point and on bolt)
 - Apply painter's tape near the valve to record the number of loosening turns
 - Loosen the 2x 10 mm bolts (10 mm standard socket) by 2x full turns. Mark tally marks on the painter's tape. If additional turns are needed, record on painter's tape

⇒ loosened 2x SWAY BAR Links on front Assy 17mm

Remove ABS Brackets

- Remove 1x 10 mm fastener (10 mm socket or geared) between UCA and ABS bracket
- Remove 1x 12mm fastener (12 mm socket or geared) between spindle and ABS bracket

Remove UCA (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=622s>)

- Remove plastic covers (2x per side) using trim tool behind cover. This improves access
 - https://youtu.be/IE_dm3NTOgM?t=251 → don't have covers
- Remove cotter pin from upper ball joint castle nut (pick or needle nose)
- Remove castle nut with 19mm wrench (open end). Link 2x together if needed
- Separate ball joint by whacking the smash pad on ball joint with hammer. Keep hands clear.
 - Don't let the spindle hang too far out, otherwise very hard to reinstall
 - Use bungee cord or strap to secure the spindle in place
 - Now is a good time to inspect CV axles, boots, etc.

Place 1x 19 mm wrench (open) on the front and 1x 19 mm wrench open on the nut on the back

If necessary, remove the hard line brake line from the frame rail to allow for more clearance near nut

Hold the UCA so it doesn't drop onto coil

Remove nut and washer

Before removing long thru-bolt from UCA, use needle nose pliers to push wiring harness towards center of vehicle.

*Pass side bolt left in

- From top of vehicle, pull the long UCA bolt through. Doesn't need to come all the way out.
- At bottom of vehicle, remove UCA

Remove Front Struts (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=348>)

- Loosen 3x 14mm nuts (Gear Wrench) on the top of the strut perch
- Leave 1x nut tight to keep the strut in place (leave a few threads on)
- Remove the lower strut bolt
 - 19 mm nut (impact) and 19 mm bolt (open end wrench)
- After lower shock bolt is removed, push the strut upwards (towards the perch) and remove the remaining 1x 14mm nut (gear wrench), from the 3x that were holding the strut in position.
- Drop the strut off the vehicle
 - Pull up on the strut and drop the bottom in front of sway bar
 - If needed, use a floor jack under the KDSS piston to allow for more articulation
 - https://youtu.be/IE_dm3NTOgM?t=1282

Extra steps:

→ loosening 2x
Fasteners on
Fixed line cap
→ JACK
under
drum
side
→ Pry tool

Install Front Struts (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=444>)

- Drop the bottom of the strut into the lower control arm, position the strut behind the sway bar then into the perch
- Loosely install 1x 14 mm nut (gear wrench) onto the 3x threaded studs at the top of the strut to "hang" the strut in position
- May need to push down on the lower control arm, but align the lower end of the strut with the thru hole on lower control arm.
 - Install 19 mm shock bolt (open end wrench) and 19 mm nut (socket)
 - Video recommends anti-seize. Leave finger tight (will tighten on ground)
- Return to the top of the strut and install remaining 2x 14mm nuts (gear wrench)
 - Tighten the rear first (hardest to access)
 - Tighten 3x nuts to 47 ft-lbs

Eng. skid

Build UCA

- Assemble "star" washer onto hex feature of the threaded ball joint. Clock plate to adjust caster. Set to neutral position (ie. long edges align)
- Insert assembly into UCA (match the plate to the milled area on the UCA)
 - Oil fill nipple facing the U.S. Patent number (ie. push through)
 - Make sure to see the SPC label on edge of ball joint when installing
- Push all the way outboard, and put nut and washer on the other side
- Adjust outboard position so that radi are tangent (corner of the middle piece, not corner of larger radii piece) https://youtu.be/IE_dm3NTOgM?t=1381
- Assemble washers on outside faces of control arm (dish side facing out)

Added grease

Install UCA (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=712>)

- Install new UCA underneath the ABS harness
- Work it back and forth until it's set
- From top of the vehicle, push the thru-bolt back through the assembly
 - Install front and rear washers in assembly
 - Set finger tight. Will tighten on the ground prior to torquing.
- Push ball joint into the knuckle by pushing down on control arm
- Install upper ball joint nut
- Reinstall ABS harnesses (Spindle and UCA)

Repeat front suspension install process on passenger Side

Remove Rear Shocks (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=938>)

- 17 mm (socket / impact) on the bottom side of the shock
- Knock bottom of shock back with hammer or mallet
- Channel locks around the (top) body of the shock with a 17 mm gear wrench on the top of the shock
 - Hold the pipe wrench stationary while you rotate the 17 mm gear wrench on the top of the shock
 - Pull the shock out of the vehicle
- Repeat process on passenger side

Remove Rear Sway Bar (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=999>)

- On driver's side, from the inside (towards vehicle center) use a 19 mm socket on breaker bar or impact to remove bolt from sway bar
- Repeat process on passenger side
- Once both driver and passenger side bolts are removed, you can pry or bend the sway bar out of the way

Articulate rear end (driver side down)

- Place floor jack under the passenger side shock mount to articulate the rear axle down on driver side. If needed, buddy can push down on disc brake on driver side

Replace Driver Side Coil (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=1081>)

- Slide the rear coil right out
- Place stock isolator cone on the new coil
- Clean the trough where the bottom of the coil rests
- Install the new coil (small diameter on bottom side of car)
- Leave a 1/4" gap between end of coil and the coil rest to prevent squeaking

Articulate rear end (passenger side down)

- Remove floor jack on passenger side – this pushes the driver side up
- With a buddy's help, ensure that the top of the coil (driver side) is correctly seated on the driver side
- Place floor jack under the driver side shock mount to articulate the rear axle down on passenger side. If needed, buddy can push down on disc brake on passenger side

Replace Passenger Side Coil

- Slide the rear coil right out
- Place stock isolator cone on the new coil
- Clean the trough where the bottom of the coil rests
- Install the new coil (small diameter on bottom side of car)
- Leave a 1/4" gap between end of coil and the coil rest to prevent squeaking

Reinstall Rear Sway Bar (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=1081>)

- Use a pry bar and hammer to line the sway bar up with the mounting locations
- Install bolts on passenger first and then driver side using 19mm socket and 19 mm wrench
 - o Can use the floor jack / hammer to position the sway bar correctly in the location

Install Rear Shocks (<https://www.youtube.com/watch?v=lcA5z4YPUTk&t=1408>)

- Build rear shocks with appropriate bushings and washer
 - o Reference Dobinson's information
- Install top side of shock into perch (video shows 1x bushing stack below the perch)
- Install flange washer, rubber bushing, top washer, nylock nut (from perch upwards)
- Hand tighten assembly once everything is centered
- Use 19 mm gear wrench and vise grips (or smaller sized wrench) to tighten
 - o Hold flats on the threaded rod while tightening the nut
 - o Tighten the nylock nut until bushing bulges. The nylock nut pulls the shock upwards into the perch.
- Antiseize on the lower shock mount pilot feature
- Install rear shock lower mount onto the pilot feature (check orientation)
 - o May need to jack rear of vehicle from diff to make the shocks reach the pilot feature
- Install lower shock bolt (17 mm socket)
 - o Leave finger tight – will tighten once the vehicle is on the ground

Install Wheels and Tires onto Vehicle

- Keep vehicle in the air

Lower Vehicle

- Remove all jack stands, jacks

Shake the Vehicle to Allow for suspension settling

- Shake for 5 minutes

Torque Hardware to Final:

Item	Size	Qty	Spec
Front Strut Top Bolts		3x	52 ft-lbs
Upper UCA Thru-Bolt	19 mm	2x	85 ft-lbs (pending access)
Ball Joint Castle Nut		2x	SPC: 45 ft-lbs Factory: 81 ft-lbs
UCA Caster Nut		2x	150 ft-lbs once aligned
Front Lower Shock Bolt	19 mm	2x	135 ft-lbs
Front Sway Bar (if removed)		1x	55 ft-lbs
Rear Lower Shock Bolt	17 mm	2x	96 ft-lbs
Rear Sway Bar	19 mm	2x	45 ft-lbs

Close KDSS System

- Turn 2x shutter valve bolts (10 mm gear wrench or socket) in by the number of turns they were extended outwards
- Make sure marks line up
- Reinstall the 2x 12 mm (gear wrench or socket) by KDSS guard fasteners
 - o Don't overtighten since the threaded feature is AI

Measure Vehicle Ride Height

- Measure the post-lift height from center hub to painter's tape. Record here:
 - Driver Front:
 - Driver Rear:

- Passenger Front:
- Passenger Rear:

KDSS Spacer install (FRONT)

- **May need to remove front skid plate
- **Must be done with loosened Shutter Valves (2x turns)
- Place floor jack loosely against the sway bar – this ensures that there is no added pressure when removing the 2x bolts and sway bar cap
- Using 17mm socket, remove 2x fasteners and cap on passenger side sway bar cap
 - o Note the orientation of the “1” on the cap. On the front it faces forwards and the rear it faces backwards
- Remove the bushing (split design) & remove the sway bar from the mount
- Install the KDSS Spacer into the fixed mount
- Install the spacer & bushing onto sway bar
 - o Note the orientation of the “1” on the cap. On the front it faces forwards and the rear it faces backwards
 - o May need to loosen the upper bolt on the fixed mount (it's rigid but it can swing)
 - o May need to remove some radiator core support structure that's in the way (removing the 2x 14mm bolts allows more articulation)
 - o <https://youtu.be/mOAr9IVoGZI?t=264>
- Install the cap over the cap, bushing, and spacer and hand tighten the 2x fasteners

KDSS Spacer install (REAR)

- Car on the ground with KDSS shutter valves open
- Drop Spare tire out of the way
- Support rear sway bar in center with a floor jack
- Remove the 2x 14 mm fasteners on the sway bar cap from both the driver side and passenger side
 - o Note the orientation of the “1” on the cap. On the front it faces forwards and the rear it faces backwards
- Drop the sway bar down low by lowering the jack (it should lower on it's own)
- Install the spacer on piston side (driver) and then install spacer on passenger side
 - o Note the orientation of the “1” on the cap. On the front it faces forwards and the rear it faces backwards
 - o Shouldn't need to use the jack on the driver side (assemble by hand)
 - o Will likely need the jack on the passenger side
 - o Note that the rib on the bushing faces upwards on both cases
- Install caps and hand tighten the 4x 14mm fasteners (socket)

Final Torque:

- Shake the car for 3 minutes, let settle for 1 minute
- Torque 2x front KDSS spacer bolts to 30 ft-lbs (alternate between the two)
- Torque 4x rear KDSS spacer bolts to 52 ft-lbs (alternate between the two)
- Tighten shutter valves