STRAIGHT SWING AXLE LOWERING KIT

KIT SHOULD INCLUDE:

- **2 - Axle tubes**
- **2 - Spring plates**
- **2 - Emergency brake cable adapters**
- **2 - Axle seal kits**
- **1 - Transmission gasket set**

TOOLS NEEDED:

- **11 through 19mm wrenches**
- **13 through 19mm sockets**
- **36mm socket**
- **46mm socket (some models)**
- **Torque wrench**
- **Rubber mallet**
- **Small metal hammer**
- **Hacksaw or cut off disc**
- **Feeler gauge**
- **Pry bars**
- **Needle nose pliers**
- **Snap ring pliers**
- **Angle finder**

SEALERS AND OILS NEEDED:

- **Gasgacinch**
- **3M weather strip adhesive**
- **White grease**
- **90w oil**

PARTS NEEDED:

You will need to find two axles that are long axle, long splines, that came on 68 only Type 1 (Bug and Karmann Ghia) or any swing axle Type 3. You will also need two bearing caps; these are the four bolt caps that hold the backing plate on. These have to come off a short axle tube from an early Bug (61-66). You will also need the inner and outer bearing spacers that come off from any swing axle. Next you'll have to decide on which brakes to use, as your old brakes will not work. Please read the section on brakes to see what suits you best. If you're working on a 1959 or earlier bus, you will need a front conversion mount and a nose cone off a 1960-1966 bus. Buses 1963 and earlier will also require you to buy two e-brake cables for a 1964-1967 bus.

BRAKES:

This is a broad, varied subject. First you need to decide what type of brakes, disc or drum? Next you must choose which lug pattern rim: wide five (5 by 205), four lug (4 by 130), Porsche five (5 by 130), or one of your own. The most frequent way is to stay with the wide five rims your bus has now. There are a couple of ways to do this. One way is to run the four lug drum and use adapters. This is the best way if you are planning to run stock bus rims. The adapter acts like a spacer allowing the tire to clear the spring plate. If you are planning on using chrome rims or an aftermarket rim, then there are a couple of different ways you can go. One

way, if you have the small spine drum on your bus now, is to take the drum to your local machine shop and have ¾" shaved off the snout and turn the farthest lip in flush. This allows it to fit into a 68 Bug backing plate. If you do that, the only thing you have to change is the wheel cylinder to the larger Bug front one. It bolts right in place without any modification. The other way is to use type 3 64-65 backing plates and drums; they already take the wide shoe and wide five pattern. If you choose to go with four lug rims, then any 68 on Bug backing plates and drums will work. Just remember if you use the Bug backing plates, change the wheel cylinder to a front Bug wheel cylinder to get the larger diameter. Type 3 68 on are also four lug and you won't have to change the wheel cylinder. If you want to use the Porsche 5 by 130 pattern, we suggest you go with four lug drums and use adapters because Porsche rims are really inset and the adapter will act like a spacer. If you want some other pattern call us and we'll do our best to find a solution. If you elect to go with disc brakes, any aftermarket disc brake kit that fits swing axle will work. One last note, you only have 6 ¼" from the face of the drum to the spring plate.

DISASSEMBLY OF STOCK REDUCTION BOX TRANSMISSION:

Once the transmission is out of the car, mount it on a stand and drain the oil. If you don't have a stand, drain the oil by placing two 2X4s under the bell housing and standing it up.

1. Remove the drums using either a 36mm or 46mm socket.
2. On one side remove the bearing cap; it has four 14mm bolts. Take out the 13mm bolt holding the wheel cylinder on and remove the wheel cylinder. Remove the two 17mm nuts under the brake shoe adjusting stars. Pull off the backing plate, leaving the brake shoes on it. Now repeat these steps on the other side.
3. Remove seven 13mm bolts that hold the reduction box halves together. Use a small hammer and punch to open the seam of the reduction box. You will find an area to hit behind the upper and lower drain plugs. Once you have an opening, use two pry bars to separate the halves. Repeat these steps on the other side.
4. You should now see a circlip on the upper axle. This clip holds the upper gear and its outer bearing on. Remove this clip with a small set of snap ring pliers, then take two small pry bars and pry behind the upper gear, pulling it off. Leave the bottom axle in the housing. Repeat these steps on the other side.
5. Move in-board and find the six 13mm nuts that hold the axle tube retainer to the side plates. Remove the nuts and get out your rubber mallet. Strike the backside of the reduction box with the mallet where the spring plate is mounted. Continue hitting it until the axle tube slides off the axle. Repeat these steps on the other side.
6. Go back to the center and carefully pull the plastic looking flower off from each side plate. Locate and remove the eight 13mm nuts holding the side plate on, see figure D. Now repeat on the other side. <u>Do not pry off side plates;</u> there's an easier way.
7. Hold the axle on the clutch arm side in one hand, keeping the axle as straight as possible and hit the end of it with your rubber mallet. Have someone on the other side catch everything that pops off. Be careful because it's heavy, but don't worry parts won't go flying all over your shop.
8. Once the carrier with axles is out, take two pry bars and pry off the side plate that came out with the carrier. It's very important that if the carrier bearing stays in the side plate that you keep track of the shim(s) and on which side they came off from. The shims are metal rings between the carrier and the bearing. There's always one thick one on each side and sometimes a thin one as well. I can't reiterate this enough, don't lose them and for heaven's sake keep track of which side they came off of, either the ring gear side or the non-ring gear side. Take a hammer and grab it by the head and use the handle to knock the side plate out that's still on the transmission.
9. Go back to the carrier that still has axles in it and find the large snap ring that holds the axles in, see figure C. Pull the snap ring off. If you don't have a pair of snap ring pliers this big, usually a pair of needle nose pliers will work. Once the snap ring is off, reach in

there and find the thrust washer. It's a thick washer with a bump on it that lays right under the snap ring you just took off. Pull this washer out and give the axle a tug and it will come out. Remove the fulcrum plates; these are the two plates that sit on each side of the spade end of the axle. Repeat these steps on the other side. Pull the side gears out of both sides of the carrier.

10. At this point you're done taking things apart, so take a break and clean up.

ASSEMBLY OF THE CONVERSION:

If you are using a Type 1 or Type 3 tranny it's not necessary to take your bus transmission apart, just pull off the axle tubes and the nose cone. Replace the nose cone with your old bus nose cone. If your bus is of the 55-58 vintage, don't bother pulling off the nose cone, as it won't work. Give us a call and order the conversion mount and find a bus nose cone from a 59-66 tranny.

1. Clean and inspect all the parts. You should look for chips in the ring gear and pinion. If you have this problem find another tranny because yours is history. Look for cracks in the side gears and excessive wear or chips on the fulcrum plates. Also look for chewed splines and threads on the axles and excessive wear on the spade ends.
2. If your carrier bearing stayed in the side plate when you took it apart, take it out of the side plate now and put it back on the carrier. Don't forget the shims. Note: There is an inner bevel on the thick shim. Make sure this bevel is on the carrier side. If the carrier bearing stayed on the carrier, ignore this step.
3. Locate the side gear, axle and fulcrum plates, see figure B. Smear some white grease on the backside of the fulcrum plates and place them into side gear. Take your axle and smear some white grease on both sides of the spade end and install it into the side gear. If you are having trouble getting the fulcrum plates to stay put, turn the axle with side gear over and reach through hole in the end and push them into place. Throughout the rest of assembly make sure that the fulcrum plates stay in place. If one slides back, you have to start over. When you're finished, take a feeler gauge and measure between the fulcrum plate and the axle. It should measure between .001 and .010", if not replace the fulcrum plates. When you're done it should look like figure A.
4. Now take some 90w oil and coat the outside of the side gear. Then pick up the axle with side gear on it and place it into the carrier. Make sure it's all the way down. Check the spider gears and make sure they haven't slid together. Then place the thrust washer and snap ring over the axle, see figure C. Place the thrust washer in the carrier paying close attention to the bump and the groove it fits into. Install the snap ring, putting the open side opposite the bump in the thrust washer. Now repeat these steps for the other axle.
5. Set the carrier with both axles aside and go back to the tranny. You're going to install the starter-side side plate (side plate without the clutch arm) first. If your transmission had a gasket between it and the side plate, be sure to use a new gasket. If it had an o-ring, then use a new o-ring but do not use both. If you're using the gasket, use Gasgacinch on both sides of the gasket and position it on the transmission and put the side plate on. If you are using the o-ring, place the new o-ring on the transmission and apply a small bead of 3M around it and install the side plate. When bolting the side plate on, use a flat washer, a lock washer and then the nut, see figure E. Nuts torque to 15-foot lbs. in a star pattern.
6. Go back and pick up the carrier and install it into the tranny with the ring gear ***now*** on the clutch arm side, see figure D. Use a rubber mallet to drive the carrier into place, making sure it's straight and sits down evenly. Mount the clutch arm-side side plate the same way you did the other side, making sure the fulcrum plates haven't slipped.
7. Place the plastic flower over the axle and down onto the side plate; it will snap into place, see figure F. Once again check the fulcrum plates. If they've slipped, turn the transmission so the axle is straight down and by pulling the axle up and down and twisting it around, you can usually get the fulcrum plates to fall back into place. If this

doesn't work turn the transmission around so the axle is up again and pull the plastic flower back off. Now pull the snap ring off and remove the thrust washer and pull the side gear back off. It's not necessary to remove the side plate again. Fix the fulcrum plates and put everything back together. With everything in place now, take three axle tube gaskets without sealer and place them on the side plate, see figure F. Place the axle tube over the axle making sure you have the correct tube for that side. The shock mount should be down and facing the nose cone. Another way to check is to look at the casting number. If the number ends in an even number that's the passenger or right side tube and if it's an odd number that's the driver or left side tube. Use wafer washers and put all six nuts on the tube and torque to 15 foot lbs. in a star pattern. Grab the axle tube and move it up and down; it should have a slight amount of drag. If it feels too loose take out one of the gaskets. If it feels too tight add a gasket. Once you have determined the correct number of gaskets, take it apart and apply Gasgacinch to both sides of all the gaskets and again install and torque to 15 foot lbs in a star pattern.

8. Before you put on the other axle tube, you'll want to finish this side all the way out to the end, see figure G. You do this so you don't have to worry about the fulcrum plates slipping again. Place the small spacer over the axle with the bevel towards the transmission and the flat side towards the bearing. Install the bearing and drive it into place with a punch on the inner race. First place the washer against the bearing and then the large spacer with bevel cupping the o-ring, refer to figure G. Now install the new seal in the bearing cap and grab your backing plate.
9. Put the backing plate on the tube with the wheel cylinder down and the emergency brake cable hole up and forward, see figure H. Next place the four-bolt gasket with Gasgacinch on it around bearing after you stretch the large o-ring around the bearing. (Now stretch the large o-ring around the bearing and then place the four-bolt gasket that's been coated with Gasketcinch around the bearing) Note: They give you two gaskets but you'll only use one. Place the bearing cap over the bearing and torque to 43 foot lbs. You're done on this side so go back and finish the other side. Now put your brake shoes on and install your drums. It's better if you wait until the transmission is back in the bus to put on your axle boots.

INSTALLING SPRING PLATES:

Level the bus with an angle finder (inclinometer) on a flat part of the bus's floor and adjust the bus to (0) degrees. If you don't have an inclinometer go buy one, it makes this whole job easier and more accurate. You can pick up an inclinometer at your local Sears store. Place the rubber grommets on each side of the spring plates. The plates will install with the notch up and splines out to the outside. Put the plates over the torsion bars and place inclinometer on the spring plate. Your starting point should be about 4 to 7 degrees for no wheel camber. To attain the correct amount of degrees you will have to combine the rotation of the inner splines (torsion bars) with rotation of the outer ones (spring plates). Just be sure that you stay within ½ degree from driver's to passenger's side. It's hard to tell just exactly where your bus will sit and it may take another round of spring plate adjustments for that look or fit that's just right, but you can be sure that when the job is finished, it was worth every cent and drop of sweat that went into it. Now put the tranny back in.

EMERGENCY BRAKE CABLES:

If your bus is a 1963 or earlier you will need 1964-1967 emergency brake cables. On buses 1958 and earlier you will need to shorten the cables in the front.

1. Remove the drum and completely loosen the cables at the front of the bus. You will need the two emergency brake cable adapters (gold tubes). This tube will be put between the cable housing and the backing plate. Slide the tube over the end of the cable paying close attention because one end of the tube has been opened up to fit on the

step portion of the cable housing. A 2" section of the return spring will need be cut off with a hacksaw or a cut off disc on a die grinder. Cut the spring and twist it off. Clamp the gold tube with the emergency brake housing into the backing plate.

2. Install the drum and tighten the axle nut to 250 foot lbs., then put in the cotter pin. Never back off the nut to line up the hole on the cotter pin. If it doesn't line up, tighten it some more until it does. Now adjust your brake shoes.
3. Your brake lines go on next. Thread the metal line into the wheel cylinder and very carefully bend a "z" into it so that it hooks the flex line. Install the clip that holds the flex line onto the tube and tighten the metal line. Do both sides. Check all the brake lines to insure they're tight. Now bleed the brakes starting from the passenger side.

ALIGNMENT:

Once both sides are complete, use a tape measure to get the toe in as close as possible. You do this by mounting the tires and measuring from a spot in the thread of one tire to the same spot on the other tire. Do the front first, making certain you're not hitting any of the frame members and then go to the back. Adjust the axle tubes on the spring plates so that you have about a 1/8" toe in. This will get you close enough so you can get it to an alignment shop to do the final adjustment.

Please contact if you have any questions.

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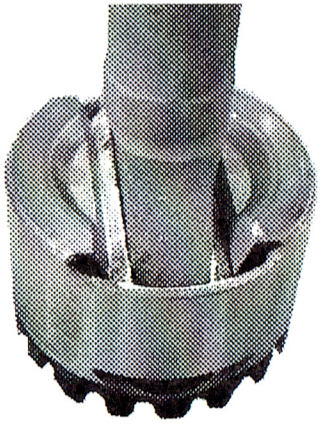

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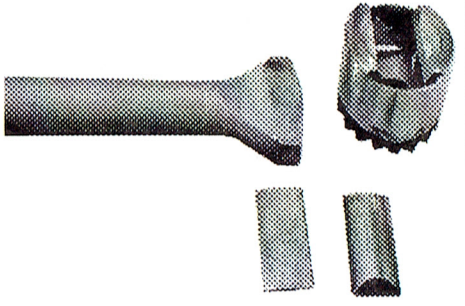

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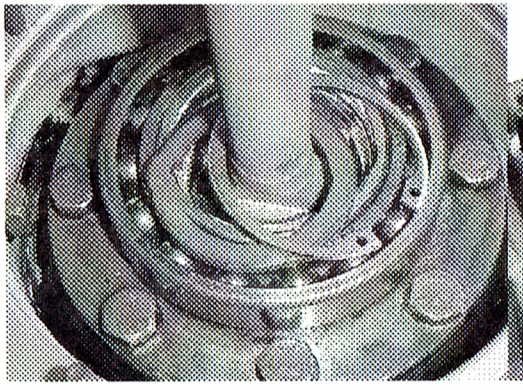

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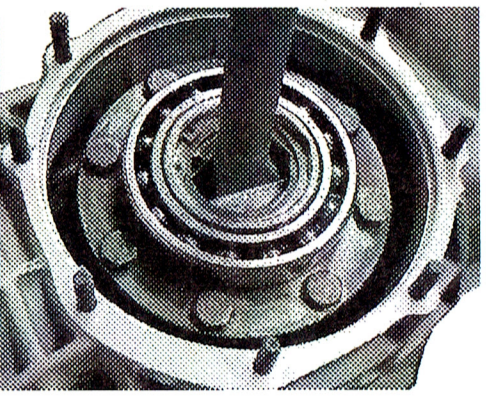

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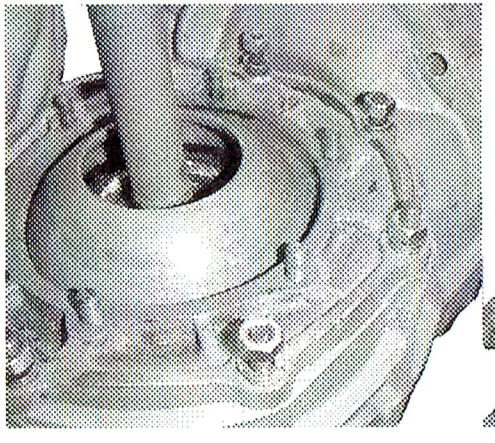

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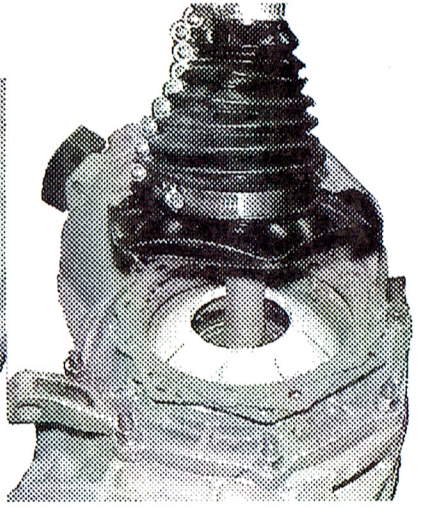

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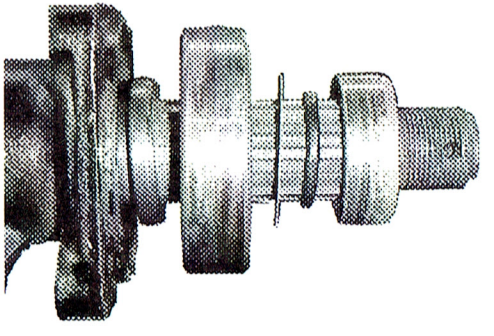

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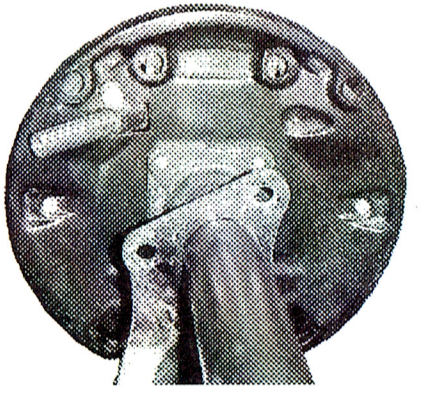

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SPRING PLATE

Customer_____Invoice #_____

Date _____/_____/_____

Core Deposit Paid $ _____

BOLT HOLES -$50.00_____

BENT -$50.00_____

OTHER _____

Total Refund _____