

\$1.00



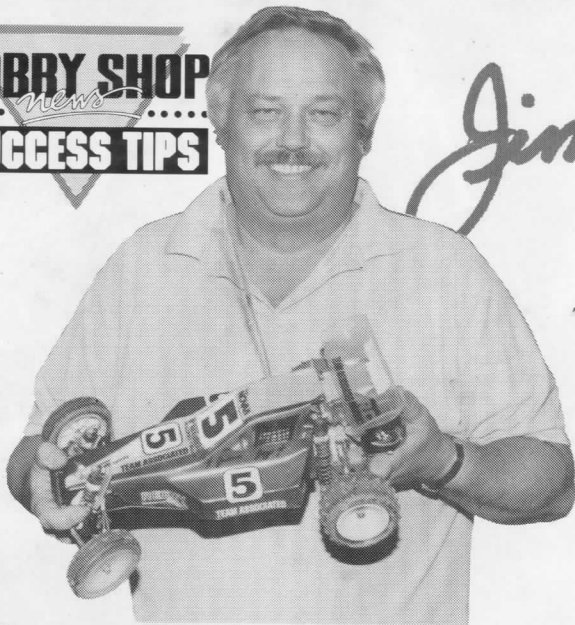
*Jim Halsey*

**HOBBIY SHOP**  
*news*  
**SUCCESS TIPS**

# TRANNY TIPS

**FOR THE  
TQ10/RX10**





*Jim Halsey*

# TRANNY TIPS

**C**hampion Jay Halsey has an impressive track record. One of Jay's advantages is a whisper smooth tranny thanks to his dad, Jim. Now you can build a Halsey transmission! It takes several hours but you get big time results - you go faster and your "new" transmission will be more reliable than stock.

We'll begin tranny assembly picking up with step 25 in the TQ10 instructions. (Or step 27 in the RC10 instructions.)

## Materials Needed

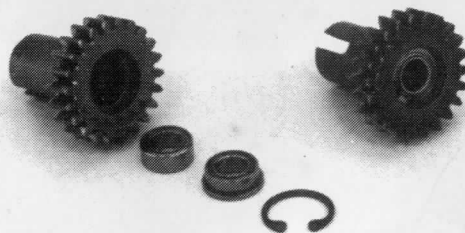
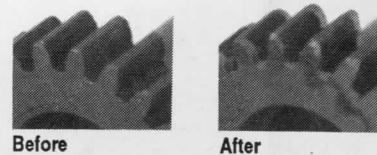
- WD40
- 1/4" thin vinyl tape (GBG striping tape works well)
- (2) 4-40 x 1/8" set screws
- TQ10 bearing set (Dynamite #3500)
- Bud's diff ring (#2110)
- Motor spray (cleaner)
- TRC or Team Pit Stop transmission dirt cover

## Tools

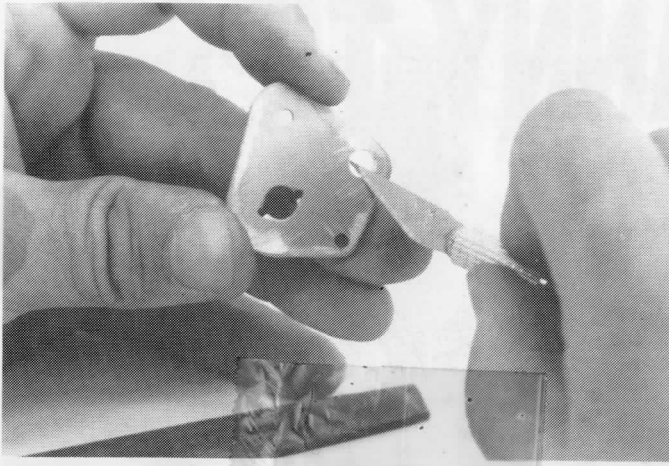
- Moto-tool with #409 cut off wheel and a #402 mandrel
- Taper reamer
- Calipers (optional)
- Small flat file
- Drill with #40 bit
- 4-40 tap and handle
- 5/16 Carbide cutters round (DRE9935) cylindrical (DRE9933)
- Plastic hammer (or screwdriver with plastic handle)



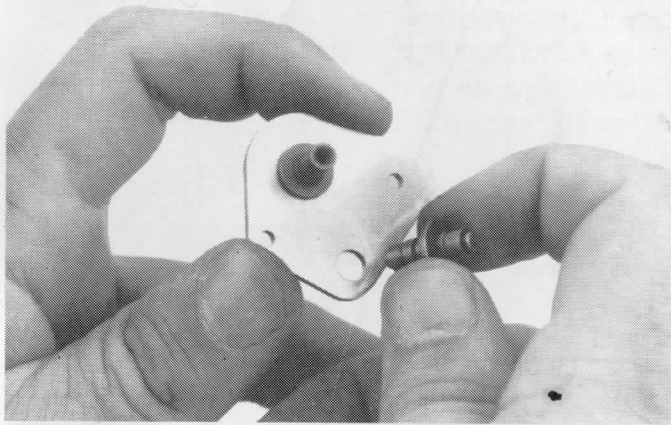
1. Start by preparing the steel gears. For a friction free gear mesh, you'll need to begin by removing the small burrs left on the metal gear (#6612 (2), 6620, 6621) caused from manufacturing (see inset photo). Use a moto tool with a #409 cut off wheel and lightly touch up the edges of each tooth. Be sure you don't change the shape of the gear itself. Use motor spray to thoroughly flush away all metal particles.



2. Install bearings (not included in the kit) in the output drive gears (#6612). Install the small unflanged bearing first and then the flanged bearing and retain with circle clips. Make sure the clip seats all the way.



3. Next, look at the spine plate (#6611). To make the shafts seat properly, any burrs around the edges of the holes where the shafts fit should be removed with a small flat file. Using an X-Acto #11 blade, lightly chamfer the holes.



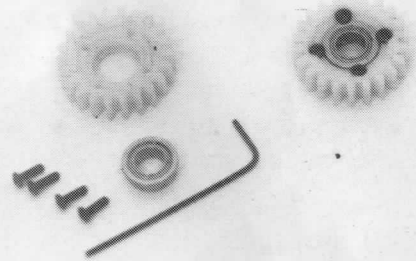
4. From the #612 bag, take out the drive gear pivot (#6609). Also in the bag is a small bag with screws and a split roll pin. This pin goes into the hole in the pivot. Using needle nose pliers to hold the pin, and lightly tap it into the hole until it's evenly centered on both sides. Trial fit the drive gear pivot shaft (with pin installed) and the idler gear pivot shaft (#6610) in place. They should fit flat on the spine plate with light hand pressure.



5. Degrease the spine plate and both pivot shafts with motor spray. Using a washer and curved 'E' clip with the center up and ends down, install the idle gear shaft in the round hole. (Since it's possible to bend the aluminum plate, be sure not to force the shaft to fit.) Make certain it's fully seated against the flange.



6. Apply a small amount of thin CA glue on the spine plate at both sides of the idler gear pivot shaft. Use a CA kicker to harden the CA.



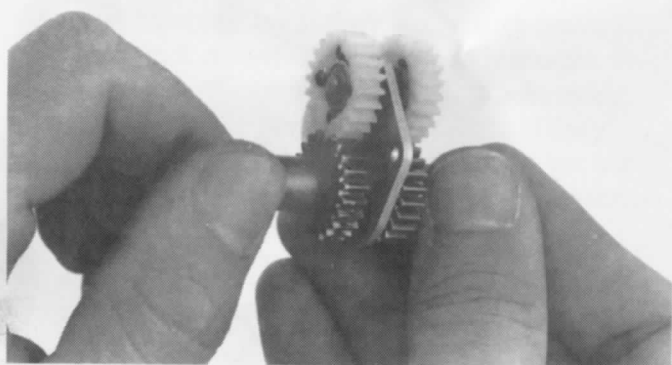
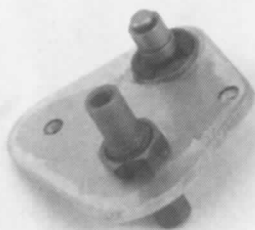
7. Install bearings in the idler gears (#6613) and then install the 4 small button head screws as shown. Only tighten the screws until they seat. Be careful not to overtighten because you'll distort the gear. (Although white idler gears are shown in the photo, your kit may have black idler gears.)



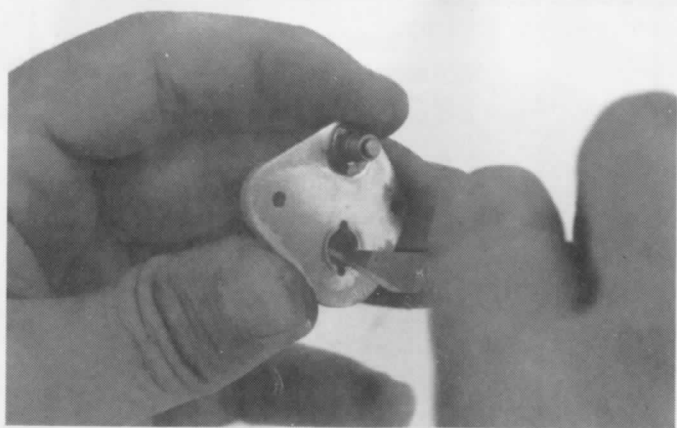
8. Use a drop of blue Loctite to secure each screw.

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9. Temporarily insert the drive gear pivot and pin in the lower pivot hole and thread the 1/4-28 hex nut on. Make sure the pin is centered with the slots in the plate, and that the flange is flush against the surface of the plate.



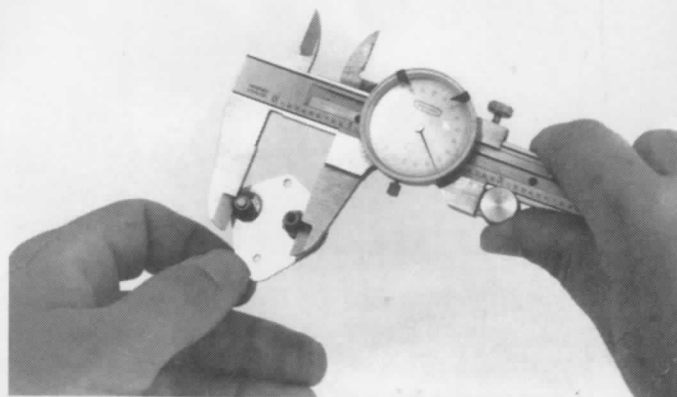
10. Now, slide the gears on their shafts. Check and see if the mesh between the idler gear and output gear is too tight.



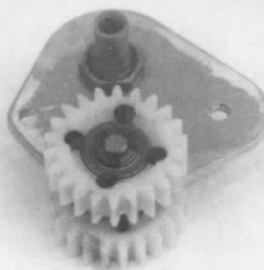
11. In most cases it will be necessary to trim the lower edge of the drive gear pivot hole approximately .015" with an X-Acto blade. This is a tough part, but critical to getting a smooth tranny.



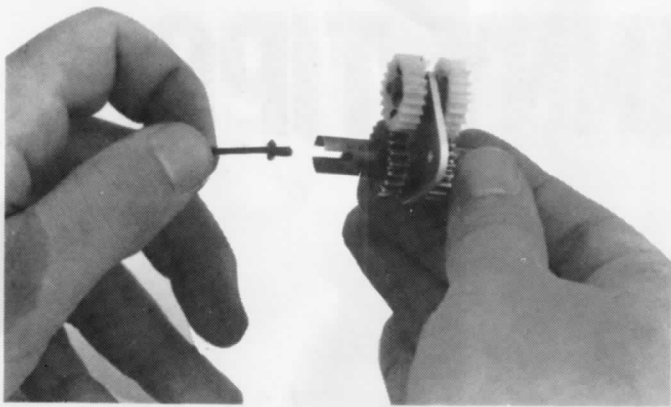
12. Reinsert the gears and check the mesh until it's correct. (It should freely spin for several seconds when spun.) Add a drop of threadlock to the threads and, while pulling away from the idler gear pivot, tighten the hex nut with a socket or open end wrench.



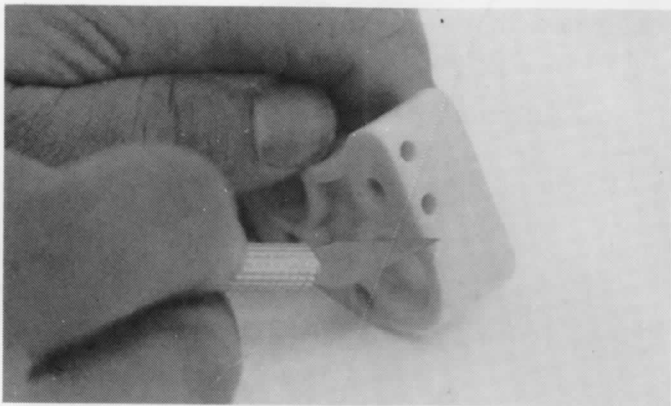
13. To ensure proper gear mesh, make sure that the pivot shafts are parallel. You may want to use a caliper to make sure the distance between the shafts on both sides of the spine plate is equal.



14. Install the idler gears (#6613) on the idler pivot shaft on the spine plate; and retain with "E" clips.



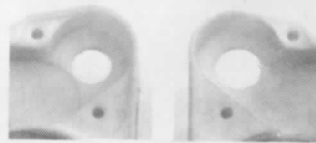
15. Use the button head screws to retain the output drive gears on both sides of the spline plate. Recheck the mesh on both sides and then set this assembly aside until step #17.



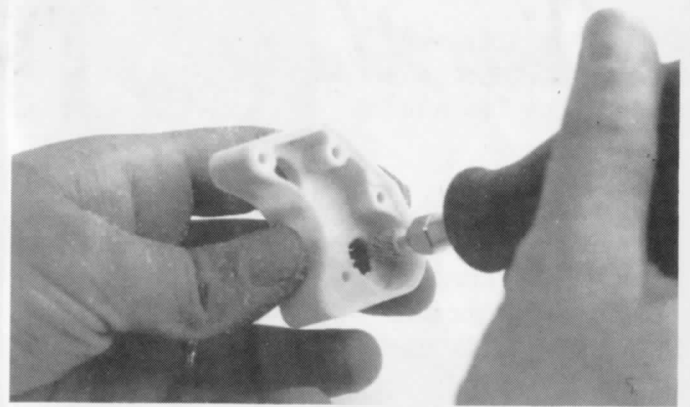
16. Take one of the transmission cases (#6605) and turn it upside-down. Using an X-Acto knife, remove the mold flashing on the bottom of the case. This is to ensure a proper fit when it's mounted on the graphite chassis plate. Do both housings.



17. Using a moto tool with a 5/16" round carbide cutter, grind the step *inside* the housing flush with the surface. Be careful not to go too deep. Do both housings.



Before After



18. Take a 5/16" cylindrical carbide cutter and grind the radius left from the round cutter to a 90 angle. Smooth the entire surface. Do both housings.

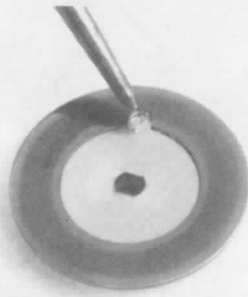


19. Using a taper reamer, enlarge the output drive hole slightly (1/8") so there's no possibility of friction between the case and the output drive gear. Wash the transmission housings thoroughly with mild soap in warm water and let dry.

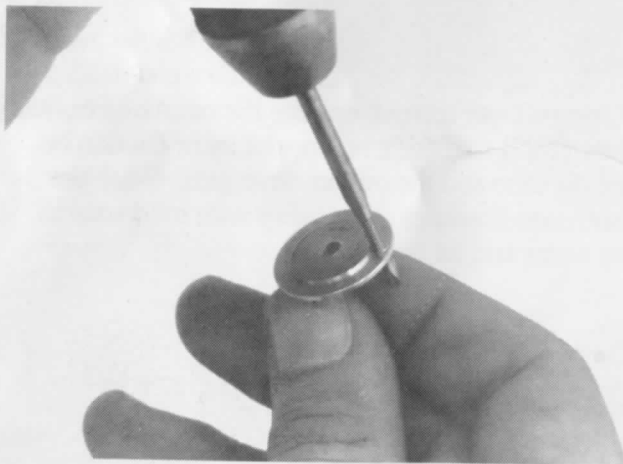
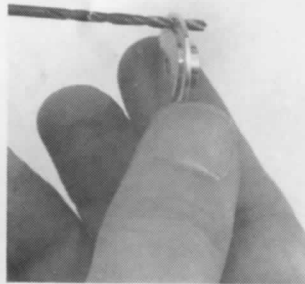


20. Trial fit the gear assembly in the transmission housing. The output drive gears should turn freely when spun with your fingers. Remove the assembly and set aside to be used in step #43.

21. Now you're ready to pin the diff ring assembly. Set a **Bud's** diff ring (BUD2110) on the diff outer hub (#6624) and mark the location for the pin to be drilled and tapped.

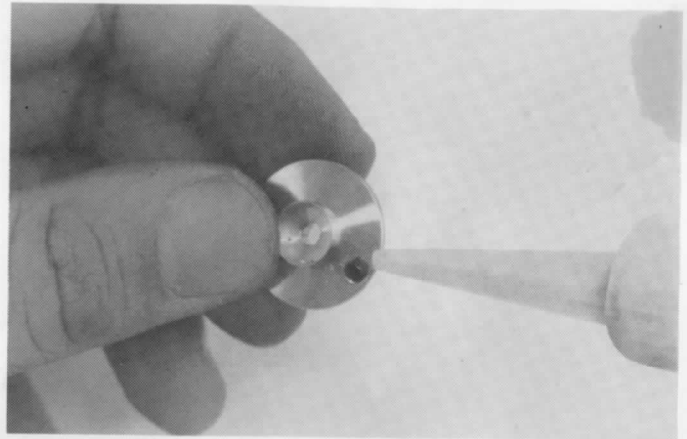
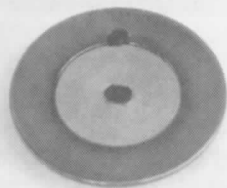


22. Remove the diff ring and carefully drill a hole in the hub (#6624), using a #40 drill bit.

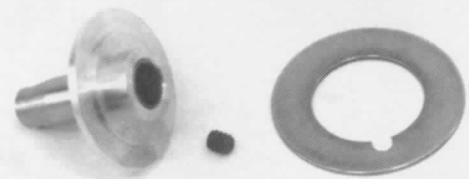


23. Now take a 4-40 tap and carefully thread the hole.

24. Using the diff ring as a guide, install a 4-40 set screw flush with the diff ring surface as shown in the photo. The set screw should fit into the notch in the diff ring.



25. Remove the diff ring. On the back side, use CA and kicker to secure the set screw.

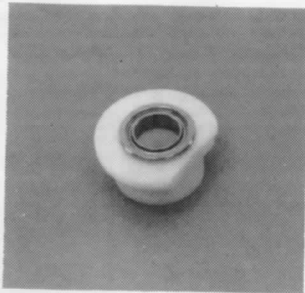


26. Take the diff tube assembly (#6617) and repeat steps #18 through #21, carefully marking, drilling, and threading a 4-40 hole in the hub on the diff tube and inserting a 4-40 set screw.

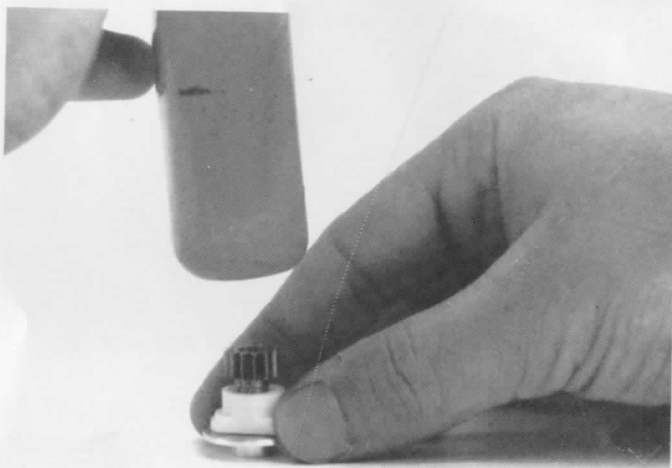
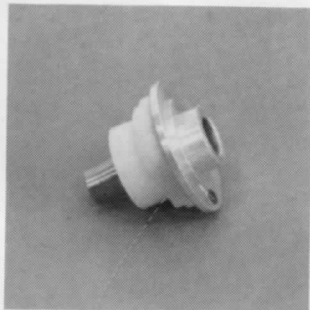


27. Now take the differential shaft (#6618) with gear, and the thick thrust washer (#6627.) The gear is locked to the shaft on a taper. Slip the washer on the shaft. Then slip the blue thrust bearing on, as shown.

28. Take one of the bearing adapters (#6606) and install a 1/4" x 3/8" ball bearing.

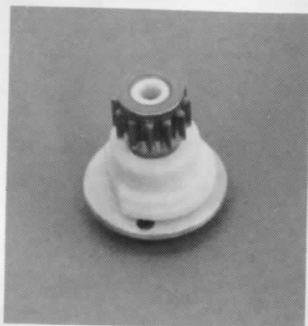


29. Now insert the diff tube into the bearing adapter assembly as shown.

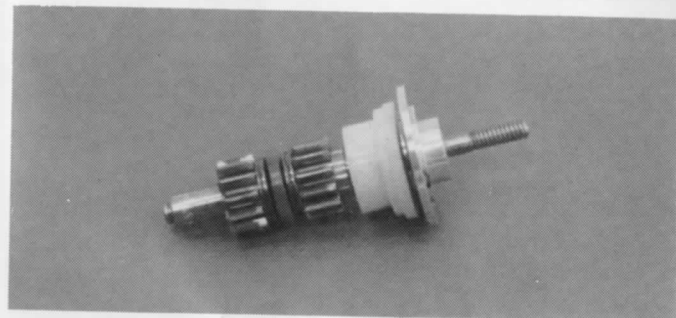
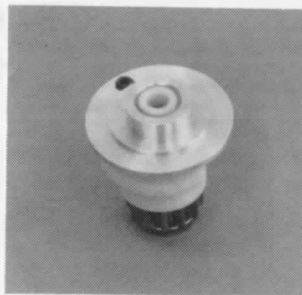


30. Take the diff pinion gear and install it on the diff tube. **This must be done very carefully.** Tap the gear on using a plastic hammer or the handle of a screwdriver. The gear **does not** go all the way on. You need to get the gear on far enough to take out some of the side play in the gear, but not too far or you'll mushroom it out. It needs to be pressed on approximately .015" beyond its natural position. Don't use a vise for this step!

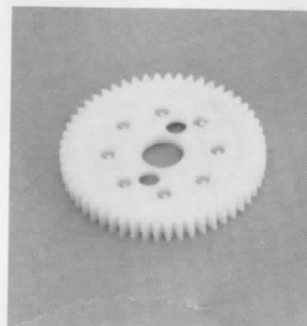
31. Take one of the teflon bushings (#6623) and the thick thrust washer. Push the bushing inside the washer.



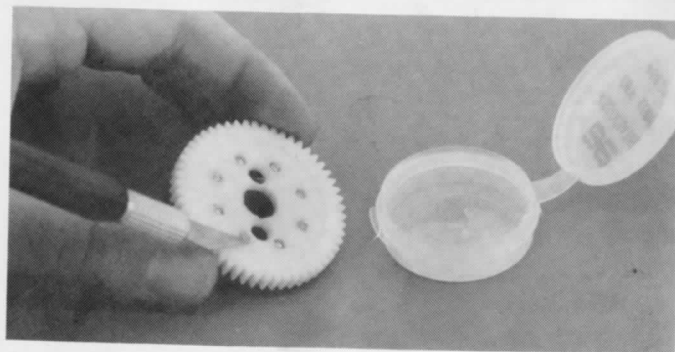
32. Take another teflon bushing and push it into the diff tube with your finger.



33. Slip the diff tube assembly onto the diff shaft. (See photo.) The diff tube assembly should spin freely on the shaft.



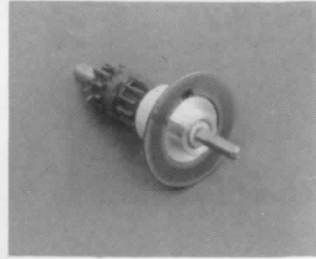
34. Take the diff balls (#6626) and plastic spur gear (#6653). (You may want to substitute a 48 pitch spur gear - they're very popular with off-roaders and make your transmission a little quieter. You also have a better selection of gear ranges than with 32 pitch.) Push the balls into the square holes in the gear as shown.



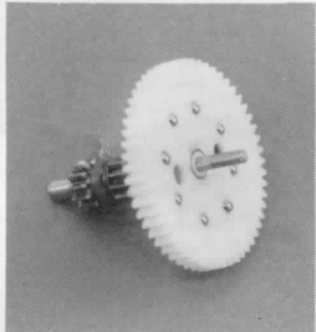
35. Take the Associated diff lube (#6636) and apply a **small** amount to the compound on both sides of the balls. Also apply a small amount of this compound to the center hole of the gear. Do not use this diff compound anywhere else on the car! It is not intended as a lubricant. (Use only **Associated diff lube** as it contains very special additives to insure the balls **roll** instead of **slide**.)

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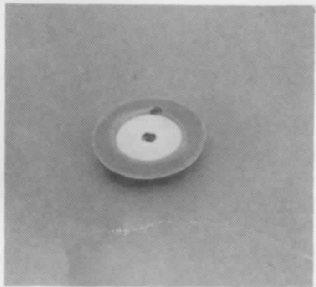
36. Take the diff shaft assembly and install a diff ring on the diff tube hub as shown.



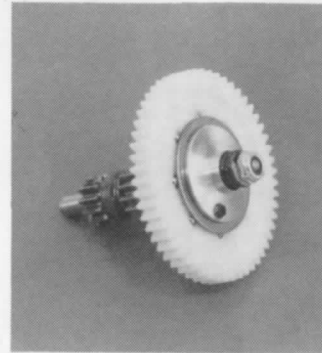
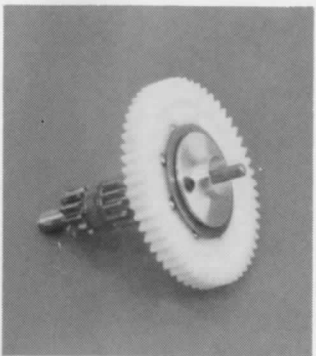
37. Take the spur gear you'll be using and slip it on the shaft.



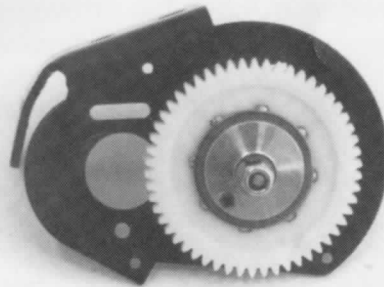
38. Take the other Bud's drive ring and slip it on the aluminum outer hub (#6624).



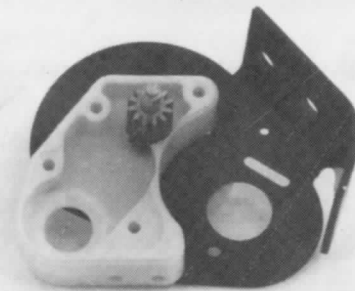
39. The outer diff hub has a notched hole to match the flat spots on the shaft. Align the two and slip the hub on the shaft. Check that both drive rings are centered and seated against the aluminum hubs and that the 4-40 set screws key into the slots of the Bud's diff rings.



40. Take out the diff spring (#6628) and nut. Slip the spring on and screw the nut on. You'll have to prevent the small gears from turning while screwing the nut on. Screw the nut on until the end of the nut is even with the end of the shaft, as shown.



41. Take the motor mount (#6607) out and slip the diff into it, as shown.



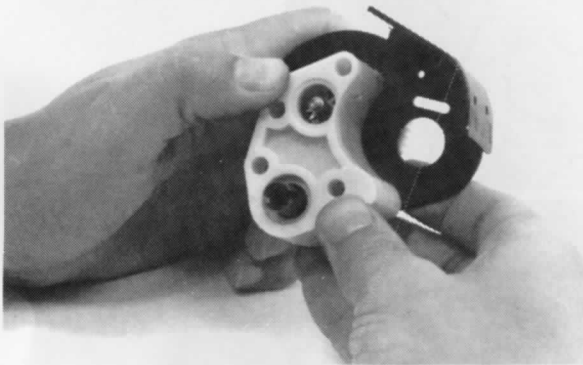
42. Make sure the bearing adapter is properly seated in the motor mount. Take out the transmission housing that was prepared in step #17 and slip the R.H. half of the housing onto the diff.

**NOTE:** There is a flat on the adapter that **MUST** match a flat in **BOTH** the motor mounting plate and the transmission case. The adapter is a tight fit in the transmission case, so you'll have to work to get it started. If you have installed it properly it (the adapter) will be in far enough to be flush on the inside of the case half-shell. The motor plate will be loose for the next 9 steps.



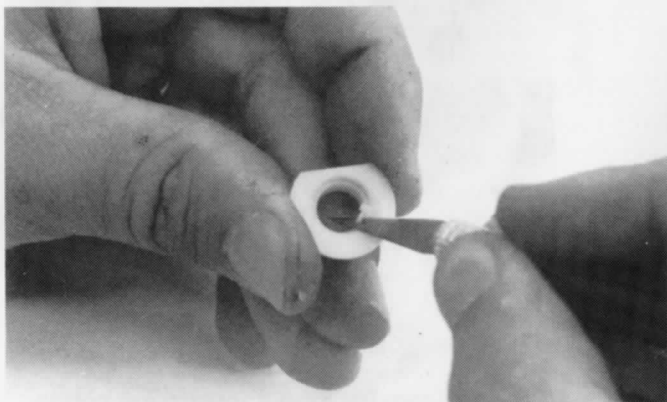


43. Take the idler gear assembly and set it into the housing, as shown.

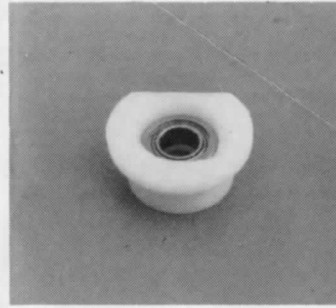


44. Take the L.H. side of the housing and push it onto the R.H. side. It will snap together with finger pressure.

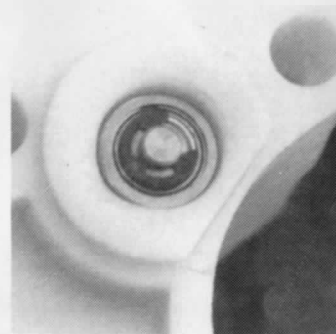
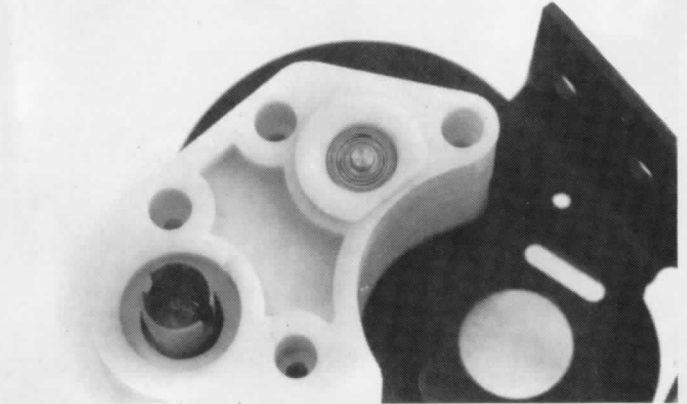
**NOTE:** The seam between the two halves of the case should close completely with no more than a few thousandths of an inch gap showing (usually on the bottom of the case). If you cannot close the case completely look for something wrong inside.



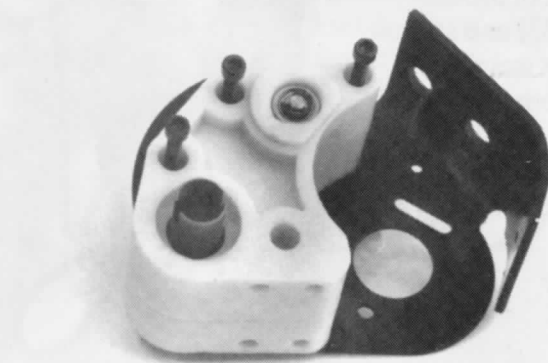
45. Take the other bearing adapter and cut a small notch in the edge, as shown. This will make installing and removing the "E" clip a lot easier.



46. Install the ball bearing into the adapter.

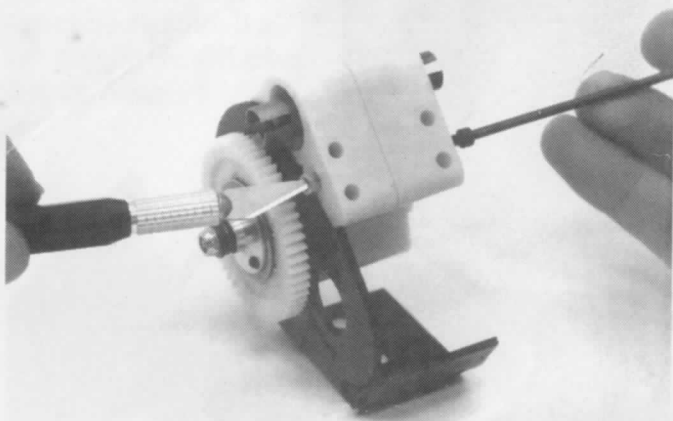


47. Install the adapter onto the diff shaft and secure with an "E" clip. Make sure it is seated correctly.

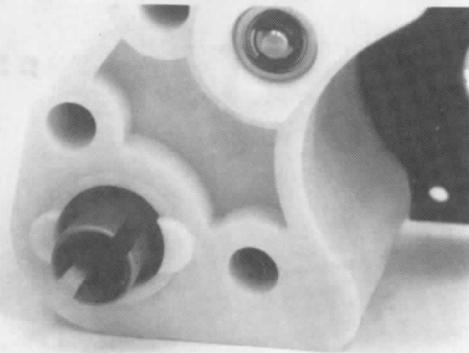


48. Take the 3 long Allen screws, as shown, and screw them into the motor mount.

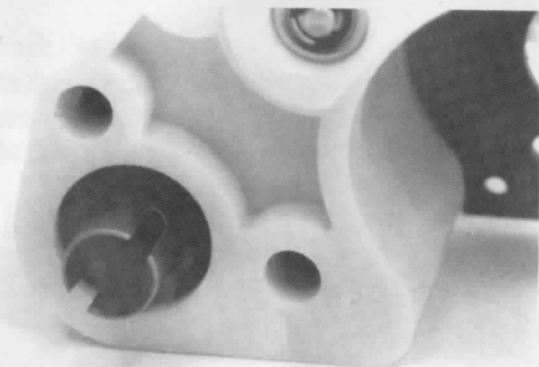
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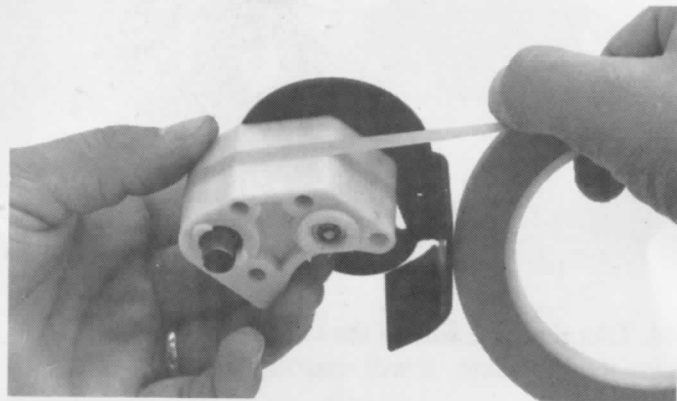
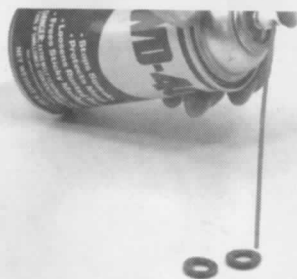
49. Take the short screw, then slip a 4/40 nut into the hex hole, as shown, and tighten this screw.



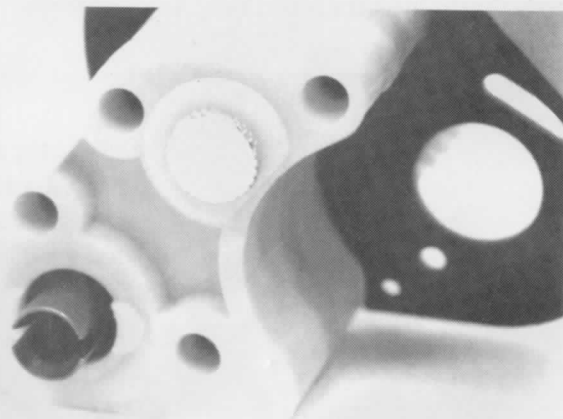
51. Now push the 2 felt retainers on. They should snap in. "Ears" should be horizontal. If they're loose, use a drop of contact cement to hold them in.



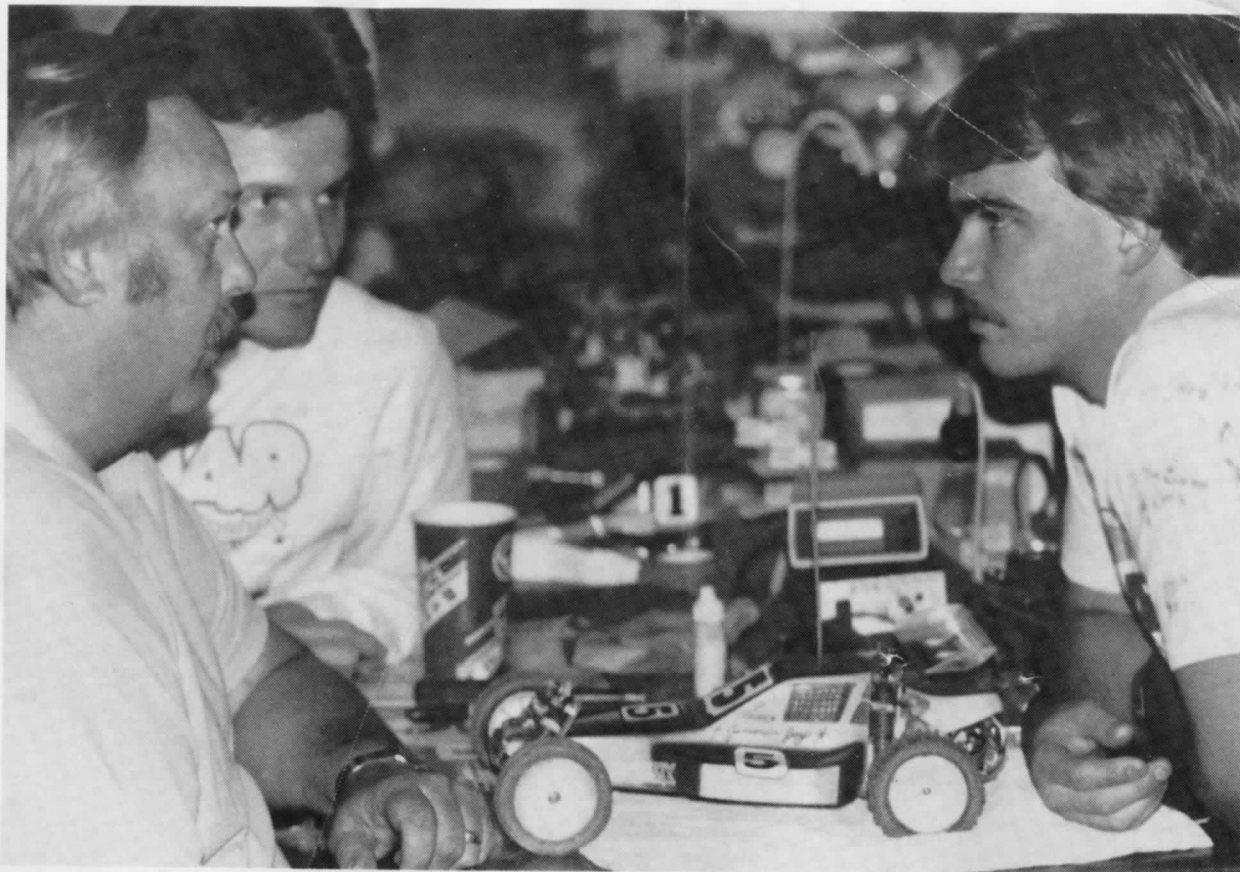
50. Take both the felt seals (#6633) and saturate with a light weight oil (WD40 works fine.) This helps keep the dirt out of the transmission. Slip them on the outdrives as shown.



52. Take a piece of 1/4" fine line tape, such as Goldberg striping tape and seal the seam of the transmission housing as shown.



53. Use a TRC or Team Pit Stop transmission button to keep dirt out of the bearing. Once the transmission is properly assembled, it should turn very freely (for approximately 15 seconds) when spun.



## *Adjustments at the track*

**W**hat I do first is hold both rear wheels and put my thumb on the spur gear. Then I keep tightening the diff to where I can't slip the spur gear when putting as much pressure on it as I can with my thumb.

As it starts to tighten up, I only go about 1/8th of a turn at a time.

After you've run the car, you should reset the diff because it will have slung some of the grease off and may be tighter than you had originally set it. From there on, it should stay until you take the diff apart again."

*Jim Halsey*

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**SUCCESS TIPS**

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