

The Preventive Maintenance Series

Mike Dawson

'61-'65 4-Speed Transmission Tips

Errors in the Books: The better guide to service these transmissions is the 4" by 8 ½" booklet by GM: *Overhauling the 1961 4-Speed Transmission* (available from CCP). It has lots of pictures, however page 3 shows an un-necessary puller, page 4 does not warn you about holding slight pressure against the counter shaft as it emerges, and page 14 shows using stub shafts on both sides of the counter gear during installation (only the left side is used). Although the '64-'65 units had many change from '63 which you need to be aware of, this booklet is a good guide to the general layout and process.

The shop manuals also show the un-necessary puller, tell you that you can remove the 3-4 shifter fork in the wrong order, include the incorrect diameter of the dummy shaft, give little help installing the counter gear, provide confusing directions on installing the shifter shafts and do not mention removing the snap ring on the 3-4 synchro. Remove the reverse idler shaft and gear after the main shaft.

If you are working with a '61-'63 unit be aware that there was a shim added to some of the main shaft assemblies that does not show up in the manual or parts books. It was installed between third gear and the synchro hub. There were several upgrades done after the '61 model and this shim was probably added to help cut down on excess clearance (movement) when shifting into third and forth.

Driving Out Pins From Shift Forks: Do the removal in the correct order of disassembly or you could lock up the fork with the pin pushed halfway out and no access to it. You must have the shifter forks **fully** engaged in the gears as specified in the books. If you do not, the pins will not clear as you drive them out. Look at where the pins have to exit and be sure they can drop into the case.

Check Spur Gear Teeth: The four forward gears each have spur gear teeth that interact with the synchro hubs. Check them for major chips or flattened edges. If these are really bad they could cause shifting problems even with good blocker rings. Over the years I have had good luck with putting points back on flattened teeth with a very thin cut-off wheel. Practice on a junk gear and with patience and a steady hand you should be able to make the gears serviceable. Also check the corresponding teeth on the synchro clutch sleeves; these are usually good but can also be dressed up if necessary. The two sets of teeth for reverse are usually damaged but unless large pieces are missing (causing clicking in reverse) they do not need dressing up.

Checking blocker ring-to-cone clearance: The tapered area of the brass ring can wear causing it to ride too close to the spur gear. They also loose their ability to engage the cone firmly due to partial loss of the internal splines. You can check by inserting a feeler gauge between the ring and the spur gear ledge while pushing the ring tight against the cone. Clearance should be a minimum of 0.030; new blocker rings from Clarks measured 0.050 on gears I recently checked.

Counter Gear Shaft and Bearings: This is the most common wear problem on the '61–'65 transmissions. If you are driving a vehicle with a bad shaft, you will hear whining in first gear that gets less noisy in second, again less noisy in third and finally quiet in fourth. There are four sets of needle bearings surrounding the shaft and with the loading greatest in first gear the first set of bearings and the corresponding area on the shaft wear out. Continuing to drive the vehicle will increase the wear down the shaft with increasing noise in each gear except fourth gear which does not load the counter gear as there is no reduction; fourth gear is 1:1. The shafts wear badly but I have never seen the bearing surface of the counter gear worn. The replacement shaft and its bearings are available from CCP.

Changing this shaft and the necessary bearings can be the hardest part of the transmission maintenance so I will share some things that help me out. You can remove the shaft for inspection and leave all 92 bearings in place by use of a dummy shaft as described in the shop manual. I used a junk clutch shaft from a '64-'65 4-speed which is the correct diameter (or visit *Metal By The Foot* for an 11/16" dowel) and cut one piece exactly 7" and a second piece about 2", keeping perfectly square cuts. Chamfer the ends of the dummy shaft slightly but leave the ends of the 2" piece sharp; it is the re-installation helper. The counter gear shaft is a press fit at the clutch gear end of the case. Start the shaft carefully with a punch and heavy hammer (or shop press) until you feel it start to give up the press fit, then use the dummy shaft to push the counter shaft out while using your other hand to keep pressure on the shaft as it emerges. This keeps the bearings in place. Since the first gear end where wear occurs comes out first you could inspect it for wear and if perfect (not likely), simply push it back in.

If you install a new shaft and bearings, use lots of cold Vaseline when placing dummy shaft, bearings and spacers into the counter gear. When you are ready to install the counter gear in the case, the book is of little help, so the following is what I use. With the case opening facing you, first, check the inside area on the case where the thrust washer fits on the right side. Half of the cases have residual casting that rubs against the small raised tab on the washer so do a check by sliding the washer into position and note if the tab hangs up. Remove any of the casting that is necessary to be able to slide the washer into place smoothly when the counter gear is in place. Next, use Vaseline to place the thrust washer in place on the left side and use the 2" dowel mentioned above inserted through the washer from the outside. Lower the counter gear into place without disturbing the left thrust washer. Keeping the counter gear level, insert the right thrust washer (coated with Vaseline) into place with its tab in the slot. Look through the hole from the outside and when the washer and dummy shaft are centered, you are ready to insert the new shaft from the right side. You may have to look back and forth at the ends to make sure of the centering and you may need to use a tiny screwdriver to center the bearing retaining washer. As you slide the (new) shaft through, hold pressure on the emerging dummy shaft to keep the bearings in place. Remember the shaft is a press fit into the case on the clutch gear end but will slide easily pushing the dummy shaft out.

Additional Stuff

Remove the reverse idler shaft after removing the mainshaft and remember to install it before replacing the mainshaft.

1-2 Synchro Hub:

Oil slots and zits to 1st Gear

3-4 Synchro Hub:

Oil slots to 3rd Gear

Cover the shifter pin hole with one layer of scotch tape when inserting shaft through seal or inserting seal over shaft. Using fine sandpaper may not get a sharp edge that the seal lip drops down into when moving across the hole.

Changes Over the Years: There were many changes in parts made from '61-'65; eight different versions with many parts upgrades according to our CORSA Transmission Historians. A lot of changes were made in the middle of model years so if you are sorting through used gears that you do not know the history of, it is vital that you read up on changes and **measure parts and count teeth carefully.**

Craig Nicol has written a great guide to yearly upgrades and parts changes, and combined that with interesting historical information. His article can be found in the October 2004 issue of CORSA Communique or in the CORSA Tech Guide, page Transmission 24.. Having a copy on hand can be useful since others may have been into your transmission before you.