

Some history of Land Rover gearboxes

Manual gearboxes from inception through 2000

The gearbox used in series Land Rovers was first used by Rover in 1932. This gearbox has undergone several modifications since then but is still basically the original design. This gearbox was considered advanced and strong when it was introduced and was finally discontinued because it could no longer be modified to hold up to the power and weight of newer Land Rovers.

From 1948 (first LR production) to 1950 the gearbox had permanent 4WD with a freewheel device in the front prop shaft. From 1951 Rover fitted a transfer case with the now well known 'yellow and red knobs' right up through series III.

The dipstick and top oil fill disappeared with the introduction of the "B" suffix gearbox. At that time the transfer case intermediate gear shaft diameter was increased for additional strength. In the autumn of 1963 the gearbox ratios and transfer case low gear ratio was changed with the introduction of the "C" suffix

In the Autumn of 1966 Rover introduced the '1 ton' 109" with the 6 cylinder petrol engine (A small number of 4 cyl models were made in 1970/71). The 1 ton version had a lower ratio gearbox and transfer case to accommodate carrying a heavier load, and to compensate for the 9.00x16 tyres that came stock under the 1 ton model. One ton models also had ENV axles instead of the standard rover type. The 109 forward control Land Rovers used the same gearbox and transfer case.

The factory built a small number of all syncro series IIA gearboxes just prior to converting the box into the series III gearbox. The all syncro series IIA gearboxes can be identified by a "S" prefix on the stamped number located on the transmission top cover. Since top covers can move about when multiple gearboxes are rebuilt, and a IIA gearbox is most likely to be rebuilt in the earlier documented style, the 'S' stamp on the top cover does not guarantee the gear box under the top cover is still all syncro.

The Series III suffix A gearbox was introduced with the introduction of the Series III Land Rover. The Series III gearbox has syncro in all gears as well as lower first and reverse gear ratios. The transfer case remained the same.

Series IIA gearboxes are generally considered to be stronger and longer lasting than "A" suffix series III gearboxes (The ones imported into North America). Though a lot of this conception may have to do with people's shifting habits.

There was a final change made to the gearbox about half way through the series III production (After Rover left North America). These suffix "B" series III gearboxes are considered by some to be the strongest of the series Land Rover gear boxes.

In general the series gearbox is considered to be strong enough for about 120 HP. If you install an engine with more HP consider updating the transmission.

The all syncro transmission has a reputation of being less robust than the earlier versions mostly because they do not hold up to quick shifting. The syncros must come to a stop when the shifter goes through the neutral position if the syncros are to last. When shifting an all syncro gearbox it is advised to hesitate just slightly in the centre of the 'H' pattern.

Now for the newer gearboxes:

This section is largely a rewording of an e-mail Mike Nieuwoudt published on the za-Iro (Southern Africa) e-mail list. It is used with permission.

The "recent" history of LR main gearboxes goes roughly as follows:

In the beginning when Rover needed a stronger gearbox for the new Range Rover and the 101 V8s they developed the **LT95**. During this time Rover was part of British Leyland so the LT stands for Leyland Transmission. "95" stands for the distance between the main and lay shafts in mm.

The LT 95 was a robust four speed gearbox with the transfer case built into the same enclosure (but they have different fluid reservoirs). One of the nice things about the LT95 was that there were a number of transfer case ratios available and you did not need to pull the box to change them. The bad thing is that it is a four speed gearbox and Rover decided that they needed a fifth gear for highway driving. The gearbox was used on Range Rover through 1983, all 109 Stage 1 V8, all 101 and on 1983 and 1984 V8 Nineties and One Tens.

Starting with 1984 models Rover abandoned the LT95 four speed gearbox and went to five speed gearboxes, the LT77 and the LT85. The LT77 is the lighter duty of the pair. The LT85 was used on the V8 versions of the Ninety and One Ten. Since the LT77 is a 2WD passenger car gearbox, Rover added the **LT230** transfer case for full time 4WD. (LT230? Yes, 230 mm parallel spacing between input and output shafts!)

1984 through 1990 When Rover (still part of British Leyland) decided to go to a five speed gearbox they picked the existing **LT77** for use in certain vehicles. The LT77 is an updated version of an old Jaguar gearbox that found its way into current model British cars manufactured by British Leyland. Yes the distance between the main and lay shafts is 77 mm. There were two version of this gearbox. The earlier version is known as the short stick version. The later version, introduced around 1988 is known as the long stick version.

The Range Rover received the LT77 in 1984 because it was less expensive than the new LT85 and considered strong enough for the 3.5L V8 to use as a street cruising gearbox. The four cylinder Ninety and One Ten also received the LT77. When the Discovery was introduced it got the LT77 as well.

1984 through 1991: The **LT85** (85 mm shaft spacing) was used in all V8 110 and 90 Land Rovers. The LT85 was originally designed under contract by Land Rover for Santana in Spain and was considered to be a strong working gearbox. Rover purchased LT85 gearboxes directly from Santana. It is also known as the Spanish Box. This gearbox was used as originally designed until 1988. A cost reduced, lighter weight, divided case version of the LT85 was introduced in 1988 and used through 1991. The main short coming of the divided case version was its main and lay shaft bearings. The loading on the bearings in 5th gear caused frequent gearbox failure when cruising for long periods of time under high throttle. There was also a bearing quality problem at one stage of manufacture and the gearbox was sensitive to the type of oil used.

In 1991 the relationship between Rover and Santana ended and the LT85 was no longer available to Rover. They needed to find a quick short term solution while they developed a new stronger gearbox.

1991 through 1993 The **LT77S** was introduced to the Defender V8 line and all models using the Tdi engine as an interim replacement for the no longer available LT85. The LT77S was a strengthened version of the LT77. The 'S' on the LT77S stands for 'Synchromesh'...it was modified for a 'smoother gear change'. The bell housings and input shafts of the LT77S differ between the V8 and Tdi due to Tdi's more aft location.

1994 and newer: The **R380** box was introduced as brand new LR gearbox across the entire Land Rover and Range Rover product lines. The R380 is a radically reworked LT77 (The 1940's Jag gearbox remember) with improved main shaft bearing arrangements that provided an overall strengthening of the box. The R380 name stands for "Rated to 380 Nm input". But the R380 still has the LT77's 77 mm shaft spacing. Since Rover was no longer part of British Leyland the LT prefix was abandoned.

The V8 and Tdi R380 gearboxes have different bell housings and primary input shafts. They will interchange by swapping these parts.

The R380 quickly got a bad name from gear problems and accelerated main shaft spline wear where it mates with the LT230 transfer case.

The LT230 accelerated main shaft spline wear problem had been present on all previous LT230 equipped Land-Rovers, irrespective of the gearbox it was mated to. This design problem was kept low key until a lot of customers complained about R380 problems.

A number of different fixes, such as flingers and special transfer case input shafts have been added to try solve the LT230 problem.

A little Automatic history

1982: the Chrysler 3 speed automatic transmission was introduced into the Range Rover product line.

1988: The Range Rover is offered with EFI and the ZF H4 four speed automatic transmission.

Somewhen in the near future: Land Rover will likely use tried and true bullet proof Ford gearboxes and leave their ancient, weak, many times reworked old Jag gearbox behind.