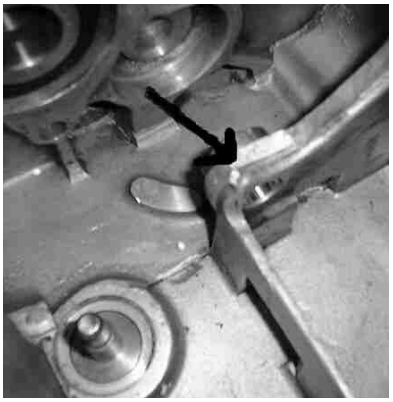
Assembly instructions for the KAD 5 speed gearbox

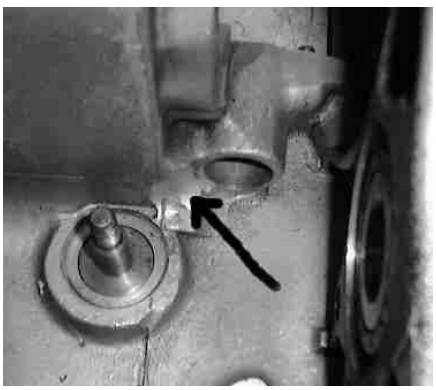
The KAD gearkit has a very compact and precisely engineered gear cluster, it is therefore essential, that in order to prevent accidental gear selection, various wide standard clearances have been reduced and care and attention is required in order to set the engaged and disengaged positions of each of the dog rings. This is achieved using shims on the selector rod against circlips on the shaft

Preparing the casing
Use DAM 5626 casing
Check all threads in the casing and thread insert if necessary, remember the the oil drain thread
Drill for 5/16 threads for block if applicable
Grind top of reverse gear web in casting until the laygear has 0.040" clearance over the web casting.
Do not grind too far here as this will seriously weaken reverse gear



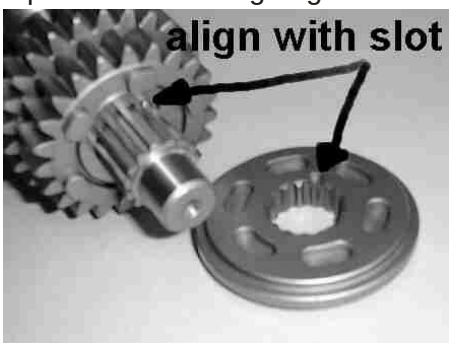
Grind casing for clearance on bell cranks again be careful not to grind too much here,
grind around where oil pipe gauze will fit to remove casting flash.

Clean thoroughly, scrub out inside to remove foreign objects especially if rebuilding after any sort of blow up



A logical order of working would be as follows:

Assembling the bell cranks
These are assembled as for a standard gearbox Instal the interlock sleeve and selector shaft
Check for correct engagement in bell cranks when interlock sleeve is fitted
Glue in bush A4 2948
The top hat bush should be glued into the casing with engineering adhesive such as Loctite 648 (high strength adhesive) to prevent rotation of the bush
Set up reverse gear
The reverse gear cluster is fitted in position as per the general assembly drawing so that there will be 0.010" endfloat on the gear. Shims (supplied) can be added between the pinion bearing web in the casing and the plain bush A4 2947.
Fit selectors and shim selector rod
The selector rod must be prevented from moving in the casing.Shims should be selected to hold the rod in position against the circlip at the first motion bearing end of the selector shaft. The selector forks can be then be fitted into the casing.Fit the detent ball, spring and sleeve and the two other circlips. With these parts fitted, measure the gaps between the ends of the selector forks and the circlips with the selectors in the neutral position held by the detent ball assembly. This establishes the maximum available travel for the selectors. Note these figures down for later.
Assemble main cluster
The main gear cluster can be asembled with oil on all parts with reference to the GA drawing. The spring that holds the pin into the splined washer for 4th gear (A3 3095) needs to be cut to length so that at full compression, the spring and pin sits flush with the top of the hole. This can be tricky to assemble, we use a short length of hacksaw blade ground square at the ends to slide under the washer and push the pin in. This helps to prevent the pin from flying out into the workshop. The 4th/5th dog ring slot should align with the pin on the main shaft



Fit main cluster
The main gear cluster and the first motion (input) gear can now be fitted into the gearcase so that the positions of the gear train relative to the dog rings can be judged.
With the selectors in the neutral position, the dog rings should sit centrally between the gears.
The gear train can be moved back and forth using shims to adjust its position. We fit shims between the first motion shaft and its bearing to position this relative to the 4th/5th dog ring or if material needs to be removed, surface grind the inner race of the bearing (taking care to wash well before re fitting). If the main shaft needs to move, shims are added between the pinion bearing and the reverse restriction washer (which can be ground to move the gear train in this direction. After this procedure, the dog rings should be sitting centrally between the gears and even when the top of the dog ring is pushed towards its mating gear it does not make contact whilst in neutral.
Measure selector over throw
The selector forks must now be set to prevent over travelling. If this is not done, very rapid selector fork wear will occur caused by the dog ring rubbing in the selector fork. To prevent this, shims of a suitable size need to be fitted to the selector shaft, using circlips on the shaft as stops. With the gear cluster in position and the selectors in neutral, measure the gaps between each gears face (not the dog teeth) and respective dog ring with feeler gauges, as these measurements will be in the region of 0.140-200", several feeler gauge blades will need to be stacked together and this stack measured. Then with reference to the figures taken earlier, subtract the observed gap between the dog ring and gear from the available travel measurement to give the thickness of the shim required. In practice, the dog ring is in clearance in the selector fork, so an approximate centre position must be used. When the trail assembly is made with the shims in place on the selector rod, it will be found that adjustments may be necessary. Correct positioning will occur when each dogring does not actually contact its gear when engaged.
Once the over travel of the selectors has been set:

Shim and fit the laygear
The laygear can now be fitted with the oil pick up pipe as per standard practice to achieve end float on the lay gear of 0.002-0.006" using shims provided fitted between the casing and the thrust washer at the flywheel end of the laygear. The oil pipe goes in if it is installed at the same time that the laygear is lowered in.
Shim pinion bearing
With the main gear cluster and laygear fitted, the pinion bearing retainer is now fitted as per a standard gearbox using shims to prevent any float in the bearing, a preload of 0.001" is used.
Fit speedo housing
With the pinion gear torqued to 150 lb/ft torque the speedo housing can be fitted with the inner race for this bearing a slide fit over the end of the mainshaft
Fit differential
This is fitted as per standard procedure
Fit side covers and detent spring These fit as standard procedure with the exception that a different detent spring sleeve is used with the closed end out. The spring length may need to be trimmed as the closed end of the sleeve increases the spring preload and this can cause the spring to coil bind. Set spring length to maximum before coil binding (and locking up) occurs.

Finally check operation through all gears

The plate that bolts to the bottom of the gearcasing needs to be changed for the one supplied in the kit. This must be turned through 180 degrees from the standard position.