

# DESCRIPTION AND OPERATION

## MANUAL TRANSMISSION - OVERVIEW

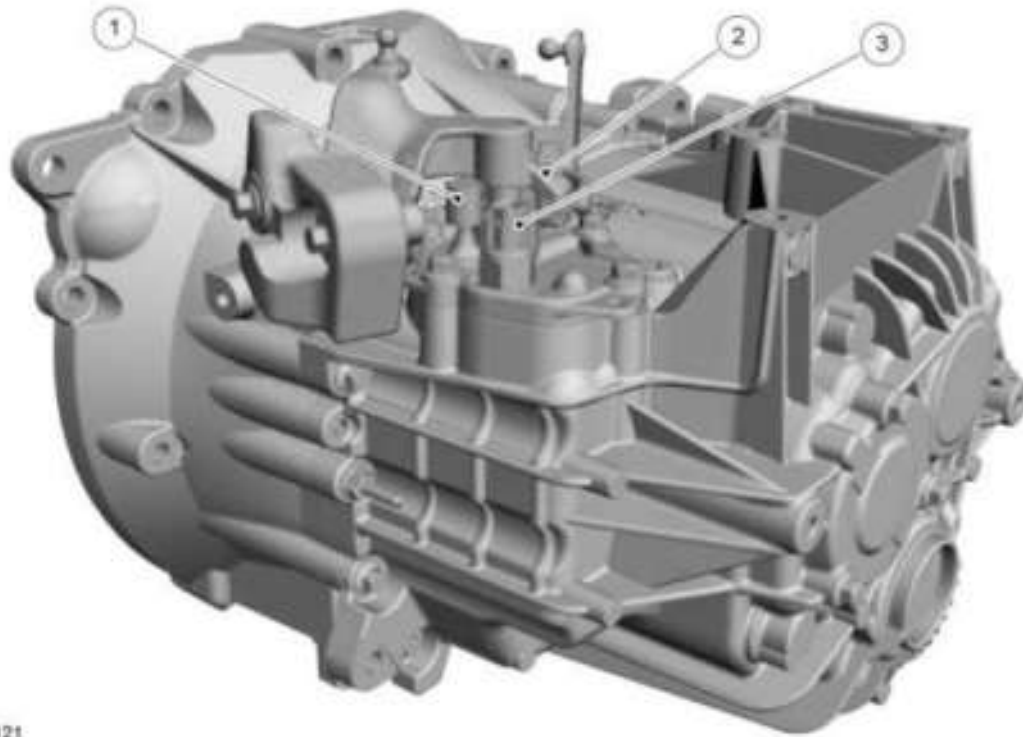
### Overview

The MMT6 manual transmission features the following:

- Two-part aluminum housing
- All gear wheels are helical toothed and are constantly engaged
- 1st, 2nd, 3rd and 4th gear are triple synchronized.
- 5th, 6th and reverse gear have double synchronization
- By optimizing the friction in the transmission and using a lower viscosity transmission fluid, it has been possible to achieve fuel savings and thereby reduce CO2 emissions. Information on the specification can be found in FordEtis
- An externally mounted gearshift mechanism
- All driving gears of the transmission are located on the input shaft
- The input shaft is designed as a solid shaft and runs on one ball bearing and one roller bearing with no pre-load
- The gears for 1st and 2nd gear are an integral part of the input shaft. The gears for 3rd and 5th gears and the gear for 4th/6th gear are pressed on. Because of the high force used to press on the components, the gears cannot be pressed off in service. A faulty input shaft can only be replaced as a complete unit
- Defective bearings can be pressed off and changed
- The output pinion of the 1st/4th gear output shaft is an integral part of the shaft
- The synchronizers of the 1st/2nd and the 3rd/4th gears are located on the output shaft
- The 1st/4th gear output shaft is a hollow shaft. The fluid is directed into the inner diameter of the hollow shaft for lubrication of the needle bearings and the synchronizer units. Both output shafts run on taper roller bearings which are pre-loaded with the aid of adjusting shims in the clutch housing
- The output pinion is an integral part of the shaft
- The 5th/6th and reverse gear synchronizer assemblies are located on the shaft
- The 5th/6th/reverse gear output shaft is a hollow shaft. The fluid is directed into the inner diameter of the hollow shaft for lubrication of the needle bearings and the synchronizer units. Both output shafts run on taper roller bearings which are pre-loaded with the aid of adjusting shims in the clutch housing
- The differential runs on taper roller bearings and is pre-loaded with the aid of an adjusting shim in the clutch housing

### Location of components

### Overview of external components

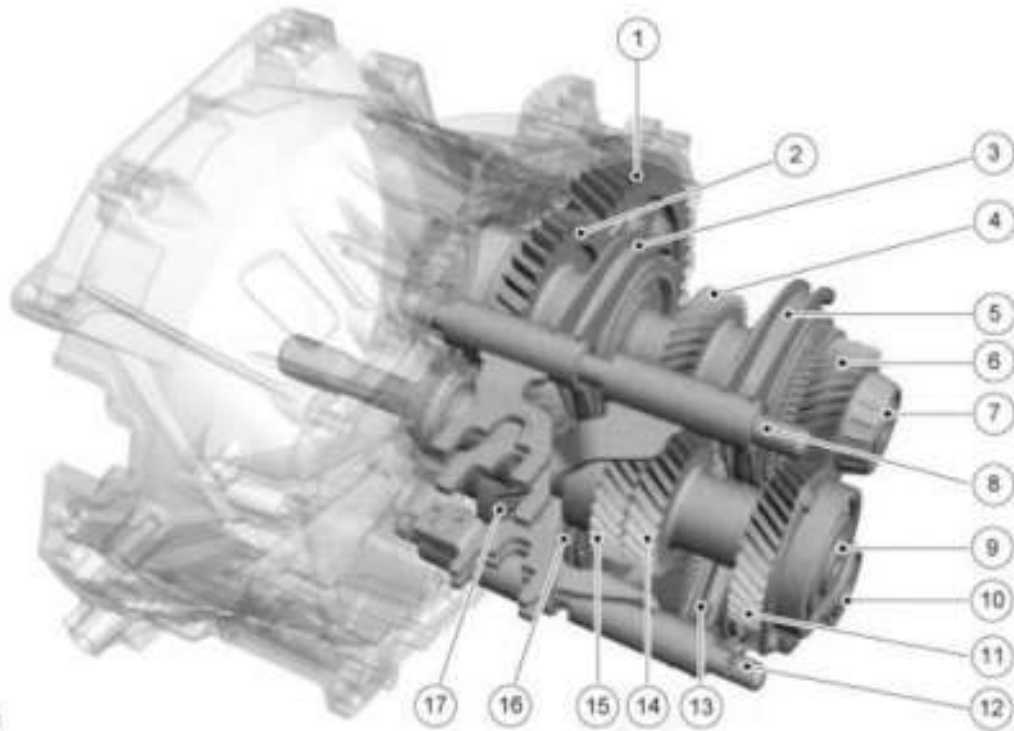


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**Fig. 1: Overview Of Manual Transmission External Components**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Vent assembly
2	Gearshift mechanism
3	Reverse gear switch

**Overview of inner components**

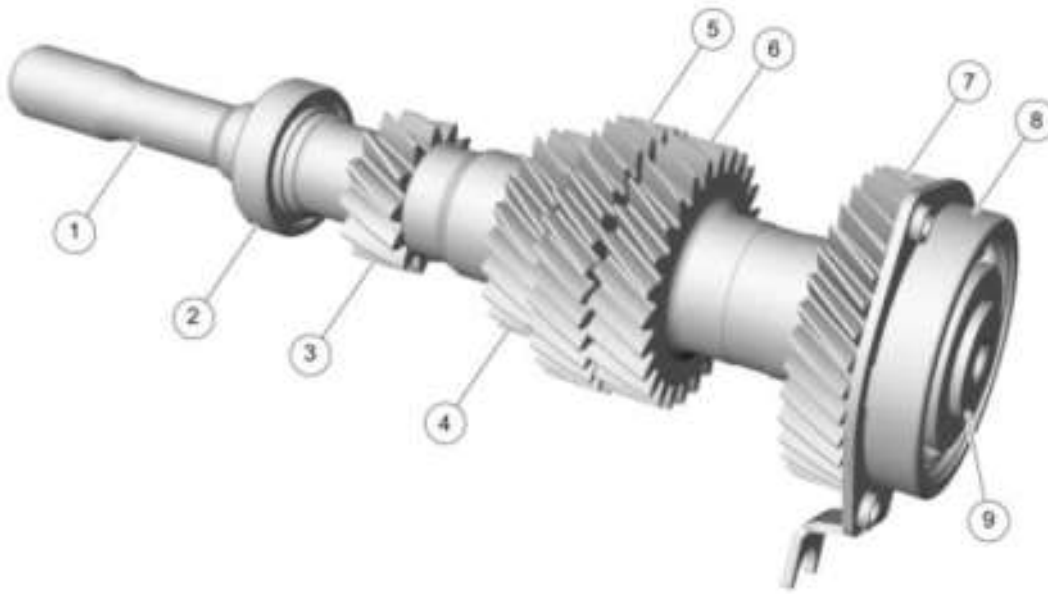


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**Fig. 2: Overview Of Manual Transmission Inner Components**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Differential
2	Reverse gear idler
3	Selector fork - reverse gear
4	5th gear idler
5	5th/6th gear selector fork
6	6th gear idler
7	5th/6th/Reverse Gear Output Shaft
8	Selector rod - 5th/6th/reverse gear
9	Input shaft
10	1st - 4th gear output shaft
11	4th/6th gear fixed
12	Selector rod - 1st/4th gear
13	Selector fork - 3rd/4th gear
14	3rd gear fixed
15	5th gear fixed
16	Selector fork - 1st/2nd gear
17	1st gear fixed

**Input shaft**

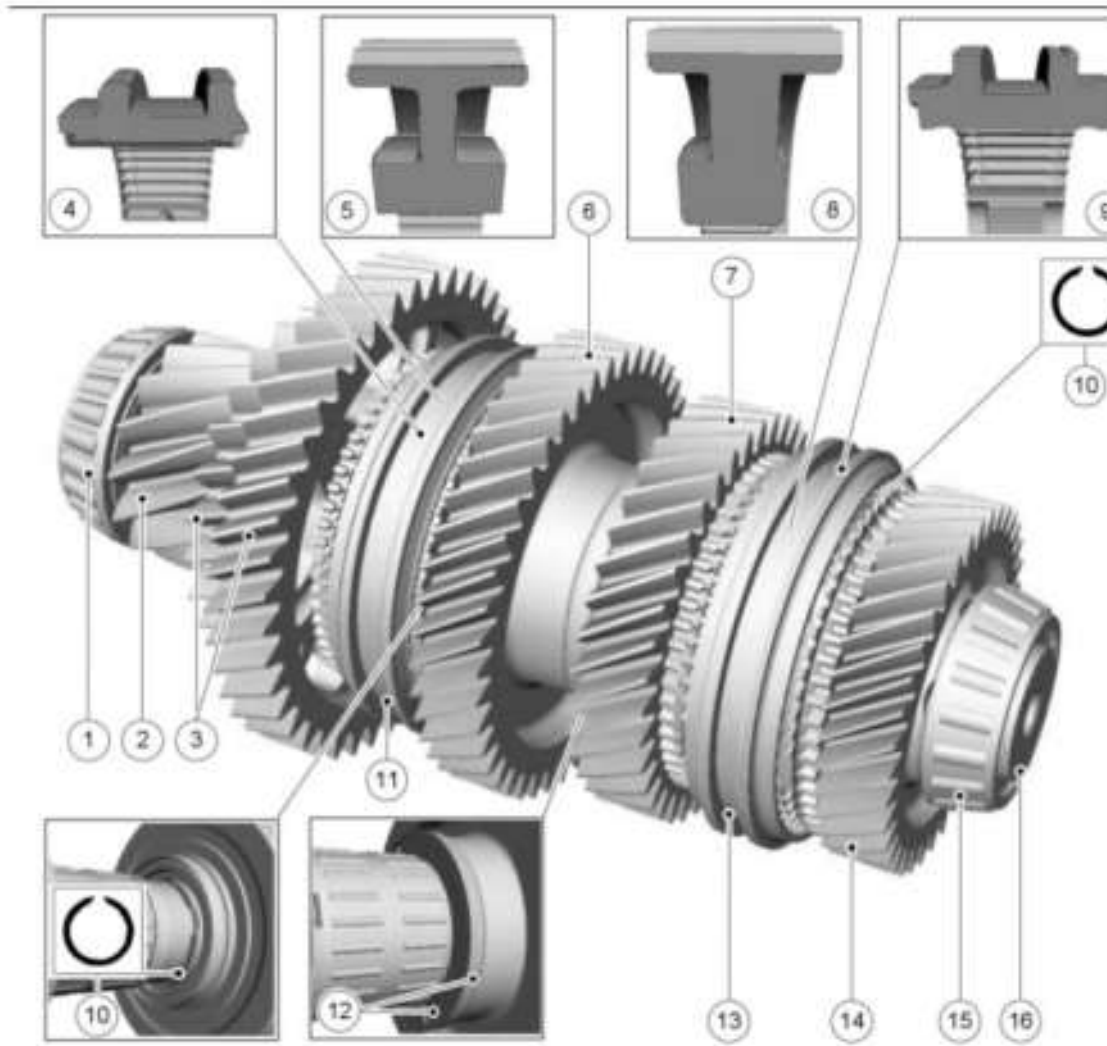


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**Fig. 3: Identifying Input Shaft Related Components**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Input shaft
2	Input shaft bearing
3	1st gear
4	2nd gear
5	5th gear
6	3rd gear
7	4th/6th gear
8	Input shaft ball bearing
9	Bearing retaining bolt

**Output shaft 1st/4th gear**



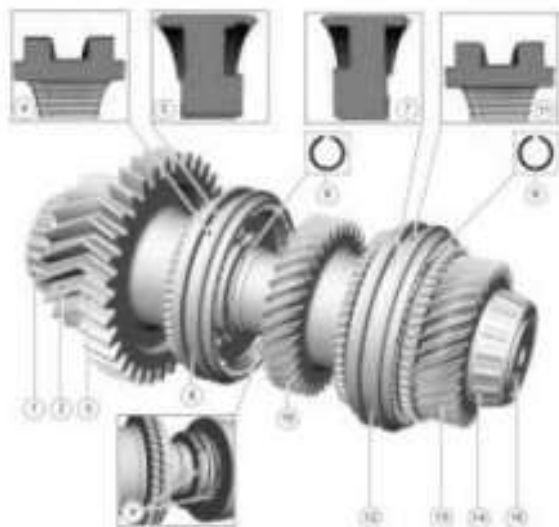
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**Fig. 4: Identifying Output Shaft 1st/4th Gear Related Components**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Clutch housing taper roller bearing
2	1st/4th gear
3	1st gear and reverse gear idler gear
4	1st/2nd gear sliding collar
5	1st/2nd gear synchronizer hub
6	2nd gear
7	3rd gear
8	3rd/4th gear synchronizer hub
9	3rd/4th gear sliding collar
10	Snap ring
11	1st/2nd gear synchronizer
12	Stop disc unit

13	3rd/4th gear synchronizer
14	4th gear
15	Transmission housing taper roller bearing
16	Bearing retaining bolt (left-hand thread)

### 5th/6th/Reverse Gear Output Shaft



**Fig. 5: Identifying 5th/6th/Reverse Gear Output Shaft Related Components**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Clutch housing taper roller bearing
2	5th/6th/reverse gear output gear
3	Reverse gear
4	Reverse gear sliding sleeve
5	Reverse gear synchronizer hub
6	Snap ring
7	5th/6th gear synchronizer hub
8	Reverse gear synchronizer
9	Stop disc unit
10	5th gear
11	5th/6th gear sliding collar
12	5th/6th gear synchronizer
13	6th gear
14	Taper roller bearing, transmission housing
15	Bearing retaining bolt (left-hand thread)

### Differential



**Fig. 6: Identifying Differential Related Components**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Shim
2	Clutch housing taper roller bearing
3	Differential
4	Ring gear bolts
5	Transmission housing taper roller bearing
6	Ring gear

## MANUAL TRANSMISSION - SYSTEM OPERATION AND COMPONENT DESCRIPTION

### System Diagram

Power transmission route in 1st gear



**Fig. 7: Power Transmission Route In 1st Gear**

Courtesy of FORD MOTOR CO.

Power transmission route in 2nd gear



**Fig. 8: Power Transmission Route In 2nd Gear**  
Courtesy of FORD MOTOR CO.

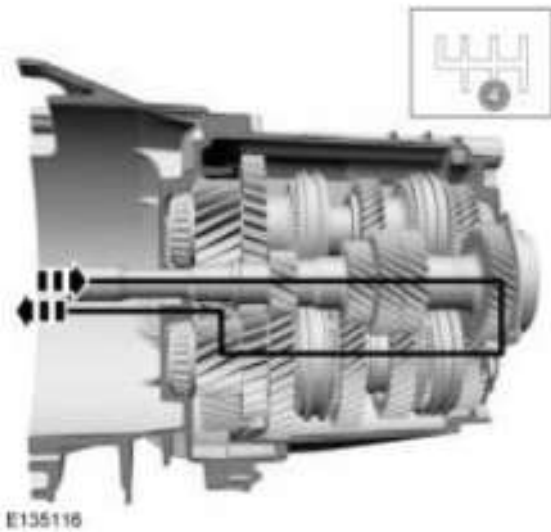
Power transmission route in 3rd gear



**Fig. 9: Power Transmission Route In 3rd Gear**  
Courtesy of FORD MOTOR CO.

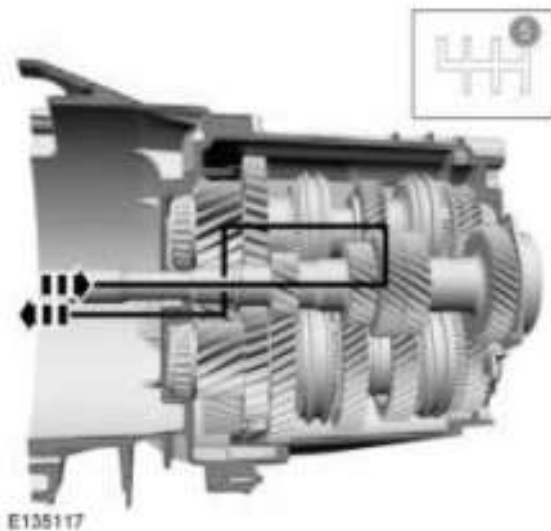
Power transmission route in 4th gear





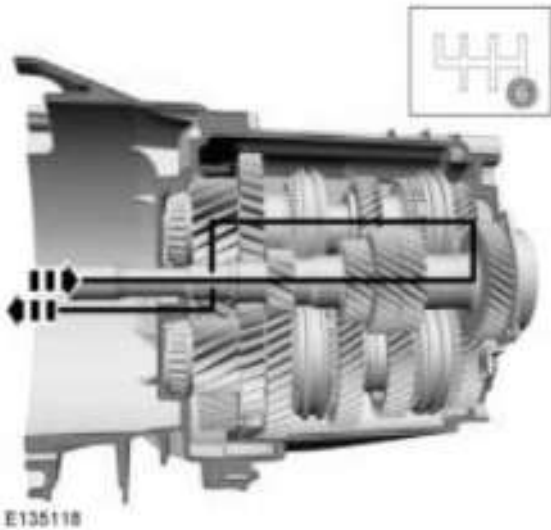
**Fig. 10: Power Transmission Route In 4th Gear**  
Courtesy of FORD MOTOR CO.

Power transmission route in 5th gear



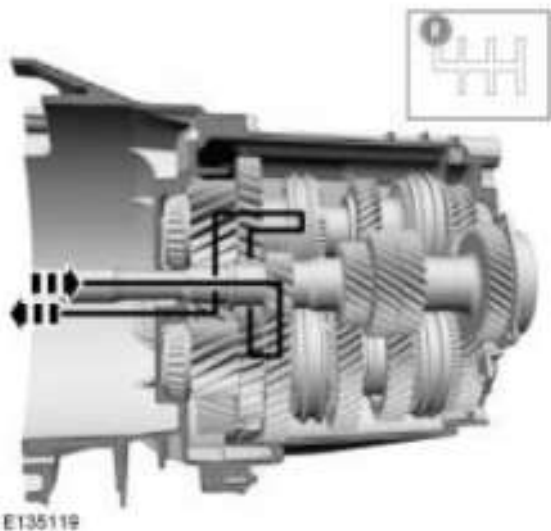
**Fig. 11: Power Transmission Route In 5th Gear**  
Courtesy of FORD MOTOR CO.

Power transmission route in 6th gear



**Fig. 12: Power Transmission Route In 6th Gear**  
 Courtesy of FORD MOTOR CO.

**Power transmission route in reverse gear**



**Fig. 13: Power Transmission Route In Reverse Gear**  
 Courtesy of FORD MOTOR CO.

**System Operation**

**Power transmission route in 1st gear**

The 1st gear is positively connected to the 1st to 4th gear output shaft by the 1st/2nd gear synchronizer assembly.

**Power transmission route in 2nd gear**

The 2nd gear is positively connected to the 1st to 4th gear output shaft by the 1st/2nd gear synchronizer assembly.

**Power transmission route in 3rd gear**

The 3rd gear is positively connected to the 1st to 4th gear output shaft by the 3rd/4th gear synchronizer assembly.

**Power transmission route in 4th gear**

The 4th gear is positively connected to the 1st to 4th gear output shaft by the 3rd/4th gear synchronizer assembly.

**Power transmission route in 5th gear**

The 5th gear is positively connected to the 5th/6th/reverse gear output shaft by the 5th/6th gear synchronizer assembly.

**Power transmission route in 6th gear**

The 6th gear is positively connected to the 5th/6th/reverse gear output shaft by the 5th/6th gear synchronizer assembly.

**Power transmission route in reverse gear**

The reverse gear idler is welded to the 1st gear. It is constantly engaged with the reverse gear wheel.

The reverse gear wheel is positively connected to the 5th/6th/reverse gear output shaft by the reverse gear synchronizer assembly.

**Component Description**

**Synchronizers**

**Synchronizer ring for triple synchronization in 1st/2nd gear**



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**Fig. 14: Identifying Synchronizer Ring For Triple Synchronization In 1st/2nd Gear**  
Courtesy of FORD MOTOR CO.

Item	Description
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1	Inner synchronizer ring with friction material on the inside
2	Synchronizer cone with friction material on the inside and outside
3	Outer synchronizer ring

**Synchronizer rings for 3rd/4th gear double synchronization**



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**Fig. 15: Identifying Synchronizer Rings For 3rd/4th Gear Double Synchronization**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Inner synchronizer ring with friction material on the outside
2	Synchronizer cone
3	Outer synchronizer ring with friction material on the inside

**Synchronizer rings for single synchronization in 5th/6th/reverse gear**

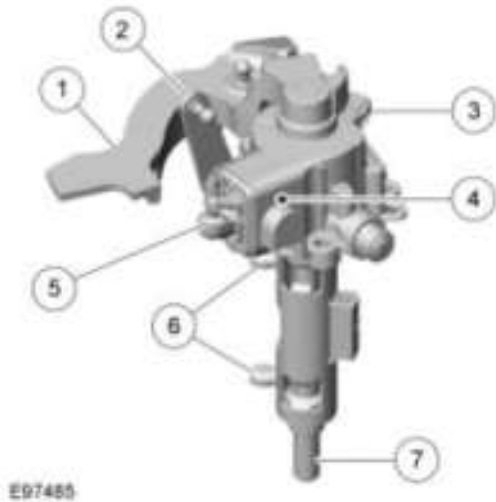


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**Fig. 16: Identifying Synchronizer Rings For Single Synchronization In 5th/6th/Reverse Gear**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Synchronizer ring
2	Synchronizer cone

### Internal gearshift mechanism



**Fig. 17: Identifying Internal Gearshift Mechanism**  
 Courtesy of FORD MOTOR CO.

Item	Description
1	Shift arm with integrated shift weight
2	Selector arm
3	Reverse gear switch
4	Gear shift mechanism housing
5	Vent assembly
6	Selector finger
7	Selector shaft

The internal shift mechanism contains the shift gate, a counter balance and reverse gear switch. The reverse gear switch can be serviced. The counter balance and shift gate can only be changed as a complete unit in service.

The shift gate is built into the gear shift mechanism housing.

The reverse gear switch is located on the housing cover of the internal shift mechanism.

The counterbalance built into the shift arm improves the smoothness of the gear shifting. The inertia of the shift weight (counterbalance) reduces the tangible shift resistances of the synchronization during gearshifts. The gearshift process becomes smoother.