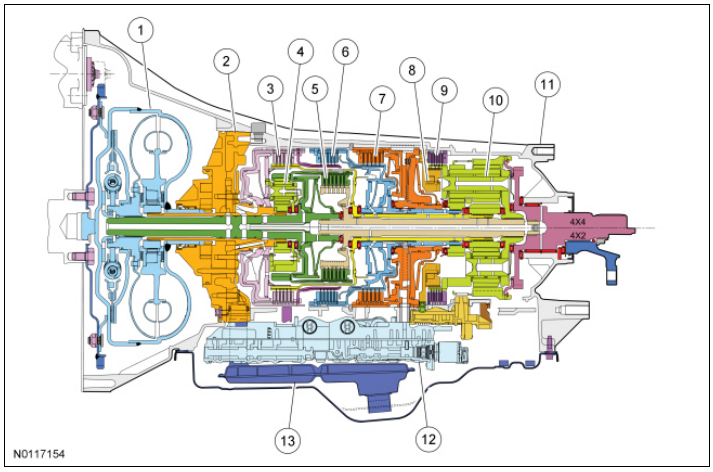
The ravigneaux planetary gearset is splined to the output shaft and consists of the following components:

- Two sun gears of different sizes
- Three long planetary gear pinions meshing with the large sun gear and the ring gear
- Three short planetary gear pinions meshing with the small sun gear and the long pinions
- One planetary carrier
- One ring gear

Output Shaft

The output shaft provides torque to the driveshaft and rear axle assembly. It is splined to the ring gear of the rear/ravigneaux planetary gearset.

Major Components Cutaway View



Item	Description
1	Torque converter
2	Front pump assembly
3	Forward clutch (A)
4	Front planetary gearset
5	Overdrive clutch (E)
6	Direct clutch (B)
7	Intermediate clutch (C)
8	One-Way Clutch (OWC)
9	Low/reverse clutch (D)
10	Rear planetary gearset
11	Transmission case
12	Main control assembly
13	Transmission fluid filter

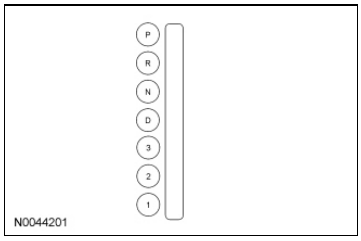
Gear Ratios

Power is transmitted from the torque converter to the planetary gearsets through the input shaft. Clutches are used to hold and drive certain combinations of gearsets. This results in 6 forward ratios and one reverse ratio which are transmitted to the rear planetary ring gear (output shaft). The planetary gearsets of this transmission provide the following ratios:

- Reverse:
  - Front planetary gearset ratio of 1.52:1
  - Rear planetary gearset ratio of 2.24:1 (reverse direction)
  - Total ratio of 3.40:1 (reverse direction)
- 1st gear:
  - Front planetary gearset ratio of 1.52:1
  - Rear planetary gearset ratio of 2.74:1
  - Total ratio of 4.17:1
- 2nd gear:
  - Front planetary gearset ratio of 1.52:1
  - Rear planetary gearset ratio of 1.54:1
  - Total ratio of 2.34:1
- 3rd gear:
  - Front planetary gearset ratio of 1.52:1
  - Rear planetary gearset ratio of 1:1
  - Total ratio of 1.52:1
- 4th gear:
  - Front planetary gearset provides ratios of 1:1 and 1.52:1 to different rear planetary gearset members
  - Rear planetary gearset ratio of 1.14:1
  - Total ratio of 1.14:1
- 5th gear:
  - Front planetary gearset provides ratios of 1:1 and 1.52:1 to different rear planetary gearset members
  - Rear planetary gearset ratio of 0.87:1
  - Total ratio of 0.87:1
- 6th gear:
  - Front planetary gearset ratio of 1:1
  - Rear planetary gearset ratio of 0.69:1
  - Total ratio of 0.69:1

Range Selection

The transmission has 7 range positions: P, R, N, D, 3, 2 and 1.



Park

In the PARK position:

- there is no power flow through the transmission.
- the park pawl locks the output shaft to the case.
- the engine can be started.
- the ignition key can be removed.

Reverse

In the REVERSE position:

- the vehicle can be operated in a rearward direction, at a reduced gear ratio.
- backup lamps are illuminated.

Neutral

In the NEUTRAL position:

- there is no power flow through the transmission.
- the output shaft is not held and is free to turn.
- the engine can be started.

D Position

The D is the normal position for most forward driving.

The D position provides:

- automatic shifts 1-6 and 6-1.
- apply and release of the torque converter clutch.
- maximum fuel economy during normal operation.
- engine braking in all gears.

Position 3 - 3rd Gear

This position provides:

- manual 3rd gear.
- engine braking in 3rd gear.

Position 2 - 2nd Gear

This position provides:

- manual 2nd gear.
- engine braking in 2nd gear.

Position 1 - 1st Gear

This position provides:

- first gear operation only.
- engine braking for descending steep grades.

Gear Availability

MANUAL LEVER POSITION	TRANSAXLE GEAR OPERATION	DESCRIPTION
P	Park	Forward or reverse gears not available. Final drive is held to the transmission case.
R	Reverse	Transmission allows reverse only.
N	Neutral	Forward or reverse gears not available. Final drive moves freely.
D	1 ⇆ 2 ⇆ 3 ⇆ 4 ⇆ 5 ⇆ 6	6 forward gears are available. Gears are dependent on vehicle speed and throttle position with coast braking.
D Grade Assist	1 ⇆ 2 ⇆ 3 ⇆ 4 ⇆ 5 6	1st through 5th gears are available. The shift scheduling is altered for higher shift speeds for a given throttle position. Transmission provides engine braking.
3	1 2 [3] 4 5 6	3rd gear hold. Downshift to 3rd gear when 3 position is selected below a calibrated speed.
2	1 [2] 3 4 5 6	2nd gear hold. Downshift to 2nd gear when 2 position is selected below a calibrated speed.
1	[1] ← 2 ← 3 ← 4 ← 5 ← 6	1st gear hold with engine braking, the transmission downshifts to 1st gear when 1 is selected below a calibrated speed under minimum to moderate accelerator pedal position.

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Torque Converter

The torque converter is a 4-element unit containing a 2-plate clutch. The clutch can be controlled and engaged in any gear, 2nd through 6th. Calibration parameters may be set to allow lockup in a higher gear only. The clutch is applied by removing fluid pressure from one side of the plate. The torque converter transmits and multiplies torque. The torque converter includes the following 4 elements:

- Impeller assembly
- Turbine assembly
- Reactor assembly
- Torque Converter Clutch (TCC)

Rotation of the torque converter housing and impeller set the transmission fluid in motion by driving the impeller blades and pump.

The turbine is driven by the transmission fluid from the impeller and transmits power to the input shaft.

The reactor redirects transmission fluid flow returned from the turbine to the impeller so that it rotates in the same direction as the impeller. This action assists in torque multiplication.

The reactor has a One-Way Clutch (OWC) to hold it stationary during torque multiplication and allows it to rotate at higher vehicle speeds.

Torque Converter Clutch (TCC)

The TCC has a cover assembly with a 2-plate clutch and a turbine and damper assembly that connects to the transmission input shaft.

The TCC connects the cover to the turbine when the TCC is applied.

During TCC release, transmission fluid flows through the torque converter in one direction to release the 2-plate clutch.

During TCC apply, transmission fluid flows through the torque converter in the opposite direction to apply the 2-plate clutch.

The TCC operates in 3 stages:

- Full release
- Controlled modulation
- Full apply

The PCM controls TCC operation using the TCC solenoid. TCC solenoid operation provides the modulation of hydraulic pressure to change the position of the bypass clutch control regulator valve. The valve changes the pressure and direction of transmission fluid flow in the torque converter. TCC may be applied in forward gears, 2nd through 6th.

Shift Patterns

Downshifts

Under normal conditions, the transmission will downshift automatically to a lower gear range (without moving the selector lever). There are 3 categories of automatic downshifts:

- Coastdown
- Torque demand
- Forced or kickdown shifts

Coastdown

The coastdown downshift occurs when the vehicle is coasting down to a stop.

Torque Demand

The torque demand downshift occurs (automatically) during part throttle acceleration when the demand for torque is greater than the engine can provide at that gear ratio.

Kickdown

For maximum acceleration, the driver can force a downshift by pressing the accelerator pedal to the floor. A forced downshift into a lower gear is possible below calibrated speeds. Specifications for downshift speeds are subject to variations due to tire size, engine and transmission calibration requirements.

Mechanical Components and Functions

Planetary Gearset

This transmission has 2 planetary gearsets (front and rear) to provide operation in reverse and 6 forward speeds.

The front planetary gearset is a single planetary gearset and has the following components:

- Front planetary No. 1 sun gear
- Front planetary carrier
- Front planetary ring gear (part of the input shaft assembly)

The input shaft rotates the front ring gear as a driving member. The front sun gear is connected to the fluid pump and is held stationary. The front ring gear rotates the front planetary carrier assembly with a reduction ratio of 1.52:1.

The front planetary carrier assembly is the only output member of the front planetary gearset in reverse, 1st, 2nd and 3rd gear. The front planetary gearset provides a 1.52:1 gear ratio to the rear planetary gearset.

In 4th and 5th gear, both the front ring gear and front planetary carrier assembly are output members of the front planetary gearset. The front planetary gearset provides both a 1:1 and 1.52:1 gear ratio to different members of the rear planetary gearset.

In 6th gear, the front ring gear is the only output member of the front planetary gearset. The front planetary gearset provides a 1:1 gear ratio to the rear planetary gearset.

The rear planetary gearset is a ravigenaux planetary gearset and has the following components:

- Rear planetary No. 2 sun gear
- Rear planetary No. 3 sun gear
- Rear planetary carrier assembly (2 sets of pinion gears)
- Rear planetary ring gear assembly

Power flow through the rear planetary gearset is as follows:

- In reverse, rear sun gear No. 2 is driven, the rear planetary carrier is held and the ring gear is the output (2.24:1 with reverse direction)
- In 1st gear, sun gear No. 3 is driven, the rear planetary carrier is held and the ring gear is the output (2.74:1)
- In 2nd gear, sun gear No. 3 is driven, sun gear No. 2 is held and the ring gear is the output (1.54:1)
- In 3rd gear, sun gear No. 3 and sun gear No. 2 are driven and the ring gear is the output (1:1)
- In 4th gear, sun gear No. 3 and the rear planetary carrier are driven and the ring gear is the output (1.14:1)
- In 5th gear, sun gear No. 2 and the rear planetary carrier are driven and the ring gear is the output (0.87:1)
- In 6th gear, the rear planetary carrier is driven, sun gear No. 2 is held and the ring gear is the output (0.69:1)