

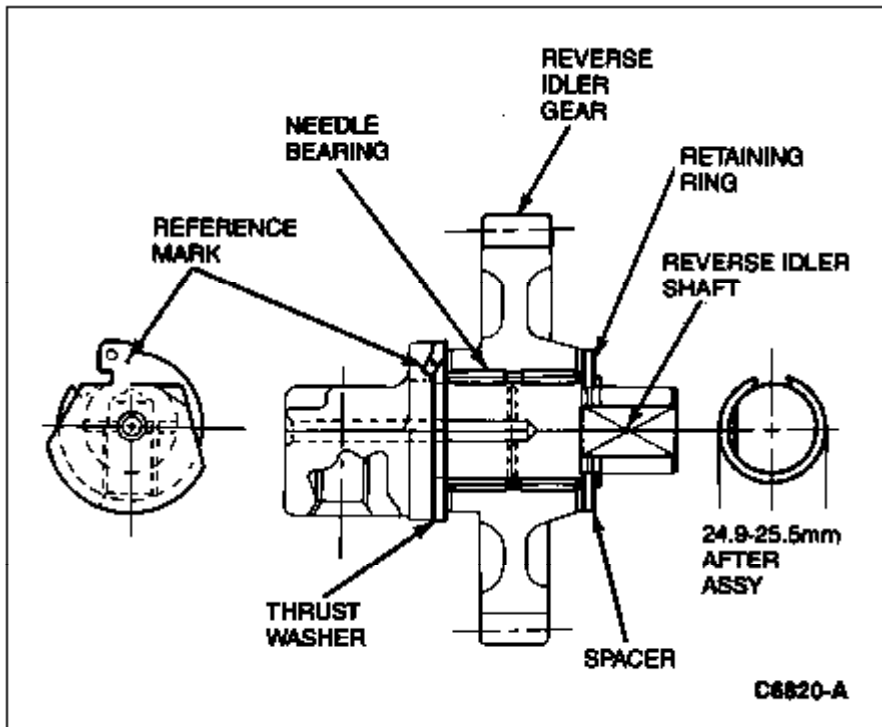


## Reverse Idler Gear Shaft

### Disassembly

Remove the following parts from reverse idler gear shaft:

- Retaining ring
- Spacer
- Idler gear
- Needle bearings
- Thrust washer



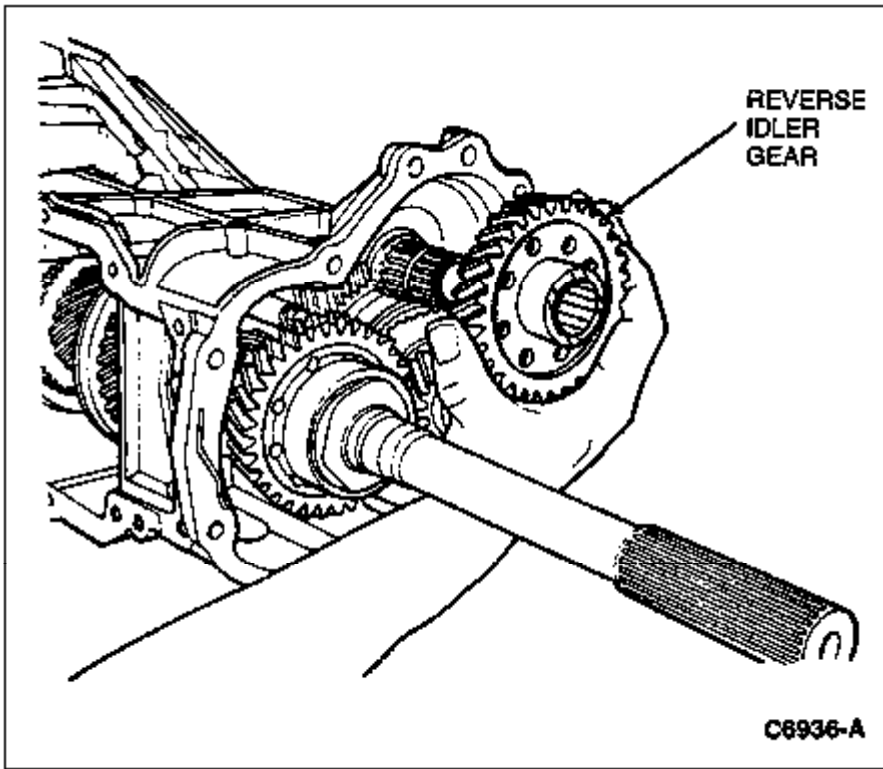
### Assembly

1. Install reverse idler shaft in transmission case. Apply Pipe Sealant with Teflon® D8AZ-19554-A (ESG-M4G194-A and ESR-M18P7-A) to the reverse idler shaft fixing bolt threads. Install and tighten fixing bolt to 79-116 N-m (58-86 lb-ft).
2. Install thrust washer, (with brass side toward gear), onto reverse idler gear shaft. Ensure that tab on thrust washer mates with groove on reverse idler shaft to prevent rotation of thrust washer.

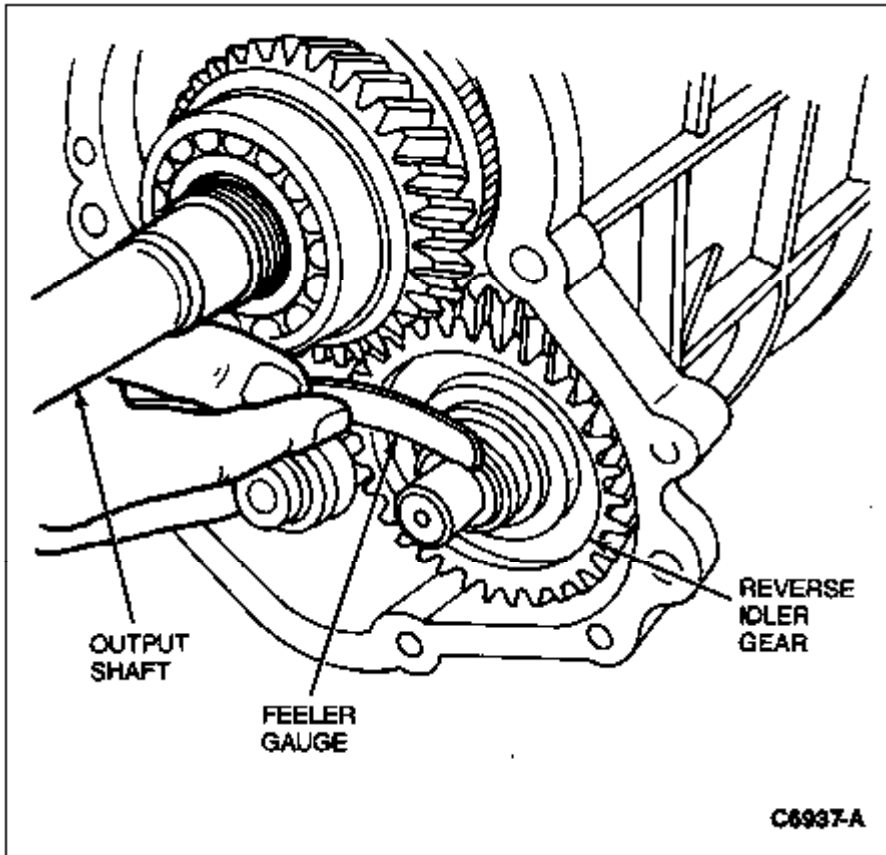
**NOTE:**

This operation is to be performed after the installation of the countershaft and input shaft assemblies.

3. Install needle bearings onto reverse idler gear shaft.
4. Install reverse idler gear.



5. Install spacer, (with brass side toward gear) and original retaining ring onto reverse idler gear shaft. Insert a feeler gauge between retaining ring and spacer to measure reverse idler gear end play.



- Using the Reverse Idler Gear Retaining Rings selection chart, adjust reverse idler gear end play to 0.1-0.2mm (0.0039-0.0078 inch).

REVERSE IDLER GEAR RETAINING RINGS

Part Number	Thickness
E8TZ-7156-F	1.5mm (0.059 inch)
E8TZ-7156-E	1.6mm (0.0629 inch)
E8TZ-7156-D	1.7mm (0.0669 inch)
E8TZ-7156-C	1.8mm (0.0708 inch)
E8TZ-7156-B	1.9mm (0.0748 inch)

## Shift Control Frame Assembly

### Tools Required:

- Ball Detent Inserter T88T-7025-H

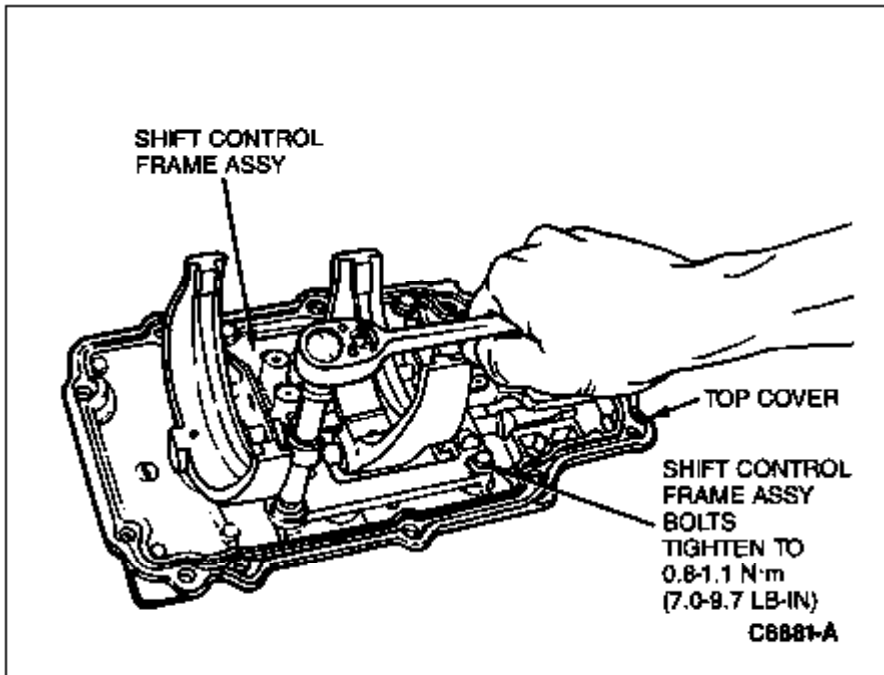
### Disassembly

#### NOTE:

To allow for proper disassembly and assembly, the shift rods must be in NEUTRAL position.

- If necessary, remove four shift control frame assembly retaining bolts from top cover using a 10mm

socket.



2. Remove shift control frame assembly from top cover.

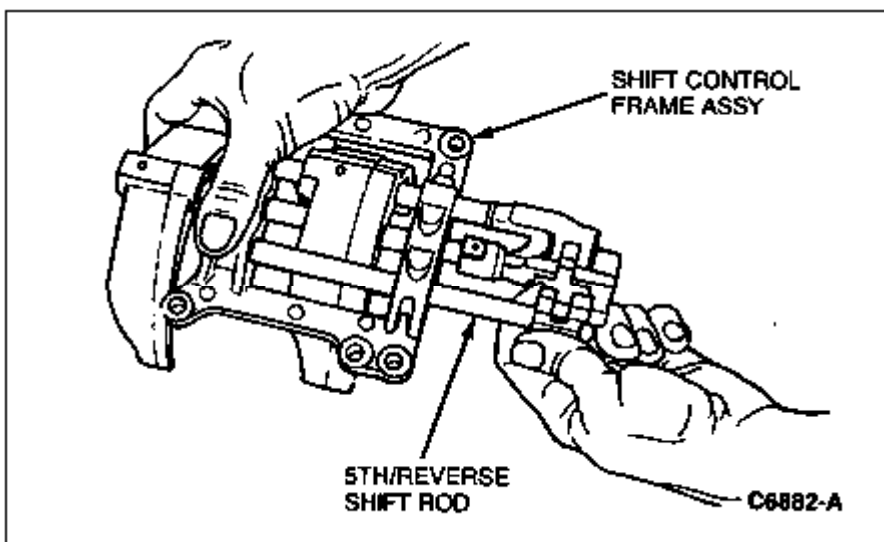
**WARNING:**

**WEAR SAFETY GLASSES WHILE PERFORMING SHIFT ROD REMOVAL PROCEDURE.**

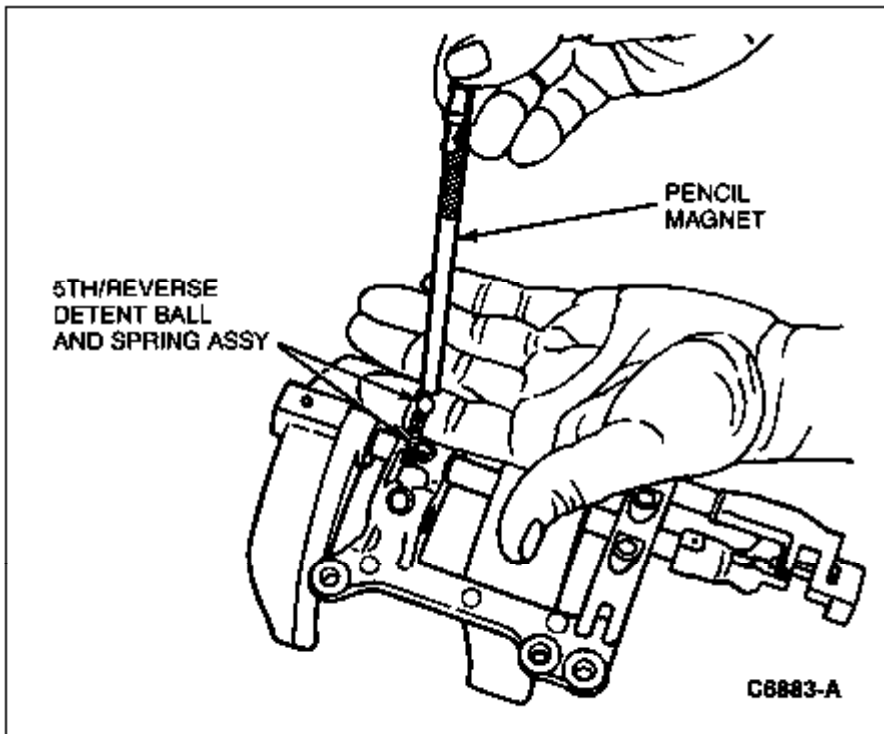
**CAUTION:**

Perform the following shift rod removal procedures with great care. Cover the lock ball bores and friction device and spring seats with a clean cloth held firmly in place during shift rod removal. Failure to firmly cover lock ball bores and friction device can result in component loss when the ball/friction device and spring leave their installed positions.

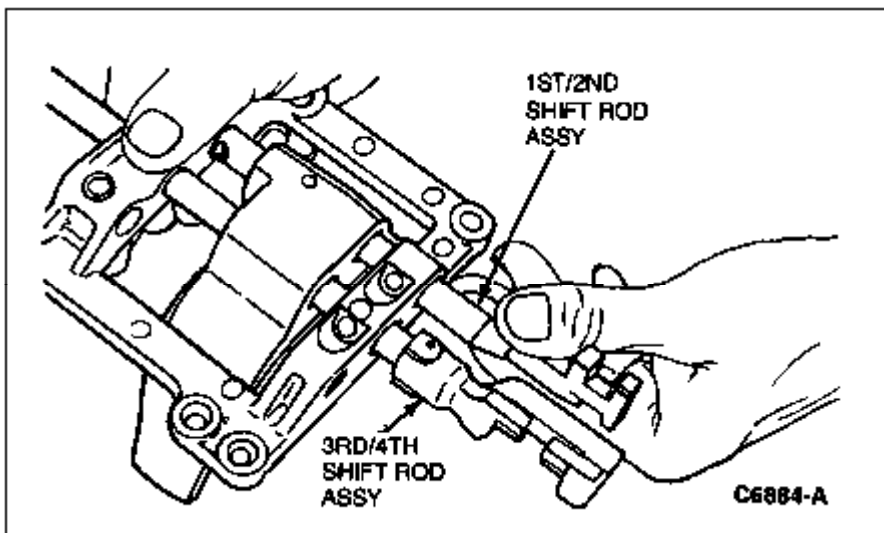
3. Remove fifth/reverse shift rod from shift control frame assembly.



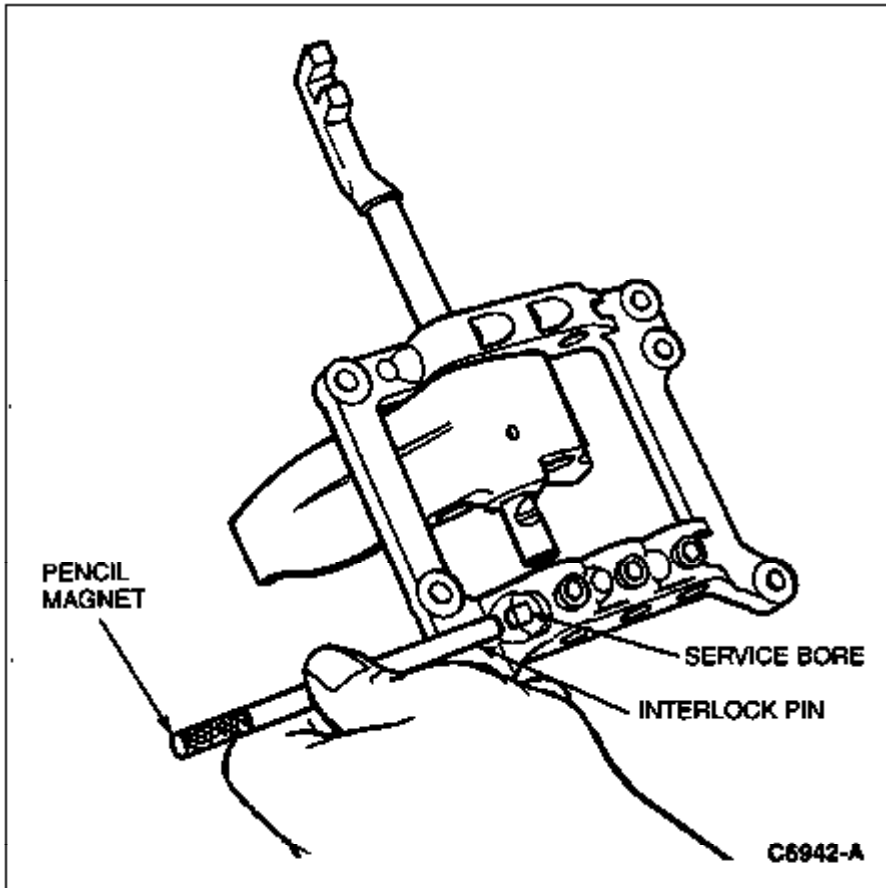
4. Remove fifth/reverse shift rod detent ball and spring using a pencil magnet.



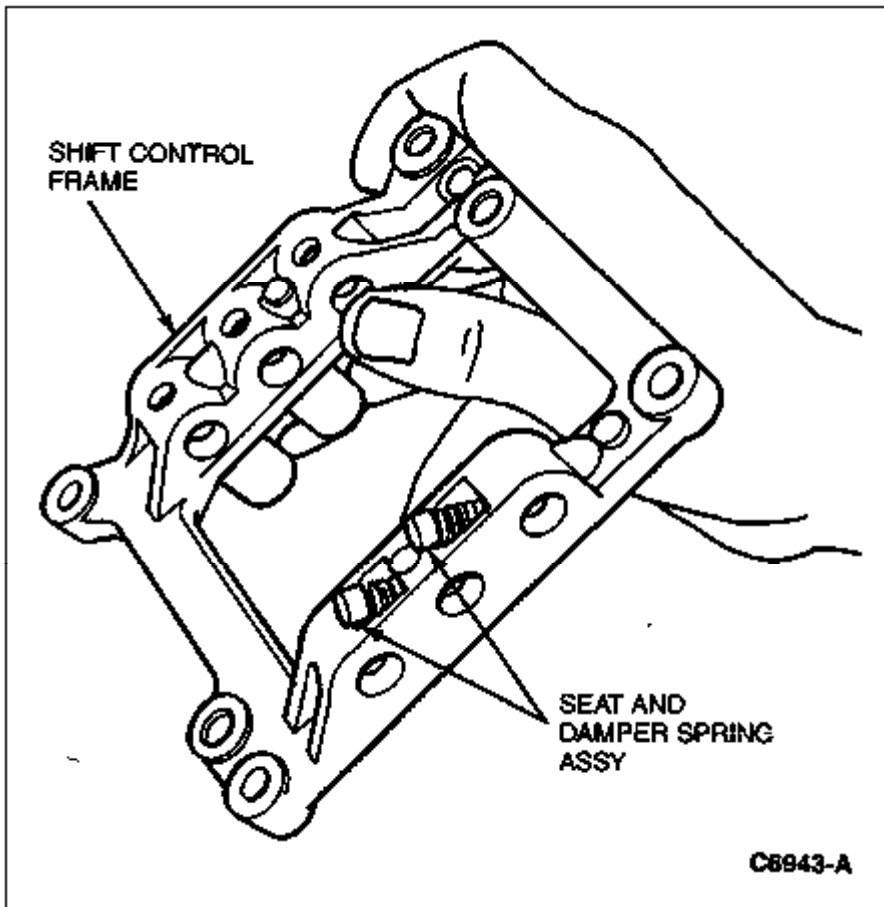
5. Remove roll pin from third/fourth gear fork and shift rod using a 5/32-inch punch and hammer.
6. Remove third/fourth gear fork from shift rod by hand.
7. Remove roll pin from first/second gear fork and shift rod using a 5/32-inch punch and hammer.
8. Rotate first/second shift rod and gate slightly to clear third/fourth shift rod gate and tap lightly to remove third/fourth shift rod and gate assembly.



9. If necessary, place third/fourth shift rod and gate assembly into a soft-jaw vise, and using a 5/32-inch punch and hammer, remove roll pin from shift rod and gate. Slide gate off shift rod.
10. Remove third/fourth shift rod detent ball and spring using a pencil magnet.
11. Remove first/second shift detent ball and spring using a pencil magnet.
12. Remove the interlock pins for fifth/reverse and first/second shift rods through service bore using a pencil magnet.



13. Remove first/second shift rod and gate by rotating assembly approximately 45 degrees while pulling out by hand.
14. To remove shift rod seat and damper spring assemblies, tilt shift control frame and tap loose.

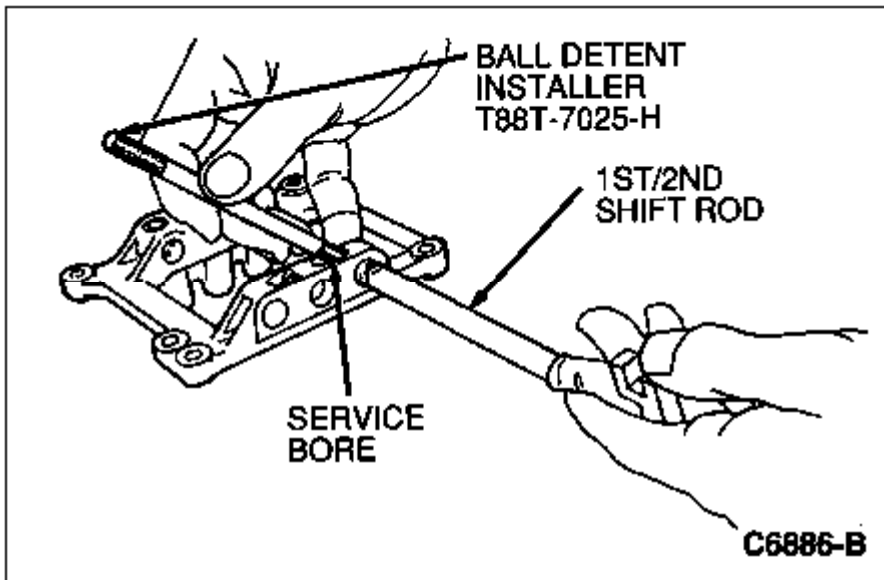


## Assembly

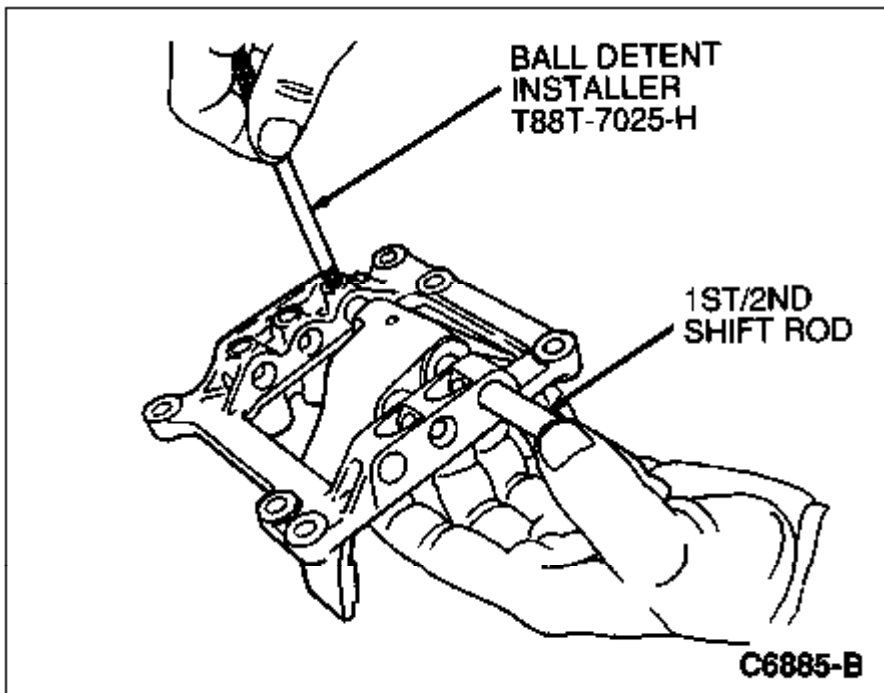
### NOTE:

Lubricate the shift rods and shift rod holes with Synthetic MERCON® Multi-Purpose Automatic Transmission Fluid E6AZ-19582-B (ESR-M2C163-A2) or equivalent, prior to assembly.

1. Insert shift rod damper springs and seats.
2. Insert interlock pins through service bore using a 5/32-inch drift. Ensure shift rod holes are not blocked.
3. Using Ball Detent Inserter T88T-7025-H, depress the first/second shift rod seat and detent spring and insert first/second shift rod in hole over seat. Remove detent inserter and slide rod through hole.



4. Insert first/second detent ball and spring into detent hole.
5. Slide first/second shift rod through first/second gear shift fork and up to detent ball. Using Ball Detent Inserter T88T-7025-H, depress detent ball and slide shift rod over ball. Remove detent inserter and slide rod through hole into neutral position.



6. Insert third/fourth detent ball and spring into detent hole.
7. Place third/fourth shift rod in a soft-jaw vise and slide gate onto rod and align roll pin holes. Drive roll pin into holes using a hammer.
8. Rotate first/second shift rod slightly to allow for gate clearance of third/fourth shift rod.
9. Using Ball Detent Inserter T88T-7025-H or equivalent, depress third/fourth shift rod seat and detent spring and place third/fourth shift rod in hole over seat. Remove detent ball inserter and slide rod through hole.
10. Slide third/fourth shift rod up through hole in first/second shift fork and up to detent ball. Using Ball

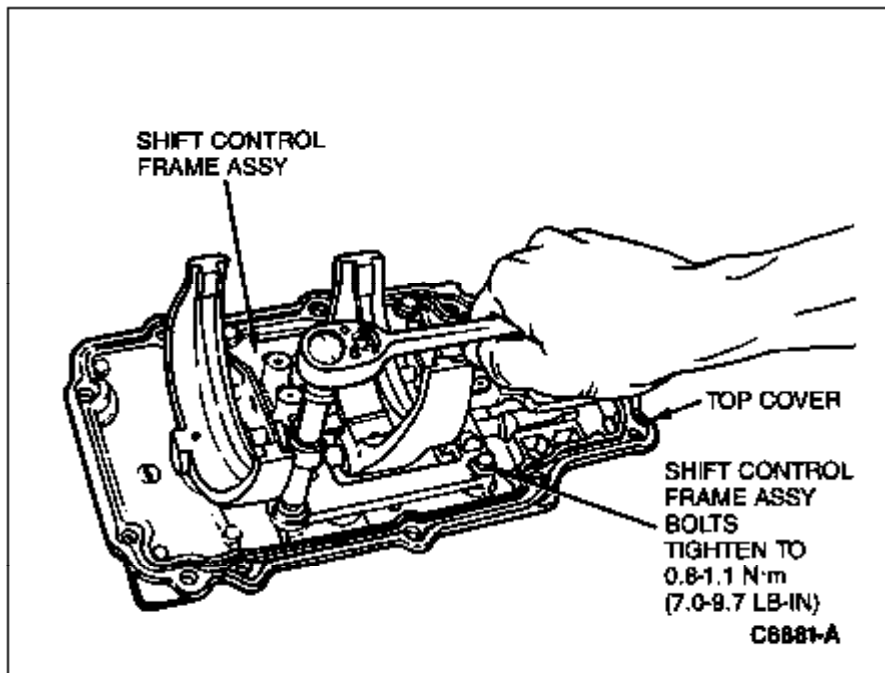
Detent Inserter T88T-7025-H, depress detent ball and spring and slide shift rod over the ball. Remove detent inserter and slide shift rod through hole and into neutral position.

11. Slide third/fourth shift fork onto third/fourth shift rod with roll pin hole located away from shift control frame.
12. Align first/second and third/fourth fork and shift rod roll pin holes. Drive roll pins into holes using a hammer.
13. Insert fifth/reverse detent ball and spring into detent hole.
14. Slide fifth/reverse shift rod through hole and up to detent ball. Depress detent ball and spring using Ball Detent Inserter T88T-7025-H and slide shift rod over ball. Remove detent inserter and slide shift rod through hole and into neutral position.

**NOTE:**

Ensure all shift rods are in NEUTRAL position when assembling shift control frame assembly to top cover.

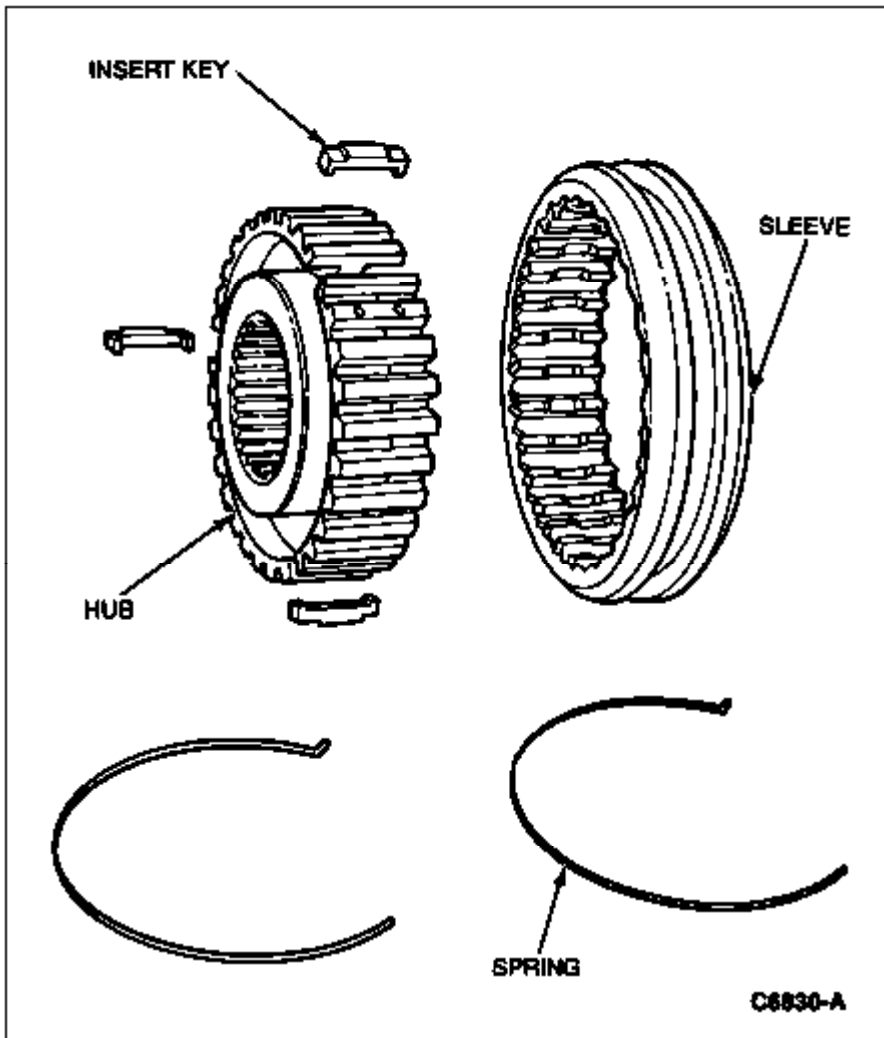
15. Align shift control frame rail assembly with top cover alignment dowels, being careful to ensure proper seating. Tighten downshift control frame assembly to top cover using a 10mm socket on four bolts. Tighten four bolts to 0.8-1.1 N·m (7.0-9.7 lb-in).



## Synchronizer

### Disassembly

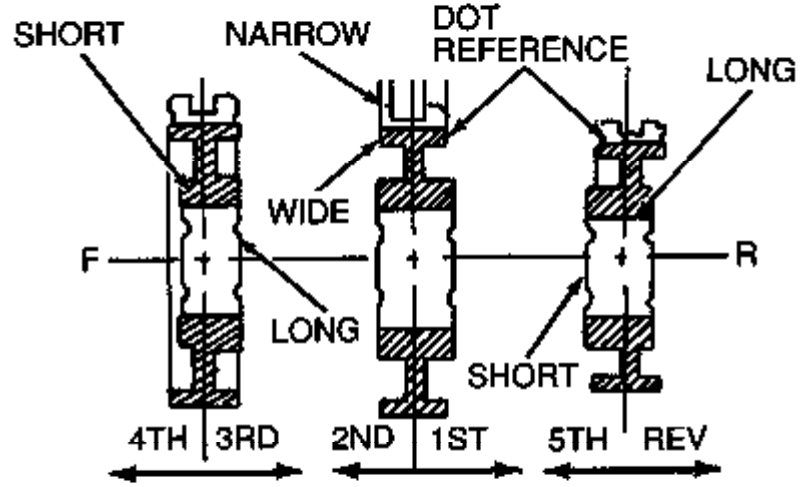
1. Lay synchronizer assembly face down and remove one synchronizer spring, using a suitable tool.
2. Hold sleeve and hub assembly in place and turn assembly over to the opposite face and lay flat on work table.
3. Remove second synchronizer spring and three insert keys.
4. Slide sleeve from hub. Replace parts as necessary.



## Assembly

1. Locate indented dot reference mark on the shoulder of one face side of sleeve. Check drawing for direction of clutch hub to sleeve assembly. Insert hub into sleeve with one of the three insert slots of hub aligned with reference mark. This will ensure proper orientation of hub to sleeve splines. Ensure hub moves freely on sleeve.
2. Lay hub and sleeve assembly face down on work table and place three insert keys into hub slots.
3. Insert one synchronizer spring into clip hole located in inner shoulder of sleeve, and place spring under protruding edge of each insert key.
4. Holding hub and sleeve together, turn assembly over to opposite face side.
5. Insert second spring just like the first, but in the opposite direction. One spring should be counterclockwise to the other.
6. When sliding synchronizer assembly onto shaft, do not allow excessive movement between hub and sleeve. This will cause insert keys to pop out of hub slots and require reassembly.

**DIRECTION OF CLUTCH HUB AND SLEEVE ASSY**



C6463-B