

1. Description of Issue & Service Letter guidance
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1: Description of Issue

Packard acknowledged an issue of a driveline vibration that occurred in 1940 R9 overdrive equipped vehicles, observed only when the overdrive system is active. The excerpt from the letter, below, offers four options to address the vibration, each of which focuses on causes from within the overdrive unit itself. While Packard designed and built its own transmissions, the overdrive unit was designed and manufactured by Borg Warner, as were the prior R6 overdrive for 1939, the R11 overdrive from mid 1948 on and versions used by many of the other car manufactures. Although Packard's first assumption of cause of the issue was directed at the overdrive unit, ultimately Packard identified the cause to be within its own transmission as the explanations below will show.

I observed this vibration not long after installing a rebuilt 1940 Junior R9 into my 39 Six. My perception of the vibration and noise were not directly from the transmission and overdrive but seemed to be coming from somewhere in the driveline. As the Service Letter stated, Packard's engineers concluded the source was the Overdrive which telegraphed through other components and so could be misdiagnosed. I was very encouraged to find this service letter and tried each solution including new clutch and the bevel thrust spring. This involves quite an invasive procedure to remove and replace transmission/overdrive/clutch. Unfortunately, none of these solved the issue. With no other guidance, I shifted back to the possibility that the source was not OD/Transmission and so, had the drive shaft rebalanced, replaced u-joints, adjusted the differential pinion to ring backlash and checked all bearings; even replaced the rear motor mounts. Still there and still annoying me; I found myself adjusting my driving style in order to prevent the vibration and worse, was unhappy driving my car.

Thanks to William Aske of Maryland, who pointed out some slight changes made to the 41 and later transmission cases. Bill has an extensive history of rebuilding and cataloging the different parts that make up the R6 (1939), R9 (1940 to mid-1948) and the R11 (mid 1948 on). These are amazing designs of compact, reliable, economic and mass produced engineering.

TRANSMISSION JAZZ—1801

You may have had some complaint, particularly on the 1801, of a rattle or buzz that is heard on pickup at about 20 to 30 m.p.h. Although this noise is a low pitched rattle and sounds much like a loose muffler, it actually is in the transmission and Econo-Drive. It is caused by a natural engine period which sets the transmission and Econo-Drive gears to rattling.

The effect of the engine period may be heard in all cars but is most noticeable in Econo-Drive-equipped cars because of the greater number of gears that may rattle.

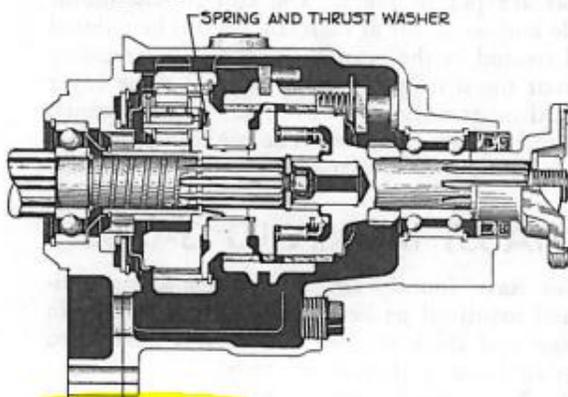
Usually one or more of the following four steps will correct it:

First: Change the transmission and Econo-Drive oil to summer grade S.A.E. 250. Use a premium grade of oil that will maintain its viscosity nearly constant and will not thin out when it gets hot. In some cases the added cushioning effect of the heavier oil alone will dampen out the vibration.

Second: Increase the Econo-Drive cut-in speed so that the engine will have gone through the period before the Econo-Drive is engaged. Governor switches are available in three different speed ranges. The speed range is identified by a paint mark on the cover.

Color	Range	Piece Number
Yellow	Low	355075
Red	Medium	347478
Blue	High	354943

The exact cut-in speed varies according to the axle ratio (see Service Letter March 1, 1940). The Blue—High—governor switch should be used.



Third: Install spring-loaded Econo-Drive clutch thrust washer. This washer is used to replace the solid bronze thrust washer between the planetary pinion cage and the ring gear hub.

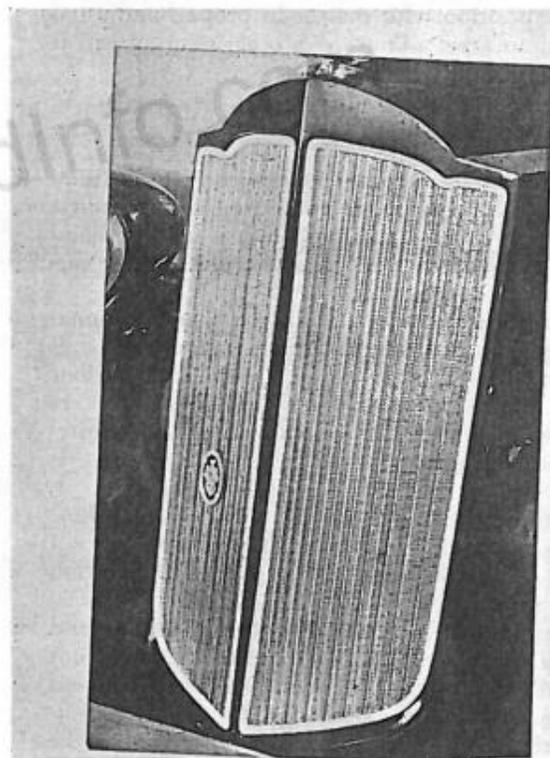
To install it, disassemble the Econo-Drive and replace the original thrust washer with the new

thinner washer and spring. Coat both thoroughly with transmission oil and install the spring first with the cupped surface toward the rear of the car and the machined face of the thrust washer away from the spring. When assembling the ring gear and over-running clutch cam, be careful not to jar the spring and washer off the shoulder on the pinion cage. Pull the screw up slowly and turn the assembly occasionally to make sure the spring and washer remain in place. 362821 Over-drive clutch thrust washer, front. 362822 Over-drive clutch thrust washer front spring. These will be available about the second week of June.

Fourth: Install a high friction lag clutch driven plate. A special high friction lag clutch plate is now available for use in the 1801 Econo-Drive equipped cars. This plate (Part No. 362637) is identified by a white paint mark on the hub.

All clutch driven plates now carried in service stock are selected to the high limit of friction lag and are identified by a yellow paint mark.

RADIATOR INSECT SCREENS



PA-356911 — Radiator Insect Screens — provide full protection for the 1940 radiators. These screens cover the fender air grilles and radiator grille. They are attractive in appearance and easy to install. Now is the time to sell screens!

SUGGESTIONS OR QUESTIONS ARE ALWAYS WELCOME. ADDRESS—EDITOR PACKARD SERVICE LETTER

Figure 1: Excerpt from Service Letter Volume 14 No. 11



Figure 2: 1940 333463 case, casting identification

2: Parts List vs. Service Letters

What is not listed in the Service Letters beyond the one above, as far I can tell, is that Packard addressed the issue in future model years by changing the transmission itself, not the overdrive. Specifically, Packard implemented a design change to address vibration coming from the cluster gear, which when the transmission is in direct drive (aka "3rd" or "high" gear) is spinning but not carrying any torque to drive the car. In mechanical engineering, this is a perfect kinematic situation to allow for vibration. So, for the 41-47 (and through mid-48), the function of the transmission countershaft thrust bearings was supplemented by the addition of two small coil springs acting on the backside of the rear thrust bearings, held in place by pressed plugs, as shown in Figure 3 and Figure 4 below. Note that some diagrams of the non overdrive transmission show a cross section of the cap screw that holds the reverse idler gear shaft in place; this can be visually confused as the thrust spring and plug.

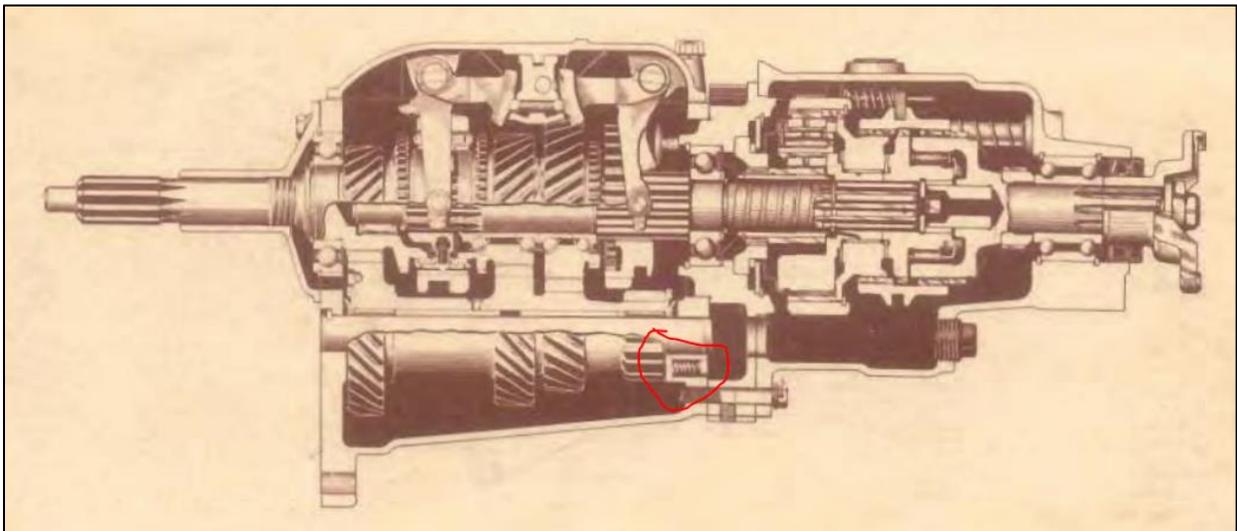


Figure 3: 1941 - mid 1948 Trans & OD with thrust springs

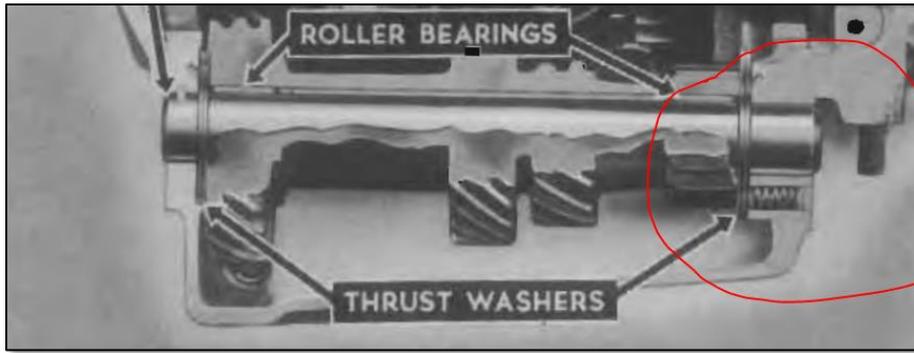


Figure 4: Close up of cluster gear thrust springs

The 1935-41 Parts list and the 1941-47 Clipper Parts list provided evidence to the changes as shown in the part number applicability listings below. Packard indicated, via the parts listings, that the new transmission casting with the anti-vibration bores, was applicable back to the 17th series, 1939.

3.401 CASE TRANSMISSION			
367590 (50.003)	(Supers 333463)	17th-18th & 19th Sr.	1
6897 (50.003)	Screw (To housing) 1/2-13 x 1-7/8	hex hd	5
7337 (50.220)	Lockwasher 1/2.		5

Figure 5: Redesigned case 367590 supersedes old 333463, printed 1941 (35-41 Parts Listing)

3.202 CASE - TRANSMISSION (Cont'd)			
367590	used with Overdrive, 1951-2000-01-03-06-10-	11-2100-01-03-06-11-26	1
6099	Plug 1/2 sq. hd., oil hole, 1951-2000-01-	03-06-10-11-2100-01-03-06-11-26-30 . .	2

Figure 6: Redesigned case 367590, 1941- 47 (and mid 48 not shown, 41-47 Parts Listing))

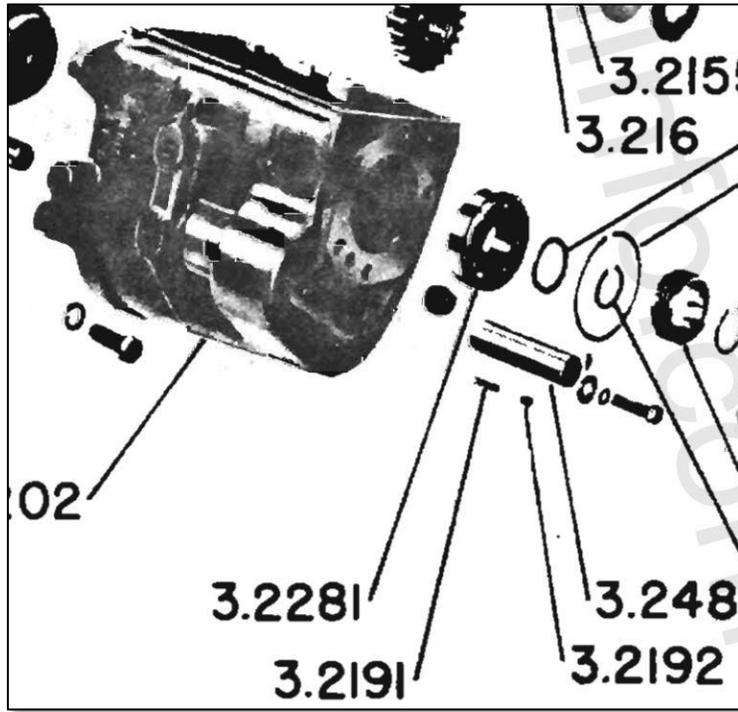


Figure 7: Exploded view of transmission showing Spring 3.2191 (pn 330087) and Plug 3.2192 (pn 367794)

3.2191	SPRING - COUNTERSHAFT THRUST	
330087	1951-2000-01-03-06-10-11-2100-01-03-06-11-26-30	2
3.2192	PLUG - COUNTERSHAFT THRUST SPRING	
367794	1951-2000-01-03-06-10-11-2100-01-03-06-11-26-30	2



Figure 8: Spring and Plug pair, as removed from 367590

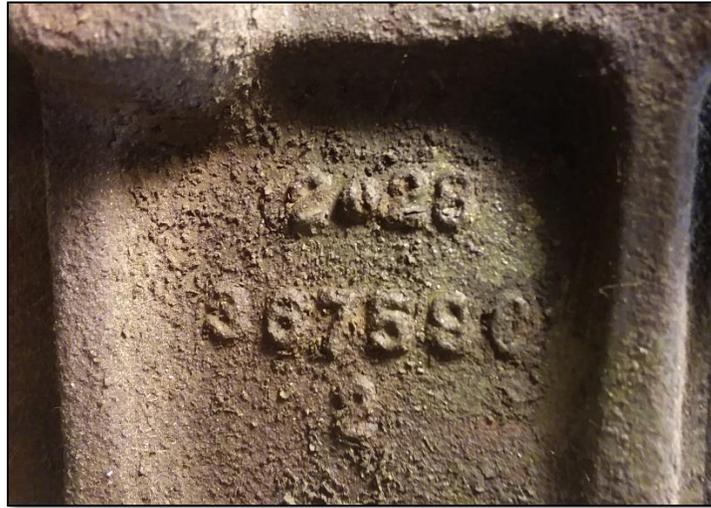


Figure 9: 367590, 41-mid 48 revised transmission casting

3: Modification of 1940 Transmission Case:

The information from the 35-41 and 41-47 Packard Parts Lists leads to the conclusion that the superseded case 333463 can be modified to accommodate the thrust springs 330087 and plugs 367794, becoming equivalent to 367590 case having the factory design change. Figure 10 shows the 1940 333463 case, marked for drill locations. The centerline of each hole is $13/16$ th" (0.8125 in) from the centerline of the countershaft as shown by the dimension A. The two holes are in line with the countershaft hole as shown by line B, but there is no direct reference feature on the original casting 367590 from which to establish line B other than the edge of the mounting hole at the top of line B. There is a margin for error regarding the location of the holes about the shaft, which can be assessed by judging the thrust surface inside the transmission. The two holes were drilled progressively until the final drill size W, equivalent to 0.386". This size will allow for a press fit of the plug. The two holes were also beveled on both the outside and inside to allow for easy insertion of the plugs and to prevent sharp edges contacting the thrust bearings.

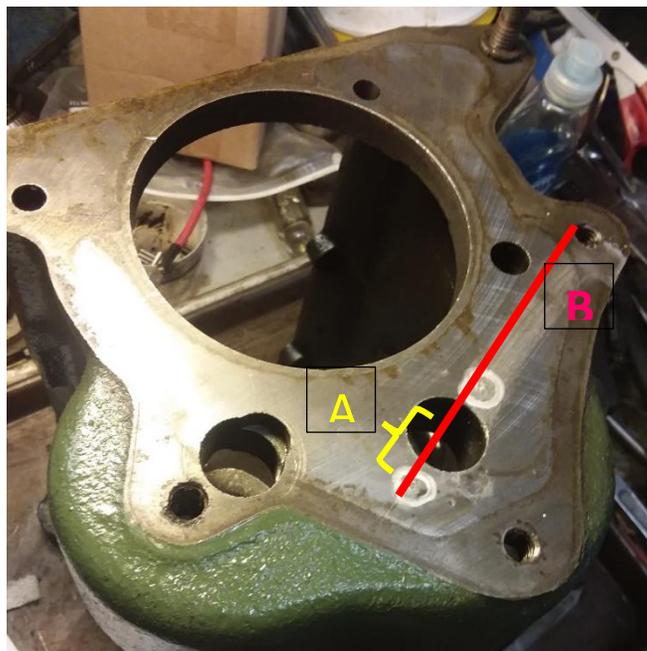


Figure 10: 1940 333463 case, marked for modification



Figure 11: 1940 333463 case after modification, ready for assembly (reverse idler already in place)

4: Additional Assembly Information:

Although the existing transmission and overdrive assembly procedures are readily available and very good, it is worth noting here that the thrust springs and plugs are not to be assembled into the holes until after the counter gear, thrust washers and shaft are in their final installed positions. An attempt to install them prior will prevent the counter gear and thrust bearings to move into their proper positions. Further, the input clutch shaft and rear transmission main shaft with adapter plate must be in place prior to the springs and plugs.

Drive the countershaft into position in the case while holding and guiding the aligning bar out through the hole in the rear of the case. Install the countershaft thrust springs and drive in the thrust spring plugs deep enough so they will not protrude.

Figure 12 shows the transmission case with overdrive adapter plate (blue arrow) attached and the access location through the adapter plate for installation of the thrust springs and plugs (red arrow) and Figure 13. The reason for this, as the transmission assembly procedure explains, is that the cluster gear and its thrust washers and bearings must be placed into the bottom of the transmission case, below the shaft centerline, to allow a clear path for the front clutch shaft and rear main shaft gears to be moved into position. Once these two are in place, the cluster gear is lifted into its final place and its drive shaft driven into place. After this step is confirmed and adapter plate attached, the springs and plugs are installed through the rear.

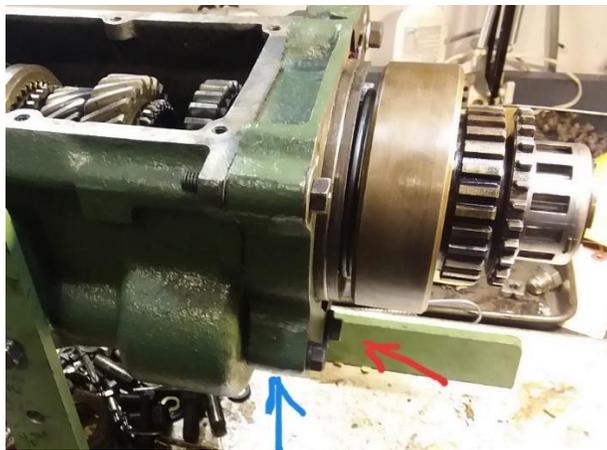


Figure 12: Transmission with Adapter Plate prior to Spring and Plug insertion and Overdrive Housing attachment



Figure 13: Spring Plugs on either side of Cluster Shaft as viewed through Adapter Plate

Figures below are excerpts from the Packard Parts Listings regarding the adapter and overdrive case part numbers.

▲ 3.271	ADAPTER - OVERDRIVE	
347550	1951-2000-01-03-06-10-11-2100-01-03-06-11-26	1

3.416	CASE, Transmission econo drive unit	
333868 1700-1-1A-2-3-3A-5	1
3475521800-1-1A	1
3475531803-3A-4-5-6-7-8	1
3.416	CASE, Transmission econo drive unit - Continued	
3670021900-1-1A	1
3670031903-3A-4-5-6-7-8	1
7833 (50.003)	Screw (to adapter) 3/8-16 x 1 hex hd	2
5506 (50.220)	Lockwasher 3/8.	2

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With Thanks to William Aske.

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