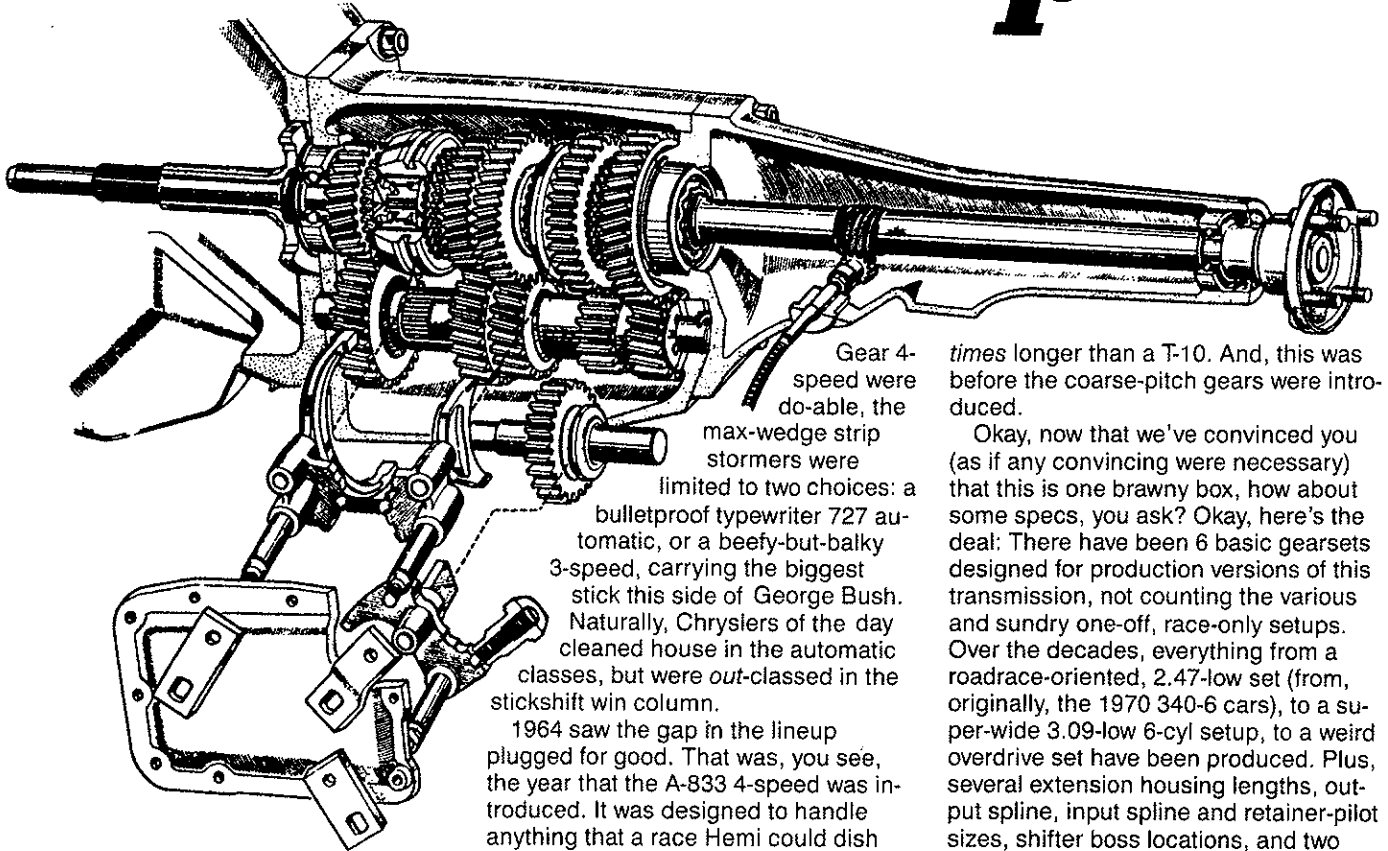


A Need Four Speed



Through Chrysler's A-833 4-speed with gun and camera or, how to check out, rebuild and beef up your manual box.

Story and photos by Richard Ehrenberg

1 993. If you don't have at least 5 speeds on the business end of your shift lever, you're, like, a zero. Hard to imagine a time when cars had only *three* forward speeds. But, for the fastest Mopars of 1963, that was the case. While lesser-motor'd Mopos with the flimsy Warner

Gear 4-speed were do-able, the max-wedge strip stormers were limited to two choices: a bulletproof typewriter 727 automatic, or a beefy-but-balky 3-speed, carrying the biggest stick this side of George Bush. Naturally, Chryslers of the day cleaned house in the automatic classes, but were *out-classed* in the stickshift win column.

1964 saw the gap in the lineup plugged for good. That was, you see, the year that the A-833 4-speed was introduced. It was designed to handle anything that a race Hemi could dish out, and then some. Following the usual Chrysler scenario, the company was late getting into the 4-speed game, but, boy, when they made their move, it was an immediate gold standard.

Using the Warner T-10 as a comparison, Chrysler engineers Dale Slaubaugh, Dale Reeker, and their teammates increased the mainshaft-to-countershaft measurement by .25 inches, and widened all gears, some by as much as 30%. These changes, as well as larger synchros, beefier bearings, etc., combined to produce a trans capable of handling a conservative 50% more torque than a T-10.

Other upgrades include the fine, rolled splined where the synchro clutch gears are fitted to the mainshaft, a beefy case with thick walls and gradual radii, and 4 rows of generous dimension needles on the countershaft gear. This resulted in a countershaft deflection of less than .004" at—get this—nearly 500 foot-pounds input. The expression "Where's the Beef?" was certainly *not* created for this torque monster.

Durability testing of the earliest, 1964 versions, revealed that, behind a max-wedge, a basic A-833 would live 15

times longer than a T-10. And, this was before the coarse-pitch gears were introduced.

Okay, now that we've convinced you (as if any convincing were necessary) that this is one brawny box, how about some specs, you ask? Okay, here's the deal: There have been 6 basic gearsets designed for production versions of this transmission, not counting the various and sundry one-off, race-only setups. Over the decades, everything from a roadrace-oriented, 2.47-low set (from, originally, the 1970 340-6 cars), to a super-wide 3.09-low 6-cyl setup, to a weird overdrive set have been produced. Plus, several extension housing lengths, output spline, input spline and retainer-pilot sizes, shifter boss locations, and two distinctly different synchro designs have found their way into A-833s. In addition, there were different side cover/interlock/fork arrangements, as well as speedo pinion setups. A virtual potpourri of hard parts.

What we're gonna do here is discuss most of the sub-systems that make up and A-833, and show you what to look for in a rebuild, point out common trouble spots, help you identify various parts, and, generally, keep you informed about what's hot and what's not. In short, we'll dissect a few A-833s, and bring you up to the minute on parts availability. As a bonus, we'll take a look at the latest lubrication recommendations from the factory engineers themselves, and, as a whipped-cream dessert bonus, we'll explore the latest in hot clutches.

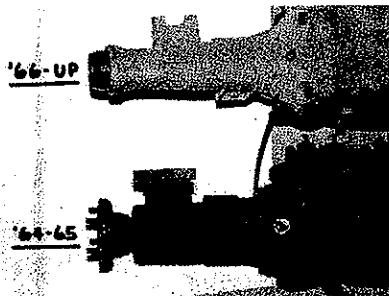
As per our standard fare, what we're *not* gonna do here is walk you through a complete rebuild of somebody's gre-naded gearbox. We won't insult your intelligence by repeating what's been printed in virtually every Mopar RWD service manual for the last 29 years!

So, rev that mill, sidestep that clutch, and let the games begin.

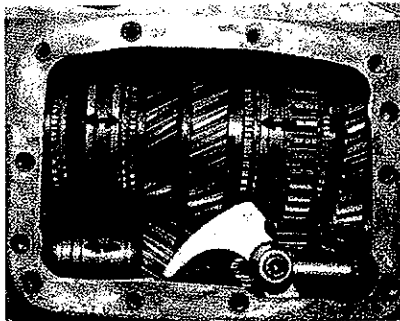
SWAP MEAT

One of the best places to score that A-833 (as well as parts) is that local swap meet. But, before you can be as swift a trader as the 833 is a shifter, you need to educate yourself as to what to look for. What case length do you need? Which shifter position? What input spline, etc.?

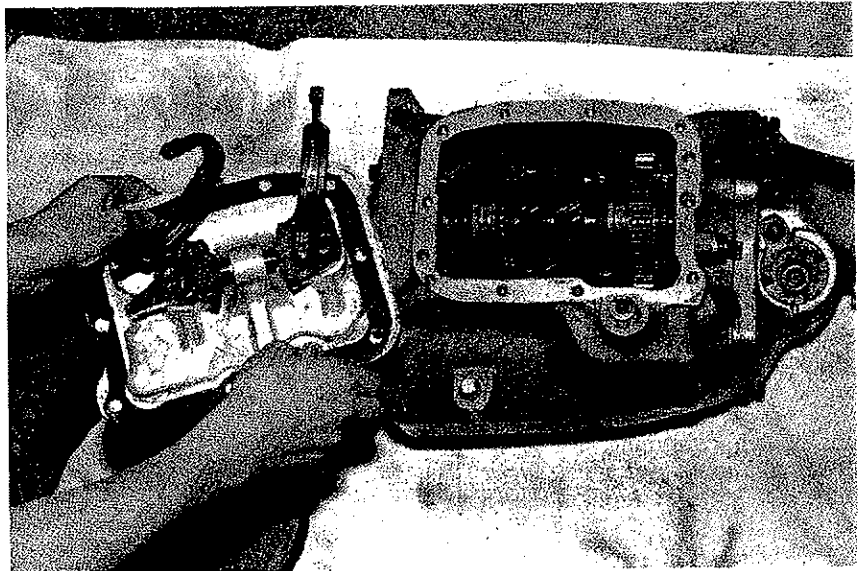
Next, you'll want to at the very least, take a peek inside your potential purchase. Does it have the ratios you want (see *Rational Ratios*). Are the synchros and gears in useable condition, or are you buying a basket case or, for that matter, just a case?



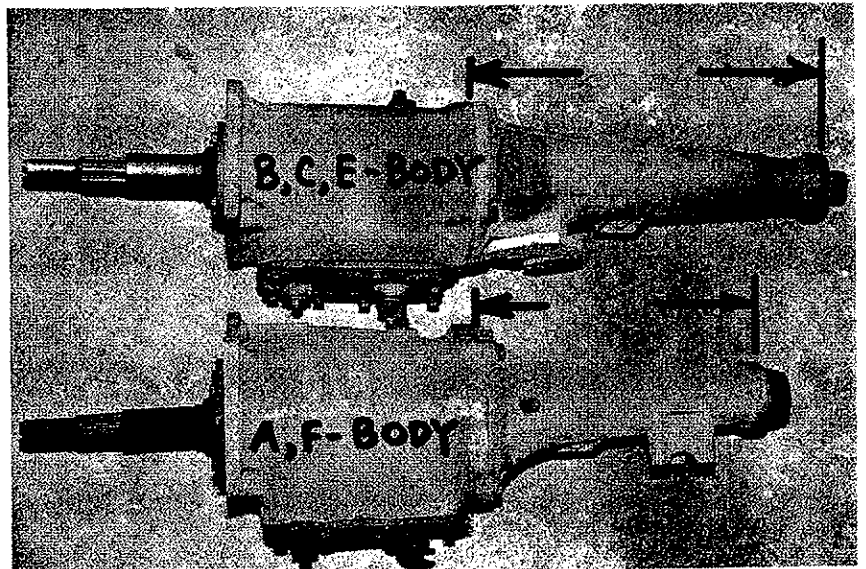
Another most-basic item to consider is the output setup. '66-up units will have the now-common sliding spline configuration (top), while the '64-'65 units are fitted with the companion flange for the ball and trunion front U-joint, as well as their small, early-style speedo pinion setup. You can't re-configure a trans from one output style to another without changing the extension housing and mainshaft—major surgery!



Once inside, check the synchro sliders (clutch sleeves, upper arrows) for easy gear-to-gear operation. Also, check the cluster (countershaft gear, bottom arrow) for excessive end-play, which would be anything over 0.029". Also, be sure to inspect gears, especially clutch gears, for damage or excessive wear. (See "Synch or Swim" section for more on synchros.)



Most swap meet sellers won't be adverse to you taking a peek inside. Inspect the gear teeth (especially the synchro/slider clutch gears), check interlock operation, and check the cluster for excessive end-play. Of course, count the teeth to see if the box has ratios you can live with.



To verify swapability, the most basic dimension to check is extension housing length. On a '66-up B/E-body trans (as well as that occasional C-body piece) the dimension, from the case to the seal-mating surface, will be 16.38 inches. The "shorty" A/F-car trans will dimension out at 12.62 inches. Since on the big box, there are several permutations, be sure that the shifter and engine-mount bosses are where you need them. You might get lucky and score a DC/MP aluminum case, or you might consider using the now-common overdrive aluminum piece. The OD case requires a huge pilot hole in the clutch housing, as well as a special shorty countershaft. This is needed since the shaft floats in the case (for gear-rattle suppression), so the front of the case must be fitted with a cupped plug to prevent oil leakage.

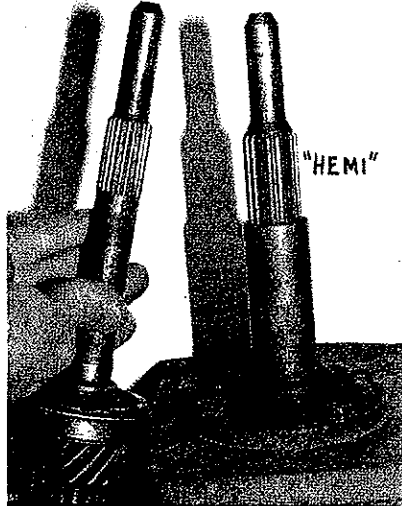


Finding an inverted 3-4 shift lever is the immediate tipoff to an "overdrive" 833. Of course, there's nothing to prevent an unscrupulous seller from flipping the lever, so, if you aren't sure, pop the side cover. See "Rational Ratios" for gear-tooth counts.

Four Speed

IN-PUT

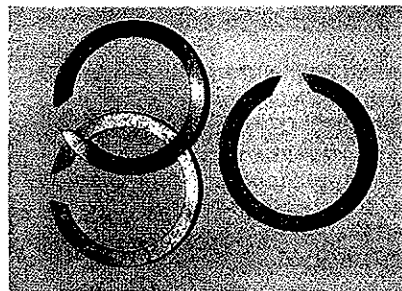
Main drive pinions, commonly referred to as input shafts, were available with two different splines. Hemi shafts (right) which were also used on most 440 cars, utilized a beefy spline measuring 1-3/16" o.d., with 18 teeth, while the weaker wedge cousins made do with a 1-inch, 23-spline configuration. While it's true that, all else being equal, fine splines are stronger (due to the increased root diameter), here, the larger diameter of the Hemi shaft much more than compensates.



RING DING

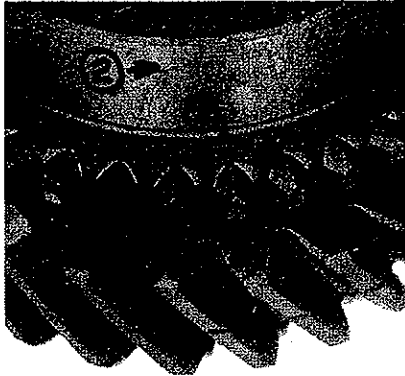
Before you even think about disassembling an A-833, be sure to lay in a small supply of the selective snap rings which are used to adjust clearances. They are available as follows:

- 0.086" thick6025754
- 0.091" thick6025755
- 0.094" thick6025756
- 0.097" thick6025757

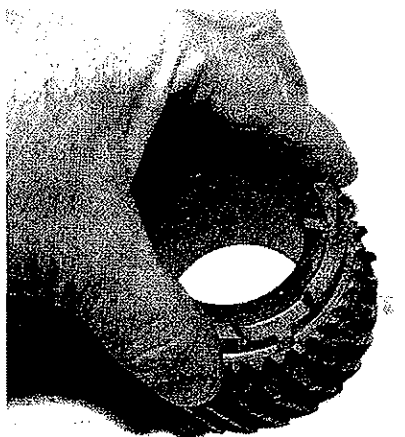


SYNCH or SWIM

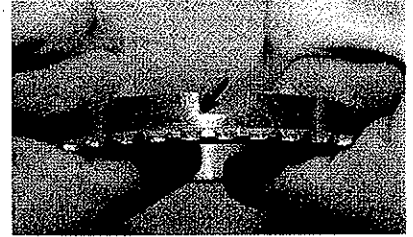
In a fully synchronized trans, such as the A-833, actual gear wear is usually minimal, since all the actual shifting between forward speeds is accomplished by sliding the synchro sleeves. Hence, the gears are most likely to show abuse on the dog teeth, where the slider makes contact (arrow #1). The teeth



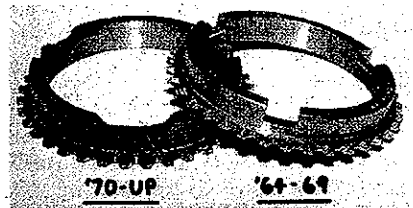
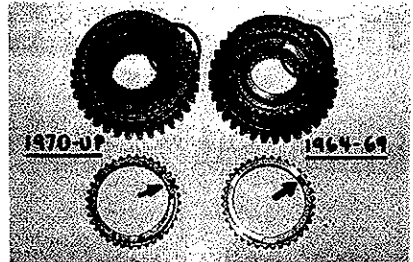
should be sharp, as shown, with a small amount of rounding being generally okay. If you are wondering what contagious disease this gear is afflicted with, it's a brand new gear, coated with Cosmolene. Arrow #2 indicates the actual brake drum area of the gear. This surface should be smooth and free from scoring, galling, or grooves.



Synchro stop-rings (brass rings) can actually be tested. All that's required is applying a light downward pressure while twisting the ring. With little more than a light press, the ring should seize onto the gear. If this fails, try a new stop ring. Still ng? Time to hunt up a new gear. Apply this test to all 4 speeds, but expect to see the majority of trouble on 2nd and 3rd gears. Like, how often do you power-shift First?



Early-style (pre-'71) stop rings were prone to breakage at the sharp corners. Sometimes these cracks were almost invisible, so the test method is simple: try to pry 'em open.

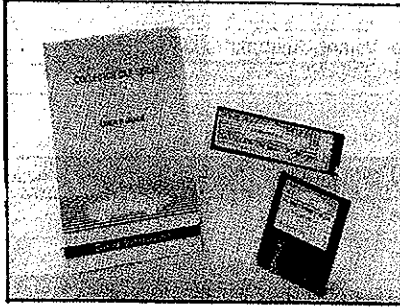


There were two distinctly different synchronizer designs. The early design, which utilized the more-fragile stop rings, can be identified by the wide-vs.-narrow struts (circled, top) and the sharp-cornered notches in the rings (lower right). Close-up of the rings clearly shows the different ring designs. Late synchros will bolt-in to earlier transmissions, as long as the matching rings are used. Note that some early '70 transmissions used the old style synchronizers, and that, 25 years later, any synchro could be in your transmission, so check before you order. The following parts are available:

- Early synchro stop rings . . 2801381 (package of 4)P4529833
- Late synchro stop rings . . 3515023 (package of 4)P4529834
- 1-2 Synchro, late type . . . 4130095
- 3-4 Synchro, overdrive. . . 4377401 (Note: this synchro can be used on non-overdrive transmissions, as long as the original clutch gear (the innermost piece) is recycled from the original synchro. The overdrive synchro has larger internal splines, but the slider, etc., is identical to the '70-up non-overdrive piece.)

Continued on page 56

DECODING SOFTWARE



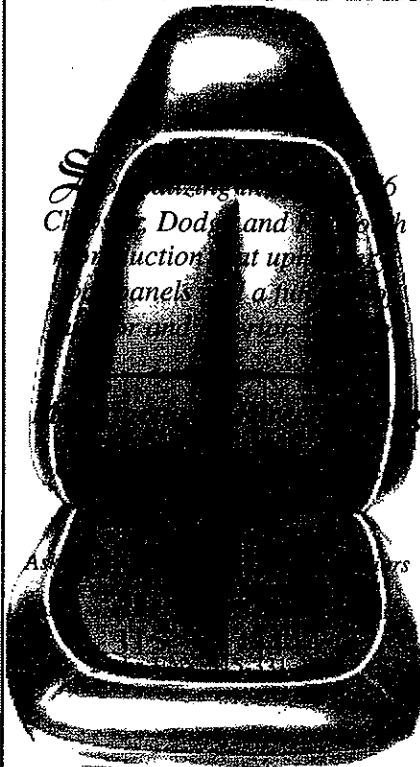
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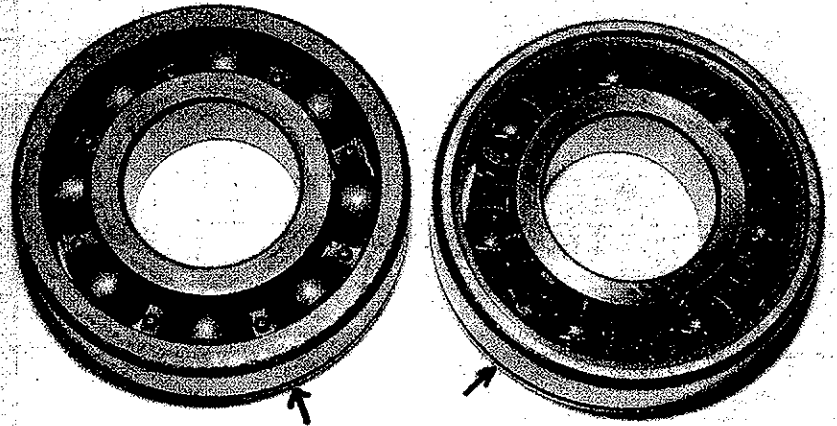
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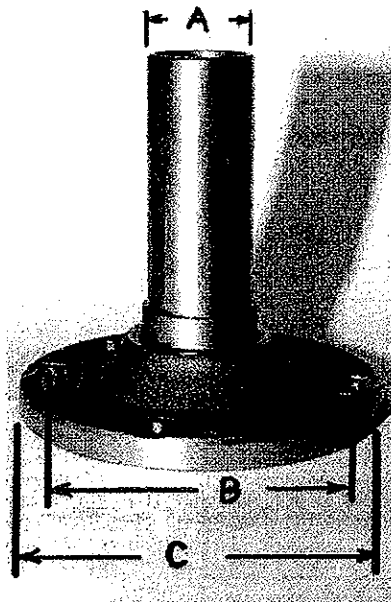
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A Need Four Speed

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BEARING UP



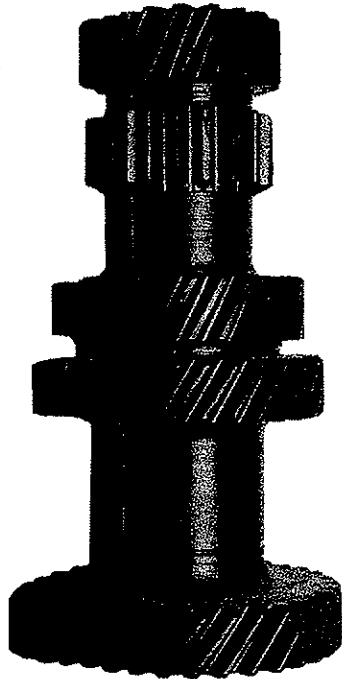
A much-abused, oft-broken part that has long been unavailable has recently resurfaced through Mopar Performance: the input bearing retainer. All the popular versions, and even some not-so-popular, are available again, as per this chart:

Input bearings were of either of two sizes, with the "307" bearing (shown), being more common. MRC, the Mopar supplier of choice for 30 years, has changed from an 8-ball configuration (left) to a newer 7-ball arrangement. While a quick assessment might lead to the conclusion that more balls is better, in this case, the newer design has bigger balls, for added capacity. Of course, the age-old question of more balls vs. bigger balls isn't going to be answered so simply, right? If you look carefully, you'll see that both of these bearings are equipped with external snap-ring grooves, which make them useable for input bearings, identified by industry no. 307-L. This groove, while not needed for the center bearing, doesn't preclude you from using them in that application. New Mopar bearings are readily available, with or without a snap ring, input retainer gasket and seal: #307-L Bearing (3.14" o.d.): P4529698 w/gaskets & seal; 3410048 bearing only. #308-L Bearing (3.54" o.d.): P4529699 w/gaskets & seal; 4446326 bearing only. Note: for whatever reason, the kits are much cheaper than the individual bearings.

"A"-input spline size	"B"-Bolt circle	"C"-Outside diameter	Part number	Notes
23	3.70"	4.35"	P4529694	Orig '64
23	3.70"	4.80"	P4529695	
23	4.16"	4.80"	P4529696	
23	4.16"	5.125"	3878596	Overdrive
18	4.16"	4.80"	P4529697	Hemi

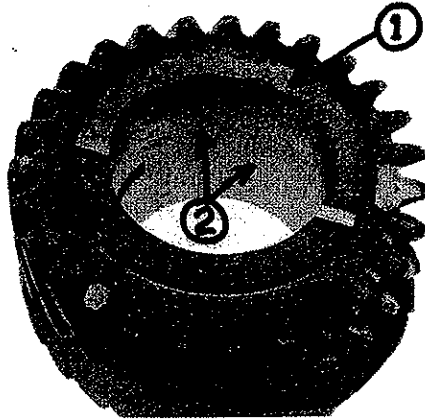
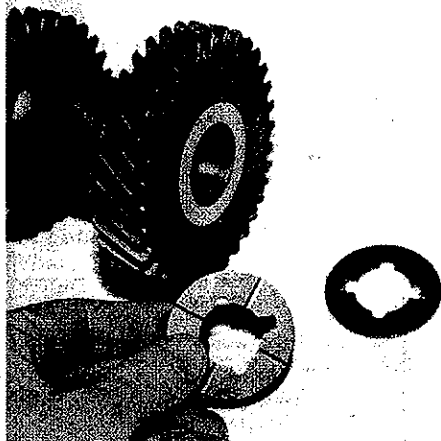
Note: All the 23-spline retainers use the standard clutch-release bearing (2405077), while the 18-spline Hemi boxes use 2823570. Also, in a reverse-scenario, the overdrive retainer is priced much lower than the MP offerings.

RATIONAL RATIOS: NO-FEAR GEARS

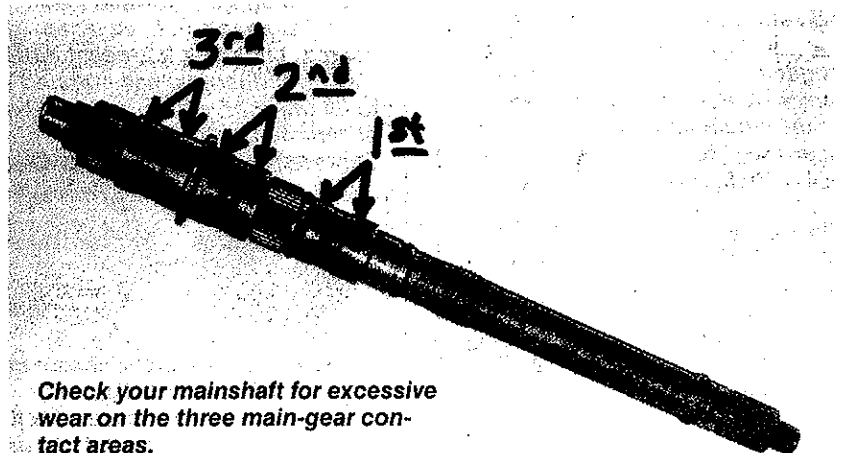


Countershaft gears (cluster gears) were manufactured in a bewildering array of ratios, pitches, etc. Your best shot at replacing a cluster would be searching the after-market gear houses, as well as NOS Mopar purveyors (with, of course, the correct part number in hand). Luckily, A-833 clusters were extremely rugged, in fact, we've seen 200,000-mile transmissions with no meaningful gear wear. In fact, the only place that the gears typically wear at all, is inside, where the 4 rows of rollers ride. Inspect this area carefully.

Sometimes the thrust surface will have some wear, but, more typically, only the thrust washers will be gone. New ones are available as part number 2538207.



As with the countershaft gear, main gears can sometimes show wear on the thrust (1) and interior bearing surfaces (2), in addition to cone and dog-tooth wear shown in the first photo in "Synch or Swim." Check these carefully for excessive play on your mainshaft. Note that Hemi gears have Oilite bushings on the inside.



Check your mainshaft for excessive wear on the three main-gear contact areas.

A-833 GEARSET SPECIFICATIONS

DESIGNATION	RATIOS			TOOTH COUNT MAIN SHAFT				TOOTH COUNT COUNTERSHAFT GEAR				NOTES
	1st	2nd	3rd	1st	2nd	3rd	Drive Pinion	1st	2nd	3rd	Direct	
1964-up 6-cyl	3.09	1.92	1.40	35	32	27	22	17	25	29	33	1
1964-up 8-cyl	2.66	1.91	1.39	35	34	29	24	17	23	27	31	
1966-70 Street Hemi	2.65	1.93	1.39	33	30	26	21	16	20	24	27	2
'70 Trans Am & '71-'74 8 cyl	2.47	1.77	1.34	35	34	29	25	17	23	26	30	4
'71-'74 Hemi & Hi-Perf	2.44	1.77	1.34	33	30	26	22	16	20	23	26	2
'75-up Overdrive	3.09	1.67	0.73	35	30	18	22	17	27	37	33	3

Numerous ratios have been produced for A-833s. This chart details the production versions only. Parts availability is poor, some overdrive parts are all that remain in the Mopar system.

NOTES:

- 1—Was used on '64 to early '66 6-cyl + 273 cars, and again in some mid '70s 318 cars.
- 2—Coarse-pitch gearset, Oilite bushed.
- 3—"Overdrive" was accomplished by "fooling" the driver by swapping 3rd and 4th. Third was actually overdrive.
- 4—First trans with new style side cover.

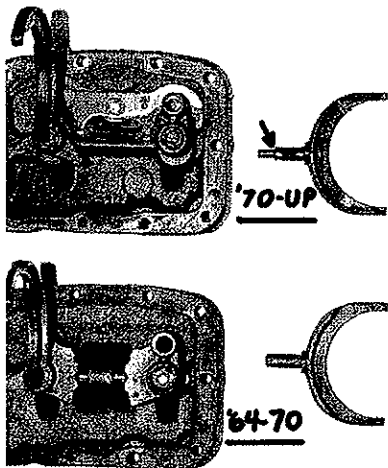
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A Need Four Speed

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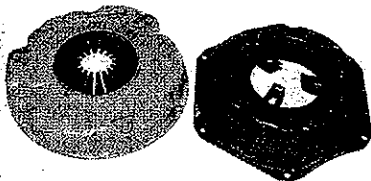
ON THE SIDE

There have been only two basic types of side cover/interlock/fork assemblies. The early type (bottom), can be recognized in a flash: it uses a double-ball arrangement to prevent the trans from being shifted into 2 gears at once, and the forks are made of brass. This setup is generally considered to be the better of the two. The only problem is the occasional broken fork, and they are disco'd. Luckily, the steel forks used in the later arrangement (top) can be used in the early side covers by simply cutting off the small-diameter protrusions (at arrow.) The 1-2 fork is available as 4130068, the 3-4 piece is 3410038. Note that 1970 was the changeover year, with both interlock/side cover types in production. If you should find an aluminum side cover, don't let it get away. To the best of our knowledge they were used only on 1965 A-990 race Hemi cars.



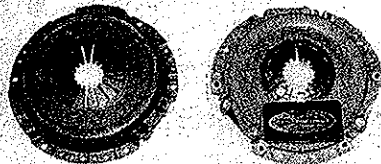
HOT HOOKUP

Clutches are a rather subjective item; everybody seems to have a favorite. Muscle-era Mopars virtually all came equipped with a typical 3-finger Borg and Beck unit (right), while most '60s GM cars were equipped with diaphragm



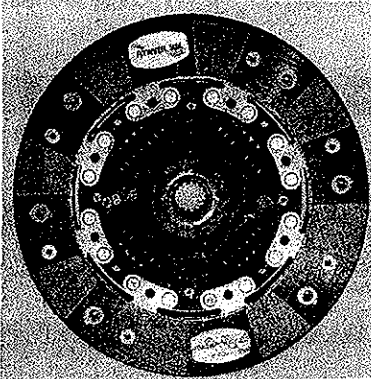
pressure plates (left.) The diaphragm units are well known for their pluses: high torque capacity, clean release, and reasonable pedal pressure. Why then, weren't they used on Mopars? Simple, they had a nasty habit of hangin' on the floor during high-rev shifts. Not a pretty picture, indeed. The pressure plate on the left, though, solved that problem. It's a Scheiffer Rev-Lock unit, circa 1970. We have been using them successfully, even on 7500-rpm 340s, since that time. One problem, though: since Hurst owned Scheiffer, and Hurst was sold off quite a while back, Scheiffer seems to have disappeared. Luckily, a left-coast outfit, Midway Industries, has stepped in to fill the void, with a fabulous line of clutches by the name of Centerforce. Here a new Center-

Photo: Dave Zelkowsky

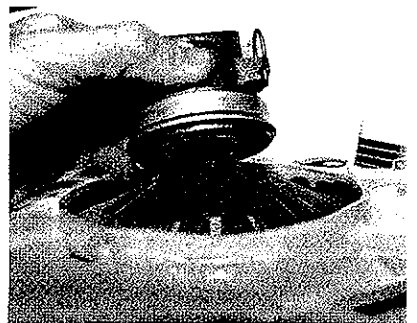
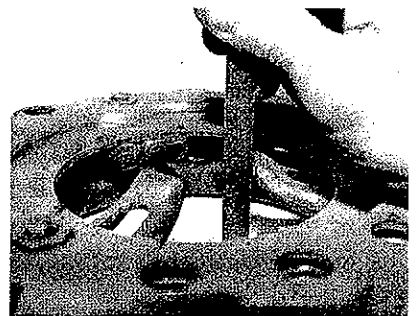
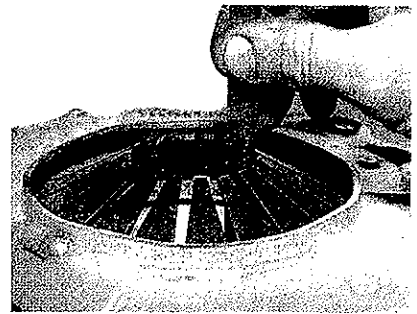


force pressure plate is shown next to a new FWD Mopar Turbo II stocker. The Centerforce clutch has readily visible centrifugal assist weights, which provide additional clamping pressure at high revs, in addition to preventing stuck-pedal-itis.

Photo: Dave Zelkowsky



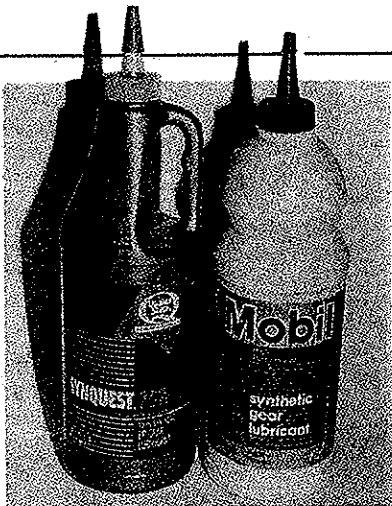
In addition to the trick pressure plate, Centerforce has a slick disc that's metallic-faced on one side only, hence it's moniker: Dual Friction. This gem provides the smooth engagement that the asbestos discs are known for, as well as the high-temp benefits of the sintered metal. Used in conjunction with the Centerforce pressure plate, torque capacity is increased by an incredible 90%. Using these two Centerforce pieces, we've been able to launch a heavy 4-door Lancer with a tire-frying 260-hp mill, for over 25,000 miles with zero problems. A testimonial? You betcha!



Want proof that the diaphragm unit will bolt into your 340 or 440? Well, besides the bolt pattern being correct, the finger height is the same, and... the finger diameter is just right for the stock release bearing. The only case we've seen where a diaphragm wouldn't fit is in a 1967 Hemi Coronet R/T, which was originally equipped with an 11" Borg & Beck pressure plate. The boxier design of the diaphragm plate caused interference inside the clutch housing. Every other swap we've done has gone without a hitch. Note, though, that Midway's catalog claims to fit that application, so they may have solved that problem. Midway produces the Dual-Friction disc in every conceivable spline, even the Hemi (1-3/16" x 18) and the newest FWDs (15/16" x 17).

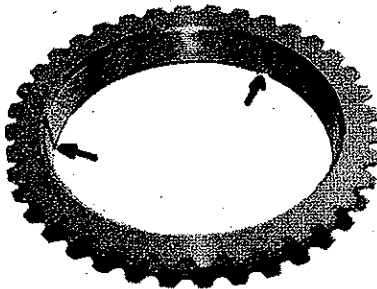
Source:

Centerforce Clutches: Midway Industries, 7171 Patterson Dr., Garden Grove, CA 92641, (714) 898-4477



BOOB LUBE?

Synthetic lubes are all the rage these days, in fact, we have been using synthetic motor oils for about a decade. As Tony the Tiger says, "They're G-R-E-A-T!" Several friends had told us about similar success using synthetics in late-model transaxles, so, recently, we tried various synthetic brews in two different A-833s. One was a fresh rebuild, one a well-worn, 1965 piece. The outcome? In a word, disaster: Gear Clash City, as if the synchro brass rings were worn or broken. Almost undriveable, in fact. Researching this with our friends at Chrysler Engineering, we came up with an explanation: since the synthetics are much more slippery, a way is needed to bleed off the lube trapped in the brass ring's circumferential grooves, so that there can be some metal-to-metal braking action. In the later FWD transaxles this is accomplished by



three notches cut by the factory (check the photo of a stock 1990 A-568 stop ring.) Unfortunately, while it would certainly be possible to duplicate these notches in an A-833 ring, it is NOT recommended, for potential breakage reasons. What has worked for use for almost 30 years is the factory-recommended S.A.E. 140 gear oil. Lately, though, this stuff is scarcer than hen's teeth, but the readily-available S.A.E. 85W-140 seems to be nearly as effective, and a lot more pleasant in very cold weather.

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