DRESSING UP PROJECT CAMARO

35372 APRIL 1976 $1.00

SUPER CHEVY

ARGUS

IND

WRINGING OUT THE LATEST CORVETTES

RACE-PREPPING THE TURBO 350

BUILD A SMALL-BLOCK THE RIGHT WAY!

0 70989 35372 04

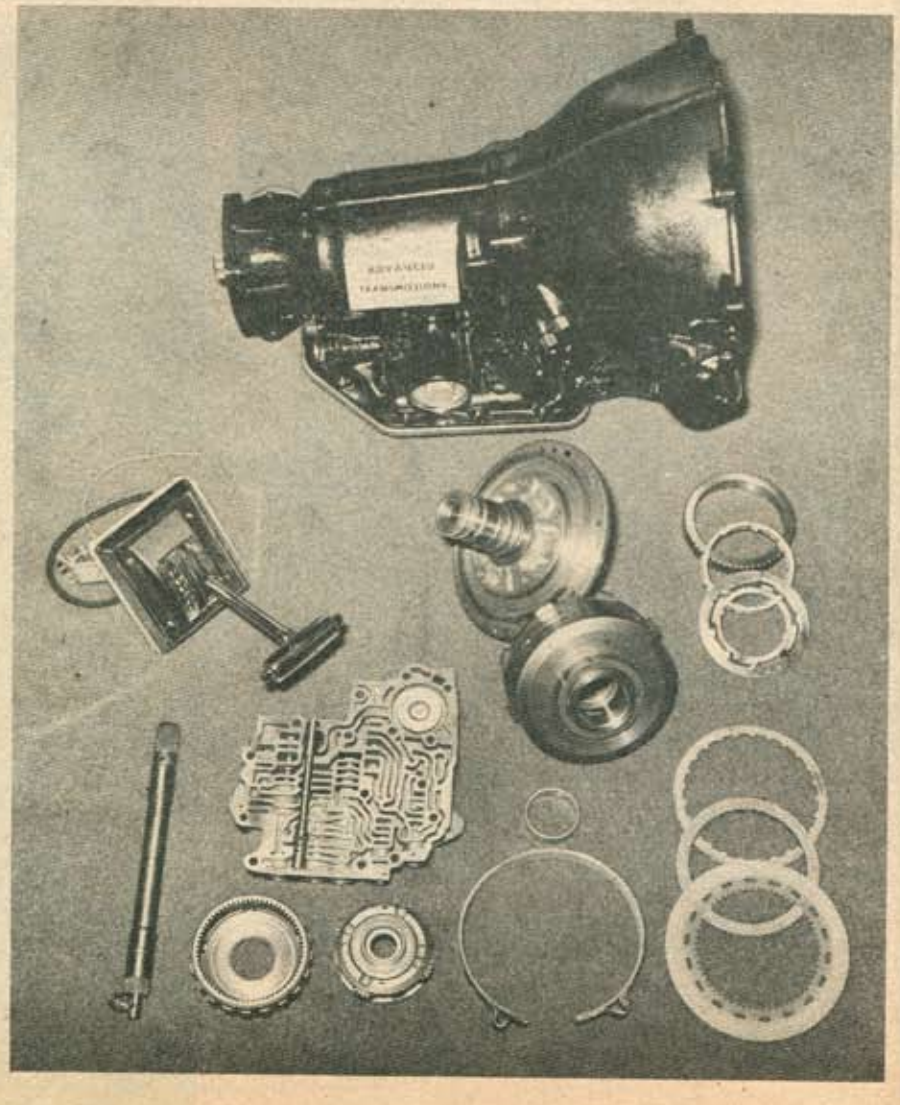
By Phil Carpenter

RACE-PREPPING THE TURBO 350

The 350 Can Be a Dynamite Performer for Street or Strip When Given the "Bulldog" Treatment!

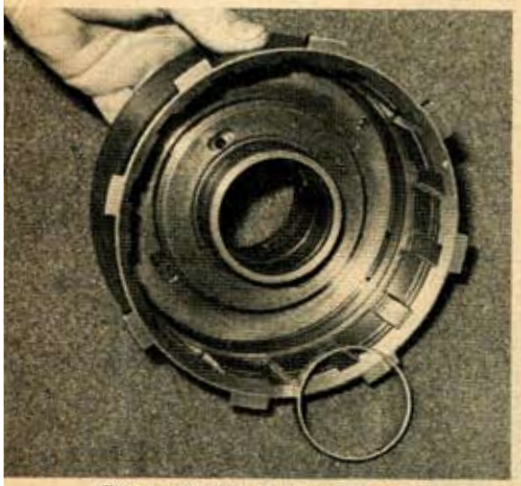
The Turbo 350 automatic has never been known for its durability or performance, and in fact was never designed to take any excessive abuse. The 350 has been generally identified as an intermediate transmission designed to bridge the gap between the ancient Powerglide two-speed and the beefy Turbo 400 automatic, basically engineered for use in lightweight cars such as the Nova. The Powerglide just couldn't cut it in any form when compared to the more modern three-speed automatics in most cars, so Chevrolet finally gave up on it. The 350 is a good compromise, or at least it was. The problem now appears to be that the powers who decide such things at GM have arranged to build the 350 worse each succeeding year...at least that's the opinion of transmission specialists like Jim Galatioto. Jim, who operates Advanced Racing Transmissions at 1156 West Holt in Ontario, Calif., has spent 10 years working with automatics and specializes in the 350. Since setting up his shop in '72, Jim has rebuilt thousands of 350s for racing purposes, both at the strip and off-road. By closely examining and testing the failed components that customers have brought into his shop, Jim has formulated new ideas that have enabled the 350 to live and perform as well as any beefed automatic, even better in many cases!

The problems with the 350 had to be solved one at a time. The basic weaknesses of the 350 are mostly due to a lack of adequate strength in critical areas, such as bearing support surface and material. The earlier 350s had

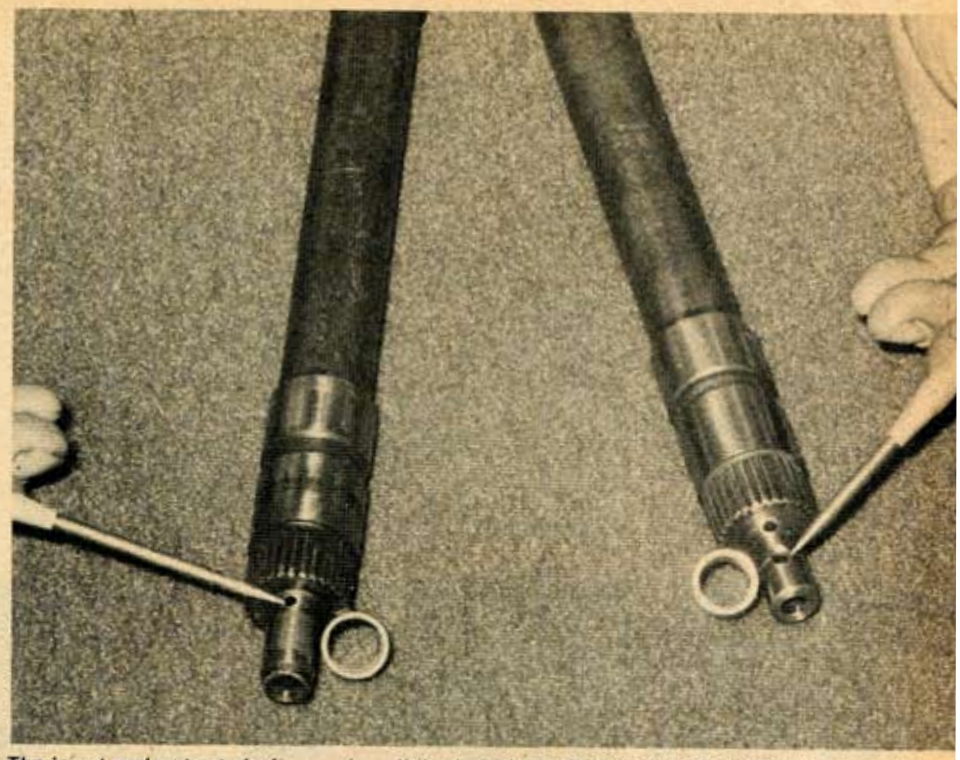


The "Bulldog" Turbo 350 with all of its internal components that make it perform, including the modified shifter. You can obtain the whole package, including special high-stall speed converter already assembled with the casing, valve bodies, clutches and seals in place. The 350 has a lower gear ratio in first and second than a Turbo 400 and is 35 lbs. lighter.

Jim Galatioto of Advanced Racing Transmissions prepares one of his "Bulldog" Turbo 350 automatics which will be set up for high-performance operation. They specialize in the 350, once considered a very marginal transmission for heavy-duty usage.



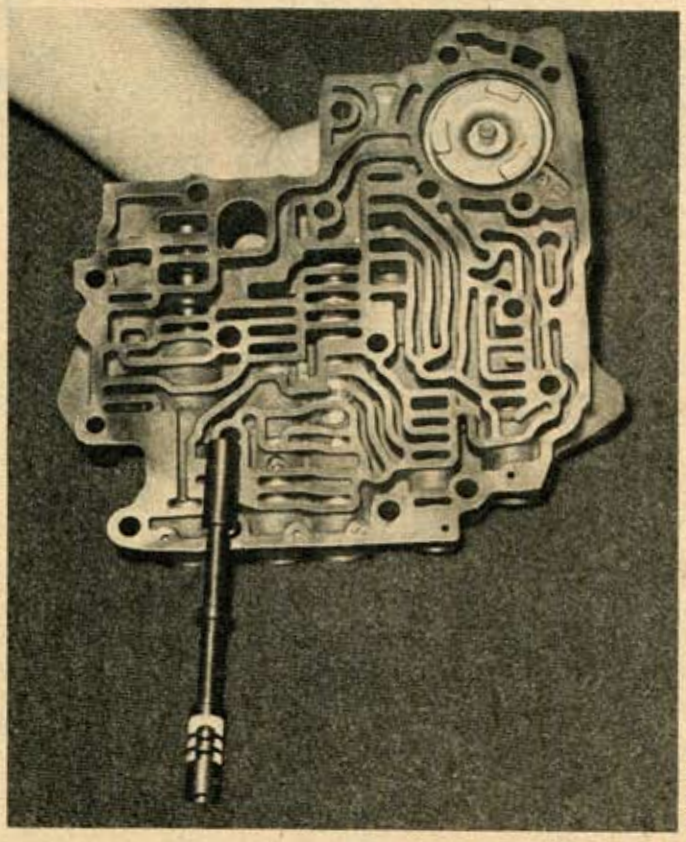
The direct clutch drum is fitted with a wider bushing of superior material, which not only prevents the drum from wobbling, but gives the sealing rings and lands much longer life. If the rings seize, a loss of line pressure will occur and the tranny may go away.



The input and output shafts receive oil lite bushings that are superior to ether babbitt or Teflon bushings. By reducing clearances they offer better support and oil pressure.

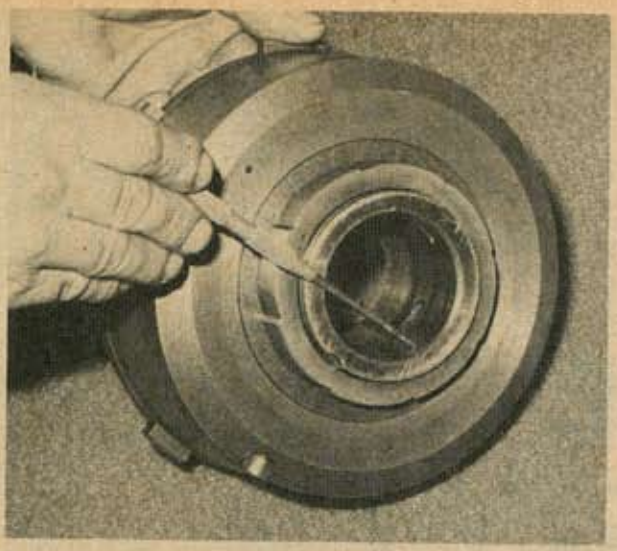
better bushings than the new ones, according to Jim, who says that the factory now is using Teflon instead of metal in some cases.

Even before this, however, the bearing surfaces for the high gear clutch drum and stator support, the output shaft to the input shaft, and other areas were inadequate to prevent clutch drum wobble that soon destroyed the bearings. Most 350s will last 12 months, which is the factory warranty. Then you will find yourselves returning to the parts counter to replace several items in the transmission...perhaps a major reason why the quality of the 350 has dropped recently. There's a lot of money in the parts business. To give you a personal example, this editor bought a '73 Monte Carlo when they first came out, in the Fall of '72. One of the reasons we sold the car about a year later was that the transmission (Turbo 350) was worn out at 47,000 miles. At 30,000 miles the pan was dropped and large particles of bearing material were found in quantity in the pan and oil, and the governor was broken. A later check revealed that the governor part number corresponded to a 1962 Chevy part, probably the reason it broke, since it wasn't working correctly. The rest of the vehicle was in perfect condition, but the transmission needed new clutches, bearings and governor.



Modified valve body eliminates many troublesome parts and gives firm shifts with manual control. Shift points are fully controlled by driver, shifts are very firm.

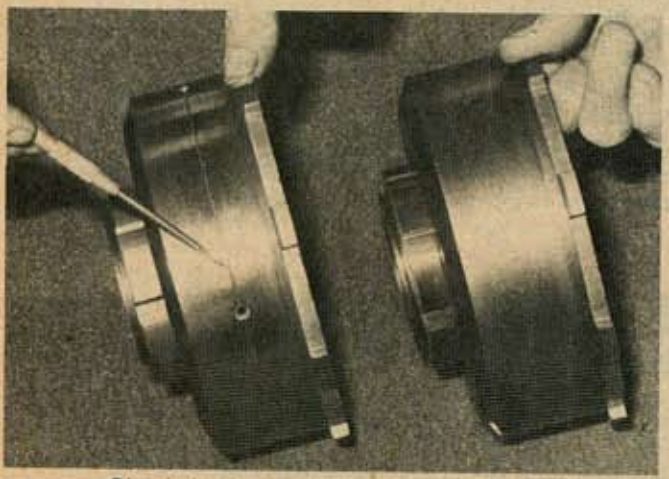
Jim Galatioto has found similar problems with 350s, plus a few more. The lack of lubrication to the internal parts causes excessive wear, there is too much slippage as the clutch applies and releases, the intermediate sprag and race are too weak (the race being so hard it cracks under continued use)



The clutch drum inner bushing support is one spot that requires beefing to eliminate all of the wobbling possible. Advanced Racing installs wider bushings on each side.

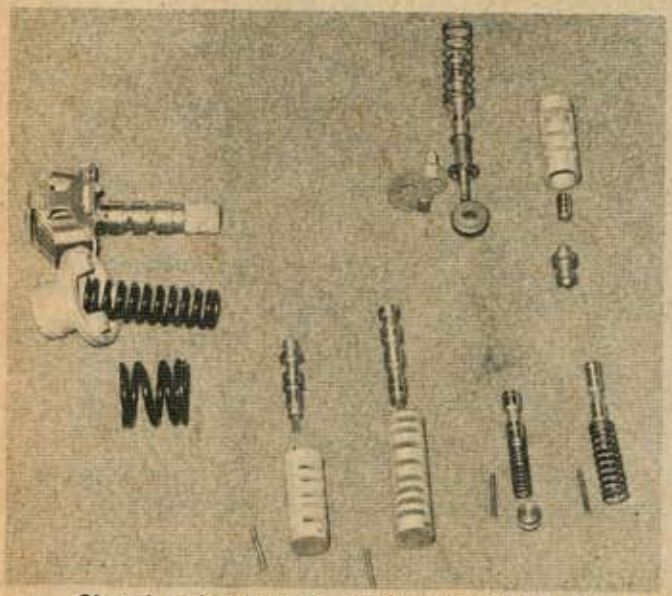
and there is too much end play in the output shaft and friction on the thrust washers. At this stage you may feel the 350 is not worth saving...but there is a brighter side to the coin.

Take the weight of the unit, for example. The 350 weight is about 35 lbs. less than a Turbo 400 and has les internal friction when set up properly Also, it can be swapped into a variety cars including older Chevys that had Powerglides, since it bolts right up to late V-8s in the Chevrolet line. Anoth neat swapping feature is that several different output shafts and housings will interchange, allowing you flexibil in adapting it to varying driveshaft an mount combinations. Another good feature is the gear ratio, which beats 400 hands down. The first gear ratio i 2.52-to-1 as opposed to 2.50-to-1 in a

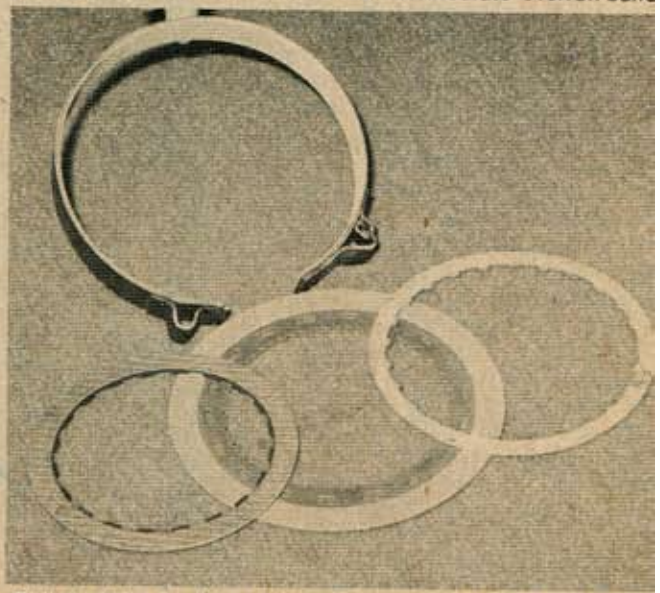


Clutch drums also receive extra oiling holes to aid in lubrication and cooling. Apply pressure is also increased for firmer shifting by modifying the oil circuits and seal system.

Ring land area of stator support is machined to take two improved bushings that give 65 percent better support and prevent most of the wobble inherent in single factory bushing of much smaller total surface area. Extra oiling orifices are also added to aid lubrication to the intermediate overrun banc



Changing of springs, governor and valve body pistons is necessary in manual/automatic valve body, but all of these components can be eliminated by using the Advanced Racing full manual valve body assembly.



Clutch plates for direct clutch, intermediate clutch discs and bands are all upgraded with improved material for longer life and increased durability.

400, and second gear is 1.52-to-1 as opposed to a 1.50-to-1. The 350, therefore, doesn't require as much horsepower to get the car moving and allows a wider choice of rear end gears. Galatioto has used these features as a basis for building a very strong-performing 350.

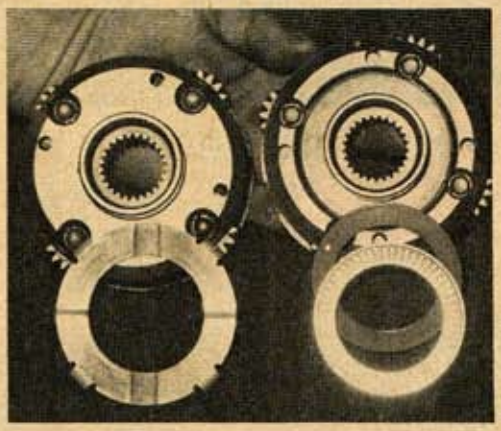
The basic areas we mentioned that need work are treated to beefing up with larger or stronger parts. The second gear sprag can crumble when the race cracks due to hard shifting, which causes you to lose second gear. By replacing the race with a stronger, heat-treated unit, Galatioto eliminates this trouble spot. The lubrication flow is also increased and controlled for proper direction by slotting the sprag. The high gear clutch drum wobbling is due to a lack of bearing support, which the shop provides. The stock bushing that takes all the strain of the entire assembly is only .562-inch wide. By replacing this with two bushings, one .749-inch and one .600-inch wide, the support area is more than doubled and the points of stress are spread out to distribute the load. By using a bushing at each end of the shaft the wobbling is stopped, which would not be possible even if one single larger bearing was used. This allows the sealing ring to live longer also, with less strain on the high gear clutches. The clutch also receives four additional oiling holes that give the intermediate overrun band better lubrication and longer life.

The clutches themselves are a higher grade material than stock, which allows you to hook up more power without losing them due to excessive heat and loading. The front planetary assembly receives a new roller bearing thrust washer with approximately 65 percent less friction than the factory hard babbitt thrust washer. The tips of the input and output shafts are also given extra support and longer life through the use of oil lite bushings which cut down the clearances and provide less friction and wobble.

Advanced racing also usually installs the all-new manual valve body they have produced. This unit gives complete shifting control of the transmission, and the only drawback is that you must, indeed, shift it into each gear. The advantages are many, however, including the replacement of the pressure regulator booster assembly, 1-2 shift valve and control valve assembly, 2-3 shift valve and control assembly, low gear control valve assembly, detent regulator valve assembly, kickdown valve assembly, third gear accumulator spring, governor valve and second gear accumulator assembly. The reverse pattern unit is the hot setup for fast shifting and supreme control, as well as eliminating all of those potential trouble spots.

While Advanced Racing can provide a manual-automatic valve body that will shift normally in "Drive," it can be controlled with the shifter for firm shifting under performance conditions. The type of shifter Jim Galatioto builds for most applications is unusual in that he prefers the early Mustang T-handle unit, which he says has a good reverse lock-out mechanism and fits almost any type of vehicle. The shift pattern is the same, but most importantly, he feels that cables are a weak point in any shifter, inasmuch as they have a tendency to stretch with time and can allow flexing and improper shift arm action. With rod linkage, he says, you don't have any slop or problems once it's adjusted correctly.

At this stage, Advanced Racing has never had any manual-valve 350s that were built for competition fail them, and several off-road racers have switched from four-speeds and even Turbo 400s to the "Bulldog" Street or Strip automatic 350. For more detailed information on applications and individualized modifications, contact Jim Galatioto at Advanced Racing Transmissions, 1156 West Holt, Ontario, Calif., phone: 714-934-3418.



The front planetary assembly receives a new roller bearing thrust washer that reduces friction by about 65 percent over the factory babbitt thrust washer. This also reduces the heat build-up that cuts down on transmission life.

Second gear sprag is slotted to increase and control the direction of the oil flow. Outer race is replaced with new and stronger one, as are roller clutch elements.

Jim Galatioto prefers rod linkage shifters to cables, feeling that cables may stretch with time and lose adjustment. He modifies a Mustang shifter which has a good reverse lock-out mechanism and the proper shift pattern.