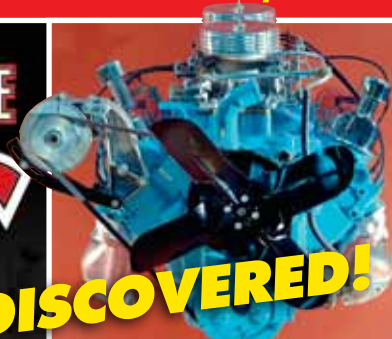


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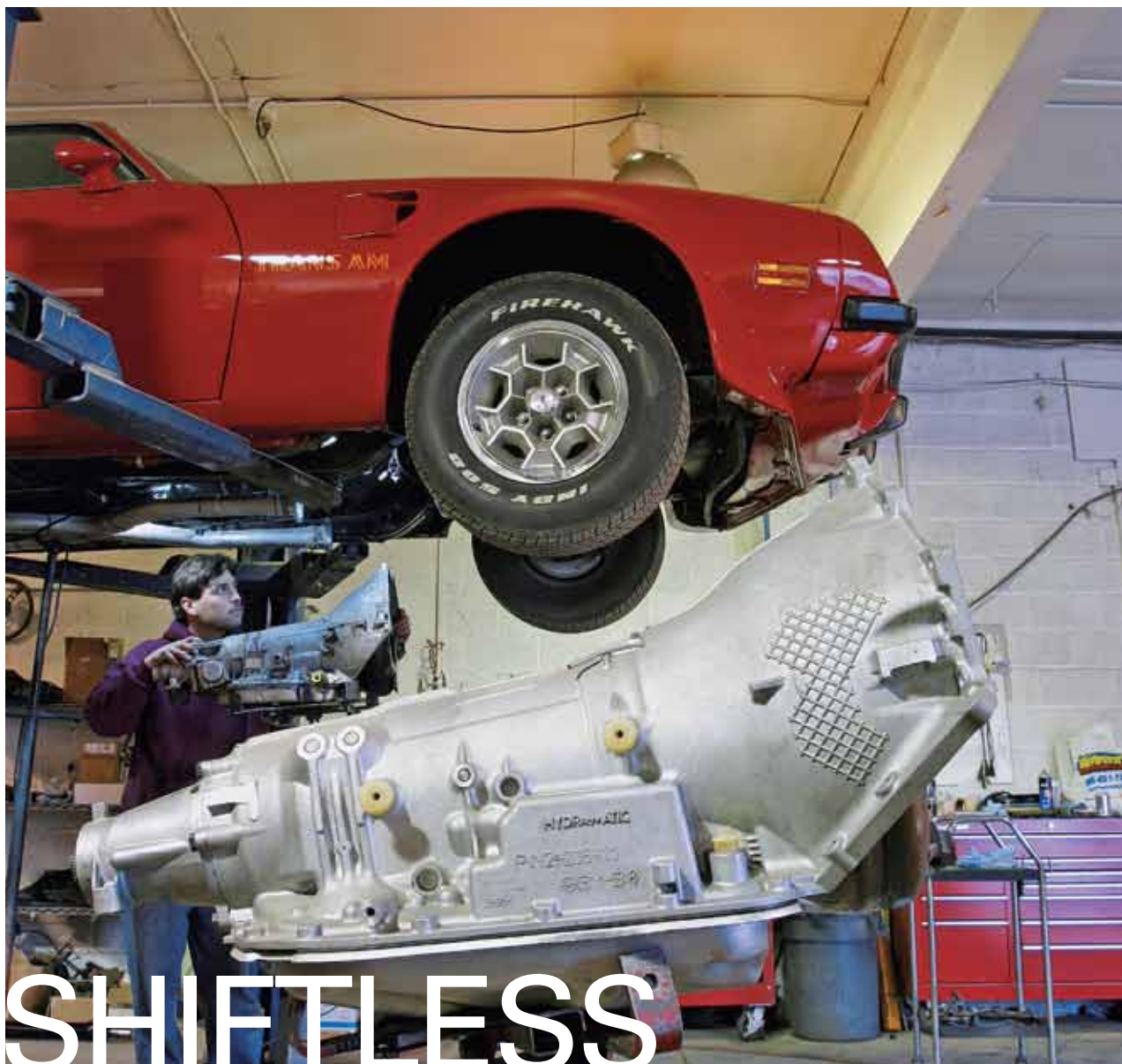
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BOLT A 4L85-E SUPERMATIC OD TRANS INTO A VINTAGE PONTIAC



SHIFTLESS PLEASURE

Classic Restorations tech Scott Hand lowers the Turbo 400 trans from the SD-455 T/A as the 4L85-E SuperMatic awaits installation.

Part II: Bolting a 4L85-E SuperMatic Transmission Into a 503hp / 522 lb-ft of Torque '74 SD-455 Trans Am

BY THOMAS A. DeMAURO
PHOTOGRAPHY BY THE AUTHOR

As you learned reading Part I of this story in the last issue, our plan is to install GM Performance Parts' (GMPP) new 4L85-E SuperMatic four-speed Overdrive (OD) transmission (PN 19154550) and its included lockup converter (approximately 1,800-to-2,000-rpm stall speed) in HPP contributor Melvin Benzaquen's street/strip '74

SD-455 Trans Am. Many of the advantages of this new transmission over the original Turbo 400 and the previous GM O.D. boxes like the 200-4R, 700-R4, 4L60-E, 4L65-E, 4L70-E, and 4L80-E were discussed in Part I, so here is a very brief review.

The 4L80-E shares its forward gear ratios of 2.48:1, 1.48:1 and 1:1 with the vintage Turbo 400, but the newer trans added an Overdrive gear of 0.75:1 and electronic control, among other upgrades. It's rated to handle 440 lb-ft of

torque. GM's 4L85-E is a heavier-duty version of the 4L80-E and incorporates a five-pinion planetary design, torque-converter upgrades, a 34-element intermediate sprag, an induction hardened input shaft, and a hardened forward hub, all to increase durability and its torque rating to 460 lb-ft. GMPP's new 4L85-E SuperMatic was conceived to hold up behind the ZZ572/720 crate engine package. This trans features more clutch plates with upgraded materials in the intermediate, direct, and forward clutches, an

improved overrun roller, and selective-fit intermediate sprag outer race. Mods to the direct-clutch housing prevent centrifugal apply at high rpm, fluid pressure was increased, and revisions were made to the valvebody to further firm up the shifts. The torque rating for this trans is 685 lb-ft.

With that step up in torque rating, the SuperMatic can be purchased and bolted in behind most potent Pontiacs without the worry of grenading it. Also, the Overdrive gear and lockup converter will allow Melvin to replace the 3.08:1 rear gears for a more aggressive setup to improve dragstrip performance, without losing highway cruiseability due to high rpm. And finally, a major advantage of having electronic control over the transmission's functions is tuneability via GMPP's transmission controller (PN 1249736). Part- and full-throttle shift points can be programmed, as can parameters for downshifting, line pressure, converter lockup, engine braking, slapstick-type shifter operation, pressure curves for each gear, and more.

If these attributes sound like what you are looking for in an automatic Overdrive transmission, then read on to see how it was installed at Classic Restorations. For this installment, we will deal with the hardware. In the next issue, we will delve into the electronics, and cooling aspects. First, let's address questions and concerns you may have pertaining to this swap.

FREQUENTLY ASKED QUESTIONS REGARDING BOLTING IN A LATE-MODEL OD TRANSMISSION

Q: Will the SuperMatic bolt right in with the existing Pontiac block bolt pattern?

A: No, an adapter plate will be required. We used one from Trans Dapt.

Q: Will the floor have to be cut or hammered to fit the SuperMatic?

A: Not in our case, as the '74 T/A had ample floor clearance.

Q: Will I need to modify the crossmember to install the transmission?

A: Yes, the crossmember mounting point on the SuperMatic is approximately 3¼ inches further back than the Turbo 400. (Included in the measurement is the ½-inch thick adapter plate used with the SuperMatic.) Be sure to take your own measurements for your swap.

Q: Will the trans mount have to be changed?

A: Yes, the bolt spacing on the trans is 4¼ inches for the Turbo 400 and 3¼ inches for the SuperMatic. The Turbo 400 mounts to the crossmember via two bolts and the SuperMatic with a single stud and nut.

Q: Will the driveshaft have to be shortened?

A: Yes, because the SuperMatic is longer than

the Turbo 400. Our driveshaft needed to be shortened approximately 3⅞ inches. Take your own measurements on your Pontiac before you have the shaft cut.

Q: Can the stock yoke on the driveshaft be retained?

A: Yes, both transmissions use the 32-spline output shaft.

Q: Can my stock torque converter be retained?

A: No, the SuperMatic has an electronically-controlled lockup converter that is a different design than the stock Turbo 400 converter. Besides, a new converter is included with the transmission.

Q: Do I have to replace my shifter?

A: No, the stock shifter can be retained and will work fine, but you won't be able to shift manually down to First gear because the stock detents in the shifter are set up for three forward gears and the trans now has four. However, the shifter can be upgraded to add the Overdrive gear on

the indicator and incorporate all four gears into the shift detents with a kit from Shiftworks.

Q: How will I get my cable-driven speedo to work with the electronic transmission?

A: With a tailhousing swap kit from Shiftworks that is set up to retain a mechanical speedo gear.

TRANS REMOVAL

Removal of the Turbo 400 trans is time consuming, but very straightforward. The steps include; disconnecting the battery; getting the car safely on the lift; removing the driveshaft; dropping the exhaust from the headers; taking out the starter and the headers; supporting the trans with a trans jack; removing the cooling lines, the shift linkage, the vacuum modulator hose, the kickdown switch, the speedo cable, the crossmember, the converter bolts, and the trans bellhousing bolts. While most items are fairly easy to remove, long extensions and universal joints for the sockets will help with the headers and the trans bellhousing bolts.



Midway up the driver's side of the SuperMatic are black connectors for the transmission input and output speed sensors. The large, round bluish-colored 12-pin connector down lower accepts the plug for the transmission controller, which will be discussed in the next issue. Also, the shift lever and shifter-control cable bracket for the Shiftworks Shifter Conversion Kit, to make the stock three-speed shifter more compatible with the four-speed Overdrive, have already been installed.



On the factory Turbo 400's driver's side, we see the electrical connector for the 12-volt kickdown switch and the mechanical speedo gear sleeve with cable access.



Note the Chevy-only bellhousing bolt pattern on the SuperMatic (left) as compared to the B-O-P pattern of the factory Turbo 400. As you may imagine, the converters are a bit different as well, but will still bolt-in without a problem. The SuperMatic converter is set up for lockup whereas the Turbo 400 is not. The SuperMatic has six attachment points for the flexplate and the Turbo 400 only three, so three bolts will be used for our application.



The flexplate was replaced for this project but not because the stock one won't work with the SuperMatic—it will. Rather, the old flexplate has a few damaged teeth. Also note the transmission dowel in the upper portion of the photo. Since we will need an adapter to mate the Chevy-bolt-pattern trans to the B-O-P-pattern engine, both dowels will have to be replaced with longer ones.



The passenger side of the SuperMatic simply has the two ports for the cooling lines (shown here covered with plastic caps) that use modern, quick-disconnect fittings. The opening for the dipstick tube near the pan rail is just behind the bellhousing.



Scott employed an old shop trick, which is to weld a nut onto the end of the dowel; then screw a slide hammer into the other end of the nut and use the tool to pull the dowel...



In comparison, the Turbo 400 cooling lines use typical NPT fittings and are positioned differently than those on the SuperMatic, so new cooling lines and fittings will be required for the swap, which we will cover in the next issue. Also shown is the four-bolt governor cover near the tailhousing and the vacuum modulator up front near the pan.



... like so. If you are doing this swap at home, to avoid welding, you can try a pair of vise grips first to twist and pull the dowel out. If that doesn't work, you can grind two flat sides into the dowel using a Dremmel tool until a wrench will fit on it, and then twist and pull it.

With the new, longer Moroso dowels (PN 37932) tapped into place, the Trans Dapt adapter plate (PN 0061) was installed using the supplied $\frac{3}{8}$ x24x1 flat-head socket screws.





The fresh TCI flexplate was installed using new ARP Pontiac flexplate bolts (PN 200-2904) with light oil on the threads to get an accurate torque reading and torqued to 95 ft-lb in three passes using a crisscross pattern. Then the Trans Dapt torque converter pilot bushing was slipped into the end of the crankshaft to take up the gap between the crank and converter due to the adapter.



Before the 4L85-E SuperMatic was bolted in, the issue of how to run a cable-operated speedometer with an electronically controlled transmission had to be resolved. For this project, it was accomplished by using a Mechanical Speedometer Kit for the 4L80-E from Shiftworks (PN SW44-A) that features a new tail housing, drive gear, sleeve, and driven gear, sleeve retainer, and nut to run the factory speedo. All Melvin had to do was tell Shiftworks which type of tailshaft the trans had, as two were used during the production of 4L80-E and 4L85-E transmissions, and then provide the rear-gear ratio and tire diameter, so the correct speedo gear could be sent.



Next, the new tailhousing, with the supplied o-ring seal in place, was bolted on and the speedo driven gear and sleeve assembly were lubed with high-temp grease and installed, while ensuring that the gears meshed.



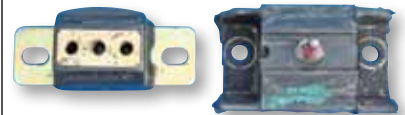
Lastly, after clocking the sleeve so that the retaining bracket could be properly seated, the nut is then tightened.



With a quart of Dexron VI in the torque converter (to prime it) and the unit mounted on the input shaft and properly seated, the SuperMatic is ready to be lifted into the Trans Am. Note the output shaft has 32 splines, just like the Turbo 400, which means the yoke on the driveshaft will not have to be changed.



Here's a comparison of the new tailshaft (left) to the old, which are both 5 $\frac{1}{4}$ inches long. The only difference is the mechanical-speedo-gear set up on the Shiftworks piece. According to the company, this swap will not affect the electronic operation of the trans.



The Turbo 400 mount (left) uses two bolts to mount to the transmission that are spaced 4 $\frac{1}{4}$ inches apart. Conversely, the 4L85-E SuperMatic trans mount also uses two bolts to secure it to the transmission, but they are only 3 $\frac{3}{4}$ inches apart. So the mount will have to be changed to the 4L85-E type. Also note that the 4L85-E mount uses only one stud and a nut to attach it to the crossmember and the Turbo 400 mount traditionally uses two bolts to attach to the stock crossmember.

With the stock tailhousing removed, a collar with a gear that will ultimately mate with the speedo gear was slid over the output shaft. It was then secured to the shaft using small Allen-head screws. Blue Loctite was used to ensure the screws stay put.



Also, since the location of the trans mount is further back on the SuperMatic than it is on the Turbo 400, the crossmember had to be modified or replaced. Scott cut the stock piece to help with measurements, and then decided it was easier for him to simply make a new crossmember from stock mild steel. Classic Restorations will make one for your swap for \$375, or you can modify your existing crossmember to move the mount back.



Since the transmission is longer, the drive shaft had to be shortened about $\frac{3}{8}$ -inches (and rebalanced) to ensure a proper fit.



The stock speed cable was screwed onto the tailhousing.



Note the new laser-cut and hardened detent already in the shifter mechanism (the stock rivets have been drilled out to remove the old detent and the new one was installed with screws and nuts) and the new lens indicator next to it (on top of the author's flash case), which are part of the Shiftworks Shifter Conversion Kit (PN SC2262). Additional hardware and brackets are included, and the original shift cable can be retained.



With the SuperMatic bolted into the adapter at the bellhousing (bolts torqued to 37 ft-lb) and secured at the crossmember, the torque-converter lugs were lined up with the flexplate bolt holes, 15mm-headed bolts (with blue Loctite on the threads), and the supplied spacers (to compensate for the $\frac{5}{16}$ -inch thickness of the adapter) and were installed and torqued to 60 ft-lb in two passes.

SOURCES

Classic Restorations
(845) 258-2050
www.classicresto.com

GM Performance Parts
See your participating GMPP dealer
www.gmperformanceparts.com

Shiftworks
(585) 383-0574
www.shiftworks.com

Trans-Dapt Performance
(562) 921-0404
www.tdperformance.com



Here's what the shifter will look like after the upgrade. Note the new OD position.

Here is the control-cable retaining clip being installed. Also included in the Shiftworks Shifter Conversion Kit are the shift lever and control cable bracket, shown. The secret to fit four gears into a three-speed shifter is the correct ratio of movement of the shifter cable at the trans-mounted shift lever per gear change at the new shifter detent. To



do this, the distance between the cable pin and the cable bracket has to be adjusted using the lever's slot to $5\frac{1}{8}$ inches apart before the pin nut is tightened (with the shifter installed, in the OD position, and the shift lever on the trans in the same position). With the mechanical areas of the swap mostly complete, next month we'll dive into the electronic and cooling aspects. 🐦