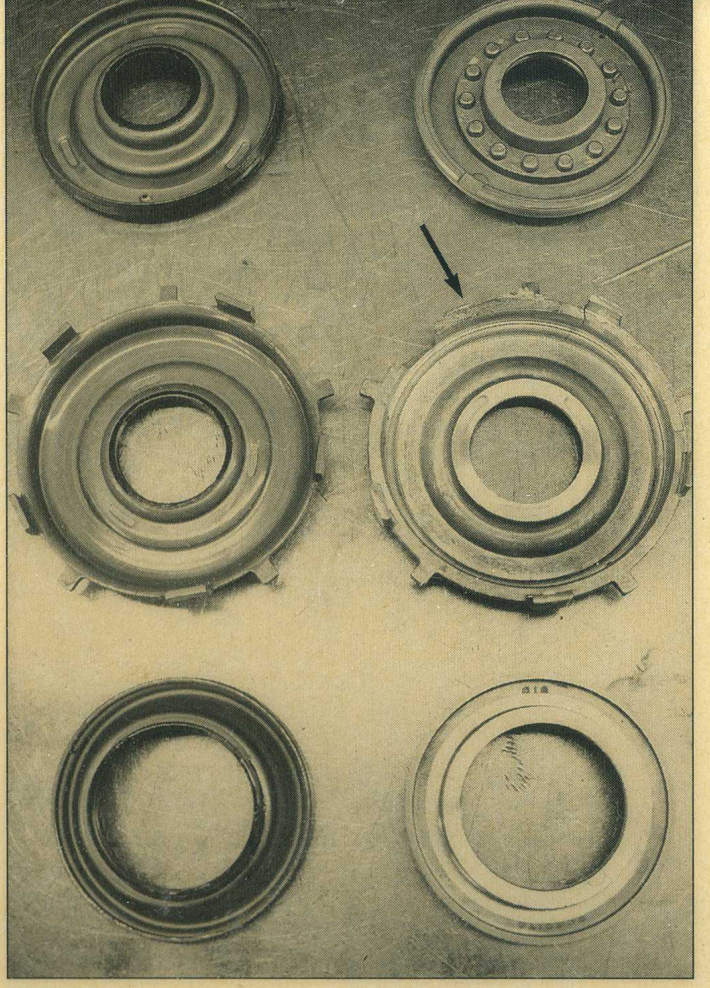
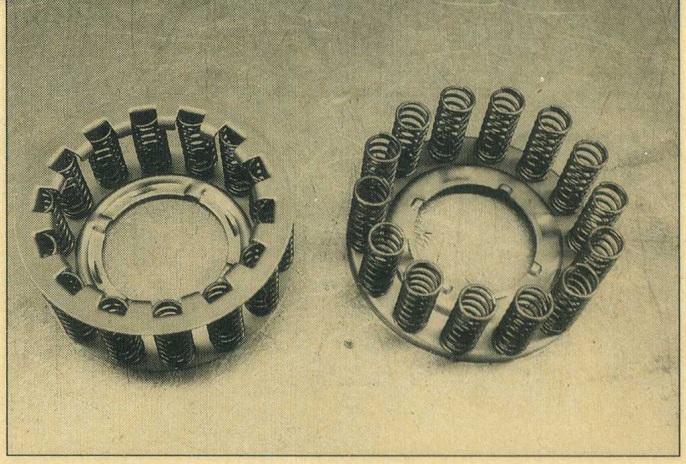
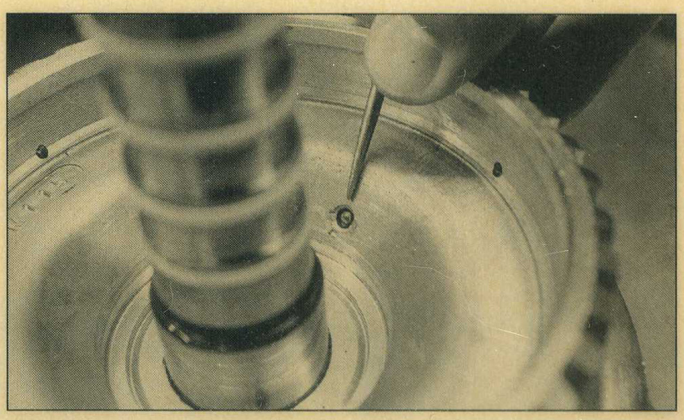


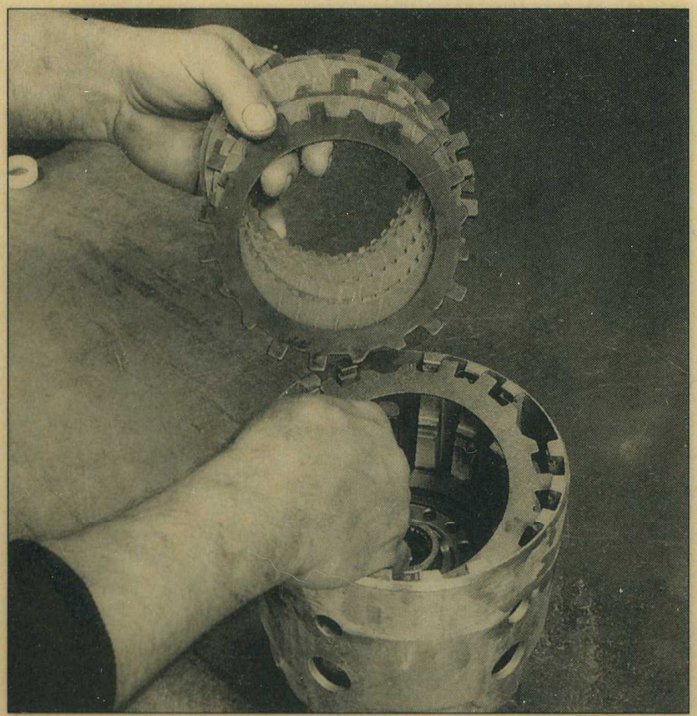
1 One of the main problems in this 4L60-E was the damaged forward clutch piston (middle, right). The arrow shows where one of the ears was broken off due to excessive wear and tear caused by high pressure and load. Typically, a vehicle that suffers from this ailment will only operate in reverse and not in any forward gear. The Level 10 kit (the three pieces on the left) remedies the problem with heavy-duty steel parts featuring molded rubber seals that can handle increased pressure.



2 To better illustrate the heavy-duty overrun clutch return spring, the stock one on the left and its replacement on the right were turned upside-down. The heavy-duty piece includes heavier springs and a retainer ring on both sides to avoid spring slop. When line pressure is increased, it is important to fortify the overrun clutch piston and return spring.

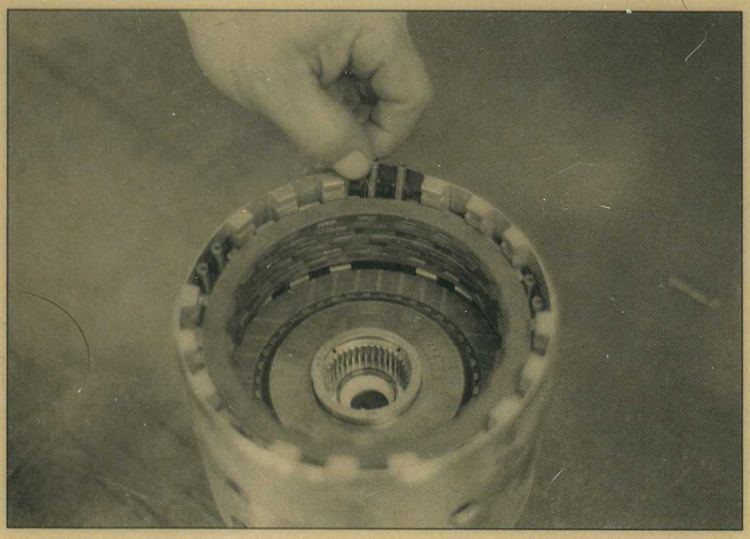


3 Before the input drum is filled with clutches and steels, the orifice cup plug is permanently closed off. This will virtually eliminate drum bleed-back, allowing more positive apply.

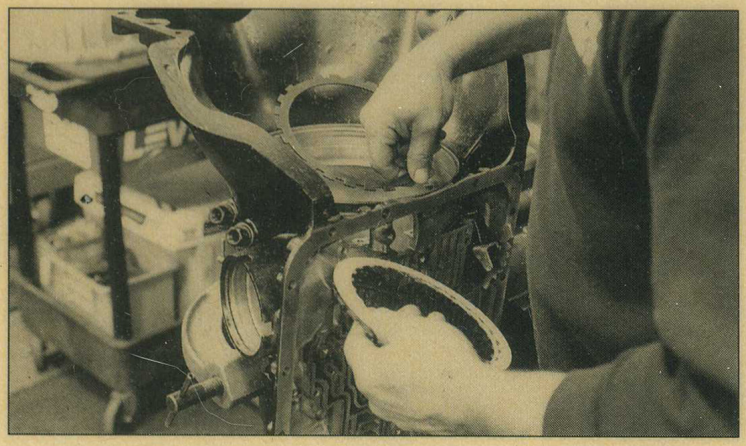


4 The input housing is kind of like the workhorse of the transmission. It encases the overrun clutch assembly, followed by the forward and 3-4 clutch packs. During operation, fluid pressure pushes the clutches and activates the shifts. Here, the Raybestos no-burn overrun clutches and Koline steel plates are installed in the input housing. Raybestos Blue Plate no-burn clutches are proven to resist three times as much heat as stock clutches. Note the shaft is down through a hole in the bench for ease of rebuilding.

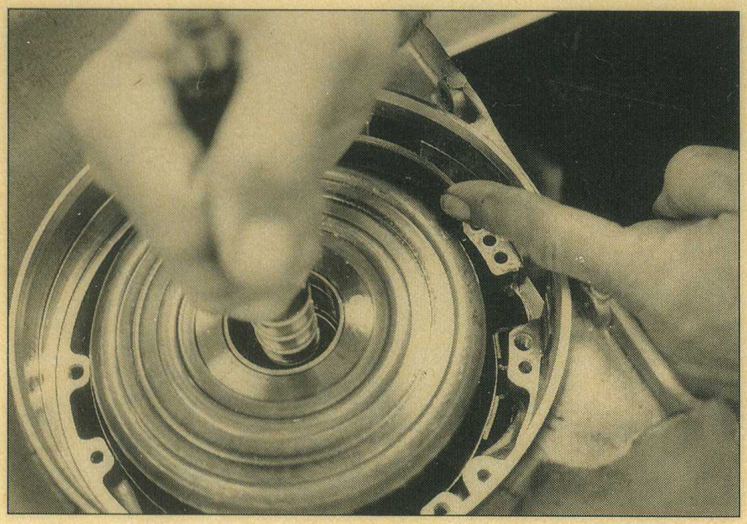
5 Next, the forward clutches and steels are dropped into place. Once the clutch pack is installed, it's held in place by a retaining snap ring.



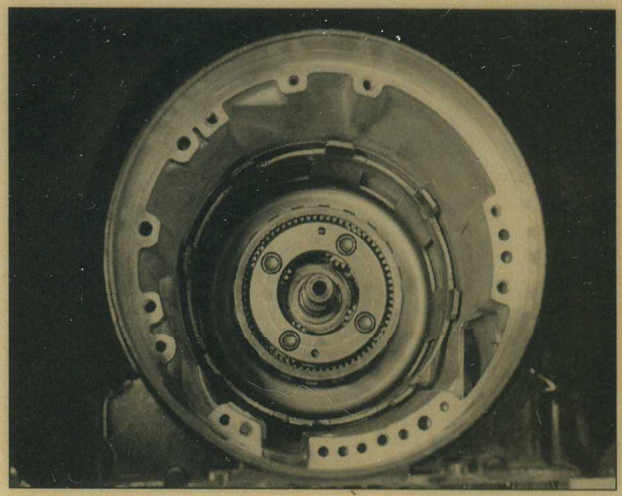
6 The 3-4 clutches and plates are the weakest part of 4L60-E automatics. Level 10's remedy begins with the Raybestos clutches and Koline steels. Because the 3-4 clutch pack reaches severely hot conditions (800° and greater), the stock seals have a tendency to warp, causing premature failure of the clutch discs. The Koline plates have a high zinc content and won't fatigue under these extreme conditions. The Level 10 kit also includes five shift load release spring assembles that help preserve the 3-4 clutch pack. Installing the five 3-4 shift load release springs inhibits the 3-4 clutches from centrifugally activating until the engine reaches 7500 rpm at wide open throttle, thus avoiding unnecessary burning of the clutch discs. The load release springs keep the piston from applying until there is enough line pressure for the clutches to apply and hold. This is a factory calibration problem and is usually the first part of a 4L60-E to go bad.



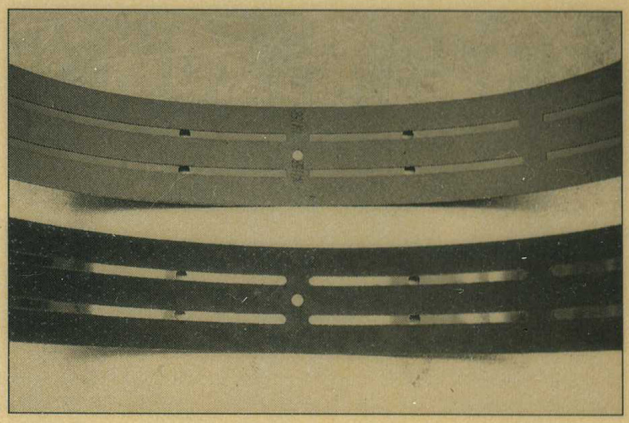
8 The Raybestos high-static low-reverse clutches and Koline steels are installed right after the planetary assembly, modified with an oil baffle to redirect the oil flow, is dropped into place.



10 Before the low-reverse input drum is set in place, the Raybestos 2-4 shift band is set in place with an anchor pin. When installing the input drum, the band must be lifted slightly on the unanchored side to help the drum slide into place without damaging the band.

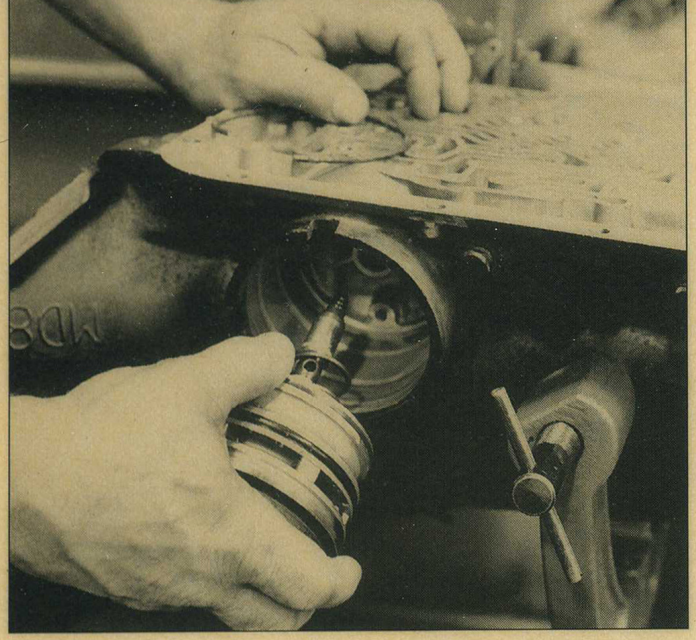


7 After the clutches are installed, the teeth are aligned and the heavy-duty mechanical diode input assembly is installed. By design, the diode is stronger than a stock sprag. The drum is then installed into the trans casing.

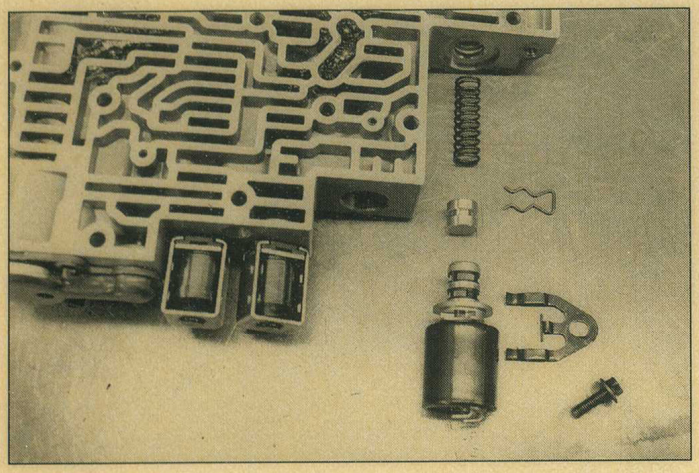


9 The Raybestos 2-4 shift band (bottom) has a better coefficient grab, which means it will absorb more horsepower than the stock one (top) and avoid slippage in high-performance applications.

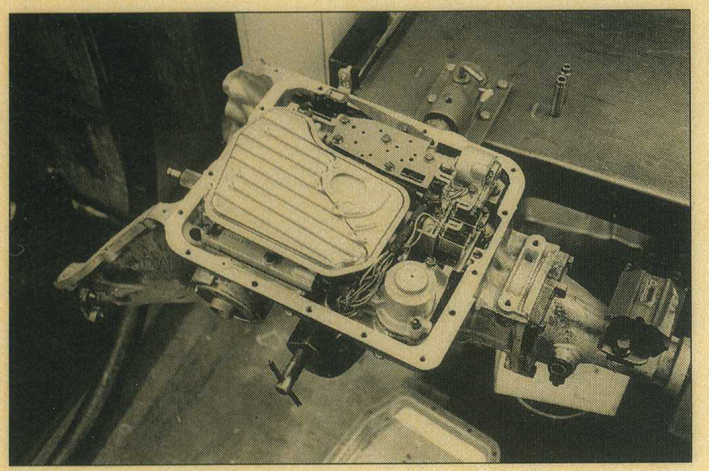
11 All Level 10 Super Pumps are modified to provide full lubrication all the time, not just when the transmission is in lockup, which is exactly what the stock pump does. It's also built with Teflon pump bushings, blueprinted pucks, or veins, high-volume slide spring and a .500-inch boost valve. The modified pump has a maximum line pressure of 295 psi, compared to the stock pump, which has only 180 psi. It's torqued down to 200 lbs.-in.



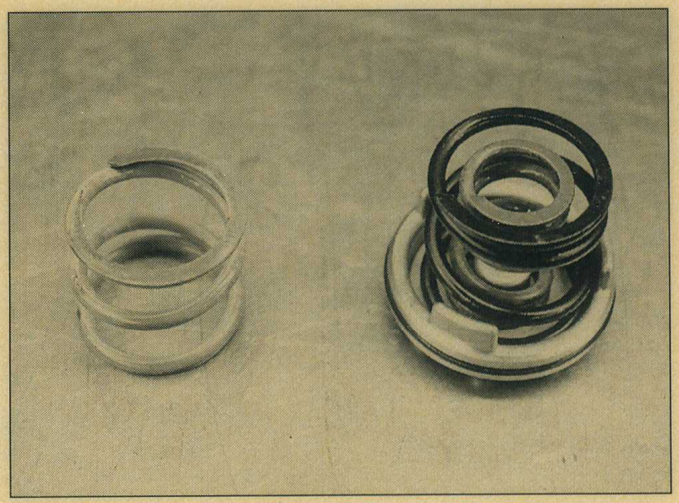
12 When installing the high-performance servo, the 2-4 shift band needs to be secured. A long screwdriver (barely visible in the background) keeps the 2-4 band from moving around while the servo is being installed. The servo activates the Kevlar 2-4 shift band. The replacement servo has a larger fluid area, which is needed to better accommodate the engine's torque. It improves the 1-2 and 2-3 shifts by creating a quicker, almost neck-jolting shift. This is a twofold modification, as it also reduces wear on the clutch discs. Because the 2-4 band is made of Kevlar, it can withstand the high temperature that the transmission will reach. It also has a better holding ability, since it's made from a more stable material than the factory piece. The band is built with the reinforced lugs that Pat uses with all high-performance servos.



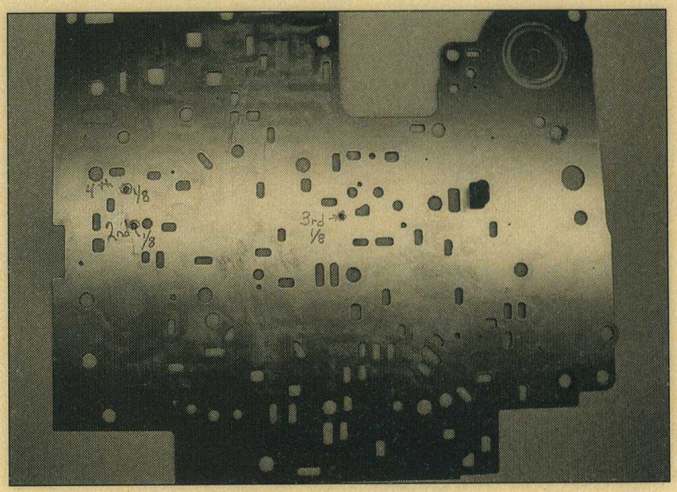
14 Valve body modifications include a heavy-duty pressure regulator spring. The stiffer spring helps increase line pressure and improves shifts. It is linked to the throttle position switch, so when you step on the gas, the transmission gets a reading directly from the TPS. The 4L60-E also has two-shift solenoids instead of the hydraulic valves in the 700-R4.



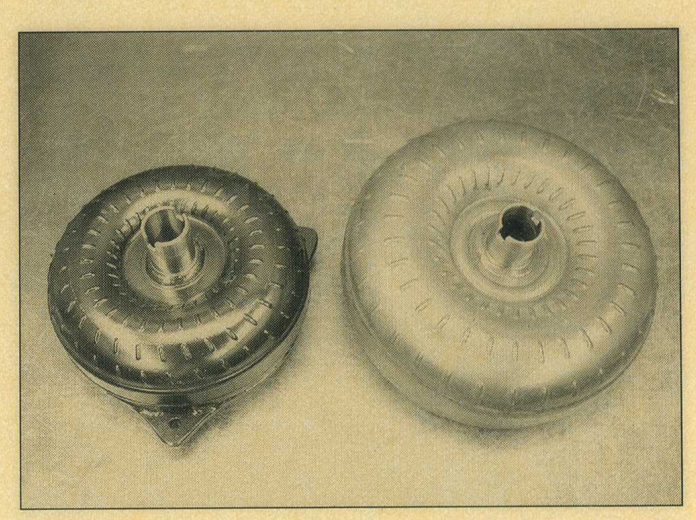
16 Once all the bolts are in the correct location in the valve body, they are torqued down to 125 lbs.-in.



13 The stock 1-2 and 3-4 accumulator springs are discarded and replaced with stiffer springs. They redirect the fluid to the 2-4 shift band, resulting in quicker application of the band. Also, the 1-2 accumulator housing is drilled and a small orifice fitting is tapped in, while an updated 1-2 accumulator piston is used to work with the larger servo for stronger shifts. Using a stiffer spring and the updated piston makes the shifts faster and stronger, while drastically reducing band wear.



15 The valve body spacer plate is drilled 1/8-inch in the three indicated areas to improve flow and line pressure. The one marked "2nd" is for the 1-2 shift, "3rd" for the 2-3 shift; the one labeled "4th" is to increase volume for the 3-4 gear change.



17 The stock torque converter on the right is replaced with the 10-inch unit on the left. It's been modified enough to drop a C4's ET by three- to five-tenths. A 14-blade angled stator (18-blade stock) spins freer, which is directly responsible for this power increase. The 14-blade modification provides a better stall speed from the oil's redirection due to the blade's angle. The best part is that it doesn't affect driveability at all. It has a larger 1-inch clutch (1/2-inch stock), resulting in improved converter clutch lockup.

Level 10's 4L60-E kit has everything you need to make your stock automatic into a bulletproof box that will shift stronger and last longer than anything the factory has to offer. Some of the parts in the kit include a steel forward clutch piston, Raybestos Blue Plate clutches, Koline steels, Kevlar 2-4 shift band, and parts for pump and valve body modifications.

Shifty Business

Rebuilding and upgrading the 4L60-E electronic automatic transmission for 1994-96 C4s.

By Robert Gross
PHOTOGRAPHY BY THE AUTHOR

The latest advance in GM's automatic transmissions is the fully electronic 4L60-E. Basically, it's nothing more than an electronically controlled 700-R4. The governor is replaced with a speed sensor, a throttle positioning switch is the substitute for the TV cable, and the pressure regulator system is replaced with a force motor activated through voltage.

All of the transmission's calibration is no longer in the centrifugally activated governor and valve body; it's in the computer—the same one that controls the rest of the late-model GM's vital signs.

Changing shift points or torque converter clutch strategy on a 4L60-E is all done by reprogramming the computer. Very simple. That's one of the reasons it's a perfect transmission to operate with DFI or other fuel management programs. Low voltage means higher pressure, and high voltage corresponds to lower pressure.

Like its big brother, the 4L60-E has its downfalls. When you start bolting on superchargers and other high-performance parts, it puts extra stress on the transmission's internals, causing premature wear and breakage.

Luckily for owners of these automatic cars, Level 10 Transmissions in Hamburg, N.J., has done it again. Pat Barrett and his qualified staff have found a way to make these transmissions stronger and, by adding a Level 10 converter, your car's ET can drop up to five-tenths of a second in the quarter-mile.

Level 10's technicians have made a reputation for themselves as transmission doctors as opposed to basic rebuilders. As soon as the 4L60-E started showing up with problems, they closely dissected each transmission they overhauled and made notes on what the common problems were.

Recently, when they opened the case that came out of a 1991 model, they weren't too surprised to find that the forward clutch piston was broken and its 3-4 clutches and 2-4 band assembly were worn beyond normal. The Corvette also had other symptoms of an injured transmission, like weak and hesitant shifts.

To better illustrate one of Level 10's transmission buildups, follow along with Level 10 technician Kevin Sterk as he rebuilds and upgrades the 4L60-E electronic automatic transmission.

SOURCE

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