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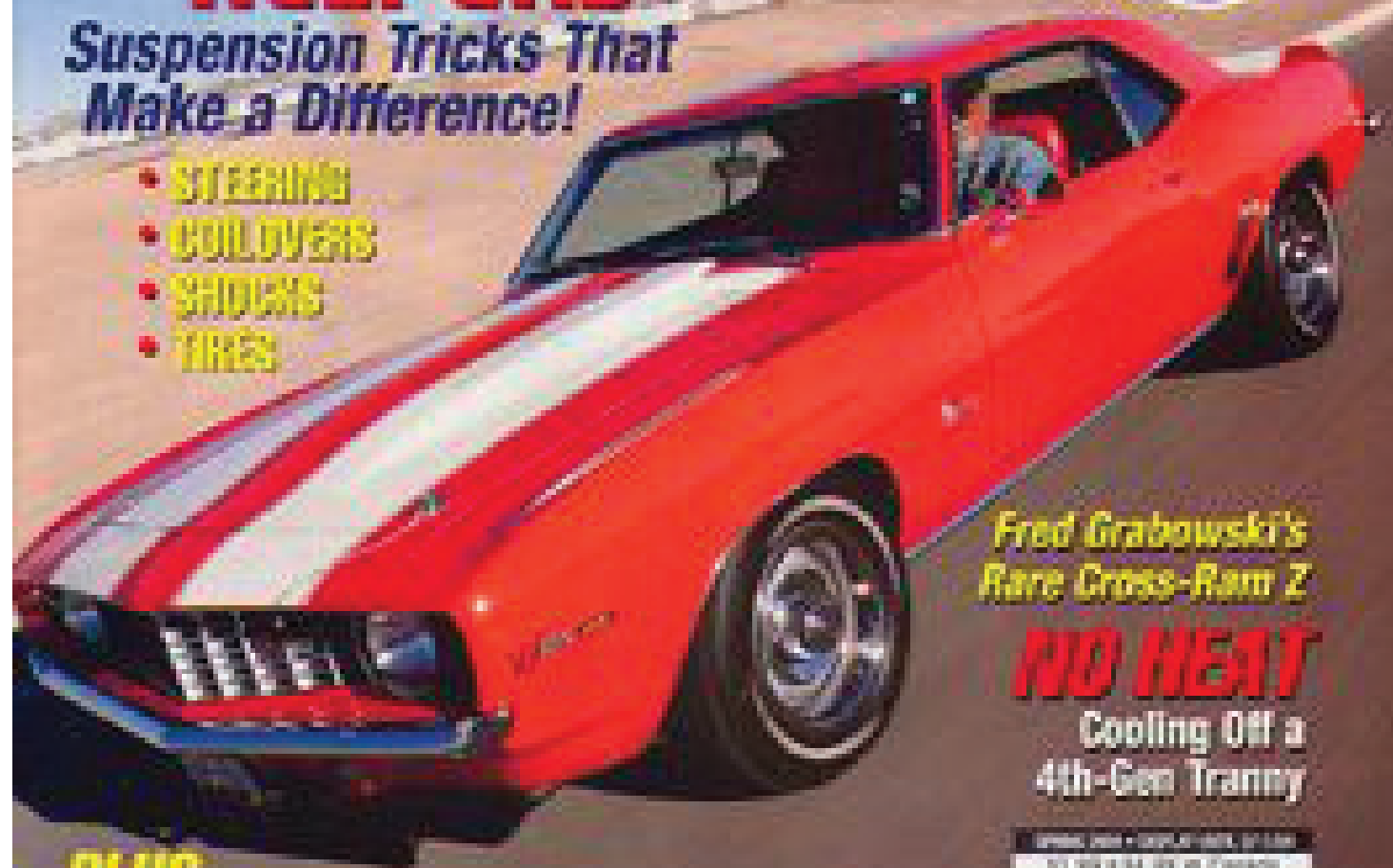
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# Beat The Heat

A PRECISION VIGILANTE CONVERTER, A TRANSGO SHIFT KIT, AND  
A TRANS REBUILD FROM COUNTYLINE

By Johnny Hunkins

Photography by the author and Rick Jensen

Our headline pretty much tells our story in a nutshell. We tested a bone stock '94 Camaro Z28 automatic and it's been a race against time to get our mods completed and drag tested so that we (and our participating manufacturers) don't look like complete idiots. As the weather warms and air density decreases, we've found it increasingly difficult to see an improvement in e.t., but we're marching forward and seeing some modest improvements nonetheless.

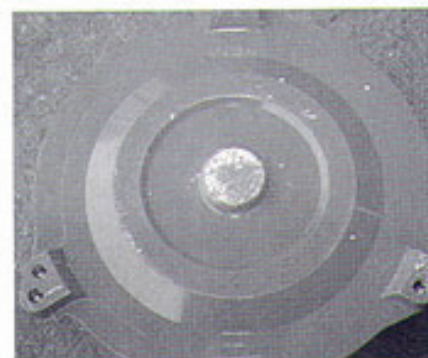
This latest batch of mods consists of a Precision Industries Vigilante torque converter (2800-rpm stall, retail price: \$699), a TransGo shift kit (\$109.99, street price) and a complete Hi-Pro trans overhaul by GM overdrive expert Eric Schertz of Countyline Transmission.

Before we jump in, we need to give Eric Schertz a big thanks. GM guys who hang out at Englishtown know Eric is a fixture there with his 9- and 10-second turbo Buicks. He's also a hardcore Impala SS man who knows his overdrive tranny's. Eric has





The Precision Industries Vigilante converter might be pink, but there's nothing sissy about it. We've tested them twice prior to this and the Vigilante—by itself—has always delivered at least 4-tenths right out of the box. Precision pulls out all the stops to get this level of performance and durability. Some of the Vigilante's features include a billet front cover, 4130 CNC-machined turbine hub, sealed Torrington bearings, furnace-brazed impeller and turbine, reinforced turbine vanes, heat-treated hubs and precision electronic balancing.



Precision's billet front cover performs a variety of functions. By stiffening the entire converter assembly, less distortion takes place under heavy load. The result is increased converter efficiency. The front cover is also the mating surface for the converter clutch and is more stable dimensionally than the factory's stamped cover. The last and perhaps most important benefit of a billet cover is to reduce ballooning under load. Look closely at this converter: With the capability to handling 1,100 hp, it's the last one you'll ever need.



Ballooning occurs in a converter because fluid pressure builds inside and pushes out in all directions. Since the converter is inherently stable in the radial dimension, the fluid forces the converter out along its weakest point, the axis. When that happens the impeller and turbine are pushed apart and the efficiency of the fluid coupling between the two is lost. The Vigilante's billet flanged hub keeps the turbine and impeller dimensionally stable and power transfer through the unit is improved.



The factory converter measures 12 inches across and stalls between 1,600 and 1,800 rpm in an LT1 F-body application. For the amount of power and the normal use it sees, the stock converter is fine, but when maximum dragstrip performance is desired you need a converter that will maximize the stall ratio. The 10.4-inch Vigilante (right) achieves a 2.5:1 stall ratio which is about 25 percent higher than any other converter on the market.



The TransGo shift kit for the 4L60-E (PN TRG-4L60E) can be purchased from most mail order outlets for \$109.99 and is one of the easiest, cheapest ways to pick up e.t. The nice thing about the TransGo kit is that it includes a step-by-step installation video for the do-it-yourselfer. If you'd rather have Eric Schertz at Countyline install it for you, it runs \$375 including labor.



Start the TransGo shift kit install by loosening all the pan perimeter bolts with a 13mm socket and drain the fluid. Leave the rear bolt in and loosen it slowly or you'll take a bath!



Remove the 1-2 accumulator, take out the filter, disconnect the various electronic harnesses and remove the valvebody by removing 16 of the 17 valvebody bolts (they're 8mm and 10mm). Remove the last bolt slowly to drain the fluid. Three of the bolts are 8mm and must go back in the same position so take note of these bolt locations.

been nagging us for years to build us a Hi-Pro transmission, and we finally took him up on his offer. Boy, are we glad too! As the resident e.t. junkie at Countyline, Eric has developed a range of performance-oriented overdrive transmissions he calls the Hi-Pro line, which distinguishes them from Countyline's standard mom 'n' pop rebuilds. When we started to see smoke from burning trans fluid, Eric came to the rescue and freshened our 4L60E with a Hi-Pro upgrade. Turns out a bushing on our pump was worn and puking fluid on our exhaust. It looked worse than it was, but we would've been in for a AAA tow before long.

Like we said, Eric works at Countyline Transmission out on "The Island." Over the years he has garnered the reputation of being one of the most respected GM overdrive trans experts in the tri-state area (that's New York, New Jersey and Connecticut for you left coasters). This made him the perfect guy to handle our converter and shift kit install. In fact, Precision Industries and TransGo happen to be some of Eric's favorite vendors for high performance GMs (he says, "Both make my job easier..."), so Eric had absolutely no problem with our choice of converter and shift-improver kit.

Our Vigilante converter, a favorite among hardcore F-body racers, was designed to stall at 2,800 rpm. That's a fairly common size due to the fact that computer-controlled 4L60-E transmissions in '94-'95 F-bodies seem unable to shift properly with stall speeds above 2,800 rpm (on a hard launch—usually your best—the engine tags the rev limiter in 1st, requiring the driver to lift throttle to shift into 2nd). Nobody we've talked to knows exactly why, but later ('96-up) F-bodies can get away with more stall with minor (or sometimes zero!) tweaks to the calibration. As a side note, prior to this, we had installed Vigs in both an '88 Firebird Formula and a '96 Trans Am. Like a charm, the Vig knocked five-tenths and four-tenths, respectively, off each car's e.t. ■



## Ask Eric!

Eric Schertz has been building high-performance overdrive GM transmissions at Countyline Transmission for 7 years. In this time, he's learned a lot by building trannies for hundreds of Camaros, Firebirds, Grand Nationals, Corvettes and Impalas. He also owns and drag races several late-model GM cars, including this '96 Impala SS and a pair of Turbo Buicks (one of them in the 9s with an overdrive 200-4R). We asked Eric some of the most commonly asked questions, and threw in a few we think people should ask.



**Q:** What is the most important thing for the beginner to remember when installing a new converter in an F-body?

**A:** Make sure that the converter is installed all the way into the transmission. There are actually three sets of splines that need to be engaged by the converter. If any of these doesn't mate, it will lead to pump failure in a hurry.

**Q:** Will I need any specialty tools to install the TransGo shift kit at home?

**A:** The only one an average garage mechanic wouldn't have is the internal snap ring pliers. All of the major tool manufacturers make them, even Sears has an inexpensive pair. You can do the job without them, but it's not worth the trouble.

**Q:** If I want the TransGo shift kit installed professionally, how much does it cost?

**A:** At Countyline transmission we get about \$375 to install one. That includes the cost of the kit, too. If you get our full Hi-Pro trans rebuild for \$1,495, that's included there, too.

**Q:** Do you recommend that anything else be done at the same time as the shift kit?

**A:** Just to change the fluid and filter. Make sure to get a new filter and plenty of fluid ahead of time to make the job easier. This is also a good time to look for any excessive wear or metal in the pan when you pull it down. If there's lots of junk there, the TransGo shift kit won't help. It should really only be installed on a good working trans, so it won't cure any problems.

**Q:** In a 700-R4 or 4L60-E, is it better to shift manually in a drag race or to let the trans shift automatically?

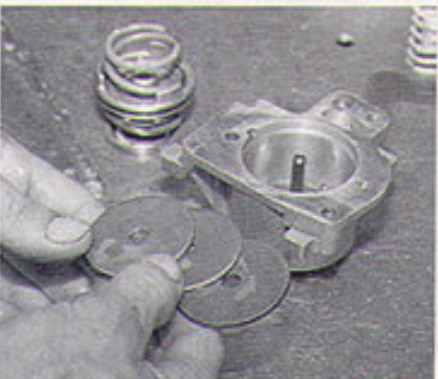
**A:** In a street/strip application, the trans should be set up to shift automatically in the "overdrive" or "drive" position. When you manually shift it, there's a delay in pressure rise. You push the lever and it won't respond right away because there's not enough line rise. You can burn the trans out shifting manually because there's not enough pressure to hold the clutches.

**Q:** Do I need a trans cooler on my street car if I have a shift kit or a higher stall converter?

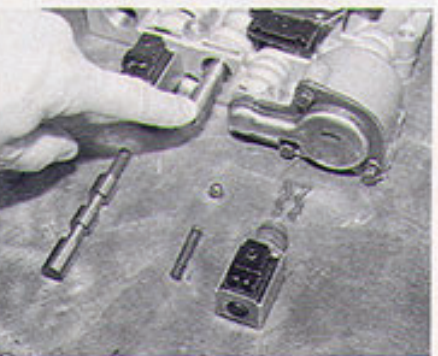
**A:** I would recommend an auxiliary cooler for any transmission, not just for transmissions with a high stall. The cooler the transmission temperature, the longer the trans will live. Overheating is the worst enemy of the automatic transmission. The Precision Vigilante converter is a very efficient converter so it won't produce any extra heat, but I feel the factory cooling is inadequate to start with for most transmissions.



First time shift kit installers should note that TransGo provides a very good installation video for the 4L60-E. Eric Schertz has installed plenty of TransGo kits and he recommends you have a large, clean work bench to perform your mods. There are lots of small parts in the kit that can get lost; Eric uses a small plastic lid to hold these.



Here it is kids, the famous "three washer mod." This is what separates the men from the boys. If you're using a high-stall converter like the Vigilante, three washers in the 1-2 accumulator housing won't cause as harsh a shift as it would with a stock converter, but it still can bark the tires at part throttle. Drop the washers in the accumulator, add the TransGo seat, then the blue TransGo spring, then the accumulator piston, then top it off with the orange TransGo spring and set the assembly aside.



Remove the stock 1-2 shift valve assembly and install the TransGo valve. Before reinstalling the electronic "A" solenoid, install the new gold TransGo check ball and spring.



# Track Results:

## Best All-Stock Run:

ET:	trap speed:	60-foot:	notes:
13.877	99.53	1.988	all stock, radials, Atco, NJ

## Previous Best ET (Round One Mods):

13.761	98.31	1.970	(SLP mods, ET Streets, Holley airfoil)
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## Previous Average (Round One Mods):

13.799	97.97	1.977	average of 4 runs
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## Round Two Mods:

Vigilante converter, TransGo shift kit, Countyline trans rebuild

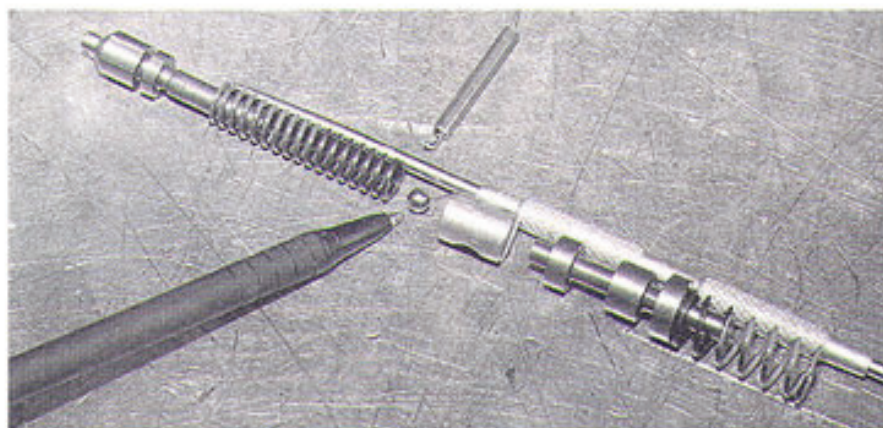
1. 13.623	97.25	1.839	
2. 13.606	97.40	1.820	New Best
3. 13.664	97.01	1.844	
4. 13.644	97.20	1.841	

## Round Two Average:

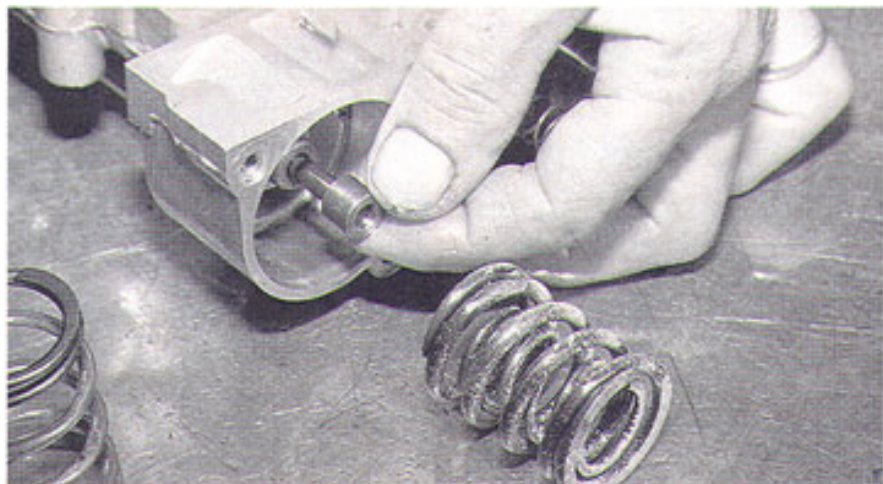
13.634	97.215	1.836
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## Average Improvement:

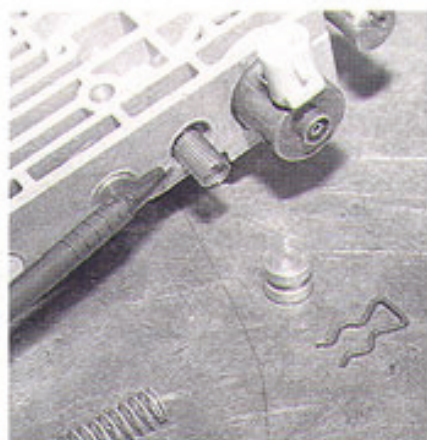
-.165	-.755	-.141
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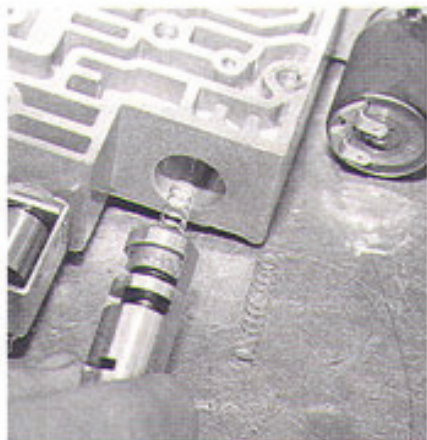
It's a lot of work to add just one check ball, but this speeds up the engagement of the forward clutch when you put the trans into gear. The check ball (pointer) limits the movement of the forward abuse valve and quickens the apply of the forward clutch. Make sure to install the valve, ball, spring, cut plug and roll pin in the proper sequence per the TransGo instructions.



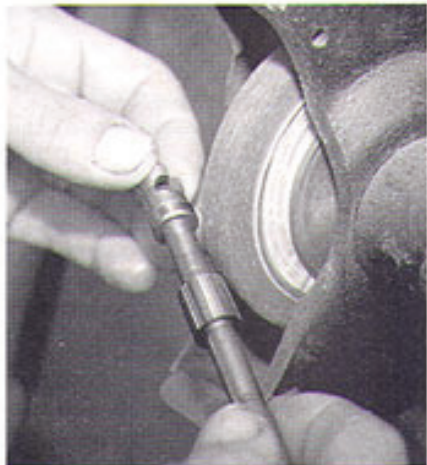
With the forward accumulator you're removing the factory spring and adding a stiffer pair of springs (aluminum piston only, plastic pistons get the large spring only) and adding a spacer to the pin. Note that the chamfered side of the spacer is oriented toward the accumulator piston.



Here Eric is replacing the stock 3-2 control valve spring with a taller spring with more coils. Once installed, the 3-2 control valve will not move at all in the bore. This will make the 3-2 downshift quick and firm.



Along with the "three-washer mod" we did earlier with the 1-2 accumulator, this stiffer 1-2 accumulator and valve bushing spring will shorten and firm the 1-2 shift. The valve itself, which cannot be seen here, is inside the large cylindrical bushing and translates within the bushing.



Here, Eric is grinding a chamfer on the manual control valve (as specified in the TransGo instructions) for a faster release of reverse.



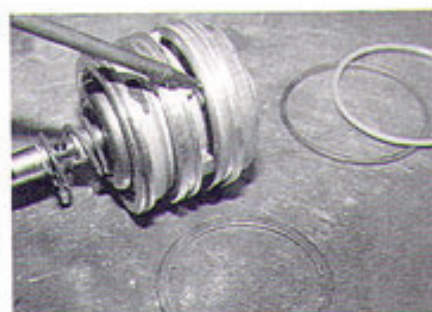
In our research, we found pretty much the entire world recommends a TranGo shift kit along with a Vigilante converter. Even Precision Industries gave the TranGo kit the hearty thumbs up. One of the main reasons they complement each other so well is that any high-stall converter tends to soften gear shifts and the TranGo kit firms them back up. They go together like peanut butter and jelly, especially on a dual-purpose street/strip car.

If you are doing any of this at home, we should mention that the TranGo shift kit comes in two forms, one for the professional rebuilder, and the other (it's a few bucks more) for the DIY guy. The difference is that the "home" version includes a very thorough video tape of the 4L60-E installation. Providing you have the right tools and follow along closely, the TranGo shift kit is a piece of cake. With the converter install, it's pretty much a menial labor job of pulling the trans out and swapping converters. The key thing here is to make sure all the splines are engaged in the hub. You'll know it's right if after you bolt the trans back on there is plenty of clearance between the converter hub and the flexplate. You should have to slide the converter towards the flexplate to bolt it up. If you've got an interference fit between the converter and flexplate, you do not have all sets of splines engaged! Lastly, we suggest you leave any trans rebuild to an expert, or risk major carnage. This is not a job for the inexperienced—even with the proper shop manuals. Our suggestion is to give Eric Schertz a call and leave it to him!

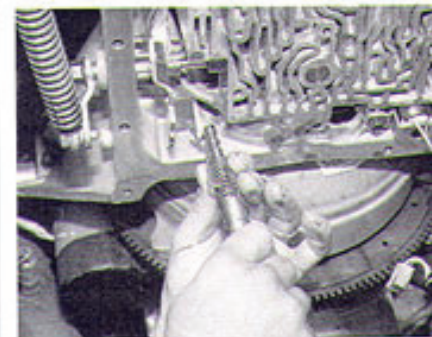
After completing the installation at Countyline, we scheduled a day at Englishtown Raceway Park. By this time of year, the weather had kicked up another notch and ambient temperature was now in the high 70s with a stiff headwind. We made a series of runs, all in the 13.60s, with a best e.t. of 13.606/97.40. This compares favorably to our previous best of 13.761/98.31 which had been accomplished in brisk March air. Our average e.t. improved by



Seven orifice holes in the valve body separator plate must be enlarged using the drill bits provided by TranGo. Note that the size of some holes will be determined by whether you've got a high-stall race converter (like the 2,800-rpm-stall Vigilante we have).



In some applications, the 2-3 accumulator (in the servo assembly) requires a heavier spring which is provided in the TranGo kit, but all cars with an LT1 or LS1 motor will already have a stronger 2-3 accumulator spring installed. The pointer shows the band adjust shim which we installed in our trans. Two shims are provided in the kit and the determining factor on how many you need is a function of the band clearance. The performance aspect of this shim is to quicken the application of the band in 2nd and 4th gear. Just remember: less band clearance equals a quicker apply.



Modification to the pressure regulator valve assembly consists of replacing the boost valve and bushing with parts from the TranGo kit. The factory pressure regulator valve is retained but new stronger springs from the TranGo kit replace the original ones. The only specialized tool you'll really need for the entire install is an inside snap ring tool to remove and replace the snap ring inside the pump casing.



The last thing before the valve body goes back up is to install the 4th gear accumulator. The stock accumulator piston is retained, but it is turned upside down and a stronger spring from the TranGo kit replaces the stock factory spring.



Installing the separator plate is a little tricky. For starters, you've got one last check ball to hold in place while maneuvering under the car. There are two bolt holes in the separator plate towards the front of the trans which are smaller than the rest. Locate these ahead of time so you know where they are; you'll want to use them as guide holes for aligning the separator plate and for reinstalling the stiffener plate and the 1-2 (second apply) accumulator. With a stiffer spring and our "three-washer mod" in the accumulator, there's a lot of spring pressure to overcome, so you'll want to tighten each accumulator bolt a little at a time.




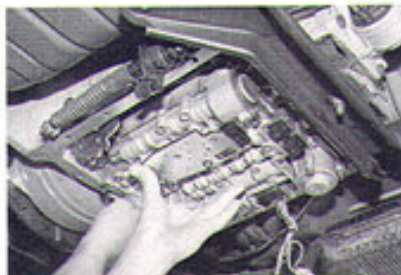
.165 seconds, which is perhaps the most indicative stat of the bunch (see "Track Results" sidebar).

An e.t. improvement of .165 seconds is off about a quarter second from what we expected, but it's not unreasonable given the track conditions that day. We are not disappointed by this because we anticipate picking up that quarter second in comparable conditions this fall when the air density improves.

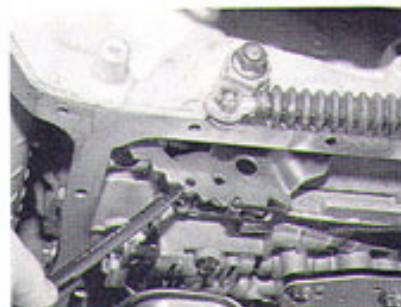
Even more importantly, we expect the air density and track conditions to deteriorate more as we push into the summer heat. That will likely impair our track results for our next round of mods too (a pair of Hooker shorty headers, Corsa cat-back exhaust, Dynomax super cat, and MSD wires installed at Classic Restoration in Sloatsburg, N.Y.). But as they say, that's racing.

Another item of note is the drop in trap speed over the quarter-mile. We lost .755 mph in trap speed which equates to a loss of about 8 hp. This is a normal occurrence when stepping up to a high-stall converter such as the Vigilante. Previously, we had lost 1.28 mph from our stock baseline due to a switch from stock radials to ET Streets. Like the converter, this loss of trap speed is normal when changing to a wrinkle-wall slick-type tire from a street radial. Nevertheless, our e.t. continues to move in the right direction in spite of the fact that the car is a full 2 mph slower through the traps.

At the end of the day, the only thing that really matters is e.t.. And as far as e.t. goes, the sole contributor to our e.t. improvement this month is our credible .141-second average improvement in 60-foot time. That's a difference you can feel, and it's not a small one either. We attribute this almost entirely to the Vigilante converter and its class-leading 2.5:1 stall ratio. 



*This part looks easy, and by the time you get here you might be inclined to rush things. There are four different sizes of bolts holding the valve body in place and they must all go in the correct locations according to the TransGo instructions. The wrong bolt in the wrong hole will result in total lock-up of the gear train. Make sure to reconnect all electrical harnesses, especially those which are hidden, like the electronic pressure regulator.*



*Here's a trick you can use to identify factory performance transmissions (both 700-R4 and 4L60-E). The shift detent linkage, known also as the "rooster," is always gold colored in the hi-po versions (Corvette, V-8 F-body, Impala SS) and silver in all others. The "golden rooster" will indicate that the trans has a higher overall line pressure, a larger band apply servo, heavier accumulator springs, and an aluminum (instead of plastic) forward accumulator piston. If you're scouting the junkyard for a tranny, the "golden rooster" can tell you a lot!*



*Although not required for most cars in good shape, we decided to get our 4L60-E rebuilt by Eric Schertz at Countyline Transmissions, and it's a good thing we did because trouble was lurking inside. Some of the gestating gremlins included a bad pump bushing and some burned clutches.*



*Countyline Transmission gets \$1,495 for a Hi-Pro rebuild on a 700-R4 or a 4L60-E. This includes the cost of a Transtar Banner rebuild kit, the TransGo shift kit, bushing kit, filter, and trans assembly. Installation runs another \$175 including trans fluid. The Banner kit is the most comprehensive rebuild kit available from Transtar and includes Borg-Warner clutches, steels, paper gaskets and rubber seals. The band, filter, and bushing kit do not come with Transtar's Banner kit, but are included in the cost of Countyline's Hi-Pro trans rebuild.*

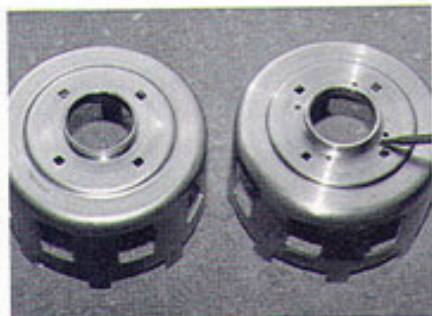


*The 13-vane pump kit on the right (stock 10-vane at left) won't add any performance, but the 700-R4 and the 4L60-E experience such a high fluid demand under overdrive lock-up cruising that the lube circuit is compromised. Since our car is a daily driver that sees a lot of highway use, Eric thought this was a good upgrade. The 13-vane pump kit adds \$65 to the cost of a Hi-Pro rebuild.*



*It should be noted that when our trans was rebuilt, the TransGo piston return springs from the TransGo kit were installed in the input drum (not shown). Unlike the TransGo shift kit, a trans rebuild is something the average enthusiasts does not want to do at home—leave it to a professional like Eric Schertz!*





Here's something brand new that came out 2 weeks after our trans was rebuilt: a heavy duty reaction sun gear shell called "The Beast." The sun shell can be a weak point in the 700-R4 and the 4L60-E where the splines join the shell. If it breaks, you'll know it because you'll have first gear only. "The Beast" is reinforced in the joint area (pointer) and adds about \$75 to the cost of Countyline's rebuild.



Eric Schertz also installed a Derale 18,000-pound GVW cooler (PN 13903) in our Z28. The unit runs about \$175 installed and is good insurance against elevated transmission temperatures. Although Precision Industries says a trans cooler is not needed with its unit, it should be considered mandatory on all other converters because elevated stall speed is usually created by increasing the gap between the impeller and the turbine—a big heat producer.

#### Sources

**Countyline Transmission**  
262 Broadway, Dept. SC  
Amityville, NY 11701  
(631) 789-4555

#### Precision Industries

80 Peirce Rd., Dept. SC  
Oakland, TN 38060  
(901) 466-0267  
www.converter.com

#### TransGo Performance

2621 Merced Ave., Dept. SC  
El Monte, CA 91733-1997  
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