



SHIFT INTO OVERDRIVE!

HOW TO BUILD A FOUR-SPEED HIGH PERFORMANCE AUTOMATIC THAT CAN HANDLE HORSEPOWER AND TORQUE



WORDS & PICS BY ROY VELARDI & LENTECH AUTOMATICS

Every muscle car I've ever owned that was an automatic had a Ford C4 three speed automatic transmission. My XYGS Falcon had a stock standard version which was perfect behind the very mild 302W up front. My stock 1966 Mustang had one as well which was flawless behind the stock 200ci inline six. I also had one in the XWGT replica, but that C4 wasn't stock. It was the top of the line C4 with a 5,000rpm Dominator stall converter and was fully manualized along with a bunch more modifications. That also worked perfectly behind the 575hp 393ci Cleveland.

A properly built Ford C4 can live in a street/strip environment up to around the 1000hp mark. Beyond that you are starting to look at either a Turbo 400 or Powerglide to swap gears. I don't know about you but I don't want a GM transmission in my Ford!

Moving forward to my XY Falcon Wild Violence, I definitely need a transmission that can handle the horsepower. So I hopped online to see if I can find a few more Ford options. The C6 struck me as being a good way to go since the upgraded parts were available. I also found that there were a few big power cars running them in the USA.

Then I got thinking about what it was like to drive the XW with a decent sized converter, 3 gears and 4.11 gears in the 9inch. Around town it was fun, blowing the tyres away etc but then once on long open roads such as the motorways or semi-rural roads, it was a bit of a pain. At around 100km/h it would be sitting on around 3300rpm. Same goes for the XBGT XBomb as it has the same setup in that car.

So then I started thinking about an AOD, an automatic overdrive transmission. I started daydreaming at how great it would be to have 3 speeds

around town and at the strip and then an extra gear for the long open road drives... So I started to hunt around for a suitable four-speed automatic that could handle the horsepower and torque my 8/71 blown 427ci is going to produce!

I found a company called LenTech Automatics in Canada that does various stages of high performance four-speed autos. After a search of their website I found that their Strip Terminator Ford 4R70W seems to be the go for my combo as it can handle up to around 1500hp and 1000lb.ft of torque.

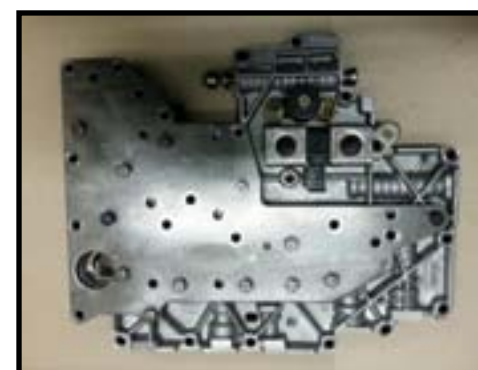
I also found that there were quite a few fellow muscle car guys running this transmission not only in the USA/Canada but also in Denmark! A full weight 2006 Mustang GT with a 5.0L Coyote engine swap, twin turbos and 1102 rear wheel horsepower has a LenTech Automatics Strip Terminator 4R70W and runs 8.39@168mph! Then there's the 1336rwhp

HOW TO BUILD A HIGH PERFORMANCE 4R70W

1 The build begins here. This is a stock 4R70W valve body for comparison



THE GARAGE



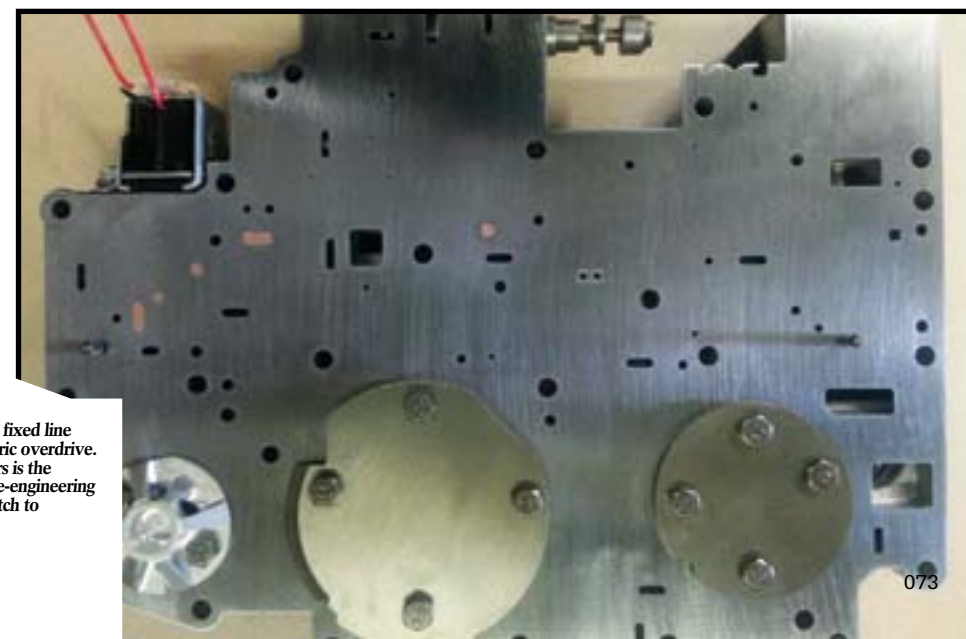
2 Here is the machined area to accept the transbrake solenoid



3 The threads added to make line pressure adjustable



This LenTech Strip Terminator transbrake valve body features fixed line pressure, full manual shifting (auto models available) with electric overdrive. A key advantage a LenTech unit will have over our competitors is the patented Reverse/Third technology which involves hydraulic re-engineering to apply the reverse input clutch along with the original 3-4 clutch to dramatically increase clutch apply capacity in 3rd gear



LS powered twin turbo street rod in Denmark that has made over made over 120 passes with a best of 8.34@ It weighs 3472lb (1574kg) It's also regularly driven on the street with around 16,000km under its belt!

With this setup I will be able to cruise at 100km/h at around 1900rpm with 3.89 gears and a 28in tall tyre. So I contacted Chris Nugteren from LenTech and asked the usual questions. Chris was awesome to deal with and answered all my questions and went on to explain everything about the AOD/4R70W transmission and made me feel confident in purchasing their Strip Terminator 4R70W.



6 Early AODE/4R70 transmission models were built with paper frictions and while V8 vehicles got 6 frictions, 6 cylinders got 5. This Strip Terminator has no fewer than 8 frictions



7 Shown are reverse top pressure plates with a factory 3 plate and 4 plate and the LenTech 5 plate, as well as factory lower pressure plate and LenTech modified lower plate. The LenTech setup brings reverse plate count to 5 as this now becomes a transbrake clutch and a shifting clutch for 3rd gear



5 To verify the function of all features and modifications of the valve body, each and every LenTech unit is run through a series of test procedures to ensure performance and quality specifications are met. Pressures are monitored via gauges fitted to the Answermatic hydraulic test bench. The valve body is bolted and torqued to a machined channel plate that simulates the circuits of the transmission case

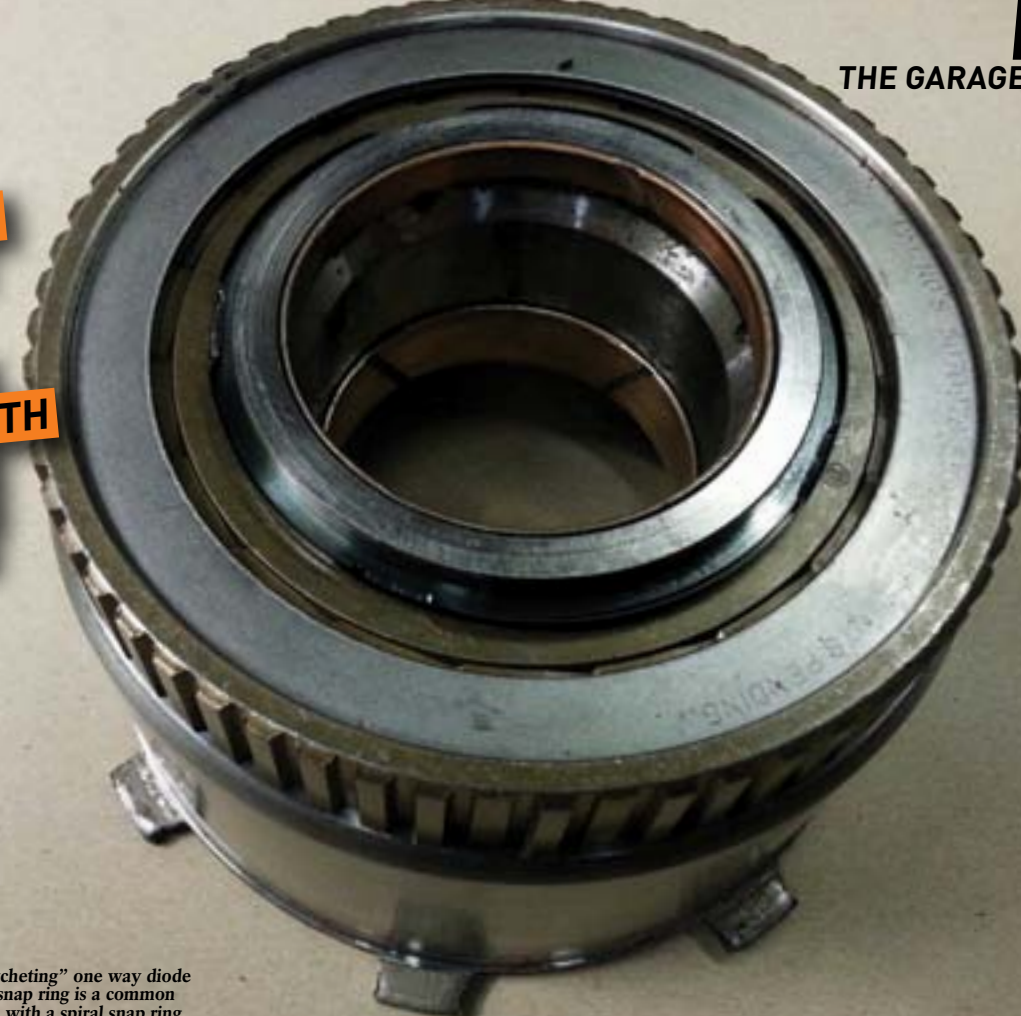
LENTECH AUTOMATICS HISTORY

LenTech Automatics is a highly regarded provider of quality AOD and 4R70 transmissions and products. This reputation has been earned over 20 years and has origins similar to many performance aftermarket companies: one automotive enthusiast building something he couldn't buy. As a licensed

transmission tech, mechanic and avid drag racer, Len Bertrand recognized the need for a performance overdrive transmission around 1990 when his personal project car (1979 Ford Capri) was fitted with an AOD to replace the C4 with lacklustre results.

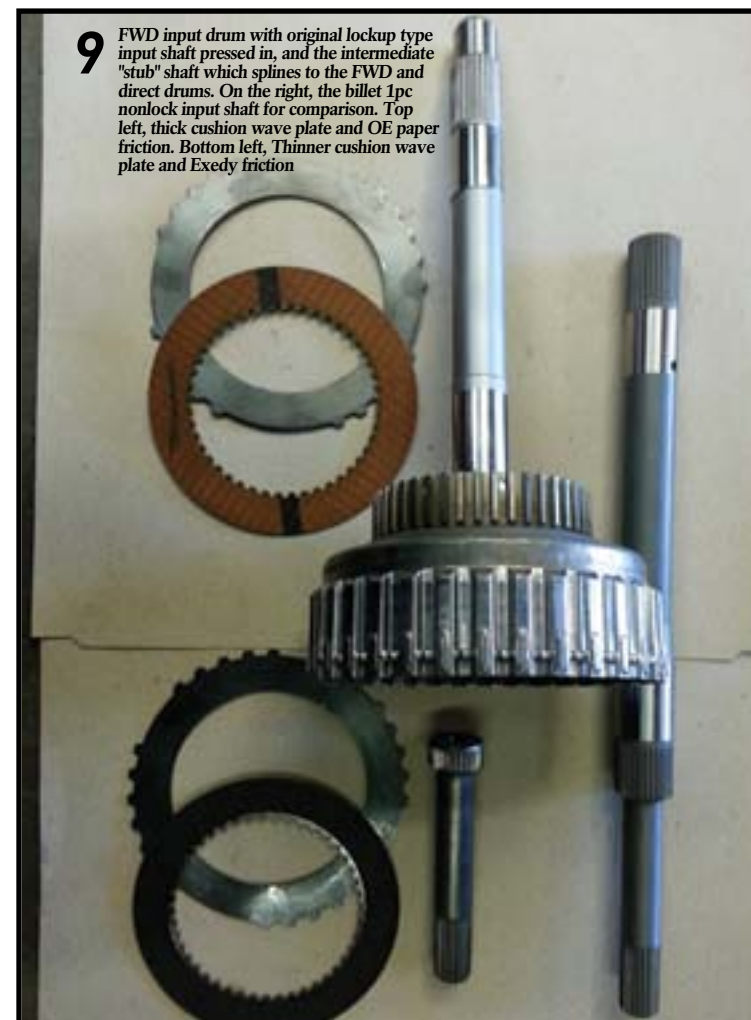
Within weeks of installation, the transmission failed. After carefully examining oil circuit diagrams, it was determined the factory shift pattern had been a major factor in the transmissions early demise. Upon this discovery, Len constructed the first AOD valvebody with

WITH THIS SETUP I WILL BE ABLE TO CRUISE AT 100KM/H AT AROUND 1900RPM WITH 3.89 GEARS AND A 28IN TALL TYRE



8 The 4R70W has a "ratcheting" one way diode (sprag). The retaining snap ring is a common failure, and is replaced with a spiral snap ring

9 FWD input drum with original lockup type input shaft pressed in, and the intermediate "stub" shaft which splines to the FWD and direct drums. On the right, the billet 1pc nonlock input shaft for comparison. Top left, thick cushion wave plate and OE paper friction. Bottom left, Thinner cushion wave plate and Exedy friction



10 The completed 3rd/4th (direct) drum. The extra friction capacity is achieved with thinner steels and machining of the piston and top pressure plate. Clearance is verified with a dial indicator



11 A comparison of the factory 4R70W input/intermediate shafts and the 1pc billet 31 spline shaft from the Strip Terminator





12 This photo shows the Strip Terminator AODE/4R70W oil pump. The original OE pump body is aluminium. As this model has eliminated lockup and is fitted with a billet 1 piece input shaft, a modified AOD pump stator support is used. This gerotor pump has good volume and pressure and has proven reliable



The AOD/AODE/4R70W family of transmission use a single "Ravigneaux" planetary gearset. This unique planetary gear design is unique with one carrier that has a long and short set of pinions, two sun gears and a single output ring gear. Most overdrive type automatic transmissions have 3 planetary gearsets. It is this geartrain that allows the LenTech Reverse/Third modified powerflow to bolster third gear torque capacity

13



14 A look into the planet carrier reveals the long and short set of pinions



15 The output subassembly including direct (3/4) drum, output hub and shaft, and output ring gear



16 Here is the output subassembly going into the prepared case



17 The low/reverse band is next to be installed

a 1, 2, 3/4 shift arrangement. It was soon after other local enthusiasts began to request that these modifications be performed to their own project cars.

As a result of growing interest and demand for the transmission, LenTech Automatics was founded in 1994. Innovations continued with transbrakes and the Reverse-Third technology which received a US Patent, as well as product offerings for the AODE/4R70W. In 1999, Chris Nugteren was brought on as LenTech's first full time employee. LenTech gained notoriety through publications in numerous magazines over the next several years and came to be considered the leader in Ford Automatic Overdrive products.

Most recently, in 2013, LenTech Automatics was purchased by long-time employee Chris Nugteren, and the "New LenTech Automatics" looks forward to continuing to provide the best products along with exceptional service into the future. Chris at LenTech is constantly developing new and improved products as horsepower levels increase and the end user's needs change.

LENTECH CAN BUILD YOU AN OVERDRIVE TRANSMISSION TO SUIT ANY APPLICATION

WORLD RENOWNED AOD/4R70 SPECIALISTS

WE SHIP WORLDWIDE

- TRANSMISSIONS
- TORQUE CONVERTERS
- VALVE BODIES
- COMPONENTS



LENTECH AUTOMATICS
CUSTOM TRANS BUILDING

Richmond, Ontario CANADA. Ph: 613-838-5390
www.lentechautomatics.com

THE DETAILS

Limited Street/Race Part # 7000-4R70-STR

Rated to 1500hp and 1000lb.ft

The Strip Terminator AODE/4R70W transmission is in a new class all by itself. A manual shift, fixed pressure valvebody is standard fare. Incorporated into this valvebody is LenTech's famous Reverse/Third technology for huge torque capacity. It is recommended for wild performance vehicles that see limited street usage. Each unit receives numerous key internal modifications and upgrades for increased durability.

This transmission incorporates a billet 1 piece input shaft. The lockup feature is deleted from the torque converter for increased reliability. It is highly recommended that higher than stock axle ratio be installed (3.55 or higher) in conjunction with this transmission model. Auxiliary transmission oil coolers are also highly recommended.

LENTECH CAN ALSO SUPPLY CONVERTERS, VALVE BODIES AND OTHER COMPONENTS AND SHIP WORLDWIDE

18 Next is the planet carrier with low sprag and centre support

19 Forward sun gear

20 Next to be fitted is reverse input sun gear/shell

21 Forward drum assembly including forward hub and billet input shaft

22 The reverse (now a hi/reverse/transbrake) drum

23 The overdrive band going into the case. It applies to the outer surface of the reverse drum

24 The intermediate pressure plate goes into the case before the clutches

25 With the surface area of four huge intermediate frictions and a non-synchronous powerflow, the Strip Terminator AODE/4R70 has an advantage over many transmission models that use a band

26 The rear of the completed pump assembly showing the intermediate apply piston, selective thrust washer and teflon sealing rings for the forward and reverse clutch drums. Teflon rings are a must for transmissions with fixed line pressure, as OE cast type eat into the ring lands and wear very rapidly when line pressure is high

SPECIFICATIONS

- Quality selected core, completely stripped, all major components washed and inspected for excessive wear.
- Pump modified to delete lockup, and increase lube and cooler flow
- Clutch cylinders modified for extra clutches
- Numerous modifications in strategic areas for efficient clutch operation and life
- 8 "high energy" 3-4 clutches
- 4 high energy intermediate clutches
- 6 or 7 "high energy" forward clutches
- 4 or 5 reverse clutches
- New 2" high energy O/D band
- All new seals, gaskets, and filter
- New bushings and thrust washer (where needed)
- New intermediate ratchet diode clutch and spiral lock ring
- New low one-way clutch
- LenTech custom fixed-pressure manual shift Valve Body with exclusive LenTechReverse/Third technology.
- LenTech built/modified transbrake
- Billet 1-piece input shaft
- New oil pan and bolts
- Re-assembled with all critical clearances adjusted for high performance/racing use
- Painted in cast grey finish
- All complete units are dyno tested to insure a quality product
- Lifetime LTD warranty

THE GARAGE

AVAILABLE CONVERTERS

10" (non-lockup) Part# 7902-CONV-10

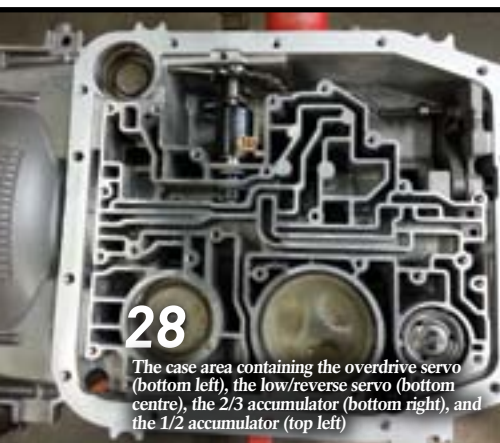
9.5" (non-lockup) Part# 7902-CONV-95

AVAILABLE UPGRADES

Transbrake valvebody upgrade
Part#7000-OPT-STTB

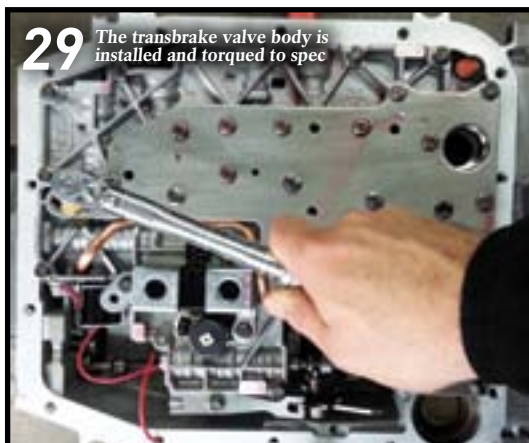


27 Once installed, the pump bolts are torqued to spec



28

The case area containing the overdrive servo (bottom left), the low/reverse servo (bottom centre), the 2/3 accumulator (bottom right), and the 1/2 accumulator (top left)



29

The transbrake valve body is installed and torqued to spec



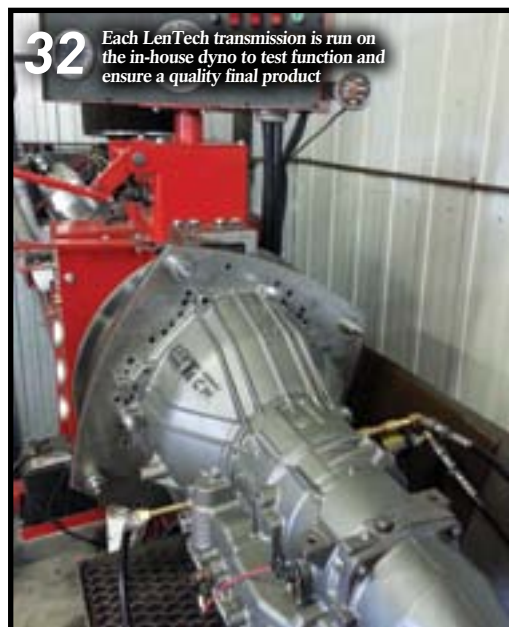
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The view before the oil pan goes on



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A larger-capacity oil pan is a good idea and LenTech have their-own custom pan



32

Each LenTech transmission is run on the in-house dyno to test function and ensure a quality final product

SOURCE:



LENTECH AUTOMATICS

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Ph: 00 111 613 838 5390
(from within Australia)