

Torqueflite A-727 Transmission Handbook: How to Rebuild Or Modify Chrysler's ...

By Carl H. Munroe

http://books.google.com/books?id=IjnczMjW46QC&pg=PA39&lpg=PA39&dq=727+rebuild+torque+converter+on+shaft&source=web&ots=IntxPw2gSE&sig=NwWw3gdh2Z-h9mPgk2SbWpk0k&hl=en&sa=X&oi=book_result&resnum=2&ct=result#PPP1,M1

Subject: How To Rebuild your Automatic Transmission Part I.
<http://www.wagoneers.com/FSJ/tech/Transmissions/howto-AT.html>

Date: Wed, 3 Sep 1997 13:26:50 -0400 (EDT)
From: Mark Wallace (redgator@bu.edu)
To: Big Jeep List

Subject: How To Rebuild your Automatic Transmission Part I.

Okay, here it is as promised, I'll get the pictures in the mail to John in a few days. It's pretty long so I'll separate it over a few days.

Preliminary thoughts:

1. Automatic Transmissions have a lot of parts, and are not exactly simple, If rebuilding a carburator or an engine represents a substantial challenge for you you may be better off going to a non-AAMCO transmission shop. On the other hand rebuilding an automatic transmission is definitely within the realm of what a good amateur mechanic can expect to do correctly.
2. Cleanliness is of utmost importance. Any place where there is wind and dust and dirt is probably unacceptable. I used the kitchen table after covering it with first some plastic garbage bags and then some masking paper. I had some newspaper down too.
3. More likely you will have to buy some tools, and it is not entirely unlikely that those will be expensive tools. Of course keep in mind that my taste in tools tends toward quality name brands, and that you'll probably end up with at least a few new tools that you'll never know how you did without. I tried to include tools used in the pictures whenever I could.
4. You will need a good manual. I used a factory Jeep shop manual for the

81 model year. This particular manual actually has the same cover graphic as the owners manual so it's a pretty cool relic too. I'm writing this how to mainly so that anyone considering this undertaking can get a good idea of what they are getting into from an ameteur's perspective.

5. I am not an expert on this subject. I rebuilt one transmission (a Torqueflyte 727, but I'm sure the TH-400 is similar) and it made it across the country without incident. Had it failed along the way I don't think that I could have witten a workable how to.

With that in mind it's time to break out the tools and get dirty.

TRANSMISSION REMOVAL

1. Transmission Removal: There are a couple of ways to go about doing this, and the various methods probably can be best chosen according to what other work has to be done on the Jeep. Basically what I did was drop the transfer case and remove it out the bottom, unbolt the engine mounts, unbolt the transmission from the crossmember and then unbolt the crossmember from the frame. I then pulled the engine and transmission as a single unit following the transmission with a bucket to catch the fluid. (With the stock tranny pan no matter what you are going to make a mess with the tranny fluid) I then set the transmission on an overturned five gallon bucket and divorced the engine and transmission. If you plan to save your torque converter (more later) you want to try and hold it on the transmission for the time being so that you don't beat up anything important. After the transmission is out the entire transmission should be set in a bucket with the tailshaft assembly pointed down to drain the remainder of the transmission fluid out.

TORQUE CONVERTER REMOVAL

2. Torque Converter Removal: With the transmission divorced from the engine pull the torque converter straight out. Set it someplace safe even if you don't plan on re-using it as there will probably be a core charge for the replacement torque converter.

TRANSMISSION PAN REMOVAL

3. Transmission Oil Pan Removal: With the transmission upside down, unbolt

the pan. The pan may need to be pried off. Note whether RTV has been used to glue on the pan. (AAMCO did use RTV to glue on my pan, which is 100% incorrect. Automatic transmission fluid will dissolve RTV, so consequently I found a substantial amount of RTV stuck to the transmission filter, and floating around in the bottom of the pan.) Look for an excessive amount of particulate matter. If there is a lot plan on replacing the torque converter.

VALVE BODY REMOVAL

4. Valve Body: As soon as the pan is off you can see the valve body. This is the hydraulic brain for the automatic transmission. It is full of sliding valves, springs, and check balls. (If AAMCO rebuilt your transmission last it is probably also full of particulate matter, which is not correct. Judging from the dirt that I cleaned out of the valve body I don't think AAMCO had ever even had it apart). Rebuilding the valve body is fairly straight forward, but first it has to be removed from the transmission. It is held on by a few bolts on each end and has the park lock rod attached to the manual shift detent by an e-clip. you can remove the whole valve body without removing the park lock rod from the valve body and the park lock rod just slides out.

REBUILDING THE VALVE BODY

5. Rebuilding The Valve Body: This is no more complex that taking the valve body apart, cleaning it carefully, and putting it back together, except for one detail: The valve body for the 727 has 106 different parts and they all look more or less the same. This is where the manual really starts to help. What I did is I laid each part on the paper on my table, drew a box around it, labeled what it was, and then proceeded to do the next part. When I was cleaning the parts I made a new piece of paper so that I did not have to set the clean parts back into the dirt that I had just washed off. I cleaned the parts in a plastic dishwashing tub in paint thinner, which is not the best solvent because it leaves a residue, but it worked okay for me. Safety Clean, or brake cleaner would be better. It is also important not to used either shop towels or paper products to clean the valve body (or any part of the transmission for that matter because any lint left in mechanisms can cause problems later). When everything is clean and dry reassemble the valve body in reverse order torquing everything to proper spec. (You'll need a torque wrench that reads in inch-lbs.)

MEASURE ENDPLAY

6. Rotating Assembly Endplay Measurement: Both the input shaft and output

shaft endplay need to be measured before the rotating mass is disassembled. This is because a selective thrust washer is used to determine endplay and it needs to be determined whether the selective thrust washer needs to be replaced. (In my case The endplay was way out of spec and by replacing the selective thrust washer with the thickest thrust washer available I was just barely able to get it back into spec. Once again this is something that AAMCO should not have screwed up) The manual says to use a dial indicator, but I was able to use a straightedge and a dial caliper. Once again the endplay spec is in the manual.

TAILSHAFT ASSEMBLY REMOVAL

7. Tailshaft Assembly Removal and Contents: On the rear of the transmission there is a short (as in maybe about eight inches in length) aluminum housing that adapts the transmission to the transfer case. It also houses the park sprag, the governor, a ball bearing, a seal, and some of the output shaft. Remove the six bolts that hold the tailshaft assembly to the main case and slide the tailshaft assembly off. The ball bearing should fall out, and the seal can be removed with a punch and a ball peen hammer (or a seal pusher if you have one). The governor is a small valve assembly that is held on the output shaft with a pin that goes through the output shaft. The governor is bolted to the park sprag which rides on a spline on the output shaft. Once this is all apart clean it and reassemble it.

Mark Wallace
81 Wagoneer
Boston MA

<http://www.colorado4x4.org/vbb/showthread.php?p=1068747>

The TF 999 was used in CJs from 1980-1986 only with the I6 and V8 engine. It was also used in 1984-1990 SJs and J pickups with the 4.2L engine, in the YJ from 1987-1991 with the 2.5L and 4.2L engine, and in the XJ in 1991 with the 2.5L engine. A modern version of the 999 continues to be used in Wrangler YJs and TJs to this day with the I6 engine.

Mopar Trans ID Guide

BY MARKO RADIELOVIC

Photos by Marko Radelovic
Illustration by Jamie Seymour

In recent issues, we've chronicled the pros, cons, weaknesses, and strengths of the various automatic transmissions offered by General Motors and Ford. This third and final installment in our automatic transmission series focuses on the Chrysler Corporation's TorqueFlites. Mopar guys don't have as many choices, but while their options may be limited, the offerings are a good foundation on which to build a hot street or strip car.

The Three Speeds

Mopar three-speed transmissions can be broken down into two groups: The light-duty 904 transmissions and the heavy-duty 727 series of transmissions. The 904 made its debut in 1960 and the 727 hit the scene in 1962. We've always found it interesting that Mopar was the lone OEM to make a three-speed automatic transmission standard on all cars rather than offer it as a higher priced upgrade for a two-speed. Heck, if you bought a Chevy, you couldn't even get a three-speed until 1965, and then only behind a big-block, and two-speeds were the standard automatic in most GM cars into the early '70s.

Both TorqueFlite transmissions came standard with a ball-and-trunion output yoke through the '65 model year, when a more conventional slip-yoke became standard. We'll look at the lighter duty of the two first, noting that the 904 was never offered behind anything larger than a small-block and was never considered a performance option. In the case of automatic-equipped performance small-block applications, such as 340-powered vehicles and heavy-duty applications with 360s, a small-block version of the 727 was standard.

Generally speaking, the 904 and its derivatives are considered some of the most mechanically efficient automatic transmissions offered to the American public.

Introduced in 1960, the light-duty

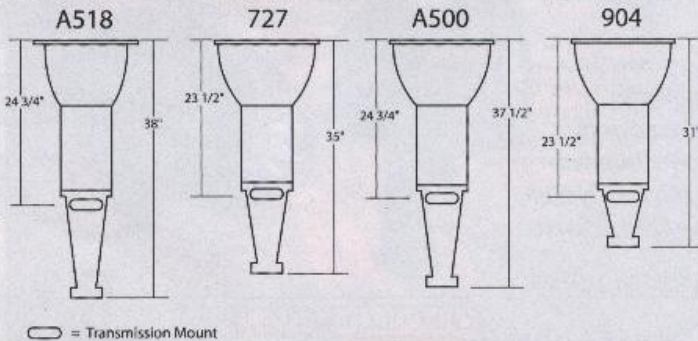


From left to right: The A518, 727, A500, and 904.

TorqueFlite came in three basic designs—the 904, 998, and 999. The 904 was equipped with three direct friction plates, the 998 had four, and the 999 came with either four or five. They are otherwise dimensionally identical, and beginning in 1980 all were offered with a low gear set (2.74 First and 1.54 Second) as standard equipment. TorqueFlites were also used in some American Motors automobiles from 1972 until AMC's

demise, and they even made an appearance in some import applications, including Mitsubishi's. Due to its high mechanical efficiency and low weight, 904-based transmissions are a popular choice with drag racers because the light internals eat a minimum of horsepower compared to heavier duty offerings. But there are certain inherent design drawbacks with the light-duty TorqueFlite. A particularly weak link is the spindly,

Dimensions of Popular Mopar Automatic Transmissions



B&M builds high-quality TorqueFlites and accessories (shifters, shift-improvement kits, torque converters, aluminum transmission pans, trans coolers, flexplates, and so on) for all your street and strip needs. This is one of B&M's brutal street/strip TorqueFlite 727 transmissions.

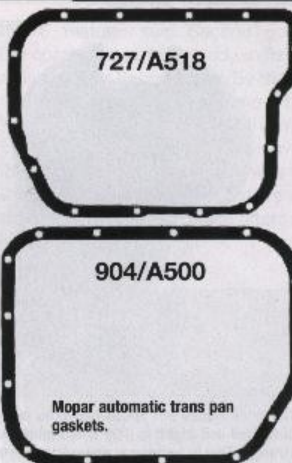


The 727 transmissions were offered with either a three- or four-pin aluminum front planetary depending on application. Big-block hi-po versions receive four-pin units. In the foreground is A-1's steel five-pin planetary.

slotted front pump drive of the torque converter. The slots themselves are wide for ease of installation, but the resulting sloppy engagement makes the drive prone to cracking. Many aftermarket torque-converter manufacturers use much narrower slots to reduce the cracking problem. Later 904-based automatic overdrive transmissions (A500 series) have a flat machined pump drive that eliminates the crack-inducing feature entirely.

Turbo Action's Paul Forte tells us his company addresses this weakness by substituting a chromoly pump drive for the weak factory version on its high-

performance torque converters. T/A's street and strip (S/S) 904 transmissions receive modifications to their lubrication circuits to improve flow along with a high-performance valvebody. Other than these basic mods and good clutch materials, T/A's S/S units can easily handle 500 eager horses. When moving up to a race unit, a full manual valvebody is standard, a transbrake is optional, and a Torrington bearing is used in the tailhousing instead of a fixed bushing. The cumulative effect of these mods brings the level up to the 600hp range. If the racer is looking to eke out the last 100th of a

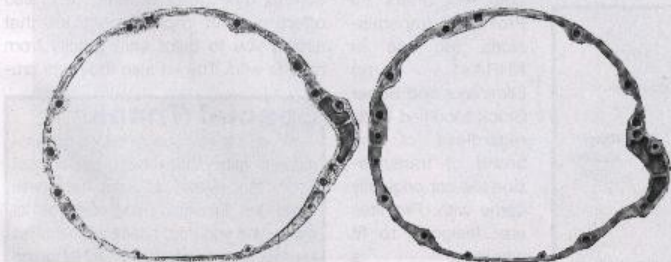


Mopar automatic trans pan gaskets.

second and is not concerned with durability, Turbo Action can build an all-out lightweight unit featuring aluminum drums and a plethora of other lightweight parts. These top-dollar units are able to withstand up to the 900-horse range as they are lighter and more efficient, but they are built to go fast and not to last in a street car.

The heavy-duty 727 TorqueFlite was used by Mopar to back up virtually all of its high-horsepower mills from the 426 Max Wedge to the aforementioned 340 high-performance V-8 engines, to the brutal Street Hemi. While not nearly as efficient as its little-brother 904, the 727 can handle an obscene amount of horsepower. Early versions of the 727 ('62 through '65) used a push-button cable-operated shifting mechanism as well as a smaller-spline input shaft that required a corresponding torque converter unique to these model years. The '65 727 did not use push-buttons, but retained the cable-operated shift mechanism. From 1966 on, all linkage was mechanical.

Marv Ripes of A-1 Automatic Transmission has developed many components to make the already stout 727 even stronger. The 727s were produced with both three- and four-pin planetary-gear sets, and all were constructed of aluminum. Heavy-duty applications, such as cars and trucks equipped with high-performance big-blocks, got the four-pin planetary. Light-duty applications received the three-pin unit. Ripes offers a steel planetary with five pinions for use in all high-performance 727 automatics.



Here are the two Mopar V-8 bellhousing bolt patterns used on TorqueFlite transmission. The big-block (B and RB) pattern is on the left and the small-block (A and LA) is on the right. Note the positions of the starter pockets.



727 Torque Flite information
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smaller AMC 727 casings (which are narrower in the bellhousing region by 1.5 inches) and featuring lightweight 904-based internal components, these transmissions are so efficient they require only 125 to 150 psi of line pressure to function compared to the 225 psi required in the 904 "Glides. The lower the pressure, the less power is wasted turning the pump. A-1 ProFlites are available with 25 different gear-ratio combinations, are available with a billet aluminum adapter to fit Chevrolet engines that allow the use of Powerglide torque con

Gear Ratios of Popular Mopar Automatic Transmissions

| Trans | First | Second | Third | Fourth |
|---------|-----------|-----------|-------|--------|
| 904/999 | 2.45/2.74 | 1.45/1.54 | 1.00 | — |
| 727 | 2.45 | 1.45 | 1.00 | — |
| A500 | 2.74 | 1.54 | 1.00 | 0.69 |
| A518 | 2.45 | 1.45 | 1.00 | 0.69 |
| 45RFE | 3.00 | 1.50/1.67 | 1.00 | 0.75 |

cial lube to the overdrive. With these modifications, JET is confident that either version is capable of withstanding up to 450 lb-ft of torque, and if the user avoids full-throttle up-shifts into Overdrive, the transmission's life expectancy increases exponentially.

Early versions of the A500 were produced with a five-clutch drum (in the overdrive unit); later versions were updated to six-clutch drums, but all A500s can be upgraded to the A518's beefier eight-clutch drum. While often maligned for not being up to the task of

used for diesel and V-10 applications with corresponding calibrations (in the diesel's case, lower rpm shifts).

Glendora Dodge's James Schagel clued us in to the particulars of DaimlerChrysler's newest offering, the 45RFE, also known as the multi-speed transmission. Introduced in 1999 in the Jeep Grand Cherokee behind the 4.7L V-8, it made its way into the Dodge Dakota lineup in 2000. This coincided with the introduction of the 4.7L and the phasing out of the 5.2L (318) as the base V-8 engine. The

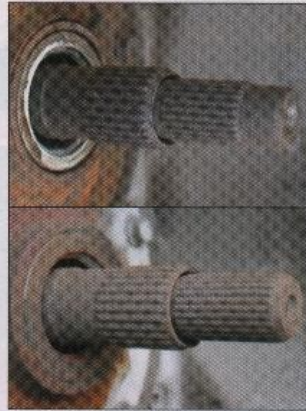
45RFE features two Second gears. The computer, sensing load, shifts the trans to either Second gear. By the '03 model year, the 45RFE became a true five-speed automatic without the multiple Second gears. This trans is available behind Chrysler's new 5.7L Hemi, but it's still too new to have much of an aftermarket following. **MCR**



A-1's ProFlite transmissions feature ultralight-weight innards like these aluminum drums, but that doesn't mean they're weak. These transmissions live behind 1,300hp NHRA Comp Eliminator cars.



A-1 offers a bolt-in overrunning clutch for 727 TorqueFlites that offers better support for this inherently weak area. The piece begins life as a stock unit, which is then drilled and tapped. Even when beefed up, it's never a good idea to do a burnout in First gear with a TorqueFlite transmission.



The 904 lockup input shaft is on the top. The input shaft on the bottom is a 904 nonlockup unit.



Another breakage-prone area of the 727 are the drive tangs (arrows) on the inner pump rotor. The tangs can break off if an engine kicks back after shutoff. High-compression race engines are more prone to cause this than low-compression street pieces. A-1 makes inner pump rotors with larger, heavier-duty tangs.

Sources

A-1 Automatic Transmission
818/884-6222

B&M Performance Products
818/882-6422
www.bmracing.com

JET Performance Products
714/848-5515
www.jetchip.com

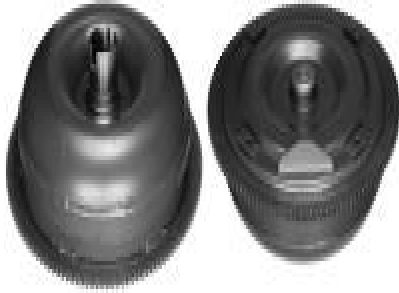
Glendora Dodge
800/946-6727
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Turbo Action
904/741-4850
www.turboaction.com

Torque Converter

Atc-Pro-King / Transmission Torque Converter

for a



About this product:

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Weight: 30.3 lbs.

Warranty: [1 YR](#)

Application: 24 spline

Low stall

Note: Non lockup

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Transmission Torque Converter

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**Pro King W/a727 Transmission; 11" Diameter; 24
Splines; 1.81" Pilot; Slotted Hub; 4 Lug Mount;
Wide Ring Gear (130 Teeth), Low Stall, 120 Gram
Butterfly Weight, Bolt Circle 10"**



Part Number: CR25L

For Your Vehicle

Vehicle: **1986 JEEP J20**
Engine: **V8 5.9 Liter 2BBL**
Reman.; Non-Lockup; w/A727 Transmission;
11" Diameter; 24 Splines; 1.81" Pilot; Slotted
Hub; 4 Lug Mount; Wide Ring Gear (130
Teeth); To ID Look For Triangular "Low Stall"
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Pro King W/a727 Transmission; 11" Diameter; 23 Splines; 1.81" Pilot; Slotted Hub; 4 Lug Mount; No Ring Gear, High Stall, Bolt Circle 10"



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For Your Vehicle

Vehicle: 1986 JEEP J20
Engine: V8 5.9 Liter 2BBL

Reman.; Lockup; w/A727 Transmission; 11" Diameter; 23 Splines; 1.81" Pilot; Slotted Hub; 4 Lug Mount; No Ring Gear; High Stall, To ID Look For "HS Lock Up" Decal; Bolt Circle 10"

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<http://www.allpar.com/mopar/transmissions/identifying-torqueflites.html>

Tannon Weber's guide to identifying and exchanging TorqueFlite automatic transmissions

Important: contributions from Allpar readers are leading Tannon to make revisions to this page. **A final version is expected — please wait !** Any input you may have would be appreciated via our [change form](#). We are aware that there are many, um, imprecise statements on this page.

The following might prove useful to people looking for information on their RWD Torqueflite transmissions. I know that it applies to Chrysler application transmissions, but I don't know it applies to the Torqueflites that were sold to AMC or other OEMs:

A-727 transmissions from their inception until 1966 have 19 splines on the input shaft. Non-lockup 727 transmissions from 1967 onward have 24 splines. Lockup 727 transmissions that debuted in 1978 had 23 splines.

Not all 727 transmissions made after 1978 were lockup; specifically towing package 727 transmissions commonly were non-lockup, and would have the '67-onward 24 spline input shaft. The A-518 overdrive also has 23 splines. The output shaft has 29 splines.

A-904 transmissions from their inception until 1967 have 18 splines in the input shaft. Non-lockup transmissions from 1968 have 27 splines.

Lockup 904 transmissions appeared in 1978, and have 26 splines. A-500 overdrive transmissions also have 26 splines. The output shaft has 25 splines.

If in doubt, count the splines. It saves a lot of headache and stress later on when you might otherwise discover that you have the wrong torque converter or drive shaft yoke.

The 904 and 727 don't have a common dust shield. The 904 uses a 10.75" converter. The 727 used either a 10.75" or an 11.75" converter, so the bell housing is larger at the bottom and deeper at both the top and the bottom. The starter ring gear is also larger.

The starter itself mounts in a slightly different position as well, so things like headers might work on one and not work on the other. If you're converting from a 904 to a 727, at the time this was written the dealer carried 727 dust shields for around \$25.

For small blocks, 360 engines and some 318 engines of the LA family are externally balanced. They use specific balance weights on the torque converter, and are not the same between the 318 and the 360. The 340 engines in 1972 and 1973 used cast cranks, and thus used their own unique externally-balanced torque converters also. (Allan)

The 5.9 Magnum engines are also externally balanced, but don't use the same balance weights as their pre-Magnum counterpart, so torque converters from the late seventies and eighties 360 will hook up but not balance properly on the Magnum motors. For big blocks, the 400 is externally balanced as well, so it should have its own particular set of balance weights.

Rick Ehrenberg wrote: "All 318 (5.2l) engines - Magnum, SMPI, or carbureted - are internally balanced, therefore there are no torque-converter / flex plate swap problems."

<http://www.pirate4x4.com/forum/showthread.php?p=8325349>

I do know the quickest way to check is to pull the convertor and look at the input shaft. If there is a machined nub on the end, like where a pilot bushing would ride, then it's a lock up. If it's

splined all the way with no machined nub, then it's a non lock-up. Know jeep, anything is possible. AMC used 727s for years in the cars starting in '71. I would bet most if not all were non-lockup up until the emmissions and fuel economy regs started setting in. On the other hand, the last three 727s I pulled from later Grand Waggys all had lock-up convertors.

http://www.technicalvideos.com/what_year_727.phtml

What Year and Type Is My 727?

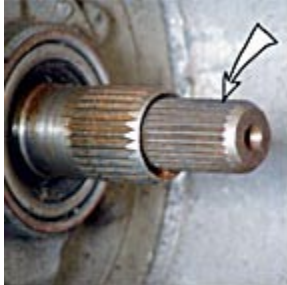


Figure 1
Input shaft of 727
(non-lockup style)



Figure 2
Input shaft of A727

The 727 (non-lockup style) was built from 1962 and on. Notice how the splines go to the end of the shaft (see Fig. 1 on left). The 727, non-lockup style, is preferred for performance building.

The A727 (lockup style) was built from 1978-1993. The A727 uses a torque converter with an internal clutch. Notice the machined area where the clutch inside the converter will seal (see Fig. 2 on left).