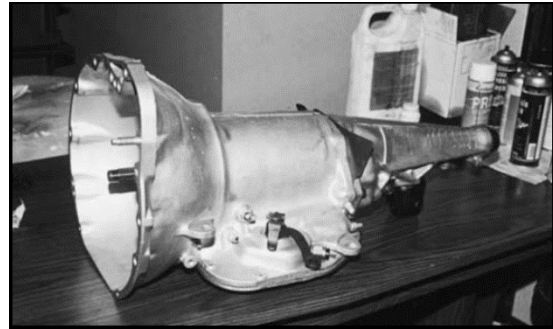



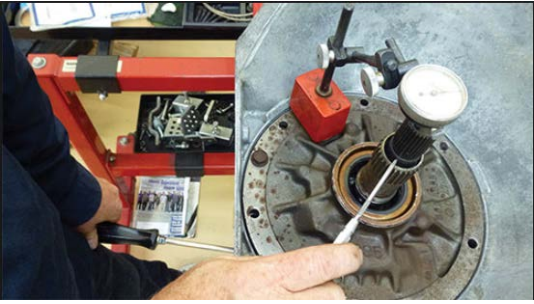

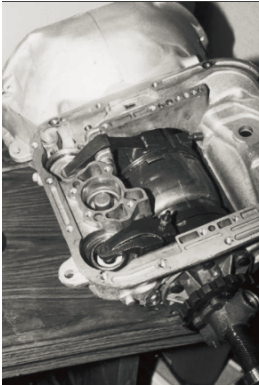
LAB – A904 Automatic Transmission Rebuild

Students: 1. _____
2. _____



Fill in each box with the appropriate information. Be sure to have the Instructor's initials before moving on to the next step. These are there to ensure everything is SAFE and CORRECT. Each team member must be able to answer questions from your instructor to receive credit for this lab.

Adapted from <http://www.hotrod.com/articles/three-speed-automatic-transmission-build/>

LAB CREDITS	TRANSMISSION IDENTIFICATION
MOST TRANSMISSIONS: <u>3 LABS</u>	
BEGIN	
2	<p>Check Input shaft end play with a dial indicator</p> <p><i>Spec: 0.022"-0.091</i></p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;"> How much did you measure? </div> <div style="text-align: center; margin: 10px 0;">  </div> <div style="float: right; margin-top: 10px;">  </div>
STOP!	<p style="text-align: center; font-size: 1.2em;">INSTRUCTOR'S INITIALS:</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-top: 5px;"></div>
	<p>Remove the oil pan, and in a SPIRAL PATTERN from the OUTSIDE INWARD, remove all the valve body bolts. Place the valve body IN the pan, and set it aside.</p> <p>Back off the Band adjusters (one internal, one external) and remove the metal links.</p> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;">   </div>

Disassemble and inspect the Band Servos (*MANUAL LOW at the back, INTERMEDIATE (2nd) at the front*). Servos are hydraulic pistons that "APPLY" bands.

- The rubber seals should have no scratches or damage
- The cylinder bore should be SUPER smooth
- The spring should be INTACT

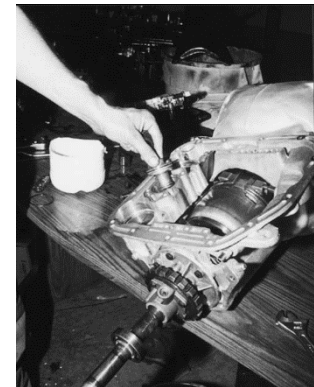
What did you find?



Disassemble and inspect the Accumulator. The Accumulator "cushions" the shift to make it less abrupt.

- The rubber seals should have no scratches or damage
- The cylinder bore should be SUPER smooth
- The spring should be INTACT

What did you find?



STOP!

INSTRUCTOR'S INITIALS:

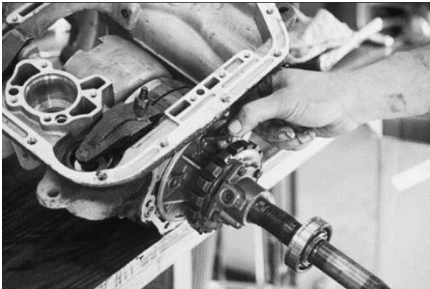
Reinstall the Servo Pistons, the Accumulator, and their springs

Remove the bolts to the tail housing. Disconnect the snap ring inside the tail housing access hole to remove.




3	<p>Remove the front pump. You will need TWO 3/8" slide hammers</p> <p>Most of the guts inside can be pulled out with ease</p> <p>There are TWO holes that are extra-threaded for the pullers</p>	 
KEEP EVERYTHING IN ORDER! TAKE PICTURES!		

STOP!	INSTRUCTOR'S INITIALS:	
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3	<p>Remove the bolts holding the output shaft support. Then the rear planetary gearset can slide out with ease.</p> <p>FOR THE LOVE OF MERCY DO NOT LOSE ANY PARTS OF THE <u>LOW-ROLLER SPRAG CLUTCH</u></p> <p>The Low-Roller Sprag is only used in Drive-Low. They sometimes explode if you put too much power through them. It's better to use Manual-Low for high-torque needs – it ADDS a BIG clutch for more strength.</p>	
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STOP!	INSTRUCTOR'S INITIALS:	
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<p>The FRONT Clutch Pack on the input shaft controls all HIGH and REVERSE gears. MEASURE the clearance between the clutch pressure plate and the first friction.</p>	
<p><i>Front Clutch (4 disc) Spec: 0.067"-0.134"</i> <i>Front Clutch (5 disc) Spec: 0.075"-0.152"</i></p>	<p><i>How much did you measure?</i></p>

The clutch pack is a stack of "frictions" and "steels." A fried clutch will have little or no friction material at all, and probably lots of blue. Remove the **LARGE DIAMETER** snap ring **ONLY**, disassemble and inspect.



The smoked pair of clutch packs shown to the left from an S10 pickup. The seal was likely cut when the apply piston traveled too far, since the friction material was all gone leaving only steels.

What did you find?

STOP!

INSTRUCTOR'S INITIALS:

4

A special tool is used to compress the DEATH SPRING to remove its snap ring. **YOU MUST BE VERY CAREFUL! THIS SPRING WILL HURT YOU!!!!**

This is one of those "can I have a demo?" moments.



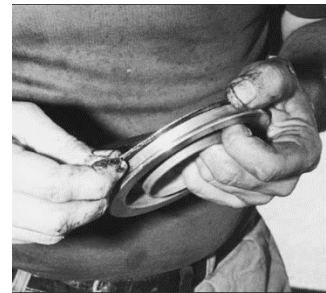
At the bottom of the Clutch Pack is the apply piston. Remove this (if this is a "real" rebuild, the seals are replaced) and inspect the seal edge – it should be perfect, with no evidence of wear, tear, or scratches.

What did you find?



The assembly lube in an automatic transmission is Vaseline. Coat the seals for reassembly, and gently install.

If these seals are a "lip" seal, the "lip" faces the piston cavity, and a circle cut from a 2L pop bottle can help persuade these seals into place without slicing them.



STOP!

INSTRUCTOR'S INITIALS:

Clutches are soaked in ATF before assembly (preferably overnight).

Install the steels & frictions (alternatingly), and the pressure plate, and install the snap ring.

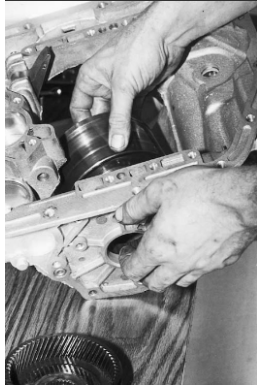


Compress the big DEATH spring, and install its snap ring.

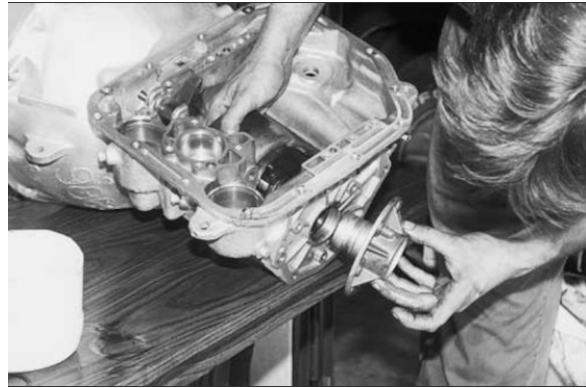
STOP!

INSTRUCTOR'S INITIALS:

Install the Low/Reverse Sprag Clutch in the bottom of the case, and install the rear Planetary Gear Set.



Install the Low/Reverse Band, and install the shaft support.



Inspect the Output Shaft and the Governor for any visible defects (damage or wear of any sort), and install into the housing.

The **Governor** increases hydraulic pressure to the shift valve based on Road Speed. When your road speed is fast enough, it shifts.

The **Vacuum Modulator** increases hydraulic pressure to the shift valve based on Engine Load. High vacuum (low throttle opening) shifts sooner; low vacuum (wide open throttle) shifts later.



The REAR CLUTCH is used in all FORWARD gears.

Measure, disassemble, inspect, and then reassemble the Rear Clutch Pack, just like you previously did with the Front.

Rear Clutch Spec: 0.032"-0.055"

How much did you measure?



STOP!

INSTRUCTOR'S INITIALS:

Assemble the Front Clutch (High/Reverse) onto the input shaft, then insert the assembled input shaft into transmission. As you do this, *TURN* and *WIGGLE* the assembly so that all the clutch discs align and fall properly into place.

This is not the time for brute force and ignorance.



Wiggle-Wiggle-Wiggle-Wiggle-Wiggle Yeah!



STOP!

INSTRUCTOR'S INITIALS:

Lubricate the pump seal o-ring with Vaseline, and install straight and true – NOTE which holes need to line up!

Torque to spec: *175in-lbs (15ftlbs)* – that's pretty wee!!

Check the input shaft endplay (*.022" To .091"*).

How much did you measure?



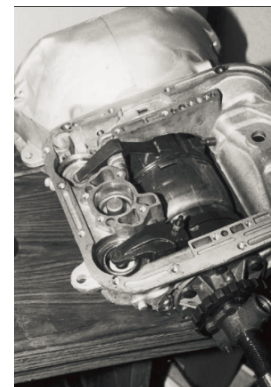
Install the two Servo Links, and adjust the bands.

Intermediate:

Back off 5 turns, snug to 72inlbs, and back off 2-1/4 turns

Low/Reverse:

Back off 5 turns, snug to 72inlbs, and back off 3-1/4 turns



STOP!

INSTRUCTOR'S INITIALS:

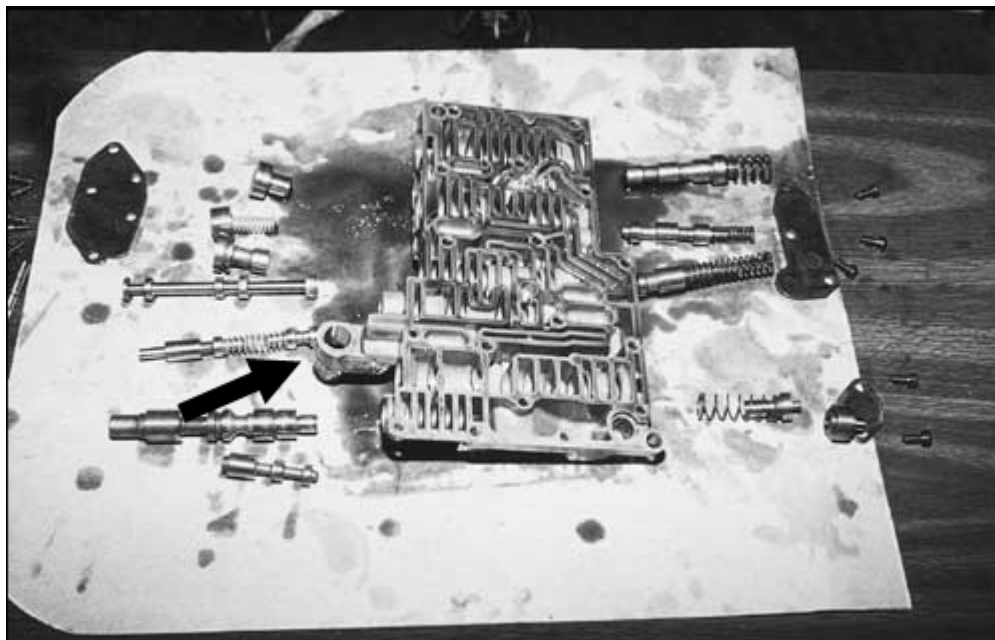
Install the tail housing.

Reconnect the snap ring inside the tail housing access hole.



Your instructor **MIGHT** ask you to disassemble and inspect the valvebody components. **CHECK FIRST!**

The valve body is controlled by the shifter, but through hydraulic valves, passages, metered holes, check balls, and springs, it decides WHICH gear to be in, WHEN to upshift, and WHEN to downshift, depending on vehicle SPEED and ENGINE LOAD.



Notes TO/FROM your Instructor:

Install the valvebody and oil filter, and get one last check inside by your instructor.

Bolts: 105inlbs (9ftlbs)

Screws: 35inlbs (3ftlbs)

STOP!

INSTRUCTOR'S INITIALS:

	<p>Install the oil pan, torquing to 150inlbs (13ft-lbs) – that's pretty wee!!</p> <p>Answer the following questions:</p> <ol style="list-style-type: none">1. An automatic transmission has no DRIVE LOW, but does have MANUAL LOW. What is the problem?2. An automatic transmission does not shift into 2nd (Intermediate). What is the problem?3. An automatic transmission has VERY LATE upshifts. What is the problem?4. An automatic transmission has no LOW or REVERSE. What is the problem?5. An automatic transmission has no HIGH or REVERSE. What is the problem?
	<p>What are THREE SIGNIFICANT things you learned in this experience?</p> <ol style="list-style-type: none">1.2.3.

