Easily Convert the 4L80E to Full Manual Control

by Chris Kokonis
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They say necessity is the mother of invention.

Some years ago I developed a method of converting a 4L80E to full manual control in the absence of a shift box, to be used with my transmission dyno. Since then I've prepared many 4L80E transmissions for competition using these methods. So this article provides a tried-and-true procedure for converting any 4L80E transmission to full manual control, eliminating the need for a PCM.

The 4L80E uses shift solenoids A and B to control upshifts and downshifts in all forward ranges. The solenoids are both powered with system voltage when the ignition is on. Ground is provided by the vehicle PCM in a specific sequence to control shift scheduling (figure 1).

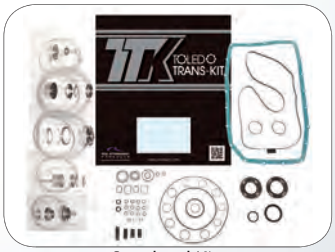
GEAR RANGE	SOLENOID "A"	SOLENOID "B"
Park, Reverse, Neutral	ON	OFF
First	ON	OFF
Second	OFF	OFF
Third	OFF	ON
Fourth	ON	ON

Figure 1

Depth + Breadth = Seal Aftermarket Products

High Performance Kits


Automatic Transmission Box Kits



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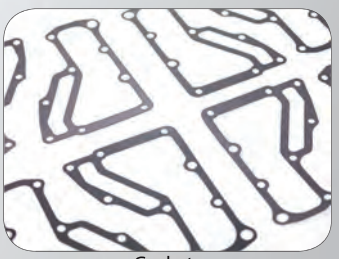
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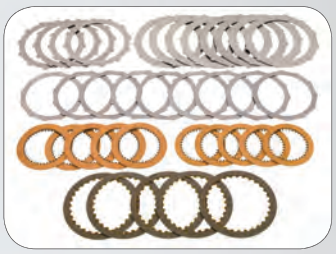
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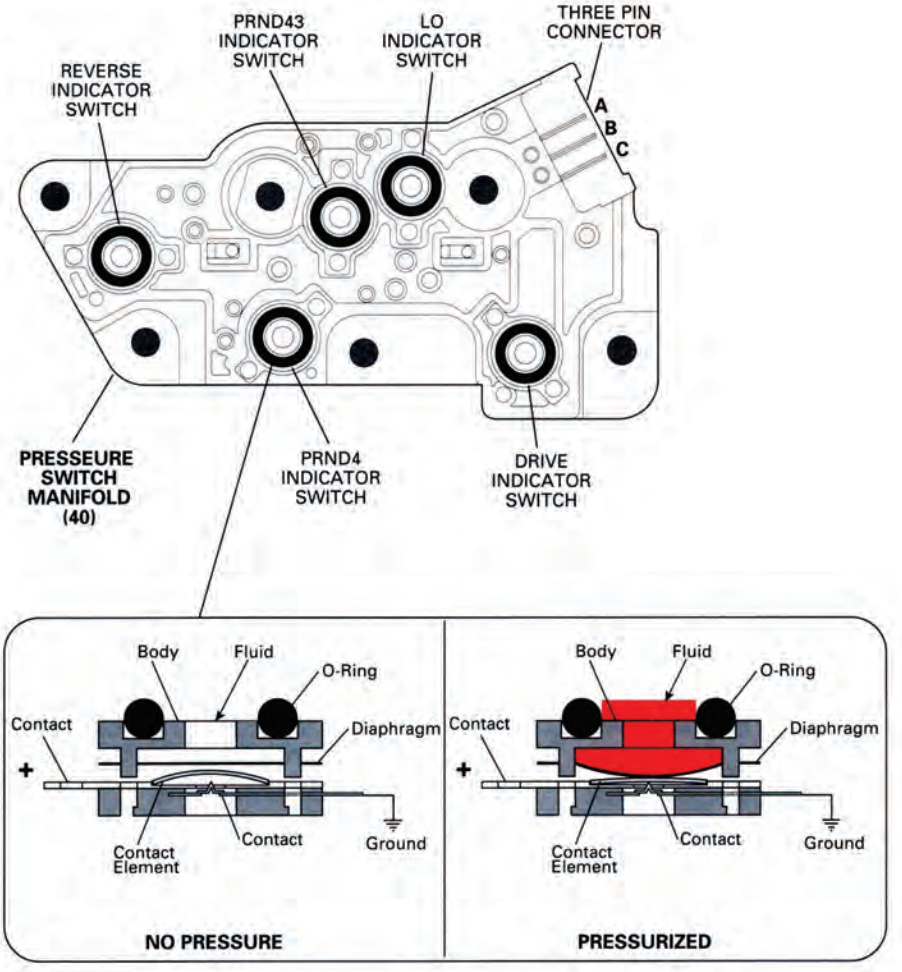
The 4L80E incorporates a pressure manifold assembly, which provides ground signals to indicate the manual valve position to the PCM (figure 2).

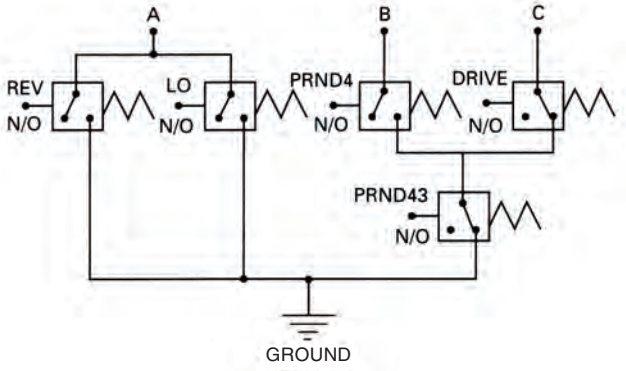
Figure 2

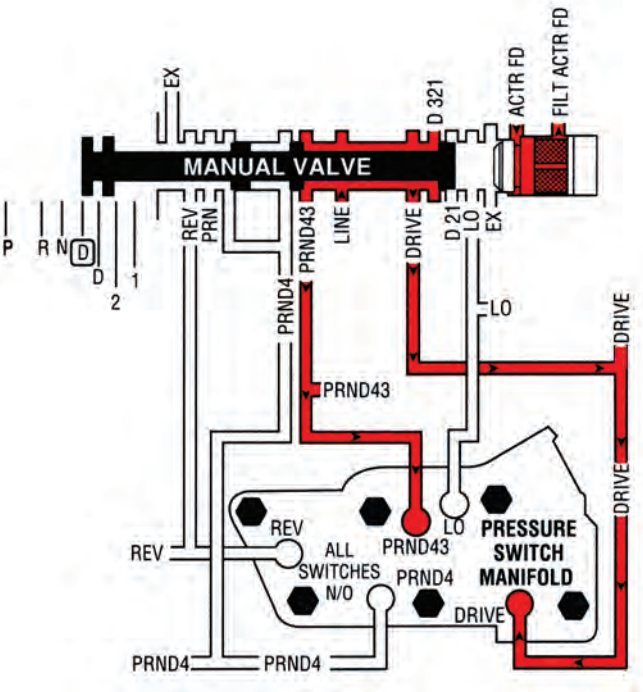


Range Indicator	Fluids					Circuit		
	Rev	Lo	PRND4	PRND43	Drive	A	B	C
Park						1	0	1
Reverse	■					0	0	1
Neutral						1	0	1
Ⓓ					■	1	0	0
D					■	1	1	0
2					■	1	1	1
1		■			■	0	1	1

■ - Pressurized

0 - Grounded: 0V LOW
1 - Open: 12V HIGH





In the absence of the PCM to control solenoid operation, you can use the pressure manifold assembly to substitute the necessary ground signals to energize the solenoids in the proper combination to provide full manual control. Here's how:

- Cut and splice the A and B outputs from the pressure manifold assembly to the ground side of shift solenoid A.
- Cut and splice the C output from the pressure manifold assembly to the ground side of shift solenoid B (figure 3).
- Use an aftermarket external wiring harness repair kit to supply system voltage to the pink wire, to provide the shift and lockup solenoids with power.

You now have full manual control over the shifts. To activate the lockup converter, supply ground to the brown wire in the repair harness through a toggle switch. And the yellow wire? That's used to activate the B solenoid for transbrake apply, as well as guarantee me a future article (figure 4).

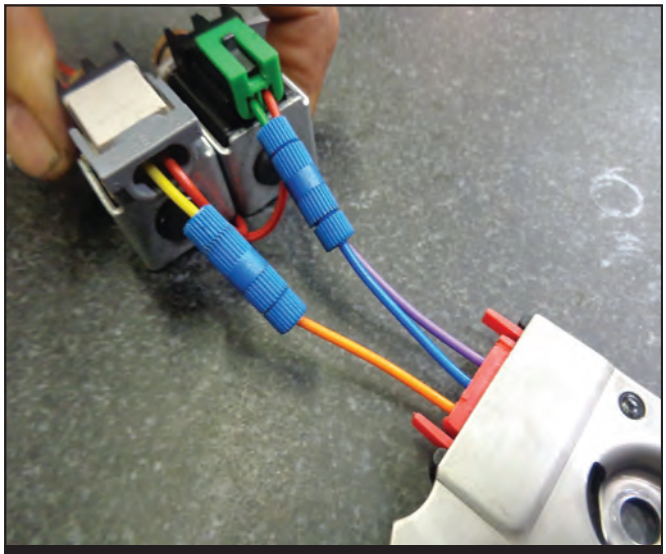


Figure 3

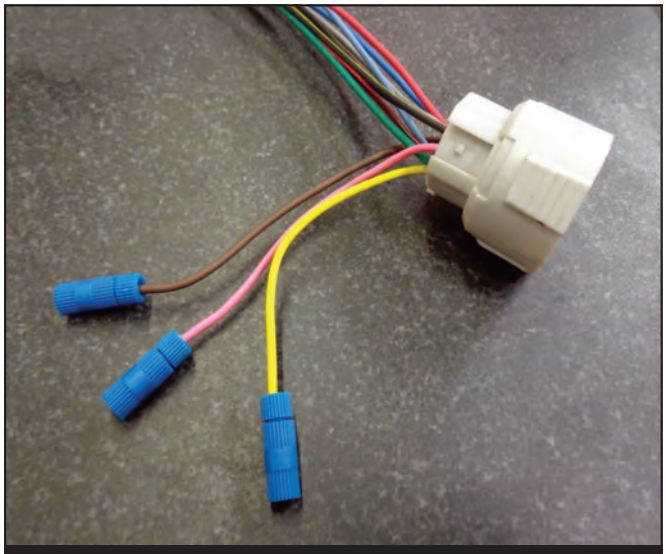


Figure 4

Figure 5

Figure 6

When performing this conversion, be sure to include these modifications:

1. Plug the reverse boost passage in stator support (figure 5). That'll close the reverse boost circuit, eliminating dangerously high line pressure in reverse. I had a quantity of 0.355" cup plugs made some time ago for this purpose.
2. Since you've eliminated reverse boost, you'll need to vent the circuit to provide adequate exhaust of torque signal oil that crossleaks into the passage (figure 6).
   Locate the reverse boost land on the reverse boost valve (228); that's the larger of the two lands. Grind a small flat on the valve land (figure 7). That'll exhaust or vent the crossleaked oil, preventing it from working on the large land where it can create excessive line pressure.
3. Increased or fixed line pressure will increase internal torque converter oil pressure and volume. This increases converter drainback or blowoff pressure and volume. The diameter of the converter drainback hole in the pump cover is too small to exhaust this increased oil pressure and volume, and can cause front seal blowout. To prevent that,

Figure 7

ONLY 1 PLACE

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Figure 8

Figure 9

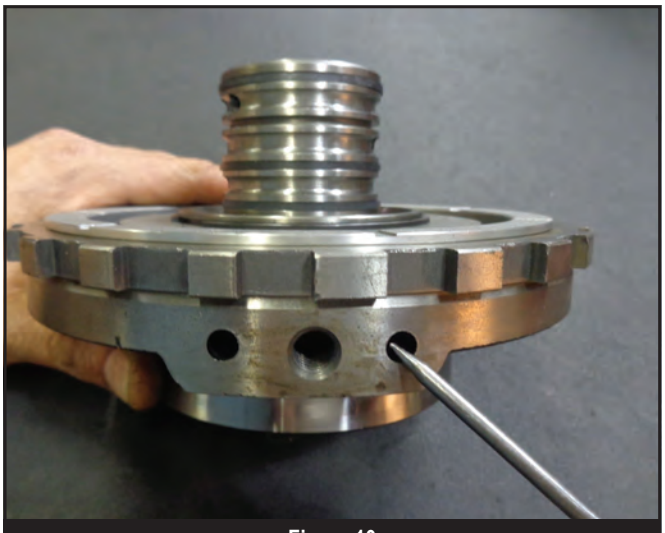

Figure 10

enlarge the converter drainback hole in the pump cover with a 0.250" drill (figure 8). That'll provide adequate exhaust flow.

4. If you'd like to change the direct clutch to dual feed, remove the second oil sealing ring from its groove in the center support (figure 9).
5. After installing the center support in the case, be sure to plug the reverse feed hole (figure 10).
6. Most of you already have a feed hole recipe you're comfortable with. Just keep in mind the shifts will be noticeably firmer, due to fixed line pressure. So don't increase feed hole sizes beyond 0.120".

That's all there is to it: With these simple changes, you've converted a 4L80E from computer control to manual operation.

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