

Mustang 5.0 Conversion

part 1

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What do you get when you cross an 83 Bronco with a 94 Mustang 5.0L HO and toss in a ZF 5 speed out of a F-250? A whole bunch of on and off road fun! This project came out better than I had ever imagined and was so straightforward that I would like to share it with anyone considering upgrading a Bronco. Some of the success was due to luck but much of it was the product of research and planning.

It all started years ago when a buddy sold me a very clean 83 Bronco. It was a bare bones vehicle with vinyl floor mats, AM radio, and not a bit of extra trim or accessories. Living in the foothills of the Rocky Mountains, the Bronco is used for foul weather days, pulling a trailer to and from the lumberyard, and weekend trips into the high country. It had always been a gas hog and never liked to idle. It often stalled at inopportune times and was cantankerous to restart. Over the past couple of years the NP-435 transmission developed an obstinate attitude about downshifting from third to second gear. I never liked the gearing and lack of synchromesh from first (granny) to second. The mechanical clutch had also developed a nasty chatter, especially when backing. If it were not in such pristine shape otherwise, it would have been a candidate for the bone yard.

My initial plan was to install an Edelbrock carburetor and manifold. Some personal testimony indicated that I would end up with a temperamental vehicle without significant performance or efficiency gains. Passing Colorado emissions would also be an issue.

Plan B was an aftermarket fuel injection system. The price tag of \$1400 to \$3000 didn't make sense without "building" an engine to get a significant performance gain. There were also emissions compliance issues.

I had always considered finding a modern fuel injected 302 but was intimidated by the complexity of retrofitting the wire harness, computer, and accessories into an older vehicle. Larry at Denver Ford Parts LTD found me a wrecked 94 Mustang with 51,000 miles. The 5.0L HO was undam-



aged, very clean, and ran like a top. I decided to tackle the project after they assured me that I would get all of the parts required to make the engine run. I started having second thoughts with \$1200 worth of parts piled on my trailer. Wish I had taken a picture.

How does one reassemble this puzzle and make it run? I wanted to have a complete understanding of the engine, computer, and accessories before putting it in the Bronco. I build up an engine stand so I could hook up all of the systems and run the engine.

The Chilton manual had the best wiring diagrams, which allowed me to power up the computer and run the engine. A



makeshift fuel tank was set up by mounting the Mustang fuel pump and filter in a 2 gallon gas can. I made the water tank is some PVC pipe and fittings that I had lying around. It was an awful lot of fun running the engine in the stand and checking out the operation of all of the components and the

ODB I reader/tester. The neighbors had a hard time understanding the importance of all of the noise coming from the headers but it gave me the confidence to proceed with the installation.

The transmission was still an issue. A little Internet research led me to High Impact Transmission and Gear. Greg Miller at High Impact was very helpful but the price tag of \$3500 for an NV 4500 conversion was beyond my budget. A little research led me to a ZF 5 speed and Greg verified that it would bolt up to the engine and my NP-208 transfer case. I found one out of a wrecked F-250 for \$500. The ZF uses a concentric hydraulic clutch, which really simplifies the conversion since the

clutch cylinder is totally contained within the bell housing and connects to the master cylinder via hydraulic line with quick connect couplers (see photo on the next page).

The clutch kit includes the hydraulic cylinder/release bearing assembly. In other words, all of the moving and wear parts are replaced and you have a totally new clutch. The preformed hydraulic line and clutch master cylinder from the clutch kit for the F-250 fit the Bronco exactly.

There is an arm on the end of the clutch pedal shaft that has to be swapped out with one for a

hydraulic clutch. This takes about ten minutes and the pushrod on the new clutch master cylinder simply snaps on. One hint on priming and bleeding the clutch. Put a clear length of tubing over the bleeder and suck on it until fluid appears. Of course I'm referring to using an approved vacuum



The top line in the picture below is the bleed line and the bottom line with the orange cap quick connects to the line from the clutch master cylinder.



The new hydraulic master cylinder is used in place of the mechanical linkage the Bronco originally had.



A new speed sensor and speedometer cable from an F-250 replaced the Bronco cable

source to “suck on it”. The black body plug on the bottom of the picture (above middle) plugs the hole from the mechanical clutch pushrod. I popped it out of the vehicle that I got the clutch lever arm out of.

A couple of items needed to be addressed to complete the transmission conversion. The computer requires a vehicle speed signal. A new speed sensor and speedometer cable for the F-250 replaced the Bronco cable and solved the problem. Other electrical connections were the back-

up light switch and four-wheel drive indicator, which plugged into their original positions. The Bronco cross member and transmission mount bolted directly to the ZF case. I had to drill new holes in the frame to move the cross member aft 3 1/8 inches due to the extra length in the ZF. This also required shortening and lengthening the drive shafts. Drive Line Service of Boulder rebuilt my drive shafts with new splines, components, and made the modifications for about \$400. The transfer case shifter

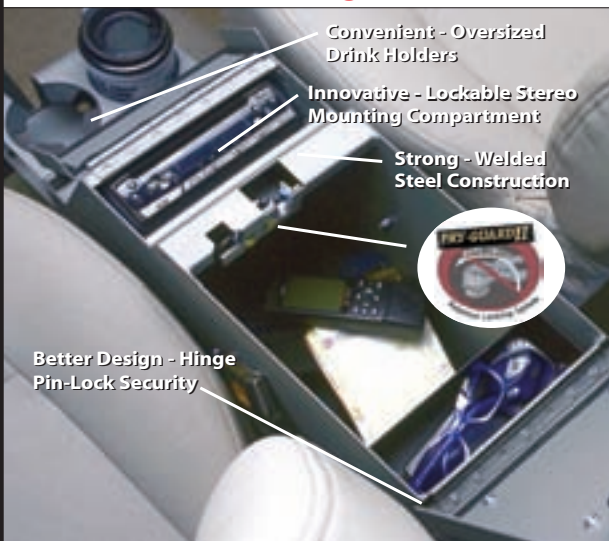
bolted up to the aft boss on the ZF. Even the shoulder bolt fit. I did have to cut the shift linkage in half and extend it about 2 inches with a small offset to the side. I did this by welding in a bent piece of 1/2 inch rod. The transmission floorboard cover had to be modified slightly to accommodate the location of the shift levers.

With the engine operable in the stand, I opened up the looming on the engine compartment wire harness and removed all of the unused circuits such as ABS braking and A/C. Some circuits were lengthened and shortened and the harness re-loomed so the components could be mounted in the Bronco. Most of the required circuits are on the engine wire harness such as; fuel injectors, throttle position, tack and timing, idle valve, oxygen sensors, engine temperature, and oil pressure which were untouched. A single large connector hooks the engine harness into the engine compartment wire harness, which makes it easy to remove and install the engine. The engine compartment harness also connects the mass airflow sensors at the air cleaner assembly, the radiator fan, computer, and ignition module, emissions solenoid valves, fuel pump, and constant control module, vehicle speed sensor, brake on/off, engine instruments/lights, ODB connector, and the power circuits. The starter and alternator wire directly into the vehicle and are not part of the harness. I wanted to do as much of the wire harness work on the engine stand as possible because access was much better than after installation and I could troubleshoot and correct problems or mistakes easily.

The engine, transmission, and transfer case were now ready to install. 🚗

Next issue:
Dropping in the engine and dealing with clearance issues.

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