BOLT-ON OVERDRIVES

Keep Your Original Trans and Add A Tailshaft Overdrive.

By Christopher Campbell

Photography: Christopher Campbell

Overdrive kits are available for most every application, provided you are willing to swap in a modern transmission. But what if you'd really like to keep the original parts in your restored classic? Or maybe you've already installed a tough TH400, C4, or other nonoverdrive trans that you're not willing to trade in. In either case, there are options that won't make you compromise on any fronts.

Known as auxiliary transmissions, these overdrive conversions simply add an additional two-speed transmission to the rear of the original. Instead of overdrive for any car, it's overdrive for any transmission. The benefit here is twofold: A standard overdrive top gear is gained, but so is the ability to split gears. Since these units can be activated in any of the original transmission gears, they effectively create another ratio in between. For example, instead of First, Second, and Drive, you get First, First OD, Second, Second OD, Drive, and Overdrive. In other words, a three-speed auto essentially becomes a close-ratio six-speed—hence the name Over/Underdrive.

So what does that mean for you? Well, the goal of any close-ratio trans is to create less rpm drop between shifts, which also means the engine doesn't have to be revved as high before shifting to keep it in the optimum rpm range. For example, if a two-three shift usually results in a 1,200-rpm drop, splitting the gears would result in a drop of around 600 rpm. Keeping an engine in its powerband is not only great for acceleration, but also for towing loads.

The two big suppliers of auxiliary transmissions in the aftermarket are Gear Vendors and U.S. Gear. U.S. Gear offers two geardriven choices, the V2OD Overdrive and the Dual Range. While the Dual Range is geared more toward motorhomes, trucks, and heavy towing, the V2OD is aimed at hot rodders. Gear Vendors on the other hand offers one unique electronically shifted planetary drive unit that serves both communities.

We decided to continue the theme of easy efficiency upgrades that don't change the muscle car personality with our '67 Ranchero test car and contacted Rick Johnson at Gear Vendors to see what it would take to slide an auxiliary transmission behind the C4 trans. According to Johnson, it was no big deal at all. At worst we were probably looking at a three- or four-hour install, since '60s Fords are some of the easiest cars to retrofit. Our Fairlane-based unibody should have had more than enough room in the trans tunnel.

Unfortunately, our cars are

probably much like yours—they've lived full lives and have the scars and patch panels to prove it. So our install involved a couple of hours of minor mods in addition to the simple 45 minutes of actually installing the Gear Vendors unit. In the end, it was worth the extra effort, since not only did mileage increase—but maybe more important—the fun factor did as well.

> This cutaway will give you an idea of how a Gear Vendors Over/Underdrive unit works and what makes them so bulletproof. The units are based on the DeNormanville design and constructed similarly to an automatic trans. An epicyclical planetary system is used with a common vertex cone clutch that can shift quickly at any throttle level due to roughly 700 psi of line pressure. Because of the precision parts and tight tolerances that create near-zero slippage, Rick Johnson tells us the company rarely receives Gear Vendors units for repair and that many with tens of thousands of miles are virtually new inside.

> This is the standard conversion kit for a C4 trans with the new tailshaft but minus the actual Over/Underdrive unit. Our electronics installation will be slightly different from this kit, however, since we won't be using the typical foot switch or status lights.

MILEAGE TESTING

INDUCTION	CITY/HIGHWAY*
650-cfm Holley Street HP	11/13 mpg
Powerjection self tune (fuel only)	13/15 mpg
Powerjection manual tune (fuel only)	13/16 mpg
Powerjection plus timing control	13.5/17 mpg
Above with Gear Vendors overdrive	14/19.5 mpg

*Highway mileage was acquired at a steady 65 mph.

> The first step in our installation is to take careful measurements. Our installer, Guillermo Amequita, first measures from the mounting flange of the tailshaft to the center of the U-joint.

> The parts Gear Vendors build in-house are OE level or above in every aspect. This is the seal that keeps the trans fluid separate from the Over/Underdrive unit.

> Amequita measures the length of the driveshaft from U-joint to U-joint. These measurements will tell our driveshaft shop how long the new shaft needs to be.

> Once we have clearance for the flange, the Over/Underdrive unit is installed to check clearance.

> You may not need to do this for your car, but the small Ranchero tunnel was dimpled with a power hammer for clearance.

> Once he's dropped the driveshaft and removed the tailhousing, Amequita uses this supplied template that mirrors the outer dimensions of the flange and mates the tailhousing to the Over/Underdrive to see what our clearance looks like. In our case, there was none due to poorly replaced floors. Johnson said it's the only case like this he's had in 25 years. That's our luck. Fortunately, a little ball-peen persuasion remedied much of the situation.

> No surprise here—the upper eyelets are making contact with the floor. We only need about 3/8 inch clearance here, but the stubborn metal in this area calls for a little more coercion.

> The electronic control is a simple install; all it needs is switched 12V, ground, and a connection to the shift button and the Gear Vendors unit. Our unit is programmed with Launch Control, which will cause the Over/Underdrive unit to automatically shift from First to First OD without touching the shift button—great for improving your 60-foot times, according to Johnson.

> East County Driveshaft suggested a new driveshaft rather than modifying the original. It should take the abuse, ahem, testing, we're known for.

DRIVER'S NOTES

Freeway cruising with the 0.78 overdriven Third is obviously more efficient because of the decreased rpm, but it also allowed us to cruise significantly faster at lower rpm, so our Ranchero was able to keep up with the typical 75-mph L.A. traffic more easily when we weren't mileage testing. Interior decibel levels were several points lower, though without a meter, we're only guessing at the true amount. We can attest that the radio was easier to hear.

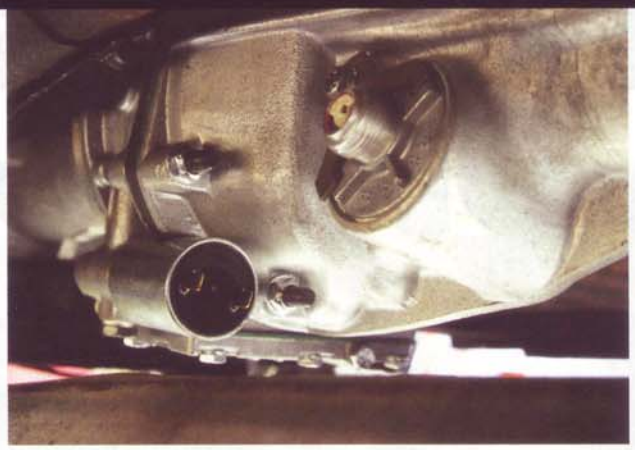
On the highway, we actually saw 20 mpg once, but on the average, mid-19s were the norm. Still, that's not bad considering we started at 13 mpg with this truck and only added easy bolt-on EFI from Professional Products and Retrotek Speed before the Gear Vendors unit. Around town we were able to squeak out 14 mpg by shifting in and out of Overdrive early. As previously mentioned, straight through Hollywood is a rotten, slow commute chock-full of idle time, so our Ranch would likely see 15ish in more standard driving.

But here's what we see as the best reason to install a Gear Vendors unit: Our test car is suddenly far more fun to drive. The ability to gear-split turns our C4 into a quick-shifting, close-ratio, six-speed trans, which makes the teeny 3.00 rear gears less of a drag since acceleration is noticeably quicker. We actually look forward to stoplights and freeway entrance ramps now. Also, with more gears, it's easy to keep it in an rpm sweet spot when carving through curvy canyons. The shifter-mounted button is definitely the way to go for uncomplicated shifting coordination, though a paddle shifter could be a neat option. The only way it could be better is if the system were fully automatic.

EFFECTIVE DRIVE RATIO: C4 EQUIPPED WITH GEAR VENDORS OVERDRIVE

		AXLE RATIO							
		4.88	4.56	4.10	3.90	3.73	3.55	3.23	3.00
GEAR	TRANS RATIO	FINAL DRIVE RATIO							
First	2.46	12.0	11.22	10.09	9.59	9.18	8.73	7.94	7.44
First OD	1.92	9.36	8.75	7.87	7.49	7.16	6.81	6.19	5.80
Second	1.46	7.12	6.66	5.99	5.69	5.45	5.18	4.72	4.38
Second OD	1.14	5.55	5.19	4.67	4.45	4.25	4.04	3.68	3.42
Third	1.00	4.88	4.56	4.10	3.90	3.73	3.55	3.23	3.00
Third OD	0.78	3.81	3.56	3.20	3.04	2.91	2.77	2.52	2.34

> Johnson fixed up our factory floor shift with this prototype shift button he's soon planning to have as an option. The final version will be polished and mimic the taper of the T-handle. Also note the red and green LEDs mounted in the bezel of the gauge cluster. The red is an armed indicator that lights when a shift is about to take place or the auto launch is armed. The green is an on/off indicator.



> Back underneath, we've only got two more connections to make. The module to the left connects to the electronic controller and tells the Over/Underdrive when to shift. To the right is the coupler used to tie in with the speedometer cable.

HEAR IT SHIFT!

Head over to HOT ROD.com to see how gear splitting works in the real world and hear the difference it makes in our shift rpm.

SOURCES

GEAR VENDORS; El Cajon, CA; 800/999-9555; www.gearvendors.com

U.S. GEAR CORP.; Chicago, IL; 888/874-3275; www.usgear.com

> Here is what it looks like all buttoned back up. Were it not for our floorpan issues, this would have been an afternoon project at best. Gear Vendors has plenty of certified installers, but the company encourages customers to install it on their own as well. By the way, the additional transmission added only 30 pounds net.