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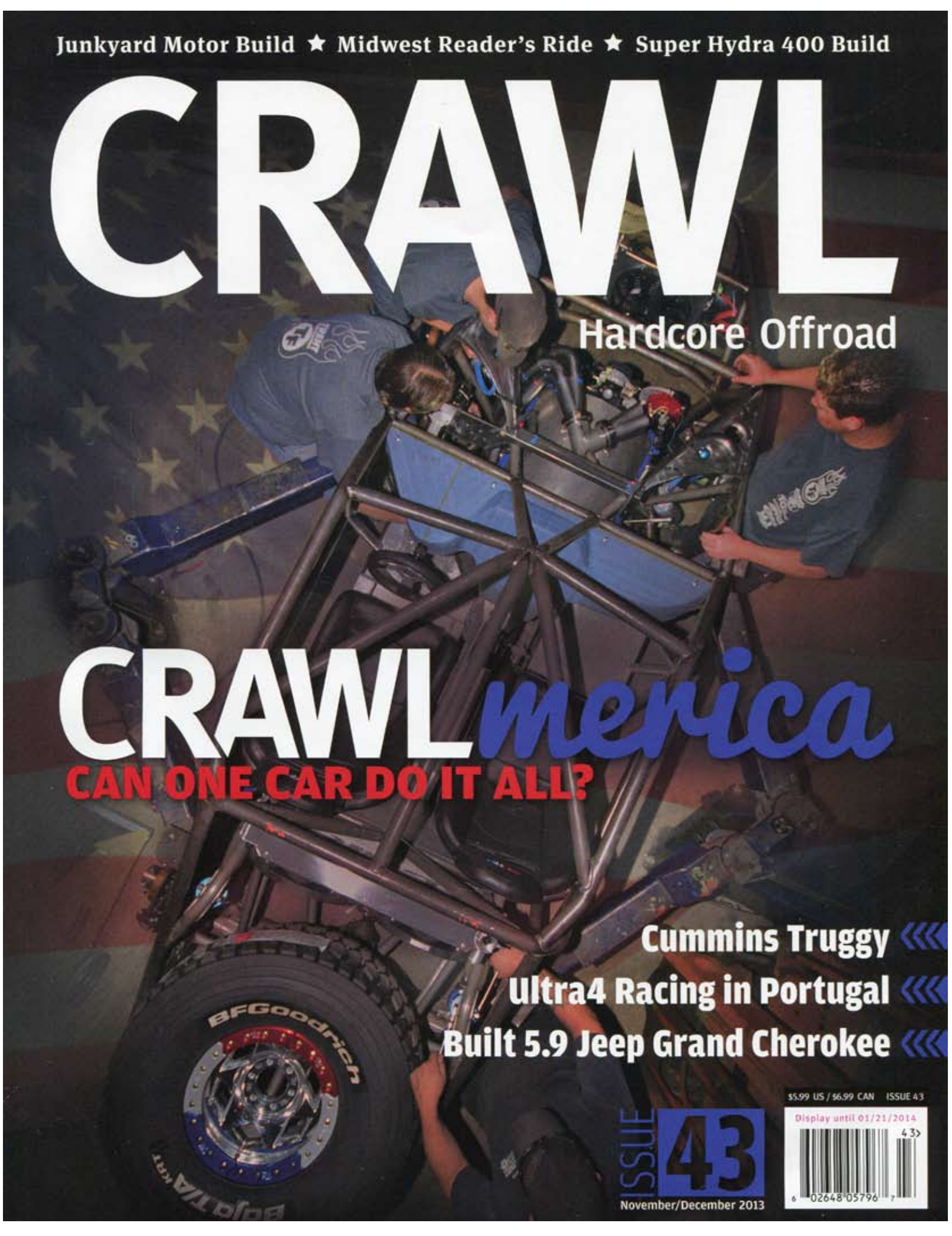

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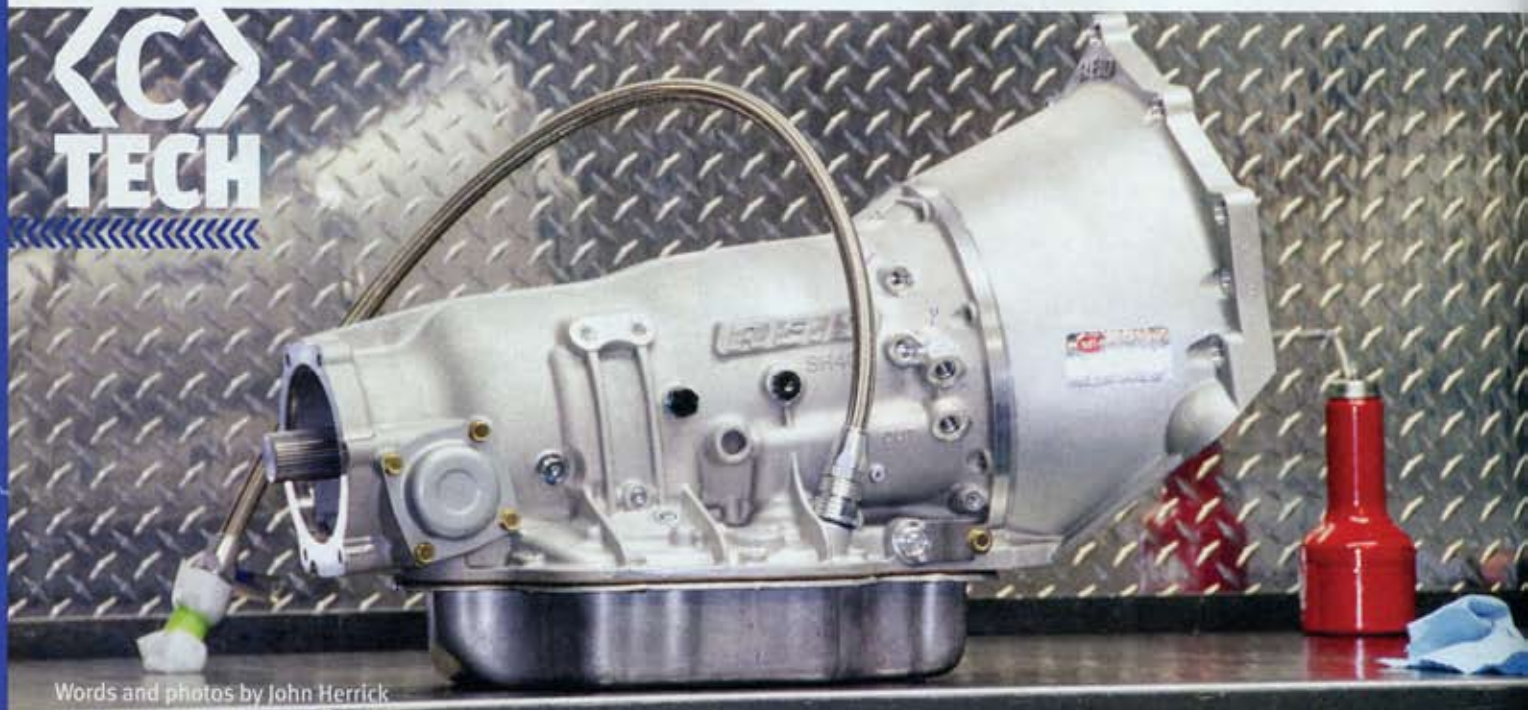

Words and photos by John Herrick

Building a Reid Super Hydra 400 Transmission: Part 1

THIS IS AS MUCH ABOUT BUILDING a transmission as it is the two guys that made it happen. Dennis Reid, the engineer, designed and built the case that is the foundation for this build. Jim Galatioto of ATO Performance is the craftsman that put this whole thing together using over 45 years of high performance experience. Together for a Saturday, I was the guy in awe, watching these two work and talk and solve problems. It was a great opportunity to be with the best in the business.

Reid Racing had already designed a great product in the Superglide case, which was a replacement for the venerable Powerglide 2-speed used by many pavement racers. With the extensive use of the GM Turbo-Hydramatic 400 (TH400) for high horsepower applications requiring a tough transmission, it seemed obvious this would be a good unit to tackle since they were no longer being produced for GM and hadn't been since about 1990. This makes the newest case out there 24 years old and typically available only in wrecking yards.

The answer from the engineering group at Reid was to build a TH400 that could be mated to multiple engine platforms via a detachable bellhousing as well as allow confidence in the case by fixing a variety of shortcomings in the original design.

Foremost in the solutions category was the use of internal lugs that are engaged in a full 360 degree circumference. The original design was made for inexpensive construction as well as speed of installation of internal parts. Consequently, a design compromise was made to only use engagement lugs around approximately 80% of the case. When one of these should fail, which is an all too common problem, they come undone like a zipper and destroy the whole case and internal parts. The Reid design solves this inherent flaw.

The second major concern was the tailhousing which is notoriously weak, especially once a 110 pound transfer case like an Atlas is hung from it. A common failure is to have the transmission case crack from the tailhousing, leaving the user with a very heavy paperweight. Reid resolved this by beefing up the entire case, especially the rear end where full circumferential material is used, additional molded struts are incorporated and the mounting flange is enlarged to handle the weight of various transfer cases.

Since this trans is renowned for its ability to handle horsepower, the Reid designers added more internal ribbing to stiffen it and prevent flex. It's also SFI 4.1 compliant to run without a scatter shield or internal liner. Add one of their bellhousings, which are also SFI compliant, and you've got a long term solution to your transmission needs.

We're using this transmission in our Trent Fabrication Top Shelf car. It will be behind a GM LQ9 6.0 liter engine producing about 400 horsepower. This case and the internals should be good to quite a bit more power than we'll be throwing at it so it can grow with us.

In Part 1, we'll review the case and bellhousing as well as the internal parts we got from our donor TH400 that was pulled from a 1986 Chevrolet full-size van. Jim uses many of these internal parts but only after going through a multi-step process to determine condition and viability. We'll cover many of the steps he goes through to prepare for the installation.

In Part 2, we'll be at Jim's shop at ATO Performance in Rancho Cordova, California where the transmission will be assembled. We'll take you through the shop as well as the steps to put this together and why in Jim's world, cleanliness is paramount.


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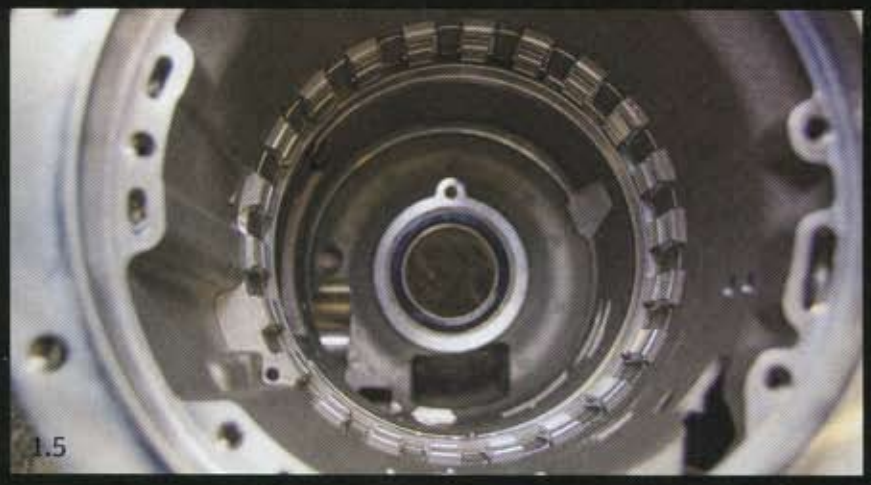
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1.1 The Crew: Jim Galatioto and Dennis Reid

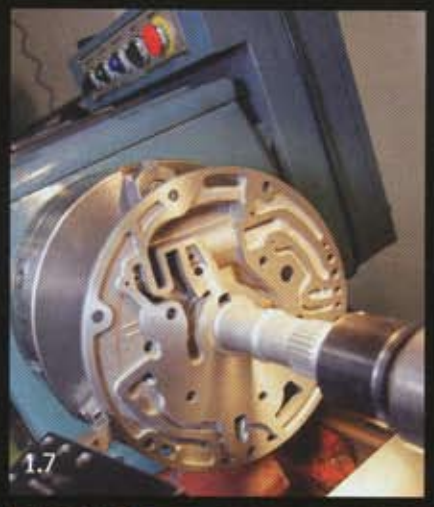
1.2 The Office: This is the clean side of the shop. Assembly takes place here without any outside air, without dust or grit. You could eat off the floor. Jim likes it that way.

1.3 The inside of a stock TH400 case with an integrated bellhousing. Notice the absence of lugs the full circumference of the case. Once the load exceeds the ability for these to stay in place, they start failing, like a zipper being pulled, destroying everything inside.

1.4 A close-up that shows how some of the stock case's lugs are already failing. To build this case as a usable transmission would be to gamble on a losing hand. It's now a mockup case for Trent Fab and won't ever move another vehicle.

1.5 The Reid case in comparison. The internal lugs are a full 360 degrees. It makes it a little more difficult to install components but the added strength outweighs this by a magnitude. Everything about this case is stronger, thicker, and more robust than the factory case.

1.6 Machining the transmission pump. Jim watches as the vacuum remains close to suck up any and all shavings. Though this is the machine side of the shop, it's important to keep it clean so shavings don't get tracked into the "clean" side.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1.7 By machining both halves of the pump, the tolerances are brought very close and the pump is far more efficient than stock. This pump was from our 28-year-old junkyard transmission. With the right processes, it's made as good as new, if not better.

1.8 The pump gear. The tolerance is down to .001" and these surfaces will mate like they were never split.

1.9 The torque converter. An often misunderstood component, this was built by Chris at Continental Torque Converters. Recognized by both Jim and Dennis as one of the best in the business, Chris spent about an hour on the phone with me learning about how the car would be used, horsepower, racing environment, personal preferences; everything that helped him build us a converter that would work as we wanted it.

1.10 The TIG welds are indicative of the overall quality of this piece. When installed it dropped right into place and fit perfectly.

1.11 The internals for our build. The pistons, drums and components from the donor trans are hard to recognize after being bead blasted, spending hours in a tumbler with polishing media and being re-machined if out of tolerance. It's as if all new parts are going in. The yellow pieces are a replacement forward drum, a billet clutch hub and 300M input shaft.

1.12 The rest of the small parts. Jim is nothing if not organized.