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US vs. THEM

TEAM NMRA BEATS DOWN TEAM NMCA ...AGAIN!



COMPLETE COVERAGE!

8TH ANNUAL
NMRA-NMCA
SUPER BOWL
 OF STREET LEGAL DRAG RACING
 ROUTE 66 RACEWAY - JOLIET, IL
 JULY 11-14, 2013
 Presented by 

> 1,600 HP Kenne Bell Supercharged 5.4L

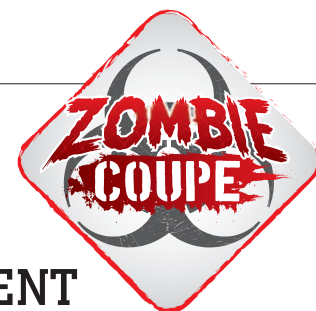


> Kiko Leiva's 1,200 HP Street Car



> A Sitdown Conversation with Matt Amrine





civilized engineering

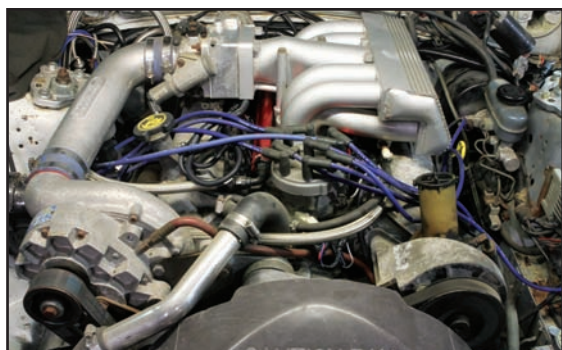
>> PRO-M RACING'S NEW PLUG 'N PLAY EFI ENGINE MANAGEMENT SYSTEM GETS RACE PAGES' NEWEST PROJECT CAR RUNNING

“It is dead, but it is alive,” that is the oxymoron mantra of the newest project vehicle of Race Pages. We’ve decided the time has come to add another member to our family in the form of a 1989 Mustang LX. Think of this car as a barnyard find, if there is such a thing for vintage EFI Mustangs. The coupe had been abandoned on the side of a house for about seven years without even being fired up. It has been twelve years since the car has even been down the drag strip. It was covered in muck, leaves, and cobwebs when we rescued it—or more appropriately stole it. The LX belongs to your author’s brother who gave up on it as college, career, and family took over. It’s a story we hear all too often but it’s his loss and our gain. We snatched it up without thinking twice.

“The LX is a relic of years gone by in our niche EFI Mustang market as the modifications are a throwback to the ‘90s in performance and style.”



>> It looks good from far but is actually far from good—the Zombie Coupe!

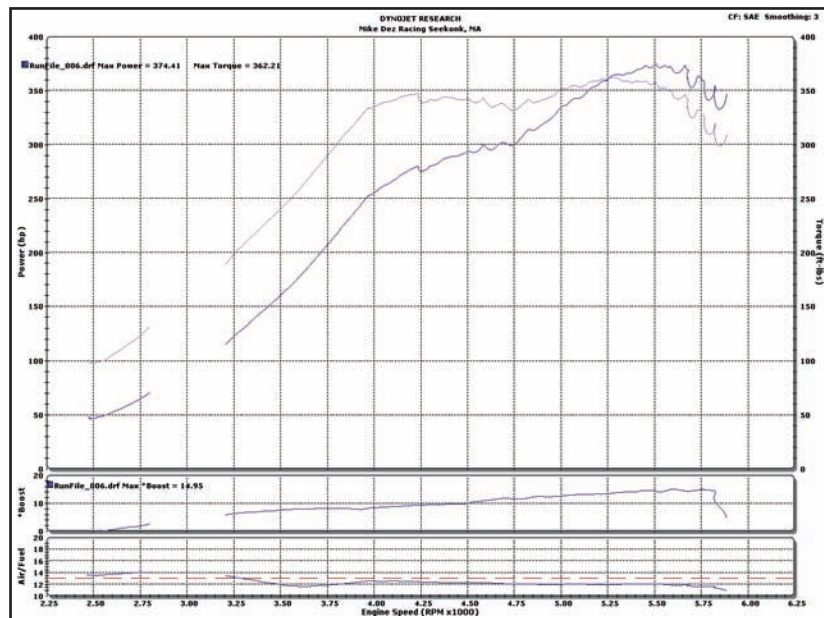


>> A relic of yesteryear as the stock short-block is topped with Trick Flow High Port heads, custom hydraulic roller camshaft, Ford Racing GT-40 intake, and a Vortech S-trim supercharger.

The LX is a relic of years gone by in our niche EFI Mustang market as the modifications are a throwback to the ‘90s in performance and style. Mike Dezotell of Dez Racing and I have dubbed it the Zombie Coupe because in all fairness this car should be dead but it is still living. Here’s a rundown of the parts and pieces that make up the car’s running gear. The stock, untouched short-block features 62,000 original miles and it has been topped off with Trick Flow High Port cylinder heads, custom blower cam from Downs Ford Motorsport, Ford Racing GT-40 intake manifold, and a Vortech S-trim. In 1996, my brother upgraded the transmission to a Dynamic Racing Transmissions built AOD and TCT torque converter—the hot ticket for sleepers back then since automatics were frowned upon. The car sounded mean but how quick could it be with an AOD? Many unsuspecting competitors in the late night street wars were



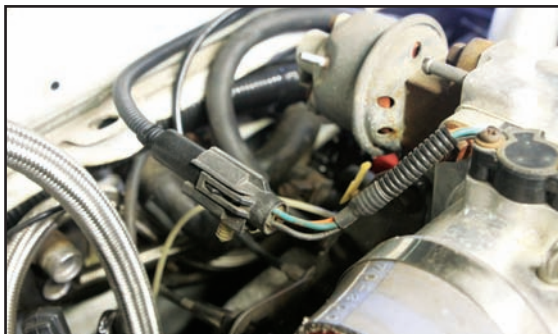
>> The original harness and EEC-IV computer were removed as we don’t want to rely on a system that is a quarter-century old.



>> We changed the spark plugs but didn’t even touch the oil, which looked new. It had been seven years since the car was even fired up. We thought the valvesprings would be shot and it wouldn’t make much power but that wasn’t the case. Here is the proof that Zombie Coupe is alive when it should be dead—374 whp and 362 rwtq.



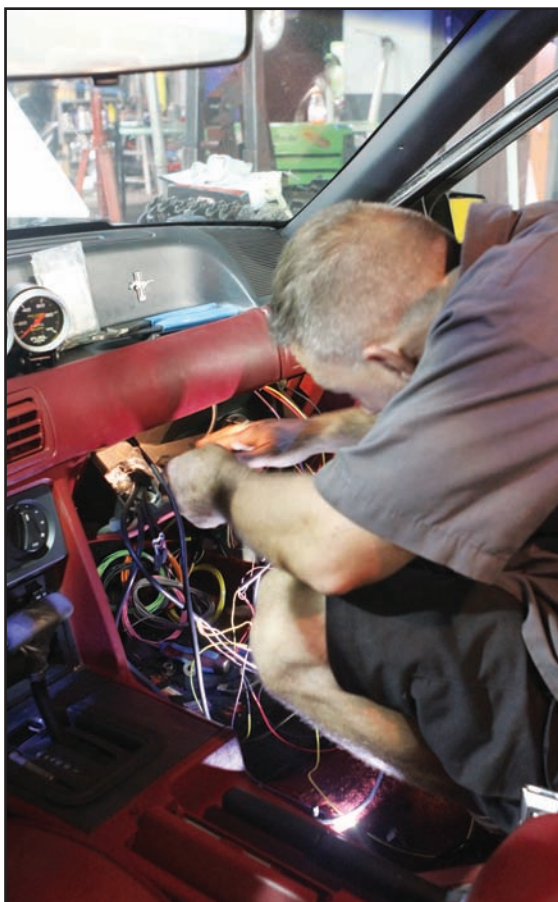
>> The Pro-M Racing EFI system is not only an after-market stand alone ECU but also built like an OEM processor.



>> All factory sensors are used with the system and here the new harness plugs into the TPS sensor. We had to replace the sensor as age obviously took its toll.

“Despite its glory in a former life, what’s left is a car that is in serious need of TLC and we are here to rescue it.”

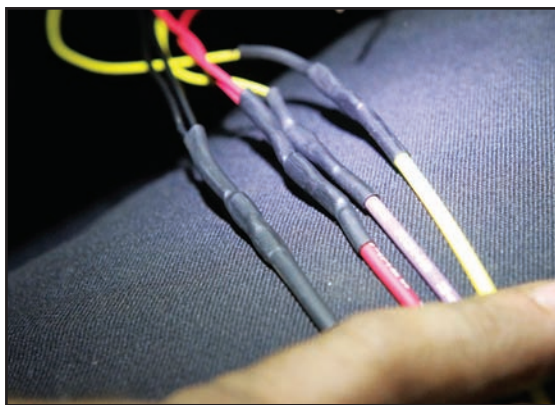
caught with the wrong answer to that question as the coupe knocked off low eleven-second times at speeds around 121 mph. Despite its glory in a former life, what’s left is a car that is in serious need of TLC and we are here to rescue it.



>> Brian Machie of Dez Racing climbed into the passenger side of Zombie Coupe so he could finish setting up the ECU and wiring harness. He was also tasked with wiring in the optional Innovate MTX-L wide-band O2 sensor, of which the Pro-M Racing system utilizes two of them.



>> Pro-M Racing supplies a brand new wiring harness and it is configured to fit in a Fox-body without any issues—including going through the firewall with a rubber grommet as it were an OEM harness setup.



>> The Innovate wide-band sensors are wired into the Pro-M Racing harness in order to feed information to the self-learning ECU.

The first order of business was to get the car running, driving, and on the chassis dyno. Was that even possible given its current condition? Dezotell and his head wrench, Brian Machie, had faith that we could pull it off in grand fashion. We knew our endgame was a big stroker engine with a ProCharger D-1SC so we didn’t waste anytime and went right to a stand-alone EFI setup. Pro-M Racing has been pushing its latest offering, a plug and play EFI designed specifically for Fox-body Mustangs (but it does offer many other units from AMC to Oldsmobile applications). Adding the Pro-M Racing EFI system made sense right now because with Zombie Coupe’s heads/cam/intake package and supercharger, it was in dire need of dedicated tuning. The car was built at a time when tuning involved a timing light and adjustable fuel pressure regulator. The archaic methods came with compromises as it ran rough at part-throttle but it screamed when hammering down. As we said, the car is a relic of a time gone by.



>> The Innovate O2 sensors fit in the stock narrow-band O2 bungs. Unfortunately our no-name brand of headers had the passenger side O2 wedged up against the transmission oil pan. The Innovate sensor wouldn’t fit. Machie fired up the welder and added a bung in a more open space on the header’s collector. This was probably the hardest part of the installation and it wasn’t even Pro-M Racing’s problem but rather our cheap headers.



We spoke with Chris Richards of Pro-M Racing to get the scoop on the system and he explained its origins and roots, which go back to a Ford Racing program. A team of calibrators and power train specialists within Ford Racing were tasked with building an engine management system for use on the Mustang FR500C race car. There were also plans to use the system as part of a turnkey crate engine program, but that idea was eventually shelved. When the FR500C program ended, the team decided they would bring the management system to the aftermarket. That's where Pro-M Racing came in. The next few years were spent refining the calibration tool, adding features to the system, and testing it in real world applications with a wide variety of engine combinations. The main ingredient in the system is a processor that is built in the same plant side by side with the production Ford Processors. In fact, the ECU is stamped with the FoMoCo logo and was an OEM processor at one time. That means the Pro-M Racing box has been subjected to the same torture tests as OEM computers.



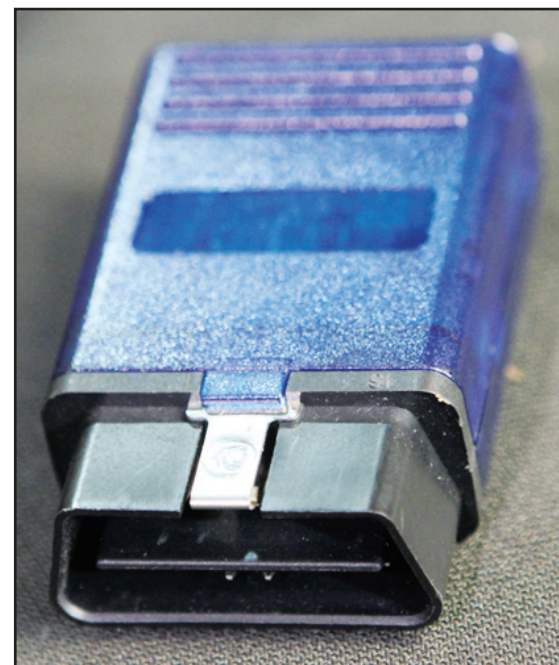
>> A quick download of some Innovate software to your laptop is required to configure the meters properly. There are two gauges included in the kit and we chose to mount them in the glove box away from prying eyes.

"The system is a Mass Air, Sequentially fired Management system with full ignition control."

The Pro-M Racing EFI system has more than enough capabilities to keep up with the demands of hardcore Mustang enthusiasts. The ECU is self-learning and consumers have the choice of a pre-programmed box (Pro-M Racing inputs your specs) or the DIY crowd can answer five questions and the ECU will develop its own start-up program. Once the car is started it self-learns—no need for dynos or many hours of custom tuning. That comes in handy for engine upgrades, power-adder upgrades, or—like in our case—testing a lot of different parts. A laptop hooks up to the ECU via an OBD-II port and the end user has full control over air/fuel ratio and timing.

The air/fuel ratio is based on load and lambda while the timing table is load-based. That eliminates the need to work with complicated VE tables. Forced induction applications benefit from the load-based tuning and Pro-M Racing offers an optional three bar MAP sensor as the ECU is capable of removing timing per psi of boost. Or one could simply lock in specific timing numbers like we did for our chassis dyno test.

One item that piqued our interest was the elimination of the TFI sensor on the distributor; it is only used as a means to connect the ECU to the distributor. In the case of the Zombie Coupe, we are sure the TFI module is dead but it doesn't



>> Pro-M Racing includes this OBD-II plug that allows a laptop to wire into it via a USB mini connector (on other side of plug).



>> The ECU gets bolted to the floor under the passenger seat to keep it out of the way. Its location also has easy access to the OBD-II port so you can hook up the laptop quickly.

matter now since the ECU relies on the module only as a bridge to the distributor. Pro-M Racing EFI allows for individual cylinder control for a more efficient engine combination. We like the fact that the harness comes equipped pre-wired for an electric fan that can be turned on and off by the ECU. The water temperature triggers the fan function and it also will kick on when the A/C is activated. The Pro-M Racing EFI is capable of running a single MAF sensor, dual MAF sensors for twin turbo or twin supercharger combos, or run as a Speed Density system.



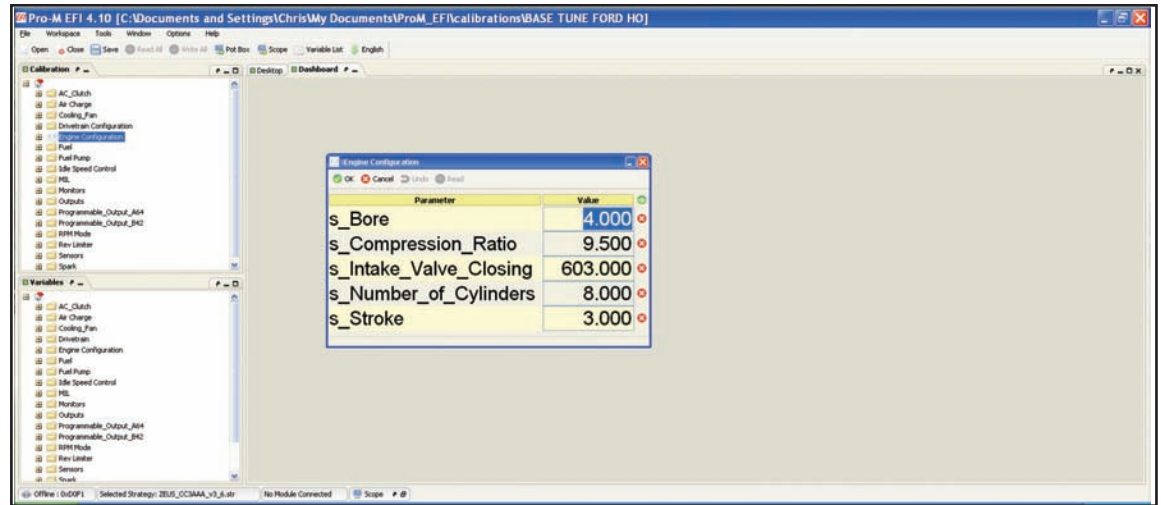
Dezotell and Machie got the new EFI on the car—as advertised the installation was a breeze—and we went immediately to key-on...nothing. The fuel pump was turning on and the fuel rails were being pressurized (40 psi). We ruled out spark after checking the coil and wires. Machie pulled a few spark plugs and sure enough there was no fuel on 'em—clogged fuel injectors. This is where the Pro-M Racing ECU was totally awesome; the car has 42 lb/hr injectors with a matching Pro-M 77mm MAF meter. If we had a factory ECU then we'd be stuck trying to find a set of 42s since the meter and injectors are matched. Dezotell had a set of brand new 55 lb/hr injectors on the shelf and we didn't think twice of tossing them in. As Machie swapped injectors, Dezotell went into the software and two keystrokes later the ECU was ready to fire. It was that easy; no matching the MAF sensor to the injectors; just input the injector's high and low slopes and the car is ready.

“As Machie swapped injectors, Dezotell went into the software and two keystrokes later the ECU was ready to fire.”

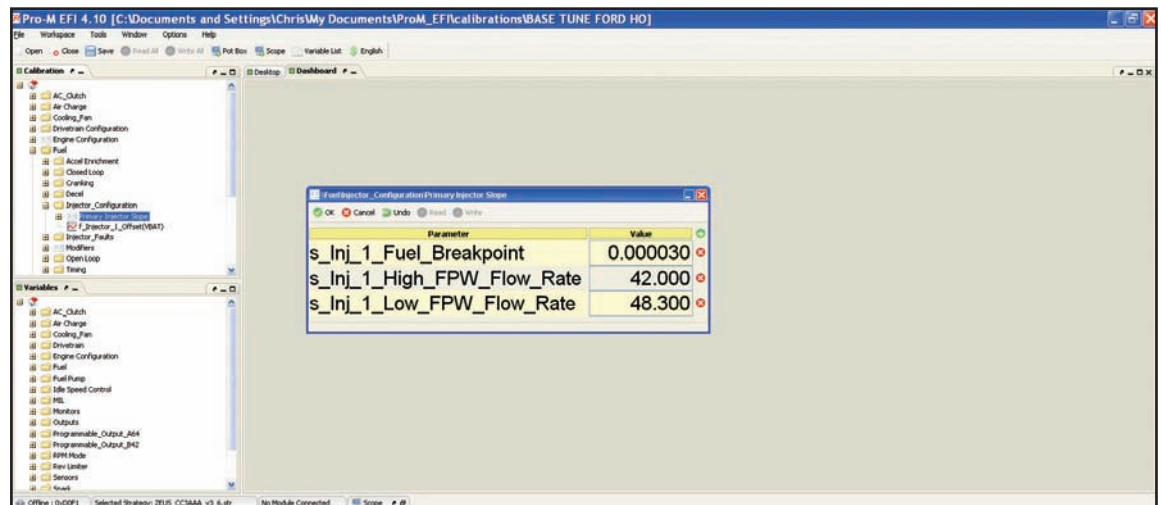
The key was turned on, the fuel pump buzzed, and the engine cranked over—surprisingly it only needed a few turns before it fired right up! No knocking or weird noises, just the familiar centrifugal blower whine combined with a nice



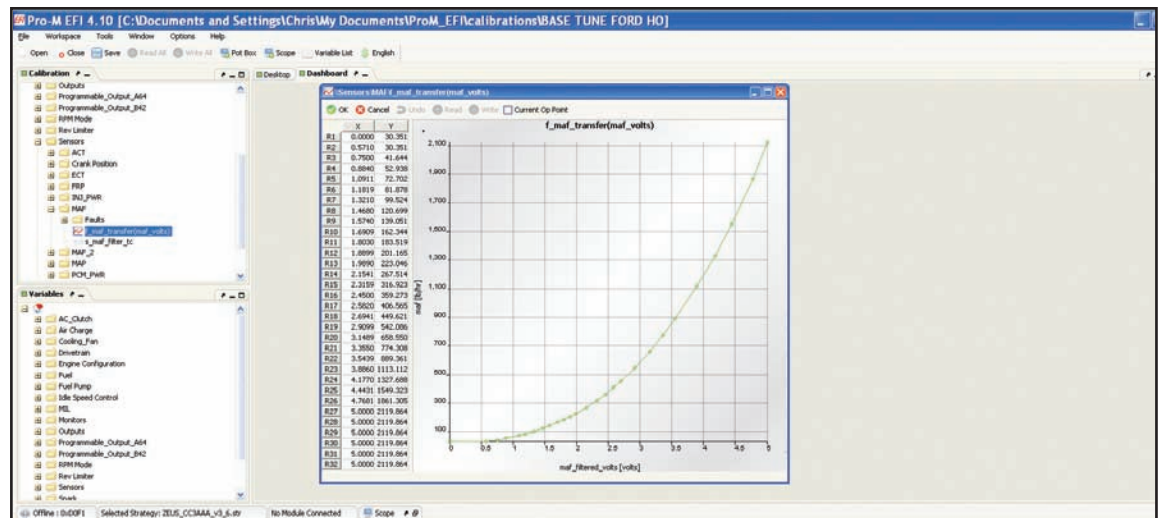
>> We chose to input our data for initial start-up as Mike Dezotell of Dez Racing wanted to get more familiar with the system. Pro-M Racing can deliver the system with your info in it already for those who don't want to mess with a laptop.



>> Bore, stroke, and compression ratio are the only three items that need to be inputted on the first screen.



>> The Zombie Coupe was initially equipped with 42 lb/hr fuel injectors and Pro-M Racing requires the high and low slope values to be added. Chris Richards of Pro-M Racing told us that the breakpoint number doesn't need to be touched.

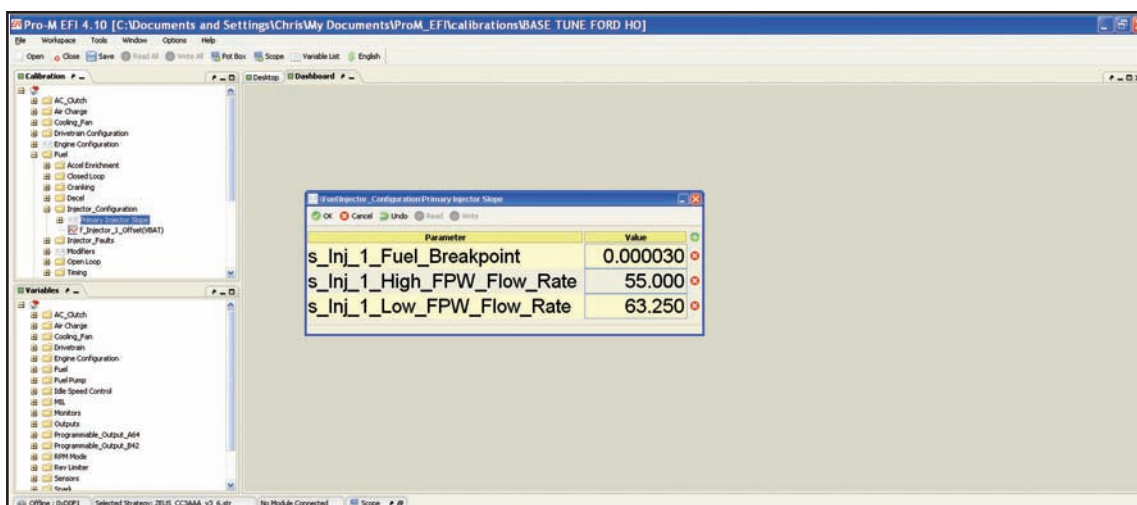


>> Dezotell then had to add the MAF transfer function. A MAF sensor outputs a voltage to the engine's computer, which then corresponds to the mass of the air flowing through the meter. The greater the air mass then the higher the voltage reading. On a chart showing several points of airflow, the corresponding voltage outputs would be the MAF meter's transfer function. That function is inputted into the ECU so it can interpret the voltage reading from the sensor and know exactly how much air was entering the engine.



smooth idle. There was a lot of smoke and muck shooting from the tailpipes but the car was running smooth and docile. We shut it off and swapped in a new set of spark plugs, the next step was to toss it on the DynoJet chassis dyno to see what it'll make for power. Your author had serious reservations that it would even live through a pull but Dezotell and Machie were the beacons of shining light on this one.

The Zombie Coupe was strapped down and it was systems go for what would be the car's first ever dyno pull. The engine sang, the exhaust evacuated more unknown materials and smoke, and the blower didn't miss a beat as it cranked out 15 psi of boost. Somehow the crusty and dry blower belt didn't snap. With just 10 degrees of timing it knocked off 333 rwhp but Dezotell was only tickling it to make sure the rods didn't



>> Our only major hiccup were a clogged set of fuel injectors and we didn't have another set of 42 lb/hr injectors in the shop. Dez Racing does stock 55 lb/hr injectors so we tossed in a set of those. Dezotell popped open the laptop and adjusted the high and low slopes to compensate for the different injector size and we were back in action, it was that simple and easy.

"The Zombie Coupe was strapped down and it was systems go for what would be the car's first ever dyno pull."



>> Before we even attempted to fire up the car, we cut out the MSD 6AL box and Vortech ignition/boost retard controller. This was done because they are old and we didn't want to waste time diagnosing a problem. We ran the car on a factory coil.

scatter through the block—we didn't even change the oil because the Mobil One synthetic oil looked brand-new despite its age. Dezotell added some more timing, 15 degrees, and the car responded with 361 rwhp and 349 rwtq. A long cool down was performed as Dezotell felt he could add one degree to bring the total to 16 degrees total and boost was reading 15 psi. The result was an impressive 374 rwhp and 362 rwtq—right where Dezotell expected it to be based on the car's 11.20 performances over a decade ago.

We have to take the good with the bad when evaluating this EFI system and even though we have a limited amount of time using it, there is one major gripe—why didn't this exist when the car was first built? It would've saved us several head gasket changes if tuning were this easy back then. Next month we stuff in the Dynamic Racing C4 and show you the right way to switch from an AOD to C4. Zombie Coupe is alive, running, and we are ready to start throwing more parts at it as Dez Racing brings the car back to glory. ■



>> The crusty and rusty parts made some good power and we had fun getting Zombie Coupe in running condition. We are going to run the Vortech combination for a while longer as we upgrade the car each month. Our finale is to add a larger ProCharger D-15C inter-cooled supercharger system that will be pressurizing a 363ci stroker engine.

SOURCE

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