

# DERIVE

## The fuel-savings solution hiding under your hood

Every fleet's most powerful fuel savings technology is under the hood; yet most fleet operators never tap into its full potential. Instead, they unwittingly settle for mediocre performance and results.

For the same reason that Ford, GM, or Dodge doesn't add drop-down ladder racks or floor-to-ceiling tool chests into its vans, original equipment manufacturers (OEMs) don't fully customize engines for vehicle owners. These engines and the computerized engine control units (ECUs) that regulate them are generic and built for a broad base of vehicles; however, the engines still can be optimized. Similar to the way that Saleen, Roush, and Shelby boost generic Mustangs and Camaros from average to wow, efficiency calibrators can transform that generic engine of your work truck or van to bring you wow-like savings.

Historically, the customized fuel-savings generated by engine calibrations have been isolated to the big rig sector, but recently the light and medium duty market has gained positive traction from after market calibrators. One company in particular, Derive, has accelerated to the forefront. With roots in high-performance calibrations, its engine optimization software is producing custom calibrations that average fuel savings of 6 -12%, depending on the customer and that customer's duty cycle.

Experts agree that aftermarket calibrations are absolutely essential to improve fleet performance.

Michael Ramsey, a veteran reporter who covers advanced automotive technology for The Wall Street Journal, has observed:

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THE (ECU) IS ONE THING THAT CAN BE MODIFIED TO CHANGE SHIFTING PATTERNS AND TO ADJUST MAXIMUM SPEED—HOW MUCH ACCELERATION YOU'RE GOING TO BE ALLOWED, WHICH ARE GOOD WAYS TO REDUCE FUEL USE.

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Fleets undoubtedly will save money and lower emissions by customizing each vehicle's engine computer for its specific needs. Research from North Carolina State University in late 2012 recounted the benefits of recalibrating engine computers. Researchers Behead Yazdani and H. Christopher Frey tested four pickup trucks, two each from Ford and Chevrolet. Their study showed that the four vehicles, operated on local roads and freeways, realized an average fuel savings of 8%-17% in some instances – over the baseline factory settings.

### ENGINE RECALIBRATIONS RESULTS:

- Idle RPM in park/neutral was reduced by approximately 25%
- Idle RPM in drive was reduced by approximately 10%.
- Gear shifting patterns—the engine RPM at which gear shifts occurred during acceleration was reduced by 20 to 30%.
- Maximum speed was limited to 65 mph.

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## What recalibrating an engine computer means

Just as a newly purchased home computer can be customized by changing the generic factory settings - such as sleep/power savings modes, desktop colors or images - any vehicle ECU can be recalibrated to better meet the specific needs of a fleet.

For example, Ford Motor Company's Taurus Police Interceptor, its Transit Van and the F-150 pickup, as well as Ford's top-performing Mustang, can share the same 3.7L V-6 engine –an engine that was unveiled in 2007 and that has undergone only minor modifications from vehicle to vehicle.

So when we compare a police cruiser that idles for hours each day as a mobile office to a delivery van that largely is driven from point to point along a fixed route, we can see immediately how a generic engine calibration likely leaves both fuel savings dollars and performance on the table.

Engine optimization software focuses on the desired differences in performance and provides a custom calibration to meet different missions.

Specific to law enforcement fleets, efficiency calibrators map an ECU and isolate idle savings without affecting other performance areas. Through an idle-reduction engine calibration, a vehicle's engine RPM is turned down. With vehicles calibrated at OEM settings, the RPM is typically set higher than necessary. Lowering an engine's idle RPM reduces fuel burn while still providing the OEM-required juice to operate the engine and vehicle accessories. This optimized idle setting ultimately means that a typical police car could be saving upwards of 50 cents for every hour it idles.

## Busting common calibration myths

While some operators may not have been aware of the savings inherent in optimizing an engine calibration, others may be cautious because of misconceptions that circulate in the marketplace. Two such misunderstandings are especially prevalent:

### MYTH 1

Installing a custom software calibrations voids the engine's factory warranty.

### BUSTED

According to the U.S. Federal Trade Commission, the Magnuson-Moss Warranty Act makes it illegal for companies to void a vehicle warranty or deny coverage under the warranty simply for making aftermarket upgrades.

### MYTH 2

Fleet drivers must change their behavior for fleets to have any chance of saving fuel.

### BUSTED

The only dependable, calculated way to save on fuel costs is to optimize the machines they drive.

Conventional wisdom has proven that behaviors are nearly impossible to change over the long term and require either continual enforcement or reward to be effective. Fleet operators are placed in the position of punishing drivers who don't adhere to company guidelines, such as idling too much or driving on unapproved routes. That approach is certain to harm company morale.

Using telematics that provide turn-by-turn directions and real-time road congestion alerts can save fuel and time, but these savings can be lost and trust compromised whenever the human element comes into play as a result of faulty anti-idle and speeding policies. A posting to the website [www.forconstructionpros.com](http://www.forconstructionpros.com) in January 2015 exposed just such a scenario. Using telematics, the manager of an asphalt hauling company received alerts via email whenever a truck in the fleet had been idling too long. The manager called each driver when he received an alert. This kind of big-brother behavior can dissolve trust between drivers and managers and even lead to driver-instigated retributions.

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## The fact is that telematics & calibrations can reinforce each other

The fact is that telematics and calibrations can complement each other. Richard Wallace, director of Transportation Systems Analysis at the Center for Automotive Research (CAR) in Ann Arbor, Michigan, is a supporter of fleets using some form of telematics but also conducting aftermarket engine software recalibrations.

"I don't really see it as A vs. B, but more of do both A and B," Wallace says. He also notes that, even with proper training, employees don't always follow a company's standard policies, such as turning off the vehicle when at a rest stop or making a home delivery.

Wallace went on to agree that, in situations like police officers needing vehicle engine power to operate in-vehicle systems when idling, the benefits of reducing idle RPMs can provide important cost savings.

An April 2014 telematics study sponsored by the U.S. Department of Transportation correlated lower top-end speed and the associated lower RPM with substantially improved fuel economy. The study showed that, without continual "coaching" or rewards, the impact of telematics on saving fuel was largely unnoticed. In fact, when incentives were removed, improvements immediately began to reverse.

However, if top-speed governing calibrations or optimized cruise calibrations were implemented, not only would the requirement for continual coaching and incentives be removed, but the majority of fuel savings would also be preserved.

BASED ON FLEET FEEDBACK AND FOCUSED RESEARCH, CUSTOMIZED ENGINE SOFTWARE CALIBRATION IS THE ONLY GUARANTEED COST SAVINGS THAT DELIVERS RESULTS IMMEDIATELY.

## Beyond idle reduction and speed control

A multitude of other parameters can be re-programmed to further any fleet's fuel savings beyond the most common idle-RPM reduction and speed-limiter calibration modifications. A sampling of more options provides an idea of the range of customization that is possible:

### SHIFT PATTERN OPTIMIZATION:

Optimizing a transmission's shift patterns has an effect on fuel efficiency and performance. Scaling the shift pattern for efficiency rather than performance results in lowered cruising engine RPM and moderates acceleration rates.

### TORQUE MANAGEMENT:

Aggressive driving behavior, as seen in a University of Michigan study, reduces fuel efficiency by 20-30%. By properly managing engine torque, fleet managers can restrain acceleration rates without having to spend an immense amount of time and patience on training drivers to be easy on the throttle.

### CYLINDER DEACTIVATION:

To enhance green technology efforts in modern engines over the past several years, OEMs have introduced "cylinder deactivation" or "displacement on demand" as a factory-equipped option. This feature shuts off cylinders when traveling at highway speeds to save on fuel when those cylinders are not needed. Cylinder deactivation temporarily lowers fuel consumption in an eight-cylinder engine by enabling it to operate on six or even four cylinders. Software like that from Derive Systems aligns cylinder deactivation with the fleet's governed top speed so that this enhanced fuel savings feature kicks in at, for instance, 55 mph instead of the OEMs generically set 65 mph.

As a fleet owner, you may be overlooking the fact that, while driver behavior may never change, the fuel savings and rule compliance you're seeking can be found inside your engine's computer. Instead of constantly trying to whip your drivers into shape, you can merely re-tune your engine parameters to shape up substantial savings.

The process is simple, and trucks or cars don't need to be pulled from service -pre-programmed engine-calibration software can be installed in just 10 minutes using the vehicle's on-board diagnostics port. Even more important, you start saving on fuel costs immediately.

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