ATI Performance Products offers two Super Dampers for 6.2L Dodge Hellcats. The first (PN 918483) features the OEM diameter and is an SFI-certified factory replacement. The second one is a 10 percent overdriven Super Damper (PN 918485) with an 8.9-inch diameter. The latter is a 2024 billet aluminum-shell damper with a steel hub that increases boost by 3 psi. It also exceeds SFI 18.1 safety certification for competition use. The overdrive Super Damper retails for around $500.

Installation begins removing the underbody engine service cover, followed by the draining of the coolant system and removal of the upper radiator hose and thermostat housing.

To be honest, Dodge’s badass Hellcat models are a bit late to the party, what with Ford’s longstanding supercharged Cobra and GT500 models and Chevy’s ZL1 Camaros, but they did bring big power—707 hp (flywheel-rated) to be exact. They’ve conjured up some extraordinary beasts in the Hellcat lineup, ones that offer the most available horsepower of any domestic car from the big three. So when The Tuning School told us they were working on modifying one, we were interested to see how it would turn out. The results were massive, and expected, from a factory supercharged machine.

THE HELLCAT TUNE FILE HAS INCORPORATED MEASURES TO MORE ACCURATELY CONTROL BOOST LEVELS AND HOW FAST BOOST RAMPS IN.
Next, the radiator support cover must be removed so that the front fascia fasteners can be accessed.

The inner fender liners must come out next to access a number of fasteners securing the front fascia.

With the front fascia now removed, we can access the radiator and condenser upper mounts. For this installation, only the radiator was removed as there was plenty of access with leaving the air conditioning condenser in place.

Though Hellcat production may be low, it won't stop people from modifying them. Eduardo Gonzalez of Orlando, Florida, is one such individual who wanted a bit more from his Charger, and The Tuning School turned to ATI Performance Products for help. Said help came in the form of a new ATI Super Damper with integrated pulleys that would increase the boost level produced by the supercharger. And what boosted engine doesn't love some high-octane fuel, right? Further testing of the Hellcat would also include a switch to E85.

While The Tuning School in Odessa, Florida, spends most of its time teaching individuals about modern automotive tuning, it does occasionally tune customer cars.

“We usually refer people to shops that we have trained,” says The Tuning School's President and CEO, Bob Morreale. “This one came to us as an R&D car.”

To make sure the engine management knew that there was going to be more manifold pressure, a change to the programming was needed. For that, the Tuning School turned to HP Tuners, which has offered its tuning suite for Hellcat models since March of 2015. Handling the ATI Super Damper installation on Gonzalez' Hellcat was 360 Customs in Brandon, Florida. From there, The Tuning School's Alex Peitz performed the programming via HP Tuners. Post installation and testing, we asked Peitz a number of questions regarding tuning on Dodge's top-of-the-line Hemi beast.

ARE THERE ANY MAJOR DIFFERENCES BETWEEN THIS SOFTWARE/HARDWARE AND THAT OF EARLIER SRT-8 VEHICLES?

The major difference between the Hellcat and earlier SRT-8 vehicles is the fact that the Hellcat has wide-bands used as its primary O2 sensors, and the addition of a mass airflow sensor. Due to the wide-bands, the Hellcat has the ability to stay in closed loop at all times after the sensors and the vehicle have heated up. This causes more accurate fueling even when inconsistencies may have existed previously, due
With greater access to the belts and pulleys, the factory serpentine belts are now removed.

The Hellcat (GPECIIA controller), like previous GPEC II controllers, uses an artificial neural network (fuel mass vs injector pulse width) to calculate fueling. Additionally, the Hellcat tune file has incorporated measures to more accurately control boost levels and how fast boost ramps in. This is especially helpful by working in conjunction with the throttle body style bypass valve Dodge has incorporated into this platform.

The Hellcat is a wonderful platform and responds very positively to just tuning alone. The PCM and its operation logic is one of the most sophisticated, if not the most sophisticated I have ever seen. Dodge Engineers really hit the nail on the head with this one!

IS THERE ANYTHING ABOUT THE STOCK TUNING FILE THAT WOULD BE OF INTEREST TO ENTHUSIASTS?

One thing I found especially interesting was the stoichiometric air/fuel ratio the factory was commanding. From the factory, the commanded stoich point was set to 13.85:1. This was most likely due to the fuel they used to calibrate the vehicle at the factory having ethanol present. Additionally, if you change the stoich point in the Hellcat tune file, it literally changes what it believes lambda actually is. This is why they seem to run so lean from the factory at wide open throttle (12.7:1 typically). The factory is actually commanding 12.01:1 air/fuel ratio, but because of the built in fuel bias, it actually shows about 6 percent leaner on your typical aftermarket wideband i.e. 12.7:1.

You can test this by examining the fuel trims at wide open throttle (it’s in closed loop at wide open throttle due to having factory wide-bands). The fuel trims will be within plus or minus 3 percent and the commanded air fuel ratio is 12.01 (the factory reads in fuel/air though), but the actual air fuel ratio on an aftermarket wideband will show 12.7:1 even though the factory wide-bands are reading around 12.0:1 to 12.1:1 air/fuel ratio.

As the overdriven damper is about an inch larger in diameter than the stock piece, a bit of clearancing was necessary.

The new ATI Performance Products Super Damper is fastened into place. You will, of course, need a different belt for the underdrive pulley, and that is a Gates K100S94H, which is 59.4 inches in length.
Stock dyno numbers for the Hellcat came in at 607rwhp and 566 lb-ft of torque and a custom tune file netted 661 hp and 587 lb-ft of torque from the supercharged Hellcat engine. With the ATI Super Damper and HP Tuners/Tuning School programming, the new totals were 701hp and 609 lb-ft of torque. These numbers were generated on The Tuning School’s Mustang MD1750 2WD dynamometer with the SAE correction factor applied.

WERE THERE ANY CHALLENGES WITH THE PULLEY/BOOST INCREASE TUNING, AS WELL AS THE E85 TUNING?

Tuning the Hellcat with the ATI Super Damper was pretty straightforward. You just had to remember you’re making additional boost and additional cylinder air-mass, therefore you end up at a lower portion of the spark advance table. Because of this, you must understand where to make adjustments where you didn’t have to previously. As far as the E85 tuning is concerned, it was fairly straightforward as well. It’s actually more simplified due to the fact that it has wideband sensors used as the primary O2 sensors in the system.

As I stated previously, the Hellcat’s PCM lambda value is dictated by what the inputted stoich point is. It’s always trying to maintain what it thinks lambda is. As long as I put the proper injector data in (like you would get with Infinity Injectors that we used) I found I did not have to put the stoich point at a richer value, such as .1015 fuel/air or 9.85:1 air/fuel. When I tried this, it threw off the entire system, most likely primarily due to keeping fueling calculations done with the artificial neural network. With proper injector data and the Hellcat still on the artificial neural network, the trims were almost dead on after a few tweaks. This is interesting because typically after adding E85, trims would be plus 25% due to the additional ethanol present.

INSTALLATION AND TESTING

It can be nerve-wracking cracking into a brand new car, but car enthusiasts have been modifying them since day one. With new models sometimes comes new procedures, however, the Hellcat proved to be pretty straightforward. Check out the captions to see what was involved and to see how the Hellcat fared on the dyno.

“THE HELLCAT IS A WONDERFUL PLATFORM AND RESPONDS VERY POSITIVELY TO JUST TUNING ALONE. THE PCM AND ITS OPERATION LOGIC IS ONE OF THE MOST SOPHISTICATED, IF NOT THE MOST SOPHISTICATED I HAVE EVER SEEN. DODGE ENGINEERS REALLY HIT THE NAIL ON THE HEAD WITH THIS ONE!”

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