



Executive Decisions

Part 3: Intake and Computer Tweaking

story and photos by per schroeder

The image of an iron fist wrapped in a velvet glove may be trite, but it gets the point across quickly. Power, strength and speed are best served with a soft layer of comfort—nasty and brutish cars rarely win hearts with regular use. Case in point: It would take a hardy soul to muscle a Shelby Cobra through downtown Manhattan on a regular basis.

The goal for our BMW 335i project may seem contradictory: brutal performance that is cloaked in mild-mannered civility. It needs to be fast and unique, yet civilized. Modifications, like the HKS exhaust system, were chosen for power and torque gains, yet poise and polish were also considered. We see no sense in living with an uncorked system's loud bark on a street-driven car—especially when we can get the same power from a pleasant growl.

We've set our benchmark rather high for this project: the latest V8-engined M3. We'd like to see our 335i outrun the mighty M3 on track—and, of course, it needs to do so for less money.

The M3 might appear to have an edge on paper—it makes 73 more horsepower than our car—but it gives up 36 lb.-ft. of torque at the rear wheels. Credit the 335i's quick-spooling turbos for this gift in low-end grunt.

We have already narrowed the gap with that HKS exhaust system. It gave our 335i an additional 13 horsepower at the rear wheels while tacking on 8 more lb.-ft. of torque.

Now it's time to level the playing field a bit more while still preserving the car's daily decorum. We gathered up a free-flowing aFe intake system as well as two piggyback ECU modules and brought them to the Superchips dynamometer facility in Sanford, Fla. The shop's in-ground Dynojet is smack-dab in the middle of a spacious and well-stocked shop, making any modification a breeze. Time to start the work.

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data sheet

project: making a BMW 335i a match for the mighty V8 M3.

part 1: project introduction and baseline comparison (December 2008).

part 2: testing exhaust systems (May 2009).

part 3: intake and computer module testing (this issue).



Baseline

horsepower:	275
torque:	274 lb.-ft.

Several months had passed since our exhaustive muffler testing, so we once again ran the car on the dyno to recreate our baseline for this day of testing. Our numbers for the several baseline pulls were slightly lower than our prior figures—we were down 5 horsepower and 8 lb.-ft. of torque.

Since the numbers were still in the realm of normal for an engine of this type, we wrote off the difference as a result of pump gas formulation, weather and possibly the celestial tides' effect on BMW engine programming.

It had been a few months since we last tuned our BMW 335i, so we performed another baseline run. Our plan for this dyno session included testing a new intake setup and a pair of piggyback ECU turbo controllers.

aFe Stage 2 Air Intake System

horsepower:	279
torque:	278 lb.-ft.
price:	\$469 plus \$129 for scoops
installation time:	45 min.

The factory BMW intake, like those on most modern cars, was designed more for sound attenuation than maximum performance. Its large plastic airbox houses a flat panel filter that is fed by a rectangular air intake pipe. This pipe draws air from behind the BMW's iconic grilles.

The aFe air intake system replaces the factory box with a steel heat shield and a bracket that holds two round filters. Each filter feeds one side of the engine's dual-inlet intake manifold. The result, in theory, is more flow and less turbulence at high air intake velocity.

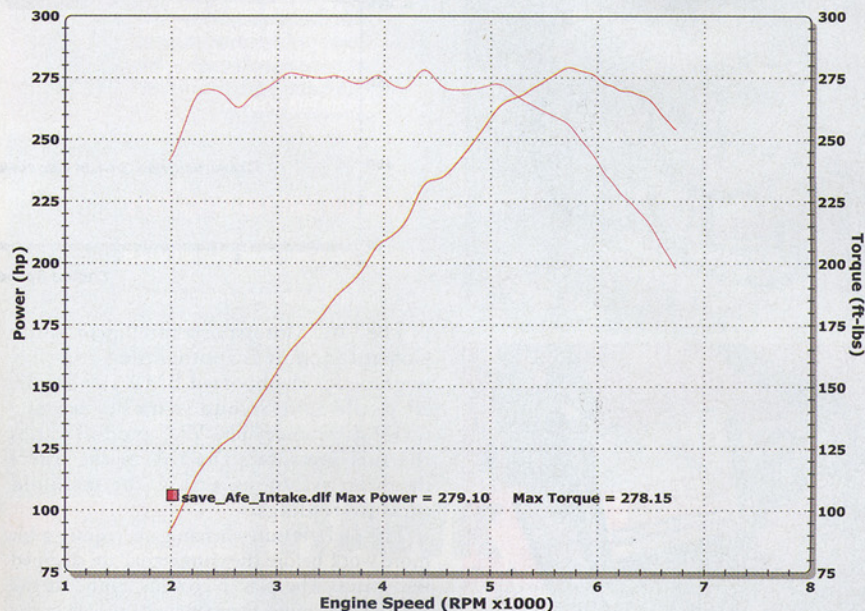
We also installed the optional Dynamic Air Scoops from aFe. These sheet metal widgets direct air from the grilles into the intake tract, creating a ram-air effect at highway speeds.

The entire installation took about 45 minutes. We'll give some credit to the excellent supplied directions. The fit and finish on both the intake and the scoops were very good—we especially liked the crinkle-finish paint on all of the sheet metal parts.

Upon restarting the car, we noticed only a slight increase in intake noise. We allowed the engine to acclimate to the new intake tract while covering several miles on the dyno.

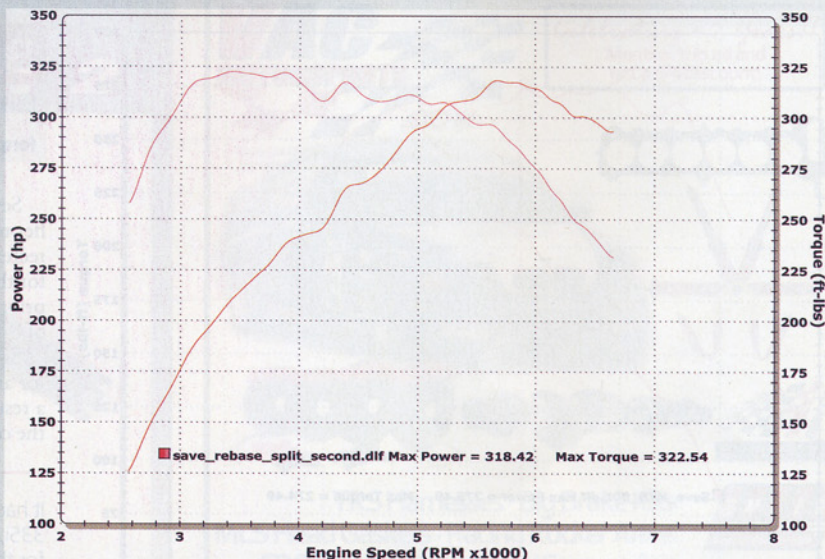
The data samples were less than impressive at first glance: We picked up just 4 horsepower and 3 lb.-ft. of torque. What those peak numbers don't show is that we gained nearly 10 horsepower at about 6700 rpm. While this gain comes after the curve's peak, it should improve on-track performance by helping maintain acceleration until the redline. Before the modification, power trailed off as the redline approached.

We also tested the intake both with and without the Dynamic Air Scoops. We could find no discernible difference in power or torque while on the stationary dynamometer, but this piece is designed to work with 60-plus mph winds. The shop's cooling fans simply couldn't provide enough airflow.



Split Second Turbo Tuner 2

horsepower:	318
torque:	322 lb.-ft.
price:	\$599
installation time:	15 min.



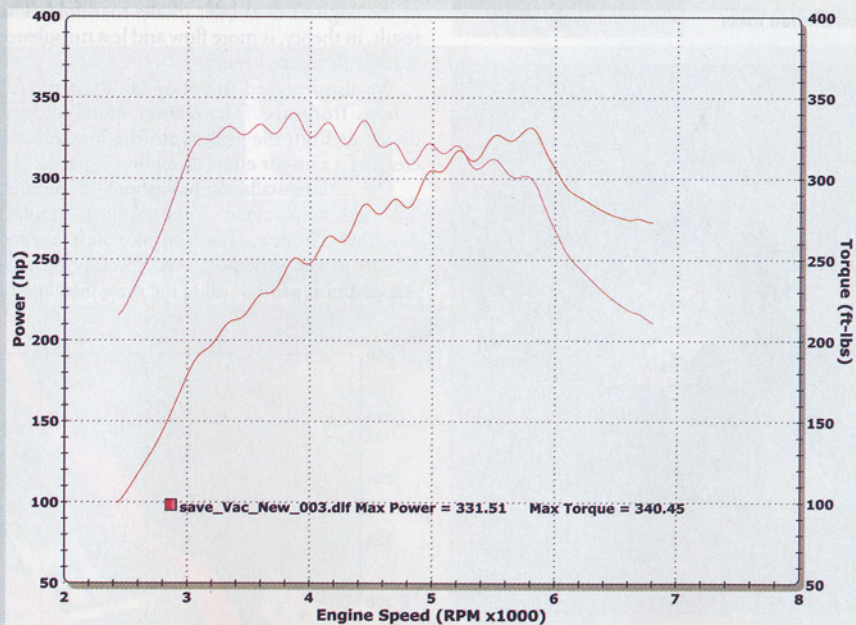
The Split Second Turbo Tuner 2 was one of the simplest modifications that we've ever done on a project car—and probably one of the most effective. The Turbo Tuner 2 plugs into the factory harness between the manifold pressure sensor and the ECU, essentially controlling the boost levels. A 4 psi increase in boost is allowed. The installation process is as simple as undoing two electrical connectors and then plugging in the new ones. If the ease of installation doesn't

impress, the power numbers certainly will: We picked up another 39 horsepower and 44 lb.-ft. of torque. The power delivery with the Split Second's Turbo Tuner 2 is absolutely seamless. We could detect no difference in smoothness or drivability. Our BMW now simply went faster.

Here's another benefit: Not only are the changes in maximum boost easy to make, but the system can also be quickly removed for invisible operation between service intervals.

VAC Intelligent Turbo Control Module

horsepower:	331
torque:	340 lb.-ft.
price:	\$599
installation time:	45 min.



The VAC Motorsports Intelligent Turbo Control Module is another plug-and-play upgrade for the boosted BMWs. It's similar to the Split Second setup but has one major difference: The VAC module varies the fuel pressure signals from the direct injection system as well as the manifold pressure readings.

The fuel pressure shenanigans require a bit more work before the connectors are snapped into place. The plastic cowling found at the back of the engine compartment as well as the engine's injector cover need to be removed to

allow access to the pressure sensor found at the rear of the fuel rail.

That extra bit of time is worth it, as the VAC module was the winner of the day. It provided an additional 52 horsepower and 62 lb.-ft. of torque. The dynamometer plots showed some surging as the power and boost climbed, almost as if the VAC was bumping against the factory boost limitations.

While this could be heard under sustained load conditions on the dyno, it's not that noticeable on the street. We'd certainly make the compromise for the additional power gains.

POWER SECRETS

Cornering Coming Up

We've now got the power to beat the muscular M3 in a drag race, but we're not in this game for quarter-mile slips. Our next task is to put the 335i Coupe's handling in supercar territory.

We'll be hitting the track soon to see if some easy bolt-ons can provide that needed Herculean grip. Once again, our goals are to maintain the BMW's civility on the street as we improve handling.



sources

BimmerWorld: HKS exhaust, aFe intake, (877) 639-9648, bimmerworld.com

BMW: [car, bmwusa.com](http://car.bmwusa.com)

Split Second: Turbo Tuner 2, (949) 863-1359, splitsec.com

Superchips: dynamometer, (888) 227-2447, superchips.com

VAC Motorsports: Intelligent Turbo Control Module, (866) 714-2002, vacmotorsports.com



david s. wallens photo

Still Civil

Maybe we're learning from our past. Far too often we have taken a new car and nearly destroyed its driving manners while trying to eke out some extra performance. Our BMW 335i, on the other hand, is still just as civil as it was when stock—despite picking up more than 60 horsepower and nearly 65 lb.-ft. of torque.

To prove it, we used the ultimate litmus test: a weekend away.

Truth be told, not all magazine project cars are cut out for vacation transport. They tend to be loud, stiff and cantankerous. Between the stop-and-go traffic, brick roads and searing summer temperatures, we figured that a weekend in Savannah would reveal any weaknesses in our BMW. Aside from the CCW wheels fitted for this issue's cover shoot, the BMW made the trip in as-dyno'ed form.

Guess what? The car didn't exhibit one vice. It was as docile as the stock version in traffic, and no red flags were raised. Plus, the air conditioning continued to blow cold in 100-degree temperatures. The in-town congestion didn't help our overall fuel economy numbers, but we still saw figures in the solid mid-20s. We also have a car that's quite quick and rarely fails to turn a few heads.—David S. Wallens

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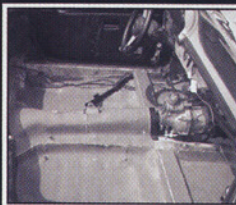
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