



Red **Hot** Roadster

With a little help from Dinan Engineering, the Z4 3.0i evolves into a nicely honed driver's machine.

STORY AND PHOTOGRAPHS BY DAVID HAUETER

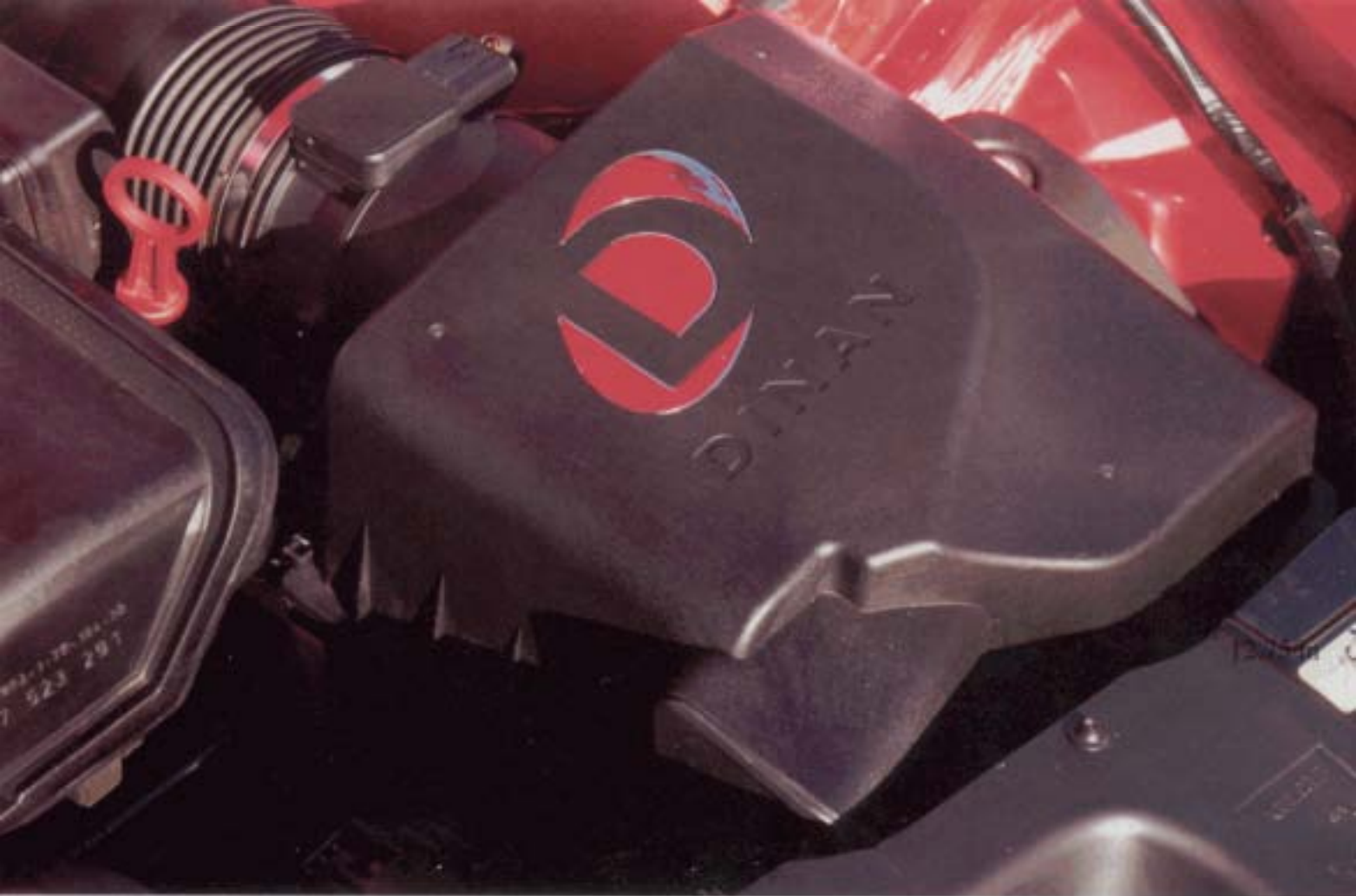
Steve Dinan has established his BMW tuning business as one of the best in the world, on par with any of the renowned names from Germany and in a class of his own here in the U.S. Sure, he gets a lot of press for his wicked-fast supercharged M-car creations, but look a little closer at some of the other offerings from his shop, and you'll find cars that may lack some of the shock and awe of the marquee cars--cars that are still very satisfying to drive, but willing to help you keep your driver's license a lot longer.

A recent trip to the San Francisco area put me smack-dab in the middle of some of the best driving roads in the region—and just an hour from Dinan's headquarters in Morgan Hill. This presented a great opportunity to exercise one of the products of a true suspension guru-- a guy who will not design a car that has more power than the suspension can handle.

Any Dinan car would have filled the bill, but the S1Z4 stood out as an obvious choice given the types of roads I would be driving, which favor nimble handling more than big

horsepower. This particular car could be called the S1 Plus, as it includes the Dinan Stage 3 suspension kit in addition to the engine upgrades of the S1 package, but for now, we'll just call it the **S1Z4**.

BMW's 24 is still very much in the shadow of the Porsche Boxster when it comes to performance-oriented roadsters, but in stock form it's very well balanced; and like most BMWs, it provides a great platform for Dinan improvements. "I think the stock Z4 actually handles pretty well," says Dinan. "Most BMWs come with a lot



of understeer built in, but the Z4 was as neutral a car as I've driven right out of the box, which surprised the hell out of me." Of course, stock BMWs are inherently sporty, but they're still designed for a large segment of the population—not for the more hardcore drivers.

That's where Dinan comes in.

Pulling up to Dinan's HQ in my rented Chevy Cavalier (try that for a reality check!), I thought the red Dinan S1 Z4 looked fabulous sitting in the garage. The stock Z4's appearance is one of the factors that polarize people one way or the other, but whether you love it or hate it to begin with, it is much more appealing sitting on Dinan's nineteen-inch lightweight forged wheels, which only weigh around twenty pounds apiece. Other cosmetic changes are more subtle—which is the way Dinan likes it. The only real giveaways are the Brembo calipers sporting the Dinan logo—they look great behind the wheels—and the Dinan exhaust tips that set the car off nicely at the tail.

Dinan is first and foremost an engineering company, and with a warranty that matches the factory's, there is a great deal of effort (and expense) that goes into developing upgrades that not only provide tangible per-

formance benefits, but also work seamlessly with the other systems in the car. One of the weaknesses of the stock Z4 is power, especially compared to rivals like the Porsche Boxster S and Mercedes' AMG SLK 55. Dinan actually considered putting an M3 engine into the Z4, but decided to go a different route when they found out BMW had the same idea. Instead, he designed and installed components that free up horsepower and help the engine breathe easier, as well as make the car even more balanced and neutral in the handling department.

If you take a really close look at the front of the Dinan S1 Z4, you'll see an intake scoop peeking through the front grille, which isn't there on the stock Z4. "What we've learned over measuring modern BMWs is that they have a vacuum in the airbox," says Dinan. "Our goal was to turn what was a negative three millibars of pressure into eight millibars of positive pressure." In simpler terms, Dinan created a ram-air intake, which force-feeds more air into the engine to produce more horsepower. This is the complete opposite of BMW's standard practice, which is to shroud the entire air intake and point it backwards, to keep water from getting in the engine and onto the air mass meter, where

The Dinan airbox is designed to keep out hot air from the engine compartment, and let in larger volumes of air from the ram-air intake.

it can change the resistance value and the voltage output.

"If you look at a wind-tunnel picture of a race car, the high pressure is at the nose and the base of the windshield," says Dinan. "We wanted to get the air intake somewhere in that high-pressure zone, but away from the heat of the engine compartment." Dinan spent eight months designing and engineering an intake tract using injection-molded plastic, along with a high-flow airbox and air filter that lets in larger volumes of air. Unlike some aftermarket air filters that are at the mercy of heat put off in the engine bay, Dinan's is completely sealed inside the airbox and has a silicone gasket to keep hot air out.

With the air-intake tube mounted forward in the grille, it was important to keep water from getting into the engine. To get the right design to keep it out, Dinan worked with Fluent, a company that specializes in computational fluid dynamics; together, they looked at computer models to see how much water would get through the intake with different designs and with varying amounts



of water. The final design uses centrifugal force to carry excess water to the back of the box and out a drainage vent; it gets over 90% separation of air and water—as much as a stock BMW. More importantly, the intake delivers an extra ten horsepower at around 75 mph. (At speeds over 75, the intake makes even more horsepower, but the fan in the Dinan dyno room only goes up to 75, so that was as far as they could measure.)

Besides the intake, there are other key components installed in this car that help the engine breathe better and also improve throttle response. The stock throttle body was bored out to increase the air-flow area by 10% and Dinan lightened the stock dual-mass flywheel, reducing rotational mass by 12%. To improve acceleration, a 3.23:1 differential was installed to replace the stock 3.07:1 diff, improving torque by over 5% and allowing a 0-60-mph run without leaving second gear. Dinan's stainless-steel free flow exhaust was specifically tuned to deliver an aural note that is not too intrusive, while it reduces back pressure for increased power gains. Dinan also recalibrated the engine-management software to maximize the power made from the additional air flow, while increasing the rev limit by 300 rpm and removing the top-speed limiter.

Braking is another area that Dinan routinely upgrades, especially when tuning a car for more power. "The stock brakes were a little too spongy with the pads that BMW uses, and typical big-brake kits are so much larger in the front that when you trail-brake, the car won't rotate," says Dinan. "If you have too much front brake, all the available grip is used for braking and there's none left for turning." Dinan's fix for the Z4 was to change the brakes to add more torque to the rear, which improves brake balance, and also change to a Ferodo pad compound that has more bite. Dinan sources the larger 320-mm slotted rotors and four-piston calipers from Brembo, but they are specifically made for the Dinan S1Z4 and are not pieces you can buy off the Brembo shelf.

Dinan will often sacrifice increased sales to avoid selling parts that don't deliver reliable performance gains, and the brakes are a good example of that. Cross-drilled rotors are the hot thing to have these days, but Dinan refuses to sell them. "With cross-drilled rotors, you give up surface area, and we've done braking tests that show the braking distance is longer on drilled rotors than it is on solid ones," says Dinan. "Another problem is that the heat gener-

Besides the intake and software upgrade, the Dinan Z4 engine is stock, but a new set of camshafts are on the way that will add fifteen more horses. Braces increase rigidity at the front

ated from braking travels through the holes and comes out the other side, which has a tendency to heat up the calipers and the brake fluid. We've done temperature tests, and solid rotors also stay cooler than drilled rotors. Pads can also become distorted as they travel over the holes."

The Z4 is one of the better-handling BMWs in stock form, but Dinan worked over the entire system to take it to another level. "Our philosophy on suspensions is to get the car more neutral, as all modern BMWs understeer a little too much," says Dinan. Suspension tuning can be a bit of a black art, and much of Dinan's development centers on shock valving. "We like to give a car more initial support with low-speed shock valving, making it firmer so that the initial set of the car happens faster," he says. At higher speeds, Dinan uses less rebound valving, to avoid jolts in the suspension that ruin ride quality and unsettle the car. Dinan also tunes in more low-speed compression in the front, which makes the front feel solid, but keeps the rear softer so that it squats when you step on the gas, which helps to put power down more effectively.

DINAN S1-Z4 PACKAGE:

Ram-air intake duct
 High-flow intake system
 High-flow throttle body
 Free-flow exhaust

Stage 1 suspension:

Performance spring set
 Koni adjustable shocks and struts
 Strut-to-~~wer~~ **lower** brace and supplemental braces
 Dinan Signature Series floor mats
 Dinan deck lid badge
 Dinan S1 serial numbered under-hood badge

Suggested retail price: \$4,754

Installation: 14 hours

OPTIONAL FEATURES:

Stage 3 suspension adds anti-roll bars and front camber plates to Stage 1 system
 19" lightweight forged performance wheels (tires sold separately)
 Lightened dual-mass flywheel
 3.23:1 differential
 Dinan/Brembo front brake conversion

Suggested retail price with options: \$16,403

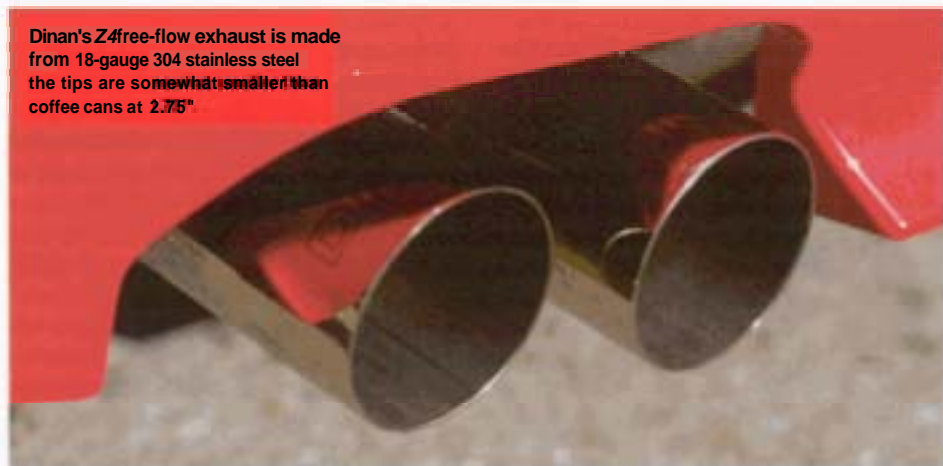
Installation: 30.5 hours



Dinan's suspension lowers the Z4 by half an inch. The rear-end suspension is tuned to squat under hard acceleration, putting more power to the ground.

Our test S1 Z4 had Dinan's Stage 3 suspension, which includes performance springs, Koni externally adjustable shocks and struts, front camber plates, and anti-roll bars that measure 25 mm at the front and 22 mm at the rear. Unlike some tuners who lower the car more for dramatic effect than handling benefits, Dinan's suspension kit lowers the car by a relatively modest half-inch, in order to retain ride quality. Tires are also an important part of the suspension system, and the S1 Z4 uses 245/35-19 Michelin Pilot Sports on 19x9" wheels at the front, with 275/130-19 boots on 19x9.5" wheels at the rear. Both front and rear wheels are an inch wider than the stock Z4 sport package.

Dinan BMWs are great to talk about and look at, but they're even better to drive. From my base in Half Moon Bay, a two-hour drive would take me south down the Pacific Coast Highway, providing the option to head west on either La Honda Road or Pescadero Drive. Both are great driver's roads, as they twist and turn through the Santa Cruz Mountains, and both roads



Dinan's Z4 free-flow exhaust is made from 18-gauge 304 stainless steel; the tips are somewhat smaller than coffee cans at 2.75".

also connect with Skyline Boulevard, which runs south to north and has sweeping turns that can be taken at higher speeds. With my meeting schedule (for my "regular" job), I was getting up at 5:00 a.m. to take my drives, which gave me enough time to run all three roads, then end up back at the Pacific Coast Highway. It was also early enough that I had the roads to myself, before the morning commuters started getting in the way (though most of them take Route 92).

The first thing that really catches your attention when heading out in the Dinan S1 Z4 is the exhaust note, a nice sporty sound

just about perfect on the loudness scale; it sounds incredible above 5,000 rpm and crackles and pops wonderfully on overrun. The second thing you notice is the throttle response, as the car responds much more readily to your right foot than the sometimes-sluggish stock Z4. Power is also noticeably increased over the stock Z4's, especially as you wind the car up to higher rpm and get the ram-air intake gulping in more air. With all the changes made to this car, the Dinan S1 Z4 delivers 239 horsepower at 5,900 rpm and 236 foot-pounds of torque at 3,500 rpm, in comparison to



the stock Z4's peak of 225 hp at 5,900 and 228 foot-pounds at 3,500.

Okay, here's a test: What's unusual about that stock torque number given in the previous sentence? Answer: It's 14 foot-pounds of torque more than what BMW spec says it should be! Given the differences between engines, Dinan reports the number they get on their dyno, and this car just happened to have more stock torque than BMW says it should. Dinan isn't finished with the engine work on this car, either, as he plans to put in a new set of camshafts that will bump power up by another 15 hp, effectively making it an S2 Z4.

But let's forget about the engine improvements. The Dinan suspension is probably the most impressive part of the entire package. On the highway, you can tell the set-up is more aggressive than the stock Z4's but it is by no means uncomfortable, and I ran over plenty of bumps on the Interstate going to and from Morgan Hill. However, it was on La Honda Road that the Dinan S1 Z4 really came alive. There's a large portion of La Honda that is nothing but quick right-left transitions, with only short sections of straight road in between. The Dinan S1 Z4 still has a slight

touch of understeer on turn-in, but the car is more balanced than stock and is noticeably sharper in the quick transitions. Dinan tuned this car with some understeer dialed in (to help keep tire wear consistent), but with the camber plates, you could dial it out completely if you wished.

On my third morning of driving La Honda, I started getting more familiar with the road and the car, and was able to take more advantage of the added power between the curves, as well as the brakes. The character of this car really came out on my last couple of runs on the road—getting hard on the throttle on the short straight sections, then on the brakes to set up for turns, and trail-braking into each corner, then powering back out for the next one. Where the stock Z4 is certainly enjoyable to drive on these types of roads, it can't be driven with the confidence or the speed of the Dinan car, simply because there is less grip, less power, and more movement from the suspension. With the S1 Z4, you can brake deeper going into corners, carry a faster entry speed since there is less understeer, and get more speed through the corner and out the exit. I drove a stock 330Ci convertible with the Performance Package on this road back in February, and it was

Dinan forged alloy wheels weigh just twenty pounds each; Brembo-sourced brakes use four-piston calipers on slotted rotors that are 20mm larger than stock.

getting a fair bit of oversteer on some of the corners; in comparison, the Dinan S1 Z4 remained perfectly composed. It just stuck

Steve Dinan and I went out for a drive on the day I returned the S1 Z4, and he gave a demonstration of how good his Z4 is when you really push it, as we lapped a road surrounding a local reservoir at elevated speeds, with the suspension perfectly handling all the bumps, elevation changes, and heavy braking. The stock Z4 is a nice car, but the Dinan package really turns it into a true competitor to the Porsche Boxster—and a better alternative for performance driving than either the 330Ci Performance Package convertible or the M3 convertible. At \$16,403 for the entire package (suggested retail—and of course you can buy individual upgrades in lieu of the whole package), the Dinan S1 Z4 is in the same price range as the M3 convertible. But frankly, it's a better driver's car and has the unique roadster character that the M3 doesn't. That money will also buy you a warranty that matches the factory's, which you aren't going to get from any other tuner out there. •