

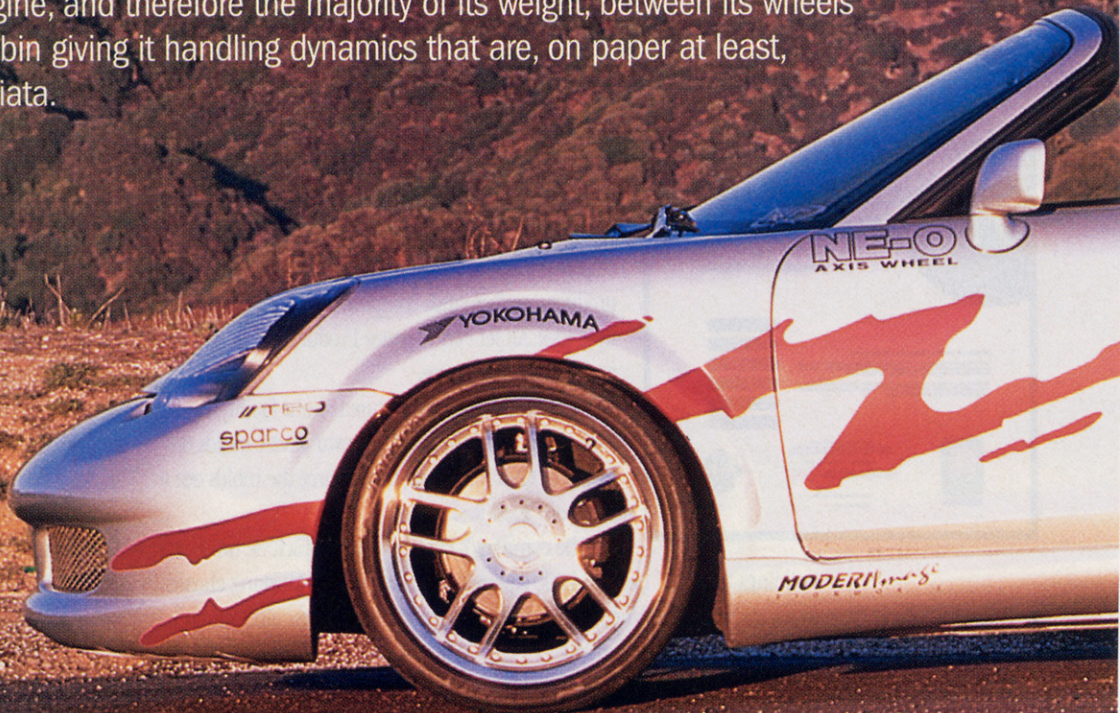
Add big power and monstrous grip to Toyota's little roadster and you've got a hard-to-beat recipe for performance.

BY JOSH JACQUOT

# MR.TWO MEETS MR.HORSEPOWER

PHOTOGRAPHY BY  
JOSH JACQUOT

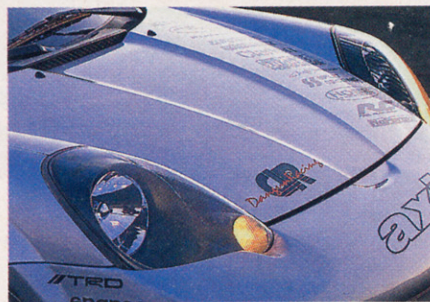
Last year when Toyota introduced the MR2 Spyder, we figured it would be a great car. It hit the market with less weight and more horsepower than its only real competitor in the United States, the Mazda Miata. It also had its engine, and therefore the majority of its weight, between its wheels and behind its cabin giving it handling dynamics that are, on paper at least, better than the Miata.











However, being a large, conservative multi-national corporation, Toyota wasn't about to go out on a limb and put huge power to the Spyder's rear wheels, making it an outrageous performance car. Instead, Japan's largest carmaker simply gave the MR2 enough performance to best its competition and figured that would be enough. And it was. The MR2 is a success and it has shown the Miata its taillights in more than one magazine comparison test.

When all is said and done, even at a feathery 2,200 lbs., the MR2 is still a wimp when it comes to going really fast. If you listen to old-school roadster purists, you'll get line after line about how real roadsters aren't about outright speed, ridiculous acceleration and stupid grip. Real roadsters, they'll claim, are for the joy of top down motoring, escaping to the mountains and cruising along the

beaches. Bah we say! Who cares? What's that worth if you can't kick some dirt on the guy next to you at every stoplight? Those folks can have their slow cars and string-back gloves. We choose real performance.

So does James Chen at Axis Sport Tuning in Santa Fe Springs, Calif. Chen owns Axis and has been known to put together some strong-running project cars in the past.

When Chen first approached us about featuring this car, we figured it would be a mild, low-boost job with perhaps slightly improved performance. The end result was quite different. Before it was over, Chen, with some help from companies like Spearco, NuFormz and APExi, produced a fire-breathing turbo car with a trick air-to-water intercooler, custom exhaust manifold and coilover suspension.

Although our time with the car was quite limited, we were able to get a feel for its performance during our testing and photography days. We quickly learned how unique the driving experience can be in a high-powered roadster. Boost response is among the best we've experienced, thanks to the long-runner, equal length NuFormz manifold and the 1ZZ-FE's relatively high 10:1 compression ratio. Not to mention the car's stock ECU is





controlling its ignition map and using the same advance curve it did without a turbo. Nail the throttle in any gear at almost any engine speed and the Spyder will mash you into its driver's seat with serious authority.

It's also quite competent in the turns, although a little more ride height might be nice. Even so, Chen knows the difference between looking cool and going fast and emphasized that difference during our time with the car. For our photo shoot, he used Axis NE-O 17x7-inch wheels and Yokohama Parada 205/40-17 tires. But during testing, he swapped to much lighter Axis 15x6.5-inch VPD wheels and sticky 205/50-15 Yokohama A032R rubber. It was a good move, as the MR2 bested our previous slalom record by more than one mile per hour and recorded the best 0-to-30 and 0-to-60 times we've seen from any two-wheel-drive car. The MR2's 1.8-second time to 30 mph lands it squarely in Lancer and Skyline territory in off-the-line acceleration. Keep banging gears and you'll be at 60 in 4.9 seconds—still on pace with all of Japan's best supercars and

certainly not the performance we're accustomed to seeing from a cute little roadster.

We drove and tested the car at 8 psi but Chen and his tuner, Je-Kin (Luke) Loke, claim it runs safely at 12 psi. In fact, on our dyno it made 236 hp and 202 lb-ft of torque at 8 psi. At 12 psi, the numbers are even more impressive (see accompanying dyno chart).

What does one have to do to Toyota's 1ZZ-FE engine to make 235 hp at the wheels?



## AXIS SPORT TUNING MR2 SPYDER TURBO

Chassis Code	: ZZW30
<b>ENGINE</b>	
Engine Code	: 1ZZ-FE
Type	: In-line four-cylinder, turbocharged and intercooled, aluminum block and head
Internal Modifications	: None
External Modifications	: Custom NuFormz exhaust manifold, Garrett T28 turbo, custom Sparco air-to-water intercooler and intake plumbing, NuFormz prototype exhaust and intake
Engine Management Mods	: APEXi AVC-R boost controller, Split Second ARC2 and ESC1, external fuel pressure regulator and in-line fuel pump
Horsepower	: 8 psi: 235 hp at 6500 rpm; 12 psi: 259 hp at 5600 rpm
Torque	: 8 psi: 202 lb-ft at 4600 rpm; 12 psi: 240 lb-ft at 4400 rpm

<b>DRIVETRAIN</b>	
Layout	: Transverse mid-engine, rear-wheel drive
Drivetrain modifications	: Advanced Clutch Technology six-puck clutch

<b>SUSPENSION</b>	
Front	: APEXi height-adjustable world sport damper system
Rear	: APEXi height-adjustable world sport damper system

<b>BRAKES</b>	
Front	: Stock
Rear	: Stock

<b>EXTERNAL</b>	
Wheels	: Photo: Axis NE-O 17x7, Test: Axis VPD 15x6.5
Tires	: Photo: Yokohama Parada 205/40-17, Test: Yokohama A032R 205/50-15
Body	: Dangun Racing MR2 bodykit

<b>PERFORMANCE</b>	
Acceleration	
0-30 mph	: 1.8 sec.
0-60 mph	: 4.9 sec.
30-50 mph	: 1.7 sec.
50-70 mph	: 2.3 sec.
Quarter Mile	: 12.9 sec. at 105 mph

<b>HANDLING</b>	
Slalom speed (700-ft)	: 73.8 mph

<b>BRAKING</b>	
60-0 stopping distance	: 107 ft.

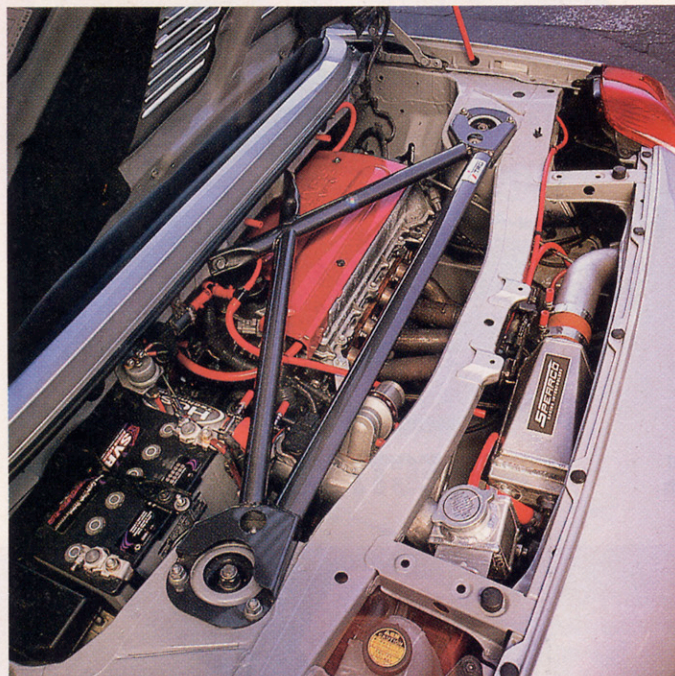
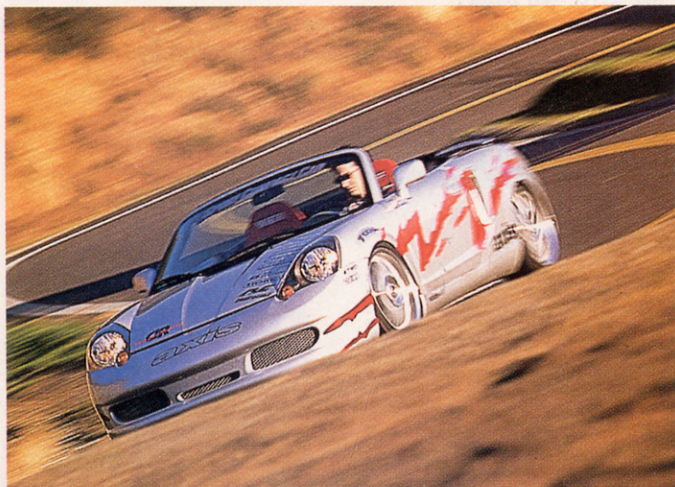


The answer is surprisingly simple. As we already mentioned, a custom NuFormz exhaust manifold, which is obviously designed to allow some degree of exhaust pulse tuning is coupled to a Garrett T28 turbocharger, which feeds intake air to the throttle body via a Spearco air-to-water intercooler. The intercooler uses a heat exchanger mounted near the bottom of the engine bay to cool water, which in turn cools the intake charge.

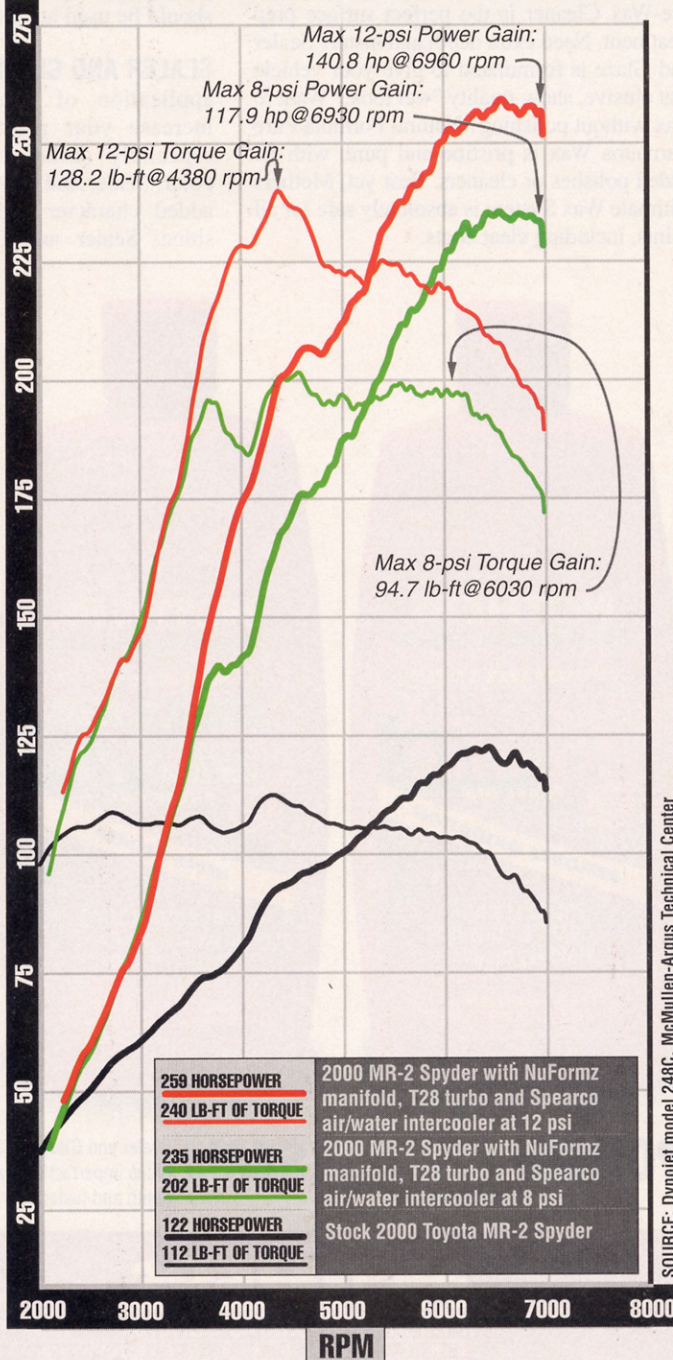
The engine's stock in-tank fuel pump and pressure regulator were scrapped in favor of a vacuum/boost referenced fuel pressure regulator and in-line fuel pump. Loke also built a return fuel line, which empties into the MR2's stock filler tube. (The 1ZZ-FE uses a dead-end fuel system in stock trim.) Additional fuel management is handled by a Split Second ARC2 air/fuel ratio calibrator, which allows for fuel map

adjustments at any combination of engine speed and load. Split Second also provided its ESC1, which alters the MR2's stock oxygen sensor signal allowing for open-loop operation as soon as the engine sees boost. Larger fuel injectors from a Honda S2000 replace the stock injectors.

Additional electronics from APEXi include an AVC-R gear-specific boost controller, peak-hold boost gauge and the company's latest turbo timer. The AVC-R allows for user-selectable boost control in



**Axis MR-2 Spyder Turbo at 8 & 12 psi vs. stock**



SOURCE: Dynojet model 248C, McMullen-Argus Technical Center





from Toyota Racing Development. The APEXi system consists of height-adjustable coil-overs designed for street use. These chassis improvements combined allowed the MR2 to push the *Sport Compact Car* slalom record to an impressive 73.8 mph.

We've already established that Toyota's MR2 and Celica excel when it comes to braking tests, so it's no surprise the added grip of R-compound tires gave impressive results. With stock brake pads, the little roadster ground to a halt from 60 mph in a scant 107 feet—another *SCC* record-breaking performance. The addition of Project  $\mu$  brake pads, which are in the car's near future, will likely shorten the distance even further.

every gear—a useful component in managing wheelspin in traction-limited cars such as this.

Significant chassis enhancements were required to keep up with the increased power and grip improvements. A World Sport Damper system from APEXi was installed, as were multiple chassis braces

All in all, this MR2 was very surprising. Its speed, handling and braking are among the best we've tested. The next time some top-down purist starts preaching the wonders of a power-deficient roadster, remind them about Chen's topless supercar. It's how God intended the roadster all along. ■

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