



Sport Compact Car: Pettit Racing's Triple-Rotor RX-7 (November 1998)

Last updated: March 19, 2001

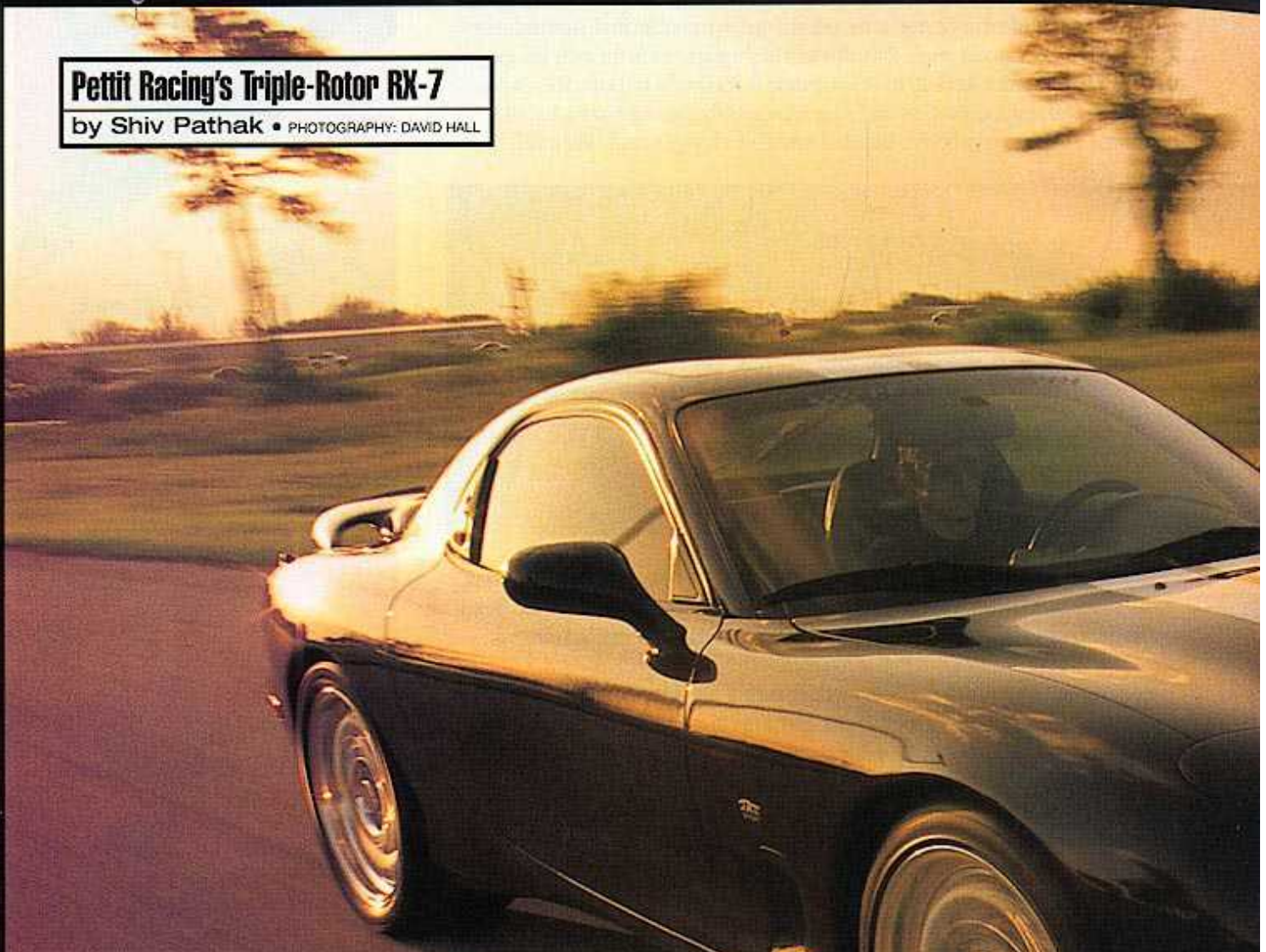
Under the shapely, svelte hood of the third-generation Mazda RX-7 lurks a front midship-mounted rotary that purrs with the confidence of a rogue lion. As several aftermarket tuners have proven, the incredibly

compact 13B twin-rotor is capable of truly impressive levels of performance. With stock turbos and pristine internals, Mazda's "little engine that could" is capable of generating over 400 hp from its pint-sized (well, 1.3 liters to be exact) displacement.

So what happens when you add another rotor, bigger turbos, and a host of complementary modifications? Cameron Worth, the owner of Pettit Racing, has the definitive answer. He calls it the RX-7 Banzai Edition.

Pettit Racing's Triple-Rotor RX-7

by Shiv Pathak • PHOTOGRAPHY: DAVID HALL



BANZAI EDITION II

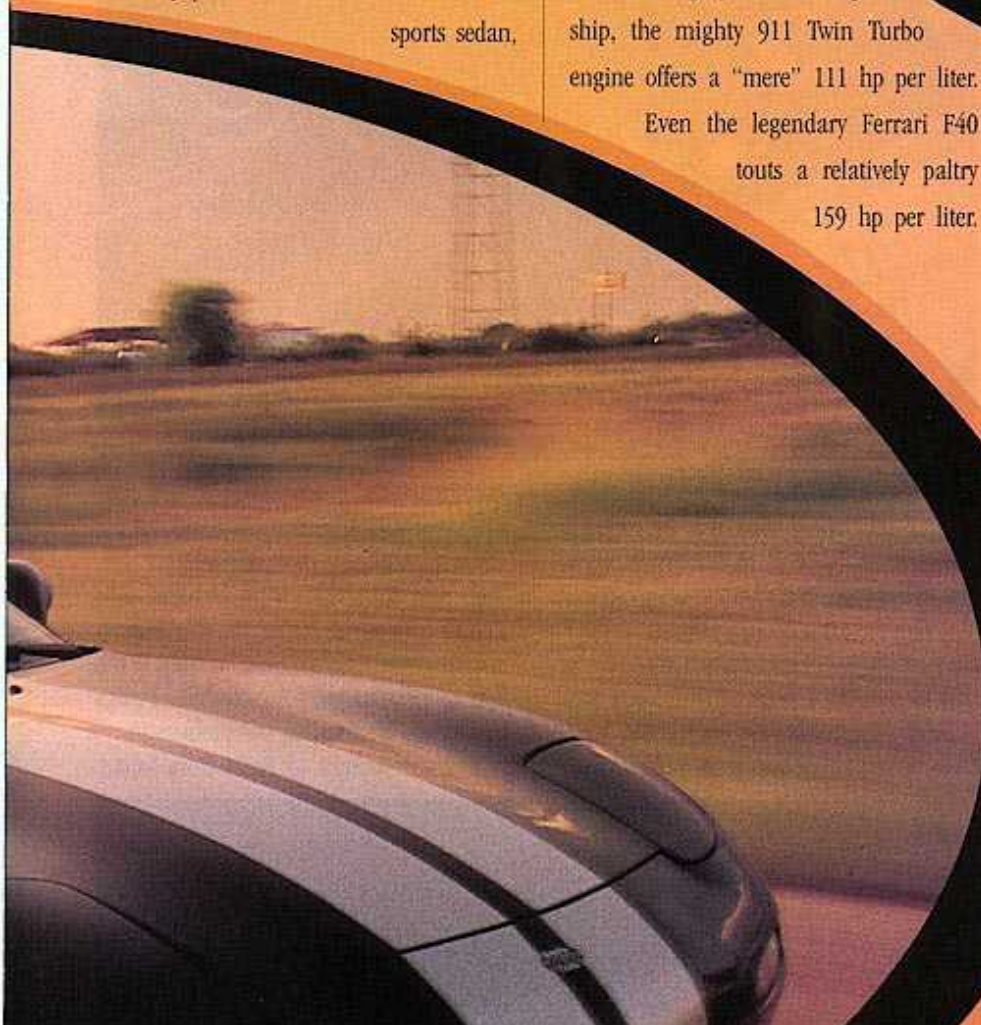
With only 1 bar (14.7 psi) of boost, this triple-rotor monster is capable of casually generating 550 tarmac-abusing ponies at 7200 rpm. Powering Pettit's Banzai is Mazda's own 20B motor, imported straight from its homeland. Standard fare the Japan-exclusive Mazda Cosmo sports sedan,

the 20B offers fifty percent more displacement than the RX-7's 13B motor. How does a specific output of 275 hp-per-liter sound? In comparison, Porsche's highly vaunted flagship, the mighty 911 Twin Turbo engine offers a "mere" 111 hp per liter.

Even the legendary Ferrari F40 touts a relatively paltry 159 hp per liter.

If the Dodge Viper's monstrous 8-liter were as overachieving as the Banzai's rotary, it would produce 2200 hp!

In terms of efficiency, the rotary engine enjoys a few unfair, but welcome, advantages over its piston-laden counterparts. Whereas traditional four-stroke motors use only half of its displacement to power each revolution of its crankshaft, a rotary engine uses its full displacement for each turn of its eccentric shaft. Effectively, a three-rotor engine fires as often a six-cylinder. Furthermore, each power stroke in the rotary is thirty per cent longer (two-thirds of the crank's rotation compared to one-half) than that of the piston motor. Also, unlike conventional motors, rotaries have no valvetrain to power and thereby



suffer no reciprocating losses.



BANZAI EDITION

But why a three rotor? Because even in the world of forced-induction rotaries, there is no substitute for cubic inches. While the stock twin rotor is a gem of a power plant by all standards, the triple rotor proves to be superior in nearly every respect. The 20B runs smoother, pulls much stronger, and generates fifty per cent more exhaust energy to get its two turbos up to speed.

Unlike the 13B's twin turbo system which use two identical Hitachi HT12 turbochargers, the 20B uses two different types of turbos. The primary turbo is the larger of the two, using flat turbine blades to maximize the impact effect of the exhaust pulse to improve low speed response. The smaller secondary turbo, like both turbos on the 13B, utilize curved turbine blades for highest possible flow at high rpm. Pettit Racing runs both turbos in parallel, unlike the sequential system found in third-generation RX-7s.

Proprietary to Pettit's triple-rotor conversion is a unique, computer-designed, custom sub-frame. This sub-frame perfectly fits the 20B in the RX-7's engine bay and allows easy access for all serviceable components. To make more room in the



tight engine bay, the small stock intercooler that once rested in front of the motor is removed in favor of an enormous front-mounted unit. A higher capacity radiator handles the extra cooling requirements.

Perhaps the most impressive feature of the Banzai RX-7 is its extraordinary simplicity. Incredibly, the engine bay looks less cluttered than that of the stock RX-7. A

custom engine management system provides exceptional performance without the convoluted wiring mess of the stock system. Also remarkable is the fact that, with Pettit's custom sub-frame, the engine swap requires essentially no modifications to the rest of the chassis. Nonetheless, Pettit's conversion is extremely comprehensive.

Shipped straight to Pettit from Japan,

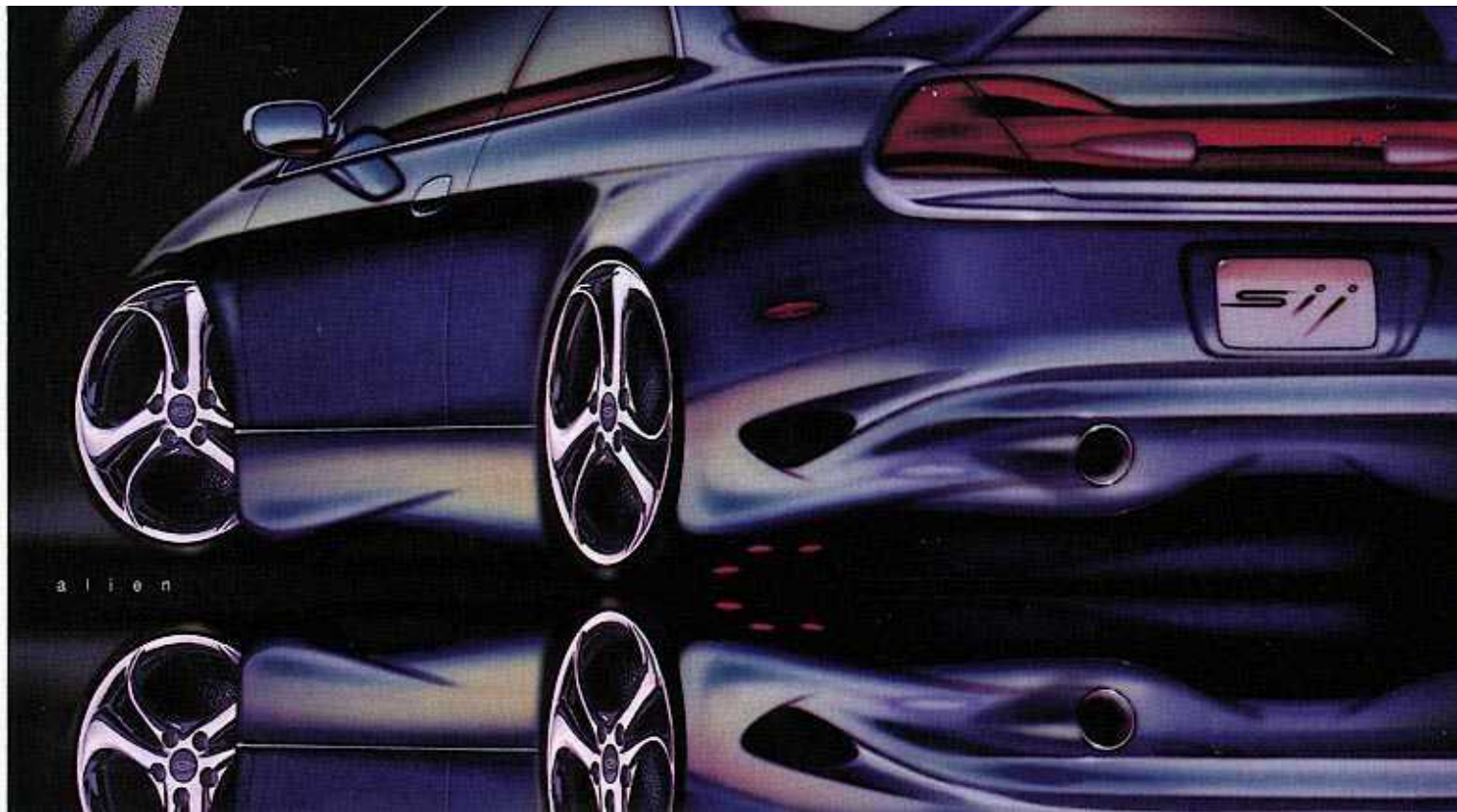


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CONCEPT KEEPER



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the Mazda 20B turbocharged motor is completely disassembled, street ported, and blueprinted. The rotors are CNC machined to accept heavy-duty Tungston-coated apex seals. Pettit also installs larger fuel injectors, a high-flow fuel pump, and a new fuel pressure regulator. The modifications continue with a Centerforce Dual Friction clutch, billet flywheel, the custom intercooler, a heavy-duty aluminum radiator, as well as a bevy of top-grade hoses and clamps.

One would assume the 20B conversion to add considerable heft to the weight-conscious RX-7. The larger motor does, in fact, add 90 lbs to the front of the car. However, replacing the stock, cast iron exhaust system with a lightweight stainless

steel cat-back and an 8.5-lb flywheel saves a whopping 80 lbs. Pettit corrects this mild front-to-rear weight imbalance by removing the hefty front-mounted battery and installing a lightweight 1000 amp dry cell unit behind the driver. The end result is a car that weighs only 2740 lbs—slightly less than a stock RX-7!

On the road, this car has the unique ability to bend the laws of physics. If Sir Newton had a driver's license, he would

never look at an apple the same way again. In full street trim, the Banzai rips the quarter-mile in the mid-11s, forcing even the most power-jaded drivers into fetal positions. From a standstill, with judicious throttle management, the Banzai squirts off the line with unexpected urgency. Before the passenger can say "Wow, this car is fas...", a strange force acts upon his neck. Immediately, his skull feels as if it is tethered to the back of the headrest. The split-second relief that occurs between shifts only accentuates the gut-wrenching

sensation of acceleration that only a weight-to-power ratio of 5 lbs-per-hp can induce. To add icing on the cake, the Banzai shares an exhaust pulse pattern typically found in the





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classic cars from Marenello. This means that the triple rotor replicates the distinct sonorous wail of a Ferrari flat-twelve. Oh, heavens!

Granted, with nearly 450 lb-ft of torque on tap at 5200 rpm, Pettit's Banzai RX-7 is capable of catapulting itself down the road with an urgency unheard of in almost any other street car. However, the car delivers much more than dizzying straight-line performance. Carefully selected suspension modifications improve on the RX-7's already exceptional handling traits. GAB eight-way adjustable shocks and Eibach Trak Pro springs tend to each corner. Carefully matched Trak Pro anti-roll bars are mounted front and rear, practically negating body roll without compromising the RX-7's extraordinary balance. The Banzai is also shod with extra wide, ultra-low profile Bridgestone S-02 tires mounted on stunning lightweight 18-inch

parts and labor for the 20B conversion alone add up to nearly \$35,000. However, those who are looking for an excessively powerful, yet perfectly streetable race car would have a hard time finding more bang-for-the-buck anywhere else. ■

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Article provided by Saad Hassan (syh1@cornell.edu). Muchas gracias!



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