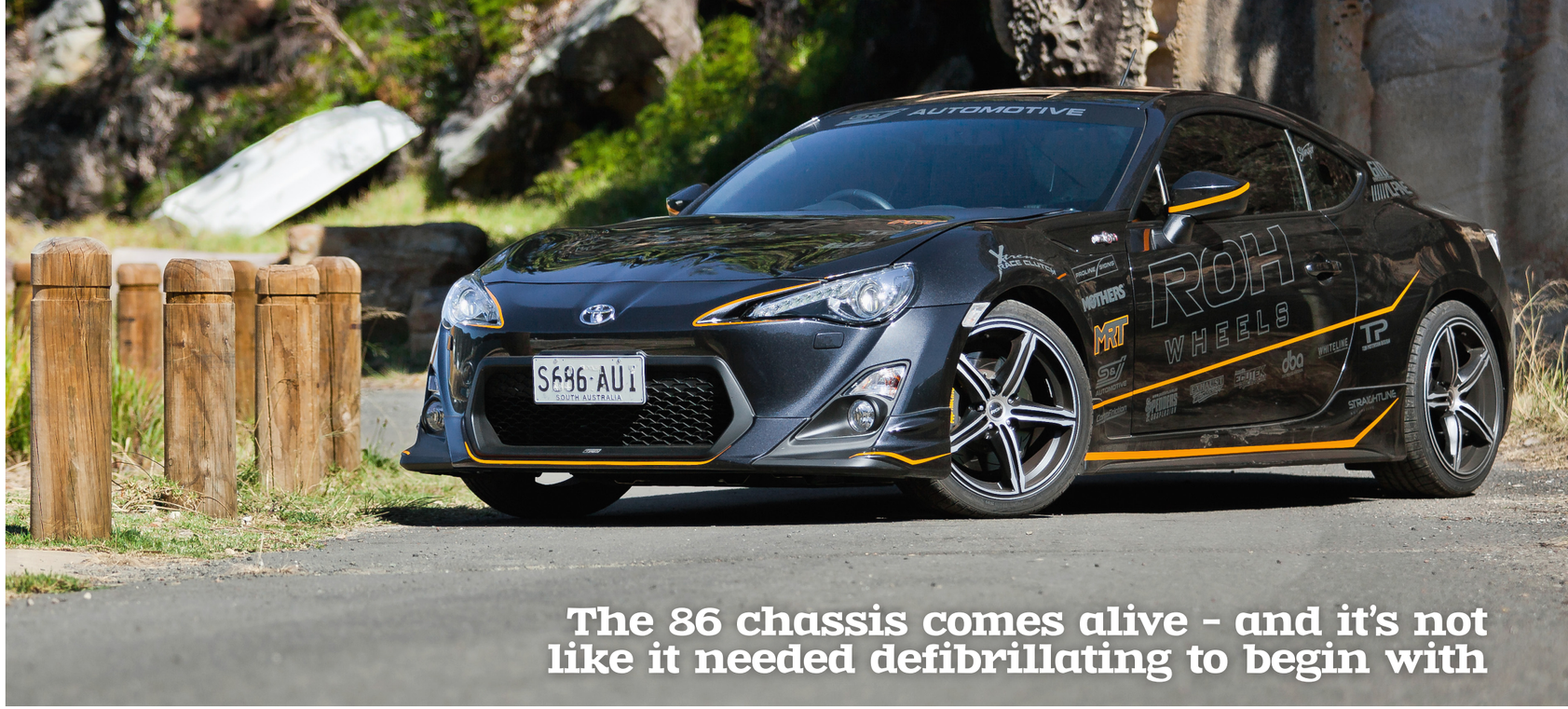
MRT twin-charged 86

by GLENN TORRENS pics SEBASTIAN VOLL

Got an 86? Torn between a turbo or slipping in a supercharger? We've found one with both – and it works. Rather well

Guilty as 'charged



The 86 chassis comes alive – and it's not like it needed defibrillating to begin with

t's the sizzle that sells the sausage," quips Brett Middleton, grand poobah of tuning gurus MRT Performance. We're standing in MRT's suburban Sydney workshop looking at his latest weapon, Project 86. Brett's mention of food is apt, given that Project 86 is packed with a smorgasbord of high-calorie parts aimed at building on the strengths of Toyota's new cult car while vanquishing its weaknesses.

Unfortunately for me, on the day of the test, this particular sausage wasn't flame-grilling over the flavour-enhancing hot coals so much as stewing in the cold rear corner of the barbecue. A few hours previous, I'd tried in vain to extract a 0-100km/h time from the 'twin-charged' – turbo- *and* supercharged – flat-four firecracker but a gearbox linkage had a sook and made things impossible. When I realised there was no way to engage third gear other than caress it into place, I'd hoped that 7400rpm in second gear would be enough to sneak the car to 100 clicks. But it wasn't to be.

But that doesn't prevent us looking at all the glorious bits that make up this special little Toyota, built to showcase the wisdom and wares of some of Australia's most respected aftermarket manufacturers.

The project's main push has been from ROH Wheels – the big brand stickered on the doors – so this is where we'll start our lap of Project 86. ROH's Glynn Helgeson sketched the wheels on this little hottie and, like all ROH's product, they're Aussie-made. Measuring 18 x 8-inch at both ends, they're a new design known as Arrow and the extra inch in size and width over the stock rims gives the Toyota's stance a bit of extra menace.

The wheels wear Bridgestone Potenza S001 225/35R18s, which give the beautifully balanced – but, to be highly controversial, under-tyred – 86 chassis far higher limits through the twisty bits yet retain a level of daily-driver durability.

Of course, having the best rubber in the world won't help if you can't keep it in contact with the road, which is why Project 86 is fitted with a stack of Whiteline and Pedders suspension gear.

Pedders' Sports Ryder eXtreme XA coil-overs are fitted to both ends, with both damping rate and ride height easily adjustable using a set of C-spanners. Whiteline is responsible for the smaller – but no less important – hardware, with poly-urethane bushes for the suspension and diff, anti-roll bars with adjustable drop-links at both ends, an anti-dive kit and strut brace. Along with the adjustable damping and ride height, the mods allow plenty of scope for weekend track junkies to tweak the 86 to their liking.

ROH's latest 'Arrow' design 18s look tough, but also allow space for massive 330mm two-piece rotors and four-pot AP calipers

Does it all work? Short answer: yes. We couldn't track the car but that dicky shift didn't stop us from a stringing together a stack of third-gear corners where the Project 86's chassis came alive, and it's not like it needed defibrillating to begin with. The only gripe was a sensation of rear steer that I don't recall in the standard car. Good suspension noise control, too, if that matters to you.

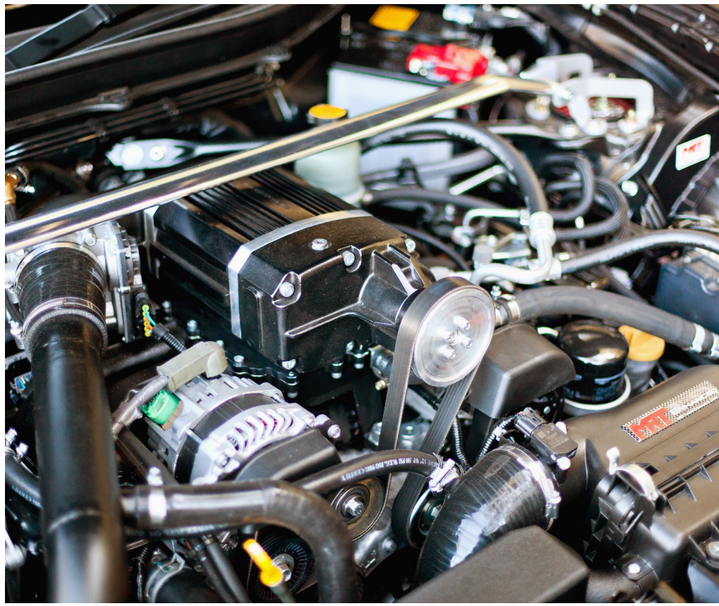
Stopping the whole show are vented Disc Brakes Australia (DBA) Club Spec T3 rotors spanning 330mm up front and 316mm at the rear. The rotors feature a distinctive construction method known as Kangaroo-Paw – named for the shape of the cooling pillars between the friction surfaces – a unique construction design that pumps heat away quicker than conventional brake rotor designs.

The fronts are two-piece and the slight flexibility between the rotor and its hat allows the rotor to move around a little more to reduce shudder. When things get really hot, the pillar design better controls the expansion (and therefore variation) in the friction surface. Plus, the two-piece design protects the wheel bearings from serious heat. The DBA rotors are bitten by AP Racing calipers – four-piston and two-piston front and rear respectively.

Specified by supplier CompFriction, the brake package was designed to be an upgrade without increasing unsprung weight or causing problems with the electronic systems such as ABS and stability control. The results are superb, with great pedal feel and no unruly noise, the car shedding speed like you've thrown an anchor over the side.

This is all well and good, I can hear you thinking. But the engine – that's what you want to know about.

Twin-charging, the theoretically deific wedding of turbo and supercharging, is



Turbo or supercharger? Why not both! Twin-charging gives power gains right across the rev range, but a high 12.5:1 compression ratio means adding extra boost is as safe as juggling sparklers while standing in a pool of kerosene

Secret Stuff

MRT's Ecutek tuning technology allows more than just fiddling of the fuel, spark and cam timing for engine tuning. Extra features are often hidden and un-used in a manufacturer's engine electronics that has to cover the needs of everything from a 600cc city-mouse to a premium performance car.

In the case of the BRZ/86, MRT's 'RaceROM' offers two modes. Access the second mode and you have launch control, flat-shifting capability and automatic throttle-blipping on downchanges, all triggered by inputs from the throttle (of course), clutch and brake pedals and tacho.

Although Project 86 is more extensively modified, RaceROM is available as a upgrade for a standard car – and other vehicles.

Things are tight under the 86 bonnet, so fitting a turbo *and* a supercharger was... interesting

not quite cutting-edge technology (Lancia used it to great effect in its Delta S4 Group B rally car) but is great for those of us who giggle at kilowatts.

As many of you will be intimately aware, supercharging uses an engine-driven pump to shove-in extra air, while turbocharging employs a turbine in the exhaust to spin a small compressor, back-to-back on a shared axle, to blow in extra atmosphere. Add in more air, and you can add in more fuel, and make a bigger bang.

Each method has advantages and drawbacks depending on the performance outcome required and manufacturers often use one of these methods – usually turbocharging – to make small motors act big and big engines bend bitumen.

But in what is claimed to be an Aussie first, Project 86 combines an AVO turbo package and Sprintex/Bullet Performance supercharger kit. On its own, each approach would individually boost the 86's power by around 40 per cent to approximately 170kW at the rear wheels. Using both doesn't double the gains, but the idea is that the two technologies complement each other, the off-the-line punch of the positive-displacement supercharger getting things moving before the turbo takes over at the top end.

It's a lot easier in theory than in practice, as installing the two independently-developed systems and making them work harmoniously came dangerously close to migraine territory. MRT's task was made even more difficult by the 86's incredibly high stock compression ratio of 12.5:1, which limits the amount of boost that can be squeezed in. Thankfully, MRT's EcuTek tuning software allows a stunning array of control, as well as accessing a few special features in the Toybaru's engine management system (see sidebar).

First, though, MRT had to make the hardware physically fit. Things are tight under the 86 bonnet, so fitting a turbo *and* a supercharger was... interesting. The turbo is mostly under the engine while the shoebox-sized blower sits atop the flat-four on a bespoke manifold. A larger pulley was fitted to reduce boost (thank that 12.5:1 compression) but fouled on the bonnet. When lifting the bonnet slightly didn't produce the desired results, the engine was lowered and tilted slightly.

Which could explain why I couldn't cleanly grab third gear. But hey, MRT's Project 86 is blazing a new trail and no-one said innovation was a cinch.