

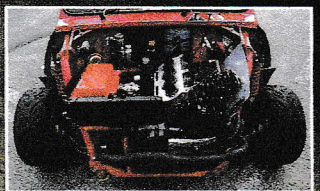
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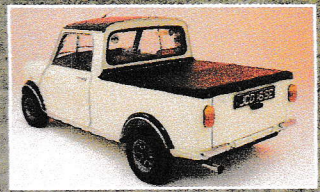
1380 Stage 3, custom 'shell, 6x10 Revos, neon, rollcage, Impreza Sonic Blue...



Nutty Yamaha R1-engined Min



V cool V-Tec 165bhp installation



Bare 'shell build - in five weeks

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- ➔ Minis at Rally of the Tests '02
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→ BIKE-POWERED MINI

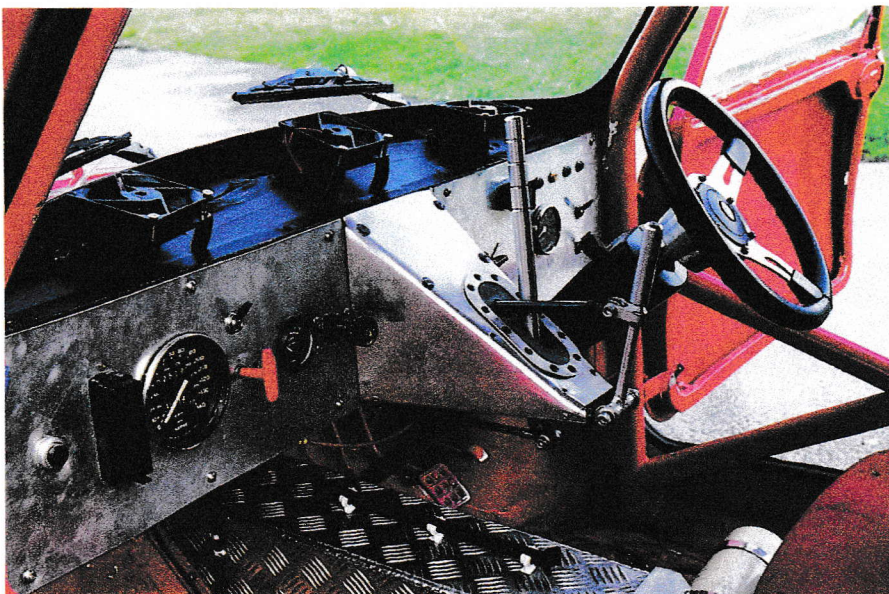


SUPERBIKE

Mike Smith took an unusual route to upgrade his rally Mini – it's now powered by a 998cc Yamaha R1 motorbike engine. Is this the new fashion in Mini engine upgrades?

Words ▶ Bill Sallis Pics ▶ Anthony Butler

Touring car-style gearshift near steering wheel. Bike gearshift is sequentially stepped so there's lots of shifting to be done



Well it had to happen sooner or later; someone was going to create a bike-engined Mini. In recent years, club motorsport – in particular, Autograss racing – has been revolutionised. Firstly, cars were adapted to carry bike engines, and now they are actually designed and built around those ultra-compact, lightweight motors.

From a technical viewpoint, the trend has been a massive success. I must confess that I never believed it would be viable in the first place. When you consider the weight of a modern motorbike and then imagine the forces that are fed back into the engine via the bike chassis, they will compare in no way to those forces that a car produces. On a tarmac circuit, in a bespoke racing car running on slick tyres and taking a load of apex sawtoothed curb, the forces fed back into the engine are surely massive. What about a Class 8 Autograss car with suspension designed to maintain traction on bumpy, loose or muddy surfaces? You can almost feel the diff snatching and grabbing.

Well, these cars have proved beyond any doubt that the current generation of bike engines is up to the job. Perhaps we shouldn't be surprised; they are Japanese, after all. Chris

Allanson is a renowned exponent of the bike-engined race car. His Z-Cars outfit has lead the way in the Autograss world using a bespoke chassis carrying a bike engine. They've moved on again with twin-engined versions and, at the Mini Racing Festival held at Donington Park this year, Chris showed his first attempt at packaging a twin-bike-motor set-up in the back of a Mini.

Ever since he started down this avenue, he has been asked, "Can you put a bike engine in a Mini?" He's always answered yes, but no one had taken the next step and put the money down to start a project – until Mike Smith walked through the door. This time, there was no messing around, although Chris was presented with an A-series-engined rally Mini to convert. With one season of tarmac rallying under his belt, Mike was looking for a better car into which to put his MBE-built A-series motor. He was delighted to acquire Dave Twilton's well-proven machine as a rolling 'shell, and he planned to install his own engine and go rallying. Then came the fateful trip to Z-Cars...

Chris Allanson was delighted finally to have a Mini commission and it was quickly underway. It struck me that using an existing Mini was an unnecessary compromise and somewhat wasteful of a very well-sorted donor vehicle. That point ▶▶



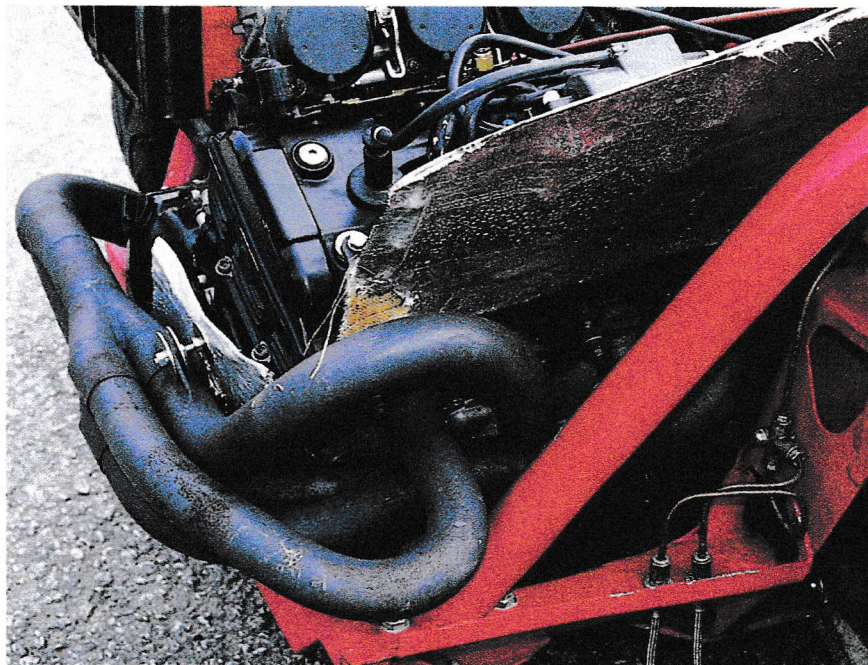
No it's not a two-stroke. Final drive gearing lowered to give much lower top end than Yamaha's norm. Also means that you can smoke it up pretty good whenever you want. 160bhp rear drive from light alloy engine unit

→ BIKE-POWERED MINI

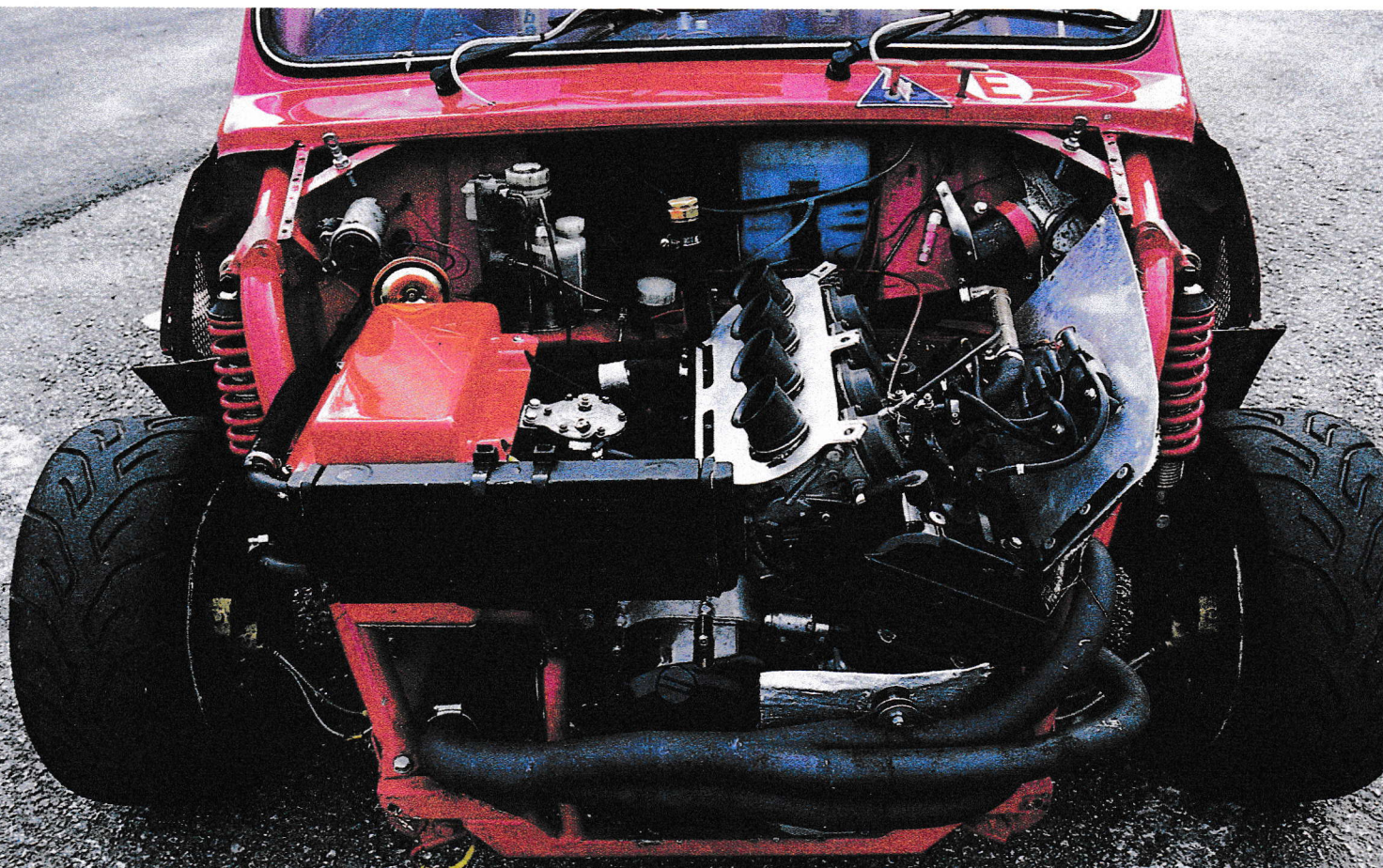


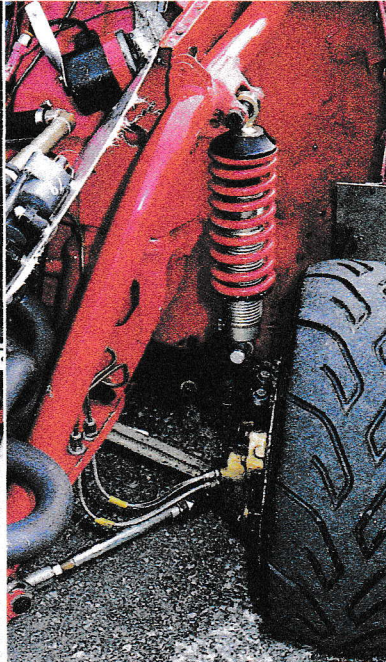
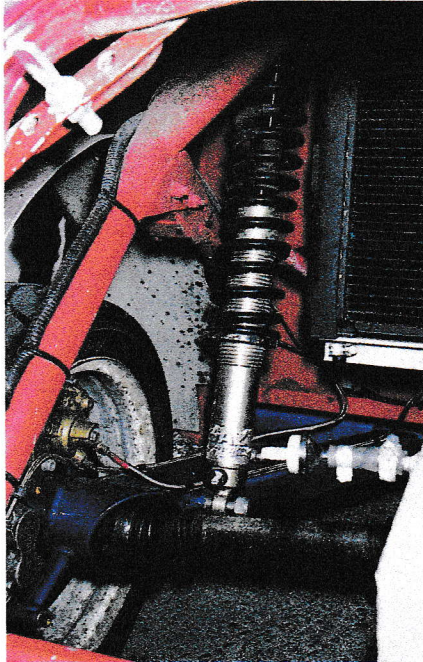
was acknowledged – but Mike had the vision and the will to complete the project, and an impressed Dave Twilton was in attendance to witness our track test, even getting behind the wheel himself. Chris explains his conversions in simple terms – he's not phased by the complications of hanging an alien engine in mid-air, creating engine mountings, making a gearshift mechanism and a drivetrain incorporating a reverse transfer box to drive the rear wheels... For many, this would be a lifetime's work. Chris has seen it all before and built it all before. One bike engine up front is easy work. This guy is now putting two bike engines where most people would put a few bags of shopping.

This motor was sourced from a Yamaha R1. It is a four-cylinder lump with a capacity of 998cc and a bore size a tad under 74mm. The stroke is ultra-short, so it can certainly rev a bit. It breathes through five valves per cylinder and produces 150bhp in standard trim. Modest tuning, which goes only as far as rejetting the carbs, delivers another 10bhp – which means that this car sits comfortably inside the weight of a conventional Mini, with 160 horses charging at the rear wheels. It is a spec to catch your attention, and demands respect. The 'box is every aspiring Touring Car driver's dream. It may just be the standard R1 unit, but the lever sits high in the dashboard and simply requires a push or a pull for the



Z-Cars re-engineered front end looks alien. Engine mounted in line with bodysell for rear drive. Long headers protrude at front of c





Above left: independent rear suspension, Escort discs (reduced) with bike callipers. No mechanical handbrake. Above centre: front coilover, lower track control arm and tie-bar. Below: alloy prop tunnel



next ratio. Considerable expense was involved in providing a reverse gear – a Quaife reversing transfer box is installed in the drive line and gives the pilot six forward and six rear ratios. The Quaife LSD is installed in an Escort Cosworth diff housing.

The suspension is Mini-derived but far from standard. The front subframe is modified to carry the engine, and the conventional doughnuts are sacrificed for coil spring/damper units. The top and bottom arms and tie-bars are all fairly conventional for this sort of car, as are the Metro Turbo front brakes. The rear end is altogether different – the subframe and radius arms are gone, replaced with Z-Cars fabricated arms and beam. Since the rear wheels are driven, much more is required of the brakes at that end than normal, so solid machined-down Escort discs are used. There are twin rear callipers, with Suzuki GSXR1100 items providing the principle stopping power and Kawasaki ZZR1100 items creating an independent system for the hydraulic handbrake. So that's the Z-Cars side of things – next up, a bespoke exhaust system was required. Packaging was tight in this area and long, equal-length primaries (the first length of exhaust tube out of the port before they join) were necessary to get the engine working properly. Tony Law is well established as a specialist exhaust manufacturer, and his solution meets all the objectives.

Prior to the track test, Mike took the car for a quick run down the local roads to give it a good warm up and clear a fouled plug. The accompanying sound effects were quite astounding. From my position in the paddock, a good mile away from where the car was performing, I heard every gearshift and the evocative scream of the bike motor between the ratios. It's not so much that it's loud; there are crisp, short bursts of screaming action, punctuated by brief silences.

I fitted into the seat with too much room to spare. A carefully folded coat served to take up some of the slack in the harness, and the rest was taken up by pulling the belts up to their end stops. I have to say at this stage that Mike and his exuberant crew were beginning to undermine my confidence. There was talk of an undrivable machine ▶▶

→ BIKE-POWERED MINI



"160bhp driving the rear wheels"

and 160bhp driving the rear wheels on a greasy surface, making it sound an impossible task for a committed front-wheel-drive man like myself. I paused to remind myself of the high points of a year spent racing in the MGF Cup at its height, and set off for the track. I had new rubber which was perfectly suited to the track conditions, and a small private audience. But everything they couldn't see would most certainly be heard, so there was nowhere to hide.

It was, of course, nowhere near as scary as I'd begun to suspect – or been lead to believe. The controls were differently balanced to a conventional Mini, with a light throttle that required the tiniest of blips to deliver a great big roar, a longish brake pedal that was less than reassuring, and a super-light clutch. That said, all operated correctly, so it was simply a question of adapting. The gearshift fell perfectly to the gloved left hand and, when up to speed, this thing had a huge appetite for gears – although I felt handicapped by the lack of any indication of which gear was engaged.

My first few laps were the most challenging, as the tyres were not sufficiently hot and, around Curborough's tight and twisting curves, the back end was nervously twitching out of line. It didn't take long to establish that, for all the apparently unruly behaviour, the car responded perfectly to the basic rear-wheel-drive rules. Trim the throttle back and it straightens up – simple, except that it has to be instinctive and it is completely opposed to the principles of front-wheel drive. The real skill is to balance the car with the throttle, moderating the power to trim the car back in line but continuing to

press to maintain the drive out of corners.

As my confidence started to rise, so did the tyre temperatures. I was having a ball, working the delightful motor in the 8000-9000rpm bracket, and absorbing the sound effects. The only straight on the track was sufficient to get it into sixth gear, before notching it down to second for the tight right-hander that signified a new lap. It was at this corner that Mike performed massive, oversteering powerslide exits and even the odd doughnut.

I didn't drive this car for too long, as the close proximity of the barriers, less-than-perfect seating position and my own limitations encouraged me not to push my luck. However, I did enough to be sure that, in the coming year of competition, this Mini will ruffle many feathers in competition.

At the time of our track test, Mike had only done one event – in which he scared himself silly, and parked the car in a ditch. A test day followed in which spring-rate changes massively improved the handling, and the next event at Snetterton showed the potential of the car. A first place in the 1300cc class and 20th overall in a field of 63 cars is impressive. Mike's overall time not only won the class, it would have given him third in the 1600cc class, seventh among the 2-litre cars and a giant-beating fifth in the muscle-bound 4WD turbo class. Impressive, by anyone's standards.

Homologating this Mini was not an easy process but, now that the technology has been proven, I think it'll be the first of many bike-engined Minis. Mike was brave enough to commit to the project, and Chris Allanson has delivered a machine capable of doing the job. Keep your eyes on this one ■



This is the first of several bike-engined Minis being constructed by Z-Cars. It ain't pretty, but it goes. Let's see a road car next...

→ TECH SPEC

998cc R1 RALLY MINI

⊕ **ENGINE** Tweaked Yamaha R1 998cc four-cyl 20v • 23.1mm inlet, 24.6mm exhaust valves • rejacketed Mikuni BDSR40 carbs • NGK CR9E plugs • Denso U27 ESR-N leads • Facet electric fuel pump, filter • rear-mounted Fiat Uno turbo-diesel rad with twin fans • bespoke Tony Law side-exit mild steel exhaust system

⊕ **GEARBOX** Yamaha R1 6-speed sequential manual 'box • custom 2-piece propshaft • Quaife reversing transfer box • Quaife ATB limited-slip diff • 3.32:1 crown wheel and pinion • Escort Cosworth diff housing • multi-plate wet clutch • TTS alloy billet clutch basket

⊕ **BRAKES** Front: non-servo-assisted • Metro turbo vented discs • 4-pot iron callipers • Rear: machined Escort solid front discs • Suzuki GSXR1100 callipers • hydraulic handbrake operating Kawasaki ZZR1100 callipers also on rear discs

⊕ **SUSPENSION** Front: modified front subframe •

Mini top arms • adjustable bottom arms • tie-bars • Gaz dampers • 250lb coil springs

• Rear: Z-Cars beam and radius arms • Gaz dampers • 200lb coil springs

⊕ **WHEELS/TYRES** 6x13-inch Weller wheels (Mini-fitment front, Ford-fitment rear) • Yokohama A048R 175/50x13 tarmac tyres • Yokohama A008 175/50x13 road tyres

⊕ **EXTERIOR** 1972 'shell • de-seamed • custom alloy arches • carbon fibre front end • alloy doors • fibreglass vented bonnet, boot • Perspex windows • optional four pod-mounted PIAA halogen spotlights on separate bonnet

⊕ **INTERIOR** Cobra Monaco FIA-approved seats • Sabelt 6-point harnesses • 3-inch shoulder straps • Smiths speedo • VDO tachometer • TIM temp gauge • Datatool Digi gearshift indicator • Mountney steering wheel • aircraft-spec switches • gel battery • full rollcage • chequerplate trans tunnel

→ OWNER

MIKE SMITH



Age: 39

First car: 1979 Austin Mini 1275cc – cost £500

Cars currently owned: Volvo 850 estate, R1 Mini

Ultimate car: twin-engined R1 Mini

Partner's opinion of the Mini: hates it with a passion

Mike Smith would like to thank his loving wife Gill and the kids, Chris Allanson, Simon and Spike at Z-Cars, Cottingham MoT Centre, Gav at Cottingham Tata, Richard Glew and Guy Gladwin for navigating, Bill Steels and Jon Vine for servicing

WANT ONE?

If you would like a bike-engined Mini like Mike Smith's (or not), contact Chris Allanson at Z-Cars on 01964 527725