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McRae's MkII

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Rally legend Colin McRae goes back to his roots with the fastest, most advanced rally Escort ever made.

IMAGINE YOU'RE A WANNABE RALLY DRIVER OBSESSED WITH CLASSIC FORDS. You watched your famous dad throw Escorts through forest tracks in the '70s and you love their shape, their indestructibility and their spectacular sideways attitude. You start rallying and turn out to be pretty good, exceptional even. Once you start to control your fearlessness, you become the best in the business, and eventually you're world champion and a household name. But now that you're armed with the sort of income that would make a Premiership footballer envious, you just have to have a rally Escort of your very own.

Except one thing is stopping you. After years of driving the best WRC cars around, a MkII Escort just doesn't do it for you — even in top spec they're under-powered, slow and their live axle means that they spin up and go sideways when you just want to go forwards.

The solution? Build one for yourself. Colin McRae has, and the result is the most technically-advanced MkII ever to venture into the forest.

The spec of McRae's Escort reads like a wish list of the sexiest of rallying parts. With independent rear suspension, a six-speed paddle-change gearbox, a 330 bhp Millington Engine and enough carbon-fibre to make an F1 car, this Escort was always going to be impressive. But it isn't the list of expensive brands that makes this car so special; it's the way that the car has been put together with exquisite engineering and attention to detail.

Rally god McRae commissioned David and Julie Plant and their DJM Motorsport concern to build this MkII for him. Initially the idea was just to improve handling with an independent rear suspension set-up, but soon his enthusiasm got the better of him and what was going to become a lightly-tweaked Group 4 rally car turned into the ultimate Escort.

Build guru David takes up the story: "Colin had been looking to improve the traction of a MkII for quite some time and had talked to the guys from Proflex suspension about making an independent rear suspension set-up for a MkII. They were up for doing it but didn't have the engineering capacity. That's when Proflex's Gordon Birtwhistle got Colin in touch with us about making it for him.

"Soon Colin was on the phone about sorting out the rear suspension on the car. Initially we were only down to do about 10 per cent of the car. Then we arranged for Colin to come down so he could have a proper look at our operation. →



“Colin’s enthusiasm was obvious. He spent most of the day looking at our KA (a tarmac-spec, four-wheel drive Cossie-turbo rally car with 315 bhp and 450 lbf.ft of torque) and he wanted us to do more for him.”

Once McRae saw the quality of David and composite-expert Julie’s work he realised that they could produce a car that could live up to his dream. “We needed to make the car handle better. This was done two ways. The first was through suspension. By using the independent rear suspension we could greatly improve travel and traction. Most Escort rally cars

have around 155 mm of suspension travel, but now we have 215 mm of travel.

“The front and rear both use McPherson-type struts with Proflex roller bearing struts,” David explains. “They are virtually frictionless and because of this can be sprung much softer than most struts resulting in a super-supple ride and loads of traction. Everything is fully adjustable including the wishbones themselves, and both front and rear have adjustable tracking arms. Suspension geometry is courtesy of 600 miles of flat-out forest testing by Colin.” This set-up is similar in concept to a WRC car and costs around £8000.

The rear end of the car is a triumph of simple engineering genius. The rear suspension pick-up points, the Cossie 7.5 inch diff casing and the driveshafts sit in a frame at the rear. The subframe points pick up the back of the roll cage and it’s this that drives the car forward. “It’s a true spaceframe — the body has very little structural contribution now,” says David.

The second way of improving the car is more complex, but just as effective. As a rally car the Escort was always flawed by its ’70s road-car roots — and it was more than just the axle. “The Escort suffers by having too much weight at either end —



So you’re into classic Fords then, Colin?

“I remember watching Escorts in the forests when my father started rallying and they always

looked the best and sounded the most spectacular. They stuck in my mind and now that MkIIs are making a big comeback, I thought I’d build one of my own for rallying.

“Out on the stages there’s so little body roll and it means great corner speeds. That’s to do with the engine and ancillaries being so low down. It’s also very light making it extremely responsive and allows me to brake late.

“I’ve not had it right on the limit yet either. You can go so deep into corners that you think you’ve missed your braking point, then it stops and you’re right on line. I know that there’s still a lot more to come from the car.

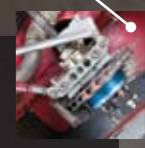
“You can’t compare it to a WRC car. It’s 300 kg lighter, which makes a massive difference. It does lose out with the lack of 4wd, but traction is very good. And once you get up the gears, it really starts to get your attention. The faster you go, the lighter and more responsive it becomes. It gives me a real buzz”
Interview Phil Royle



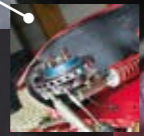
TRANSMISSION
David’s own design, it has a magnesium casing for lightness and strength. It’s a sequential unit (back for up, forwards for down) but also has an electronically-operated paddle shifter on the steering column. Special design means the engine can be mounted low in the car. Uses a 7.5 mm Sierra Cosworth diff casing with a Gripper LSD.



BRAKES
Forrest-spec Alcon four-pots bite onto 285 mm vented discs up front. Two-piston APs do the job at the rear. The same sized discs are used all round for simplicity.



SUSPENSION
Fully-independent all round. The car uses McPherson struts front and rear. Suspension geometry is fully adjustable and was finalised after hundreds of miles of testing by McRae. Proflex struts are adjustable for preload, rebound and high and low-speed compression damping. All in all the suspension set-up alone costs about £8000. Uprights were machined and made in-house.



with the fuel tank over the rear axle and the engine quite far forward. This gives it a high polar moment of inertia — which in layman’s terms means it’s susceptible to lots of oversteer and understeer. We’ve reduced this by moving the engine back towards the bulkhead and the fuel tank’s near the centre of the car. It now has 50/50 weight distribution. We’ve lowered all the major components of the car too; the gearbox and engine have been dropped and even the wheelwell lowers the CofG.”

Every move made on the car required a serious amount of engineering to get it to work. In order to shift the position of the engine a new gearbox was needed. Initially Dave was to source the gearbox from an external supplier, but the box wasn’t deemed good enough — and it didn’t lower the engine by as much as it could.

“In the end we set up our own company to engineer the gearbox. It has the input and output shaft parallel so that the engine can be even lower. All in all we’ve

moved the engine back 330 mm and about 50 mm down,” he says.

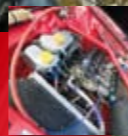
The gearbox is an absolute work of art. The straight-cut dog-box has a sequential shift action and a paddle gearchanger — just like an F1 or WRC rally car. Combined with a quickshifter it allows lightning-fast shifts with the throttle still buried. Ratios can be almost infinitely changed to suit gravel and tarmac stages.

Nearly everything on the car has been moved to get it as close to the centre of





ENGINE
 The 2.5-litre Millington Lump kicks out 330 bhp and revs to over 8000 rpm. Even more power would be available, but only by sacrificing drivability. Originally based on a normally-aspirated version of the Cosworth YB, it has developed into a virtually bespoke engine. It is mounted 330 mm further back than stock.



BODY
 Carbon/Kevlar boot and bonnet are used to reduce weight, but every other panel is steel for durability. McRae wanted the car to look as much like a standard rally Escort as possible – the tinted windows are to hide the goodies inside.



gravity as possible. The seats have been moved back, closer to the centre of the car, with a driving position designed around McRae. The pedals are floor-mounted to keep the weight as low as possible — they are even offset to allow left-foot braking by the 1995 world champion.

“They were Colin’s design — we simply fabricated them out of alloy. They’re 60 mm off the floor of the car and are much lower than a conventional pedal box,” says David. Even the position of the fluid reservoirs has been thought of. They’ve been moved towards the centre of the car and are mounted in their own custom-made carbon inspection box on the floor. Stunning.

Even the fuel tank is sex made metal. The 40-litre bag tank sits low just behind the seats and is shrouded in alloy and carbon-fibre. Despite the interior mounting, it still has an external filler cap — a massive length of fat, braided hose snakes its way up from the centre of the tank to a filler mounted low on the left-hand-side C-pillar. Having the fuel tank in the centre makes massive sense — quite literally. Not only does the lack of weight over the rear end reduce the polar moment that makes a car oversteer wildly (think early rear-engined Porsche 911) but means that the balance of the car isn’t altered as fuel is used.

These are just a few of the examples of clever engineering →



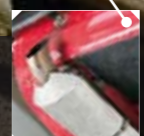
UNDERBODY PROTECTION
 Bullet-proof Kevlar protects chassis rails and sills from massive Scottish rocks. When in gravel-spec the car has a 5 mm alloy sump guard and diff protectors and flexible acrylic sheet protecting the wishbones. When it’s used for tarmac rallies, the suspension protectors are removed and the guards replaced with Kevlar items.



ARCHES
 The alloy rally arches were manufactured to DJM’s spec by Ralloy. They were designed to accommodate 15 inch wheels.



EXHAUST
 A modified Tony Law manifold mates to DJM’s own stainless-steel system. It has its own protective plate to shield it from stone blast. It is fearsomely loud.



WHEELS AND TYRES
 Minilites and Dunlop are the choices here. McRae runs 15 inch rims with varying widths for tarmac and gravel. DJM reckons a design with less offset would improve performance, but McRae likes the classic look.





DASH

A total work of art, the carbon dash weighs just 750 g — a standard dash weighs 10 kg! It houses an SPA rev-counter, a multi-function gauge and a digital gear position display. Rally computer sits on left-hand door with own bespoke mount. All interior carbon work was done by Julie; including the door cards, rear panels and all interior fittings.

GEARSHIFTER

Made out of hollow carbon to McRae's own design. You flick it to go up and push it forward to go down the gears. Gearlever on tunnel is included as a fail-safe.

STEERING COLUMN SHROUD

Made out of pre-preg carbon to hide the extra-long steering column, it houses all the switches that would normally be on the dash, but are now too far away to reach.

PASSENGER FOOTREST

Made out of carbon-fibre, it hides the custom alloy-fabricated washer bottle. Carbon shroud above it hides the dry-sump filler.

HANDBRAKE

Fabricated by Julie, the carbon-honeycomb rod operates the rear APs. It's that long so that McRae spends as little time with his hands off the wheel as possible.

FUEL TANK

The 40-litre tank is just about the only alloy piece that wasn't fabricated by DJM. Tank is shrouded in carbon-fibre and has an aerospace-spec braided steel filler.

ECU

Weber-Alpha ECU controls the hybrid throttle bodies and mapping. The box above controls the quickshifter — which allows flat-out clutchless gearshifts.

SEATS

Carbon-fibre seats are made by Sparco to McRae's own fitting. Six-point, FIA-approved harnesses hold McRae and Grist in.

solutions and the kind of attention to detail that a works rally driver is used to, but is still appreciated by the classic Ford-crazy world champ. "Working with Colin on this car has been a real pleasure. We've spent hours talking on the phone and every few months he'd fly down from Scotland in his private helicopter. The pride was obvious on his face every time he saw the car. He's a proper petrolhead. He just loves cars," says a very pleased David.

"There have been so many surreal moments working with McRae on this project. When we had just got the car into a running state, I gave Colin a phone and said the car was ready to run. Normally I have the first drive in the cars that we build, but this time it was different. He flew down from Scotland, made himself late for a meeting in London and then drove it out of the workshop. It was one of the most bizarre things that I have seen — a world rally champion driving an Escort around an industrial estate with no glass, no boot, doors or bonnet! He was as involved as if he was testing a new WRC car for the first time." →

McRae just can't get enough of driving it and the end result is that it's as well developed as any WRC car. "We've done about 500 stage miles in the car now and Colin is always testing new things for it. He's the best development driver any of us have ever worked with and he puts as much enthusiasm into this car as he would his works car. Working with him is impressive as he is so professional. Every time we take the car out to do some development he never wastes a mile.

"We can prove that the car is 1.8-2 seconds faster a mile than a GRP4 Escort. Colin has got some serious speed out of the car. We've got footage of Colin at the Killarney Rally and he's hitting 125 mph on

the roughest roads imaginable. At 900 kg it's around 300 kg lighter than a WRC car and straightline performance is incredible. It still doesn't have the traction of a 4wd car, but because it's so light and well balanced you can take real liberties with it. It gives you massive confidence," boasts David.

The sheer amount of time, cash and motorsport boffin brain cells means there's no more highly-developed an Escort than this. It's the ultimate in so many ways. Packed to the brim with the latest technology and driven harder than any other Escort on the planet, it's very special indeed. We want one. And we bet you do too.

Who Is DJM Motorsport?

DJM's Nottinghamshire workshop is a fascinating place to poke around in if you are into mechanical transformations. Stick your head in and you'll see 4wd KAs with Cossie lumps, wild rallycross cars and rolls and rolls of ready-to-bake, pre-preg carbon-fibre. Owners David and Julie Plant work wonders as they combine new, hi-tech materials with old-skool engineering.

DJM was set up 13 years ago and has produced over 200 wild cars. "The Escort is among the most important we have done," says David. "Working with Colin means that we've been able to develop things much further. There's no

better rally test driver in the world." Colin's development work has done classic Ford owners a massive favour — now there's a fresh source of highly-developed, quality competition parts ready to be fitted to your Escort.

"Everything we've done on Colin's car we can now do for any other classic Ford owner. We've got jigs, patterns and moulds for everything we've built and we can supply kits for independent rear suspension as well as any part from the dash to the gearbox. We can build near-replicas of Colin's car, but are happy to sell any part. If you fancy having a piece of Colin's car call 01623 836503.

What's A Millington Engine?

Millington engines are legendary in rally circles. Based around a highly-modified head from a Cosworth YB unit, so many parts of the motor are custom-made, it almost becomes a bespoke motor. With years of racing and rally success, Millington is an expert on how to get the best out of a screaming NA engine.

Everything apart from the head is either custom-made or manufactured at Millington's own facility. Millington buys in blank cylinder heads from Cosworth and CNC them to its own spec, whether it's for turbo, race or rally applications. The block is its own too, which allows it to increase the engine's bore and stroke compared to a YB, and its race engines have a maximum capacity of 2.6-litres.

McRae's 2.5-litre motor is running top rally spec, with hybrid Weber Alpha/Jenvey throttle bodies. It kicks out 335 bhp at 7750 rpm and 235 lbf.ft of torque at 5600. In a car weighing 900 kg, performance is amazing.

Tech Spec

Bodywork

1980 MkII Escort with semi-spaceframed chassis, steel front and rear wings and roof, standard floorpan, multi-point cage that continues into the engine bay and triangulates with strut tops and chassis rails, rear subframe for independent suspension, Rally 15 inch forest arches made to DJM spec, alloy front spoiler, carbon-fibre rear spoiler, roof-mounted snorkel, Kevlar chassis protectors, Kevlar sump guard and diff protectors (tarmac), 5 mm alloy sump guard and diff protectors (gravel), acrylic suspension protectors.



Engine

2.5-litre Millington unit, custom-made tall block, pistons, cams, crank, ported Cosworth YB-based head, Weber-Alpha throttle bodies and management, forced cold-air induction, modified Tony Law manifold, custom-made DJM exhaust system, custom-made DJM radiator and header tanks, custom-made alloy power-steering reservoir. Power: 335 bhp. Torque: 220 lbf.ft.

Transmission

Six-speed sequential gearbox, magnesium casing, parallel input and output shafts, electromagnetic paddle shift, single-piece steel prop, Gripper LSD with 7.5 inch Sierra Cosworth housing, custom-made steel driveshafts, 3.64:1 final drive ratio.

Suspension

Front and Rear: Proflex low-friction roller bearing struts, adjustable for preload, rebound and high and low-speed compression damping, fully-adjustable A-frame lower links, custom-made DJM cast alloy uprights.

Brakes

Front: Alcon four-piston gravel-spec callipers with 285 mm vented discs. Rear: AP two-piston callipers with 285 mm vented discs, hydraulic fly-off handbrake.



Interior

Multi-point cage, internal 40-litre fuel cell, dry sump, washer, brake and clutch reservoirs, custom-made floor-mounted alloy pedal box, Sparco carbon seats, Sparco removable steering wheel, custom carbon dash, steering column shroud door card and rear panels, carbon fuel cell cover and supports, carbon passenger brace plate, helmet nest, SPA rev counter, digital gear indicator, rally computer.



Wheels And Tyres
7x15 Minilite rally wheels with Dunlop competition tyres.