

# DARK HORSE

**A** secret new British car is about the most public property in the country. The 'Mini-Metro,' 'Rover 800,' 'Jaguar XJ40,' 'Schumacher 'CAT' and 'PB 'Mini-Mustang' all fall into the net; although the public at large may be somewhat less aware of the last two! Yet the 'CAT' and 'Mini-Mustang' were at one time the same car.

Cecil Schumacher and Keith Plested of PB spent time a year or more ago discussing a collaborative project to take on the world of 1/10th Off-Road racing. Whether Schumacher or PB deserve our thanks for not persuing this route is unknown — thanks because we now have the choice of two excellent, but different, approaches to winning. Make no mistake that these are competition cars — not mobile models — and one hits the club driver target with more accuracy.

PB already make 1/8th circuit and rallycross chassis which do their share of winning. Including export sales of the *Demon* 'MF83' 1/12th car, PB are unique in the world, now having supplied cars in all four of the recognised BRCA scale sections. Uniquely they have twice won the 1/8th Circuit World Championships — the box leaves you in no doubt proclaiming 'World Champions' in large letters!

'Mini-Mustang' has no revolutionary features; it is nonetheless full of neat touches for that.

Selling 1/10th cars the *Tamiya* way requires an eye-catching box, and PB deliver with a colour artist's rendition of the 'Mini-Mustang' at speed. Inside are wheels/tyres and body on 'bubble' packs, and minor components in clearly labelled bags, and large items neatly packed.

Extracting the large (A4) blue covered instruction book in fear of inadequate assembly details — British kits have been like that — brings only joy. The book is superb, plenty of photos and helpful hints on top of good details. Concern over missing parts — through personal experience — is also unfounded, everything was in place as advertised.

The first job is to read the instructions right through so as to familiarise oneself with the methods of assembly — leave this step out at your peril with any kit!

Differentials are of star bevel pinion design, no difficulty encountered in getting two

reasonably free running units. Already the importance of a good quality No. 1 *Posidrive* screwdriver for the self-tapping screws is revealed. Unless the correct item is used screw heads will be damaged and correct tightness cannot be

**In the race for top honours PB's Mini-Mustang may pip the rest at the post. Pete Winton has been assessing an outside chance**

obtained. Don't skimp — go out and buy the correct item now from a reputable maker such as *Stanley*, it is worth every penny.

Our kit was four-wheel drive, so four identical axles are mounted in their blocks. Support bearings are wide spaced to give good wheel location. Drive to the wheels is via a crosspin and triangular wheel drivers a *la* 'Hotshot.' The crosspins are a pushfit onto the wheel driver, no more scrabbling in the grass at meetings to rescue lost crosspins!

First contact with the centre chassis spine is to insert the steering servo. The hole is designed to accept the popular *Futaba* 'FP-131' servo, or one of similar size. I do not recommend enlarging the hole for bigger servos, this could lead to problems. A small plate should be made up to accept smaller servos.

Clever design has incorporated the main pulley into a bracket which doubles as an idler carrier and belt adjuster. Make certain that there is adequate side play in the idler pulley and that it is free running on the shaft.

Fitting all items into the left hand spine half and routing the Kevlar reinforced belt is slightly fiddly, but after a couple of dry runs the knack is developed to make the operation successful. Exercise great care in tightening the self tappers, our car now contains one 2mm nut and bolt to replace a stripped self tapper! Two or three such nuts and bolts should be in the

kit, they cost pence, but relieve the frustration of an easy mistake.

An aluminium motor layshaft bracket fitted to the right side of the spine holds the motor in front of the rear axle as close to the ground as possible. The layshaft is supported by ballraces at both ends — and here was my only mistake with the instructions.

Before fitting the 8 x 4mm collar to the non-gear end of the layshaft the last remaining 8mm x 4mm ballraces must be pressed gently into the counterbox in the spine — shown on the previous page.

A 54 tooth spur gear is easily located on the gear carrier. Combined with the supplied 17 tooth pinion I calculate an overall ratio of around 7½:1 — standard motor ratio (27 or 28 turn single). PB really should include an alternative ratio for modifieds as well. Alternative gears are available, but the temptation for users to make alternative adaptors to take *Kimbrough*, *Associated*, *Parma*, or *Schumacher* gears — which many already use — will be greater because PB fail to equip the user properly in the first place. The instructions would also benefit from a ratio chart.

Wheels are supported on double unequal length wishbones. Free movement of the upper wishbones is essential, and easily obtained following the instructions. The lower wishbones are fitted into slots in the base of the spine which provides excellent lateral location in addition to simplified assembly.

To give the best free movement the inside faces of the wishbone pivot 'legs' must be carefully deflashed with a sharp modelling knife.

Position the rear anti-roll bar and offer up the epoxy glass chassis plate. A small amount of material was filed from the plate at the rear to give uninterrupted movement to the rear lower wishbones, the same process was required at the front to remove flash from the angled plastic bumper support. All eight wishbones should 'flap' up and down freely.

Front steering components, including servo saver, and anti-roll bar links present no problems. Front and rear track rods use the most enormous ball joints ever seen. These are bomb proof. Squeeze gently with pliers once fitted to the steel balls to obtain a free movement without slack. This free movement in balljoints is most important.



Ball and pin style driveshafts are used, but uniquely the shafts are plastic mouldings. The user has to fit the pins into each end and retain with a locking compound or 'superglue.' The latter method requires speedy work to position the pin centrally before the glue goes off.

Assembling the axle blocks to the wishbones requires an engineer's vice with at least a 2½in. opening. I'm not sure everyone will possess such a thing — I do not — but take it from me there is no other proper way of doing the job. 'Popping' both balls into the

wishbones is an agonising task. The axle blocks collapse alarmingly onto the drive cup and you feel that the end is nigh for your pride and joy! Persevere until both joints 'pop' — all returns to normal with no detrimental effect on anything.

Driveshafts, track rods, and driveshaft supports all fit as described, the car now takes shape rapidly.

Each wheel is controlled by its own spring/damper until comprising a plastic moulded oil-filled damper with steel spring running outside and 'adjusted' by a plastic clamp. Contrary to advice, our 'Mini-

Mustang' uses *Tamiya* Light Damper Oil. The suggested 3 in 1 oil is readily available, but not designed as a damper oil. Over a period 3 in 1 can rot oil seals, and may not be as stable as oil designed for the job. Whatever you choose make it a light (low viscosity) oil.

Assembly is straightforward but benefits from previous experience. If a friend/relative who has previously assembled dampers can be found, take their advice. Ensure that the security pins holding the end cap are pushed fully home and engage in both holes in the damper body. Although not a

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constant volume design, a smooth action is possible with little effort.

A word of caution. Imperfect moulding means that the two holes in the pistons are not of uniform size. This will greatly affect the damping rate of each unit, and damping rates must be uniform on each side. Spend time making each hole the same size, using a suitable small drill if necessary. Holes must be of the same size, clean and burr free.

Fit the piston rod and piston assembly into the damper body without oil to check that movement is free from top to bottom, even when the piston is rotated. There must be no binding at any point in rotation or stroke of the piston. Lastly in the caution stakes, oil the piston rod to avoid damage to the silicone O rings during fitting.

PB suggest buying further damper sets and building them with different oils to suit track conditions. At £6.19 per pair this seems to be a practical idea. Dismantling dampers of this design at trackside to change the oil is not going to be easy!

Springs are easily fitted but take care not to mark the piston rod whilst gripping it to fit the lower trunnion.

Tyres are from *Dynamite* — low profile four row studded pattern — and fit to PB's own red nylon wheels with a small drop of cyanoacrylate (super glue) to prevent rotation or detachment. PB advise that any 'Hotshot' style tyres (and wheels) will fit — no doubt a range of adaptors to take others will appear before long.

The car was set up in 'beginner' mode according to the last page of the instructions.

Front wheels set dead ahead (no toe in/out), rear wheels slightly toe-in.

At the rear PB's roll induced steering effect is available. Bearing in mind slightly adverse comments by Colin Leake on this feature when fitted to the 1/8th PB 'NOVA X5,' no 'RISE' has been dialled in — yet! Springs are set at the top of the damper body, full steering available.

The battery clamp and connector is an excellent idea. The design makes for positive location and two clamps are included. The self taper in the clamp is useless, and should be immediately changed for a suitable M3 nut and bolt. Using the clamp as the electrical connection is a matter of personal choice. Insertion and removal of the pack acts as an on/off switch for the car if the system is used as an electrical connection.

Finally, the (non-supplied) electrical, and radio control components are shown in their suggested positions. The receiver is fitted a long way from other electrical parts, but may be vulnerable to rear impacts. Our 'Mustang' uses a JR 'Beat 2' Pro 'receiver, Futaba' FP-S131SH' servo, Lazer 'Buggy FET' speed controller, and SRM 'Race Prep' 28 turn motor — all tried and tested items with high reputations for winning.

Kit reviews should tell the reader what he/she wishes to know. Since a friend started running the 'Mini-Mustang' he is most often asked how it compares to the *Schumacher* 'CAT.' At the time of writing I have not driven either, but have first hand experience of

building both — so here goes.

Anyone following PB's instructions to the letter will achieve a result that satisfies in eight/ten hours. I leave you to assess Geoff Driver's comments on the 'CAT' (RCM&E Dec. '86) for your own comparison.

The 'Mini-Mustang' has four-wheel drive, independent suspension, good choice of gear ratios, mid engine layout, and excellent suspension geometry. The 'CAT' offers variable drive to the front wheels in addition, but the PB boasts easy belt tensioning, quick release battery pack, and

superb chassis rigidity (the 'CAT' is more flexible here — not desirable according to the textbook).

The 'CAT' offers deflectable front suspension to minimise damage, the PB has a large front bumper to protect the front wheels. It boils down to two very similar cars which solve the problems quite differently.

Up to the point where they got onto the track, the 'Mini-Mustang' solution is more appropriate to the clubman. If you select your cars by ease of assembly only — then buy a

*Tamiya* kit. Both the 'Mini-Mustang' and 'CAT' are designed for the track, and that must be where the final judgement is made on these two cars.

PB have annoyed me with the 'Mini-Mustang.' The design and build integrity is let down by poor moulding. Parts have excessive flash on their edges and holes, worst in the damper pistons where uniformity is essential. Screws should be straight cut heads for easier assembly, and machine screws/nuts would be better in the spine. Niggling points — yes;

but this is all that separates this kit from Japanese levels of all round quality.

Marking out the 'best' from the 'rest' takes care in dealing with the small points. I beg PB to spend as much effort developing their moulding techniques as they have designing the car — it will pay off in sales.

At this level we are being asked to pay £150-£175 for a car. Buyers will no doubt be cautious. RCMC has been careful about recommendations in the past, so our final opinion must rest on the track test. I do

however congratulate PB on a marvellous effort to date, this is a fine kit — is it a fine car...?

Available from all good model shops and direct from: PB *Racing Products Ltd.*, Downley Road, Havant, Hants. PO9 2NJ.

**Price:** 4WD single speed £159.50, 4WD 2 speed £179.50.

**Spares:** Dampers, front £6.19 per pair. Springs 48p each. Dampers, rear £6.19 per pair. Springs 50p each. Spur gears (single speed) 54, 56, 58 and 60 tooth £1.01 each. Motor pinions (single speed) 11 to 22 tooth inclusive £1.98 to £2.00. Motor pinions (two speed) 11/17,

12/18, 13/19, 14/20, 15/21 £3.79 each. Gear ratios — multiply motor flyshaft ratio by 2.33 e.g. 14 tooth motor with 54 tooth spur 54:17 = 3.18:1 3:18 x 2.33 = 7.40. Overall ratio is 7.40:1.

Above: mean and moody and ready for action; PB's Mini-Mustang will appeal to the club racer and expert alike.



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1. Inside the centre drive spine showing the Kevlar re-inforced drive belt running the full length.

2. The two complex spine mouldings bolt together to form a very rigid chassis member. Shown underneath are each of the four stub axle housings.

3. The main drive gear assembly mounted in front of the rear axle. Single speed or automatic two-speed gearbox can be fitted. To the right of the gear plate is the belt tension adjustment screw.

4. The rear suspension from behind showing the Roll Induced Steering Effect (RISE) rear-end. By adjusting the height of the track-rod's RISE characteristics can be altered. Adjusting the length sets the amount of rear-wheel toe-in or toe-out.

5. Rear damper positioning; in front of the wishbone out of harm's way, the dampers are moulded plastic units which are both relatively inexpensive and lightweight. Also note the rear anti-roll bar fixing on the lower wishbone.

6: Motor mounting within the centre spine keeps the motor out of harm's way.

Also this midship mounting is the reason for the car's natural balance.

7. At the front showing independent suspension set-up.

8. Front dampers are of the same design as the rear. Again note the anti-roll bar placement.

9. Front drive shaft guides help to keep everything in place when steering is applied. Steering track rods have heavy duty ball joints.

10. Wheel hub fixings are very similar to those of the Tamiya four-wheel model range. In fact Tamiya wheels and tyres will fit.

11. Also mounted within the centre spine is the steering servo. The space provided should allow access for all makes but check first.

12: Quick release Ni-Cad pack fixing.

13. In operation: a simple press on the spring button releases the pack instantly.

14. From underneath: the GRP chassis when fitted to the centre spine produces a very strong chassis.

15. Overall view of the Mini-Mustang.

