

Model cars takes an early look
at one of the top contenders for
1988



OPTIMA MID

Since the world championship at Romsey, conversation at 1/10 club meetings have centred around three things. Where can I buy a *Schumacher* 'CAT', when will the Mid Motor 'Optima' be available and what do you know about the new 'Yokomo'? If you know the answers to all three questions, answers on a postcard . . . you know the rest.

What you get

This review will examine the mechanics and kit build. Performance will be the subject of another article.

The car in this review does vary a little from the world championship version with a slightly reduced specification. I suspect that add ons will be available or maybe a more fully equipped version may appear later.

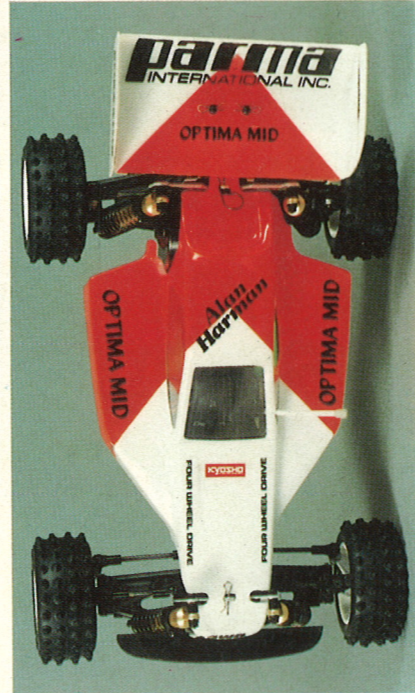
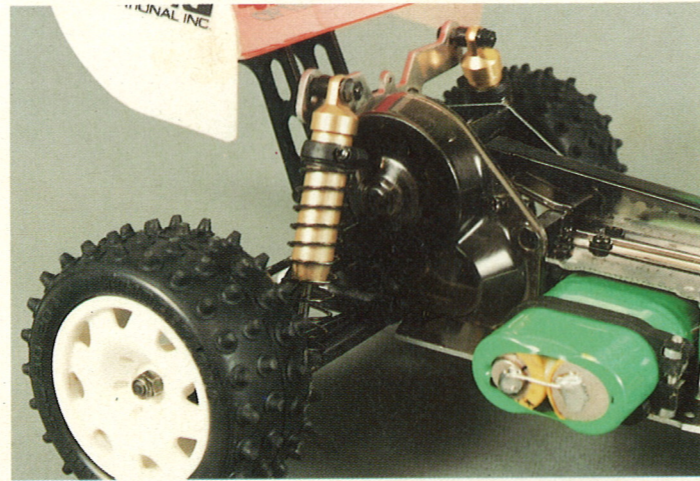
The basic specification hinges on a course pitch (five teeth per inch) belt driving from rear to the front axle, although the primary motor reduction is still via gears. The main reduction gear incorporates a slipper clutch to absorb transmission shocks, a favourite system used by *Kyosho* these days. This main (74 tooth) gear is mounted on an extended shaft which drives the gearbox primary gear. An idler gear transfers the power to the rear differential which incorporates the rear toothed belt pulley. This allows the toothed belt to pick up the drive from the rear axle, travelling around an idler toothed pulley mounted on the main gearbox input shaft and then to the front axle. Front and rear differentials are of the two pinion type and come ready assembled. Ball and pin drive shafts connect to the

front and rear wheels. A total of eighteen ball races are supplied with the kit (including the wheel bearings) in an effort to keep frictional losses low.

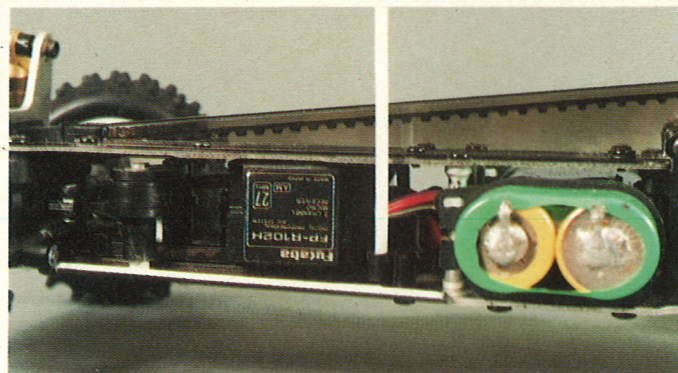
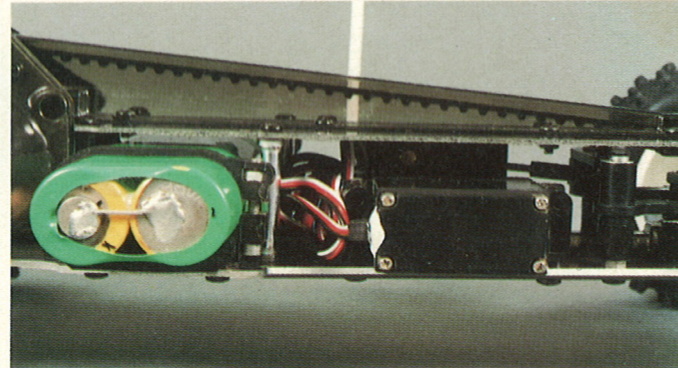
Over the bumps

Suspension is based on the now well tried and tested 'Optima' series, with the bottom wishbones similar to the Turbo 'Optima' with single adjustable length top arms. The inner ends of the top arms for both front and rear suspension are provided with a mass of alternative fixing positions, the rear has a total of ten alternative fixing holes on each side, the front arms have three alternative positions. Shock absorbers are the usual coil over type with 'Option House' dampers. Keen Kyosho fans will note that the front steering uprights are the type to be found on 'Optimas'. A good point for spares availability. Finally there is the chassis pan. On this version it is a pressed aluminium pan of a nominal 2mm thickness. The upper section of the chassis unit is GRP sheet. A slot in this top plate allows the drive belt to come from the main gearbox in the rear of the car down through the upper GRP plate, around the front axle differential and returns along the bottom chassis plate. Neat polycarbonate covers protect the belt on the upper and lower path. Batteries are mounted across the chassis just in front of the motor, which itself is mounted in front of the rear wheels. This "mid" mounted motor gives this car its name of 'Mid Optima'. The design follows both the 'CAT' and PB 'Mini Mustang' in attempting to bring some of the mass of the car within the wheelbase. A two wheel drive car needs to keep a good contact between the rear driving wheels and the road, hence the practice of hanging the motor beyond the rear axle. Although it works, see the 'RC10', Porsche and others I have this feeling in my bones that there are some very funny forces at work with this design of car. Indeed I have heard a number of eminent automotive engineers comment about the Porsche being a very successful car "despite the design". Perhaps Ferdinand knew something after all. The four wheel drive cars need to get some mass over the front wheels as well as the rear, and the simplest way is to get the motor inboard. Of course there is a lot more to the dynamics of car design than that simplistic view, but to quote Brunel who made everything from bridges and ships to railway locomotives, "if it looks right then it must be right", I think that the 'Mid Optima' looks right.

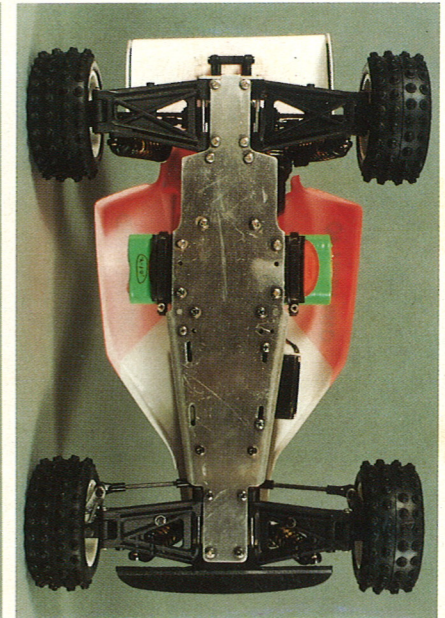
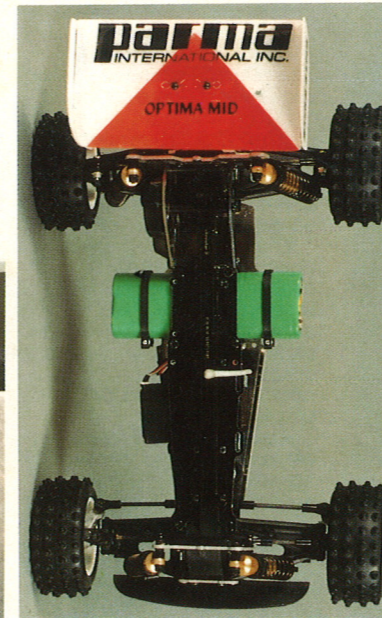
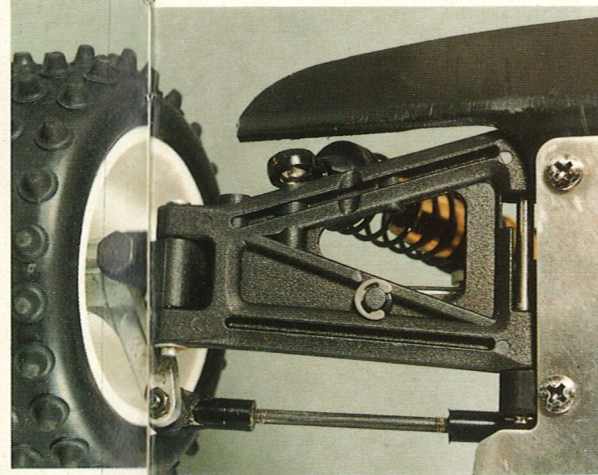
The battery supports keep the battery clear of the belt and have two alternative positions for weight distribution changes. A well positioned servo saver and slave should



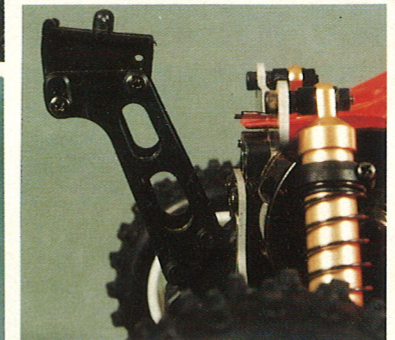
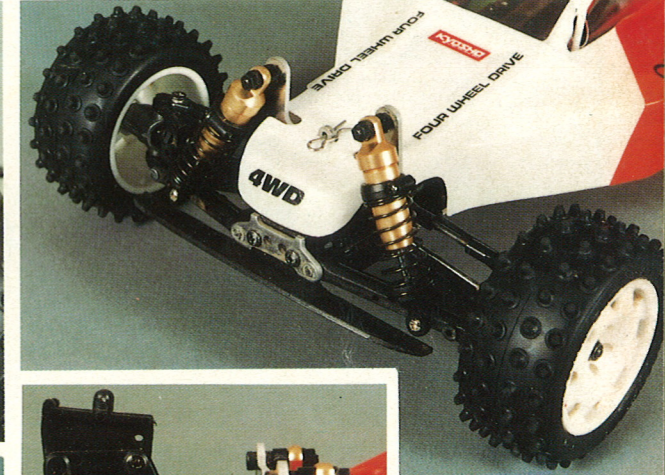
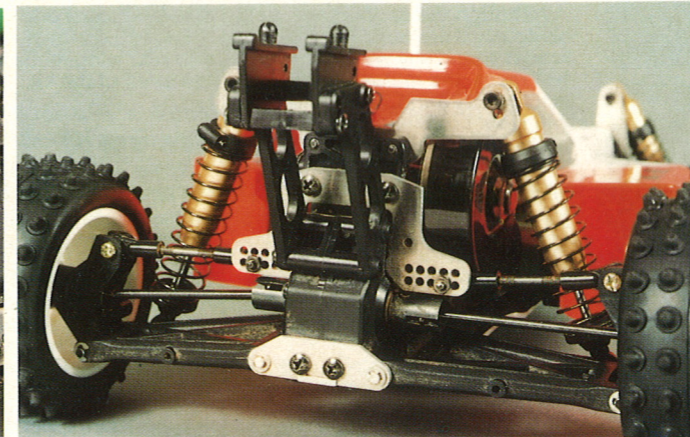
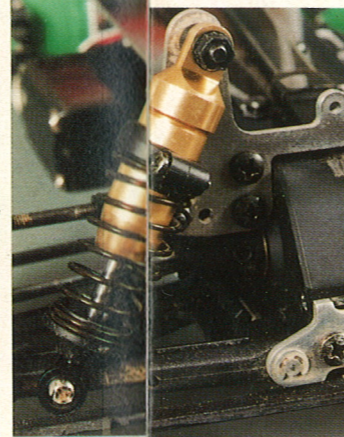
Top: The motor drive gears are enclosed by a plastic cover. Above and right: The car is fitted with a Parma monster wing although an adequate wing is included in the kit. Below: Peugeot 1.9GTI-styled wheels are included and are one piece. Bottom: Cell location is adjustable - note large tooth belt.



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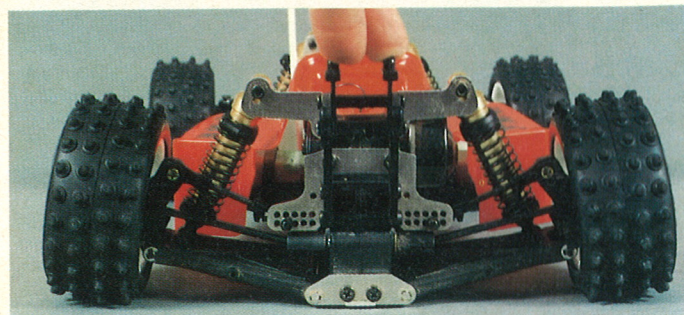
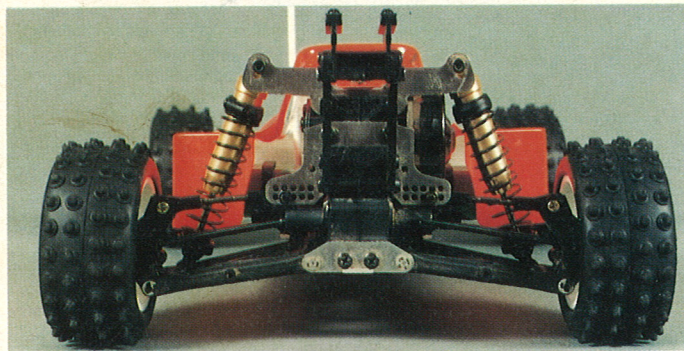
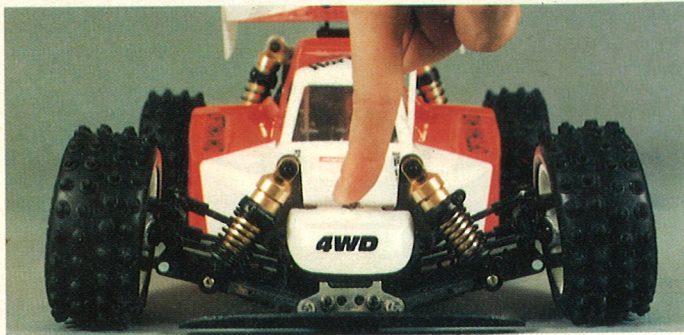


Left: Shock mounting position and tough glass filled nylon suspension arms. Above: The car has a wide stance. New body is extra wide to cover up all the bits! Below: A super wing mount is included which has multiple settings.



Above: Alain Prost, eat your heart out! Kyosho's latest bodyshell really does the 'mid' proud. Right: Option House shocks are standard as are the 'dot' type tyres. Note - our car has been fitted with battery clamps although the Kyosho tie wrap method works fine.





Above: Suspension travel front and back. The amount of camber can be changed by the adjustable rods. The camber change through suspension movement is also adjustable by means of the range of setting holes on the front and rear plate.

reduce bump steer to a minimum. A new, very functional looking wing mount which allows twelve alternative wing positions, is mounted on the rear gearbox moulding. Finally there are the new dished wheels, which in my opinion give a really smart finish to the car.

For those who need a little more in the way of technical detail the measured ground clearance on maximum travel is 30mm. The front wishbones

have a trail of about 5 degrees and the rear wishbones a trail of about one or two degrees.

Front dampers are much more upright than the 'Optima', this should give a much more linear damping and spring action. Alternative mounting points are provided on the wishbones should you feel the need to change this.

A tiny front bumper will do more for looks than protection and might also upset some scrutineers we altered our kit.

The main differences I can see between this production car and the hand built pre-production version of Romsey fame are:-

No anti roll bars fitted although the mounting points do exist.

The chassis on the world championship cars were carbon fibre, which should be a little lighter and probably stronger than the aluminium plate on the review car and the suspension top arm fixing points were carbon or GRP plates.

A good design feature of the car is the much improved approach and departure angles. Most 1/10 off roaders rarely give much thought to this particular aspect of car design, but it rates high on the list of requirements for the full size off roader. The approach angle is the maximum slope angle the car can attack, it is determined by ground clearance and projections in front of the front wheels. The 'Mid Optima' scores well on both counts.

Although the car is very obviously a serious racing off roader especially with so many ball races, the motor supplied is a plain bearing, fixed timing 240 type, probably with fairly hot wind.

Speed control is by the usual switched resistors.

Kit building

This took about 3 hours excluding painting the body and presented no problems at all.

As always, the instructions were neat and clear and made the kit assembly a pleasure. Rear gearbox came first. The only complication was the installation of the toothed belt during the construction. With the type of gearbox construction used it is obvious that the gearbox would need a complete stripdown if the belt should need replacement. Next came the motor mounting plate followed by the main reduction gear. The slipper device to protect the transmission system is a new design, although incorporates old principles. The friction to ensure drive is maintained comes from three spring pressure washers forcing the drive gear against the combination of slipper washers. Front differential gearbox comes next, not forgetting to include the drive belt. Although replacement of the belt will mean a stripdown of both the front and rear gearboxes, because the belt runs more or less through the centre of the gearboxes directly on the differentials, the loads on the shaft bearings are equal, unlike cars such as the 'Rocky' where the load is applied to one side of shaft. With the gearboxes in position on the chassis, the belt plastic

cover is fitted. The bottom cover is held in place with sticky tape (provided in the kit). This is neat and simple, but remember to get some more when the belt is changed. The upper cover is fitted at a later stage to the GRP plate. Dust and dirt is prevented from entering the main gearbox by neat plastic foam seals. After the addition of a few other chassis items including battery brackets it is time to start on the suspension. The front and rear suspension uprights are assembled on the wishbones before mounting on the car chassis. A straightforward job.

Steering arms, at the front and hub carriers at the rear followed by the drive shafts which must be inserted with care. The assembled oil filled dampers complete the main part of the suspension assembly and are attached to the aluminium mounting brackets. The final section of the main structure is the top GRP plate. This also carries the top belt guard which is held in place with screws.

Speed controller, radio gear and rear wing mount completes the build of the kit.

How was it?

As far as the construction of the kit is concerned there are no particular difficulties other than just manipulating the gearboxes with belt attached into position onto the chassis. A minor criticism is the use of machine screws without nuts to secure the top belt guard. The threads in the GRP plate stripped very quickly. The next move will be to add nuts to the screws.

Maintenance will be a more significant problem. I have already mentioned the fair amount of work involved in a belt change, hopefully this will not be needed very often. However even simple checks on the gearbox itself will be reasonably time consuming as the unit will need to be removed from the chassis and suspension and then split in half, not the sort of job I should like to do with just a couple of minutes before a race. Other than that the car appears to be well thought out, well designed and well engineered. The next step is to get to the track!

The 'Optima Mid' will be available in two forms, our kit is the 'standard' as seen but also a 'Turbo' kit will be available. This will include a thicker chassis (2.3mm), countersunk screws, fibreglass shock brackets, special rod set and UJ driveshafts at each wheel. Also the kit comes less motor and speed controller.

The prices of the two kits are £169.95 and £199.95 respectively.

