

The OPTIMUM point

We build the Kyosho 'Optima' four-wheel drive electric Off-Road race-car

HAVING BEEN GIVEN a serious shunt up the rear-end by an upstart Californian car company Japanese manufacturers have responded in typical fashion with a virtual plethora of new kits to swing the results back their way.

Kyosho are leading the charge with their 'Progress/Gallop' kits plus the 'Turbo Scorpion' and now this latest release the 'Optima.' The pace of development in electric Off-Road racing is fast and furious and the design team back in Japan have not lost any time in presenting what they feel to be the optimum in performance and handling.

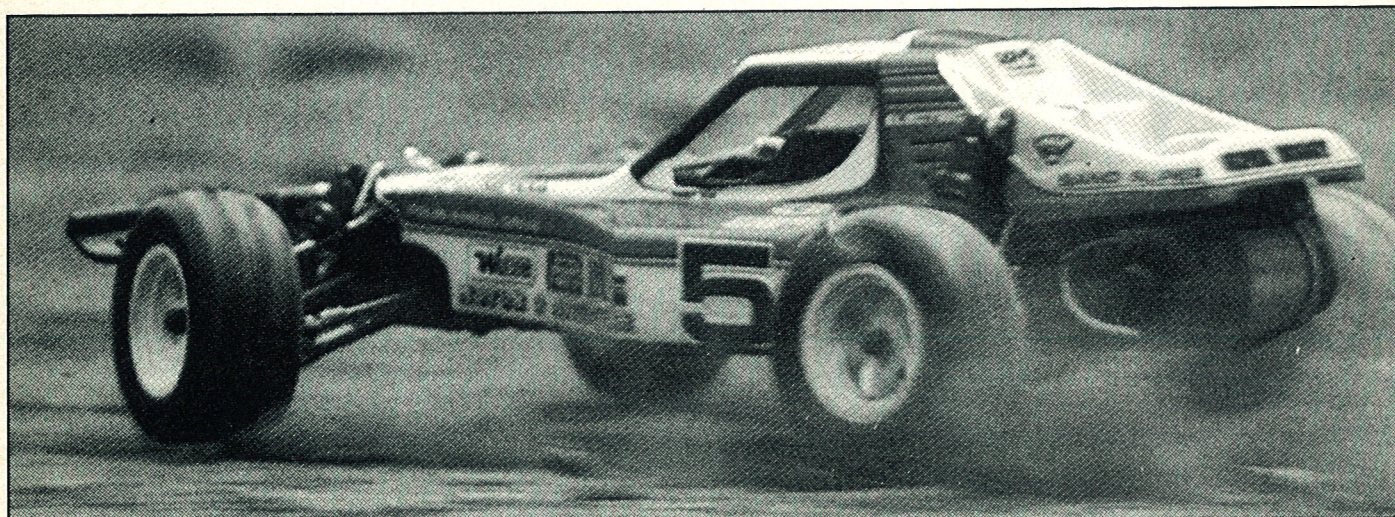
Specification

Obviously the Kyosho design team have been travelling the learning curve for some time now and are very aware of what does and does not make good mechanical sense on the track. Equally obvious is the fact that they are not adverse to combining good ideas from other products with their own in-house innovations.

The 'Optima' bristles with

such good ideas and practical thinking. Half the trouble with a great many of the current crop of cars is their low resistance to wear and tear and general unreliability of operation. During the time spent building the 'Optima' it became apparent that Kyosho have taken measures to make the car as strong and reliable as possible.

The 'Optima' features a



KYOSHO

THE FINEST RADIO CONTROL MODELS

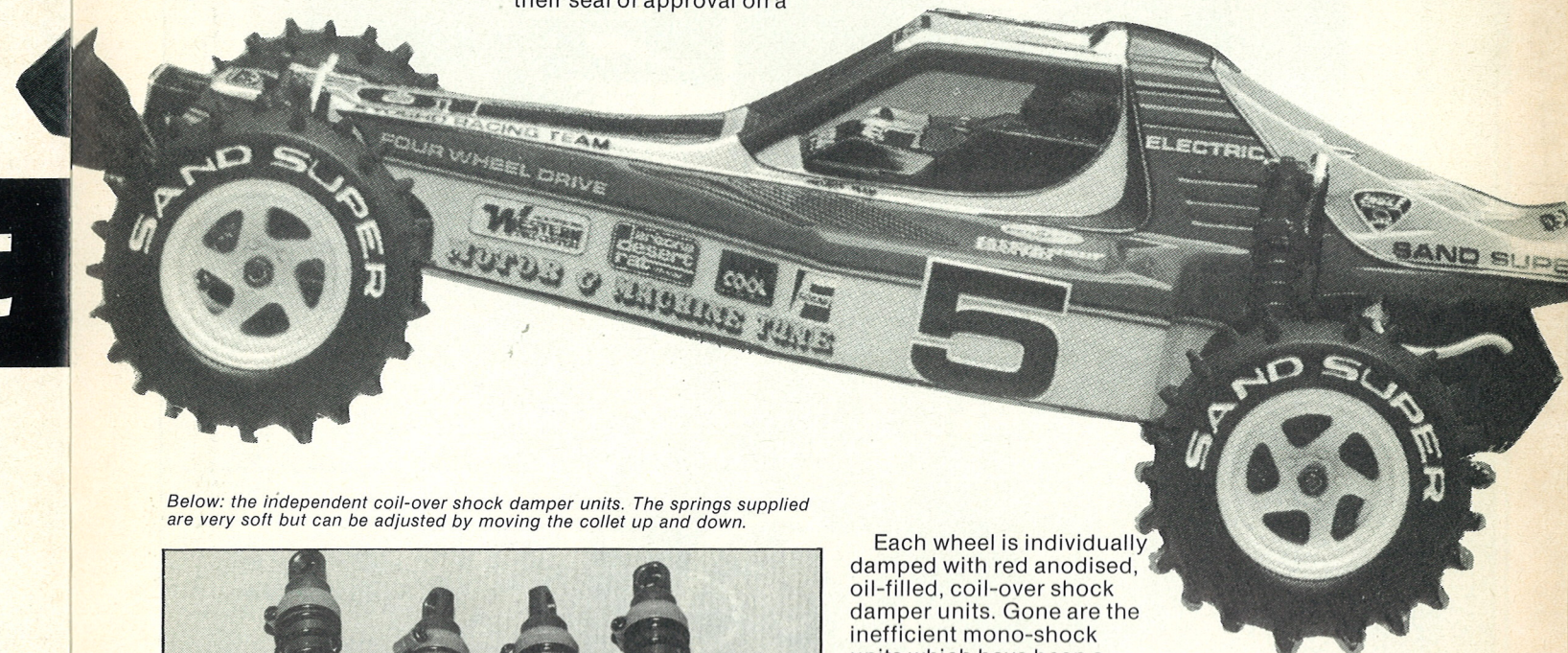
very strong box section chassis which is both rigid and lightweight. The suspension components also have these features in common with resilient precision moulded nylon wishbones. The system of operation is another race

proven aspect using lower 'A' — arms with upper adjustable suspension links to set the amount of camber for front and rear wheels. The suspension pivot pins are produced from steel and are virtually unbendable in the normal course of operation and even more difficult to break.

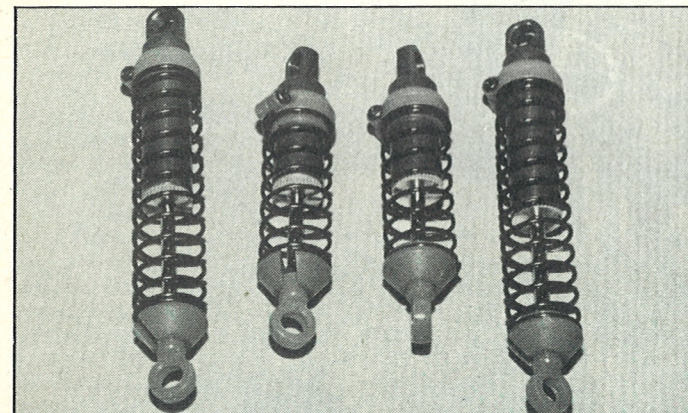
Having decided that four-wheel drive is the way to go the men at Kyosho have set their seal of approval on a

chain drive system linking bevel geared differentials front and rear. These diffs are housed in plastic formed gearbox casings and again not only are the mouldings superb they are also very light. The 'Optima' kit includes the four main ball-races which support the drive outputs in the gearbox casings.

coupled to the low unsprung weight of the wishbones results in a suspension system that 'flutters' up and down to even out track contours. With a ground clearance of 36mm (1.4in.) and suspension movement of over 50mm (2in.) the 'Optima' should exhibit a smooth and unruffled progress around the track.



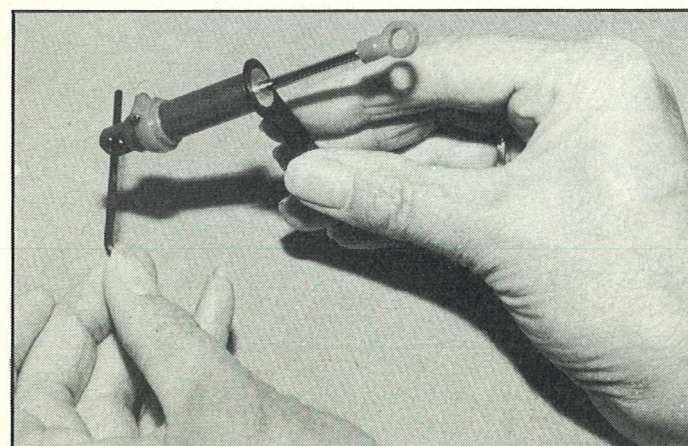
Below: the independent coil-over shock damper units. The springs supplied are very soft but can be adjusted by moving the collet up and down.



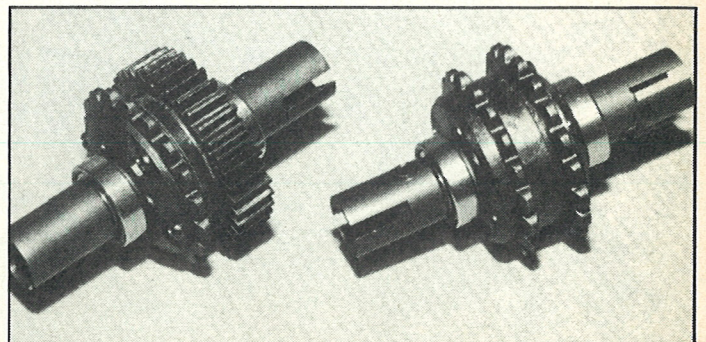
Each wheel is individually damped with red anodised, oil-filled, coil-over shock damper units. Gone are the inefficient mono-shock units which have been a feature of other (and Kyosho) cars of late. A thoughtful provision in the kit contents is a small ring spanner for tightening the damper barrel cap. The damper springs are on the soft side and can be adjusted for a firmer setting by adjusting the collet up and down the damper barrel. The soft damping

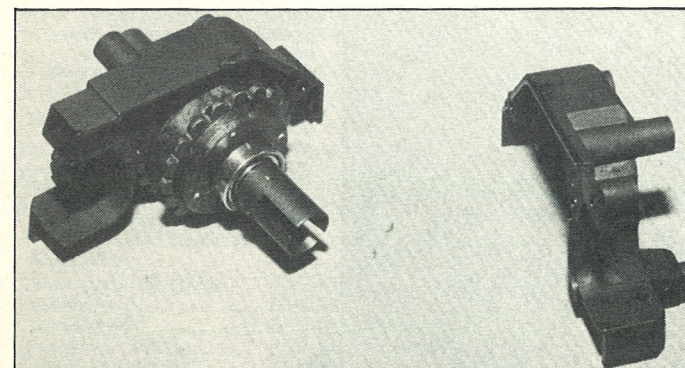
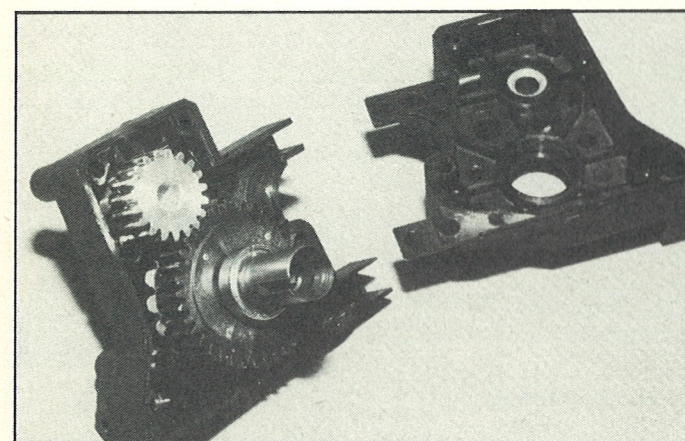
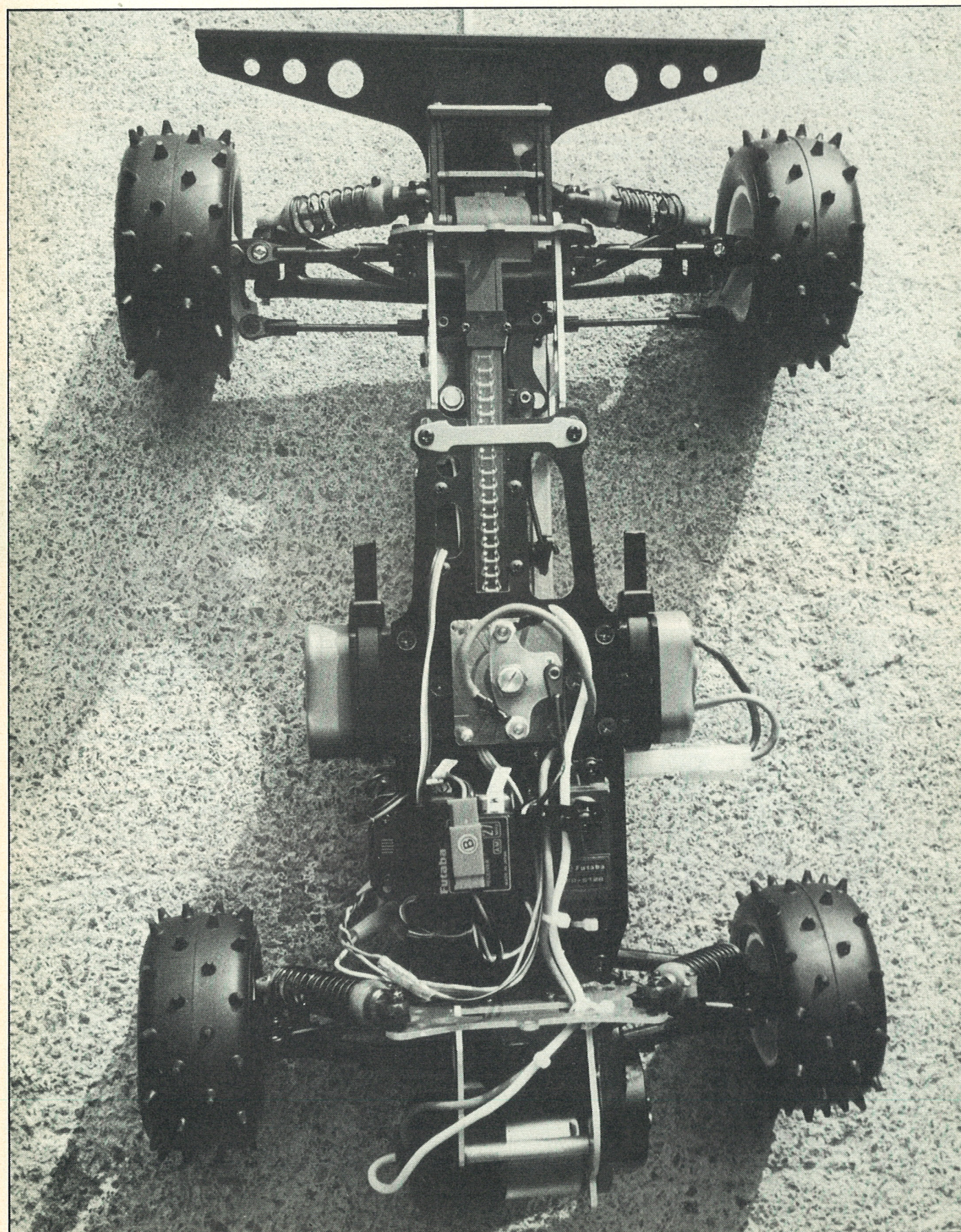
Constructional notes

Third on the constructional list (dampers, wheels and tyres are first and second) are the two differentials. Both are supplied ready assembled. But unable to contain our natural curiosity we loosened off the four screws and peeked inside. The little



Left: a handy little ring spanner is supplied to tighten the damper barrel cap. Damper oil is also provided which is of similar consistency to 3in1 oil. Below: the two differential units pre-assembled and fitted with ball-races and hardened steel drive outputs.





Japanese lady who had put the units together had thoughtfully inserted a blob of grease between the bevels and left it at that. This is why the diffs may feel slightly notchy in operation at first: they will free up after a few minutes running.

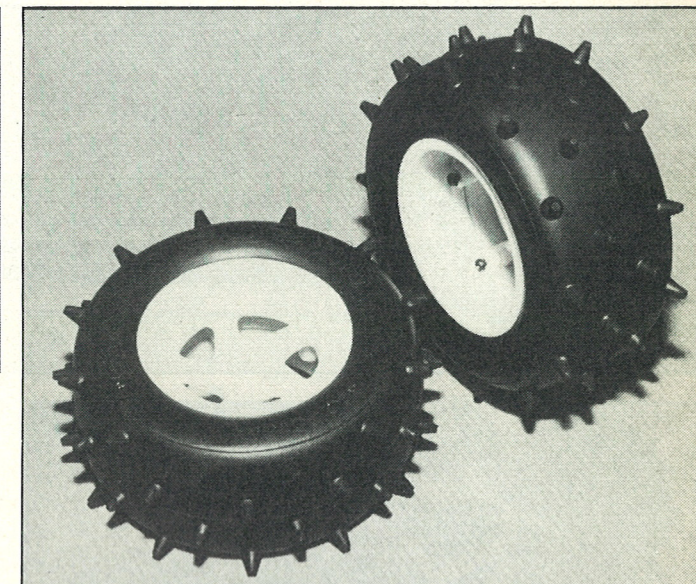
Small tubes of threadlock compound and silicone grease are supplied in the kit and the instructions detail the points at which either should be used. The thread lock is particularly important as in a machine of this complexity with so many metal to metal installations threadlock is needed to stop screws and bolts vibrating loose. The kit also includes a great many self-tapping metal screws which anchor into the nylon mouldings. Again take care when installing these in a metal against plastic situation overtightening of the screws will result in stripped threads.

The damper units are also supplied ready assembled only needing a fill of oil to make them ready for fitting to the car.

When assembling the front differential unit another performance feature became apparent.

The front unit is fitted with twin drive sprockets, 18 tooth and 19 tooth respectively. Because only one is used at a time it is possible to vary the ratio of drive between the front and rear wheels by substituting one for the other. The rear diff is supplied with an 18 tooth drive sprocket and if the same is fitted at the front then a straight 50/50 ratio of drive between the front and rear wheels is achieved. By changing either of the two sprockets (front or rear) for the 19 tooth version then the drive can be biased towards either front or rear. The net result of this is a car that can be adjusted to suit your driving style depending on your preference for understeer or oversteer. You have to make your choice early on as changing the sprockets entails a complete strip down of the car.

Chain tension is an important area for consideration as this can affect the overall capacity of the system to transmit all the drive efficiently. Chain tension is set by adjusting the distance between the front and rear gearboxes, the punched alloy side plates have slotted holes



Anti-clockwise from top: rear differential unit and nylon moulded gearbox casings. Front differential and housings. Wheels and tyres. The hubs are the usual three piece plastic design which clamps the plastic tyre. The tyre tread uses widely spaced spikes to provide grip.

which allow movement of the gearboxes. It is not a good idea to have the chain set too tight. The chain will stretch at first and if, after a long period of use, it has stretched beyond the capacity of the side plate adjustment then the simple solution is to remove a link from the chain. The instructions show how this can be done. The drive chain is also protected by enclosed plastic channels to prevent the ingress of dirt and grit.

Another area of adjustment is the ride height which can be altered according to which mounting point is used for the dampers.

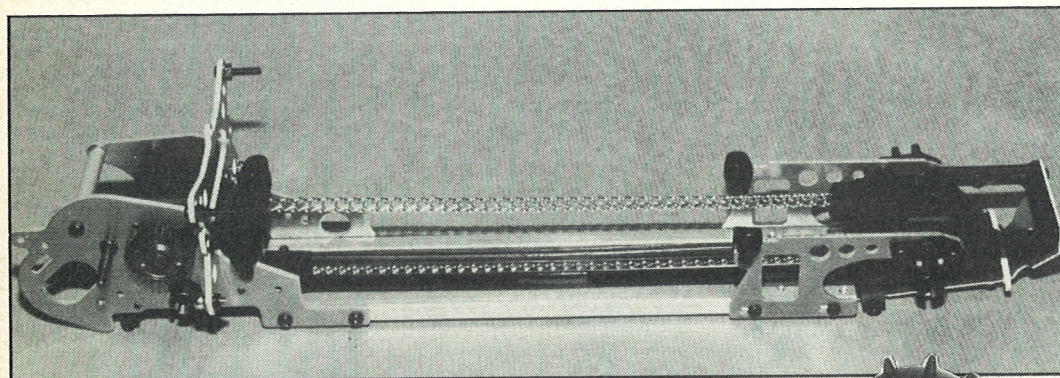
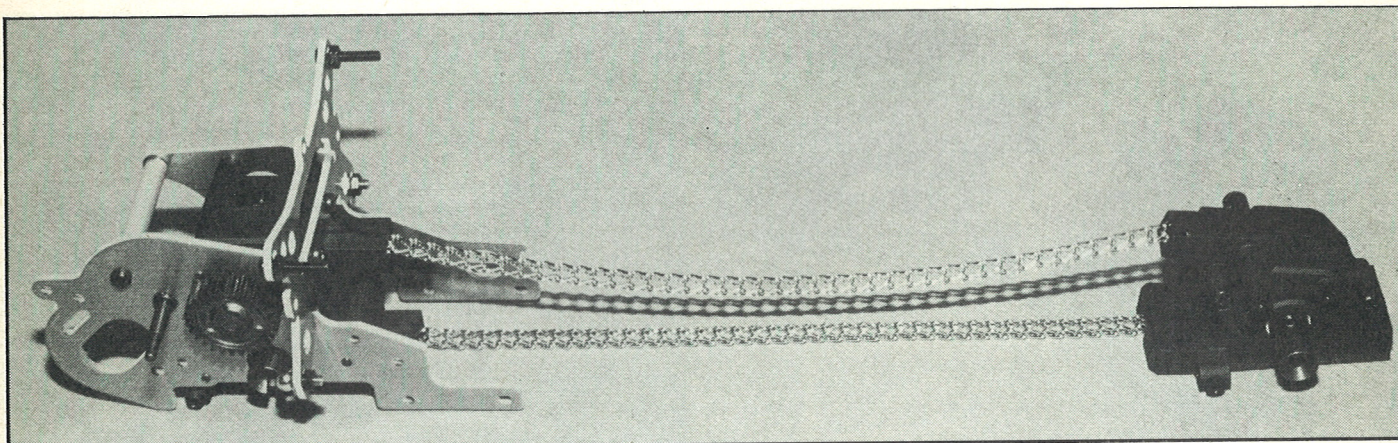
As mentioned already camber can be set by adjusting the length of the upper suspension arm links.

The instructions give measurements for the length of these which result in a fairly neutral setting all round. It's up to you to experiment.

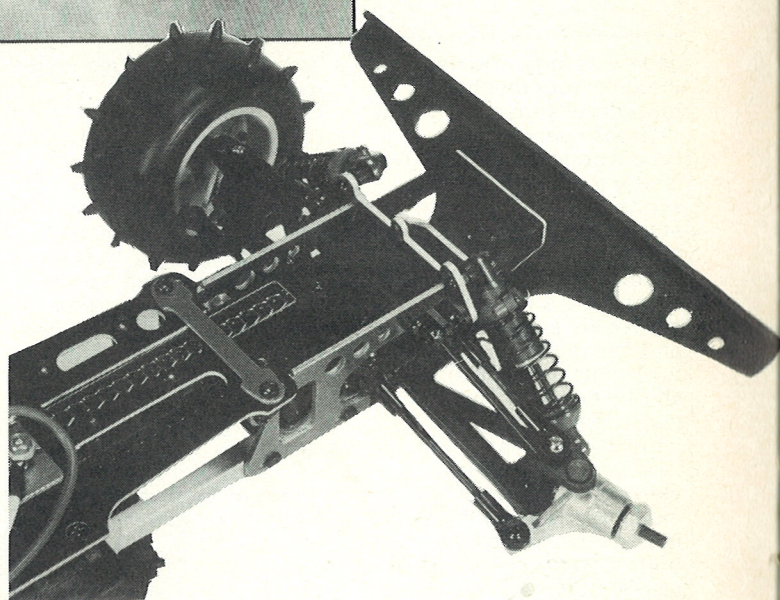
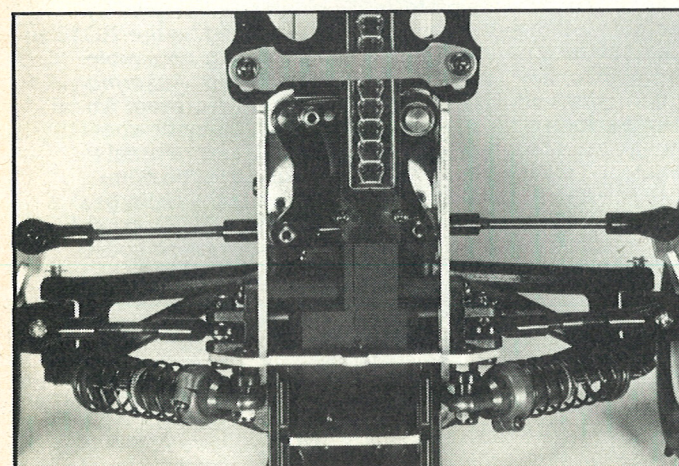
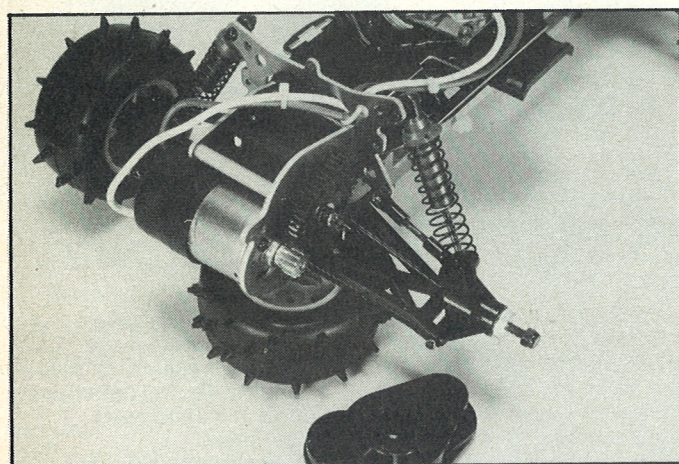
The steering set up is similar to that used by Associated on the 'RC10' in that it gives negligible bump-steer. Ackerman steering is present which allows the inner wheel to turn through a greater radius than the outer.

Finally the radio gear is fitted to a GRP top deck. The mechanical speed controller, throttle servo and receiver are all covered by a polycarbonate driver figure. The speed controller will also provide a regulated power supply for the receiver cutting out the need for a separate power supply.

Track Test



Above: the front and rear gearbox sub-assemblies linked by the drive chain. Left: the chassis is now introduced with the side plates forming a strong, rigid box section. Centre left: quick release gearbox cover allows easy access to the precision moulded nylon gears. Bottom left: close-up of the servo saver and front steering. Below: lower 'A' arm suspension with upper adjustable radius arm links.



Conclusions

During our time spent building the 'Optima' we were impressed with the high quality of component manufacture and clear, systematic approach to the construction.

As a race-bred electric Off-road car we will even go as far as to say that Kyosho have incorporated into the 'Optima' virtually every race-proven feature that has resulted from the past five

years of competition racing. How these factors marry together on the track is the next item on our Track Test agenda and will be the subject of a further test report next month. Our running time to date has been very encouraging and we expect this to continue the more we drive the 'Optima.'

UK importer: Ripmax Models Ltd.

Price: approximately £110.00.