




modify



 Associated front shockers, probably the best around.




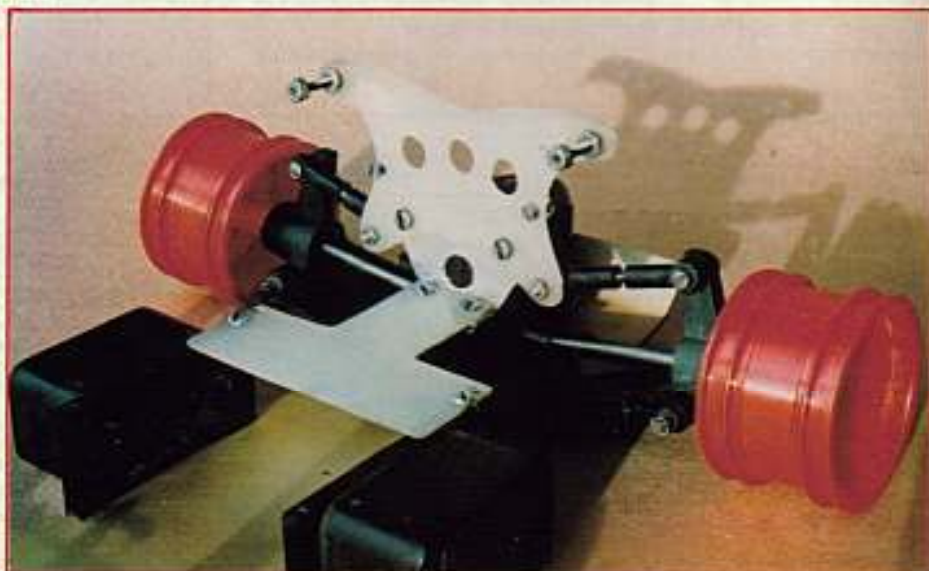
 Low and mean with all modifications fitted.

GREG HALLIDAY has had success after success with his mean modified Meteor, here he explains exactly why.

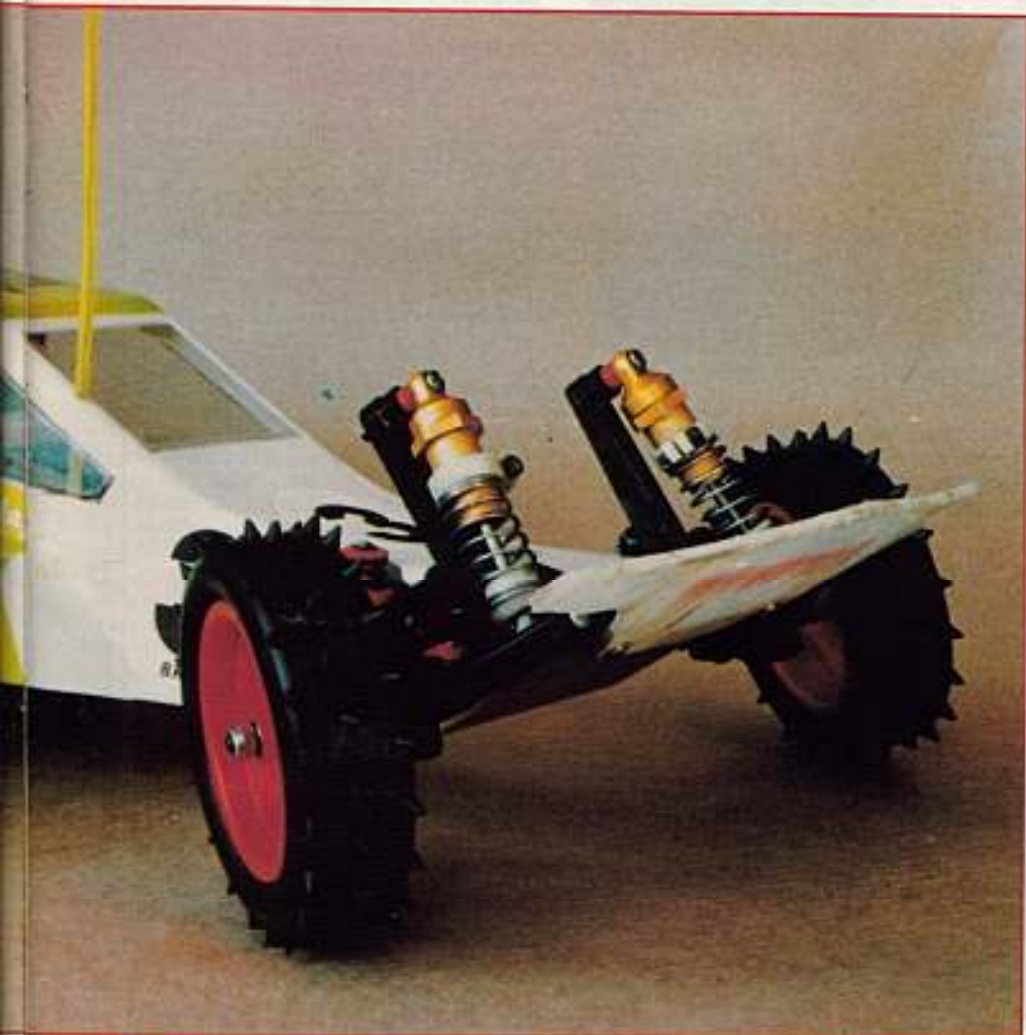
Over 7,000 Mardave Meteors have been sold since they first appeared two years ago, and since that time Mardave have steadily developed the car with both reliability and competitiveness in mind. Those of you who have been avid readers of RRC for some time will probably recall my previous article on how to update the car back in the August 1987 issue. I entered the car referred to in the article in two national competitions that year and managed fifth place in the 'A' finals of both. One of them was an RRC standard class round which last year included both two and four wheel drive run together so you can imagine the look on some of the other drivers' faces when they realised they had been beaten by such an inexpensive car!

I have continued to develop my modifications to the Meteor and in its 1988 form, detailed in this article, I managed 6th and 9th places in the 'A' finals of the two RRC standard rounds entered. A similar version built by local driver Steve Jones took 1st place in the standard class and 2nd in the modified class of the 1988 WDA Grand Prix. The factory have also been working on the car and the very latest prototype, fitted with

 This shot clearly shows the rear chassis brace and manufactured shock mount.



METEOR *Mk. 2*



a new gearbox and longer front and rear wishbones, was driven by Scott Raynor (Mr Mardave's son!) to 5th place in the final RRC modified class round at Swindon and took 8th place overall in the series in his first year of fully competitive racing. If these competition successes look a bit like 'blowing the trumpet', what I am trying to show is that although not many drivers use Meteors in full blown competition, if more started on the grid I am sure more would be in the 'A' finals! OK, if you want to get your Meteor up there with the rest of the winners, then take this magazine into your workshop (or clear the kitchen table), grab your Meteor and get to work!


Where do I start

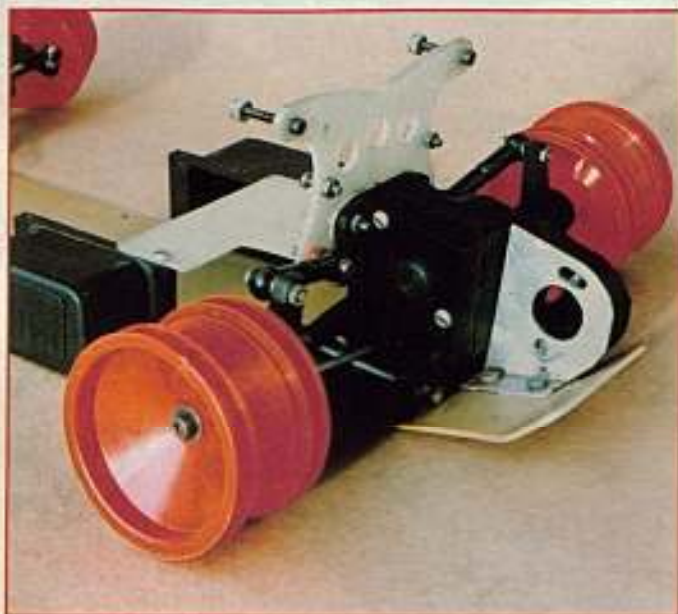
Those of you who remember last year's article will recall that it was split into various component sections. For simplicity, and to help those of you who have already modified your cars to my original specification I have followed the same format. In one area, namely transmission, little has changed, but as work here has such an important effect on performance (and for the benefit of Meteor owners who were not able to get the back issue of RRC before they sold out!), it is re-included, albeit slightly amended. OK then? Off we go!

Transmission

Although noisy, this area can be made to perform with little friction. Firstly, after dismantling the gearbox, obtain the two optional extra bearings Nos. T60B for each end of the large intermediate gear. In order to get the minimum friction at this point it is necessary to slightly enlarge the plain bearing bushes in the housing and outer cover. This is indicated in the photograph.

 Aluminium motor mount and heat sink bolted firmly in place, this mod serves two purposes, see text.

 Anti roll bar fitted and in place, this should leave you in no doubts as to where it fits.



Earlier shafts may also require reducing in length slightly by filing on the outer cover side.

At each stage of the rebuild, reassemble the gearbox and check for any friction or drag. Try squeezing the cover onto the casing with your fingers to ensure this does not put any end pressure either on the intermediate gear shaft, or the second intermediate gear. On my car, this latter gear has been machined out and twin ballraces fitted. This modification is available from Mardave, price approximately £5, and is essential for top performance. The existing differential ballraces are grease-filled and benefit by being washed through with solvent and re-lubricated with Tri-flon.

With the gearbox assembled, but without the motor fitted, check there is a small amount of sideways float on the second intermediate gear by inserting your finger through the motor hole. An extra washer may have to be introduced here. If for some reason it is too tight, then the thrust washers need reducing in width, or the side of the gear needs lightly grinding away. All the bearings and gears should be given a light coating of Tri-flon during assembly. SRM silicon gear oil may also be used.

If you do not already have them, fit the optional four bearings for the stub axle carriers, part No. T458. The stub axle itself has a flat face and this rubs over the whole face of the inner bearing — this causes drag. I filed down a washer to act as a spigot and this works very successfully. However, take care that there is still sideways float on the drive shafts at the top and bottom of the suspension travel, particularly with the earlier cars as they had slightly shorter shafts and the drive cups were deeper.

To aid the handling over bumps, it is important to introduce some rear end castor by inserting two 6BA, or similar, washers on each of the front chassis to gearbox mounting screws. The effect of these is to tilt up the front of the gearbox (see arrows on photographs).

Motor Mount

One point discovered early on was that motors can get very hot during the latter part of a race due to lack of heat dissipation, the plastic mount being a poor conductor of heat. Likewise when plastic gets hot it softens and on the Meteor gearbox this could affect the motor first gear meshing as the motor will try to force itself away from the gear. My solution to this was to



Success with the Mardave in this form is obvious as shown by its collection of trophies.

make the mount shown in the photograph. The motor clamps this thin aluminium plate in place, and it provides both additional gearbox bracing and heat sinking. Bear in mind some motor manufacturers say that motor magnets are reduced in efficiency by heat.

Some people have complained they cannot mesh nine tooth gears. It is possible, provided you use motors with four fixing holes. And on the subject of gearing — you will probably have discovered that pinions recommended for use on the Associated do not seem to enable your favourite motor to pull as well on the Meteor. The reason for this is the overall gear ratio is different, and I have therefore reincluded the comparison gear chart with this article to enable you to correctly match your particular motor preference.

Chassis

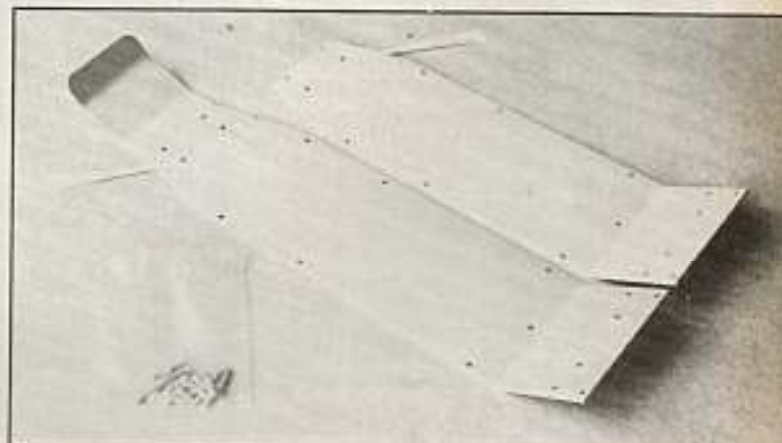
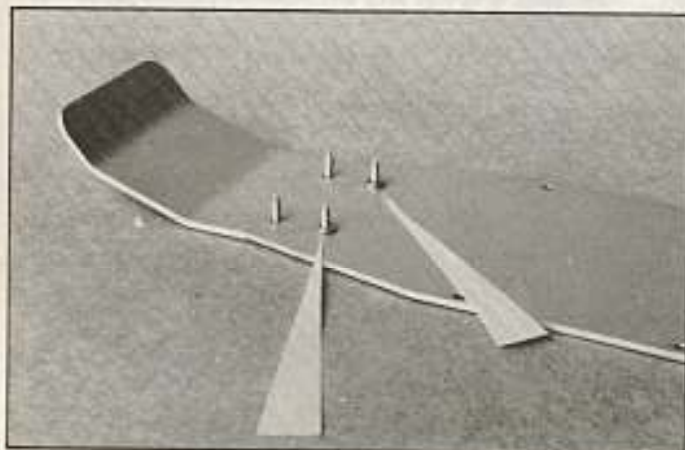
Factory development work has produced a new longer wheelbase chassis with integral rear bumper and countersunk holes. It is supplied with a full set of countersunk screws and bolts and costs £5.50. The advantage of having a longer wheelbase is in stability over rough ground. I have heard it said that if you always race on tarmac, or similar surfaces, then the shorter wheel-

base car turns-in quicker, and this is true, but the rear end also slides out more viciously making the car 'twitchy'. If you watch the fastest two wheel drive cars racing you will notice the drivers virtually let them freewheel around the corners. Lots of opposite lock power-slides look spectacular and are great fun, but it's not the fastest way around the circuit. Hence, the longer wheelbase is better. However, you do need the maximum available amount of steering lock and careful trimming of the front steering arms and steering uprights will allow more. Also use the inner hole on the servo end of the servo saver.

A certain amount of chassis flex occurs when the car lands heavily after a jump, particularly as the chassis is narrower in width immediately in front of the gearbox housing. This excess flex can not only permit the chassis to ground, but, as it is undamped, can work in opposition to the suspension system. To overcome the problem I have made a 1/16 inch epoxy resin sheet 'T' piece with an aluminium support bracket fitted between the gearbox casing and the new rear damper mounting bracket referred to later. The front part of the 'T' piece is held in place with two self-tapping screws secured into the top rear of the battery holders.

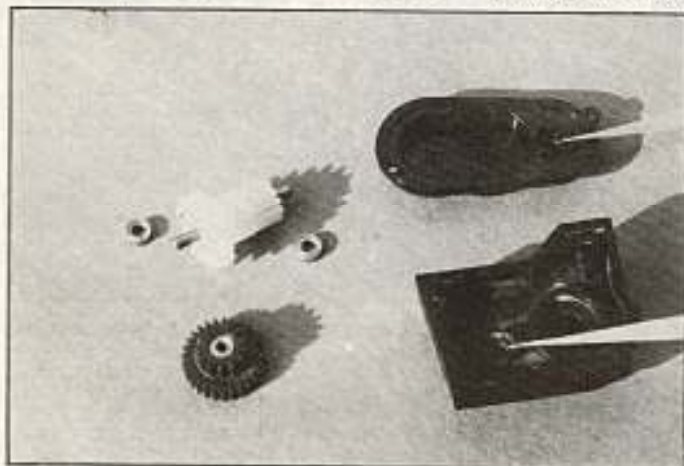
Insert spacers here to give a degree of anti squat. See text for full explanation.

As you can see the difference between the long and short wheel base chassis is quite noticeable even off the track.

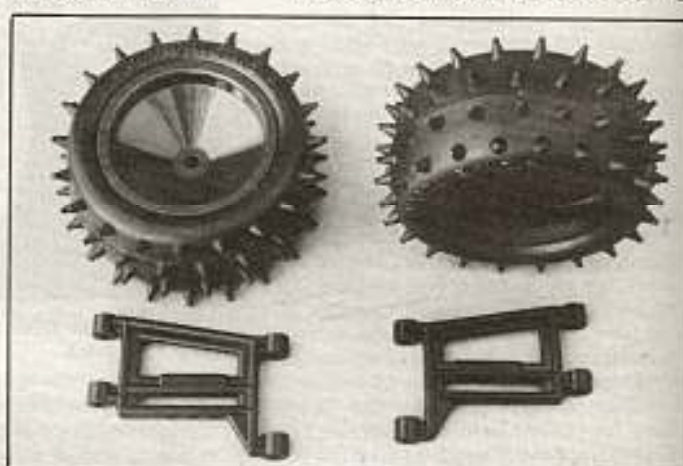


The speed controller can be fixed by servo tape, either on top of the 'T' piece, to keep it clear of mud and water, or on the chassis below the 'T' wrapped in cling film. For optimum handling the lower position is preferred in order that the centre of gravity is kept as low as possible.

Don't forget to fit a wider polypropylene bumper on the front to prevent damage in bad shunts. It is possible to bend the steering servo-saver idler bolt if you crash heavily, and this introduces 'bump-steer' into the steering. This problem can be reduced



Inner gearbox casing showing points to be eased.



New factory wheels, tyres and soon to be released front long arms.

by drilling out the idler and chassis and fitting a large bolt, such as 4BA. I have also discovered the bolts used in fitting electric wall light switches fit! Note that it is necessary to put two nuts on this bolt below the idler so that the link between the servo-saver and idler is parallel with the chassis. This also helps prevent 'bump-steer'.

Wheels and Tyres

By now I am sure all Meteor owners must be aware of Mardave's new lightweight one piece wheels. They increase track width and allow fitment of all the popular low profile tyres such as CAT, Hot Laps, Tamiya and of course, Mardave's own new front and rear tyres. These are called ISF (inclined spike front) and ISR (inclined spike rear). A new type is about to be released called VSR — very easy to decode, but if you haven't worked out what it is yet, it means vertical spike rear! The new front wheels cost 80p each and the new rears 95p each. The fronts are, of course, available fitted with ball-bearing races. I can thoroughly recommend these new wheels for improving handling and proving tough enough to withstand hard racing.

If you want to use Pro-line pimped tyres on the front, you'll need to use RC10 front stub-axes and Tamiya Fox/Wild One wheels as per my 1987 car.

The inside face of the new rear wheel hubs still need trimming to a taper shape where they mate with the stub axle bearing in order that they do not drag on the face of the bearing. Also check that there is a small amount of sideways float on each wheel — if not, grind away some of the inside of the hub.

If you keep losing the circlips when fitting the front wheels, and maybe even the whole stub axles in crashes, then fit the threaded type with nut fixing as supplied by the Model Car Centre of Stoke on Trent. They must be quite good, the factory use them on their cars!

Suspension

If you are racing on smooth and medium undulating tracks then the Meteor does benefit from the fitting of a front anti roll bar. It's quite easy to make one if you study the photograph carefully. Model Car Centre also produce their own version.

Perhaps the most radical change I have made to this year's car is in the area of the dampers. Although the car handles quite well on its original units, particularly when modified with Associated front and rear springs, the greatest improvement came

when I fitted the Associated front shock absorbers, and the Kyosho Option House rears. (RC10 rears can also be used.)

The front units are the standard RC10 units, 0.56 travel, fitted with the silver springs. The top fixing retains the Mardave spacer bush and screw fixing, with the lower Associated metal ball bush secured by the original self-tap screw. A small spacer needs to be introduced on the self-tap screw to stop excess lateral movement. Use 20wt oil with the anti-roll bar, or 30-50wt without. The rear posed a much more difficult problem, as the superb Option House units are much longer travel than the originals. Obviously the T4 rear damper mounting bracket would have to be scrap-

Scott Rayner with his very successful Meteor campaigned superbly in the R.R.C. 2WD modified class.



ped and a new one made from 3/16 inch epoxy sheet. A full size pattern is included with this article to enable you to make your own. There are two top mounting positions for the shock absorbers enabling one to stiffen up the ride if necessary, although I would recommend using the outer position on all but tarmac tracks. The top fixing utilises RC10 components, except that the white nylon bush is reversed. Studying the photographs should help here and with the following points.

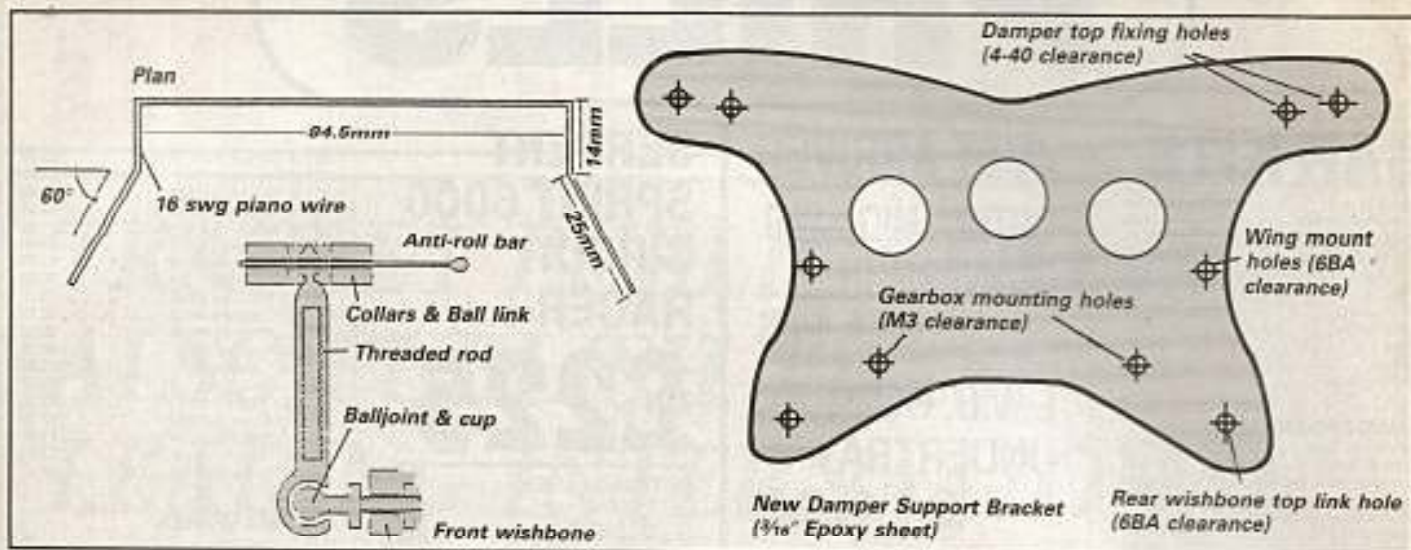
To prevent fouling of the damper spring,

the rear wishbone top link needs a 2mm spacer between it and the new damper mount; I found a suitable part in the Option House damper kit. Fixing was by way of 6BA nuts and bolts. (Don't forget to use Loctite.) For the lower attachment you'll need a pair of the front inner wishbone hinge pins (T30) fitted in the outer rear position. Utilise one of the spare Mardave damper spacer bushes, cut down in length, on the hinge pin, place damper on the bush and retain with a washer and circlip. When this alteration is completed you will have a really smooth operating suspension. I recommend 20wt oil for the rear, using the silver springs and the two hole pistons.

Front negative camber should be introduced between 3½-5½ degrees and to do this it will probably be necessary to cut away a small amount of the black plastic threaded section on the top suspension wishbone links in order to shorten them. The rear end should be set-up with approximately 3½ degrees of negative camber. Take care not to introduce too much rear negative camber as it is possible for the drive shaft ball pins to foul the cup end of the stub axle at the limit of suspension travel and it is even possible to break the cup if 'silly' amounts of negative camber are introduced.

Body Shell and Wing

If you use the long wheel base chassis then you'll need a new shell and Mardave produce an optional lexan version (part No. T90L). It's important not to cut away too much at the rear of the bodyshell. As there is no longer any rear body post, velcro needs to be stuck on each end of the battery boxes, and correspondingly inside each of the shell side pods. Finally if you want the car to look sleek (and keep the drag co-effi-



cient to a minimum!), then cut down the front body post, and fit the shell as low as possible without fouling the servo saver. It'll be necessary to trim the shell around the saver. Again reference to the photographs should help you with these points.

The original wing on the Meteor is not adjustable and so as I had to sort out a different method for mounting it on the new rear damper mount, I took the opportunity of fitting the wing and wing mount kit made for the PB Maxima. The clever ones amongst you will ask why I haven't cut off the Maxima body post from the mount. Well, it's left so I can put it back on the PB when I go 4WD racing!

Gearing Comparison Chart

Motor Pinion	RC10 with 54T Diff Wheel*	Meteor*
15T	6.59	6.78
14T	7.06	7.27
13T	7.60	7.83
12T	8.24	8.46
11T	9.98	9.25
10T	9.88	10.17
9T	10.98	11.30

*Ratios quoted as number of Motor Shaft Revolutions per One Road Wheel Revolution.

Conclusion

Construct your Meteor as per the foregoing and you will have as competitive a car as any other make on smooth to medium surfaces. On the very roughest, life can be a little harder and hopefully the new longer front and rear wishbones should overcome any chassis grounding. Perhaps they won't be too long in coming from the factory, shortly followed by the new gearbox which was fitted to Scott Raynors' factory car.

So there you have it! Your chance to win for quite a bit less outlay than with any other marque, and with an extremely rugged British car. See you on the grid and good luck.

MARDAVE 1/10 OFF ROAD



This easy to build but fully competitive car features two wheel drive for minimum power loss and maximum speed, limited slip differential unit, oil filled dampers, unbreakable HE 30 anodised dural chassis and all kits now include new one piece wheels and race proven lightweight spiked tyres making the Meteor a race winner straight out of the box. Race successes include 1st at the Welsh GP and many RRC 'A' final places.

STANDARD KIT (including speed controller and Mabuchi 540 motor SRP £59.95

COMPETITION KIT (less motor and speed controller but with 4 extra ballraces in rear stub axles) £57.00

6 CELL BATTERY PACK WITH CONNECTOR £14.95

FAST CHARGE LEAD £5.95

Available from all good model shops

Mardave R/C Racing, 7 Heanor Street, Leicester. Tel: 0533 24701