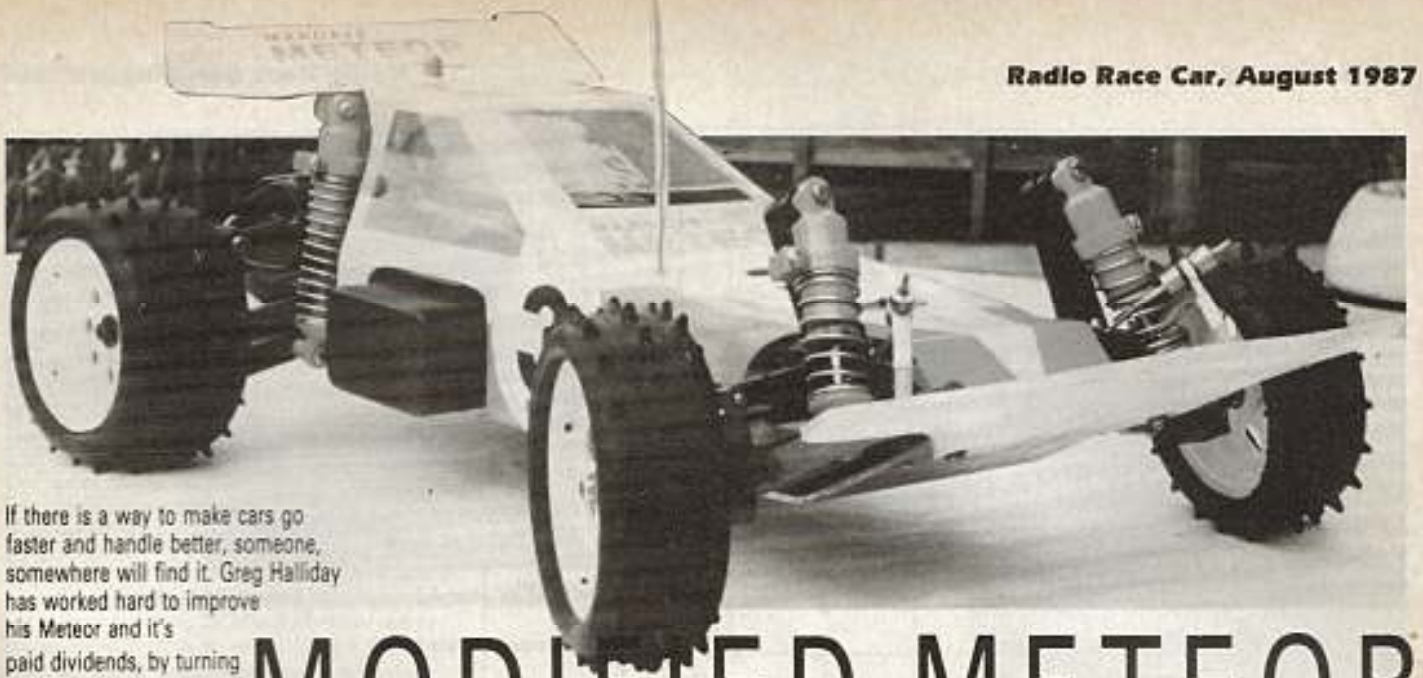


If there is a way to make cars go faster and handle better, someone, somewhere will find it. Greg Halliday has worked hard to improve his Meteor and it's paid dividends, by turning this good British car into a right little meanie!

MODIFIED METEOR

I was lucky enough to purchase one of Mardave's earliest pre-production Meteors back in August last year; at that point the car didn't even have a name. It was obtained to replace my eleven-year-old son Paul's well-worn Apache and was intended for him to make his debut in competition. At this time I was running an RC10 with some reasonable success. Through the remainder of the season we were able to contribute to some of the factory development. Paul drove in three competitions and finished joint best driver of his team in the Cobra 1986 team challenge, which was no mean achievement considering several of the other team cars were RC10's, and such names as Rory Cull were also competing. The conditions were abysmal (as they often were last year) with a lot of the track under water, but the Meteor kept going when much more expensive cars failed.

To be competitive this year it appears you need an expensive 4wd car, although if the track is fairly smooth and fast with reasonable grip, the RC10's can still win. Faced with this situation I considered either (A) an expensive new car with spares, or (B) a lightened rebuild of the Associated. Lightened RC10's weigh approximately 3lb 4oz. The Meteor weighs in standard at approximately 3lb 20z/3lb 5oz — then it occurred to me, why not try to make it perform like the RC10; maybe even beat it?

The following article, split into the various component sections, should help you get your Mardave to perform as well as ours now does and give some of the other buggy drivers an eye-opener!

Transmission

This area, although noisy, 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. The shaft 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 end pressure either on the intermediate gear shaft of the second intermediate gear. On our car, this latter gear has been machined out and twin ballraces fitted (See photo). This modification is now available from Mardave, price approx £5. The existing differential ballraces are grease-filled and benefit by being washed through with solvent and re-lubricated with Tri-flon.

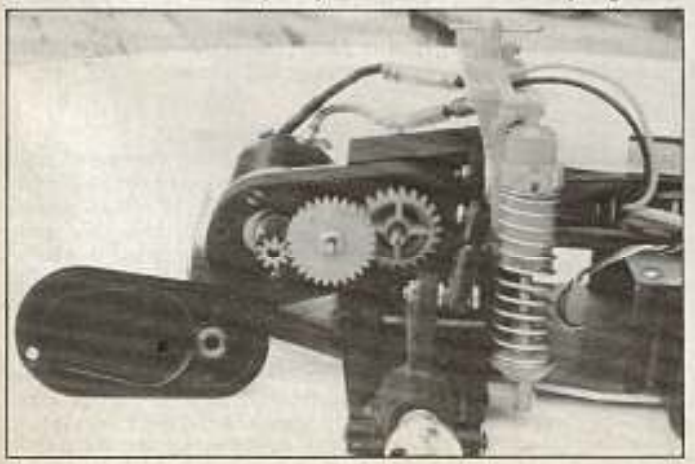
With the gearbox assembled, but without the motor fitted, check there is a small amount of sideways float on the second intermediate gear by inserting your finger through the motor hole. An extra washer may have to be introduced here. If for some reason it is too tight, then the thrust washers need reducing 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. T45/B. The stub axle itself has a flat face and this rubs over the whole face of the inner bearings — this causes drag. I filed down a washer to act as a spigot and this works very successfully. The inside face of the rear wheel should also be trimmed as per the diagram to prevent drag on the bearing face. Note that after reassembling must have a small amount of sideways float — if not, grind away the inside of the wheel hub. (A mini-drill circular sanding pad is ideal for this).

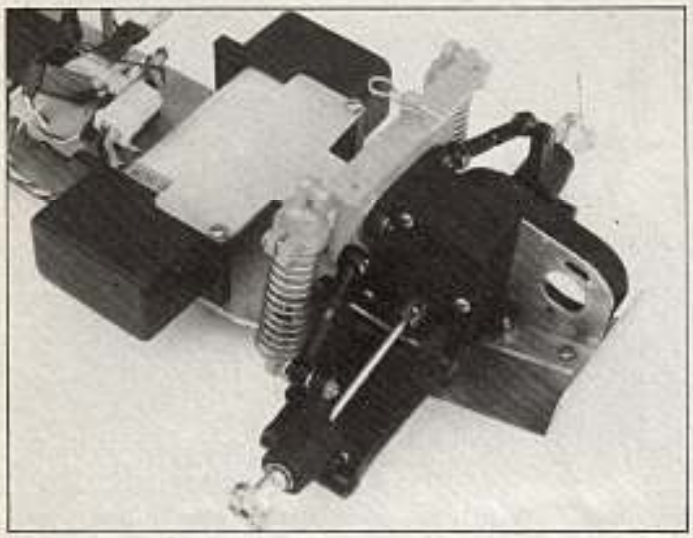
The final item to check in this area is that the inside bearing faces do not drag on the stub axle carriers — ours needed drilling out to clear. When reassembling, take care to align these new bearings carefully — if one is not properly seated it will cause drag.

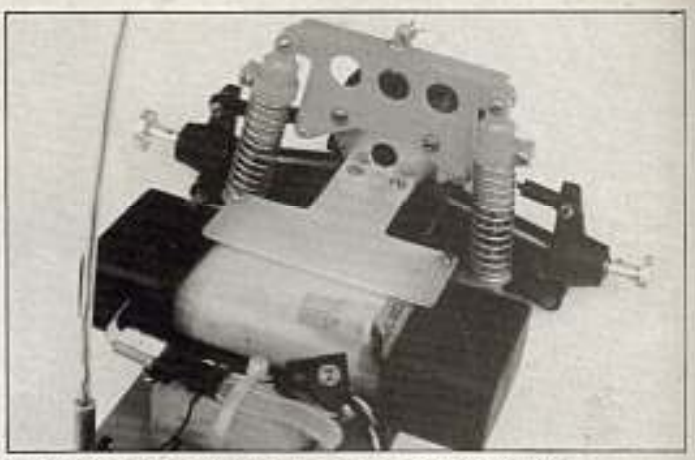
With the wheels fitted you should now be able to spin the transmission easily.

Gearbox with all modified parts fitted. Also shown here are the rear shock absorber bump stops and Associated soft springs.



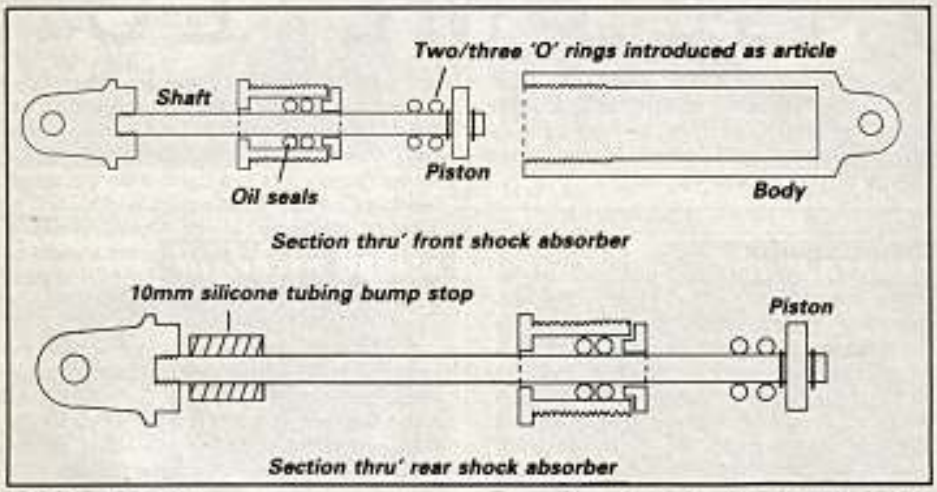
Front shot showing anti-roll bar, RC10 stub axles and parallel link between the servo saver and idler.





Left: Home-made aluminium motor mount/heat sink.

Above: The rear chassis brace.



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 make a mount. The motor now clamps this thin aluminium 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 that they cannot mesh nine tooth gears. It is possible, provided you use motors with four fixing holes. And on ths 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 included a comparison gear chart with this article to enable you to correctly match your particular motor preference.

Rumour has it that to aid meshing of small motor pinions Wes Raynor (Mr Mardave) will revise the first pinion size in time, but as this also needs a new outer cover, we shall all have to wait until he gets some free time from producing all those Meteor kits everybody wants!

Chassis

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 permits the chassis to ground and this can slow the car down.

To overcome the problem I have made a 1/16in. epoxy resin sheet 'T' piece with an aluminium support bracket fitted between the gearbox casing and the rear damper mounting bracket T4 (See photo). In order that these parts fit together properly it will be necessary to grind down, or cut off, the two spigots on the T4 mounting bracket. The front part of 'T' piece is held in place with two self-tapping screws secured into the battery holders.

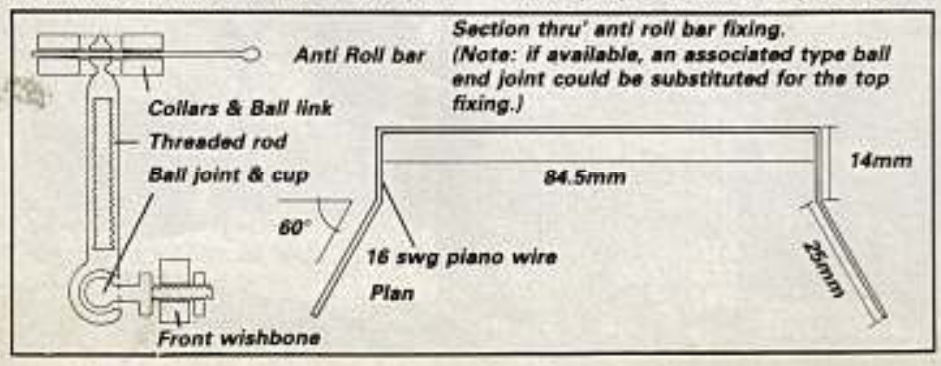
The speed controller can now be fixed by servo-tape or a cable tie around the support.

Experiments in full length chassis bracing are currently being carried out by another local Meteor driver and I hope to report on this in the future.

I recommend the use of the optional rear bumper T7 to prevent some keen following driver from smashing your brush gear holder into its commutator when you brake for a corner. I know, it has happened to me! Chamfer the front leading edge to prevent it dragging the ground when the suspension bottoms.

Another useful modification is to fit countersunk screws in the chassis in place of the existing roundheaded type. Again these are available from Mardave. This gives a smoother underside. A much larger polypropylene bumper is also necessary to prevent wheel/steering damage in heavy 'shunts'. I recommend you use polypropylene as Lexan tends to break more easily.

If you crash heavily it is possible to bend the steering servo-saver idler bolt, this introduces 'bump-steer' into the steering. (See also the section on suspension). This problem can be avoided by drilling out the idler and chassis and fitting a larger bolt, such as 4BA. Note that it is necessary to put another nut 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

Good news, folks! One complaint from drivers wanting better performance from their Meteors was the lack of ball-bearing raced front wheels. Well, now their problems are over — Mardave offer these as an optional extra, and they cost less than £10 complete with four bearings. (How do they do it)!

For those who want to use Associated RC10 or Fox/Wild One wheels, then the Associated front stub axles can be fitted simply by countersinking the steering arm for sufficient depth to accept the thicker

The beautifully made rear wheel adaptors with a modified stub axle and modified second gear. Note the carefully hand filed washers on the stub axle and gear required to reduce friction.

hexagonal portion of the stub axle and until enough of the inside end is through to accept the securing 'E' clip. Take care not to countersink too deep or too large as this can seriously reduce the steering arm strength.

The standard wheels and tyres perform well on most surfaces, but the rears do benefit from having a small hole being made in the tread area to reduce their bounce unless you intend running on concrete, tarmac, or carpet. They are better left as standard on these surfaces.

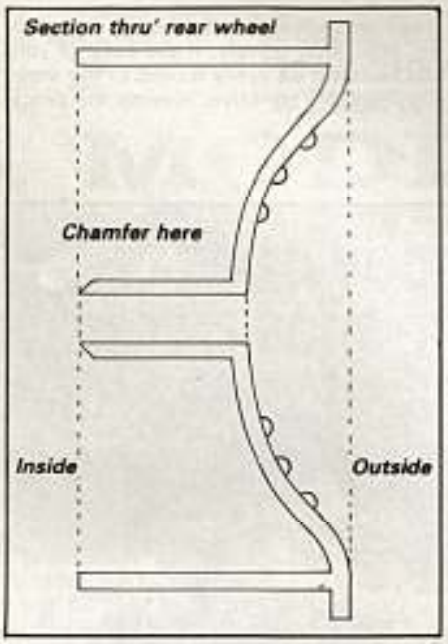
My own car is fitted with a pair of superbly crafted rear wheel adaptors manufactured by a local engineer (see photo) and now I can use Tamiya Fox/Wild One wheels all round. The rear track is also widened by some 8mm. These are certainly beneficial in obtaining the maximum handling from the car and I hope it is only a short time before one of the 'tune-up goody' manufacturers starts turning them out for sale.

Fitted with these wheels and using Cat spikes, the handling has now been developed to be very similar to the RC10.

By the way, if you want to lighten your car still further, discard all the standard tyre fixing rings, inner rims and screws, and secure the tyres to the rim with 'instant' glue. This will save 1½ozs on four wheels.

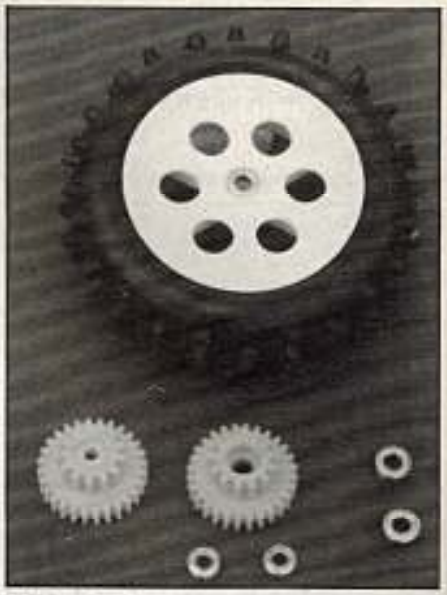
Suspension

The Meteors handling benefits greatly by the fitting of a front anti-roll bar, and it is quite easy to make one if you follow diagram two and study the photograph carefully. The ball-joints and fittings are all model aircraft spares and should be easily obtainable from your local model shop.



Front negative camber should be introduced to approx five and a half degrees and to do this it will probably be necessary to cut away a small amount of the black plastic threaded section on to top suspension links in order to shorten them. The rear end should also have approx three and a half degrees of negative camber. Be careful not to introduce too much rear camber as it is possible for the drive shaft ball pins to foul the cup end of th stub axle at the bottom end of the suspension travel, and it is even possible to break the cup if 'silly' amounts of negative camber are used.

Now we come to the most grey area of the setting-up of any car; the spring and damping rates. I have fitted the Associated soft silver springs all round as I feel they are more progressive and respond better on rough surfaces. The damping action needs a lot of research and experiments in this zone are still being conducted. Two Meteors are currently being tested side by side with entirely different approaches to the oil/piston ratio. One car is running 30 WT damper oil all round with the two small hole pistons in the rear and the four small hole pistons in the front. The other car is using GTX oil in the front with EP90 transmission oil in the rear and using the four large hole pistons all round. This latter



Mardave's latest tune-up goodies: front wheels with ball-bearing races fitted, the modified second intermediate gear with bearings (with the standard type on the left), the T60/B first intermediate gear bearings.

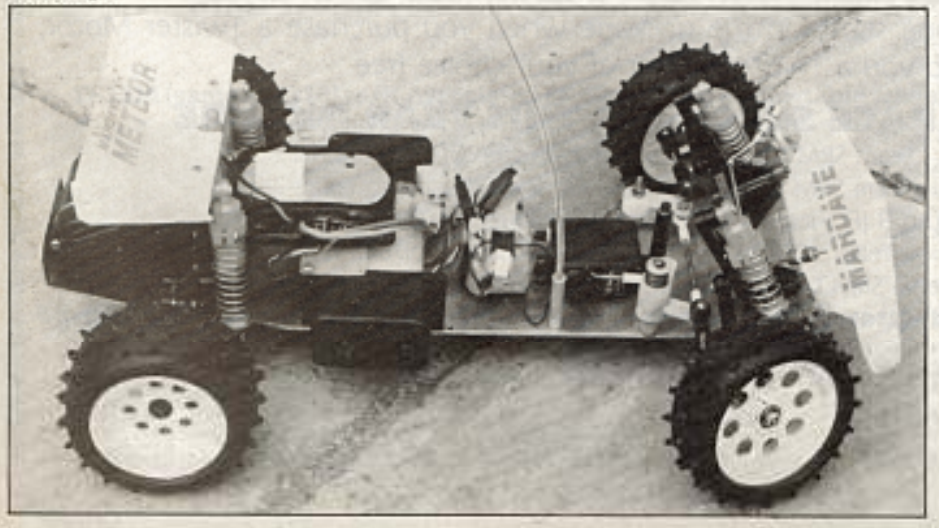
combination appears very slightly smoother, but as the front springs are in fact the original Meteor rears, it will be necessary to swop all four shock absorbers from car to car to prove which is the best. As this other car is the one with the full length chassis bracing, it could also be that this is aving some effect by preventing any chassis oscillation. Perhaps a follow-up article on the final conclusion would be a good idea. The lower fixing of the rear shock absorbers on the rear wishbone also affects the ride of the car. On smooth surfaces use the outer hole, on slightly undulating surfaces use the middle hole, and on the roughest use the inner. You will find the difference quite surprising!

Both front and rear dampers require amendments to their length of travel. The fronts should have two small 'O' rings, the same size as the oil seals, placed on the shaft inside the body and below the first 'E' clip to reduce their downward travel. By doing this you will find that most of the bump-steer that occurs will be eradicated. If you are running only on smoother surfaces, then three 'O' rings will totally eliminate the problem. The rear dampers should have a 10mm length of silicone tube slid over the shaft outside the body to restrict their upward travel. This helps to reduce the amount of chassis grounding. Refer to the diagram if you have problems understanding these points. Do you have trouble sealing the shock absorber with the recommended PTFE tape? I have discovered that the silicone seals sold as a replacement for the tops of the Associated units can be used instead, but take care to hold them in place carefully when tightening down as they can squeeze out.

Did you know the standard RC10 front dampers will fit straight on, and with a revised rear support to raise the top fixing they could be fitted to the rear! I wonder who will be the first to use them? Brimod are also now manufacturing special units to fit.

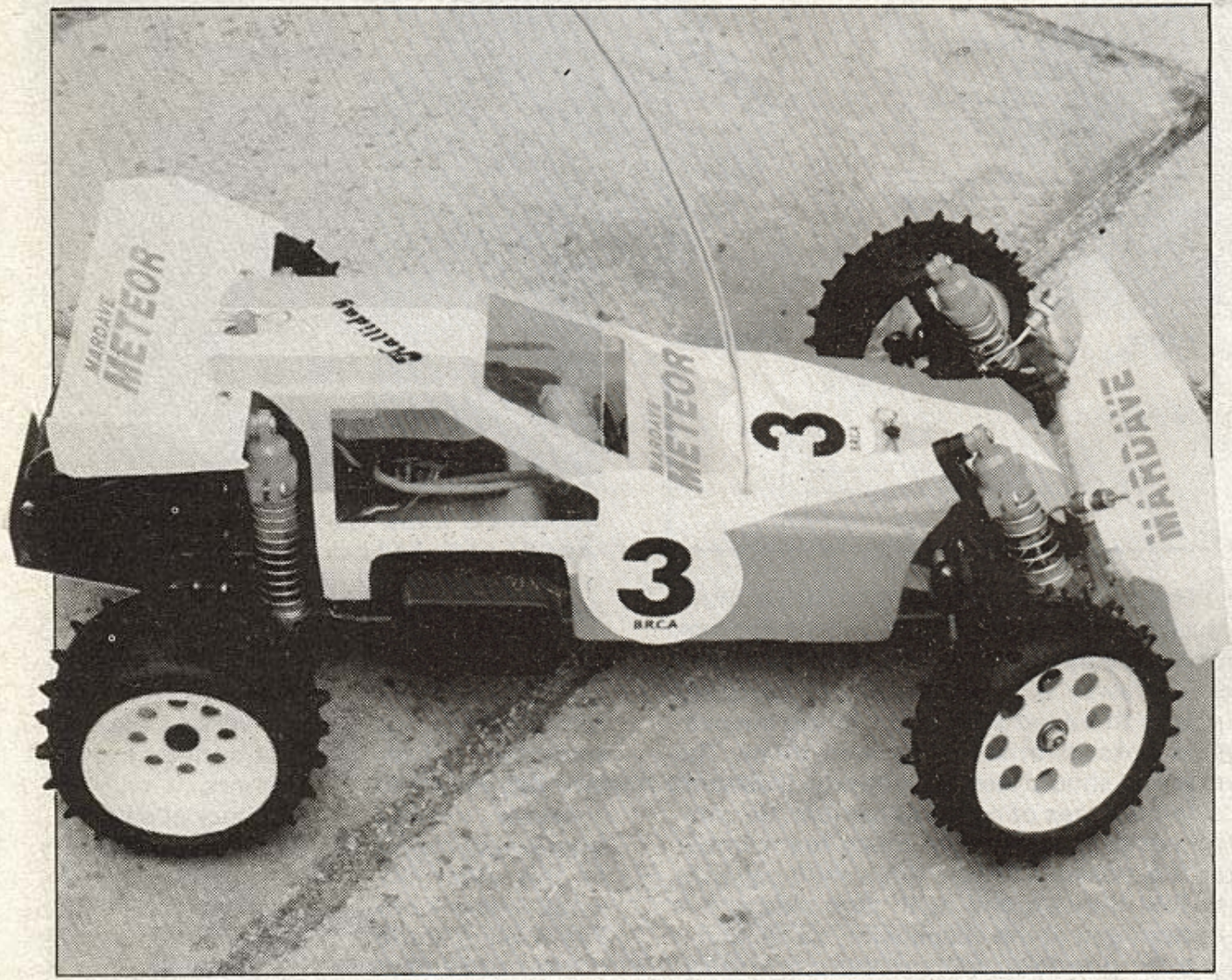
Finally, a few comments to help those of you who do not understand how the spring tersions can affect under/over steer. If you

With the lid off! The speed controller is an old Demon 2 CES, shortly to be replaced by a 'Pro-King'.



car will not steer around corners easily, either (a) move the rear spring collar downward on the damper body, or (b) move the front spring collar upwards. A balance of these two will be required for the smoothest ride. Alternatively, if the back of your car flicks out on every corner, or the steering feels too sensitive, reverse the procedure, i.e. move the rear collar upward or the front downward.

The up-rated Meteor, poised and ready for action.



Body And Wing

Replace the ABS shell provided in the kit with the optional Lexan units offered by Mardave — these will save a few ounces.

Conclusion

Well, there you have it! I hope you have found my article useful and that you will compete in as many events as you can with your modified Meteor. It is very tough and will withstand crashes that leave a lot of the more sophisticated cars in bits; its also exceptionally good value. Let's see more 'mean' Mardave's around the circuits. Good luck!

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

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