

**M**odel Racing Products introduced the 'PRO-110' as a competition 2WD 1/10th Off-Roader to challenge the hold that *Associated's* 'RC10' has had on this class for quite some time.

Unlike the UK competition scene America has divided racing into four-wheel drive and 2WD classes. Subsequently *Associated* still enjoy sales success with the 'RC10' because it is quite simply the best 2WD car available. How fortunate!

Because the 2WD class is still popular in the States *MRP* obviously consider the market to be worthy of their attention.

### The main features

The chassis is a black anodised aluminium plate. A GRP radio plate fits over this and is located on the front and rear suspension units.

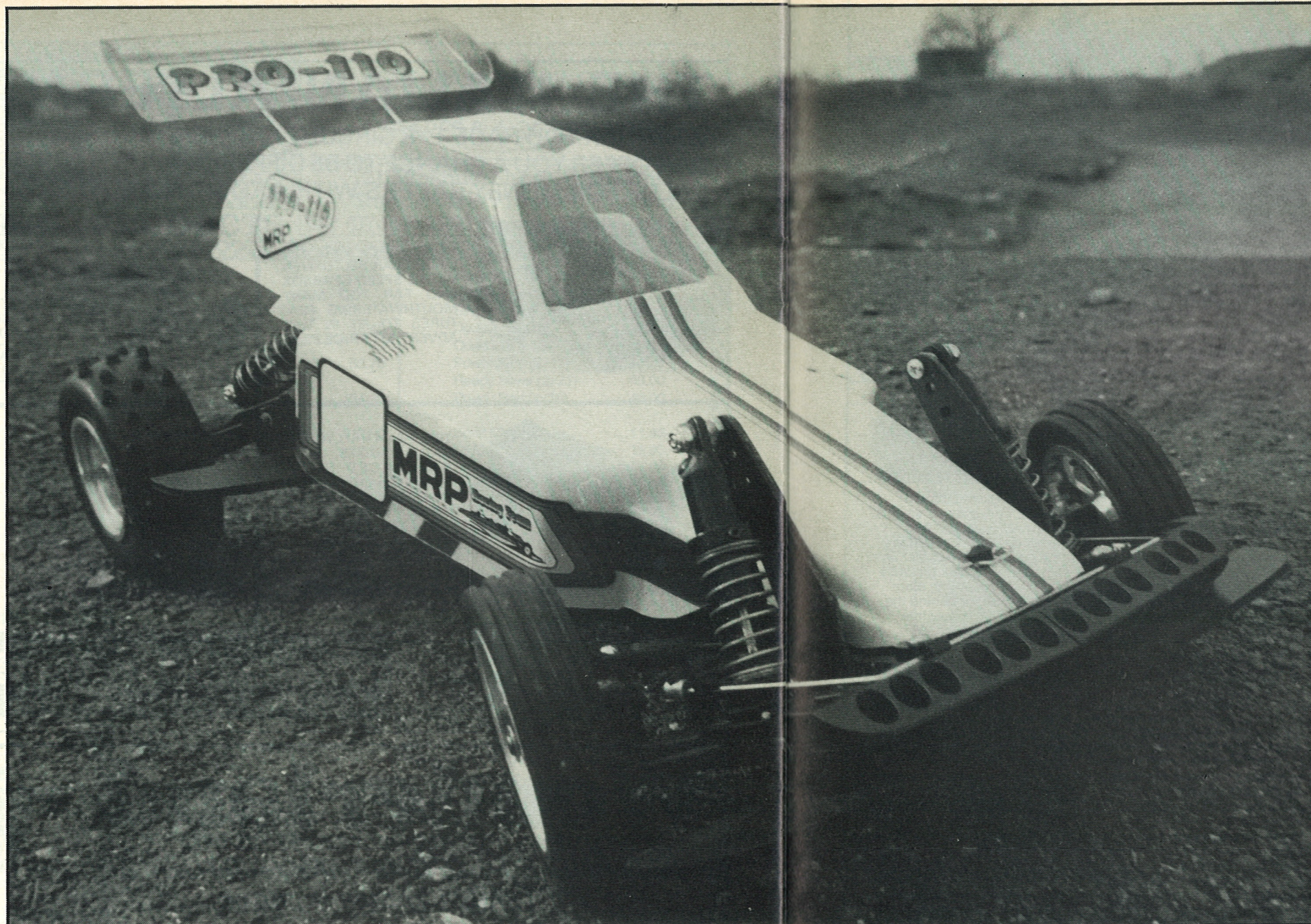
Between these two plates are fitted the batteries and steering servo whilst the speed controller and receiver could be fitted either above or below the plate as there is ample space available.

Both front and rear suspensions are independent trailing arm type with coil over damper springing. Built into the suspension design are a range of adjustments allowing settings to be tailored to individual circuits or driver's style. The kit comes with a range of alternative springs to further widen the choice of suspension set ups available, some springs being progressive and others linear in action.

The damper units themselves are of an interesting design being the volume compensating type. The compensating action is achieved by creating a chamber at the shaft output end of the unit. The volume of this chamber varies as the piston moves in or out of the damper barrel. Most other variable volume designs have a compensating chamber at the 'top' end of the barrel.

The main advantage I can see in having the chamber at the shaft end is that air can move in or out of the barrel around the shaft as no seal is provided at this point. The seal is in fact at the other end of this air pocket. Suffice it to say that this is quite an innovative design which appears to work very well and has been used successfully on the 1/8th *Delta* car. Up to now I have noticed minimal oil leaks.

The suspension design which is of the angled trailing arm type has some unusual geometry. In addition the designers of the car have built in a pretty impressive range of adjustments including, variable castor, camber and toe in/toe out. Most of the adjustments are



# MRP PRO-110

easy to alter, once again making this a car for 'any track.' The left and right plastic swinging arms are of identical design making it simpler for both manufacture and spares holding.

Rear suspension is of a similar trailing arm design, once again using a single moulding for left and right arms. A choice of suspension set ups is also available at the rear and the rear dampers are very steeply inclined. This allows dampers with limited piston travel to work over a large axle movement. It means that the damping action is unlikely to be as good as having the dampers

more upright, but in fairness to the 'PRO-110' the action is not bad.

In addition, as the springs are mounted at such a steep angle the wheel end of the damper unit follows a pronounced arc of travel, and as such the springing effect is quite progressive. For this reason the designers have decided to use only non progressive springs on the rear. Another somewhat minor advantage is the car can be given a low profile, although the choice of body design included in the kit indicates that this was not uppermost in the designer's mind.

Both front and rear dampers are provided with alternative top mounting positions.

Although I am reluctant to make comparisons with other kits it is worth noting the design of this suspension is reminiscent of the *Kyosho* 'Scorpion' of a few years back, but with refinements.

### The transmission

Although 2WD has had a bit of a hammering with the 4x4 vehicles running away with a lot of the honours recently 4x2 still has a lot to offer.

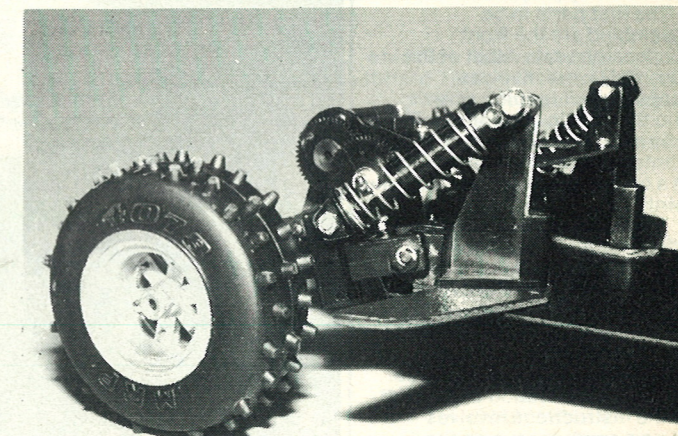
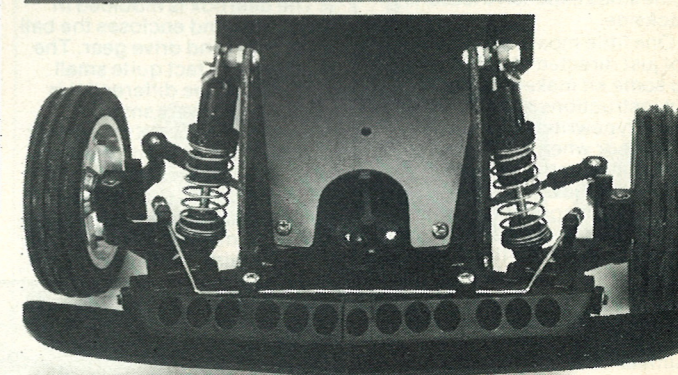
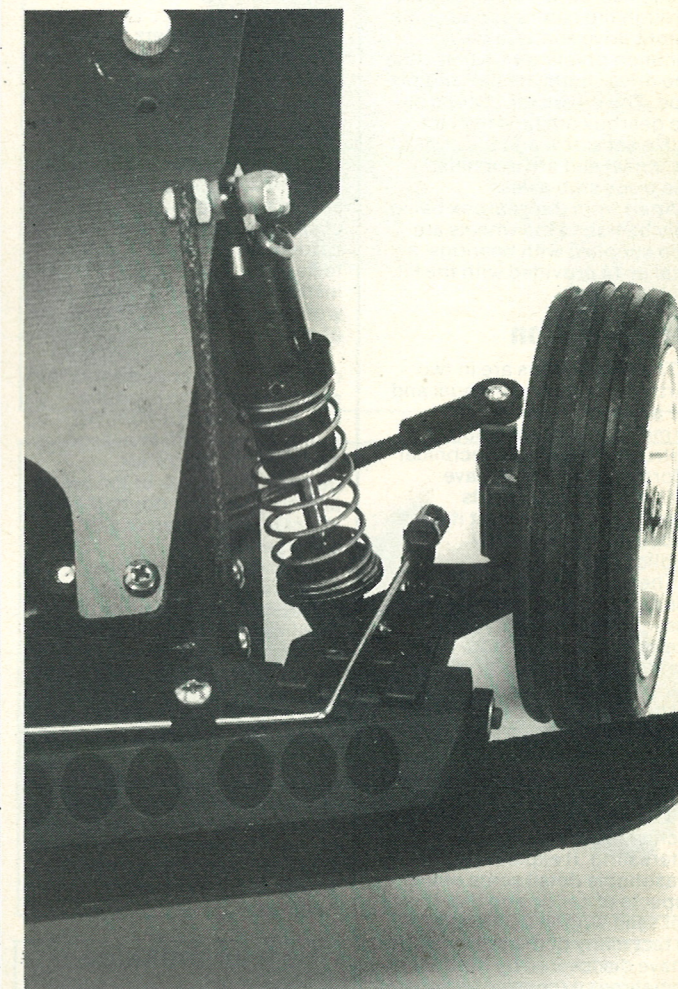
**Two-wheel drive Off-Road racing is still fiercely contested on stateside circuits. Geoff Driver has been testing one of the main title contenders**

The 'PRO-110' designers have managed to build in a particularly interesting option, namely, the easy repositioning of the motor from either in front of the rear wheels to behind. So what? you might ask. I might venture to say that perhaps this single change is likely to achieve more dramatic changes in handling characteristics than any other. I am not in a position to say which is better, but with the 'PRO-110' at least you can try out the options.

The gearbox is fully ballraced and within its small external dimensions is a ball differential driven by a transfer gear. The

transfer gear in turn is driven by three externally mounted cogs. The gears are all 48DP, which is a pitch roughly between the original standard pitch (32DP) and the more recently favoured fine pitch gears (64DP). The main reduction gears are all moulded plastic.

*Top right: front suspension unit features single trailing arm regulated by coil-over shock unit. Centre: the complete front-end. Shock towers are produced from GRP. Right: rear suspension - again single trailing arm (similar to *Kyosho* 'Scorpion') with dampers positioned for maximum stroke/arm travel.*



The differential unit is adjusted by means of a hexagon headed screw which is reached through the centre of one of the output drive shafts, a fairly common practice with ball diffs. The drive shafts are ball and pin type. The drive output cups on the gearbox are held in place with a set screw and the cups at the wheel end are machined one piece stub axles.

Apart from the gearbox being fully ballraced the wheels are also supplied with bearings, a total of 14 provided with the kit.

## Construction

The instructions are in two parts, the technical manual and the assembly manual. The former is in part assembly instructions and part technical information. As MRP have brought the two aspects together in one booklet it does become a rather wordy publication.

The assembly manual is a series of drawings showing the assembly step by step. The drawings are very good, being clear and explicit, but having the instructions in a separate manual rather spoils the whole exercise, which is a bit of a shame considering the work that went into the preparation of the drawings.

The technical part of the manual is very interesting. It explains in reasonable detail some of the aspects of car design that I have not seen written up elsewhere. In fact many of the points made I have discovered by hard and sometimes expensive lessons trackside.

One little moan, and this is not just directed at MRP. Why do some kit makers still bash out instructions on the ancient office typewriter or word processor when cheap good quality typesetting is readily available? However, the information contained in the technical manual would, I suggest be of benefit to anyone studying the science of car, and in particular model car, and mention this last fact as R/C Model Cars has received a number of letters from readers who have decided to use model car design as a subject for school study projects.

The first parts to be assembled are the front suspension units. Most of the assembly work involves screwing self tapping screws into the plastic mouldings. The only minor departure on the front suspension is the drilling of a couple holes to take the ball joints.

The damper units must be filled and fitted in place. Although they come assembled the units must be dismantled to be filled with oil. MRP recommend a 1:4 mix of 90W and 10W oil. This in practice does seem to be a wise choice. A small modification suggested in the instructions involves filing a small groove on the edge of the piston. I assume

that this mod was found by experience to be desirable. I duly filed the groove in the piston.

Filling the dampers was not difficult, although I had to do it a couple of times to get the same sort of performance from all four dampers. A bleed screw at the top of the damper unit allows the air to be bled off.

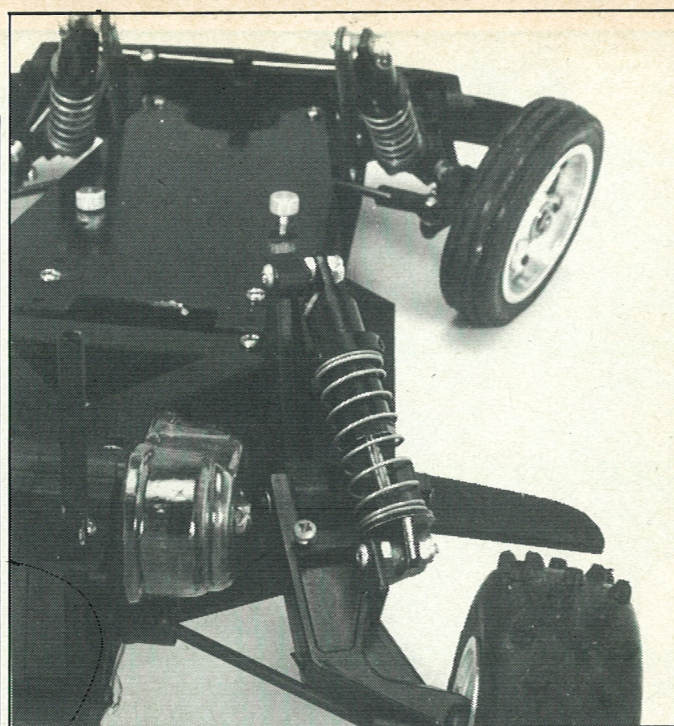
As mentioned earlier there are provided in the kit a choice of springs, as yet I have not carried out a thorough range of tests but the advice given in the instructions is sensible, well worth reading and is almost free of clichés.

The servo saver is mounted centrally in the chassis and as such does tend to produce some significant amount of bump steer effect. However compared to the other geometrical antics of the swing arm suspension I doubt that its effect is worse than any other consideration.

All of this including the ballraced wheels with their ribbed tyres (which are incidentally held in place with circlips, or if you have American sympathies E clips) can be assembled before fitting to the flat pan chassis. The bumper provided with the kit is wide enough to reach to the outside edge of the front wheels. The kit includes an anti-roll (they call it an anti sway) bar. A quick test of the front suspension showed that it worked with a smooth action and was sensibly damped.

## The transmission

The gearbox is moulded in two halves and encloses the ball differential and drive gear. The gearbox is in fact quite small, and as such the differential is also of a relatively small diameter. This is OK for getting a reasonable ground clearance, but it does mean that the ball differential has to work within a limited diameter, and as such the adjustment screw must be done up fairly tight to avoid



unnecessary differential slippage. This of course is a problem common to all small diameter ball differentials. The gears and shafts all run in ballraces.

The mounting lugs of the gearbox must be drilled out to allow for fixing to the chassis. The final part of the gearbox assembly is the fitting of the output drive cups that are held to the output drive shafts with a socket headed grub screw. Memories came flooding back of 'Rough Rider' days when the universal joints (that were held in place in a similar way) always seemed to be falling off. Liberal application of thread locking compound was applied to the securing screws, and (touch wood) no problems so far.

The externally mounted gears have a Lexan cover to protect them and the underside of the gearbox is also provided with a Lexan shield to add further protection. Yet another cover is provided to fit between the radio section and the transmission unit to cut down

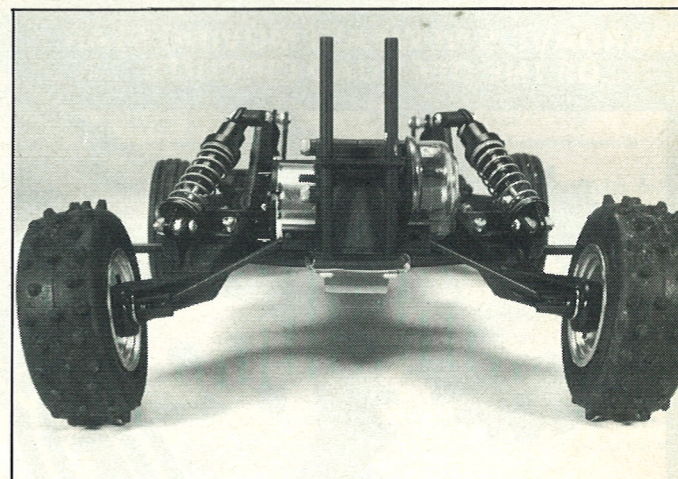
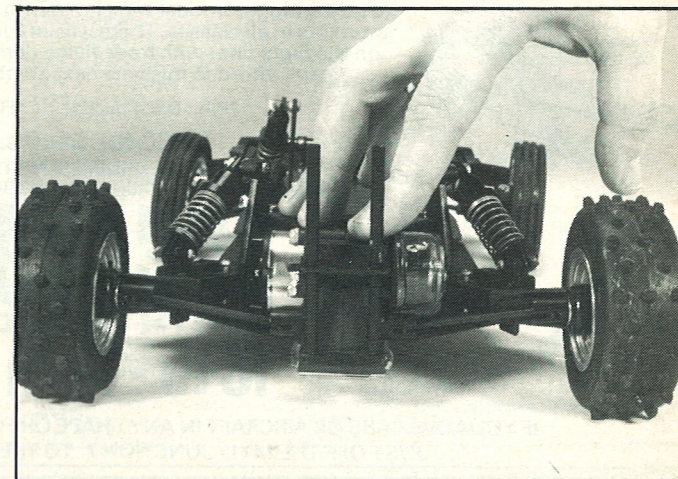
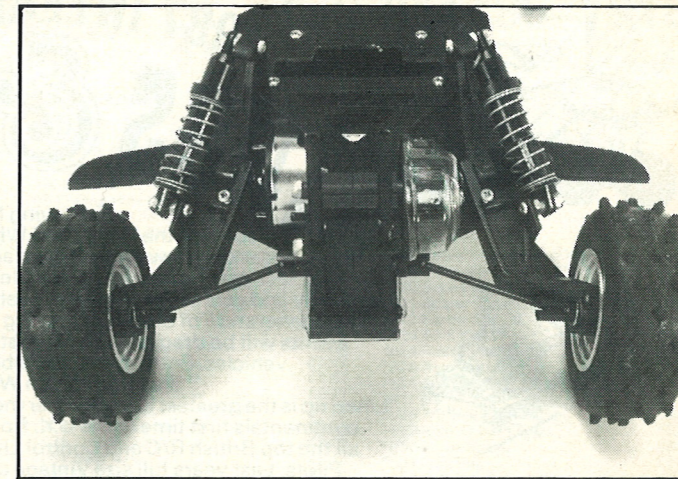
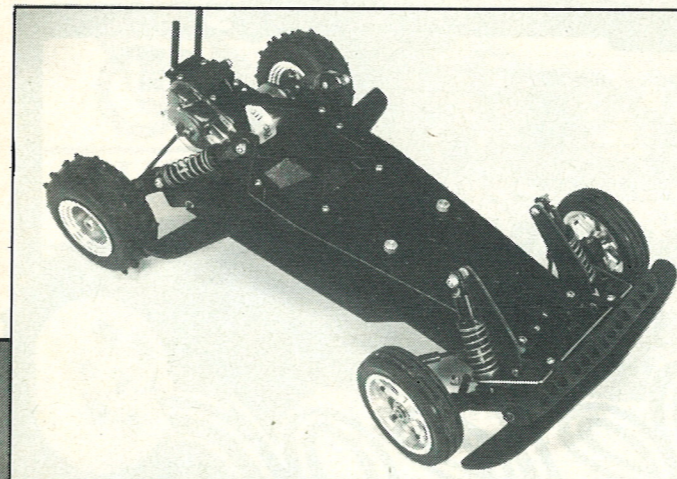
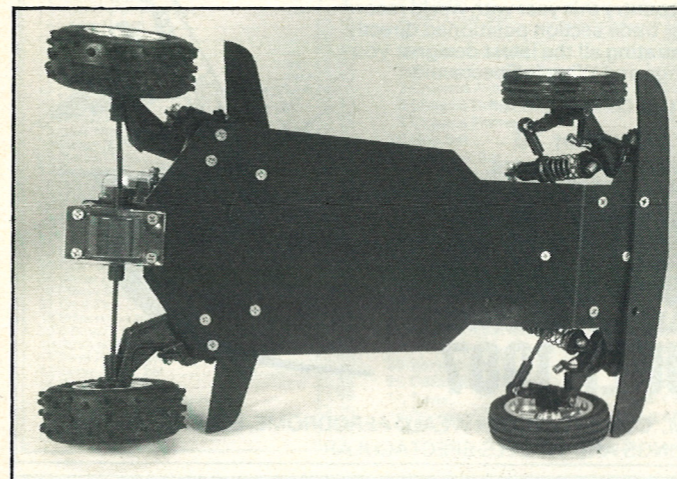
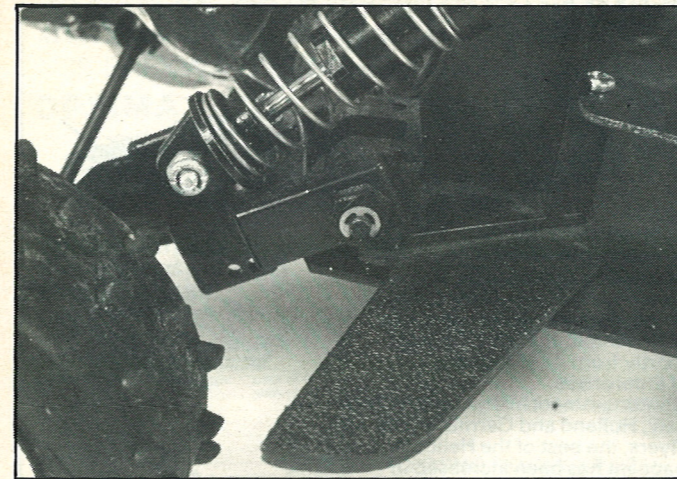
on rubbish being thrown forward from the rear wheels. The novel feature of the transmission unit is that the motor (a Hong Kong Mabuchi provided with the kit) can be fitted to its mounting plate either in front or behind the gearbox. This is possible because the gearbox is (externally) symmetrical.

## Rear suspension

The individual suspension unit can once again be assembled out of the car. An eccentric pivot and a number of damper mounting holes are provided to give a full range of suspension adjustment. As the rear wheels are reversible two track widths can be obtained just by turning the wheels around.

Finally comes the fitting of the radio tray which requires drilling a couple more holes, this time for the fixing of the front of the tray.

Pillars for the steering servo are provided and a small brass



Opposite page top: view from behind of the rear suspension. Screw head just to the left of bottom damper point adjusts ride height. This page clockwise from top left: eccentric cams in the trailing arm pivots adjust toe-in/toe-out. Full amount of suspension travel, shown at maximum ride height and depressed. View from underneath showing full length anodised alloy chassis. Complete rolling chassis.

coupling is provided for the steering servo to couple to the servo saver.

Screwed to the underside of the radio tray are two battery clamps for holding a 7.2 parallel stick. Holes are drilled in the radio plate to allow a number of battery positions to be tried out. The speed controller is resistor with wiper arm for fitting direct to a servo. All plugs and sockets are provided, even down to a voltage dropping diode to allow the receiver to be run from the drive battery.

The body option set is novel. A driver figure is provided on what is in effect an inner body. Over this comes the outer body

which is a little reminiscent of the old Tamiya 'Rough Rider.' A wing fitting into a pair of tubes at the rear of the gearbox completes the whole assembly.

The assembly provided no unpleasant surprises and the quality of materials and workmanship appears to be good. The kit is very complete which is unusual for a car intended at being a serious competition racer, and I did like the box design.

**Importer:** J. & P. Turner R/C Cars. Tel. (0689) 32082 for details of your local stockists.  
**Price:** £139.95.

