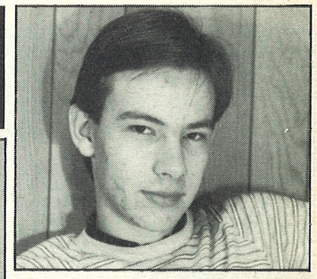
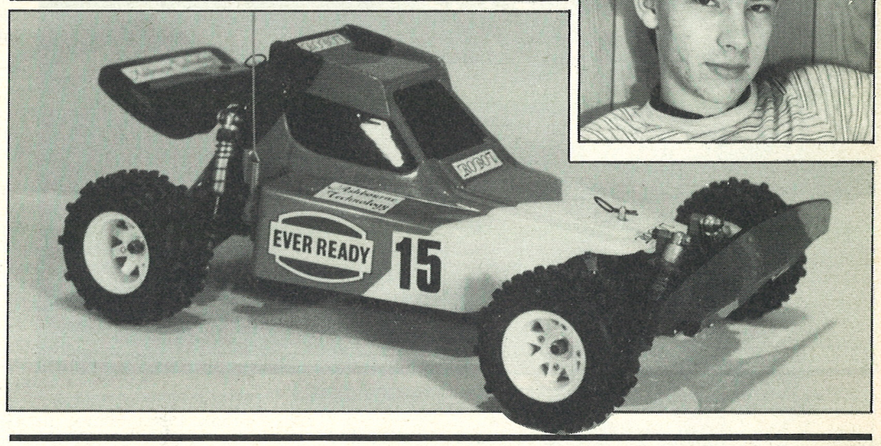




Inset right: the driver – Miles Howard who has knotched up some noteworthy success in race meetings around the South East. Below: the Hirobo fitted with a polycarbonate MRP 'Scorpion' bodyshell. Bottom right: close up of the front suspension showing the re-located upper suspension arm links. Also the centralised servo mounted on homemade brackets. This allows equal length steering track rods.

Gear-drive Hirobo

Miles Howard's modified Hirobo 4-wheel drive car is well known around the Bury Buggy Club Circuit.
Mike Howard details the design and modifications

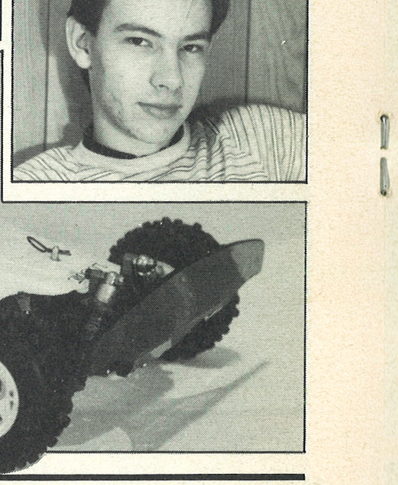
1. Transmission

The drive motor is mounted forward of and above the rear gearbox input shaft. The motor is carried on a 1.5mm thick carbon fibre plate bolted to the gearbox right hand side plate. A specially machined input shaft replaces the original and is designed to accept *Kimbro'* spur gears.

The motor mount is slotted to allow correct meshing of drive gear sets ranging from 12 to 15 tooth motor pinion with 50 or 52 tooth spur gears giving a wide choice of drive ratios. The usual ratio for standard motors is 14:52 giving 1:8.66 overall. The new motor installation gives a reduction in rear overhung weight, eliminates primary belt tensioning and power losses, and provides a wide selection of quick change gear ratios. The rear section of the gearbox is cut away and covered with a clear polycarbonate panel giving dirt protection to the fore/aft drive belt but with instant visual check facility of belt condition.

2. Rear suspension

The rear suspension lower wishbones are reversed giving a reduction in wheelbase of about 16mm and improved cornering. In addition, the rear shockers are now mounted forward of the axle further reducing rear end overhung weight and making them less vulnerable to rear impact. Original springs and shockers are used, but with a heavier damper oil and modified piston to cylinder clearances.



3. Chassis

The radio box is replaced by a flat 2.3mm thick glass fibre plate, shaped to match the body skirt profile, and bolted to the original aluminium chassis plate and lower belt cover. Two plastic square sections, 5mm deep are run along the top of the aluminium chassis and below the glass fibre plate to provide space for the belt. This flat plate with its close fit to the body profile keeps the dirt and water out of the car and provides a neat layout for the battery, receiver, speed controller and steering servo. This chassis layout was originally developed on a *Tamiya* 'Super Champ' raced by Miles early last year, and shown in 'Model Cars Monthly,' August '84 edition.

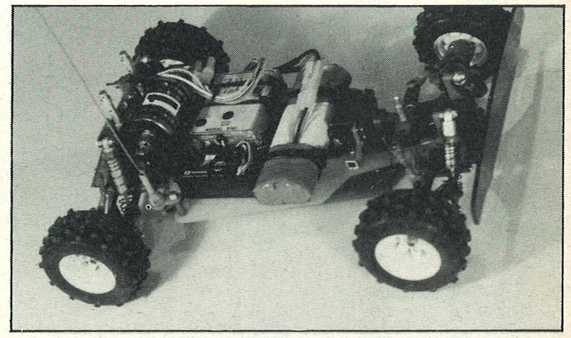
4. Front suspension and steering

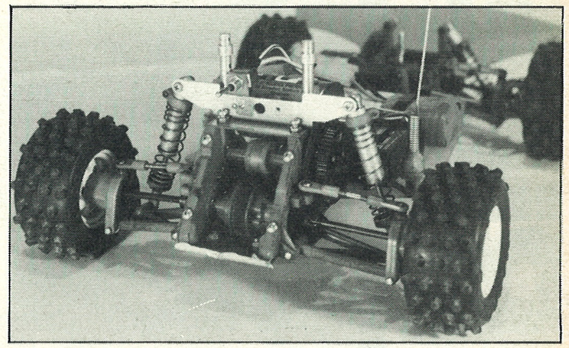
The front suspension upper links are shortened and angled rearwards to eliminate front wheel positive camber under body roll conditions, thus reducing understeer.

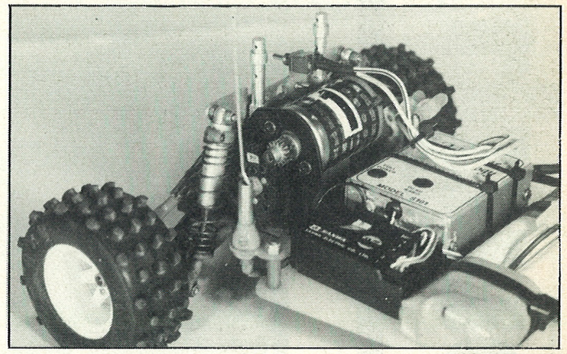
The steering servo is positioned with its output shaft along the car's longitudinal axis, and is mounted high enough above the chassis plate to allow a *Kimbro'* servo saver to hang vertically downwards. Equal length track rods are used from the servo saver to the steering arms. This arrangement virtually eliminates bump steer and its direct action provides very positive steering and really benefits from the exponential rate transmitter. Front dampers are original with heavier oil and modified pistons. Front springs are *Hirobo* heavy duty.

5. Specifications

Drive motors — Standard: *MG, Bolink, Igarashi.* Modified: *MG, Magnum, VT Igarashi.*
Radio transmitter — *Sanwa* Excellence FM.
Radio receiver — *Sanwa* FM.
Steering servo — *Sanwa* Mini SM 401.
Speed controller — *Ashbourne Technology* 'Robot.'
Batteries — *Ever Ready* 1.4Ah.
Body shell — *MRP* Scorpion Lexan.







Top right: the overall chassis layout showing Ni-Cad 'stick' pack mounted across the chassis. The GRP plate is cut to fit flush with the body. Tyres are Mardave 'Apache.' Centre right: rear view of the car. The dampers are re-located forward of the axle. The rear of the axle/motor mounts is protected by a piece of clear lexan. Right: close up of the gearbox showing new motor mounting plate and drive gears. This system allows a wider range of quick change gear ratios.