



**Pete Winton**

**builds**

**Schumacher's**

**answer to two**

**wheel drive**

In the race to win the worst kept secret of 1988, the impending release of the Schumacher 'TOPCAT' must rank as a major contender. Advertised in the modelling press since October 1988 (a stripped down 'CAT' lurking beneath a towel!) there was great anticipation in every club. Schumacher needed a car aimed at the mass market yet capable of giving the high standards of performance we now expect from them. Enter their contender for this difficult task, the two-wheel drive (2WD) 'TOPCAT'.

The car arrived in late February 1989. Nice box, excellent packaging, and a thick instruction book. Plenty of plastic bags thoughtfully grouping major assemblies as they appear in the booklet. Mention must be made of the beautiful exploded diagram in the middle pages done by Roy Crowson - yes the 1/8th Oval racer of repute - which is invaluable during assembly.

#### The basics

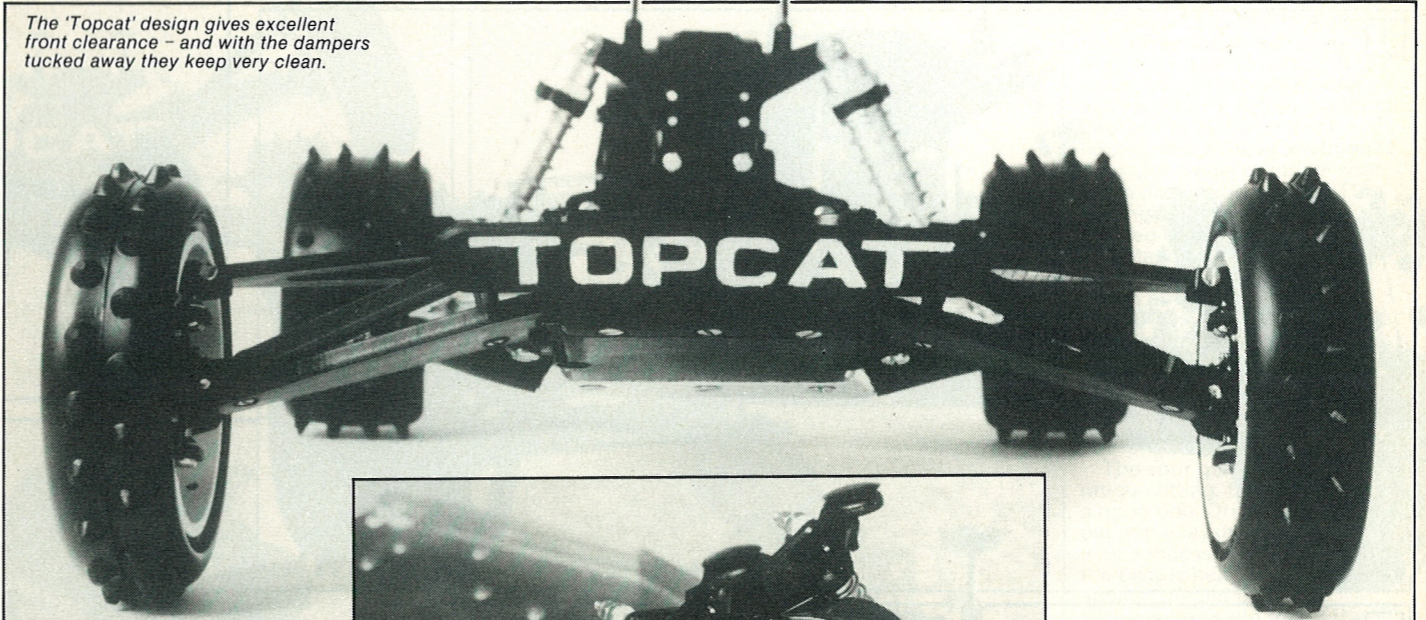
The car is built around a pressed aluminium chassis which supports all the running gear and electrics. This very rigid unit marks a change for Schumacher away from (flexible) glass reinforced plastic used in their 1/12th 'C' Car, and 1/10th 4WD 'CAT'. A small lip on the edge of the chassis adds rigidity and mates with the bodyshell totally enclosing the chassis in the way pioneered by the 'CAT' undertray. The body is retained on the chassis using Velcro strips. Thoughtful design includes a recess at the rear for the motor to keep everything as low as possible, and proper countersinks for all the screws which pass through the

# The Cat's

# Whiskers



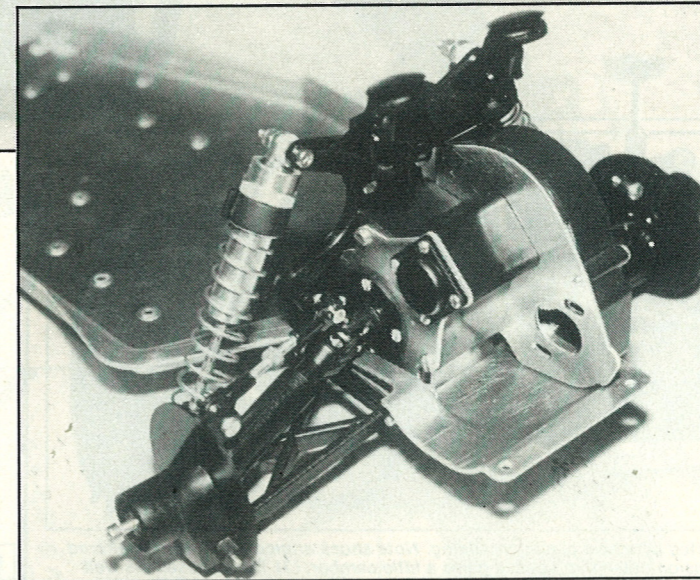
# The Cat's Whiskers The Cat's Whiskers



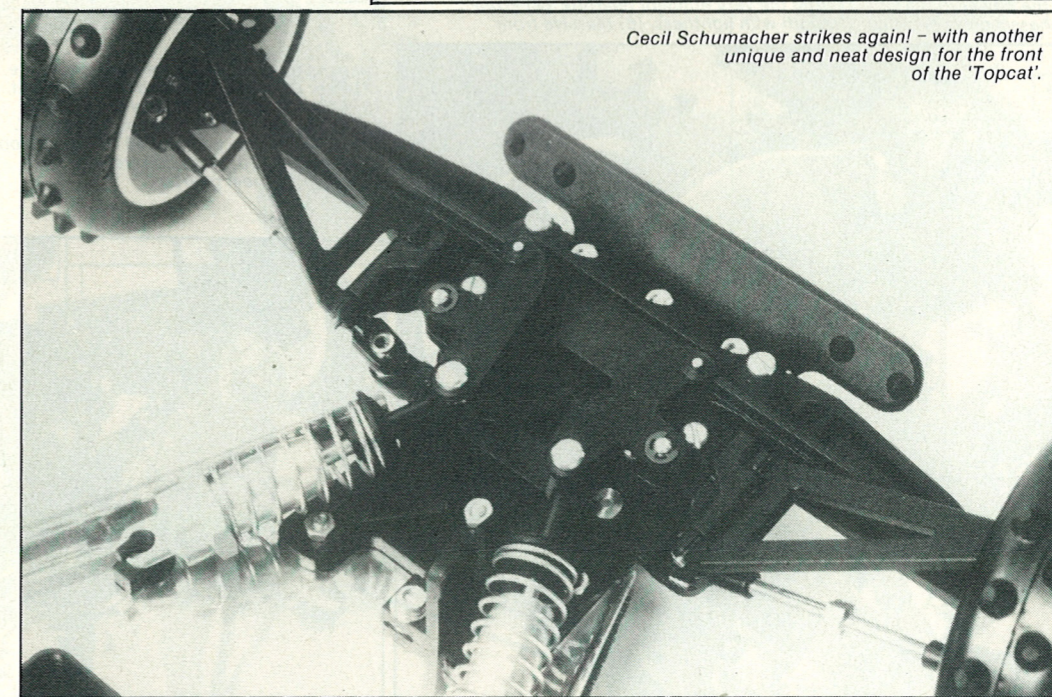
The 'Topcat' design gives excellent front clearance - and with the dampers tucked away they keep very clean.

chassis. The result is a totally smooth underside to the car, and strength way beyond anything yet seen in 1/10th Off-Road.

The rear gearbox is a plastic moulding sandwiched between two aluminium plates, as used in the 'CAT'. A belt connects a top layshaft (driven by the motor) to the rear axle, and is of a new design. Schumacher have used the patented Uniroyal HTD toothed belt design for this single belt drive and the belt itself is three times wider than the 'CAT'. The ball



Cecil Schumacher strikes again! - with another unique and neat design for the front of the 'Topcat'.



and thrust race differential has 14 balls in it to reduce slip under high loads. Clever use of abrasive paper (similar to 'Wet

and Dry' paper) glued to the thrust races and bearings on the nylon carrier makes assembly much easier.

### Gearbox details

The differential has all enveloping side plates to keep

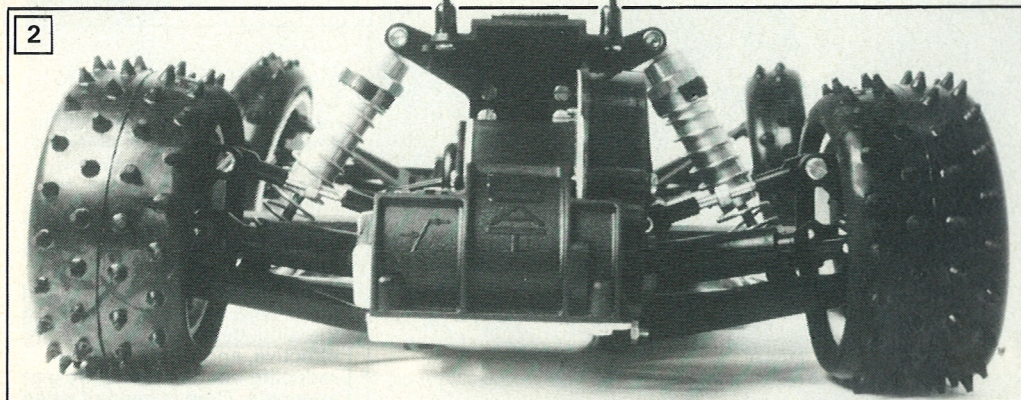
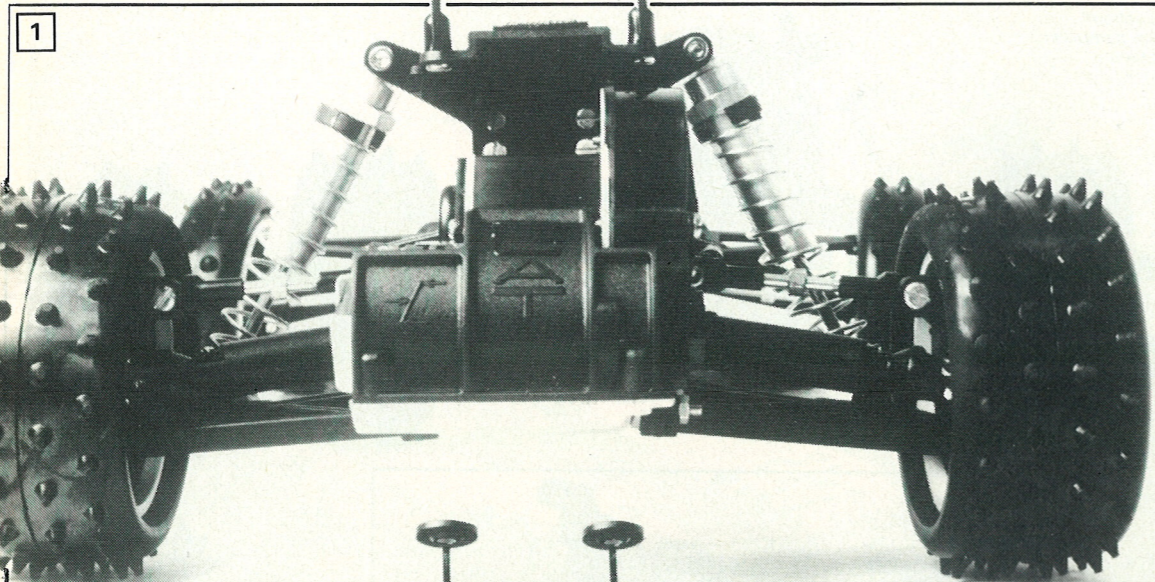
the dirt out, and connects to Schumacher's excellent moulded universal drive shafts. The kit comes with oilite (solid) bearings for all gearbox and axle use. Each bearing is sintered bronze, but all the axles are plastic. These materials would not make good bearings, so a steel sleeve is fitted over the nylon axle, and it is the steel sleeve which runs in the oilite bearing. Simple, effective, and with a friction-reducing coating, perfectly adequate. Care is needed when adjusting the belt on new gearboxes fitted with oilites, as one approaches the recommended tension of 1mm-2mm, the gearbox tightens up considerably. Leaving tension at the 2mm end of the range worked well, and the bearings do free up with use.

Compared to the front suspension, that of the rear is conventional. Lower wishbones attached to the metal chassis support rigid uprights and a top link connects each upright to the bulkhead. The top link is threaded left/right, permitting camber adjustment without removing the link from the car - nice. Spring/damper units (from the 'CAT') attach to the bulkhead and wishbone.

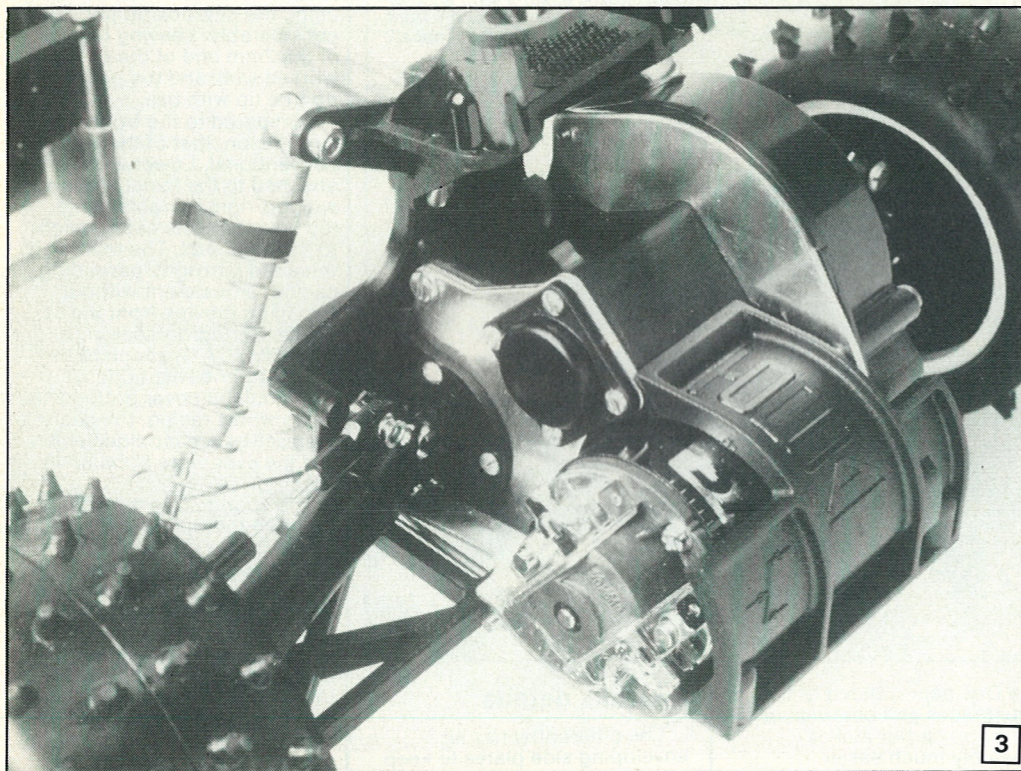
A moulded cover protects the gears whilst racing, the gears themselves are moulded and use the ever more popular 48 DP size.

The spur gear in the kit is big, a 95 tooth, and there are three smaller ones available (86, 89, 92). With a full range of 48 DP pinions these gears are all you need. The instructions give example ratios using only four pinions, and this range will suit anyone. Be careful since the ratios given in the book are not the generally accepted way of working this out. Normally the ratio is expressed as the

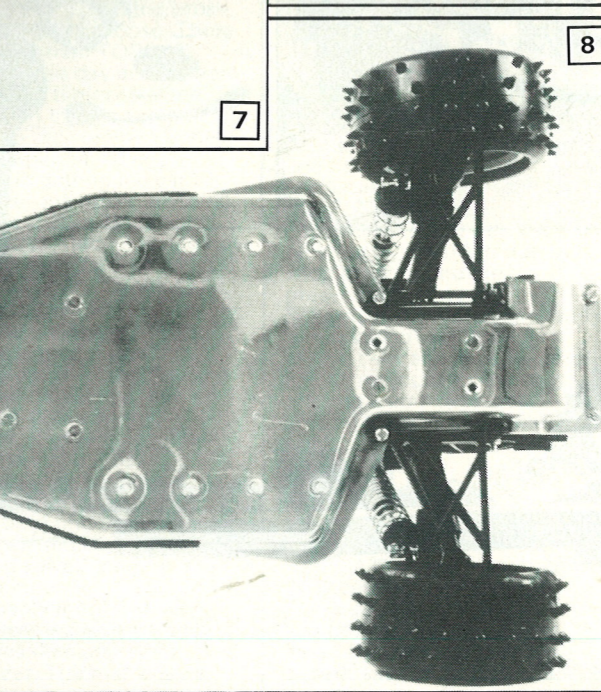
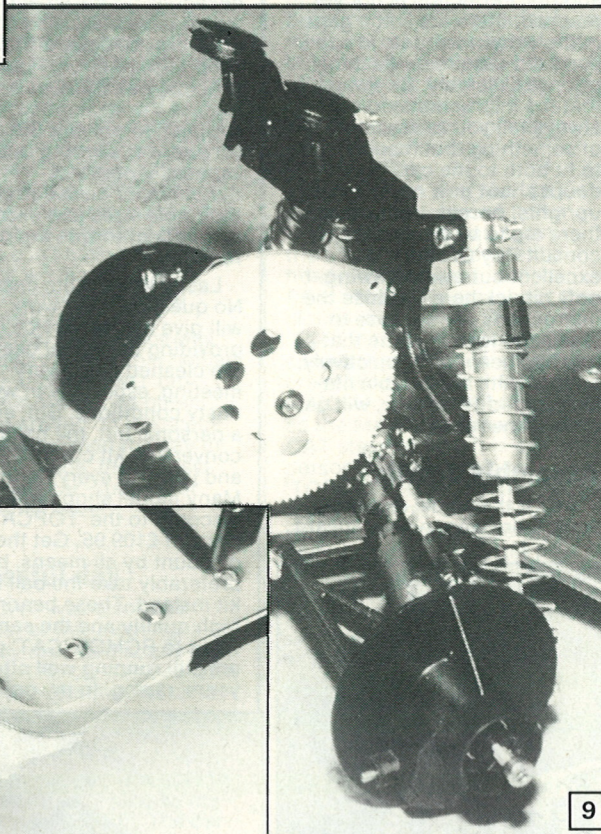
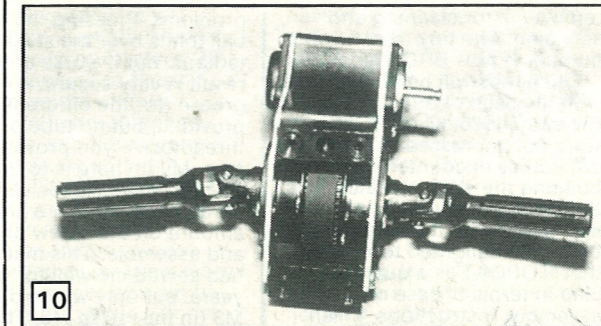
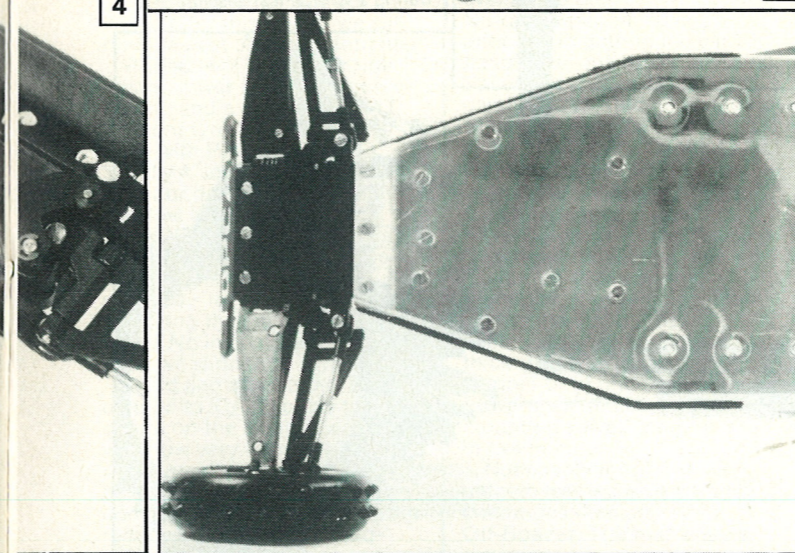
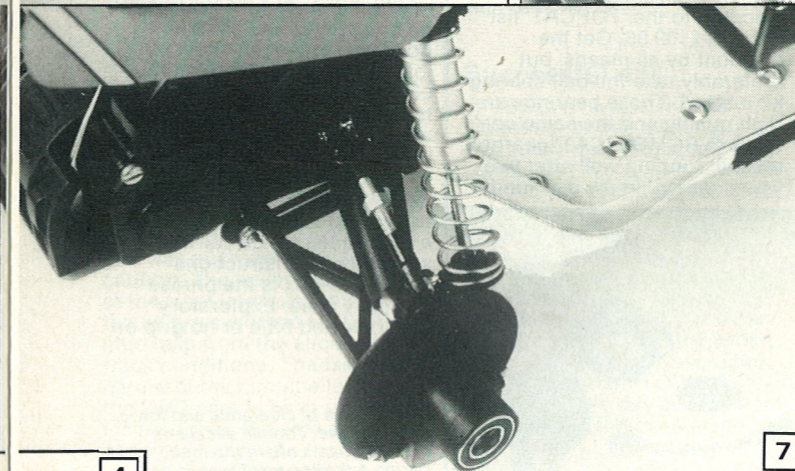
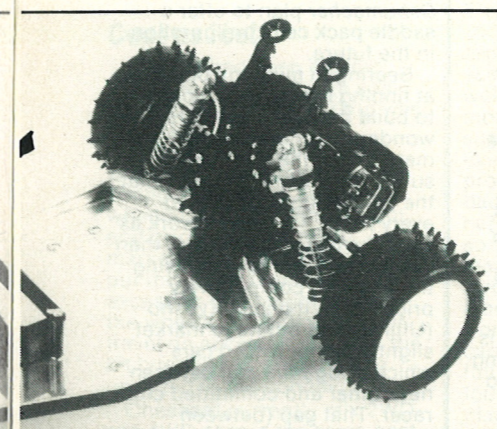
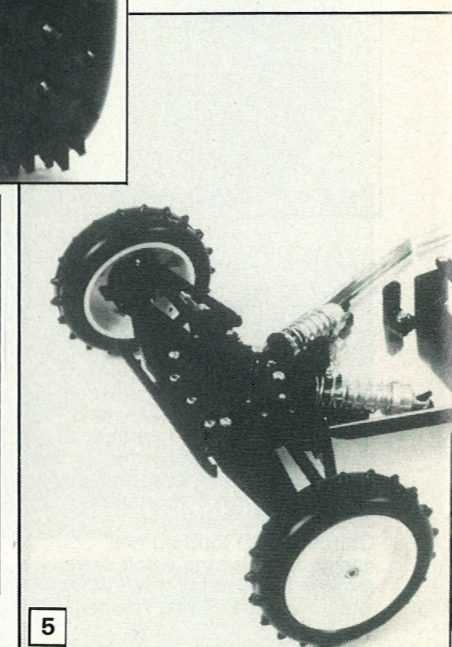
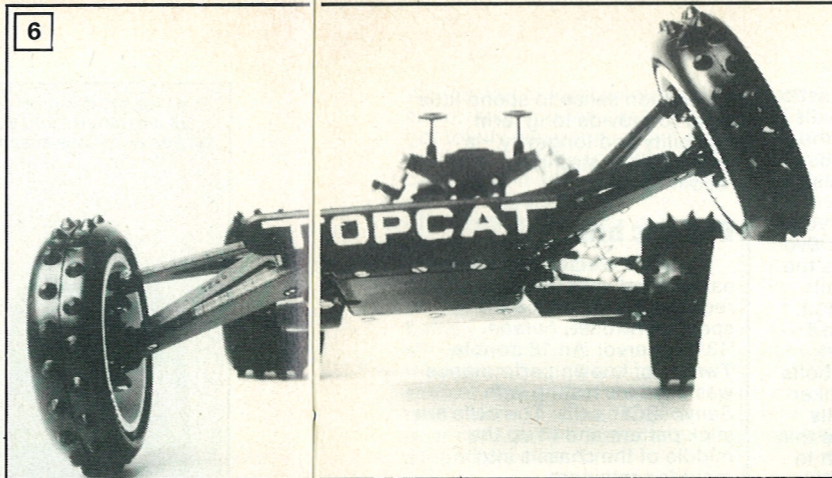
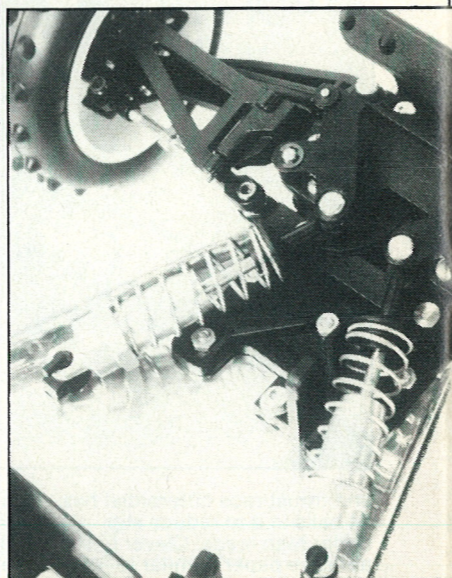
# The Cat's Whiskers The Cat's Whiskers



(1) The motor in the 'Topcat' is well protected by a neat plastic moulding. Note shock angles which can be altered at the suspension arm. (2) With the suspension down the 'Topcat' gains a little camber. (3) The car uses the well proven sliding CAT driveshafts to transfer the power to the wheels from the very efficient gearbox. (4) Front shockers are easy to remove. (5) Unique chassis gives excellent strength with lightness. (6) Massive front



suspension gives lots of ground clearance. (7) Rear wheel guards keep the stores out. (8) Clean chassis with ready countersink holes and smooth front keeps unclogged. (9) Quick release gears of 48 DP feature on the 'Topcat'. (10) Wide belt transfer's power in the neat gearbox.



total reduction from motor to rear axle. Schumacher have only given the primary ratio from spur gear to pinion. Each ratio given in the book must be multiplied by 2.428 (the internal gearbox ratio) to arrive at figures which mean anything to your clubmates or model shop when discussing motors. This glaring mistake has been pointed out to Schumacher. The standard gears supplied are 22 pinion and 95 spur, giving an overall ratio around 10.5:1. This ratio will suit 19/18 double motors. A ratio around 7.5:1 is needed for standard motors, requiring a 30 tooth pinion - SRM Racing have a complete range if you have any bother getting 48 DP gears.

The spur gear has (another) unique fitting, but this time it is a good one. Drive is via a cross pin in the layshaft which mates with a recess in the gear, and the gear is held in position against the pin by Cecil Schumacher's old friend the 'O' Ring! There has been some slight miscalculation (the only one on the entire car) and the 95 tooth gear is very fiddly to remove with the gearbox on the chassis, careful wiggling does allow removal *in situ*. To complement the gear cover is a neat moulded motor cover to protect the motive power from rear collisions. The ease of removal also means that motor boots are no problem - at last!

#### Wing mount

On top of the bulkhead is the wing mount, another clever system which is totally reliable and easy to use, if slightly fiddly on first acquaintance. The 'O' Ring should clip into the lower of the two hooks on the moulding, this is not shown in the instructions. All in all the rear of the 'TOPCAT' looks very similar to the 'RC10' and 'ULTIMA' when assembled. That similarity is misleading for 'TOPCAT' hides much of its best qualities under the skin.

If 'TOPCAT' is easily distinguishable from other 2WD cars it is because of the front suspension - or lack of it when the body is in place! Double unequal length wishbones and swivelling uprights sounds conventional, but where are the spring/damper units? Laid flat on the chassis and totally out of sight when the body is fixed on. A lever fitted to the lower wishbone bears on a bellcrank which is fixed to the damper. This is common practice for Formula 1/Group 'C' full-size racers (called pushrod suspension), but unheard of in 1/10th Off-Road. The system operates very well, including the complicated looking, but easily assembled, steering rack. If there is a reticence it is that the wheel is not controlled by the damper when it falls, only when it rises.

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The wishbone-mounted lever pushes the bellcrank which operates the spring/damper as the wheel rises. The wheel falls under its own weight however, with the damper in hot pursuit! Any reservations about this system during assembly were held pending the track test, but there was no need to worry – it works well.

### Under cover

This method of mounting and operating the dampers allows Schumacher to fit their 'crashback' system to the front wishbone/wheel assembly. Basically, in the event of a wheel hitting a stationary object head on, the whole assembly swivels backwards absorbing the impact. The same system fitted to the 'CAT' works well, this should follow suit and prevent unwanted breakages.

The whole front suspension system sounds complicated, and if mere mortals were asked to design such a system it would be. Cecil Schumacher's brain has ensured a simple result which assembled easily apart from fiddling with the 'O' Rings used in the crashback system. The assembled front suspension unit bolts separately to the chassis and is

removable for cleaning and servicing. The tiny front bumper is now BRCA legal.

Old hands will be familiar with the saga of our 'CAT' review of 1986, when RCMC were not impressed with the difficulties encountered in building the 4WD car and Schumacher were not impressed with the way we said that. I am delighted to report that 'TOPCAT' is a quantum leap in terms of ease of assembly, instructions, finish and fits. Perfection is not yet reached, there are some gaps in the written words and some parts did require de-flashing prior to assembly. Be aware that the instructions do not always tell you to assemble two of something, but then ask you to fit both to the car? If in doubt about how many front uprights, or rear wishbones, there are to be assembled, consult Roy Crowson's excellent cut-away drawing. I only nitpick here because the instructions are so close to ideal, and it annoys me that a gap has been left. Objectively, anyone with reasonable life-skills, aged 14 or over, will get a first-time result.

### Assembly details

As for the actual assembly work there were no significant

problems. Pressing the plastic ball joints over the steel balls is tedious, but it works and the result is very secure. A tube of grease (for the differentials) is provided, but no tube of threadlock – you provide your own. My tip here is to use *Evo-Stick* Contact Adhesive as the 'threadlock.' Smear a small amount on the screw or bolt, and assemble. This method had served me well for ten years, but only works on bolts M3 (in the kit) to M6. Thicker hexagons on the steel balls would have been nice, the thin ones provided are difficult to keep a spanner on. Posidrive (Philips) head screws should replace the straight cut ones supplied to prevent the screwdriver slipping out, especially now that Schumacher have corrected their hole sizes and excessive amounts of torque are not required.

Lastly those oilite bearings. No question, they work. They will give usable service providing the wheel bearings are cleaned after every meeting, especially in wet or dusty conditions. But, and it is a personal but, the ball bearing conversion kit costs £12 or so and is worth every penny. Many model shops will offer discount to the 'TOPCAT' list price of £109.95. Get the discount by all means, but preferably take the ball bearing kit instead. These bearings are high quality and the same one's fitted to RCMC's 'CAT' gearbox are still running well after two years' racing. In my opinion it

is common sense to spend little extra to provide long term reliability and longevity – a bearing kit is strongly recommended.

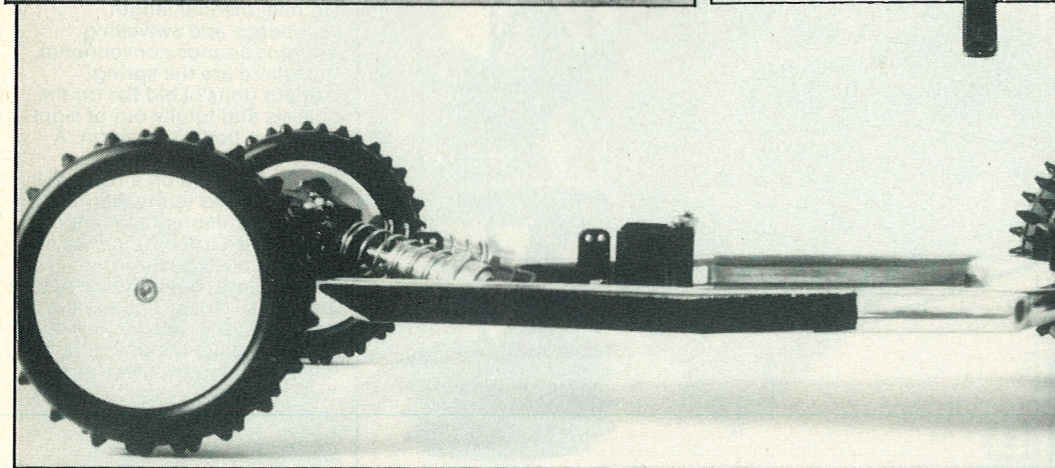
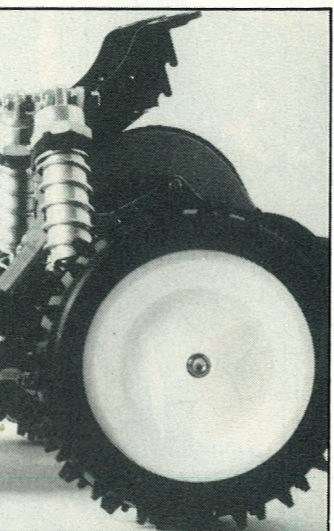
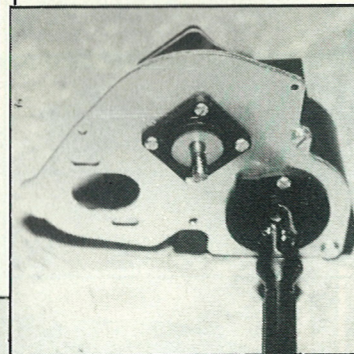
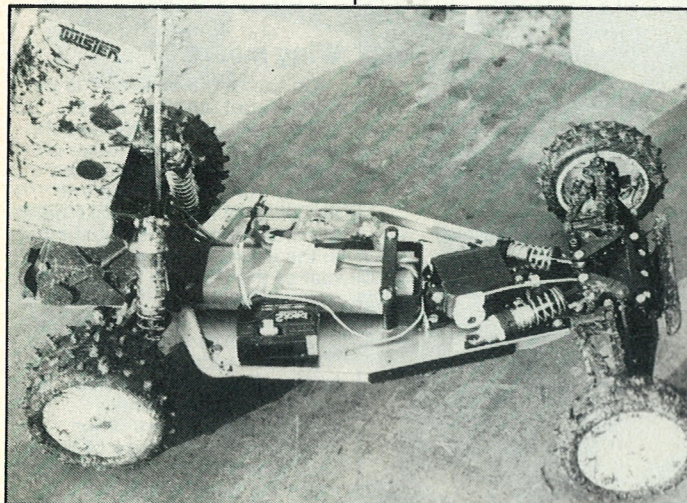
### Electric bits

My usual electrics were easily fitted – JR 'Beat 2' receiver, Laser 'Mini-PRO' speed controller, Futaba '131SH' servo. An 18 double *Twister* of known performance was used for testing with Sanyo 'SCR' cells. The cells are stick pattern and fit up the middle of the chassis into moulded retainers. Schumacher plan to offer a saddle pack cell configuration in the future.

Bearing in mind my pleasure at finding the car much better to build than previous cars, I wondered if that would be matched on the track. 2WD is surely the entry-level class that the BRCA agonises over at every AGM. To make it work as such the class needs more than *Tamiya* and *Mardave* showing the flag with competitively priced cars, it needs *Kyosho* (Ultima) and others to market slightly higher priced cars which bridge the gap between newcomer and committed club racer. That gap (between newcomer and club racer) can be bridged by one car if it is good enough – can 'TOPCAT' join 'Ultima' and 'RC10' in this competitive area where a car must be good out-of-the-box, and capable of development?

Ideal test conditions are hard to define, but the coating of frozen slush at Chesham would not spring instantly to mind as a requirement! The car was set-up as per instructions – out-of-the-box is the phrase normally used. Exploratory laps revealed little or no grip on

Bottom; lots of clearance and low c. of g. give the 'Topcat' excellent performance. Left; in the mud – during a Winton test session.



the ice, but at least we proved it all worked, and the car never got totally away from me. I retired gracefully to check the car over and allow other cars to get out there and clear the ice off the track. Everything on the car was fine, and the gearbox bearings had freed off nicely. The four holes down each side of the chassis (for alternative battery pack mounting) had allowed water into the car, so these were sealed with silicon sealant. Apart from that, a quick clean, and a change of gear ratio, we were ready for a second practice run.

### Cool as ice!

The ice had been cleared exposing wet grass with some dirt showing through. Grip was excellent at the rear, but lacking at the front. The car went well over bumps and changed direction quickly when asked. The lack of front end grip appeared most marked on acceleration and I put this down to either excessive ride height putting the wheels at the limit of their travel on acceleration, or to the kit tyres (2 row studs) being unsuited to the conditions.

Chesham currently mix 2WD and 4WD cars in the same heat. Markedly different driving styles between the two types of car makes racing a little tricky if you have any sense of awareness. Roughly translated that means the minority 2WD runners making allowances for the 4WD runners, most of whom have never driven a 2WD car and know nothing of the different lines required. Round one was approached with caution. The lower ride height at the front improved things, the kit tyres worked well with a little help from the stickier track conditions. The fast open nature of the circuit allowed the 2WD cars to keep up, only losing out on the very slippery concrete jump, and the tight tarmac turn. The track got worse after this round, we sat ninth fastest out of 90 entrants!

Round two; lower rear ride height, lower (again) front ride height, and a change to 'CAT' rib front tyres. The car kept pace with Pete Stevens' 'ULTIMA' losing only to Pete's superior driving. A lot of time was lost later on in the race. The 4WD brigade nudged us into a couple of spins on the jump, and a couple were unaided – let's just say I was exploring the car's roadholding limits! No improvement on lap time, we slipped to 14th fastest.

Third and final round; a change to 'CAT' spikes (cut down) on the front. The car was now very impressive, riding small bumps well, handling neutral, and easy to control. A very sharp downpour reduced the track to a mud-

bath. In these conditions 'TOPCAT' ran well, finishing the race easily whilst the 4WD brigade struggled to finish under the weight of mud attached to their bodies and suspension. Lap times were well down so we ended qualifying 20th fastest, back of the B Final grid.

From this lowly start, 'TOPCAT' made up places hand over fist as we grew more confident. The car was nimble, responsive, yet stable. On the now cut-up, bumpy back straight it rode less well, occasionally hopping unexpectedly from side to side. This never had disastrous consequences, and was far less serious than the 'CAT's on the same section, but an RC10 would have handled it with more composure. The rear suspension was too stiff for my liking, but on reflection the problem can't have been that bad since we made up time here with gritted teeth and some cheeky passing manoeuvres. Third place was thrown away with a spin helped along by another 4WD 'tap-from-behind' and two other cars who arrived on the scene full tilt. We finished the day in fourteenth place, the highest placed 2WD car – pause for self-satisfied grin!

### Successful day

'TOPCAT' was a serious contender at this meeting, a feat easily repeated at any club I suspect. The car handles well, turns in with progression and obedience, accelerates well out of turns, and has no nasty surprises. Even with the oilite gearbox bearings I was able to run the same gear ratio as my fully ballraced 'RC10'. The car is easy to clean, nothing broke, and nothing came loose. There were three other 'TOPCAT' runners on the day and all were pleased with their cars. One was built on the Saturday evening to race on the Sunday! No-one experienced any difficulty in getting the car to handle, no-one broke anything. Racestores' Chris Davidson candidly admitted he would not bother running 4WD so often as he enjoyed the 'TOPCAT'. I can only agree.

The rear wishbones fouled the chassis on full upward travel before reaching the limit of damper movement, putting unwanted stress on the wishbone. It gave no problem during the test but fitting a white nylon washer 1.6mm thick (there are spares in the damper bag) under each forward wishbone pivot mounting solved the problem in five minutes.

Noticeably the 'TOPCAT' gathers less weight in muddy conditions than any other Off-Roader. The rear wheels

have shields to keep the mud out, the rear dampers 'hide' behind the body (not the prettiest item I have ever seen, but effective and roomy inside), and the front dampers are completely hidden from the elements. The result is a car which comes off a rain soaked track considerably lighter than other cars, a great help in making the finish, and a plus in UK racing. If this was in Cecil's mind when designing the car he got it right (and make no mistake this car is entirely a product of Cecil Schumacher's mind, no other). I suspect not, but it is a welcome by-product of the lay-flat front dampers and rear damper angle. Less dirt in the works also means longer life and less maintenance.

Let's not go over the top just because I am pleased that a British company has again tried to meet the competition head-on. The first to do so – PB's 'MAXIMA' – never got the results it deserved. The 'TOPCAT' should because it comes to market with the right credentials (as did the MAXIMA), at the right time (not so the MAXIMA, it ran into the CAT steamroller). It is also a personal pleasure since 'TOPCAT' corrects many of the faults with the 'CAT' (bad instructions, poor assembly, complication) which are now no longer a problem, but which harmed the car at the start.

Objectively, here is a car which takes more time to assemble than a *Tamiya* kit, but provides more quality in club racing use than the standard-setting *Tamiya* cars – quality of race-oriented design, serviceability, durability, and handling. Yet it can be built by those having only experienced *Tamiya* kits before. There will be race-derived development not to replace or strengthen parts, but to improve performance. Already SRM Racing are working on an adaptor to utilise 'CAT' gears on the 'TOPCAT', expect them and others to carry on producing accessories. Price of the 'TOPCAT' is very competitive (£122 with the ballrace kit, £110 without, but shop around) and the presentation is good. Schumacher must offer a ready to run version (including motor, cells and speed control) for the newcomer. Any shop offering a complete 'deal' around the £175 mark will do brisk business.

### Dare we ask?

Perhaps the \$64,000 (or £110) question is how 'TOPCAT' compares with other 2WD cars on the market. *Tamiya*'s market is not in jeopardy since 'TOPCAT' cannot compete with their superb ease of build, looks,

and low price. 'TOPCAT' is not aimed at that class of user, and comparisons with *Tamiya*'s excellent products are not valid, *Tamiya* are in that class on their own. *Mardave*'s 'Meteor' is the only car which gives *Tamiya* a run for its money in that price range, and should *Mardave* fit all the necessary parts (or provide them as spares) then 'TOPCAT' would have a serious rival in the value for money stakes.

*Kyosho* (Ultima) and *Associated* (RC10) had better look to their laurels. The new 'Ultima' PRO is a rival for 'TOPCAT' and may remain so because people still believe no-one can compete with Japanese quality and ease of build. The 'RC10' has a certain finesse about its track behaviour which the 'TOPCAT' and 'Ultima' lack. The 'RC10' rides better, turns with more poise and is fully developed. Having said that, 'RC10's' which behave in this way are definitely not out-of-the-box cars.

But and it is a big BUT, both the 'Ultima PRO' and the 'RC10' are developed cars. 'TOPCAT' could yet match them – who knows? 'TOPCAT' scores on gearbox, strength, 'out-of-the-box' performance, and design over both cars. An 'RC10' modified to give its full potential costs the thick end of £170. The 'Ultima PRO' lacks useable kit tyres and an undertray. Neither car has rear wheel shields, crashback front suspension, or fully enclosed bearings. Quality, performance, reliability, and value for money are at levels the competition cannot ignore. On the track, what our 'TOPCAT' gave away to my 'RC10' most of us can live without, it will only show at National and International races. As of today don't bet against a fully developed RC10 seeing off anything at that level – tomorrow? For an out-of-the-box 2WD car, 'TOPCAT' does not deliver a knock-out blow to the competition, but in my view it gets the decision on points.

Perfection? – of course not, nothing is perfect. There are no adrenaline-pumping thrills – there is no disappointment. This is not an out-and-out no-compromise racer to thrash the 'RC10' – so what? Beginners will rely on its stability to enjoy learning about Off-Road racing, experienced racers can tune it, or take it by the scruff of the neck and have fun. There is nothing individually brilliant about the car, but the sum of its parts make 'TOPCAT' an excellent whole.

'TOPCAT' should set new standards as the car any driver would be pleased and proud to own. Isn't that what Cecil Schumacher set out to produce? **Bullseye.**

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