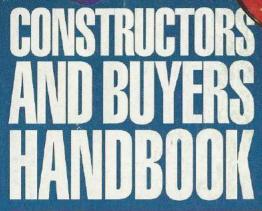
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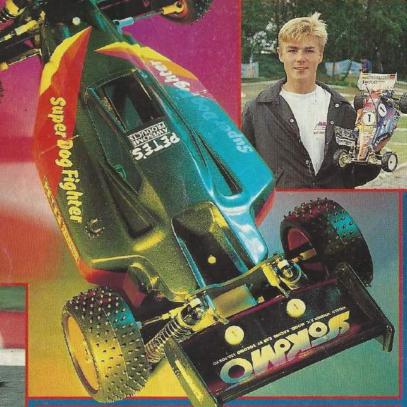














AN ARGUS SPECIALIST PUBLICATION



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Radio Round-up

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**Forward Charge** 

A guide to assembly and charging of

**Body Matters** 

Richard Delves with the ultimate painting guide

**Batteries** 

We list the different packs and specifications available

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Design: SALLY STRAY



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# Speed CONTROLLERS

fter buying the car, probably the first extra to be purchased will be an electronic speed controller.

K.O.

Top Gear Model and Trading Co.

5 Page Close, Bean, Dartford Ken Electronic speed controllers have been around for an awful long time and I suppose that this is one area where technical advances have moved on at a pace. Compared to the earliest speed controllers, todays versions are smaller, lighter, they can handle vast amounts of current and have many more features and sophistication. Of course all these improvements have to paid for, but when you compare the equipment of a decade ago to todays controllers you can see some definite changes for the better. In addition to all that, todays controllers are a lot more reliable than those of 10 years ago. Having said that even the latest electronic speed controllers are not indestructible.

#### Novak.

Pete's Awesome Products. High St. Tottenham. London. USA Manufactured for over 13 years. Bob Novak keeps his product line in the technological forefront with a never ending development programme.
410 MXC Adjustable current limiting, regen 14 FET 500 Ampere.

operate at 2.5KHz

410 MIC Adjustable current limiting, regen 7 FET 250 Ampere. operate at 2.5KHz 410 RVE 610 RV Torque regen reverse

#### Nosram.

Nosram Distribution, 10 Bronsil Drive, Malvern, Worcestershire

Designed and produced by Nick Marson the NOSRAM range have a substantial number of national and international championship successes to their credit. New releases include a competitively priced clubmans speed controller, the "Tomahawk" and at the other end of the range, motor management controllers offer some of the most sophisticated controllers produced in Britain.

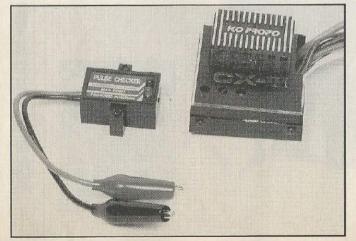
Tomahawk Fwd/reverse/brake 6 FET's tempfet. Enhanced Fwd/reverse/brake 180 Amperes 8 FET's Exterminator Fwd/reverse/brake 270 Ampere 11 FET's Exterminator Pro Fwd/reverse/brake 450 Ampere 12 FET's

Exterminator TL 12 FEt's Motor management system

International Fwd/brake 180 Ampere 8 FET International Pro Fwd/brake 300 Ampere 8 FET's

International PDQ Fwd/brake 7 FET's very compact International Pro PDQ Fwd/brake 7 FET's

International Pro TL Fwd/brake motor management system.



5 Page Close, Bean, Dartford Kent. Japanese made by KO company. One of the first companies to produce really small, high performance speed controllers. CX 1 Fwd only CX 3 Fwd only CX 4 CX 8 Fwd only tempfet

#### Fleet Fleet

ZX 500 Fwd/reverse

Control Systems, 47 Fleet Road, Fleet, Hants GU13 8PJ. FPS 24B Fwd/reverse 144 Ampere, Robust.

#### Corally

Intronics, Claerwen, Bexhill Road, Pevensey, East Sussex, BN24

Ian Spashett (the boss) maintains close links with Dutch company Corally to provide one of the first motor management speedos available.

#### MMSII

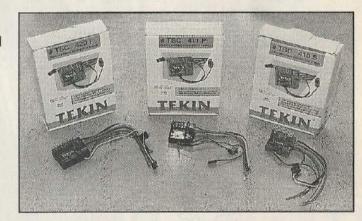
Fwd only. Motor management system, small, light, current limiting at 5 KHz, switch and radio lead plug into unit and can be left in situ when speedo moved between cars.

#### Speedmaster

Designed and manufactured by Duncan MacDonald. These competitively priced speedos have a proven record of good performance coupled to high reliability.

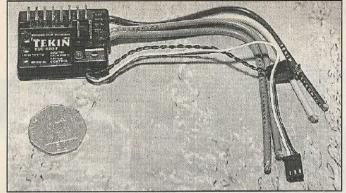
#### Silver Star

Fwd and reverse. 180 Amperes Turbo Silver Star Fwd and reverse 310 Amperes Gold Star Fwd only. 8 FET's 180 Amperes Turbo Gold Star Fwd only 8 FET's 310 Amperes



Parma, Unit 2, 25 Horsecroft Road, The Pinnacles, Harlow, Essex CM19 5BH. Retail outlets only. One of the world leaders at forcing the technological advance of todays modern electronic speed controllers. Designed and manufactured in U.S.A.
Latest TSC 410 series include multi-layer printed circuit boards with more components per board. Regenerative battery charging providing longer run time and regulated current flow providing torque limitation to driving wheels thus reducing wheel spin. ESC 610 Pro X Fwd only vario torque 300 Ampere ESC 310 Pro Fwd only vario torque 300 Ampere ESC 250 Fwd only. competitive price 300 Ampere ESC 700 Fwd only. Vario torque 480 Ampere. Top of the range. TSC 410 Fwd only. Adjustable current limit. Regenerative type

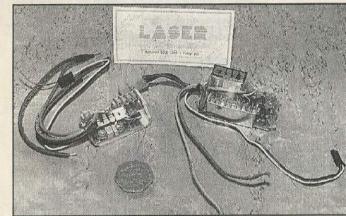
Radio Control Model Cars



digital high frequency 250 Ampere TSC 411 Fwd only. Adjustable current limit. Regenerative type digital high frequency 250 Ampere TSC 420 Fwd only. Adjustable current limit. Regenerative type digital high frequency 400 Ampere

Laser, Glenorie, Latchford Lane, Great Haseley, Oxford. OX9 7LA.
Designed and produced in Britain by Glyn Peglar.
Good performance with faithful service. GT Fwd/reverse 215 Ampere TQ Fwd/reverse 285 Ampere FET brake Mini pro Fwd only 215 Ampere, very small





#### **Futaba**

Importers RIPMAX have continued the Futaba range of controllers with few changes from previous years.

MC111 Fwd/reverse/brake 130 Ampere relayless

MC112 Fwd/reverse/brake 100 Ampere MC116 Fwd/reverse/brake 210 Ampere

MC110 Fwd/reverse/brake 75 Ampere narrow design

Imported by RIPMAX details to be announced.

#### Sanwa.

Available through Irvine Engines. BL Fighter Fwd/reverse Vortex 107 Fwd only Vortex 112 Fwd only

Racing Special

MacGregor Industries Ltd., Canal Estate, Langley, Berks SL3 6EQ JR have a reputation of excellence in all their products. The UK importer, MacGregor offer some speed controllers suitable for both high performance motors as well kit motors.

NEA 950 Fwd only. Suitable for high performance motors.

NEA 950B as above but with reverse

NEA 850 Fwd only. Suitable for unmodified kit motors

NEA 850B as above but with reverse

#### Apex

Apex Models, 178 Dukes Ride, Crowthorne, Berkshire. A range of 4 speedos with a rising spec and price list. All come with sealed switch, tuning LED and installation instructions. Dominator 1R Forward, brake and reverse for 27 turns or more with

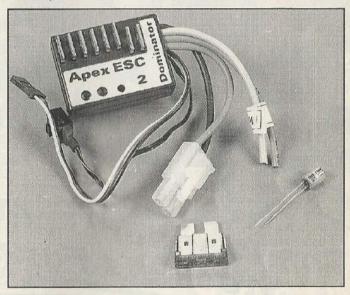
Tamiya plug.

Dominator 2 Forward and brake – ideal club racing speedo,

compact size Tamiya plug.

Dominator 3 Mini size, forward and brake, suitable for any motor

Dominator Pro Forward and brake to a high spec for hot motors and

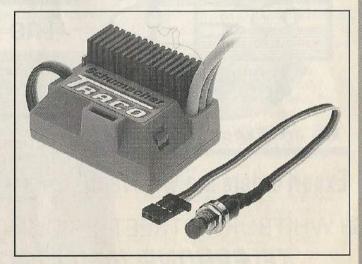


#### Schumacher

Schumacher Racing Ltd.

Traco speedo has a number of unique features. Programmable to any transmitter. 7 rates of acceleration. ABS braking – also programmable. Speedo falls into expensive bracket but is small and

Traco. Fwd only with brakes.





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# Introduction



When we set out a number of years ago to produce the first Racing Special we knew exactly what we wanted to give you, the ultimate tune-up mod for your racing - a guide on everything you needed to know!

We hope that this, the third Racing Special does just that - and even a bit more. The hobby has developed greatly in the past few years, from building and modifying cars to the massive market of goodies available today which allows you to buy anything you need to win. This massive range of goods can confuse anyone as well as doing great damage to the bank account!

What we've done is list what's available to help you make your own

mind up.
So let's have a look at what we have in store within these pages.

#### Kit survey

Our kit survey covers the massive range

of electric kits available, from the inexpensive starter cars to the latest in high tech racing machines; we give a basic specification and description to aid you in making the right choice. Our motor article details the correct way to clean and rebuild your motors, it is clearly explained with lots of photos which shows how easy good motor maintenance can be. Also we investigate motor skimming - the latest craze in motor technology.

Richard Delves is well known in RC Model Car circles as one of the best bodyshell painters in the business. He explains how to achieve a brilliant result in plain English - and every step is clearly illustrated. This really is the ultimate

#### **Batteries**

Another area which is clouded in mystery is the way in which batteries should be charged, Pete Winton has probably been charging batteries for longer than he cares to remember and outlines how to do it properly. Assembly of packs from

raw cells is also covered to help maintain the life of your cells.

A top ten accessories list was a tough job, but we've come up with what we think are ten good buys that will improve your hobby - there are also a few other items thrown in for good measure.

Building cars is all important, we cover the areas which seem to cause the most problems in a clear and simple way.

Our other surveys cover the rest the model car industry has to offer. Speed Controllers, Radio Control Systems, Nicad Batteries and Electric Motors are all listed to let you know what's on the market; again a basic specifiction and outline of each is given to help you decide what's best for you.

#### Inspiration

Apart from the technical side we also try to offer a little inspiration. The racing side of our hobby is important, but not the be-all and end-all, so in our Rallycross and Monster Truck feature we show how to have a lot of fun on a reasonable budget. These two sides of the hobby are still in their infancy but can offer so much fun we just had to tell you about it!

The BRCA and club scene is also covered in our affiliated club list and article on our national association, the BRCA (British Radio Car Association)

Well I hope you find Racing Special 1991 useful, it should help you in your racing, be it at National, club or back garden level!

One last point - don't forget Radio Control Model Cars Magazine, Britain's best RC Car Magazine full of kit reviews, features, race reports and helpful hints and tips - apart from Racing Special it's all you need! Best of luck in your racing.



omewhere in all of us is a desire to achieve something which may seem unattainable – play the Centre Court at Wimbledon, shoot a sub-par round of golf, paint a picture, or write a book. Radio-controlled model car racing is for all those people who ever wanted to race cars at high speed, but never had the chance or the ability to be a Jimmy Clark, Stirling Moss, or Nigel Mansell. From your privileged position on the drivers rostrum you can enjoy all the thrills of motor racing for a fraction of the cost and none of the danger.

Our third Racing Special concentrates on the most popular form of radio controlled car racing, Off Road. These cars can be used almost anywhere, and almost at any time. They require no special race tracks, no specialist

country dedicated to providing enjoyment for their racing members from the beginner right through to the British Champion.

The essence of the Off Road electric car is a chassis and gearbox unit. Most cars are fitted with fully independent

(4WD). The two wheel drive cars will usually have the rear wheels driven, and the four wheel drive cars will feature special gearboxes to take the drive to the front wheels, and various other devices to improve their handling. Whichever car you choose, the basic components fitted to it will be similar. Each car must have a two-channel radio control unit consisting of the transmitter held in the hand to guide the car, and a receiver mounted in the car to receive the signals. The steering is achieved by the use of an electronic servo, which follows the commands issued from the transmitter and allows the car to be steered precisely where required. Control of the speed is achieved by the use of

only two positions, it responds exactly to the position required to negotiate any corner, and in the majority of cases, speed can be adjusted throughout its range.

#### New Formula

From the basic 2WD and 4WD race cars have evolved two exciting new branches of the hobby with the emphasis firmly on fun. Conversion kits are available for the 2WD cars to make them look like the very popular Stadium Trucks from America. These trucks are extensively modified pick-up trucks fitted with huge engines and even bigger wheels. They race in indoor stadiums over a short course, the objective being to crush as many old wrecks as they can!! Our model versions are not quite as realistic, but they race over large jumps and humps ideally suited to their big wheels and large ground clearance. The object of the exercise here is to get as much air underneath the car, and make it jump long distances!! The 4WD cars are converted

to look like Rallycross cars, those raced at places like Lydden Hill and Brands Hatch. Quite the opposite of the Stadium Trucks, these cars race on very flat tracks, have lowered suspension, and are fitted with bodies resembling saloon cars like the Ford Sapphire Cosworth, Vauxhall Astra GTE, and BMW M3. The tracks are sometimes quite slippery. allowing the driver to enjoy sliding the car around with quite amazing results. With their fully enclosed bodies, the Rallycross cars can be raced side by side around the turns, although this is a non-contact sport!

Off Road electric car racing is the number one radio controlled car hobby, and in its many different guises shown in this racing special, anyone can have their motor racing dreams come true. From the Club level, races are organised for ten regions in the country, and on a National basis to decide the British Champion, From there you can go on to race in Europe, or indeed the World Championships. It is almost impossible to describe the thrill of racing model cars in such an easy and friendly environment, we all feel like Nigel Mansell every race day. We hope you enjoy this edition of the Racing Special, and look forward to seeing you at trackside.



# Right STUFF

knowledge to get started, and no bottomless bank balance to continue racing. The cars are very friendly to the environment being powered by electric motors using rechargable batteries and very quiet in operation.

Although a speed of 25 miles per hour might not seem very tast, this equates to a scale speed of 250mph!! On a marked out circuit this means plenty of speed, and lots of exciting racing. There are over 200 clubs up and down the

suspension for all four wheels, and a strong gearbox to make sure all the power of the motor reaches the road. Cars come in various specifications depending on your taste. They are all open-wheeled designs with the specific task of crossing rough terrain.

rough terrain.

Cars start from around £80 for a basic kit, right up to £500 for a purpose designed racer with all the radio-control equipment and spares for the serious racer. Cars come in two basic designs, two-wheel drive (2WD) and four-wheel drive

a speed controller. This can be a mechanical device using a resistor, or an sophisticated electronic device with no moving parts. The combination of the steering servo and the speed controller connected to the receiver gives the driver full control of the car. This control is not to be confused with many of the cheap kits available in toy shops which look similar. Proper Off Road radio control cars, such as those featured here, are much more powerful, and their controls are fully proportional. Steering is not











There are so many scales and classes to choose from! Monster truck racing can be fun and still supply close exciting racing. For the competitive minded there is always 1:10th off-road - surely the most hotly contested racing available. **Bottom**; From small beginnings - Jamie Booth started with a Tamiya for Christmas and is now a full time professional racer.





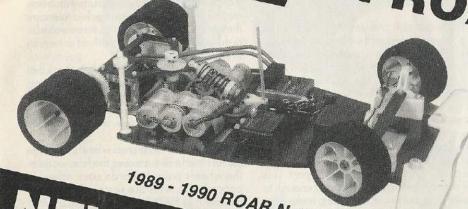


11

Radio Control Model Cars Racing Special



RC10LON-ROAD!



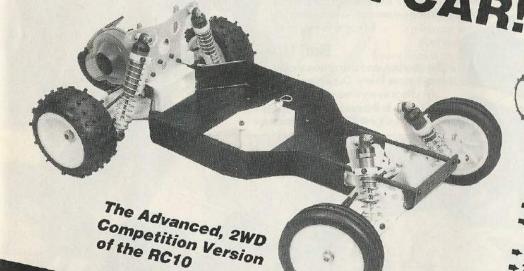
World Championship Design Based On the Race-winning RC12L

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Racing Special

13

here is always a right way and wrong way to do things, often it is very obvious. When building one of the many popular Off-Road cars the right way is to follow the instructions carefully. What follows are hints and tips which do not come with the instructions, but will make sure you get the maximum life and performance from your car.

Seal of Quality

It is essential to build the oil filled dampers correctly. When passing the piston rod through the O ring seals at the base of the body for the first time, make certain that there is plenty of oil on the seals, and the piston rod. If assembled dry, the piston rod may scratch or cut the seals which will then leak all

Before filling the body with oil, make sure that the action on the piston is smooth and free. If there is any noise or jerkiness, check that the piston rod is smooth and shiny, and that the Oring seals are properly assembled. Make sure that the piston is not binding on the body as it travels up and down.

Piston rods can be polished with a silver polish (Eg Duraglit) to make them smooth and shiny. If the piston does bind in the body, try changing if for another one from the opposite damper. If that fails, rub very gently round the edge with a 1200 grit wet and dry paper -

there may be a very small burr.
When filling the body with oil, make sure there is enough oil to give a smooth action from one end of the piston travel to the other, but not so much that the piston can not reach the top of the body. Too

much oil is normally the problem piston rod will not go the full travel (it appears to lock solid) and when you let go, it shoots out of the body of its own accord. If there is too little oil more in and try

again. If there is

too much oil

undo the cap one or two turns, push the piston up to the top, and tighten the cap whilst holding the piston at the top of its travel. Always use a good quality shock oil. 3-in-1 or household oils are useless for this job, buy a proper shock oil from your local model shop.

The suspension and steering joints must be free moving to give of their best on the track. At every stage of the suspension assembly, make sure that the piece you have just fitted (be it wishbone, hub carrier, top link, etc.) moves freely under its own weight. Hold it up, let go - does it fall freely? If not, check carefully for bent pins, burrs in holes, and correctly assembled parts. If a ball joint, or a hinge joint, is stiff, there is an easy way to loosen it. Using a small pair of pliers, squeeze the plastic part against the metal part. This will slightly deform the plastic part enough to loosen it up, but not so much as to make it too loose. Squeeze gently each time, and try the part again to see if it is better. If after 6 or so reasonable squeezes with the pliers it is the same, look somewhere else for the cause, or

try another part. Once completely assembled, each suspension system on each of the four corners of the car should move freely up and down under its own weight. The same goes for the steering linkages, they should move freely from lock to lock with the minimum of effort. Only when all these areas are confirmed as working properly should the dampers be connected to the suspension, and the steering

linkages to the servo.

Belt Up The gearbox and belt drives should lways move freely. During assembly, check every time you move on to the next stage that the gearbox is free. Make sure that all the shafts are at right angles to their bearings, that

RC10 re-A simple guide on how

to build cars for reliable

use and good handling

AITOGETHER

D TEAM ASSOCIATE

alter-

ations

as the

Team Spec cars

are excellent out of the box. every gear and belt meshes properly and centrally with its mating gear or pulley. If in doubt, try again.

As the gearbox build is completed, make sure every screw is properly tight and that everything is correctly in line. Don't forget that after the first two or three runs with a new car, all the screws must be checked to ensure they are still tight. Often the screws can be tightened up another 1/8th of a turn as everything settles in.

Once the car is fully assembled, check that the wheel camber (the amount a wheel leans in towards the car at the top compared with the bottom) is even on both sides, and in accordance with the manufacturers

Check that the steered wheels have the correct toe-in (the amount the front edge of the wheels point towards each other) in accordance with the instructions. As a general rule 2WD cars should have a hint of toe-in, and 4WD cars should be parallel.

#### Clean and Tidy

Between each race, use a small paintbrush to clean dust off every part of the car. As well as keeping the car clean, this serves to make you



a notebook to record the track conditions, what was changed, and its effect. As the

notes build up it is possible to look back and remind yourself what works in any given circumstances. This provides a use-

ful shortcut to getting a good set-up straight away. Don't be tempted to modify the car drastically at meeting to copy someone else's set-up without noting down your current set-up. If it works, fine, but if it doesn't your notes allow you to return to the original set-up.

Perhaps most important of all, learn when the time has come to stop changing the car, and to start looking at your lines on the track. Unless the track is very uniform all round

are doing as well as they are. Above all, make sure your preparation gives you com-plete confidence in the car. Good preparation goes a long way towards ensuring you finish the race. To finish first, you must first finish!

Centre; Jamie Booth's Manta Ray featuring

standard chassis and Rallycross body mounts.

there may always be one turn you are not

very fast around. Providing the car is easy to

drive everywhere else, look at the line others

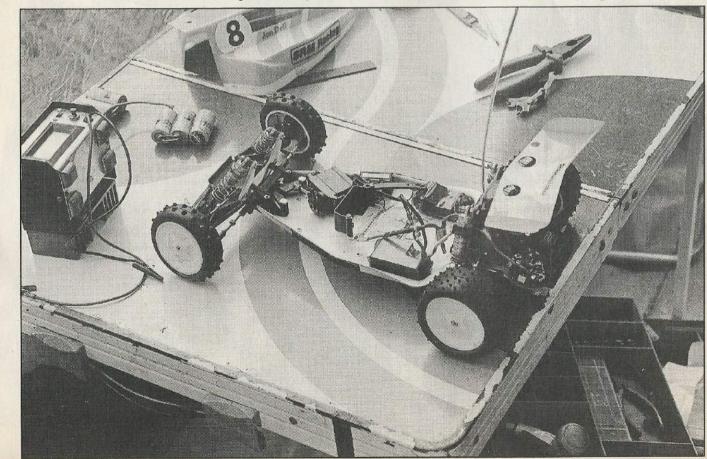
take through that turn, and ask yourself if you

#### Schumacher Procat

The Procat is arguably the most popular 4WD car in Europe. In the five years it has been on the market there are very few things which are not right 'out of the box'. The Procat is not really touchy about anything, but it is important to make sure the long belt from front to rear is correctly tensioned. Check the long belt regularly, especially after a bad accident.

After each race, check the lower rear wishbone pivots, they can work loose. Replace the Orings which hold the front suspension together (the crash back system) as they can perish and go soft after a few

Schumacher Cougar - a number of parts are available to tune the Cougar to top spec. Above; RC10 - Team car comes with a variation of springs as standard.





16

joint driveshafts and the Stealth gearbox make the RC10 transmission bullet proof. SRM Racing supply O rings to fit over the servo-saver to stiffen it up and improve the steering. Ground steel pivots for the servosaver and steering idler should also be fitted for accuracy and longevity – SRM Racing supply these too. The rear wishbone pivots which are mounted on the chassis next to the gearbox have two sets of holes. This adjusts the wheelbase. Move the pivots back to increase the wheelbase on grippy tracks, and forward to reduce the wheelbase for slippery tracks. Adjust the position of the front shock absorber top mountings to tune the front

Radio Control Model Cars

suspension. The further out the mountings are the stiffer the suspension will be which reduces the steering 'bite'

Pay careful attention to the rear wheel bearings on the RC10, they are worth checking after every race to make sure they

work properly. Their small size means high wear, and they should be replaced

every 15 or 20 meetings.

Manta Ray The Tamiya Manta Ray has recently been raced successfully by Jamie Booth. Jamie's works car has had a number of changes made to it including a longer wheelbase carbon chassis. long dampers all round and increased castor front blocks. Apart from these changes the car he has been running is fairly standard. To the standard

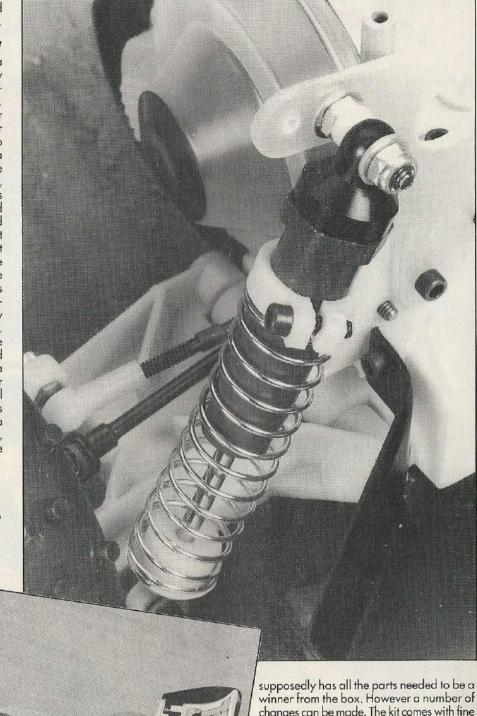
cara number of features will greatly help its performance. Firstly a full set of ballraces, these improve the

Right; Associated shocks. The latest type feature coated internals and new hidden seals.

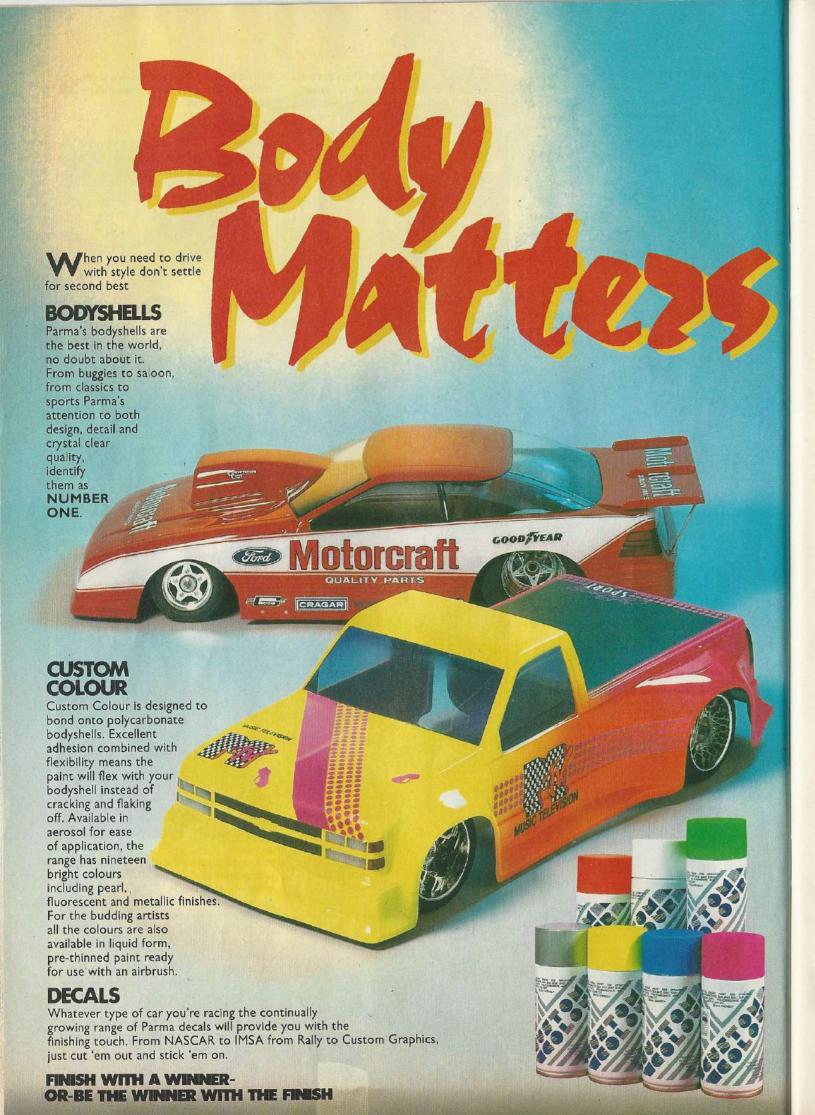
performance dramatically. Then the diffs should be replaced for the ball type versions. In the front gearbox the one-way roller gear should also be added to give increased steering. The Hop Up shocks are also a good buy and are probably the smoothest dampers available. Another easy tune-up is to throw away the centre drive shaft and replace with Egress parts, these need a little work but will fit in!

#### Yokomo

The new works Yokomo is as a standard kit very expensive. This is because the car



changes can be made. The kit comes with fine pitch belts, these should be changed for the course ones that can be run very loose and still not slip. The servo savers also can be replaced by a ball raced set that makes the steering free and more positive. The diffs on the car have a tendency to come loose, these should be checked after each run to make sure they aren't slipping. When running the Yokomo the front of the car should sit a little lower than the rear, this may seem odd but the car seems to be able to run very low even over the roughest ground.



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saturation. In fact the competition between Japanese companies to get the price lower and lower has resulted in virtually all of the cheapest sets being manufactured in other far eastern countries, where labour is substantially cheaper than Japan. This has left the Japanese to concentrate on the more complex and sophisticated sets. This of course does not just mean more and more channels, but added value features, including more control and adjustment options and information displays.

It is unlikely that the newcomer to the sport will need or could even make the best use of some of these "extra" features. As skill level increases and more demands are made of the equipment then there is a need for these additional options. However, what we all need from RC equipment, be it novice or experienced user is reliability. Thankfully that is one area where electronics over the years has excelled. The only area I find that is sometimes vulnerable is the interchangeable crystal. Not that it falls out, but if you use the direction types then againg eding cheaper types then ageing can

# RADIO ROUND-UP

ot so many years ago it was suggested by a few of the well informed in the RC industry that the success of RC cars was, in the main due to the availability of cheap, reliable two channel proportional radio equipment. Whether or not cheap radio equipment was the only reason behind the undoubted popularity of RC cars may be open to argument.

There is no doubt that radio equipment was and is, in many instances still pretty cheap compared to a few years ago. There can be little disagreement that the Japanese were responsible for this situation. They achieved this by market



give problems in the form of drift. Other than that all the component parts of an RC outfit, and that includes the transmitter, receiver and servos perform outstandingly well under the most arduous of conditions and mistreatment.

#### Futaba.

The world's largest manufacturer of RC equipment. For years Futaba has been one of the leaders in not only entry level equipment but also some of the most sophisticated has come from their factories.

#### Attack

2 Ch. The Attack series has had a number of variants over the years. Now available in 27 and 40 Mhz. Receiver comes with a battery eliminator circuit (BEC) so that a separate receiver battery is not required. The Attack Sport is the cheapest in the range and the Attack R 40 Mhz the most expensive.

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Cleaning the cell on emery

# Forward CHARGE

e all like to buy the best equipment available, and in the case of nickel-cadmium batteries we tend to go for the 'computer matched' types. Many of these cells come as single cells for the buyer to assemble. They get assembled but do you know how to do it properly? Are you aware that in 70% of cases, the incorrect assembly of a pack of cells will shorten their life and reduce their performance before you ever use them?

Cells bought singly must be connected together to form a pack. The best way to do this is to solder connectors from one cell to the other. A strong reliable, and permanent connection results, allowing the pack to be used without fear of

Ni-cad cells have a flat bottom (the negative) and a 'button' top (the positive). Six cells need to be connected in series, positive to negative and then furnished with a connector which plugs into the car electronics. The button top and flat bottom provide ideal

surfaces onto which to solder connectors. However, underneath those surface lurk components of the cell which if damaged, will ruin the cells performance.

#### Release Me

Under the button is a release valve. Its function is to allow any gases which build up during charge to be released safely. If the valve is damaged it may not work, and the cell becomes pressurised. At the bottom, the sintered plates and chemicals are next to the surface of the car, and if they become damaged the cells performance

**Pete Winton on** the assembly and charging of Ni-cads



**Cell showing the correct** amount of soldier.



First piece of wire in place on the cell.

deteriorates. It is the heat from the soldering of the connectors which damages these parts, and so it is essential that the soldering is done properly, and

Radio Control Model Cars



The two cells connected by the wire.



The start of the twisting action.



After twisting the cells fall neatly into line.

quickly. Never try to solder to cells using an iron of less than 40 watts. I use a Weller 40 watt iron, costing about £10. The tip must be in good condition, flat, and fully trimmed. Never use an acid flux (Bakers fluid etc) only the flux in a multicore solder. First, clean all the tops and bottoms of the cells with emery paper (200 grit) and then wipe them over with lighter fuel. What you do next depends on what type of pack you are assembling.

#### Stick Pack

The stick pack is two sets of these

more than 10 seconds. If the wire will not take in that time, remove the iron, clean the wire with emery, allow the cell to cool, and try again.

Once the wire is attached, cut it off leaving 20mm projecting from the cap. Now put a blob of solder on the bottom of another cell. Place the two cells on a flat surface. Line them up so the wire is positioned towards the edge of the bottom of the cell. Solder the wire to the bottom of the cell. Now, roll the cells towards each other.

The rolling action causes



as this will make it impossible to separate the cells in future.

#### Sticks and Stones

Place the two sticks side by side so that at each end there is a top and a bottom. Using the plastic stick from a cotton bud (remove the cotton wool ends) to reinforce the glue, run a bead of Evo-stick down the centre of the cells, Leave them to dry for 24 hours.

We show the use of the excellent Parma end caps to seal the cells. Before fitting them proceed to the bit about connecting the sticks and fitting the plua. Once this has been done the end caps can be fitted and the pack shrink wrapped.

Stick packs are shrink wrapped to hold them together firmly. Cut a length of shrink warp about 20mm longer than the pack. Slip the pack into the shrink wrap and heat it. I hold mine over a gas ring, but this is easy to get wrong. A high quality hairdryer will do the job much better, or of course, a heat

To one end of the pack solder another length of solid copper wire from a top (+ve) to a bottom. This connects the two sticks together. At the other end, solder a plug on. Attach the red wire to the positive (button) end, and the black wire to the negative (bottom) end.

#### Saddle Packs

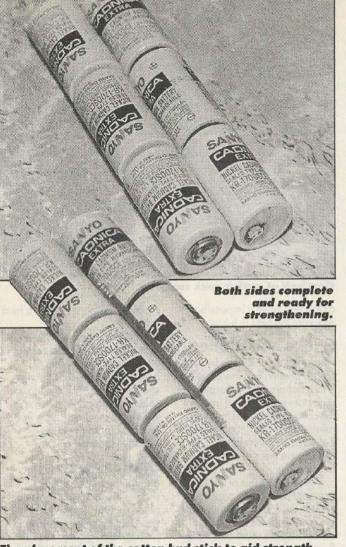
Saddle packs do not need shrink wrapping, but must be glued together firmly. Using short lengths of the cotton bud plastic sticks, glue three cells together side by side so that the buttons (top) ad bottoms alternate. Repeat this for the other three cells.

Place the two threesomes in your car and position them so that you have one top (+ve) and one bottom (-ve) in the correct position to connect your cells. This should mean that you have one top and one bottom facing inwards at the other end of the

Now solder 18g solid copper







The placement of the cotton bud stick to aid strength.



The wires or plug neatly soldiered in to place.

wire between the other cells so that each cell is connected to the next one. Solder a piece of heavy flexible wire (two pieces for off-road cars) between the top and bottom of the inner rear cells. The Parma flexible multi strand wire is best for this. You should have two points

28

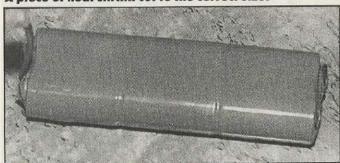
unconnected at the front of the pack, one top (+ve) and one bottom (-ve). Make the connections to your plug here.

Parma also sell some excellent solder tag connectors for saddle pack cells which are much better than the 18a wire. Obviously they are not suitable claimed that cells will hold their match better in this condition.

We recommend you use a foolproof plug to connect the cells to your electronics. This ensures that there can be no mistake when plugging the cells in and no damage to your valuable electronics.



A piece of heat shrink cut to the correct size.



Heat shrink in place - a neat finish.

for stick cell packs. The trick with assembling packs is to solder any connections onto the large blob of solder you have made on the cell. is way there is a minimum amount of heat passing into the cell. Make sure everything is clean and that every part you are trying to solder together has a coating of solder on it which is clean and bright (this is called tinning).

The latest tip is to replace the flexible wire connection between saddle pack cells with a solid wire connection. It is

Charging

There are two basic methods of charging ni-cad cells for use in R/C model cars. Peak detection, and temperature sensing. Both are automatic.

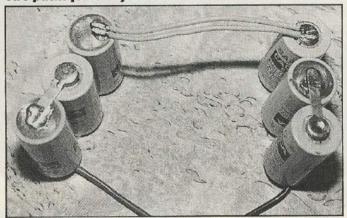
Peak detecting chargers work by sensing the voltage of the nicads being charged. During charging, the voltage starts to drop. The peak detection charger uses its sophisticated electronics to detect this drop and switches off. This type of charger is most suitable for SCE and SC cell types.



Tags in place on the saddle pack layout.



Two packs joined by a double link.



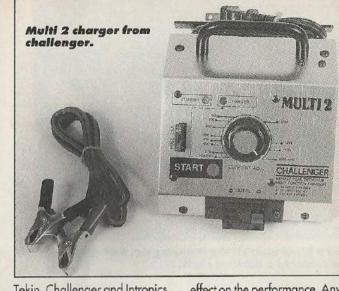
All connections in place and ready to go!

Temperature sensing chargers work by monitoring the temperature of the cells. As they approach full charge as well as the voltage dropping, the temperature rises. Once the cells reach a temperature of 30 degrees C to 35 degrees C (slightly above hand warm) the charger switches off. These chargers are most suitable for SCR and SCK cell types. Always buy a good quality charger. Having gone to all the expense of good cells, properly assembled, it is easy to lose that expensive advantage by bad charging.

For the newcomer, the Laser range of chargers are excellent value for money. They are robust and very easy to use, and

for the price cannot be beaten Although temperature sensing, they have two settings, one for SCE/SC, and one for SCR/ SCK. Charge current can be varied. These chargers will be entirely suitable for drivers at any level and allow the newcomer to get all the advantages of the sophisticated charging circuits at a bargain price, without all the bells and whistles.

Chargers from Intronics, Tekin, Schumacher and Challenger feature similar charging circuitry as the Laser, but come with many extras. Top of the range is the Schumacher which records data for different packs to compare their performance every time. The



Tekin, Challenger and Intronics chargers have various features which you should investigate to see which you really require.

The basic rules of charging are never to overheat the cells, and to match the charging current to the type of performance you need.

The higher the charge current you use, the more acceleration (or punch) the cell will give, but the less duration. Generally speaking, aim for a current of 3 to 4 amps for SC/SCE cells, and 5/6 amps for SCR/SCK. These levels will give the best performance for the longest life (that is the number of times you can use the cells before they are no longer any good).

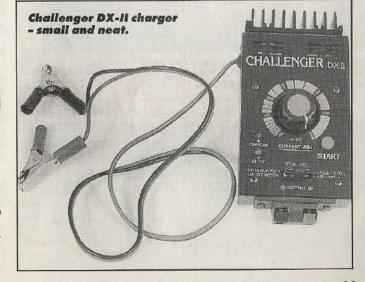
#### Charge Time

For best results, time you charging so that the charge is complete during the race before yours. If the charge finishes too early, then recharge the cells during the heat before your own so they are fully charged just before you go out to race. Generally speaking, a delay of up to 15 minutes between completion of the charge and the start of the race will have no

effect on the performance. Any delay beyond 15 minutes may affect duration, so recharge the

SCR/SCK cells can be used more than once in the same day without affecting their performance. SCE/SC cells will give lower performance if used twice in the same day. SCR cells last longer than SCE cells in terms of overall life. The performance of the cells on the track depends solely on the type of motor you use.

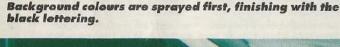
Wherever possible, try to have two packs at least at a race meeting so that you can allow them to cool right down before using them again. Cells can reach temperatures up to 60 degrees C whilst in the car, but such levels are not harmful during discharge, only during charge. We use our cells at the limit of their capability, and beyond some manufacturers recommendations. Treated with consideration they should last for up to 200 races. However, if they do fail it is only to be expected since they are at the limit of their design capability. In our experience, failures are very few.





To give a bit of interest the lettering can be faded from a light colour to a darker colour.







Above; When the lettering gets too small neatly applied decals can add the finishing touch. Below; Rear light detail and decals applied.



ody Matters. Or does it? What impression would people get if after hearing Jaguar had spent milions of pounds developing a new sports race car, it was wheeled out painted in stone grey emulsion and no one had bothered to mask the windows!!

In past times when 1/10th R/C racing was restricted mainly to buggies, painting bodyshells wasn't so important because there wasn't a lot of bodyshell to paint. But now more saloon type shells are being raced the lack of time being spent is more noticeable.

Perhaps the kit manufacturers are at fault. After fifteen pages of how to put the car together, they devote one paragraph and perhaps a picture of a bodyshell with a paint brush poking out of it to illustrate how to paint it. Painting bodyshells is not difficult, it just requires the correct equipment and application, not to mention a good deal of

So... let's go through the equipment, how to use it, and then run step by step through actually painting a couple of bodyshells.

There are several brands of paint on the market. All are really as good as each other, but the one thing they have in common is that they adhere to polycarbonate as they are acrylic based. As such, they are what is known as a reversible type coating, which means that because they rely on a solvent (or thinners) evaporating to dry the paint, if you then apply solvent or thinners to the dry paint it will return to its original state - wet!

Because of this, brushing this type of paint, although possible, does not give a very good finish because adding coats only 'stirs' up the ones underneath.

Airbrushing is therefore the best way to apply it. Most of these brands of paint need thinning down, and as a general rule of thumb, proportions should be around 40% paint and 60% thinners. If the paint goes onto the shell very 'wet' and doesn't cover it, there's too much thinners, if on the other hand, the paint comes out of the airbrush very 'dry' or even like cobwebs, there's not enough thinners.

The paint we used on our bodyshells was Custom Colour which comes ready thinned, so the experimenting has already been done; just put it in the airbrush and off you go!

A question that quite often crops up is 'can different makes of paint be mixed?'. You would think this is the case, because they are all basically the same,

The type of masking tape needed, is called low tack masking tape. This is necessary for two reasons. Firstly the adhesive used on

Masking Tape

this type of tape will not get left behind on the bodyshell when the tape is removed, and secondly, the layer of adhesive is very thin, making it very difficult for the paint to creep under the gap between the body shell and the tape. Ordinary automotive

Models, and is available through most model shops. Although the adhesive on this tape is low tock, the actual tape itself is paper. This is actually much more flexible than its plastic counterparts, and

tends to stay where you put it.
Moving away from tape there is the brush on mask. This is very useful for awkward shapes but has disadvantages. It has to be brushed very evenly, and takes quite a long time to dry. Once it has dried all the edges have to be can be made much smaller by rolling the knife in between your fingers as well as guiding the

6a bodyshell with a paintbrush poking out of it to illustrate how to paint it 9

11 blades to be the best for the job. Swivel bladed knifes are available, but to make them swivel the way you want, the knife must be held in a certain position, something that is not always possible when you're working on the inside of a bodyshell.

To make sure the masking tape is put down properly, you need to ensure the edges are firmly pressed to the plastic, so that they won't lift and allow the paint to



but the solvents could react with each other. So, to be safe always try on a scrap piece of plastic before spraying your shell. Finally, what to do if you get some paint somewhere it shouldn't be, (other than on yourself). Perhaps overspray through body mount holes or around the wheel arches. Don't attempt to remove it with thinners, it will mark the plastic. Use ordinary methylated spirits; just a little on some kitchen towel, used with minimal pressure, will remove the paint and not mark the plastic.

Radio Control Model Cars

masking tape, along with cut on the shell, which tends to insulating tape and any other types you can think of are just not suitable and will not give good clean edges. Of the low tack masking tape, the vast majority are made from plastic. Although these will work, care has to be taken to make sure that due to the thickness of the plastic, the tape doesn't try to straighten out and come away from the body shell. Special care must be taken when masking convex surfaces and other body lines.

The tape we used is called Betto Tape, imported by Ripmax

First to get is the knife. There are two sides to consider here, the handle and the blade. The handle should be the round section aluminium type. You will

score it. For the most part these edges have to be cut freehand no second chances here. Even after all this some paints can attack the medium and 'bleed' through, either clouding or actually colouring the body shell.

find when cutting curves around windows etc., the curving line

**Richard Delves gives the** complete low down on how to produce the perfect finish on

#### Lexan.

The blade is also important in determining how much control you can have over where you are cutting. The shallower the angle the blade is ground to, and the shallower the angle the point is, the more control you have.

I have found X-Acto number

creep under. Fingernails are OK but can tear an edge. Fingers are too soft and don't push hard enough. The answer is a burnishing tool. Letraset make various types, and most office stationary stores who stock Letraset instant lettering will have



them or can at least get them. The best type to get is the spoon type.

Laying tape in awkward corners or sometimes if the tape is very small, can be a problem, and a pair of tweezers can be a real asset. Get the type that come to a point as opposed to the ones that have a flat top, (unless you want to pluck your eyebrows with them as well!!). Finally in this section, is the cutting mat. Because it is easier and less damaging to the bodyshell, it is best to do as much cutting out off the shell as you can. Cutting mats are the tool for the job. Most of them have a grid marked to help cut square and parallel. They are self healing, meaning that knife cuts will disappear and the surface will always remain smooth.

#### Air Brushes

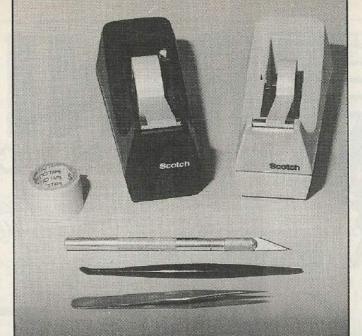
Perhaps these should have been included with the previous heading, but there is such a vast choice they warrant a little more attention.

Different manufacturers have developed different designs, but basically they fall into two types; single and double action. On single action guns the air is controlled by the trigger. When you press it the air comes out and brings the paint out with it. The amount of paint is adjustable, but only by adjusting the position of the needle in the nozzle (usually by means of a screw at the tail end of the gun). The difference between this and the double action is that although the paint still comes out when you allow the air out, the amount of paint can be varied whilst actually spraying. This is achieved by the trigger moving in two directions – downwards opens a valve and allows the air to flow, backwards adjusts the position of the needle in the nozzle, allowing more or less paint to pass out - thus, double action.

Double action air brushes are more versatile and can be used to create more effects, but are usually quite expensive and take some experience to be able to

Right: Applying the paint is a matter of balance, too much will give runs, too little will give an uneven finish. Spray in alternate directions to give an even colour build up. Keep the gun approximately 20cm from the body.

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The airbrush used for our paint jobs. The double action Badger 150. Although expensive, a good quality airbrush is worth the investment.



use. For the beginner, single action air brushes are probably best, and can be purchased for as little as £10-£12. How much you pay for an airbrush will, as

Laying tape in awkward corners or sometimes if the tape is very small, can be a problem,?

well as the type, determine the quality of manufacture.

A point to bear in mind is that

A point to bear in mind is that parts do wear, and they are

Below: Note:safety must always be kept in mind. A neat spray booth can be constructed from a cooker hood, two wooden side panels and a clear plastic front screen. A bare minimum is to always wear a mask and spray in a well ventilated area not mum's kitchen.



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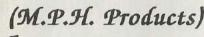
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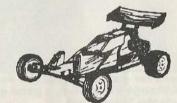
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## CONTINUED FROM P.35

usually very small and easily lost, so make sure spares are readily available.

The airbrush we used was a Badger, and was some fifteen years old and still going strong, although it has had quite a few replacement return springs!! Most shops stock these and spares are easily available.

Air supply depends on how much you can afford, although small compressors are not as expensive as they used to be. Tinned air is available, but although initially less expensive, over a period of time it much be cheaper to invest in a small compressor.

For those who don't want to indulge in the expense of

airbrushes there is the good old aerosol. Of course, using aerosols reduces the complexity of the paint design to a bare minimum. Restricting it really to splitting the body shell into reasonably large areas of block colour.

Small details such as fogged edges, pin-lines and lettering are really beyond the capability of the aerosol. However, with the range of decals available from various manufacturers a very basic paint scheme can be livened up quite considerably.

#### **Back to Business**

The basic procedures and skills using the tools are the same regardless of what type of bodyshell is being sprayed, so let's run through these.

The first job is to cut the bodyshell out and mount it to the

KEEP ANGLE

KEEP ANGLE SMALL TO HELP LETTERS UP car. This can be done either using scissors, or by scoring the outline with a knife, bending the plastic back on itself causing it to snap. Try to keep all edges smooth and avoid sharp corners as this is where splits start. Remember any rough edges can be sanded – don't leave them unsightly!

don't leave them unsightly!
Once the shell has been trimmed it must be washed in warm soapy water, rinsed and thoroughly dried. The reason for this is that during the manufacture the mold that the bodyshell comes from is coated with a releasing agent.

Once the body shell is dry, start by masking up the windows. Don't just cover them with tape and try to cut around the edge, but lay a length of 3mm tape around the outside as your edge. To do this first lay tape onto the cutting mat and cut a small amount off along its full length, this gets rid of the edge that has been damaged being on the end of the roll. Always do this to give a clean edge to the tape. With this, mask the straight lines and gentle curves of the windows. The corners and tight curves can be overlaid with a longer piece of tape and then trimmed carefully down with a knife, joining the 3mm strips with a gentle even

# Cutting freehand curves is a matter of controlling the knife and making it cut where you want it to. 9

#### Freehand

Cutting freehand curves is a matter of controlling the knife and making it cut where you want it to. Two things affect this, the first is the sharpness of the blade. You shouldn't have to press to get the blade to cut through the tape. If you have to press with any force you can't fully control where the knife is going. Secondly, try to keep the blade as flat to the cutting surface as possible. The smaller the angle between the blade and the surface being cut, the more control again you have. You want ideally to be almost dragging the knife blade across the surface.

Once the windows are outline masked, just fill in the centre.

After the windows are masked, mask the lights, grilles and any other bits using the same method although the round edges may need to be cut freehand depending on their size.

Next, apply any lettering or lines that you want. Lettering will generally go on first so that it looks to be on top from the outside. Lettering is a little tricky, but with some care and patience it can be done.

#### Lettering

Draw out your lettering on some ordinary paper. Work on it until you're happy with it. Then get a sheet of draughting tracing paper, 90gsm is best, and trace your lettering onto it using a fine telt tip, black ballpoint or some type of pen that will give a strong line.

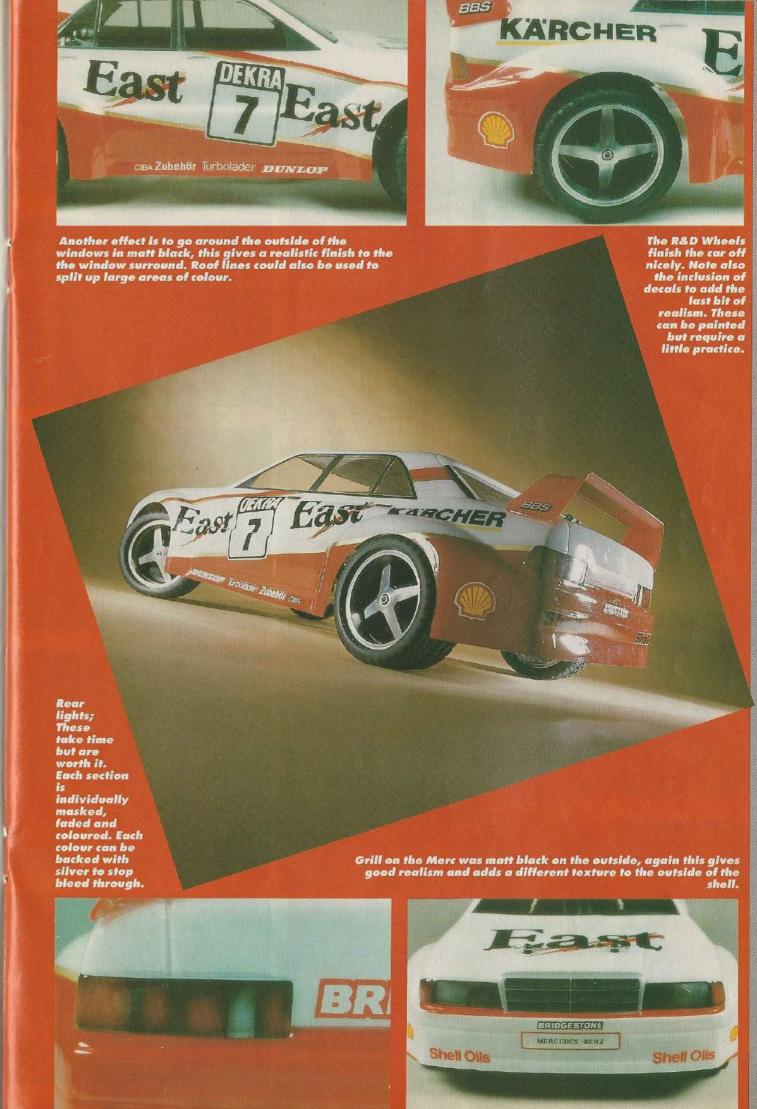
Now turn the paper upside down so that the lettering is back to front, and cover it, overlapping joins if needed, with Betta Tape. Because the tape is thin and your lines are strong, you will be able to cut the shapes out, leaving the lettering on the sheet of tracing paper.

Here comes the tricky bit... get another strip of tape, slightly longer than the lettering, and lay it down over the top, rubbing reasonably hard.

Now carefully and very slowly, pull the strip off, and with a knife point prize the lettering away from the paper so that it comes away with the strip. What you should now have is a long strip of tape with your lettering stuck onto it. Carefully offer it into position inside the shell and lay it down. Burnish the lettering onto the shell, and pull the backing strip off slowly, peeling it back on itself. Once completely off, get a piece of tracing paper, lay it over the lettering and again burnish the lettering through the paper, paying particular attention to the edges. Once the details are on, divide the shell into colour panels as you want, and again like the windows mask the edges with a 3mm strip and then fill in. When the tape goes over a body line or is a little stretched, cut the tape with a scalpel and put a small piece of tape over the top. This will stop the tape lifting and allowing paint to go where it

Ideally the first colour to be applied should be the darkest, but by backing colours with silver you can prevent other colours 'bleeding' through. It is best to paint the largest area of colour first to save a lot of masking, put

Radio Control Model Cars



ORANGE

FILL IN WITH TAPE









1. Masking the windows, this is done by laying an outline of 2mm tape around the outside edge. The corners are cut on the body carefully with a knife. Cutting on the bodyshell should be kept to a minimum, as the shell can be scored and will split. Once the outside is finished fill in with tape. 2. The windows filled in, don't forget to rub down the edges of the tape with the burnisher, this stops the paint bleeding under. 3. Detail is left to later, just fill in the lights and grills at this stage to the minimum. 4. Extra detailing on the Mercedes included a number plate area, this is again done in the early stages and can improve the look of the front of

the shell.





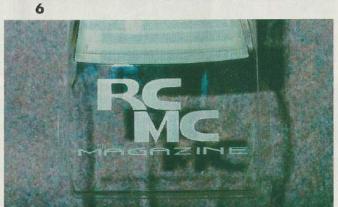






1. Lettering is drawn to the size required onto the tracing paper, tape is then placed over the lettering and is carefully cut out. Try to use a ruler on the straight edges and keep the round edges as smooth as possible. 2. Cutting out the lettering requires the tracing paper to be moved as well as the knife. This can give smoother curves and allows the cutting to flow more easily. 3: Once the lettering is cut out place a second piece of tape over the centre of the lettering to enable it to be picked up without loosing the spacing. 4. Carefully peel the lettering off of the tracing paper by easing up the letters with the edge of a knife. Try to keep the angle as low as possible to help the letters up. Keep the letters on the tape, this gives the perfect spacing. Don't attempt to place letters on individually as this is near impossible. 5. The end product, the lettering still attached to the tape and ready to put up inside the bodyshell.











6. Back to the Mercedes, the main lettering on the shell. The main lettering is placed on the shell at this stage, so that the main body colour is sprayed on first, leaving the lettering to be filled in afterwards. 7. The more detailed RCMC logo requires the outline to be placed on first then the centre to be filled in with tape afterwards. This can be trimmed on the shell, but don't cut too deep - just through the first layer of tape. 8. All detail masking complete, rub this down by covering the lettering with a small piece of tracing paper and burnishing over it. Only the main area of the body remains now unmasked. 9. Side detail on the truck showing lettering and side lines. 10. The rear **Custom Colour** logo - well I suppose they did

supply the paint.



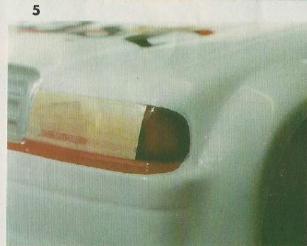


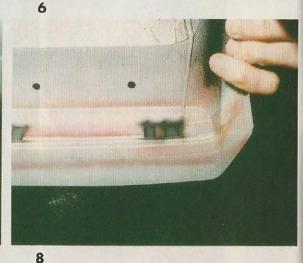












Radio Control Model Cars

9. The inside of the grill was simply sprayed silver, the detailing was on put on like this on the outside. Cut the tape into fine lines on the cutting mat. Then apply to the body on the outside. Gently rub down with the burnisher taking care not to distort the position of the lines. Surround the outside of the grill on the shape you require cutting the edges with a knife to form the round corners. 10: Window detail again on the outside, use 2mm tape to outline the shape and then fill in outwards to stop overspray. Again rub down with a burnisher to stop the paint from creeping under the tape.
11: Pulling the Nitro lettering off of the body, again be careful on small

lettering not to scratch the body. As we faded the lettering, put the lettering, put the lighter colour on first as this helps the gradvation. 12: Not far from finished, at the end of painting any overspray can be removed from the shell with a little methylated spirits and kitchen towel. Finish the body off after applying decals with a good quality real car polish. **Paint Suppliers**; Custom Colour via Parma dealers Pactra via Ripmax dealers Coverite via CML Distribution Tape Suppliers; Betto Tape via Ripmax

Racing Special

Kager via Lesro

RIKO outlets De

Models Tamiya via

Villbiss via art shops

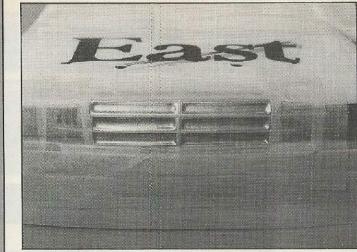
Pactra via Ripmax

3M Tape via art shops Airbrush Suppliers;

Badger via art shops and model shops

dealers

dealers





10



12

11

the first light coat on first and check for any signs of the tape lifting – if this happens re-burnish the edges down. Work your way through the other colour panels and lettering in reverse order to that which they were applied. Back each colour to prevent the 'bleed' through we mentioned before.

The headlight and rearlight detail is achieved by spraying each section individually. Firstly a small amount of black is lightly sprayed around the outside, then red, then silver. This is done with all the light sections in turn and produces the effect shown. The grill is also done in this method using the black and silver.

On our Mercedes we also put a small amount of black on the outside, this is done the same as the out inside with lines of 3mm tape and masking around the outside, the effect gives a matt finish perfect for around windows or on grills. With applying paint, there is one simple rule; lots of light coats is better than one thick coat. Polycarbonate is a very flexible material, and paint is not. If you put several light coats on leaving them to dry in between applications, they will to an extent flex. However, one thick coat when it does eventually dry will not be flexible This will certainly mean flexible. This will certainly mean the paint will crack, and may even flake off.

#### The Prologue

So that's it really... the skills briefly explained. All you need is a ton of patience to go with them in order to get some really nice concours trophies.

One final word on safety. Most spray guns and aerosols have what's known as a TE. TE stands for Transfer Efficiency, and this is around 40%. That means 40% of the paint sprayed actually ends up on the bodyshell, but the rest decorates your workshop (or lounge if you can get away with it) and if you don't wear a mask-your lungs.

The solvents used in these paints aren't very nice, they etch onto plastic, so they won't do your lungs much good. Masks are very inexpensive and for the good they will do they are worth every penny. Wear one, and always spray in a well ventilated

So, Tom Walkinshaw made a pretty good job of spraying those new Jags, but then it was pretty easy... he didn't have to do it on the inside!!!



# Batteries

An up to date list of available Batteries

#### Parma

SCE matched and graphed spec SCR matched and graphed spec SCE factory matched SCR factory matched All cells from USA, assembled and matched in UK, available plugged or unplugged, saddle or stick.

#### Pete's Awesome Products

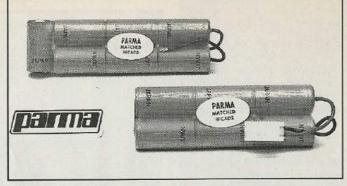
SCE matched and graphed (Team Pro-pack)
SCR matched and graphed (Team Pro-pack)
Comp Packs matched and graphed (SCE and SCR)
Racing Packs (un-matched) (SCE and SCR)
Single cells also available - also Panasonic 1700 SCR soon to be released.

#### Tamiya

SCE Matched packs in stick form SCR Matched packs in stick form Economy SCR packs for mass market All packs neatly assembled, good value and easily attainable.

#### Kyosho

SCE Factory assembled stick or saddle SCR Factory assembled stick or saddle



#### Sanyo

SCE 7.2v or 6v packs with plug SCR 7.2v or 6v packs with plug Packs made to order in various specs

#### **Phil Greeno**

SCE Pro Pack (Top Range Cells) Stick or saddle SCE Club Pack (slightly lower spec) SCE Economy pack (Ideal for kit deals) SCR Computer matched club pack (saddle or sticks) All hard wired

#### RCP

SCR pack Silver Star SCR pack Red Star SCE pack Silver Star SCE pack Red Star All packs supplied with graph and rating, available in stick or saddle form (also loose cells)

#### Lesro Models

Trinity SCR and SCE Pushed cells in 4,6,7 cell packs
Trinity stock economy packs 6 or 7 cells
Magic 1200, 1400, and 1700 SCE and SCR packs
Large range of hard wired cells from the USA available in various
specifications

#### Laser

SCE computer matched packs (high spec) SCR computer matched packs (high spec) All available in saddle or stick form.

#### Gale Force

SCE competition pack (top range)
SCE clubmans pack
SCR 1400 packs
All computer matched in the UK, saddle or sticks available

Radio Control Model Cars

#### System

SCE Pro 1700 (top range)
SCR 1400 (top range)
Matched SCE pack
Matched SCR pack
All cells in saddle or stick, computer matched

#### Nosram

SCE matched pack (top range)
SCR matched pack (top range)
Available in saddle or stick, computer matched in the UK

#### **Top Models**

Special SCE stick or saddle Special SCR stick or saddle Computer matched, service for re-matching also available, all packs with guarantee

#### **Power Products**

SCE computer matched SCR computer matched Cells supplied with graphs, available in stick or saddle form



#### Samifran Racing

Eliminator Plus 1550 Avenger Plus 1400 sports pack Neatly packaged, stick packs

#### LRP

SCE 6Plus packs computer matched SCR 6Plus packs computer matched Packs come as individual cells with braid, soldier and wire for self assembly into saddle or stick

#### Keil

SCE pushed computer matched SCE computer matched SCR pushed computer matched SCR computer matched Available in stick or saddle packs

#### Tanaplan

SCE matched and graphed SCR matched and graphed Saddle or stick packs available, matched in the UK

#### MG

Red Dragon SCE matched cells (saddle only)

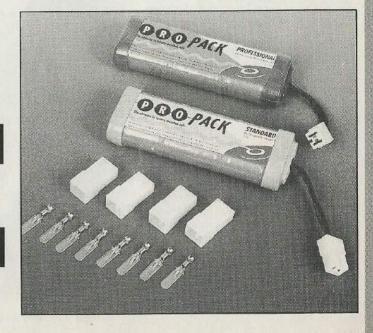
#### Reedy

1200 SCR packs in Factory, Racer and Team spec 1400 SCR packs in Factory, Racer and Team spec 1700 SCE packs in Factory, Racer, Team and Ultra Power spec All available in single cell form, 6 or 7 cells.

#### Schumacher

Flashpoint Pink SCE stick or saddle
Flashpoint Pink SCR stick or saddle
Flashpoint Orange SCE stick or saddle
Flashpoint Orange SCR stick or saddle
Flashpoint Blue SCE stick or saddle
Flashpoint Blue SCR stick or saddle
Various spec of Sanyo computer matched cells

We have made every endeavour to ensure that all UK available cells have been included, however if this is not the case please let us know at Model Cars and we will include them in the next available issue.



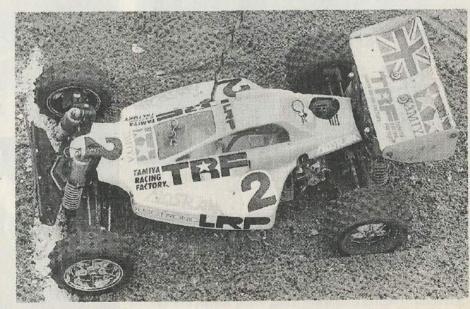


# KITS GALO

ago. I cannot believe that technical advancement and innovation has simply been exhausted. I can believe however that the investment required to produce a new car is so great that volume producers have to be sure that there is a market and that customers are waiting to spend their money before they commit the hundreds of thousands of pounds in new tooling. Of course rumours of new cars continue at the same pace as always. Kyosho head up the list with stories of a replacement Laser, but that is unsubstantiated. Tamiya are still producing the occasional car, but recent adventures into serious international competitions seemed to have stemmed their output. Mardave are beavering away in deepest Leicestershire and who knows what might come from behind those closed doors. Even Associated must have felt some cold wind because they have now joined the trendy's in offering some unusual coloured chassis for the RC10.

The rest of the US market seems a little more buoyant, but then it is a very large market and they do have some classes that are not so popular in this country, such as oval racing.

#### Geoff Driver searches the UK for a list of kits on the market



Tamiya's Manta Ray fitted with Egress bodyshell.

I suppose the main beneficiary of the unchanging market is the after sales business. There is no shortage of add on, go faster, look better, weigh heavier, cost lots more, goodies. In this way designs can be enhanced and further developed, even if some of the add on bits do little more than add mass to the cars.

#### Tamiya

Richard Kohnstam Ltd., 13-15a High Street, Hemel Hempstead, Herts HP1 3AD. During the last year Tamiya have had notable world wide successes with their 1/10 works driver. These successes have led to race developed products coming from the Shizuoka factory. Although the output of completely new 1/10 off road cars has slowed during 1990/91 some emphasis has shifted to other RC product

Some products have been deleted from the importers lists, although stocks may still be in some shops. Tamiya and their UK importer are no less enthusiastic about winning and supporting race meetings. The Tamiya trailer is still to be seen at most big events bringing the message of RC racing to as wide a public as possible.

The latest product to come from the world's most prodigious producer of kits is the Bear Hawk

At the entry level the Grasshopper and its derivatives the Grasshopper II and Super G Grasshopper II are still available. This car must be breaking some kind of record as one of the longest produced RC cars.

#### Grasshopper

2WD independent swing axle front suspension. Rear suspension is motor, gearbox and final drive all in a single unit. Plastic bathtub chassis. Minimal dampers are upgradable. ABS body. 380 motor. **Grasshopper II** 

2WD as Grasshopper. New smoother body lines. Grasshopper



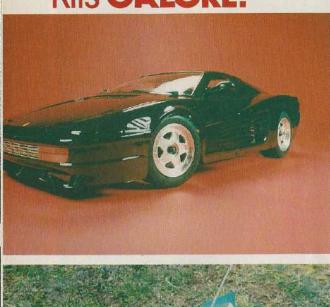
The lovely and reasonably priced Tamiya F1 kits including the Ferrari.



Losi's Junior Two for the starter market in racing. Below; Manta Ray has proven to be the best racer from Tamiya.



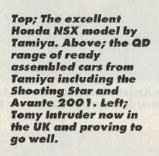
## Kits GALORE!





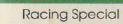


Above; The Associated Monster Truck should be available as you read this. Below left; Masami Hirosaka holds the Yokomo Dogfighter that gave him the title of World Champion. Right; Ken Mac Dowell, President of Parma with his latest kit the Hemi Coupe. Bottom; The Losi cars including the Junior Two and JRX Pro.

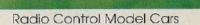


HONDA











super G 2WD as Grasshopper. Smoother body lines, 540 motor. Different style friction dampers.

Hornet

2WD as Grasshopper. Polycarbonate body. 540 motor. Oil filled

dampers. Astute

2WD Top of the range Tamiya single driven axle car. Ball diff. FRP chassis with independent all round with oil filled shocks.

Polycarbonate body.

Vanessa's Lunch Box

2WD Big wheeled fun car.

Chassis is moulded specifically for the van, but suspension and transmission imported



2WD

Next step up from a starter car, a simplified Astute. With independent suspension all round and oil filled shocks, ball diff. and polycarbonate body.

Nissan Kinacab

2WD Polycarbonate truck cab, oil filled shocks and ball diff. Double wishbone suspension all round. Uses Astute transmission.

Toyota

Hi-Lux Monster Racer

Apart from the body the only other noticeable difference between the Toyota and Nissan Kingcab are the front tyres. Specifications are otherwise similar.



The Associated RC10 - the most successful car ever?



The Kyosho oval racer - the Lumina. Below; Schumacher Rallycross Sierras.

#### Corally's Pro 10 car is beautifully finished.

from the Hornet/Grasshopper range. Body

Midnight Pumpkin

2WD Basically the same mechanics as Vanessa's Lunchbox, but with a pick-up style styrene body.

Blackfoot

2WD Great favourite in the USA.
The 2WD chassis started life as the Tamiya Subaru BRAT some years ago. All independent suspension with long travel shocks. Front is double wishbone, rear trailing arm type. Body styrene.

Monster Beetle

The Beetle body has been chopped to fit the same chassis as the Blackfoot. Detailed changes but basically the same type of fun vehicle as the Blackfoot. Body

Mudblaster

2WD

The original Subaru Brat from Tamiya was the first car to feature the distinctive triangulated chassis. The other noticeable feature was the horizontal mounted rear shock. Body styrene.



4WD Top level entry into the 4WD competition. Similar in principle to the Vanquish but with carbon fibre chassis and other parts. Shaft drive, ball diffs. front and

Clodbuster

4WD Massive wheels, two motors and 4 wheel steering. Lots of car crushing fun. Two shocks at each wheel. Body styrene.

Bullhead

Basically the same configuration as the Clodbuster. Minor mechanical changes but does sport a Monster Truck body with lashings of chrome plus a red chassis.

Terra Scorcher

4WD Shaft drive transmission with ball races included. Front and rear independent suspension with oil filled dampers. ABS plastic bathtub chassis with polycarbonate body. Comes with anti roll bar.

Thundershot

4WD Shaft drive from rear mounted motor. Independent wishbone suspension with single crossframe damper at the front and two at the rear.

Manta Ray

4WD The base car for a factory attempt at the top competition. Accepts many upgrade parts.

Bear Hawk

2WD All new starter car from Tamiya. ABS body on plastic bathtub style chassis. Independent suspension with oil free dampers. Powered with a 540 motor through a 3 speed resistor control.

Kyosho

RIPMAX Ltd., 241 Green Street, Enfield, Middx. EN3 7SJ.

Despite racing success elsewhere in the world, the Laser has been largely ignored in the UK. Perhaps this will change following the result of the British Grand Prix at Birmingham this year.

Kyosho have tended to move towards a series of scale cars bodies. These cars use the basic mechanics which are common the 1/10 off roaders, but carry some very stylish 1/10 passenger car bodies.

It seems that some severe rationalisation of the original Kyosho range has taken place, but it may be that some of the early models are still available.

ZX Laser

4WD Latest in a long line of race winning cars. Double belt drive transmission. Oil filled shocks all round. No motor supplied. GRP chassis and polycarbonate body.

Optima Mid

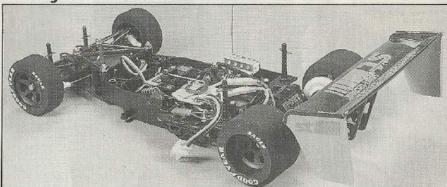
erent versions with different amounts of extras and equipment. Custom, Special, SE, etc. etc. Some with aluminium chassis some GRP/Carbon chassis. All cars use the same basic transmission, independent suspension and layout. Motor mounted in front of rear axle.

Optima

4WD Virtually disappeared from the shelves. Predecessor to Mid but with motor at the rear.



Tamiya's economically priced 1:10th cars including the Nissan 300ZX.



The Tamiya Mercedes chassis with separate wing. Below; Sideways from Kyosho is a real fun racer.





#### Kits GALORE!

Rocky 4WD Independent suspension all round with oil filled shocks. Uses ladder chain transmission. Entry level to 4WD.

Maxxum

2WD One of the few front wheel drive off road race cars made.

Ultima

2WD Has captured many race successes world-wide. Rear mounted motor with gear transmission. Oil filled shocks. Upgraded model is the Turbo Ultima, with ball races, ball diff and Platinum shocks. Followed by the top of the Kyosho line of Ultima off road racers, the Ultima Pro. Features different chassis and a host of upgrades.

Triumph

2WD New competition car from Kyosho with long suspension arms and a belt drive transmission, aimed as a new challenger to the Associated and Schumacher 2WD cars. Super Bomber (ready built) Aero Streak (ready built)

Raider

2WD A ready built entry level off roader.

\* The Big Tyre

4WD As the name suggests it is all wheels.
4 wheel steering and twin motors.

**Big Boss** 

2WD based on a Ford F250 design. Independent suspension all round with double wishbone.

**BigBrute** 

2WD Big wheels, limited slip diff and double wishbone suspension.

Hi-Rider Corvette

2WD Big wheels to join the latest range of car crusher. Different body but same mechanics as Big Brute.

Double Dare

4WD Twin motor and 4 wheels steering. Double shocks at each wheel.

Ferrari F40

4WD one of a new series of 1/10 scale bodies using traditional 1/10 off road mechanics.

Porsche 911

4WD as Ferrari Nissan Skyline

4WD as Ferrari Chevrolet Lumina

4WD as Ferrari

Lamborghini Countach

2WD virtually true scale. Road wheels and tyres, independent suspension and three speed control. Body is fairly complex and made from a number of parts in Polycarbonate.

Ferrari Testarossa

2WD mechanics as for Lamborghini with the beautiful Ferrari body.

Nissan Saurus

2WD Rear wheel drive. Flat pan chassis with independent suspension and coil over shocks.

Sideways

Based on U.S oval dirt track "sprint racing". Uses Ultima mechanics.

#### Yokomo

CML Distribution, 1684 Bristol Road South, Rednal, Birmingham, B45 9TZ The Yokomo company had a fairly difficult

Radio Control Model Cars

start with their world championship "Works 91" car, Initial supplies of the car had various suspension parts breaking a little too easily. The car was rapidly removed from the shelves, quick redesign and retooling of suspension parts and has now appeared in a much healthier condition.

Super Dog Fighter Works 91. 4WD Flat pan graphite chassis with top brace, belt drive with centre adjustable torque split. Teflon coated dampers, various titanium parts, ballraces. Altogether a full race trimmed car.

#### Associated

Ted Longshaw, P.O. Box 89, Orpington,

It seems that little can be said about the RC10 that has not already been said. The car which took years to design and develop has taken so many race honours around the world that it would take a warehouse to accommodate all the trophies. Through the years numerous changes have been made to the car, although the basic design has remained unchanged. The latest significant change was the "Stealth" gearbox.
Lightweight with improved features to transmit all the power from todays super powerful motors. The latest car available is the RC10 Team Car.

If you really need to be trendy Associated have now released a range of coloured alloy chassis.

#### RC10

2WD aluminium tub chassis with nylon suspension and transmission components. A few steering geometry changes over the years but the car is basically the same as when it was released on the RC market. Now available with carbon chassis.

The Team Car comes with Stealth transmission, low profile wheels, new drive shafts, Viper bodyshell, new front axle and steering blocks, longer suspension arms, black chassis and new Teflon coated dampers.

#### RC10L

2WD Based on the successful 1/12 chassis the RC10L has been suitably beefed up for 1/10 racing. Available in either fibreglass or graphite chassis form. Holds a speed record of 70.1 mph for a 1/10 electric car. RC12LW

Latest in a long line of very successful 1/12 circuit racers. World champion.

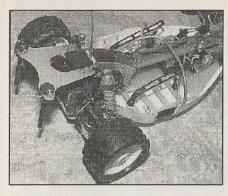
#### Schumacher

Schumacher, Hansons Business Park, 71-73 Tenter Road, Moulton Park, Northampton NN3 1AX

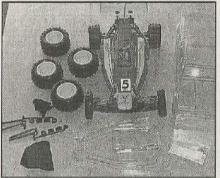
Schumacher competition successes continue., Both the 4WD Procat and 2WD Cougar have won European championships honours in 1990. The track successes are followed by a steady range of

CONTINUED PAGE 56











The easy stages to going Rallycross racing. Left; All the bits you need to build a truck.

he emphasis in Rally-X and Monster Truck Racing is firmly on fun. Arguably the best cars to have for this purpose are the Schumacher Procat and Cougar - not because they are the best cars on the track, or the easiest to drive but because the conversion kits are so easy to fit that it is possible to convert them in a very short space of time from our off-road competition cars, to the fun classes of Rally-X and Monster Trucks.

'Senior' had been asked to commentate at the Harlow round of the BRCA National, and as inducement was offered a place at the Rally-X and Monster Truck 'Festival' to be held by the Harlow Club the day before. This was an ideal opportunity to put money where mouth is, and covert our two off-road racers to the fun classes.

Schumacher's Tim Walden responded to our plight with admirable speed, and the conversion kits U783 (£8.17) plus body (£12.21) for Procat to Rally-X, and U569 (£50.57) including body for Cougar to Monster Truck duly arrived. A Parma Ford Cosworth body was used for the Rally-X,

and the Parma Monster Truck body for the Monster Truck. 'Junior' decided that he too wished to race, so it was all hands to the pumps to get both cars ready in less than a fortnight for the big day.

The Rally-X conversion could be simpler, but it is difficult to know how. The rear wing mounting is removed and replaced with a glass reinforced resin plate. To the plate are attached the body mounts, which adjust for height, and have clever little hinged supports to follow the contour of the bodyshell.

#### **Up Front**

The front gearbox screws are removed to allow another plate to be fitted which supports the same simple body posts. The clear bodyshell was positioned over the car and aligned correctly. Holes for the body posts were marked out, drilled, and then the shell was attached to the car to check correct positioning.

### The Monster Truck conversion...

The Monster Truck, or Stadium Truck to give it its correct fitle, proved less simple than I

# Two new crazes sweeping the UK

# Rallycross & ANONSTERS

expected. The conversion kit comes nicely packaged with a box of bits and one of the excellent Parma bodyshells. However, it's a little short on instructions, and some fairly good leaps of the imagination were required. You shall not have such a requirement since there are plenty of photo's here to point out the areas where the instructions do not tell you what to do.

The rear wing mount is removed and replaced by a glass-fibre plate. Body posts and damper mounts are attached to this plate. The body mounts are screwed onto the side of the plate facing the front so as to clear the gearbox, and the damper mounts also face torward. Change the rear hub carriers for the new ones in the box. Replace the upper suspension arm with the new one. This is necessary because the new hub carriers have a different pick up point for the upper link.

At the front it is necessary to fit a new mounting plate to carry the front body posts. This is not explained at all, and unless you know the trick, it looks impossible. On the plate which lies between the two wishbone inner pivots there are two round marks on the front edge, the ejector pin marks from the mould. Drill two 3mm diameter holes through the plate using each circle as a guide. You will now find the 3mm threaded bolts pass straight through the bumper and the plate, allowing you to bolt the plate onto the car. Once it is bolted on, simply drill through for the third hole using the bumper as a guide and bolt up the assembly. Fix the body posts in the same way as the rear.

Ćut out the dust cover and fit. Position the body over the body posts, centralise on the chassis, and mark the holes to be drilled. Make sure the rear wheels align with the arches, and let the front wheels take care of themselves. Once you are confident in your positioning, drill away! Mask the body up as required (not forgetting that the two rectangles in each rear wheel arch are the holders for your race numbers, and the long rectangle across the back is the rear wing-if you want them a different colour they must be masked off too) and follow the instructions in our spraying guide for a good finish.

The Rally-X conversion for the ProCat is undoubtedly the easier of the two, and it is easy to imagine a quick change from 4WD racer to Rally-X fun-car from one weekend to the other. The Cougar to Stadium Truck conversion is less convincing in this respect, but not too onerous as to be impossible. However, since this is written with the benefit of hindsight, we may, as you will see, not want to change them back at all!!

Our article in this Racing Special on spraying bodies will tell you all you need to know about how to make your body beautiful. Our efforts are certainly not in the same class, but some carefully placed Parma stickers and a little imagination gave us a passable result.

Racing these cars will give you a Monster smile and not make you (Rally) cross. For some strange reason the Rally-X bodyshell makes the Procat easier to drive, and the



New Experience

Racing Special

The Monster Truck is quite unlike anything you have ever seen or driven before. The huge tyres soak up any size of bump imaginable, and the suspension needs to be set for maximum wheel movement and ground clearance. It was easy to spot the competitive racers, they were the ones with stiffened suspension and bodyshells lowered close to the chassis. This is quite out of keeping with the spirit of the class. Bodies should be mounted high and handsome, and ground clearance at rest should be ENORMOUS!

Any club running Monster Trucks should immediately introduce three rules. First, only standard kits with bodymount conversions should be allowed. No roll bars or special dampers. Second, the minimum

ground clearance at rest, fully laden, should be set so that the cars have to ride high! Third, the minimum height from the roof of the body to the ground should be set to keep the shells looking like trucks. Both these classes place the emphasis on fun and rightly so. The cars are easily identified by the public and so pull in vast crowds. They have a permanent place in any club where they should be regarded as fun — anyone winning a race is a bad sport, the winner is the driver with the most spectacular style! You should also see the looks as on the faces of Junior's mates when he shows them

the car – WOW!! Senior and Junior have never enjoyed themselves so much. Where did we finish – who cares. We did the whole meeting sharing the cars and rotating five old packs of SCR's. We wore out no sets of tyres, broke nothing, and even came home with the bodies in one piece.

Monster Trucks are the biggest selling kit type in America, outselling 2WD and 4WD. We shall soon see the new RC10 Monster Truck and the Losi Monster Truck. We predict that the craze will sweep the UK in 1992. Get yours now before the rush and smile, smile, smile!



#### Kits GALORE!



Team Car from Associated features the Stealth transmission.



Schumacher Cougars are proving to be the most popular choice for 2WD.



The excellent F40 from Kyosho features 4WD and a lexen body.



Above; The almost scale perfect Mercedes from Tamiya. Below; Parma's Hemi Coupe and Willys'.



CONTINUED FROM PAGE 51 kit improvements or optional bolt on bits kit improvements or optional bolt on bits from the factory under the banner of "Speed Secrets". To further supplement the range Schumacher now have saloon car bodies available to fit the slightly modified 2WD and 4WD chassis. In addition a truck racer, the Shotgun has been added to the

The most recent production from the Schumacher stable is a range of 1/10 IC powered cars. Based on the Cougar mechanics but using a 2.5cc pull start engine these "Nitro 10" cars offer an introduction into the world of IC powered RC cars.

**Top Cat** 

2WD Aluminium tub chassis. Independent suspension all round with horizontally mounted front shocks.

Cougar

2WD similar spec to Top Cat but front suspension geometry changed and front shocks have been lifted to vertical position. Very successful racer.

Pro Cat

4WD Schumacher's highly acclaimed championship winning off roader with fold back front suspension. Started life with unique transmission involving integrator device to transmit drive to front wheels by belt. Numerous modifications over the years based on race experience.

#### Traxxas

To be announced

Although a few specialised dealer have managed to obtain limited supplies of Traxxas products as yet no "official" distributor has been appointed. There is no shortage of companies willing to take up the distribution of Traxxas in the UK, but boss Jim Jenkins is being very careful about who he will allow to represent his company in the UK and Europe.

Sledgehammer

2WD (big wheels) Rear wheel drive, double shocks at each wheel. Plastic tub chassis, spring mounted body.

Blue Eagle.

2WD Full race bread racing truck. Substantial number of race successes all over the USA. Features alloy dampers, race transmission, carbon chassis and full race spec.

TRX-10 Bullet

2WD Full blooded off road racer. Coil over shocks, tub chassis

Radicator

2WD Entry level off roader

Vector

2WD Brand new full competition spec. Long alloy shocks, graphite and nylon construction. Slipper clutch and adjustable dual bearing ball diff.

#### Hirobo

MacGregor Industries Ltd., Canal Estate, Langley, Berks, SL3 6EQ

Hirobo cars are as popular as ever with a very nice pair of ready built 1/10 racers.

Racing Special



Peugeot 205.

4WD rear mounted motor driving front axle through an in line drive shaft. Independent suspension all round with coil over shocks and ride height adjustment.

Toyota Celica.

Same chassis as the Peugeot but with a Celica body. Once again Hirobo leads a class of racing where other manufacturers are only just getting into. If it takes off then the two Hirobo cars could well be sought ofter.

#### Bolink

Ted Longshaw, P.O. Box 89, Orpington,

Bolink continue to be popular in the USA. Not a massive following in the UK, but

nevertheless a well respected, robust and reliable product range

#### Eliminator

2WD Circuit racer.

Well proven design, tough and fast. Alloy sides for rear motor pod. Rear dampers mounted horizontally. Front suspension independent rising blocks.

**Eliminator Gold Edition** 

2WD circuit racer. Top spec Eliminator.

#### Losi

CML Distribution, 1684 Bristol Road South, Rednal, Birmingham, B45 9TZ

Designed and produced by Gil Losi Jr. Using experience gained in world class

# Kits GALORE!



Clodbuster and Bullhead use the same enormous chassis.



Saint Dragon is an ideal starter car - reliable strong and well priced.

championships.

Junior 2

2WD Entry level car with plastic chassis, 5 link rear suspension and sliding drive

JRX Pro.

Top of the range Independent suspension all round on a LWB carbon fibre chassis. Rear suspension is conventional wishbone to aid "turn in". Specially designed gear drive made from self lubricating materials.

#### Marui

Amerang Ltd., Commerce Way, Lancing, West Sussex BN158TE.

Tokyo Marui are still to be found in a limited number of outlets.

The product line remains the same as last year, but still some very nicely presented and designed kits.

2WD Big Wheels version of a Datsun pickup. Chassis ABS moulding and body is also an injection moulding. Independent front suspension rigid rear axle all on coil spring

suspension.

Ninja

4WD off road racer. Coil spring all independent suspension. Transmission is shaft drive front to back.

Shogun

4WD off road racer. Spec as Ninja

Thunderbird

4WD on/off road racer. Spec as Ninja but with alternative ride height adjustment.

#### Mardave

Mardave Leicester

One of the few UK producers of RC cars. Les Rayner has been keeping the Mardave company moving nicely along with 1/12, 1/10 and 1/8 RC models. The Meteor is the mainstay of the companies 1/10 off road effort. A robust, cheap and excellent value for money kit, the Meteor is to be found all over the UK turning in first class race results as well as providing hours of fascination for garden drivers everywhere. Do not make the mistake of thinking that the Meteor is anything less than a top grade 2WD racer. It incorporates all the design features of more expensive imported models, and it is built in Britain. New cars are under development but at the time of printing no detailed information was available

Meteor

2WD Economic robust kit. Independent suspension all round. Ready built gearbox for fitting to aluminium chassis. Body needs to painted on the outside. Ball differential. Soon to have a new gearbox.

Meteor comp.

2WD Competition version of Meteor. No motor but ball races included. Corally Intronics From Holland the Corally company have had outstanding success with their beautifully engineered and finished car. The company has made limited expansion into parts for other cars and a revolutionary electronic speed controller.

SP10

2WD circuit car. Based on the SP12 circuit car. Chassis made from machined aluminium alloy. Front suspension front beam flexes to give front wheel suspension movement. Motor pod pivots on a special ball joint mounted on the chassis.

#### PB

PB Racing Products Ltd., Downley Road, Havant, Hampshire PO9 2NJ.

PB have never followed conventions. Innovation and ideas have always been behind PB product.

The original Mini Mustang used adjustable roll induced steering. Although unusual, it never made noticeable gains on the track

The Sizzler, a 1/10 circuit racer came onto the market and caused a stir with its all new rear suspension system, featuring a

parallelogram action

Mini Mustang

The original entry into 1/10 off road by PB. Still available according to information supplied by PB.

Sizzler

2WD circuit racer. Composite chassis and carbon fibre rear axle with ball diff. Machined alloy rear pod side plates. 5 link rear suspension system with single shocker. Full ball raced. Front coil spring suspension.

4WD off roader. Three belt transmission with adjusters driven by rear mounted motor. Ball differential and U.J. drive shafts. Double wishbone suspension with coil over oil filled shocks. Backbone chassis which houses the transmission system.

**Advanced Racing Technology** 

Holcomac Marketing Ltd., Britannic House, 17a George Street, Stroud, Glos. GL5 3DP.

Agitator 2

2WD circuit racer. Incorporates unique load actuator system claimed to improve handling and traction. High level specification including triple rear shock system. Adjustable camber and castor. Uses a lot of machined Delrin.

Junior

2WD circuit racer. Entry level car. Graphite components, similar back end to Agitator 2. Upgradable to full Agitator spec.

Wasp

Wasp Products Ltd., 13 Morningside Road, Worcester Park, Surrey. KT4 8LQ.

Fury
4WD A new venture for Wasp is this, their first RC car. At the time of writing no price has been published. The specification is high, with a lot of machined components in plastic and aluminium alloy. Main front to rear drive is by toothed belt.

#### Samifran Racing

5 Skimpot Road, Luton,

Tomy Intruder.

The Japanese made Tomy Intruder has had noticeable success in the far east, but yet to have a big impact in the UK. However these are early days. Unusual features include a range of transmission options with:

1. A 60/40% front to rear torque split

within the centre epicyclic differential 2. Torque split plus one rollers in the wheels.

3. Direct drive to rear with one rollers in the front wheels. 4. Finally direct drive to both front and rear. Main transmission by belt with 16 ballraces throughout the car.

Parma

2WD 1/12 and 1/10 circuit cars.

Kawada

2WD 1/12 Japans answer to the Associated RC12.

Cobra

Tanaplan 1/10 circuit racer

Racing Special

Serpent Tenforce

RIKO 1/10 circuit racer. Independent suspension all round.

Eclipse

2WD Circuit car made in Canada. Independent suspension all round.

Nikko

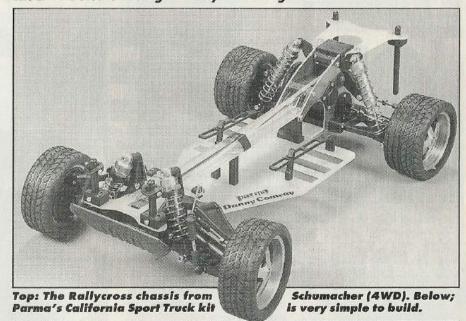
4WD Super Sprint buggy. Belt drive, aluminium shocks and a modified motor

**Twister Cyclone** 

Pete's Awesome Products. 1/10 circuit



The 2WD Porsche has a good body and strong chassis.





Radio Control Model Cars



Robinson Racing in the USA produce a large number of spurs and pinions.





Our top ten list. and other add-ons on the market

special list of the top ten add on extras 1/10 cars must be one of the most suicidal exercises for a writer to take on. If you own a Pro CAT then you would not consider an extra for the Laser to be much use. Indeed my list of extras might not be anything like your list even if it were for the same car.

The ultimate accessory? your own com truer.

There is another problem. The suppliers. If I ask them what is their best seller the chances are, they would present me with their complete catalogue and claim every item was a best seller. They would not be able to pick out just one item.

So having said all of that I have made my list. Not for one car but for a range of cars and

in addition I have used a bit of licence when it comes to choosing one particular device. As far as cost is concerned, I have effectively ignored the cost of the items, some items are expensive some not.

I have deliberately ignored

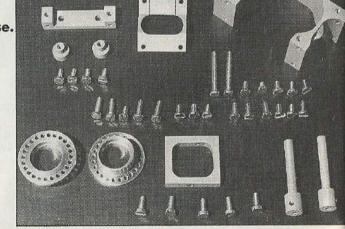
bodies, batteries and speed controllers, they will dealt with elsewhere.

Differential and layshaft assembly for the Pro CAT and Cougar. Model Motor Sport. Unit 31, Tweedale Court, Tweedale North, Industrial Estate, Telford, Shropshire TF7 4JZ.

A useful, well made and reliable after market extra specifically designed to fit one car.

RC 10 Titanium suspension pins and turn buckles. RC Performance Products. Available from: Petes Awesome

Products, 316A High Road, Tottenham, London N154BP.



A vast range of alloy machined parts is now available.

Light weight, more robust than the original equipment and longer lasting as it transfers wear to swinging arms not the chassis mounted blocks.

Servo Savers Kimbro Available from: Ted Longshaw, P.O. Box 99, Orpington, Kent.

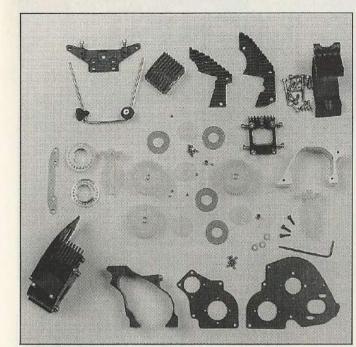
Easy to fit on servo drive shaft, minimal slop, range of sizes and fittings for all sorts of servos. Reliable and long lasting and takes a tremendous amount of abuse.

Battery connectors Corally Available from: Intronics, Claerwen, Bexhill Road, Pevenset, East Sussex BN24 5JT.

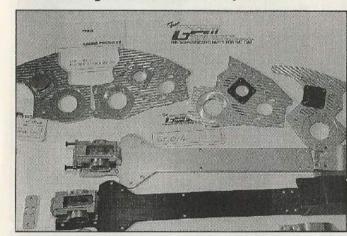
Easy to fit, carry a lot of current without overheating, simple to use and reliable.

2.2 inch wheels Available from: Power Products, P.O. Box 12, Aldershot, Hants Fittings for a wide range of cars, range of colours, accepts the

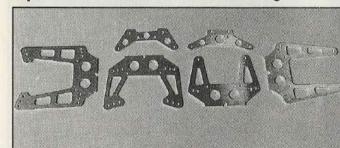
Radio Control Model Cars



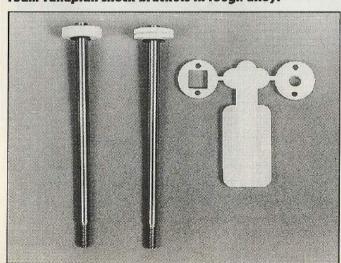
The MMS range is well liked and respected.



Top Gear now offer a vast and colourful range.

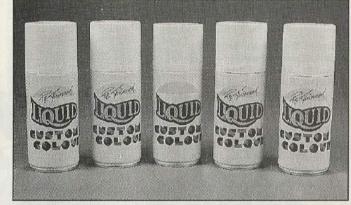


Team Tanaplan shock brackets in tough alloy.





The Coverite range of paints from CML.



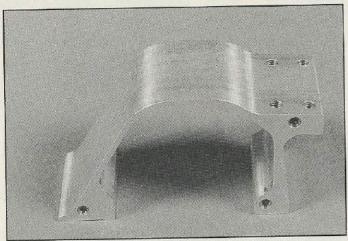
Custom Colour is a new paint from Helger Racing.



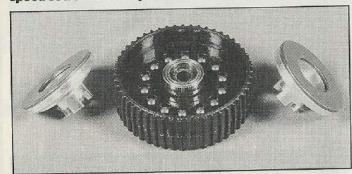
always a good buy.

lower profile tyres (wide range of tread patterns), lightweight, rigid and robust.



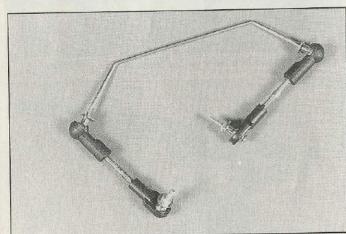


Alloy centre housing for the Schumacher Procat - a speed secret accessory.



Above: Super diff from Schumacher is very smooth. Right; Alloy bearing holders are a must in top competition.





Damper units.
Associated. Available from Ted Longshaw

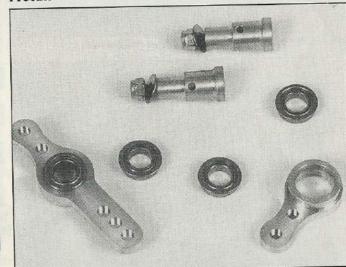
Excellent quality. Teflon coated aluminium alloy. Low friction, smooth working, careful design. Tamiya Hi-Cap. Model shops via RIKO

Fit most of Tamiya range plus a lot of other cars. Available as top of the range aluminium version. With diaphragm. Tough and dependable. Kyosho Option House. Model shops via RIPMAX Gold, terrific finish, diaphragm type, alternative pistons good performance can be fitted to most cars.

One way clutches for Manta Ray and Avante 2001 Tamiya Model Shops via RIKO. Available for Avante 2001 and Manta Ray. Greatly enhance "turn in" on Tamiya shaft drive 4WD cars.



Pete's rear alloy bracket does a good job on the Procat.



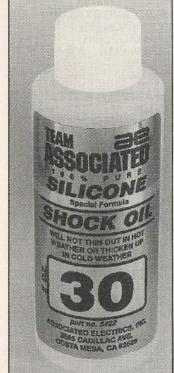


High torque servo K.O., Sanwaand JR. Available from: Top Gear Model and Trading, 5 Page Close, Bean, Dartford, Kent, DA2 8BX Tanaplan, 1 Berry Place, Sebastion Street, London EC1V OHE

The amazing power and speed of the latest high performance servos can only be wondered at compared to just a few years ago. The lead was set with now

Radio Control Model Cars

legendary PS 87 series from KO. That type has been superseded by the KO model PS 1001. From JR there is the NES 4471 and from Sanwa the ERG HS and models.



TEAM ASSOCIATED

Cougar Slipper Clutch.
Schumacher Speed Secrets.
Model Shops via Schumacher.

Keeps front wheels on the ground under acceleration and controls wheel spin. Can be fitted to Pro CAT as well.

Alloy rear pod for the 10L Associated. Left; Shock oil – the Associated brand is very popular.

Motor Cleaners
Power Products. P.O.
Box 12, Aldershot,
Hants.
Wasp. 13 Marpingside Pood

Wasp. 13 Morningside Road, Worcester Park, Surrey, KT14 8LQ Paragon. Holomac Marketing Ltd., Unit G4, Bath Road Trading Estate, Lightpill, Stroud, Glos. GL53QF plus a few others.

A simple enough product, but indispensable if you want to keep your motor in top condition. Most of the aerosols use non CFC propellants. Not just useful for motors but just about anything that needs some potent cleaner. Good, safe (as long as they are used with care and common sense).





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PE176XX

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WARSOP MCRC

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LIVERPOOL MCRC

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**BOLTON BUGGY** CLUB

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WEST CRAVEN MCC

R WRIGHT ESQ 184 MANCHESTER ROAD BARNOLDSWICK NR COLNE LANCS BB8 5HQ

BENTLEY MCC

R P GRIIGS ESQ 6 PICKWICK CLOSE SANDBACH CHESHIRE CW11 OYR

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GEMINI combo

JR APEX combo

SCHUMACHER PRO	
CAT	£175.00
COUGAR (BALLRACED)	£110.00
WORKS 91 YOKOMO	£265.00
JRX PRO	£185.00
JRX JUNIOR	£125.00
RC10 TEAM CAR	£185.00

TAMIYA

HORNET

THUNDERSHOT

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THUNDER DRAGON

MONSTER BEETLE

MIDNIGHT PUMPKIN

1 ACOMS MK5 RADIO

DEAL ONE £70.00

ACOMS 15 MIN FAST CHARGER

MORE DURATION THAN 1200 MAH

DEAL TWO £80.00

SAME AS ABOVE BUT WITH

MAINS AND 12 VOLT FAST

CHARGER

L.R.P. ELECTRONIC

TRINITY 1700 SERIES

MOTOR'S

BLUEE

WHITEE

PINK F

15 x 2

13 x 2

12 x 2

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BLUE SE 91

SANYO 1300 MAH BATTERY

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**KITS** 

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#### SERVO'S £58.00 5.00 5.00 2.95 2.95 2.95 8.70 1.50

SANWA CONQUEST	158
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1 ACOM'S MK5 RADIO 1 TEKOMO MINI SLOPE CHARGER (PEAK DETECT) 1 1700 MAH BATTERY 1 SILVER STAR SPEED CONTROLLER 1 PARMA STD MOTOR

REEDY MR SERIES

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MAIL ORDER — 0902 - 202

£240.00	NOVAK MXC	£134.9
£120.00	NOVAK MIC	£115.0
£199.00	NOVAK RV610	£115.0
£199.00	TEKIN 420	£124.9
£40.95	TEKIN 410s	£85.0
	TEKIN 408	£79.9
CONTRACTOR OF THE PERSONS	NEW STARTERS	SPEEDO
THE RESERVE OF THE PARTY OF THE		Property and the second

**ELECTRONIC SPEEDOS** 

SPEEDMASTER	3 VAI	LUE
TURBO	ande	*********
SILVER STAR	£65.00	
SILVER STAR		£50.00
GEM RECEIVER		£24.95
27meg Smalle	est Availa	ble

SUPER

## MMS

1		
S	UPER DIFF	£33.95
L	AY SHAFT	£15.32
5	1T FRONT DIFF	£21.35
50	OT FRONT DIFF	£21.35
IN	NNER HOUSING	£44.9
PI	RO CAT SHOCK MOUNT	£17.30
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T	OP HOUSINGS	
-	CHOID OF IDDAY	

YOKOMO FRONT 4 REAR BULKHEADS £29.95 each CENTRE HEATSINK

BULKHEAD P.O.A. HEX DRIVE WASHERS £8.50

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£79.95

£59.95

£29.95

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MASSIVE SPARES BACK UP ON SCHUMACHER. ASSOCIATED, YOKOMO, ECT

#### **GENERAL** HOP UP PARTS

	7,500
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SCHUMACHER TYRES MASSIVE RANGE OF R.W. SPURS & PINIONS IN 64DP,

48DP, 6MOD ALSO MANY UP DATE PARTS MUCH MUCH MORE AVAILABLE

THE POWER

TO WIN!

TOP HEATSINK	£10
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#### FROM TEAM IS ONLY THE BEST BATTERIES

NEW

£45.97 Mr K 17x4

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Mr H 12x3

Mr J 12x4

Mr T 11x4

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£45.97

£45.97

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£15.32

#### FROM TEAM 15

MATCHED SCE's

MATCHED SCR'S

BLUE STAR

SILVER STAR

SCE's

MATCHED & PUSHED

MATCHED & PUSHED

JS MATCHED

L.R.P. SCE's £42.50 L.R.P. SCR's 1400

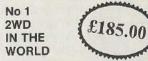




No 1 £39.95 2WD £44.95 IN THE

£35.00

£37.97



ASSOCIATED

#### CHARGERS

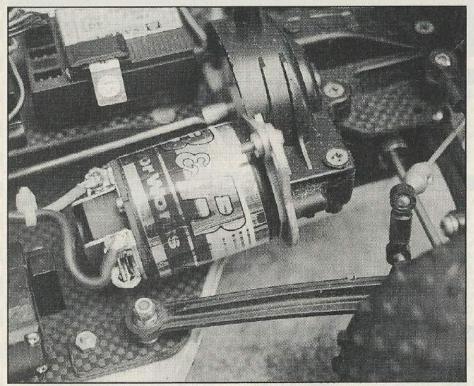
BATTERIES TEKOMO PRO PLUS TEKOMO PRO SLOPE TEKOMO MINI SLOPE LINEAR TURBO £39.95 CHARGER 15 MIN FAST ACOMS £32.95 MAINS & 12 VOLT

£22.95 CHARGER

£24.95

DESPATCH

J.S. RACING LTD., 3 St. Georges Parade, Wolverhampton. WV2 1AZ



tested on a dynamometer, where are the results and how can you interpret them.

There is probably a simple maxim to remember, you can't get out more than you put in. So draw more current and it is possible to produce more power. This is only true of course if the motor is properly adjusted, clean and in good condition. Of course it is possible to draw lots of current and produce very little motive power but an awful lot of heat. This is a pretty clear sign that something somewhere is not working properly.

I suppose the best way of testing a motor to see if it is better than all the rest is simply to compare it with the others. The most accurate way to do that is by applying certain fixed loads to the motor and measuring the result. There are a number of suitable cheap motor testers available. Sadly the results of tests such as these do not tell you if your motor will be good on this or that type of track. So in the end there is only one answer, make your choice, pick your gear ratio and get out their and drive it, but, don't believe all you read in the ads.

The B&R Motorworks motors are now available in the UK.

Motor-WORKS

manufacturers of the type of motors used in RC Racing. For the most part the factories are in Japan, Hong Kong and Taiwan. These manufacturers in turn source their raw materials and components from yet more manufacturers. Thus to say that this or that motor is made in the U.K. or USA is perhaps a little misleading. The name that appears on the can is probably the company that chose the specification and imported the original motors and indeed may well have put the finishing touches to the product or even carried out the winding of the armature. Even here one can be mislead. Some suppliers simply buy motors from this or that importer, stick on the labels and hey presto another motor hits the market place. So in the end how do you choose. Firstly be on your guard. Read the advertisements closely and do not swallow all the hype. If you like the look of this or that label, and that is what you want in your car,

Claims about staggering R.P.M. may look good, but it is of little help. You need to relate that to the amount of power available at the specified R.P.M. A motor that has a free running speed (unloaded) of 50,000 R.P.M. but does not have enough power to move the car off the start line is not a lot of use. Also does the advert guarantee that all motors can reach these speeds or just a "sample" motor was capable of reaching those speeds. It is also worth remembering that as soon as a small DC electric motor is used, the performance will start to fall off. All sorts of things happen to it. The commutator will start to erode as well as

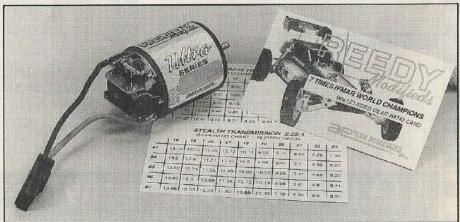
ecently the USA RC controlling body has introduced new rules governing the amount of "advance" a stock motor is permitted. Although the rules do not directly affect U.K. racing, motors imported from the USA may be constructed to abide by that ruling.

oxidise, hence contact resistance will build up. The brushes will start to heat up, break up and of course wear. Brush springs will heat up and gradually loose their tension. The magnets will be affected by shock, heat and flux reversals, which will eventually bring about a reduction in magnet energy. So from the moment the motor starts to run it is on the decline. Dyno tested is another neat phrase. What does it mean? Perhaps more importantly if the motor has been

There are now many manufacturers – Geoff Driver investigates what's available

#### Power Products.

P.O. Box 12, Aldershot, Hants.
Power Products have one of the largest ranges of motor types available, and among the cheapest to be found. Apart



The Reedy name has many championships behind it, although others feel they are catching up.

from their own exclusive design of endbell, motors are offered with "ceramic, wet or cobalt" magnets. Power Products are the only company to offer cobalt magnets on RC car motors.

In addition to the magnet types, three options of magnet strength are available. All "adjustable" motors are precision balanced by Power Products in the UK. Full spares and rebuild service available. Magnetising of magnets, comm truing and balancing available for Power Products and Demon motors.

Standard

27 x 1 BRCA stock motor. 30 deg timing 17 x 1 Fixed timing. Fast for 4WD 20 x 1 fixed timing. Fast for 2WD

Modified 13×1 14×1 15×1 16x1 17x 18×1 19x1 20 x 1 21 x 1 10×2 also in x 3 11 x 2 also in x 3 also in x 4 also in x 3 also in x 4 also in x 3 also in x 4 13 x 2 also in x 3 also in x 4 15×2 also in x 3 also in x 4 16x2 also in x3 also in x4 also in x 3 also in x 4 18 x 2 also in x 3 also in x 4 also in x 3 also in x 4 20 x 2 also in x 3 also in x 4 21 x 2 also in x 3 also in x 4

22x2 also in x 3 also in x 4

#### Kyosho

23×4

24×4

The original Le Man series have been added to and in some cases superseded by an alternative. Although not widely appreciated it was Kyosho who were responsible for a lot of the work that went into the so called wet magnet motors, and

were among the first to release this type of motor onto the market. Now of course just about everyone has a wet magnet series.

Le mans 480 Gold Special 480 WT 360 PT H-240 S 600 E 240 SB AP29 AP29BB Speed 240T DMC20BB GP Super Stock 20 Super Stock 34 SPA240 WS 480 WT Mega Motors 12 x 2 Paved Oval 14 x 2 Dirt Oval 16 x 2 4WD Off Road 18 x 2 Off Road 20 x 2 On Road 22 x 1 Outlaw Stock 360 Monster Truck

MRI Motors
Wetmags and ballraces
31 × 2
15 × 2

21 x 1 27 x 1

#### Yokomo CML

Yokomo motors have long been the source for other manufacturers to rework. No less a person than Mike Reedy used Yokomo motors for many years. Of course nowadays sourcing at the best price tends to have manufacturers looking further and further afield.

Esprit
Lightening

Just about any wind can be obtained, but the motors usually reappear with other labels on

Reedy

Still at the top of the motor heap despite claims by all the competition.

Whether the success is just a result of the Reedy motors or the Associated cars or, as is more likely a wise choice of driver it does not matter. At the end of the day it is the Reedy name that appears on the winners rostrum. The support that Mike Reedy and Team Associated give to the hobby is legendary. Sponsoring race meetings world wide not only keeps the Reedy name alive but also continues to promote top level competitive driving in many countries. Reedy motors feature cord wrapping around the armature windings to ensure there is no winding movement at high speed.

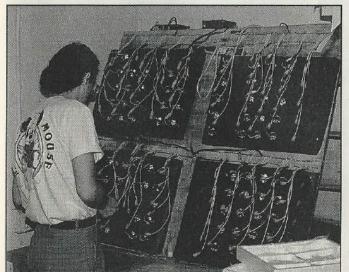
Ultra series 21 x 2 Silver dot 17 x 2 Red dot Pink dot 13×2 19×2 Gold dot 20 x 3 Gold star Blue dot 12×2 13×2 Green dot Yellow dot 16x2 21 x 2 Silver dot 19 Brown dot 27 advanced timing 35 fixed timing

Esprit series
17 fixed timing
20 fixed timing
19 x 2
15
23
13 x 2

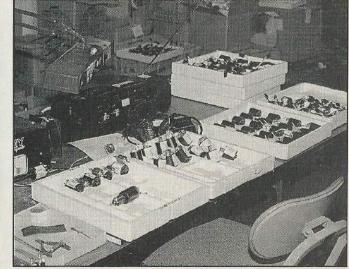
Ultra Torque series Mr. K 17 x 2 Mr. R 16 x 3 Mr. D 14 x 2 Mr. C 13 x 3 Mr. J 12 x 4 Mr. E 13 x 3 Mr. H 12 x 2

**Trinity** 

The U.S. ruling body for RC racing have recently decreed that fixed timing motors

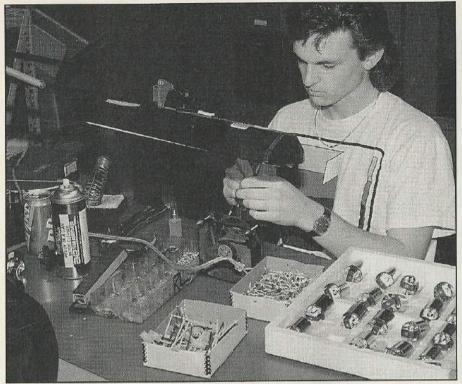


Associated motors being tested in the factory.



Boxes of motors before being sent out.

Radio Control Model Cars



Motors having their brushes and springs assembled.

can be up to 24 degrees of advance but the armature must be locked. This means that the armatures cannot be forced into greater amounts of advance as was done previously. Trinity have responded to this ruling by introducing "the Slot Machine". A redesign of the armature stack they claim, provides the fastest stock motor to meet the new rules. A similar spec but with a different wind designed for 4WD and trucks is the

A new design of armature known as the "Tri-Rotor System" has been introduced to the adjustable timing motor range. Claimed to provide better cooling by letting air circulate around the centre of the wire mass. Cans are 1.3mm thick and fitted with wet magnets. Motors come in 9,11,12,13,14 and 15 turn single winds priced at 46.00. Armatures are available in a similar range of winds but include double and triple wind options, all priced at 21.95.

Clodbuster

17 RC2012

RC2013 reverse rotation

17 RC2010

70

19 RC2006

16 RC20309

RC1700 Nuclear assault fastest motor 10 RC1701 Big Daddy 2 min.run

12 RC1703 Godzilla Oval track motor 13 RC 1704 King Kong needs good cells. For 4WD cars

14 RC1705 Maximum Overdrive. Oval track motor.

15 RC1706 Behemouth. Based on World Championship motor 16 RC1707 Gargantua. Good for on and

off road. 17 RC1708 Magic Speed Joel Johnson

Signature. 18 RC1709 Heavy Metal Thunder 19 RC1710 Tyrannosaurus Rex

20 RC1711 Killer Force Stock motor 27 RC2000 Monster Horsepower. Tweaked 34 deg. timing, wet mags. 27 RC2020 Reverse monster stock. Suitable for Clodbuster and Hyperdrive

Hand wound armatures from 9 to 20 doubles; 13 to 17 triples and 14 to 16 quad. Lesro provide a motor overhaul and rebuild service including truing and

#### **Twister**

Pete's Awsome Products, 316a High

19 x 4 Monster truck, easy driving and long run times

17 x 3 Stadium special 2WD cars and trucks.

19 x 2 Kris Moore special. Championship

Road Tottenham London

16 x 3 Dirt Merchant 4WD or high traction circuits 2WD

14 x 2 SCE Special Takes advantage of high capacity SCE 14 x 3 Erik's Express. Very fast 44,000

13 x 1 Cyclone 48,000 RPM on road cars 14 x 1 Titan Championship winner, best in heavier cars

12 x 2 Fast Eddie's Ride Masses of torque

15 x 2 Hurricane Sprint cars 17 x 2 Terminator very flexible

21 x 2 Tornado Tremendous torque and good run time

5 x 3 Formula 10 A 1/10 on road car motor, budget price

19 x 4 Formula 12 1/12 motor

12 x 2 Typhoon Drag, 2/4WD 50,000RPM hold drag speed record at 74 MPH 11 x 2 Annihilator Hottest motor in the

range. 50,000RPM

13 x 3 Carolina Mountain Mt. Fast dirt

14 x 3 Flash Intended for direct drive 14 x 3 Clydesdale Monster truck motor

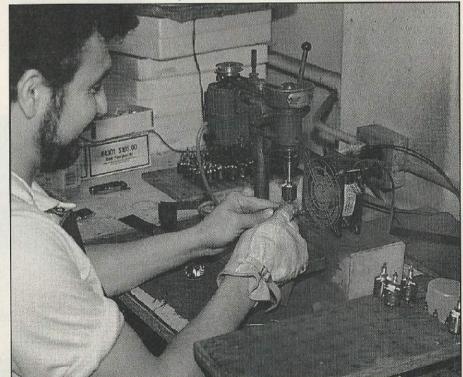
14 x 3 reverse Clydesdale

13 x 3 Black Max suitable for 6 or 7 cells 14 x 3 Street Racer 27 standard Ultra stock

2WD Cleaned and dyno checked 27 standard Ultra stock 4WD as above 27 standard P.R. Superpro Hotest stock

17 standard Pocket Rocket bushes (34,000 RPM) entry level motor

20 standard Pocket Rocket bushes (as above) 15 x 2 Pocket Rocket ball races, adjustable



Putting the windings on at the factory.

19 x 2 Pocket Rocket ball races, adjustable timing, long life and reliable All Modified motors now available in 'Blue Print' mode (tested and tuned)

Parma motors have a high specification and come in a good range of winds. They feature hand winds, balanced and epoxied armatures. Parma UK also offer a rebuilding service for all makes and types of motor via their dealer network.

21 x 2 1/12 on carpet motor 1/12 but ok for tarmac  $20 \times 3$ Good all round and monster truck motor

Excellent flat track motor 2 or 17 x 3 4WD

Good short track buggy motor Very fast for 2WD and some 4WD Smooth and quick for longer 16x1 14x2 12×3

tracks 13 x 1 Lots of punch on twisting tracks 8 x

1 Drag racer Truck and pulling tractors BRCA stock  $30 \times 1$ 27 x 1

Stock type, low price Ultra stock, non  $25 \times 1$ 17×1 adjustable

18 x 2 Good all rounder adjustable

timing, 2 or 4WD 16x2 Good for 2 or 4WD.

Lower pinion required

17 x 2 Fully ball-

raced with adjustable timing.
Suitable top to middle range cars
15×2 Ball raced and adjustable. Excellent for the more experienced

13 x 2 Very hot. needs a lot of experience to make the best of the performance

#### T.M.S.

TMS Ltd., Deanfield Mills, Asquith, Morey, Leeds TMS motor brandname is Mikado. They feature good ventilation, wet magnets and are dynamically balanced.

13x2 14x2

15x2 19x2 21 x 2

14x3 16x3

#### MG

M.G. continue to have many race successes with their brand of motors. They offer full rebuild service of motors (any make) including magnetising, truing and balancina.

Magnum 15x2

Racing Special

17×2 18×2 19×2 15×3 16x3 17×3 15×4 16×4 Super Magnum/eliminator. Ceramic shaft large heatsink. 10×2

11 x 2 12×2 13x2 14×2 11×3 12 x 3 13×3

> Red dot plus fixed timing ball raced/ balanced wet mag.

18×1 19×2 20 x 1 27 x 1 15×2 18×3 Red dot 18×1  $20 \times 1$ 

> Orange dot. BRCA standard motor wet

#### Schumacher

Schumacher have a limited range of motors in addition to Reedy motors that are also offered.

Ultra Stock 15 x 2 Pink Power 17 x 2 Red Heat 14 x 2 Gold Nova 21 x 2 Quick Silver

19 x 2 Gold Rush

#### Tamiya

Tamiya co operate with two of the major motor manufacturers in the far east to produce motors exclusive for Tamiya. Mabuchi, the worlds largest producer of small DC motors manufacture two performance motors for Tamiya. Techniqold Techniplus Dynatech 01R

#### Dynatech 02H Tanaplan

Tanaplan offer machine or hand wound motors. Just about any type of wind you fancy can be provided. Motors have ballraces, diamond trued commutator and with wet magnets.

13×2 14×2 15x2 16 x 3

15×3 15×4 16×2 16x3 17×2 17×3 18×2 19×2 Brushes are available in timed, hard and medium types. Phil Greeno Phil Greeno has been entering all types RC racing for many years his shop in north London has become something of a Mecca for RC enthusiast in the area. His own brand of motors carry the name "Lightening". They are good value for money motors for 1/10 on and off road. Lightning 27 x 1 Fixed

17×2

18×2

12 x 1

12×2

13×2

13×3

14×2

15×2

Handwound

6 Claims about staggering R.P.M. may look good, but it is of little help.?

#### LRP

Tamiya

motor

coling.

Dyna-tech

features alloy

finning to aid

This German produced motors are used by Jamie Booth with some considerable success in his race winning Tamiya cars. Now marketed by Jamie Booth.

Blue SE Pink E White E Orange AE

Black Silver

No wind information given.

#### Revolution

CML Distribution, 1648 Bristol Road South, Rednal, Birmingham, B45 9TZ. USA produced motors with a good range of winds and performance options. Dry magnets

14×2

15x2

17×21

9 x 2

19x2 17×3 14×2 11 x 4

Wet mags 18×3 16x2 13×3 12×1 17×2 19x2 27 stock motor

Kawada

Small Japanese company, makers of a 1/ 12 car MX-1 17 turn M X-1 15 turn Speedworks Buggymaster Endurance

Checkpoint

16×2 8×2

HPI

Top Gear Models and Trading, 5 Page Close, Bean, Dartford Kent DA2 8BX Some years ago UNO HPI (Hobby Products International) suddenly appeared from nowhere. Whether or not the HPI motor took Masami Hirosaka to be 1986 world champion or Masami took the HPI

15×2 19x2

STS

Wasp Products Ltd., 13 Morninside Road, Worcester Park, Surrey KT4 8LQ Motors from the USA

17×2 11×3

12×3

12×2

13×2

14×2

15×2

16x2

21 x 2

12x3

13 x 3

15 x 3

16x3

19×3

12×4

13×4

14×4

15×4

Standard 27 turn

Samifran Racing

**B&R** Motorworks

some cases wet magnets.

5 Skimpot Road, Luton, Beds. LU4 OJB.

Motors from the U.S.A. offering both fixed

and adjustable timing types. Stock motors

are available with up to 44 degs. of advance, silver graphite brushes and in

Modified are hand wound and epoxied,

magnets, silver graphite brushes and are

balanced armature, trued comm. wet

Modified motors 20 x 1 13x2 14×2 16x2 17x2

11x31  $2 \times 3$ Standard 27 turn Other winds to order

Laser Lite

Wasp Products Ltd., 13 Morningside Road, Worcester Park, Surrey KT4 8LQ USA produced quality motors from a company with an expanding portfolio

Modified Motors 20 x 1 21 x 1 13 x 2 14×2 15×2

lotor-WORKS

motor to world championship fame is academic. The two were an unbeatable partnership. The motor was for a long time only available in Japan, supplies filtered into the USA and now the same motor can be bought in the UK. Original motor chassis by Air Supply

700 Series (plain bearings) 27 turn Stock Sports 15 Sports 18

Club Racer 14 4WD On & Offroad Club Racer 15 2 & 4WD Offroad, Oval Club Racer 18 2WD On & offroad, Monster

Modified 12 4WD On and offroad, Oval Modified 14 4WD Offroad, Ovals Modified 18 2WD On & offroad Monster

Paragon

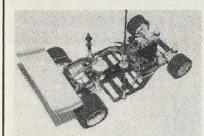
72

Holcomac Marketing Ltd., Britannic House, 17A George Street, Stroud, Glos. GL5 3DP U.S.A produced motor, available in the UK in a limited range of winds.

27 x 1 Stock motor Modified range Eclipse



## **Brampton Radio Models**



290 CHATSWORTH ROAD CHESTERFIELD S40 2BY

TEL. (0246) 208082



Team B.R.M. Kawada Drivers

R. PICKERING 5 'A' Finals at Nationals 1990



Team B.R.M. Driver R. HOLLINGWORTH Tansley Champion Track Record Holder 2nd 2WD Radio Race Car 1989

SHUMACHER

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**MODEL MOTOR SPORT** 

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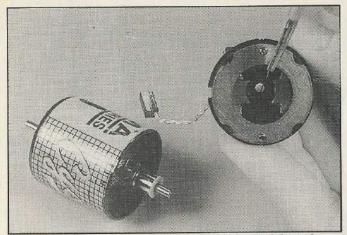


- Schumacher

**A**Schumacher

humacher

Schumach



Make sure that any spacer washers which stick to the bearing are removed from the endbell and put back on the armature, or stored spearately.



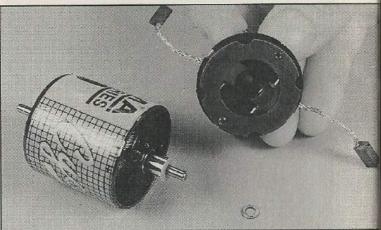
Don't use a dirty bud).

Replace the springs.
Standard motors should have their bearing oiled before every race. Place a very tiny drop of oil on each bearing and rotate the shaft several times. That's itno more, no less.

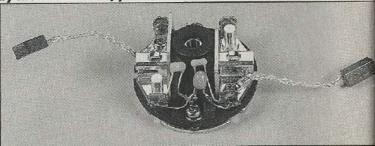
Modified motors used in dusty or wet conditions should be cleaned the same way, but don't oil the bearings. This attracts dust and dirt and will cause increased wear. Only oil ball bearings after cleaning at home. Modifieds used indoors, or outside on 'clean' tracks, should be inspected after run.

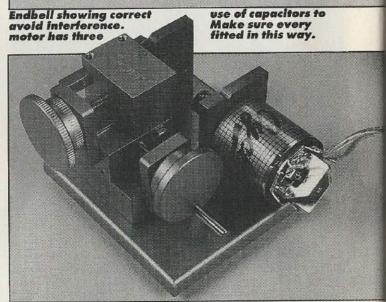
Remove the brushes and look at them. They should be clean, probably shiny, and smooth. There may be little chips at the edges, don't worry. The commutator should be mainly a clean copper colour, with some black marks near the edges of each slot. Check for severe brush damage, and for any score marks in the brush or commutator. If the brushes are badly scored, it is time for a rebuild.

Modified motors should be completely dismantled at home after each meeting. Using a cloth and a small paintbrush,



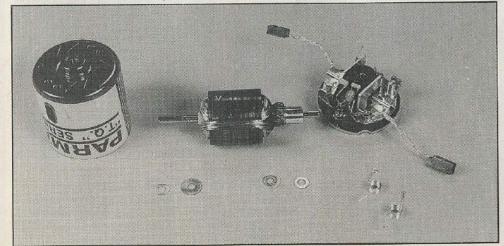
The endbell, a spacer washer and the armature still in the can. Holding the can in one hand and the armature by the commutator, pull...

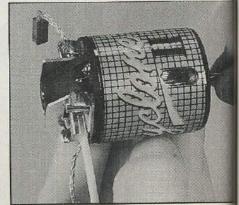




The Twister lathe, ready for action.

#### At this stage you should have all these parts. All Motor spacer washers must be removed before mounting the armature in the lathe.





Cleaning the armature with a cotton bud. Hold the bud against the commutator and rotate the armature.

Radio Control Model Cars

ands up all those who remember hulahoops, ra-ra skirts, and bell bottom
trousers – no National A finalists there,
more a pensioners convention. Like all
crazes of the time we all had to have
one, and we all failed to do them justice. Radio control model car racing has a similar
capacity to generate crazes – cranking standard
motors, water dipping motors cycling ni-cads on
the bench. The latest craze is portable commutator
lathes, and once again most people fail to do them
justice.

The commutator is the copper part of the motor armature which passes electrical current from the batteries to the motor. Two sintered brushes are held in contact with the commutator (comm) by springs to make a good electrical connection. Due to the heat generated by the motor in use, and the dirt which gets in and forces its way between the commutator (comm) and the brush, the comm wears and becomes distorted. This results in the electrical contact becoming poor, and the performance of the motor getting

#### **Back to Original**

If the commutator can be restored to its original condition, and the motor brushes are replaced, the performance of the motor can be restored almost back to its level when new. By removing a small amount of the copper from the outside of the comm, a new surface is exposed which is clean, bright, and most importantly, round. This is the best possible surface for achieving a good electrical contact between the brush and the commutator.

Small high precision lathes such as the Unimat have always been used for comm trueing, up to now. The latest idea is to use portable lathes so that this operation can be performed at the trackside. There are a number of models available from both the

UK and America, but we chose to use the most popular machine, the TWISTER from America sold in this country by Pete's Awesome Products.

whatever machine is used, the general procedure given here will apply. A first class honours degree in Engineering, or a full Craft Apprenticeship is not required, merely common sense and a careful approach. The TWISTER lathe we used came with a diamond tipped turning tool. These cost about £90 to replace so handle with care. They are the best tool to use, and will last about 5000 operations before replacement.

The tip of the tool must be set in accordance with the instructions. In the case of the Twister, it is set fractionally below the centre height of the comm. The speed at which the commutator turns is also critical. The theoretical speed should be about 5000 rpm, and this can be achieved by connecting the motor to a 4.8 volt battery. We used four old cells from a standard car battery pack, connected in series. This is four 1.2 v cells, 4.8 v.

There are different methods of mounting the armature in these lathes, the Twister machine uses two supports which bear on the spindle. Make certain that the plastic washers supplied are mounted on each end of the armature so that the armature runs

centrally between the supports, and has almost no side play. Too much and the armature will move during cutting, damaging the tool. Too little and the armature will bind lowering the speed and giving a poor finish. Take plenty of time to get this right,

The Twister lathe has adjustable stops to prevent the tool hitting the support. Make sure the stops are properly adjusted. Put two small drops of oil on each support where the spindle is supported. Connect the belt over the armature and onto the motor pulley. With the tool well clear of the commutator, switch on and make sure that the armature runs freely at a constant speed, and does not float between one support and the other. If the speed rises and falls, it is possible that the armature has too many washers on it, and is binding. I the armature floats back and forth, there are insufficient washers, start again.

satisfactorily, carefully position the tool about 3mm in from the end of the comm. Carefully advance the tool towards the comm until the tip of the tool is just touching the comm. Either a clean mark will appear on the comm., or there will be a noise and some swarf will come off the tool. Make a note of (or mark) the handwheel when the tool is in this position. Wind the tool out half a turn. Move the tool to the front of the commutator so it is off the comm. Move the tool back in to your mark.

Once the armature is running

Move the tool in one graduation on the wheel. Slowly start the tool moving across the face of the commutator. Move the tool at an even steady pace until it reaches the end of the comm. Do not try to machine the large end of the comm, the lathe will become overloaded and the tool may be damaged. Having reached the

end, wind the tool back to the beginning. Stop the lathe and rotate the armature by hand. If the surface is clean and bright all over, the comm is now true. More likely the surface will be clean in parts, and dirty in others. This represents the out-of-roundness of the comm, and it can be a quite frightening sight!

If the comm is clean and bright all over, the job is finished. More cuts will be required if it is not, so wind the tool in one more graduation (or mark) and repeat the process. As you become more familiar with the lathe, it may be possible to wind in more than one graduation per cut, but take care, the tool costs £90! Whilst the tool is cutting the speed should drop only slightly. Too much of a drop and the tool will be under strain.

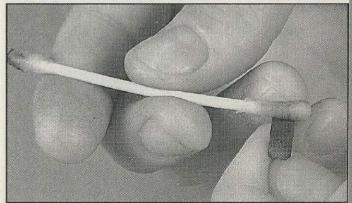
When complete, the armature should be removed. Clean the armature with some motor cleaner, and make sure that any pieces of copper swarf are removed from the slots between the armature segments. Careful use of a thin modeling knife will achieve the desired result.

Re-trued armatures should always be fitted with new brushes. It is not necessary to re-true the commutator more than every ten to fifteen races. Make sure the brushes are clean, and that dirt is removed from the motor between races.

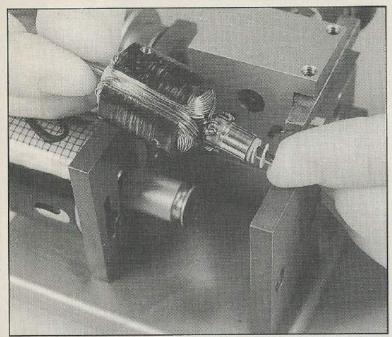
These machines are a real benefit to improving the performance and life of motors, but they require careful use to give of their best. They are not the answer to more power, and will be of any benefit only if the retrued armature is fitted with new brushes. As a craze they should last a lot longer than hula-hoops and ra-ra skirts for they are a definite aid to ensuring long life and top motor performance for the racer. Take care, and good racina.



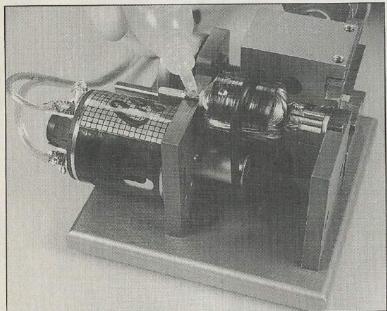
Ughh!!... the black dirt removed! Repeat this process until the copper colour of the armature shows through.



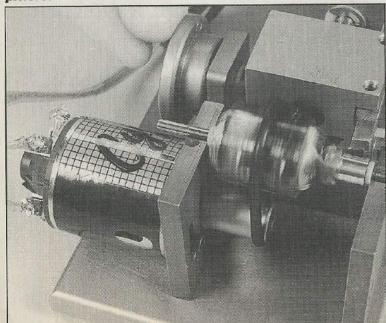
Wiping the face of the brush to remove dirt. The cotton bud will never be clean as there is carbon in the brush. Make sure all dirt is removed.



Spacer washers in place – there must be some at both ends (see picture below) – and the armature is checked for side play or binding.



All OK, drive band fitted and oil applied to the bearing supports. Note graduation marks on handwheel at top right of picture.



remove all dirt and debris from the can, end bell, and armature. Take care not to touch the commutator at any time, an always put the motor back exactly as it came apart, including the correct rotary position of the end bell. This latter point is most important, and will be dealt with in more detail later. Once reassembled, place a tiny drop of oil in each bearing.

The reason for cleaning standard motor brushes and commutators, but not modifieds, is the brush material. Standard motor brushes are soft, and easily pick up dust and dirt which is rubbed into the commutator. Also, being soft, the carbon in the brush is more easily liberated, and burns (it's the sparks you see coming from a motor whilst it is running) allowing the residue, which is hard, to get into the brushes and so the same damage as the dirt.

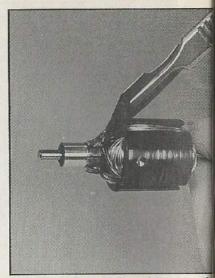
This is also the reason for cleaning modifieds in dusty or wet conditions – to remove the dirt and prevent excess damage.

#### Round Up

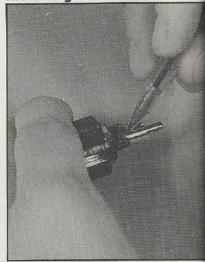
So, to sum up the basic motor care, clean standards after every run with a cotton bud, and modifieds used in wet or dusty conditions. Dismantle modifieds to remove dirt and debris from all parts after every meeting, and oil the bearings very sparingly afterwards. Oil standard motor bearings very sparingly before each run. Keep doing this until the brushes are one third worn, or until the brushes are scored for any reason. On standards, replace the brushes once this point is reached. Note that the brush on the positive side of the motor wears faster - no, I don't know why either. Always replace brushes in pairs, never one at a

Goodbye
dirt, hello
clean, sound
commutator.
Turn the
wheel
steadily and
slowly to get
a nice even
cutting
action.

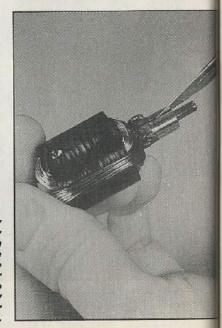
Very carefully run a thin knife blade down the slots after turning to remove any copper swarf.



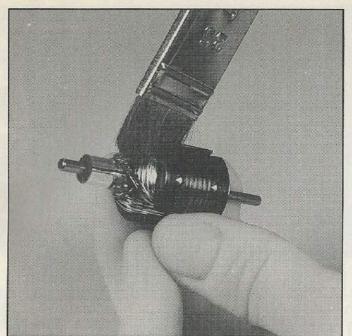
Do not try to machine this part of the commutator. Note that where the wires are staked will tell you the wind. Divide the number of wires on the stake by two. Four wires per stake means the motor is a 'double' wind, six a 'triple', two a 'single'.



Using an old biro, run the ball along the slot. This removes any wisps of copper and gives a nice rounded edge to each segment.



Radio Control Model Cars



Brush off the armature to ensure no swarf or dirt is trapped in the windings.

time. On modifieds the motor should be rebuilt if the brushes are one third worn, chipped or scored, never simply replace the brushes.

Now for the list of nevers when it comes to motor care.

NEVER immerse a motor in any liquid whether running or not.

NEVER touch the commutator. If this happens accidently, use the motor cleaner – soaked cotton bud on the commutator before using the motor again.

NEVER over-oil the bearings, either with too much oil, or by oiling too often.

NEVER put a sharp knife

anywhere near a commutator. NEVER use a motor if you

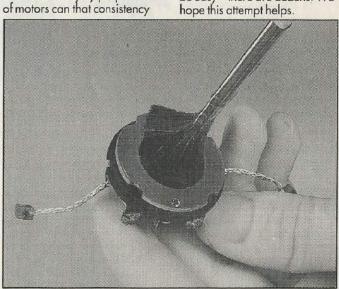
suspect anything is wrong with it.

NEVER squirt motor cleaner into a motor, whether running or stationery. Improving your driving is the key to fast lap times. This is impossible unless

the car runs consistently heat after heat. Only by proper care

be achieved. Look after them, and they will look after you.

Motor Selection – This is the most difficult thing to write down so that everyone makes the right choice. The more one knows about motors, the more difficult it becomes to give precise advice. If there were only two motors on the market, it would be easy – there are dozens. We hope this attempt helps.



Brust dirt out of the endbell so it is clean and the steel of the bearing is clearly visible. Re-assemble the motor in the reverse order it came apart. Don't forget the spacer washers, and the marks you made for realigning the endbell.



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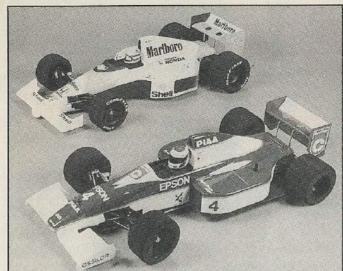
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hy join the BRCA?? The British Radio Car Association is the governing body for radio control cars in the United Kingdom. At some time or other, you will come across the British Radio Car Association (BRCA), probably when someone asks you to join. Why should you join the BRCA?

with British drivers, giving them

valuable publicity and earning

the racer, there are three main

benefits from joining the BRCA.

The BRCA is a voluntary organisation whose objective is to promote the hobby of radio control car racing, to allow the interchange of information and ideas relating to the sport, and to coordinate National and International competition within a coordinated calendar of events. Membership of the BRCA is open to all, and you can join through your club for £2.50 per year, or as an individual for slightly more. It is through the work of the BRCA that construction rules have been established which mean that wherever you go in the world, the cars you buy are all eliaible to race. The BRCA works through various other associations throughout the world to maintain a stable and up to date set of construction rules which are followed by all the manufacturers. That enables any manufacturer in the world to produce a single car which can be raced in any country in the world.

The BRCA maintains links with the European and World Federations to ensure that at European and World Championship events, British drivers are guaranteed places to represent their country, and in turn the many British companies that sponsor them. Were it not for this work, some of the best known British manufacturers would not have won these prestigious events

Most importantly, you get a vote in your hobby. Whether you exercise this vote as an individual by attending the Annual General Meeting, or through your club representative voting on your behalf at the AGM, you have the power to make changes to the way your hobby is run. In recent times, the votes of the club affiliated members have been a major factor in changing some of the BRCA's rules.

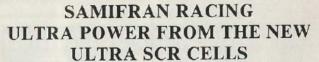
#### Licensed to Drive

Secondly, the BRCA racina licence means you have automatic third party insurance cover. Should you ever be involved in an accident where your model car causes someone injury, the BRCA insurance is available to help you pay any damages which may be awarded against you. It is difficult to imagine how you would feel if at a meeting your car badly damaged someone's hand, and that someone turned out to be a top surgeon!! BRCA insurance covers you against damage your car or equipment sales for their products. For you, may cause to other people or

their property up to a maximum of £1,000,000. Thirdly, the BRCA gives you

the opportunity to race at one of the many top National events which make up the National Championship in each class of radio controlled cars. In the case of Off-Road cars, the BRCA organises a Regional Championship, a Clubmans Championship aimed specifically at the newcomer, and from which the more experienced drivers are excluded, and a Junior Championship for up to 13's. and up to 16's. At whatever level, there is an event sanctioned by the BRCA which as a member you have the right to enter. And when you are ready to enter one of the European Grand Prix, the BRCA is there to provide you with your European licence and assist you in getting your entry to races anywhere in Europe. The BRCA is the gateway to International competition. It is excellent value for money. The next cheapest Accident Protection Policy costs £6.00 for the same cover, and you can get it by joining through your affiliated club for only £2.50!! You should join the BRCA quite simply because is the organisation for the radio control car racer who cares about his hobby.





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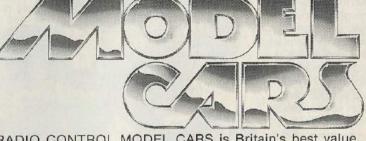
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