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NUMBER 20

JUNE - JULY 1991

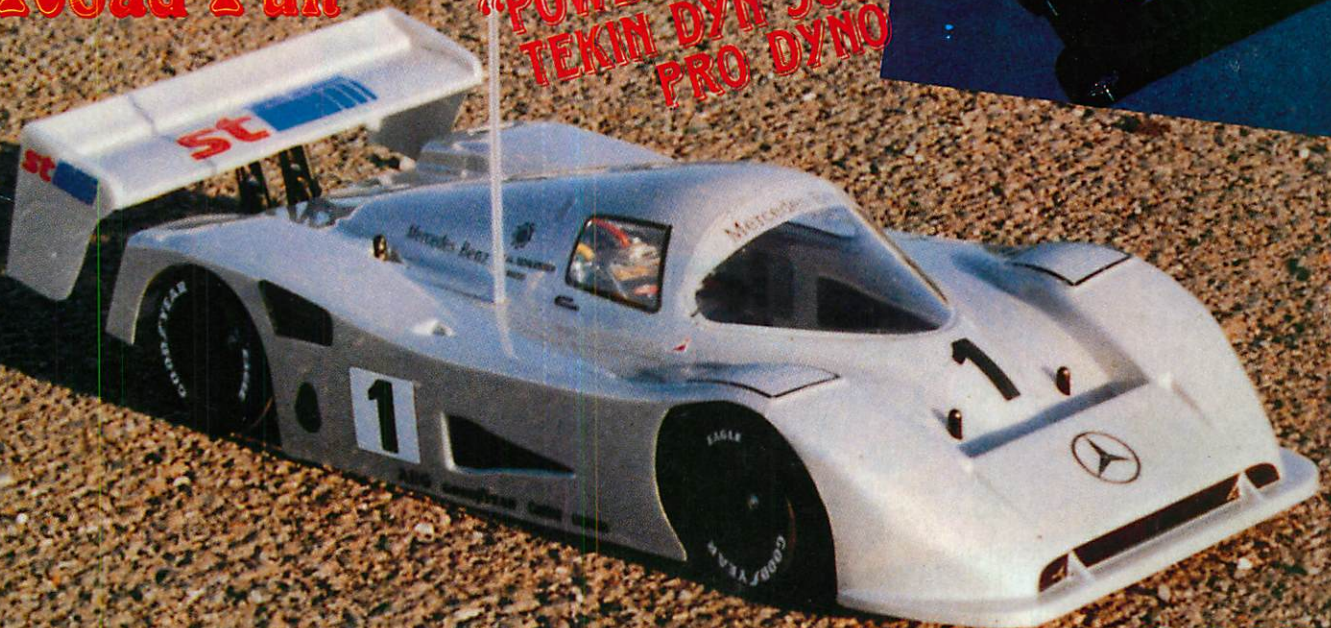
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# DIRT & TRACK

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# DIRT & TRACK

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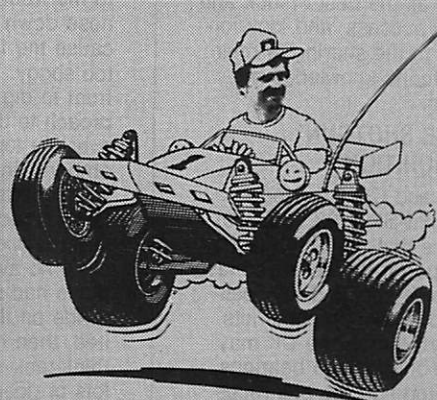
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# FROM THE DRIVERS SEAT



## DOWN THE ROAD A PIECE

It is inevitable that any technological activity gets more-technical and more complicated as it progresses. Unfortunately it usually gets more expensive too. The trick is to maintain progress and interest at the upper level whilst creating a less expensive alternative for the new chums. This isn't easy but other sports do it and it must be accomplished to ensure survival.

The electric racing scene is currently in this dilemma. Fortunately the powers-that-be, in addition to the trade are well aware of the situation and trying to do something about it. They may not always agree on the modus-operandi but they are moving in the right direction. Based on recent information we can look down the road a piece and see where we are heading. The high energy batteries, 1700's or SCE's are one problem that could soon be solved. As we have said before their performance is great but their life is too short. Saft and now Sanyo have the more robust SCR type cell in 1400 mAh capacity which are finding favour even in Open class racing and there are rumours of

evenmore capacity in addition to alternatives to nicke-ladmium (note, only sub C size cells are legal). We've heard that Nickel-Hydride cells will soon be available with twice the capacity at twice the price. If they last more than twice as long then we would welcome them.

Another possibility is to go to gas. The change to internal combustion power in the popular 1/10th buggy class has been muted for a while and is now coming closer to reality. One tenth gas buggies are nothing new but Schumacher is now the first to release a really high performance model. How does 50 kph, out of the box, grab you? This is being claimed for the new Schumacher Panther powered with a racing 15 (2.5cc) engine and based on the successful electric Cougar. Having seen the Panther perform I wouldn't argue. This class of racing could have a big future on our existing 1/10th tracks with the proviso that noise must be kept to a minimum. If we start to disturb our neighbors then clubs will be hounded out of the district. Just ask any aeromodeller.

And finally it looks like there

is a solution to the Stock motor dilemma. This subject has prompted more letters to the editor than all other subjects put together. The authorities in the USA have recently passed a rule allowing no more than 24 degrees of timing advancement for their Stock motors. Also, we believe that the new 24 degree motors will have pegged armatures to prevent illegal twisting. Twenty four degrees is a sensible compromise which will still allow Stock class racing to be quick and motors to enjoy a longer life whilst at the same time negate the need for high capacity batteries. It's not an ideal solution but certainly an improvement on the present woeful situation. As more of these motors become available we would expect the US solution to be quickly adopted here.

## MOTOR CITY MANIA

Detroit Michigan in the USA used to be the motor manufacturing capital of the world - that's why they call it Motor City. It may have lost it's crown in the full size world but for a few days in August it will be the RC car capital of the world. August 4 - 11th are the dates for the third World Championships for electric 1/10th scale off-landers. Still the biggest class in model cardom.

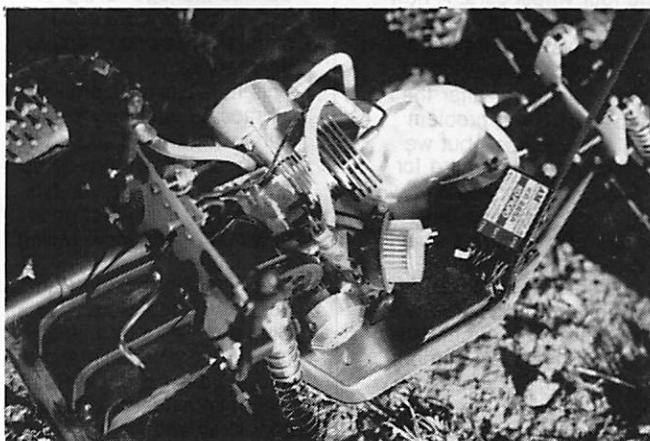
What will be the sensation this time? At the last words in Sydney, Yokomo's 2.2 inch tyres and rims were the "unfair" advantage so what will the experts come up with this time? I hear some teams are again experimenting with two speed transmissions and Kyosho has a constantly variable tranny. Maybe it will be a new motor or battery charging method or, most likely there will be nothing sensationally new. Time will soon tell.

Australia is sending a very strong team to these titles - in fact the cream of our racers will soon be packing their bags and using many thousands of their personal dollars to race for Australia. If only that were the case. Sadly, most drivers will be representing themselves and their sponsors first with little thought for patriotism. That's how things have to be structured in our sport. Australia does little to support these sports people so they have to turn to the manufacturers and their agents for assistance.

Never the less, these ten drivers plus their crew are ambassadors for Australia. They will all be trying 100 percent and should carry themselves well for their country. Maybe old differences can even be forgotten whilst offshore. We wish



A racing .15 engine gives the Schumacher Panther incredible speed.



Super Shotgun! Irvine racing .15 powers Schumachers new gas truck.



them all the best of luck and every success, and look forward to the sharing of their new-found knowledge on return.

### **MORE SHOTGUN AMMUNITION**

Jack and Col Grenenger from Pit Stop (02 9056330) advise that the Schumacher Shotgun truck, reviewed last issue, is supplied fully ball-raced. Although some kits imported from the UK may have only bronze bearings, Pit Stop add the ball races here to ensure that all locally purchased kits are race ready. This is included in the price we gave in the review. After a slow start, truck racings starting to gather momentum with more clubs now offering truck classes. Monster truck racing is a real visual treat and if you're thinking of joining the fun, then the fully ballraced Shotgun should be high on your shopping list.

### **STILL LIVING AND LEARNING**

The St.Ives Showgrounds in Sydneys northern suburbs may be famous for it's hosting of the buggy world titles a couple of years ago but long before that venue was famous for it's annual show. The St.Ives Show is still around and for buggy racers the St.Ives Cup is still everything a racing event should be. Where else can you get good racing as well as ride the Dodgems, and watch everything from woodchipping to Holdens Precision Driving Team? Fun for all the family you might say. And there's nothing like a big and appreciative spectator audience to bring out the best in our egotistical drivers!

The D&T team were at the Cup in May this year but our ego's took some what of a battering thanks to a handling problem with both two and four wheel cars. A new megajump on St.Ives famous straightaway caught out a few drivers. Many buggies were nosing over after the jump - a common problem with many jumps - but we are-claiming the record for the most high speed cartwheels and nose over tails. An Olympic gymnast would have been proud. Some cars were jumping superbly and of course these guys were out in front. We spied on the good jumpers, examined their cars, took lots of notes and made many adjustments but 75 percent of the weekend had elapsed before we fixed the problem. Normally you look

to the front end. A car will nose down after a jump because the front shocks are too soggy. This causes the front to dig into the approach to the jump and nose over the top. Spectacular but embarrassing. We tried heavier springs, lighter oil, different shock angles and then heavier oil on the front, all to no avail. After the panic had subsided we had a ride on the Cha-Cha, vomited, then had a serious think-tank session. Getting lots of good advice and copying others is all very well but eventually you have to stop and think for yourselves. If we couldn't stop the front from nosing down maybe we could prevent the back kicking up. If we lessened the effectiveness of the rear shocks maybe the tail of the car would dig-in as it hit the approach and keep the tail down in the air. All we did was increase the angle of the rear shocks (which decreases their effectiveness and lets them compress more easily) by moving the lower mounting out one hole. It worked! The car flew like a homesick F18 and landed flat. We couldn't believe that such a seemingly small and simple change would make such a big difference - but a lesson was learned. The same often applies to many an ill handling car. There is always a solution so get advice then think it through.

### **New Guy on the Block**

Formerly Holeshoot Hobbies, Gary and Heather Davey have now expanded into a full-time hobby shop called Canberra Hobby and Model Supplies.

Although catering for all hobbyists, Gary and Heather specialize in RC cars. Their son, Adam (a dual A-Finalist at the 1991 Nationals), and Service Manager Craig Jackson, provide a good standard of advice, repairs and service.

This new business provides all racers (especially beginners) with a good source of buggy supplies. "We do our best by our customers. No "big" promises - just good service to get people racing" says Gary.

"We are right behind Canberra Off-Road Model Car Club Inc. The club has a growing membership and the future looks good. On-Road racing is fast increasing in popularity and we are very excited by this fast form of RC racing".

Canberra Hobby and Model

Supplies is open 9am - 5.30pm Monday to Thursday, 9am - 9pm Friday and 9am - 4pm on Saturdays at Shop 7, Curtin Shops, Curtin ACT. PH: (06) 281 6460.

### **TEKIN FINALLY ARRIVES**

One of the most popular and respected names in the sport has finally established a firm footing in Australia. Products from Tekin Electronics USA have previously been available here but only on an irregular basis. That has now changed with the recent announcement that Rob Reade of PB Model Cars Aust. has been appointed a factory direct importer.

Tekin have always been at the leading edge of technology starting with the worlds first MOSFET speed controller in 1982. They bought us the first peak detection chargers, the first negative pulse charger (BC210 reviewed in D&T 18) and now the first affordable dyno - reviewed this issue. Their products now range from the ESC250 speedo at around \$150 to the TSC420F digital at around \$315, and the very popular BC 100L charger (around \$171) up to the Proflex. The Tekin micro receiver is probably the smallest and lightest around for about \$115.

PBMCA say they will stock the full range as well as some spares and full back up and servicing facilities. Readers can now ask for Tekin at their favourite hobby store, and retailers can contact Rob for supplies.

### **FORMULAE RACING IN WOLLONGONG**

The Illawarra club in Wollongong, just south of Sydney, are running a new buggy racing class they call Formulae Racing. Their aim is to provide closer and fairer racing without spiraling costs. They hope to achieve this by some simple rules which specify not only the car but also the driver. Drivers are graded into three categories according to experience and ability. Formulae One (or F1) drivers are the hot-shots, whilst F3 drivers are the novices. F2 class caters for the large number of intermediate drivers who do not (admitted or not) fall into the other two categories. This addresses the problem of the competitor who is too good for Novice but not yet ready to mix it with the top guys. Many drivers are lost to the sport when they

become discouraged after trying unsuccessfully to keep up with the experienced racers. F2 gives them their own class - just like in full size racing.

A promotion and demotion system applies between classes and any visitors are placed according to their race history and stated experience.

The Formulae rules also specify a motor with enclosed brushes and price ceiling, currently \$20 Maximum wheel rim diameter is 50mm but otherwise car and equipment specifications are as usual. The Three Formulae may be split into 2WD and 4WD classes and they usually run three heats plus the best of two finals.

They hope that other clubs will consider this racing format and welcome visitors, particularly intermediate drivers, to their Dapto track on the forth Sunday each month (the usual Stock and Open classes apply on the second Sunday). Sign-on time should be before to 9am. For further details, including full written Formulae rules, please contact either Alex Mazik (042) 56 6215, or Mel Gillot (042) 71 4683.

### **CHAINED TO THE WHEEL**

The latest batch of off-road rims arrived from RCS in Sydney. Hobby Products International are rapidly making a name for themselves in the USA with wheels of all types and sizes. We had good look at the HPI Super Star monster truck rims which would be ideal for buggy conversions. They are one piece, very strong but light in an attractive 5 spoke pattern. Diameter is 2.2 inch and each pair comes with adaptors for RC10, JRX-T, Ultima, King-Cab, Black Foot range, As-tute and others. Most MT and racing truck tyres will fit and you can get pairs in several colours including the compulsory flouros -for around \$16.

The pattern is similar for the HPI rear 2 inch diameter buggy rims and also front rims of 2.1 inch diameter (these wheel sizes are breeding like rabbits!) with adaptors supplied to suit most off-roaders. For these you are looking at around \$11 a pair.

### **RICH BOYS TOYS?**

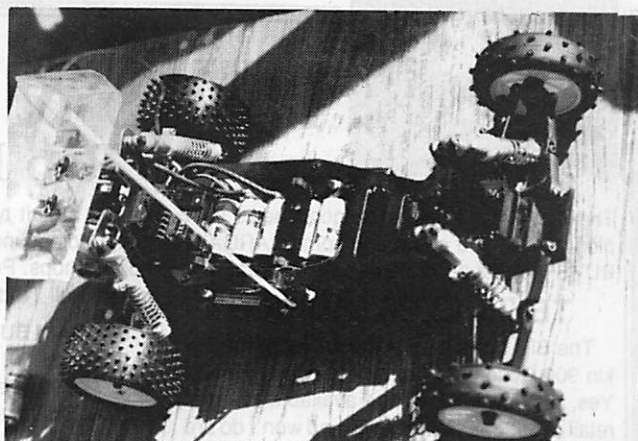
I remember the last time we had an economic recession. Back then I wrote how the RC hobby was weathering the times very well. The



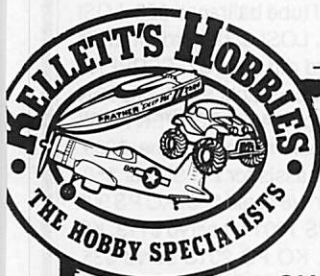
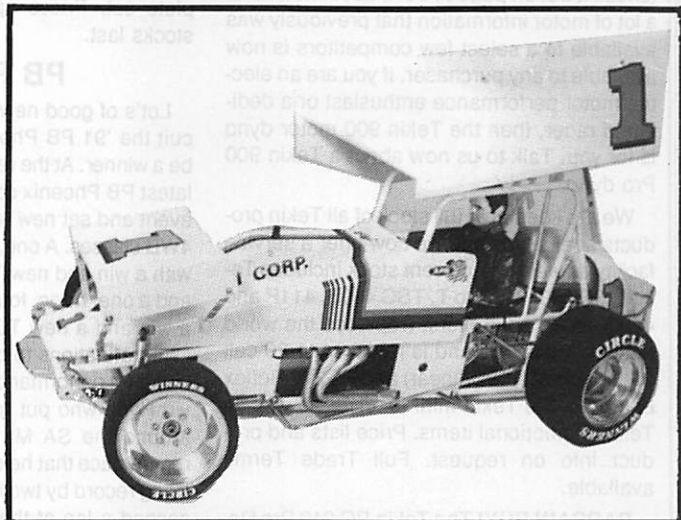
present "recession we had to have" is worse but certainly not fatal. For example the best recent sellers in the sport have been Victors Hi-Iq and Tekins new Dyno. Neither are exactly budget items. I'm not sure why this is so but it's probably something too with the vice's of our race. The tougher the items the more we smoke, drink and play with toys. I would have liked to present more affordable new items this issue but instead most new releases are in the dream category. Here's some more to tempt your vices. Schumacher have released two new high technology items in their NMS is a micro processor controlled charger/discharger/cycler with a data memory for nine packs of cells. It will constant current charge six cells with 2.5 to 8.0 amps to peak or to temperature cut-off, and discharge at 10 amps. Capacity readings are given as well as a percentage of the last figure stored in memory. The Traco speed controller looks very interesting too. It has a braking system that will not lock the wheels, called ABS (Advanced Breaking System)

what else! Fully programmable from the transmitter including eight acceleration rates, and the latest high frequency switching. These two items from Schumacher are deemed so important that details were sent direct to D&T from the factory in England. We will try and get our grubby hands on them for a proper review but in the meantime direct your enquiries to Pit Stop in Sydney.

Finally, and also from Pit Stop, the ultimate in rich boys toys. You may have seen the 1/4 scale cars and races in the States, well now you can get them here. Grenenger's are handling the full line of WCM kits of georgeously exciting cars. There are six in the range -Outlaw Sprint, Super Modified, Nascar, Street Rod, Mud Bus and Dragster. All are complete with 23cc motors and the dragster claims 0 to 100 kph in 4 seconds. Keep out of the way 'cause they are all big enough to run you over. Don't expect a review because nobody is silly enough to lend me one. And if you have to ask the price you can not afford one but I'm sure Jack or Col at Pit Stop will be happy to oblige.



Spy shot of the new Kyosho Triumph 2WD buggy.



## KELLETT'S SPECIALS

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\$219.00

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#### FUTABA MEGATECH 2 ch x 2 servo Wheel Radio



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LEISURE 6 or 7 cell fast charger/discharger. Built in AMP. meter. A built in equalizer tops off your battery pack when timer is off position.

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#### TRINITY STOCK MOTORS \$45.00

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# NEWS & VIEWS

## by Rob Reade

The news this issue is all good news with plenty to tell you about and some BARGAIN BUYS in most sections as well, so read on!

### TEKIN ELECTRONICS

The BIG news here is the arrival of the Tekin 900 Dynamometer for 1/10 electric motors. Yes, it is now in stock and available at a retail of \$525.00. What it will and won't do are covered in a review elsewhere in this issue (check it out on page 9) but it does mean that a lot of motor information that previously was available to a select few competitors is now available to any purchaser. If you are an electric motor performance enthusiast or a dedicated racer, then the Tekin 900 motor dyno is for you. Talk to us now about a Tekin 900 Pro dyno.

We are keeping a full stock of all Tekin products at all times and we now offer a service facility as well. Our current stock includes Tekin ESC 250, 310 Pro T, TSC 410S, 411P and 420F speed controllers, (replaces the world famous Tekin 700 and is rated up to 20 cell use) Tekin BC100L (linear) and BC210 Reflex chargers, the Tekin mini receiver as well as Tekin promotional items. Price lists and product info on request. Full Trade Terms available.

**BARGAIN BUY!** The Tekin BC 210 Pro Reflex charger at \$272.00 rec. retail, but only while current stocks last.

### FREWER INTERNATIONAL incorporating "BODIES AND BITS"

We have lexan bodies galore be it 1/12, 1/10 or 1/8 scale you require. New releases include the 1/10 VN Group A Commodore and 1/10 Porsche 959 both at \$41.30 rec. retail. We have big name sedan bodies like BMW, Ford Sierra Cosworth, Mercedes Group A, Peugeot 405 Rallye to name a few that will fit most 1/10 buggies, we have bodies that will fit 1/10 Monster trucks (Ford F150 and Nissan King-Cab), 1/10 Pro 10 circuit racers be it "purist" style or "Days of Thunder" Nascar style and we have 1/10 bodies in buggy style for Associated, Kyosho, Losi, PB, Schumacher and Tamiya. In 1/8 scale we have them all, not only for circuit racers, but for off-road as well. Apart from very competitive prices on all these bodies we also have all the wanted accessories like wings, wing mount kits and body mount kits. In this section also are the very popular Frewer 1/10 buggy and Monster truck tyres.

These tyres are very, very good so if you haven't tried them, do so now. We also have

Frewer circuit tyres in 1/12 and 1/10 super grippy compounds. Available from most good hobby shops. Pricelist and catalogue on request. Full Trade Terms available.

**BARGAIN BUYS!** Nissan 1/8 Sports Group C body \$25.00. Jaguar 1/8 Sports Group C body \$25.00. Frewer blue compound 1/8 tyres \$10.00. Schumacher Top or Pro-Cat body with front wing \$19.95. Frewer semi-pneumatic slick on road buggy tyres at \$15.00 per complete set. Prices apply only while current stocks last.

### PB RACING

Lot's of good news here! Firstly in 1/8 circuit the '91 PB Phoenix is really proving to be a winner. At the recent SA 1/8 Champs the latest PB Phoenix completely dominated the event and set new records in both 2WD and 4WD classes. A one, two, three finish in 4WD with a win and new TQ record to Ashley Cox and a one, three, four, five finish in 2WD with a win and a new TQ record to David Hyde. Congratulations to both drivers on their outstanding performances but particularly to David Hyde who put his '91 2WD PB Phoenix around the SA Mt Barker track at such a record pace that he upped the 5 minute qualifying record by two laps and was within a 1/2 second a lap of the fastest 4WD lap times! Amazing. That's some of the recent winning track news but the real winner now is you, because prices are down! By the time you read this a new rec. retail price list will be available with '91 PB Phoenix kit prices from a low \$599.00, and cheaper parts prices as well! Added to this is a soon to be available range of options including three speed gearbox, short wheel base conversion, fixed rear axle conversion and 5mm thick chassis. PB really are on the move in 1/8 circuit racing. Full info available on request.

In 1/10 scale we still have a few '91 production fully ballraced 4WD Mini Mustang buggies left at \$225. We are also working on a monster truck conversion for these because there is one running here in Adelaide and it is brilliant!

The Pro-10 Sizzler 1/10 circuit racer in it's latest form is very, very good and of course is backed with ready availability of spare parts, if and when you need them. At \$295 rec. retail for a fully ballraced top of the line competition kit it is super value.

**BARGAIN BUYS!** PB MINI MUSTANG 4WD fully ballraced competition buggy \$225.

PB ACE 4WD fully ballraced top of the line competition buggy \$245. Prices apply only while current stocks last.

### NOVA ROSSI, REX and TOP

### 3.5 engines incorporating "Horsepower"

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Regards  
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# TEKIN DYN 900 • PRO DYNO

*At Last, Performance Evaluation of Electric Motors Comes Within Everyone's Reach.*

Over the past few years, products for the evaluation of nicad cells have become very sophisticated and almost commonplace. Units such as Victors HI-IQ have enabled racers to do anything to a nicad that doesn't require a sled-hammer. The same cannot be said for the motors that power our electric cars. Sure, you've been able to perform basic tests with fairly basic equipment but complete evaluation had to be left with the manufacturers. That's why people like Messrs. Reedy, Twister etc. can easily keep the very best for their best drivers - they check the motors after manufacture with a dynamometer.

Professional dyno's cost many thousands of dollars. Even if you could afford one you would need training in its use and then spend some time taking torque readings at various rpm's so that a power curve can be drawn. Bob Roach of Bob's Tech Corner fame uses industrial equipment and many man-hours to produce the curves you see in his motor tests. It's not the sort of thing you could drag trackside for a quick motor evaluation. The smart cookies in electronics have been aware of these obstacles and the race has been on to design a dyno for a common man. One that is relatively affordable and easy to use. Maintaining their reputation as innovators, Tekin are the first with their 900 Pro Dyno.

## WHY DO I NEED ONE?

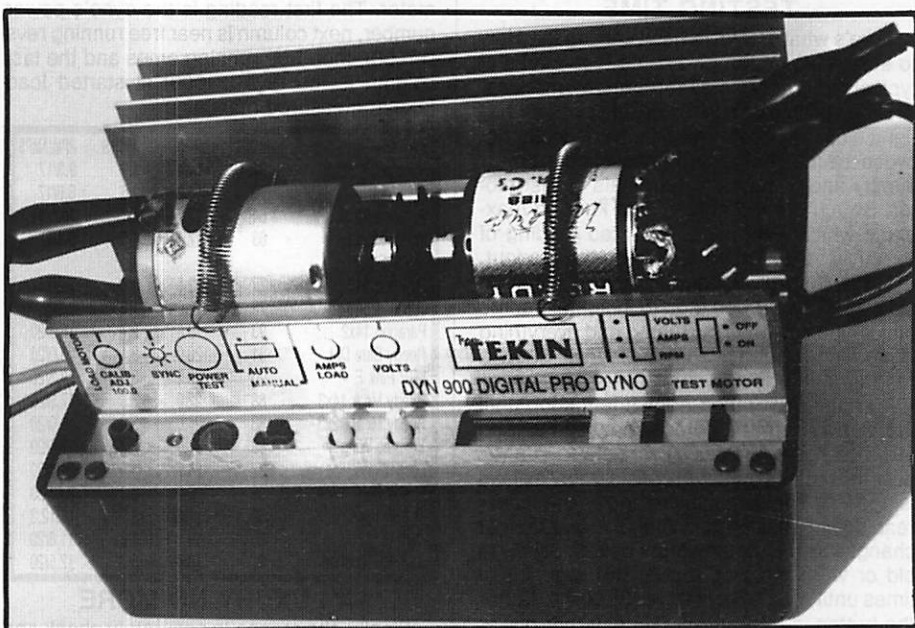
It's a good question - especially with a price tag of over \$500. You can check the rpm's of a motor with a \$70 tachometer but the free running revs only gives you an idea of what gearing to use. It might sound impressive but only knowing the maximum revs is of little practical use. You can use a motor checker to measure the ripple voltage from the commutator and this gives a fairly accurate account of motor condition. You can check the current draw quite easily with a digital multimeter but what does this give? It gives the power consumed within the motor and not delivered to the output shaft and can be used to compare the efficiency of identical motors. Even then, a less efficient motor may produce more power even though it uses heaps of battery in doing so.

What we need is to measure the power produced by the motor. This can only be achieved by applying a known and correct load to a motor fed with a voltage that is unvarying no matter what the load. A tall and expensive order.

## WHAT DOES IT DO?

Wrapped up in the 900's box is a number of very smart integrated electronic functions.

One circuit provides an exact 5.0 volts to the motor under test irrespective of whether the motor is drawing one or twenty amps. This voltage can be manually reduced to perform operation such as running-in. Other circuits are for an interrupted light type tachometer and an ammeter so that the usual rpm's and current draw can be measured. An LCD display announces the results. Now we come to the really clever part. An automatic function that gives, in one simple operation, the maximum power of a motor. It identifies the motor under test, applies a load to measure the torque at the relevant rpm (at the peak of the power curve), and hits you with a simple two digit



*Tekin have won the race to perfect an affordable Dynamometer.*

number. The greater this number the more powerful the motor. (Note that this is an empirical number that does not increase proportionately to power. The manual tells you how to convert to horsepower or watts).

## HOW DOES IT DO IT?

If you think I can explain the intricacies of the dyno's electronics - forget it! However, it's useful to know how the dyno achieves some of its readings.

The motor undergoing testing is loaded by connecting shafts to slave motor. The dyno is then able to load up the slave and hence the test motor by applying controlled resistances across the terminals of the slave. Just take our word for it.

The load applied to the slave motor may be adjusted manually via a small knob or, as previously explained it is automatically taken care of when the dyno is switched to auto.

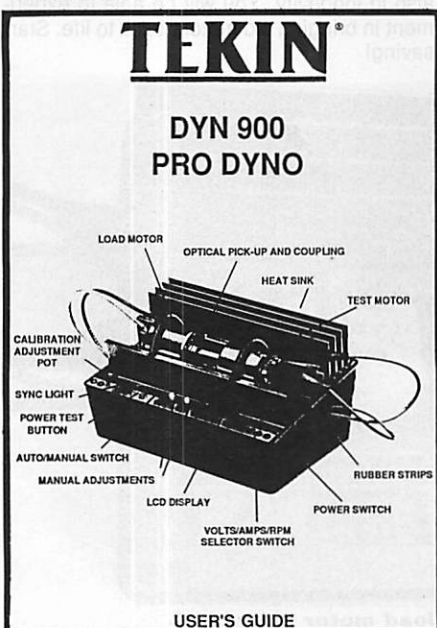
The supplied shaft connector also has a plastic disc affixed. This rotates through a light interrupter to measure rpm's. Just the same as a digital tacho, but this one is not affected by fluoro lights.

## PRACTICALITIES

The Tekin dyno runs off a 12 volt power supply which may be an auto battery or a mains supply of 11 to 15 volts and 25 mps output.

You must supply your own slave motor which ideally should be a ballraced can, fitted with a stock armature and zero timing. Ball-races do not develop side play like bushes; stock winds develop more torque (load) and since the slave is driven backwards it should have no timing advancement. Two rubber strips run along the base of a channel on the top of the dyno and the slave fits over the strips. It is held down by double sided tape underneath and a spring on top of the motor. The motor to be tested is fixed in a similar manner but without the tape. Fly leads emanating from the unit are connected to the terminals of both motors.

The mechanics of this dyno are not on a par with the electrics. I find the method of holding the motors is not positive enough. The slave gets very hot but there is no connection between its case and the dyno's heat sinks. What's more, the slave motor can vibrate and get displaced when changing test motors. If the tacho disc moves too far it will damage the sensor so I marked the sensor centre position on the heat sink to keep check on its movement. As for the slave motor, fortunately it should be a simple matter to add a metal strap over the can to both secure and conduct away heat. The terminals of the test motor are close





to the verticals of the heat sink so ensure they do not both short on the aluminium before switching on.

Whilst I am having a whinge, the functions of the various knobs and switches are marked on the upright heat sink which is at 90 degrees to the controls. This makes them less than easy to read. However, you soon get to know what the controls are for.

As long as you are careful none of these aberrations affect the performance of the dyno but they are an annoyance at first.

### TESTING TIME

Here's what you have been waiting for. How to evaluate a motor, and some test results of typical motors. Let's go through the motions.

Slide the motor to be tested into position and tighten up the grub screw on the connector between the motor shafts. Connect dyno to power supply and fly leads to terminals of test motor. Switch on and adjust volts knob to maximum which will give a regulated reading of exactly 5 volts. This is shown on the readout.

Throw the Auto/Manual switch to Auto and the sync light will come on to indicate that the motor type has been evaluated and everything is working properly. The display will show a random number.

Turn the Calibration Adjustment knob until the display shows a number between 99 and 101 then push the Power Test button. You will hear the motor slow down considerably as load is applied. The display now shows the power reading for that motor. Since power output changes as the motor warms up (especially in old or worn motors), repeat this step a few times until the display still reads 99 - 101 after the button is released. Tekin say that power readings are always right as long as the sync light comes on, and any variations are caused by changes in the test motor. That's a very significant and important claim.

Flip selector switch to RPM and the display will show the free running revolutions of the motors, (actually the motor is not quite free running since it is also having to turn the slave motor).

Switch back to manual and you can take your own load vs rpm reading if you wish. Just turn up the amps knob and read off the revs at the selected amps.

Switch off, slide test motor away from the motor coupling, switch on again and read the free running amp draw. After a bit of practice it is possible to completely install/test/remove a motor in a couple of minutes.

The Tekin users guide also explains how to find the neutral timing position of any motor. For those mathematically inclined, the guide also gives formulae for calculating peak power

(in watts), horsepower, and torque in inch/ounces. It also gives a formulae for efficiency which cannot be understood and doesn't work but Tekin say they are sorting this out.

### TYPICAL RESULTS

We got a hold of as many motors as possible and came up with the following table. All motors were clean and in good condition but none were new.

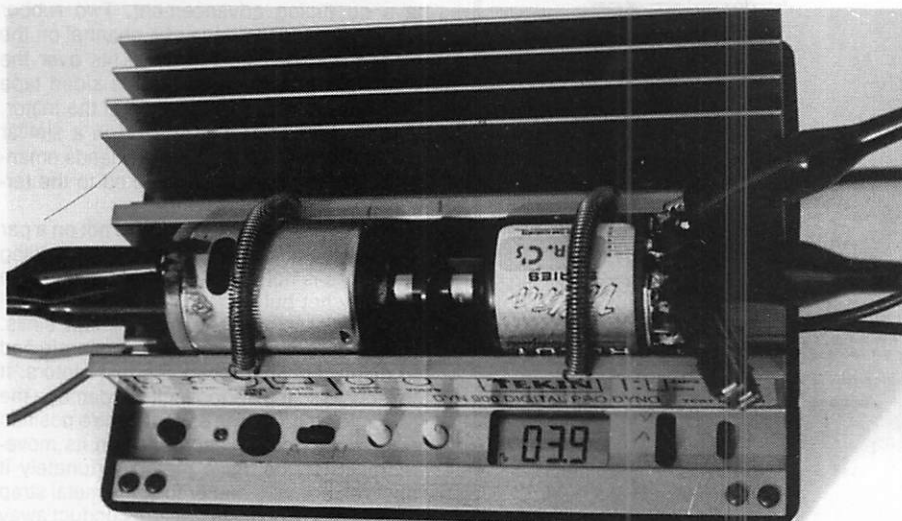
Therefore these results are a good guide but they may not be representative of a brand new motor. The first reading is the dyno's power number, next column is near free running revs (x1000), then free running amps and the last column is the revs (x1000) at started load (amps) measured manually.

MOTOR	PWR	RPM	AMPS	RPM/AMPS
Kyosho 34 Stock	81	14.4	1.9	9.3/17
PP Stock	72	14.3	2.6	8.5/17
Paragon Stock	64	17.7	4.1	10.0/17
Trinity Monster Stock	63	17.4	4.5	9.9/17
Johnson 540 (1)	77	12.5	0.85	7.2/15
Johnson 540 (2)	73	12.9	1.02	7.9/15
Paragon 14x2	93	19.6	2.7	16.5/20
Reedy Blue Dot	91	26.0	3.1	23.0/20
LRP Pink E	90	28.2	3.3	23.3/20
Reedy Mr A 14x3	88	22.0	3.6	17.9/20
Reedy Mr H 12x3	88	24.0	3.0	19.0/20
Yokomo Wing 4	88	21.9	2.2	17.4/20
Losi 13x4	87	24.7	3.6	20.1/20
Reedy Mr C 13x4	85	28.0	5.0	23.0/20
M & Y 18x2	82	21.2	2.2	16/12.3
Dart 16x2	80	19.4	1.9	11.8/20
AKS 18T bushed	81	18.4	5.3	12.5/20

### A LUXURY NO MORE

Finally, the means to accurately check and compare motors is available to Joe Public and not just the works sponsored teams. Our review has only hinted at the possibilities with this gadget. For example you can compare the effects of different bushes, spring tensions and timing adjustment. Since all Tekin dyno's give the same reading (claims Tekin) then one can compare figures with others or with published results. From now on, D&T will publish figures as per the above chart for all the motors we review.

In summary the Tekin DYN 900 Pro Dyno does everything claimed and is a very useful tool that should be eagerly snapped up by serious racers. The expense will only be temporary deterrent. If the desire is strong enough then the means will always be found - like a few racers clubbing together to buy a dyno. The advantages will not only be in more speed but also in longevity. You will be able to experiment in bringing old motors back to life. Start saving!



Slave motor (left) used to load motor under test.

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- \* Super Tuner - Motor Commutation Analyzer

### LUNS福德

- \* Titanium Turnbuckle Sets for RC10, Losi, Lazer, Ultima and Schumacher.
- \* Titanium Hinge Pin Sets for RC10, Losi and Yokomo.
- \* Titanium Shock Shafts for RC10 and Losi shocks, all sizes
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### TORNADO

- \* Commutator Lathe, precision engineered - with diamond cutting tool standard

### STAGE III

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- \* Ultrabraid - 12 gauge cell hook-up wire.
- \* Cell Shrink

### A & L MFG

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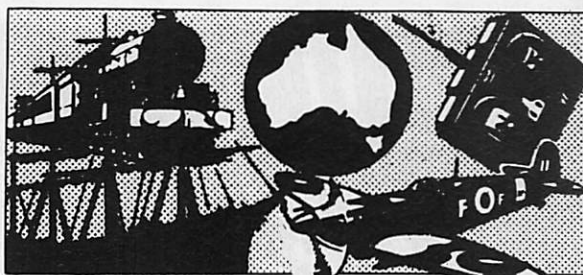
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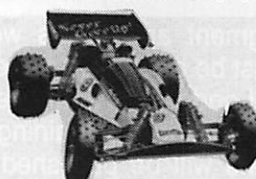
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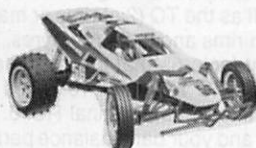
58 BLACK FOOT F150  
Car Only \$199.95  
Deal Price \$329.95



67 THUNDERSHOT  
Car Price \$239.95  
Deal Price \$359.95



89 F1 FERRARI  
(No motor)  
Car Only \$229.95



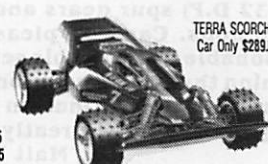
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# YOU WANTED TO KNOW?



Letters for this segment are always welcome. Full name and address must be given plus a telephone number if possible. We will endeavour to answer all queries but only those of general interest pertaining to 1/12, 1/10 and 1/18 scale RC cars will be published. Please address mail direct to the editor at the address on page 4.

**Q.** Recently I purchased some Yokomo tyres for my Mini Mustang but was disappointed that they were 2.2 inch tyres. My car has 2 inch rims and I am hoping that 2.2 inch rims may have been made for the Supershot etc. If not, are wheel drivers from CAT's, YZ10's, and Kyosho cars etc, adaptable to my Mini Mustang's axles? Not only are 2.2 inch rims available for these cars, but they are better looking rims than on my PB. Also, my car has a Sanyo matched SCR Battery with a 14 quad speedworks motor. I am getting just over 3 minutes from this battery and am wondering if this is normal. My bearings and drive system is free and clean but I think my gear ratio is wrong. I have a 56 & 60 tooth (32 D.P) spur gears and 14-18 tooth pinions. Can you please give a reasonable ratio for this setup? I am running the 15 tooth pinion and 60 tooth spur. Any information that you can give me will be greatly appreciated.

**Matt W. Loxton, SA**

**A.** Readers should be careful when buying buggy tyres as both Yokomo and Trinity now make 2.2 inch sizes that are too big for the standard 2 inch rims. Unfortunately 2.2 inch rims are not available for PB's, but the Losi JRX2 axle is very similar and therefore the Trinity 2.2 inch Losi rear wheels should fit the PB. You will have to place a small washer behind the pin in the axle and note that track will increase with the Trinity rims fitted. The other alternative is to make an aluminium adaptor to mate the PB's pinned axles with the squared-2 bolt Yokomo wheels. You are running too high a gear for a 14 quad motor. An overall ratio of 11 to 12 is normal for a 14 turn. Use a 12 or 13 tooth pinion with your 1200 SCR battery and you should get over 4 minutes run time. The gearbox reduction in a PB is 2.33 so the overall ratio for a 12 pinion / 60 spur would be; 60 divided by 12 X 2.33 equals 11.65.

**Q.** I've run my Kyosho Nitro Brute only twice, as each time I've blown a plug in the first 3 minutes. Some airplane modellers told me that this is normal for a new engine (I have an O.S CZ-R). I ran the motor at rich settings for breaking in, but both plugs blew as I slowly began to throttle down

from full speed. Due to a very tight budget, I can't afford to replace glow plugs every time I run my vehicle. Also, are there any other oil-filled shocks available cheaper than Kyosho Golds (\$70/pr) that would work on the rear of my vehicle to eliminate rear-end 'sag'? Would drilling holes in the back of the rims improve dampening? Last, but not least, should I ball race the transmission or the wheels first? I am at the brink of giving up on this car, so any help would be GREATLY appreciated.

**David G. Narrogin, WA**

**A.** The aircraft modellers should buy and read Airborne mag since nowadays it is not normal for a new engine to blow plugs. It is possible for machining swarf to be present in a new engine and this can destroy the plug element (among other things) when the motor is run, but this is not common especially in an OS. The fine particles removed from a tight engine during running in also destroy plugs, but again OS machine to such exact tolerances that running in is hardly necessary. I would look for the following; Dirty fuel, too much Nitro in fuel (no more than about 10 percent is necessary), plug should be short reach (not long), too lean carburetture, not enough oil in fuel (min 15 percent castor or 20 percent synthetic). Finally, it wouldn't hurt to flush out the motor spins freely (plug removed) without any grinding noises.

There are some cheaper copies of the Gold shocks which are worth checking out. Drilling holes in the rims or punching holes (leather punch is ideal) in tyres is normal practice to stop tyre bounce. Ball race the wheels first since they attract more dirt, and are also more accessible.

**Q.** Could you give me some hot-up tips on the Tamiya Falcon, motors, tyres etc, as I am soon to purchase one. Also there is a proviso given in my Tamiya R/C Guide Book spare parts list towards using the Technigold motor in the Falcon. It's written using a symbol that does not appear in the key and I was hoping that you could tell me what it was.

**Dennis F. Nambucca Heads, NSW**

**A.** You did the right thing by starting off with the Tamiya RC Guide Book. It contains all the basic information that newcomers need. The

symbol refers to fitting ball racers in conjunction with a more powerful motor such as the Technigold. Ball racers, an electronic speed controller (ESC), Fox wheels, BEC device and harder wearings. Dog bones are some of the mods we have suggested for the Falcon (and others) over the last few issues of D&T. Any of the supertock motors (around \$40) are okay for the Falcon but you will need a smaller motor pinion.

**Q.** I am a beginner to racing and was wondering whether you could put a track directory in your magazine to help me find a club to race at? I was also wondering what hot up parts would help the original RC10 be more competitive? Keep up the good work.

**Nicholas C. Ipswich, QLD**

**A.** A Club Directory is normally a feature of D&T but this has unfortunately been omitted recently due to space restraints. Your state governing body will help you find a club, contact David Guyatt at 2 Balaton St. Riverhills 4074. The sky's the limit when it comes to after market parts for associated RC10. There are literally hundreds of different parts available many of which are just not necessary. You should certainly be running ball races and an ESC as well as the TQ (2in) rims or maybe Trinity 2.2 inch rims and the larger tyres. The most important factor is that all components of the latest RC10 G Team car, reviewed this issue, maybe fitted to an original RC10. So, as experience and your bank balance permits you can gradually add new suspension parts, drive shafts and gearbox and be confident that new and old parts are all interchangeable.

**Q.** Hi, I own a Tamiya Hornet and was wondering if there would be any oil filled shocks available to fit the front of the Hornet? Could you also tell me what RPM the Stock Mabuchi motor does? I am thinking of purchasing a Tamiya Porche 959. Has it got a reputation of having any major problems? By the way your magazine is great! Terry W. Charters Towers, QLD

**A.** Tamiya do not make oil filled shocks small enough to fit the Hornet but we believe that oil filled shocks from the Panda cars will fit. Parma also make Hornet shocks but could be hard to find. Our test of the Mabuchi RS 540 in D&T Number 5 reports maximum free running RPM of 19,800 with max power developed at 15,000 RPM. Tamiya's Porche 959 has a problem with pin failure on the front to rear drive shaft. A better connection is found on the Tamiya Celica Gr.B and the Celica Prop. shaft can be fitted to the Porche. Conversion cost is under \$10 ask for part No.T50324 otherwise the Porche is a rugged and reliable machine.

**Q.** With reference to the article in D&T No.18 "Bird Torque -Choosing the Right Motor" subsection Radio



**Interference.** My son has fitted a Dynatech 02H motor to his Tamiya Vanguish and recently purchased a Tekin 410S Speed control. Fitting instructions for the Tekin suggest a Tag Tantalum capacitor 2.2 uf 25 volt to be fitted instead of the 0.47 uf polarised capacitor as per article. When dismantling the Dynatech Motor for cleaning I have discovered that the positive terminal of the motor has a positive connector behind the end bell and when assembled the motor can become positive charged. The reason for this I am not sure, could cause problems if any conductor was to be lodged between the motor can and any earthing point. Thus when connecting the 0.1 uf capacitors, I have connected these in series and connected other ends to the positive and negative terminals as the motor can was positive charged. Do you agree with the above connection and do you have any information as to why the motor can of the Dynatech motor is connected to the positive terminal?

John M. Port Macquarie, NSW.

**A.** Ray Woods of Wings N Things in Sydney is one of the few serious racers to have used the Tamiya type motors over any period of time. He does not use any capacitors and reports having no problems. Paul Bird's article did not address the Tamiya type motors (which has hinged type brush holders) but referred to the more common sliding brush configuration of endbell. Since there is no "Ground" on your motor there is little point in using the small 0.1 uf capacitors. However, since the latest digital type controllers, such as the Tekin 410 and 411, can be more susceptible to motor interference I would use the 2.2 uf cap between pos. & neg. terminals. Always ensure this Electrolytic Capacitor is connected the right way around. If not it will be made useless immediately. A Tag Tantalums just a higher quality polarised capacitor and the extra capacity (2.2 instead of 0.47) simply gives more absorption of the motor "spikes". The Dynatech is an underated motor so don't worry about it's configuration - just fit the 2.2 cap and have fun.

**Q.** I'm 11 years old and I'm thinking of buying a Grasshopper II. Is this car suitable for me? How much do bearings cost for this car? Is it good enough with new oil, shocks and bearings to make it to "B" Finals? Do you have any other ideas to make it go faster with-in a \$100 budget? Your

help would help me to start my racing career. I love your magazine.

Paul M. Bolwarra. 2320.

**A.** The Grasshopper II, is one of many buggies suitable for entry level racing. Just take your time during assembly, read all the instructions and get adult help if possible. Ball bearings are one of the first hot-ups you should buy. They are expensive at about \$4.50 each and we think ten will be needed for the Grasshopper. Oil filled shocks (Tamiya CVA's) are the other important mod. But don't think about another motor yet. During your first few races more speed will only hasten the time to the next crash. Any spare cash can go towards an electronic speed controller. Try and practice on the race track and the 'B' Final placings should follow.

**Q.** Soon I will be getting a Schumacher Cougar and want to know if it can take a 'stick' type racing pack, regarding its battery holders (how much would new holders cost?). Also I would like to know if it has room for a mechanical speed control with BEC. What is the fastest motor a KO ZX-400 would handle? What type of gearing would I use for a 16 to 17 turn motor? And last but not least, can you tell me all the rules of 1/10 Off Road Club and Competition car racing? (eg. details on the reverse of speed controllers in stock or modified races etc). Hope you can help.

Jeffrey P. Kwinana, WA.

**A.** Most stick type NiCad packs come with end caps and this makes them too large to fit into the holder in the Cougars rear bulkheads. Remove the end cap and the pack will just fit. There are several other alternatives. You can mount a stick pack across the chassis but this entails cutting slots in the aluminium through which the hold-downs will pass. Use tape, tie wraps or velcro to hold the battery down. Schumacher saddle pack holders cost around \$21 a pair or see "Whats New & due" this issue for Pure Tech's velcro straps. A mechanical speed control (plus extra servo) will fit but it will be a tight squeeze. Mounts will have to be fabricated for the S.C and it's resistors. The KO ZX-400 was reviewed in D&T 13 and should handle down to 14 turn motors. The Cougar manual gives a gear chart - I would try 22 - 24 pinion with a 95 or 92 spur gear. All racing rules come from your state governing body. Contact WAORMA Inc. Secretary, 118 Emberson Road, Naranda, 6062 WA.

**Q.** I own a Tamiya Madcap. I often race with mates on our back yard

track or at the BMX track since there is no R/C racing at Leigh Creek. I am currently ball racing my car. I am also looking for an ESC I have been reading your magazines and it sound as though they are rather delicate. By delicate I mean they burn out easily, can't handle rough bouncing around, can only handle certain motors, etc. Is this correct or have I read wrongly? If looked after properly how long should an ESC last? The speedo I am looking at is a Force Mach 1 for \$150. Is this a wise choice? I would also like to request that a review of the Kyosho Lazer ZX be published in your magazine.

Simon G. Leigh Creek, SA.

**A.** Your impressions of electronic speed controllers are generally accurate - despite what the manufacturers may say. However, with good care - and a modicum of luck an ESC should last indefinitely. Wrong connections cause most burn-outs so think before you plug-in. Mount securely with good ventilation and don't allow batteries or bare wires to touch the Fets or heat-sinks. Keep controller and switch dry at all times. The ESC can get warm after a run but if very hot then look to a less powerful motor or lower gearing. Excessive low throttle will cause overheating. Force Mach 1 is a good choice. Lazer ZX review was in D&T 16 - back issues are available from the publisher.

**Q.** I was wondering if the constant current charger, for the photo tip in Issue 15 on page 6, is able to charge single cells? Could you list some peak chargers with a 1 to 6 cell range? Would you also be able to list the current ratings for Intac Engineering's Force Mach 1. Any help would be greatly appreciated.

J.D. Tuncurry. 2428

**A.** The photo tip shows small 1 Ohm resistors being used to discharge individual cells in a pack. The idea is to fully discharge all cells before recharging the 6 cell pack in the normal manner. Most constant current fast chargers will not charge single cells. Only the more sophisticated (and expensive) chargers (eg HiiQ, Turbocharger, Lavco, digital challenger) will handle single cells. Generally, if a charger is most advertised as being suitable for single cells then it will only handle 4 plus cells. The Force Mach 1 speed controller will safely handle down to 14 turn motors and at \$150 is destined to become the leader in affordable controllers.

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## NEWS FLASH - STOP PRESS DOGFIGHTER BARES ITS TEETH!

It's no secret that Yokomo are getting ready for the 91 Worlds with a new "WORKS 91" version of the '89 World's winning Dogfighter.

It has been also widely known that the Birtles have been quietly "beavering" away getting it ready for heavy battle. What has not been known is when it would all finally happen?

The Bankstown "Invitational Race of champions" was a bit of a "teaser" with Reece fielding a 'composite' '89 Worlds and '91 WORKS' Dogfighter! Chassis and front end of the '91 version, rear end of the '89 job. It convincingly won 2 of 6 heats (one Victorian driver and two NSW drivers each won 2 of 6) which was an exceptional performance given that rain did not permit any practice save for one hour prior to racing.

We now know that Reece and his dad, Geoff subsequently did a sneak debut at Knox (Vic.) club meeting. In extraordinarily rough conditions they took home the track record.

On Sunday May 26th the Birtles' WORKS 91 finally made its full blown debut at a major ORRCA meeting (Warrnambool).

And did it snarl!

In top company it took home: TQ top Qualifier; Fastest single lap of the day; Track record; "A" final by two clear laps of all but the second and third placegetters, which were each lapped once. A full review on Yokomo's new "WORKS 91" will follow in the next issue of Dirt & Track. I should be a beauty because your editor will collaborate with the Birtles to tell you how it really is.

FOOTNOTE: Configuration was "out of the box" except for Associated shocks and wing, TF31 and TR31 tyres, and Reedy MR motor.



# YOKOMO STREET BRAWLER

**Barking, snarling & ready for the '91 WORLDS!**

**THE SECRET IS OUT..... AND SO IS THE KIT!**

**DOGFIGHTER  
WORKS '91**

- New Graphite chassis configuration
- Top Plate
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- New longer Suspension arms
- Fine pitch belts
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- Aluminium Bulkheads
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- Customised Shock Towers
- New Aerodynamic Body



**WORKS '91 as raced to a one clear lap victory at Warrnambool ORRCA Shield.**

**This is a very special buggy. New chassis configuration with totally new front and rear geometry for even more grip, faster turn-in and more stable corner exiting. This DOGFIGHTER hugs corners like kids on a first date!**

Yokomo have been getting ready for the '91 WORLDS since winning the '89 WORLDS.

This time they've got even smarter again. The **WORKS '91 DOGFIGHTER** kit is special, but not exclusive to Team Drivers.

Pre-released to Team driver (fleas 'n all) in January of this year it has now been highly tuned, re-tuned and developed by top Australian, American and Japanese drivers (including World Champion Masami Hirotsuka) to a "state-of-the-art", leap out of the box race winner.

And now it's available to you in the same configuration supplied to Yokomo's Team Drivers.

## STOP PRESS!

Yokomo WORKS '91 draws "first blood" in Australia.

NSW. The "legend" comes back! Bolton takes "A" final at St Ives Cup (May '91).

VIC. "T.Q." Birtles (alias the Ninja Turtle) grabs track record, T.Q. and "A" final from top company at Warrnambool ORRCA Shield event (May '91).

And New Zealand! David Bromley takes out National Title.

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# LETTERS TO THE EDITOR



Dear D&T

Non-competitive drivers do like to read about State and National event. How else are we to keep informed on whats happening, and whats winning these events. For example, the 1/10 Buggy Champs in ACT at Narrabundah. Both the non-competitive racer and the serious racing community like to read and hear about these events. On behalf of the non-competitive racers, I wish to ask you to publish some State, but mainly National events and maybe brief International updates. Just on who's winning what and with what equipment.

After all you don't want faithful D&T readers to turn to that American magazine.

The "Around the Clubs" section is a bit boring, and I am not complaining but maybe it could be shortened a little to make room for race reports. I believe that I and many other readers find what equipment the winning drivers are using to be very useful.

Dear Sir

Your magazine is one of the best around, your columnists write informative and interesting articles, which some of the other magazines don't seem able to do. Don't you dare get rid of race reports, they provided information on equipment and race testing is invaluable.

It is unfortunate that the sport is being ruined by the so called turkeys. Jonathon Borthwick was a great contributor, who has helped me improve my skills, in both on and off road. His leaving has brought some question to mind.

1. Jonathon contributed to primarily 1/12th, but also to 1/10th on-road and off-road. Will there be a new columnist, who will cater for these areas of our sport?

2. What is happening to our sport, that long time racers are leaving?

On the issue of stock motors, the old Mabuchi 540 was the original stock, it should be the only legal stock motor. The idea of the

stock class was to provide a class of racing for newcomers and people with small budgets, anyway these motors are capable of quick lap times, if the car and driver are up to scratch.

Our sport has taken a turn for the worse, and I don't believe that everyone has noticed (or they ignore it), as little is being done to improve the outlook. You only have to attend a major race meeting to see the problems we are facing. Even you have stated this in "From the Drivers Seat", in D&T 19.

Model car racing is following Paul Keatings budget into the gutter and we have to stop it.

The American scene has had the same problems, but they are doing something about it. They are re-organizing stock classes, and manufacturers like "Trinity" have begun to encourage the younger racers by introducing the Sportsman's cup races, all over the country. The team drivers and sponsored racers are not permitted to race, but they hold seminars, aimed at helping beginners and they are on hand all the time, offering help to everyone.

The Australian Hobby industry should be taking similar steps to organise something similar to the Sportsman races.

We all need to get off our backsides and do something to help the sport get back off the ground.

James Nottle, Stirling SA.

*Thanks for your nice opening words Jim - your cheque is in the mail!*

*In answer to your first question we are organising a new columnist for 1/10 and 1/12 on-road.*

*Question number two deserves an answer but I am not sure that I, or anyone, is knowledgeable enough to respond with authority. But here goes anyway.*

*I do not think that long time racers are leaving in great numbers - probably no more than would normally occur with natural attrition. Some ex. racers are even returning. However,*

*the general scene in Oz does seem rather pathetic when compared to the sustained interest overseas. I would agree that little is apparently being done to improve the outlook. Judging from the letters we receive and the feedback I get from the grass-roots racers there is general agreement that Stock classes have to be re-organised and that "something" must be done to encourage the new chums. This situation has been discussed many times at State and National level but the vote has usually gone toward retaining the status quo. The reasoning is that it is the responsibility of clubs to gain and then foster newcomers. As for commercial involvement you have to bear in mind that the Australian hobby industry is very small and not as lucrative as the American counterpart so assistance is more difficult to justify. Never the less, some of the major distributors could probably channel more effort and assistance towards the lower levels instead of the top guys. They say that you get the government that you deserve and this is certainly the case in our situation. We tend to whinge a lot but do less. The normal democratic channels are there for anyone to voice their opinion and get things changed - but it rarely works that way. Instead, apathy leaves a few volunteers to administer the sport and we all suffer the consequences. The return to Mabuchi (or Johnson) 540 motors in Stock is a prime example. All it takes is a majority of club members to vote for a change at club level and set the wheels in motion. The Club delegate moves the motion at State level and the State delegate does the same at National level. If enough of the grass-roots drivers agree, and they seem to in my experience, then the few self serving, narrow minded but influential activists will be over-ruled.*

*Talking amongst yourselves is one thing, and writing letters to magazines is a good way to voice an opinion (keep 'em coming!) but the best, albeit less glamorous way to get things done is through official channels.* - Ed.

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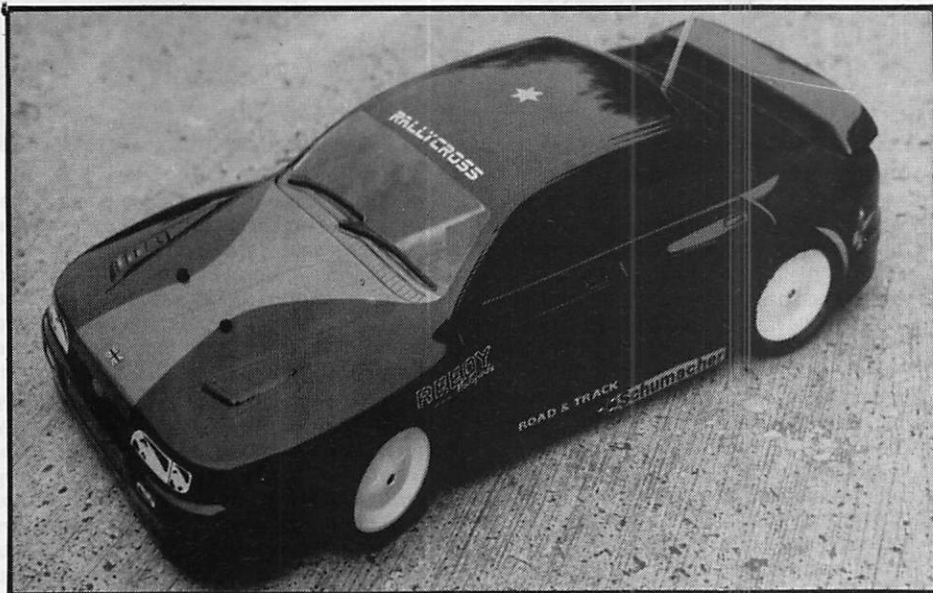
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# RS 4x4

## SCHUMACHER BRINGS RALLYCROSS TO RADIO CONTROL



**Chunky but realistic looking body covers Schumachers Rally Cross 4x4**

Still the good things keep coming from Schumacher. Their Research and Development (R&D) section mustn't sleep, since in recent times we have had the ProCat, the Cougar, and the Shotgun truck (see last issue). They also have a new 2WD rally car the 911 SE, and new generation chargers and speed controllers - but they're another story. Right now the story is not just a new car but a whole new class of RC racing. Rallycross is buggy racing with more realism. Full suspension cars, as opposed to the relatively crude pan chassis cars with solid rear axles, racing with sporty sedan bodico over a track that might alternate between smooth concrete, loose dirt and everything in between. We used to fit sedan bodies in the early days of buggy racing - they are due for revival. Let's go Rallycrossing.

### ALMOST A GROUP A

The RS 4X4 is no simple beginners car but a full blown competition machine based on the highly successful ProCat. In fact the 4X4 is essentially Schumachers 4WD ProCat with a change of body and tyres. No unproven ideas here - all the ProCat's tried and tested race winning features can be found on this road and track Rally car. Features such as:

- Full belt drive.
- Ball races throughout.
- UJ, sliding drive shafts and front one-way bearings.
- Ultra smooth 14 ball differential, front and rear.
- Fibreglass upper and lower chassis with saddle pack nicad configuration and nifty nicad clamps.
- Crash-back front suspension to minimise damage from frontal impact.
- Turnbuckle adjusters throughout except front chamber and rear toe-in which must be adjusted with shims.

The body mounting posts are the same fully adjustable affairs that we got excited about in our Shotgun review last issue and Schumachers nice shocks have spacer tubes fitted on the

RS 4X4 to restrict movement. You don't need mega suspension throw on a smoother track.

### BUILD YOUR OWN SIERRA COSWORTH 4X4.

So much for the advertising, now let's get down to the nitty gritty. This is not a cheap kit so you expect some quality - and you get it with Schumacher. The packaging and presentation is first class and so is the glossy 28 page manual. As we said, this is not a beginners car but anyone with a gram of nous and two grams of patience can handle it. Some additional advice follows to help you along.

- File chamfers in the chassis cell slots to seat the nicads better.

Think twice when fitting the one-ways to the front diff UJ's or you'll end up with a 2WD car.

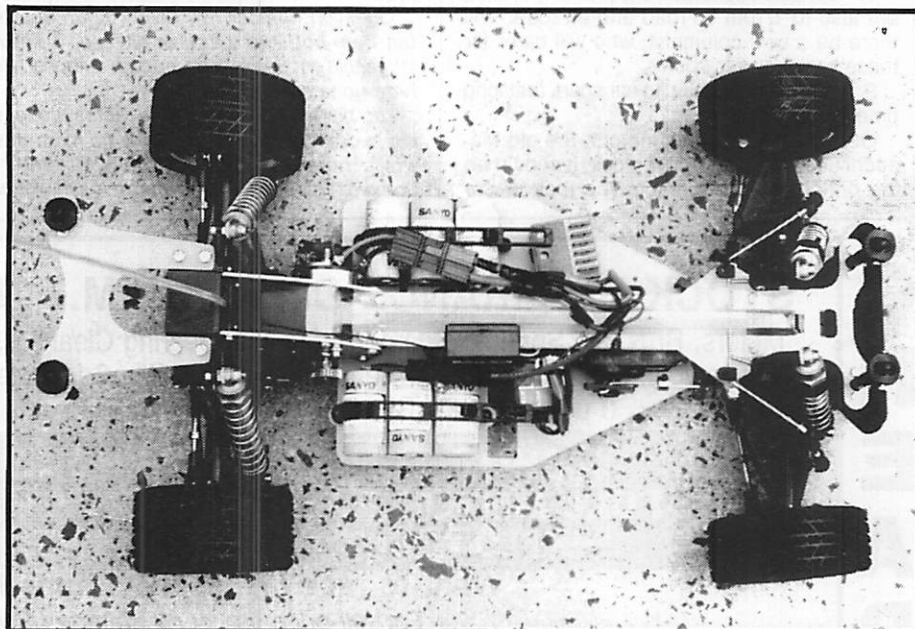
The diff balls come ready greased and we found no need to replace with any other exotic grease.

Install the bearings so the black seal is on the outside. Make sure you take the part number tab off the rear transmission housing during assembly or it will rub on the belt.

To ensure the high performance that this machine is capable of, some areas deserve careful attention. The Steering is an excellent design that doesn't need expensive updates but make sure the brass pivots are the exact length to avoid binding or slop. It's a good idea to put a hole in the rear transmission housing and the top belt cover to check belt tension and ingress of dirt. And speaking of belt covers, these are not mentioned in the instructions. Fitting is self explanatory but smart builders seal (with silicone, door dust seals, or just tape) any gaps, particularly at the rear of the top cover.

The front transmission assembly is as tricky as ever, especially for first timers, and is not helped by parts TO56/TO57 being incorrectly drawn on page 8 of the manual. The front transmission also carries a tensioning bar with screw adjusters but in practice I found this didn't work. However, it is simple enough to slide the front diff housing to adjust belt tension. Finally there is an alarming amount of side play in the front diff assembly in it's housing, but worry not. This is normal and so far has not been a problem in practice, however I will probably fit some spacer washers during the next strip down.

No, the kit is not perfect but the minor aberrations are less than in many other kits,



**More sophisticated than the average road RC Car, the RS 4x4 deserves decent electronics. Review model fitted with KO FET servo, KO receiver, Aristo ESC and A & D cells.**



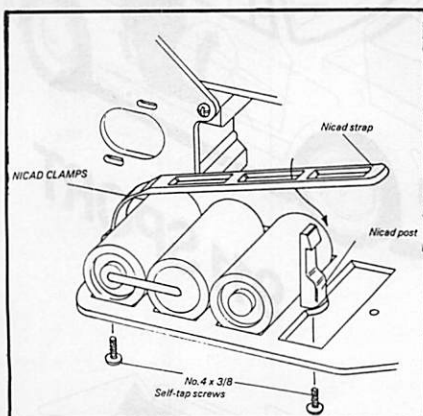
should not deter the would be purchaser and certainly not detract from the performance.

## POETRY IN MOTION

Once finished the RS 4X4 looks a real picture. The body fits perfectly and is very realistic, especially with the rear spoiler added. The plain wheels and low profile real rubber road tyres (there's a tongue twister), compliment the body and add to the realism. We sprayed the body with Pactra's Racing Finish paints, added Schumachers superb decals and headed for the local velodrome.

What amazed us was the traction from the road pattern tyres. They seem ideal for concrete and hang on nicely during acceleration and at speed around the banked oval. The car can be made to slide if pushed but the handling is very neutral and predictable. We found similar characteristics over bitumen and I would expect handling to be similar over hard packed clay but more spiked tyres would be needed over loose dirt. All this with the standard track settings found in the back of Schumacher's manual. The sophisticated independant suspension of the 4X4 will run rings around even the best of the conventional live rear axle on-road cars.

You wanna know how fast it goes? This is a common question but it is mostly irrelevant. All todays competition cars are capable of the same top speeds. How fast they really go depends more on the gearing, speed controller, nicads and paying attention to literally dozens of other items in the power chain. Our test car was outfitted with an Aristo ESC, KO FET servo, A and D SCE cells and many different motors and it didn't disappoint - thankyou. The Schumacher RS 4X4 is as fast as they come.



**Typical neat design from Schumacher**

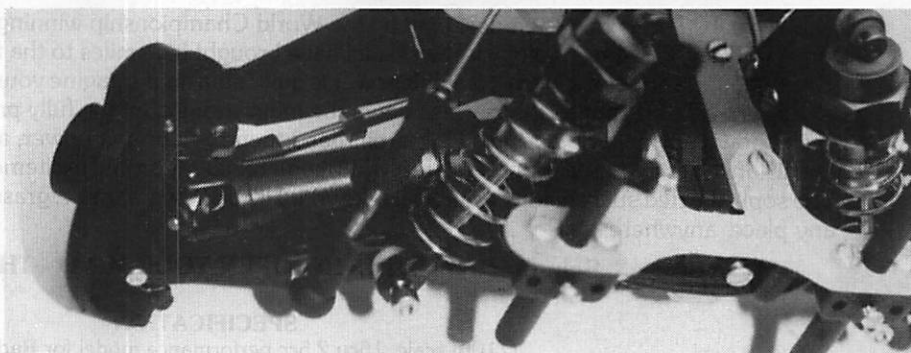
## TRANSFORMERS

Like the Transformer toys of the same name, the 4X4 is really two cars in one and can easily be converted into the famous Pro-Cat off road buggy. The conversion will require purchase of body, undertray, wing and mount, sticky backed velcro and of course different tyres. Also you will probably want to remove the spacers from inside the shocks and soften up the suspension. And that's all. Although the RS 4X4 and the ProCat kits are priced the same it would cost a little more to transform a ProCat into an RS 4X4 than vice versa.

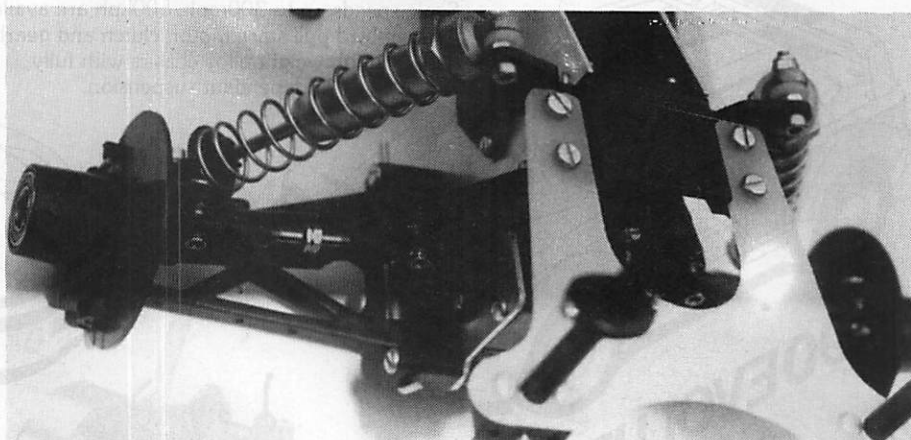
I would also throw out Schumachers agricultural style servo saver and replace it with a Kimbro, but otherwise no exotic hot-ups are required to make either version one very competitive mean machine. Schumacher's original four wheel drive was ahead of it's time when introduced a few years ago and now the latest versions, whatever their form, uphold the tradition.

## SCHUMACHER RS 4X4 - REVIEW AT A GLANCE

Quality of instructions	★★★★
Ease of construction	★★★
Quality of materials	★★★★
Motor	Not Supplied
Speed Controller	Not Supplied
Chassis type	FRP (fibreglass)
Suspension type	Lower A arms. Adjustable top links, rear, fixed at front.
Shock type	Oil damped, sprung shaft.
Differential	14 Ball diffs, front and rear.
Ball races	Throughout, with fibre seals
Motor accessibility	★★★
Body Shell.	Polycarbonate
Handling as tested	★★★★
Price	\$590.00



**Complex front end has differential, oneway bearings, stabilizer bar, sliding U.J. drive shafts and crash-back facility.**



**Good body mount system is featured together with Schumachers long smooth shocks.**



**Here's the same car after a quick conversion to the Pro-Cat racing buggy.**



# Schumacher

## Nitro 10

The Nitro 10 family has been designed by the World Championship winning team at Schumacher using the very latest in CAD/CAM technology. The results have brought big smiles to the faces of everyone who has tried them. The sight and sound of a Nitro 10 at full power is quite amazing. Imagine yourself at the controls, the engine revving at close to 30,000 rpm as the car flies down the main straight, hit the fully proportional brakes to quickly bring the speed down, turn sharp left into the hairpin bend then back on the power, a touch of wheelspin, and race off into the distance at scale speeds upto 300 mph (500kph). Exhilaration and excitement you have never experienced before. The sophisticated suspension design will take your Nitro 10 over tarmac, grass or dirt so you can burn Nitro anytime, any place, anywhere.

**Schumacher NITRO 10 - OPEN YOUR MIND - THEN DRIVE IT!**

### SPECIFICATION

1/10th scale .15cu 2.5cc performance model for Radio Control

High specification motor with "ABC" and ball bearings.

Pull start and onboard glo-supply for easy starting.

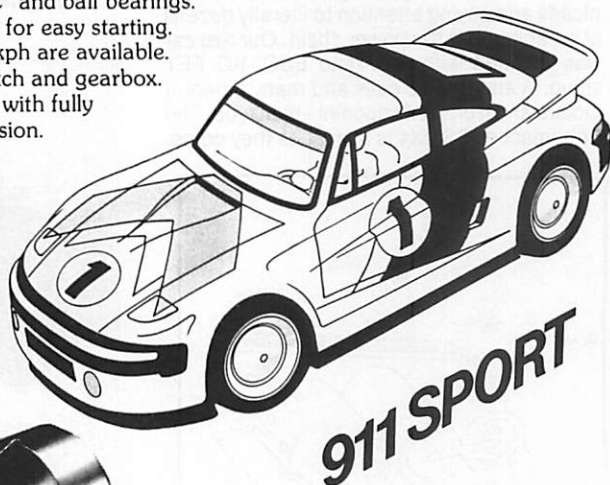
Scale speeds up to 300mph, 500kph are available.

Assembled pull start, motor, clutch and gearbox.

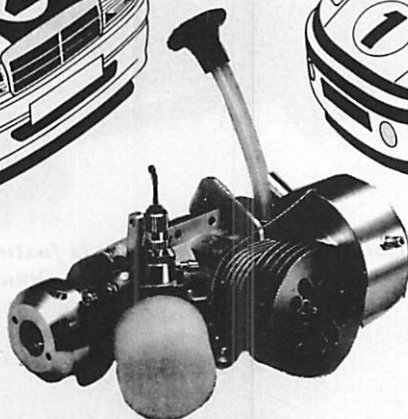
Lightweight alloy chassis with fully independent suspension.



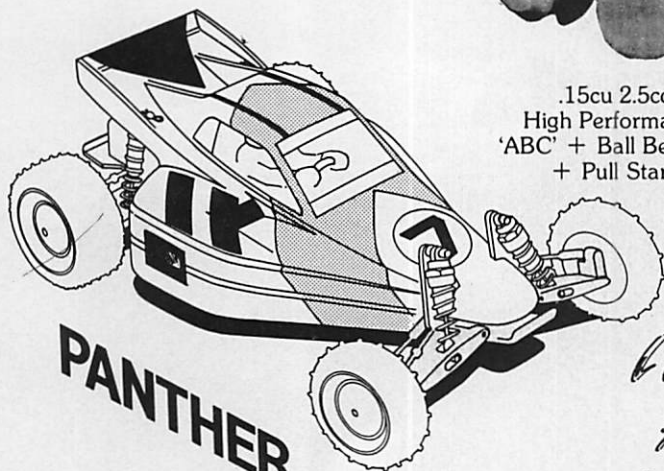
**190 EVOLUTION**



**911 SPORT**



.15cu 2.5cc  
High Performance  
'ABC' + Ball Bearings  
+ Pull Start.



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# PRODUCT REVIEW

## Nitro 10 Cars

It is hard to catch up with, let alone get close to the mind of Cecil Schumacher, his brain must be like a tin of worms, it never stops! His latest creation is the Nitro 10 range of cars.

Born out of the necessity to keep RC racing on a competitive basis and stop the spiralling costs of electric RC, to use an oft quoted phrase "to bring racing back to a sane cost structure" (where everyone will compete on an equal footing and not as it is now \$\$\$).

There are four new units in the Nitro 10 range: 1. 190 Evolution, 2. 911 Sports, 3. Panther and 4. Racing Truck.

The 190 and 911 Porsche are road and track vehicles.

The racing truck comes with truck wheels and tyres same as the Shotgun.

The Panther is an off road unit and similar to the Cougar in appearance.

All units are 2WD and in essence all 4 kits are identical to each other, apart from body, wheels, tyres, bumper and body mounts.

Gear ratios do differ on the Racing truck, because of larger diameter of wheels and tyres.

The units come complete with motor, carby, gear box, pull start, and muffler built and on the chassis. When the attractive box is opened, the buyer sees the factory assembled unit on the aluminium pan chassis the body, an excellent manual and instruction book. Things we have become used to with Schumacher presentation.

The motor is an Irvine .15 or 2.5cc and is the only 2.5cc motor in the world made for cars, it produces 2 HP at 40,000 revs and as can be expected by those figures is absolutely awesome on the track.

There is little building to do, only the rear and front ends to assemble.

A feature of these kits is another Schumacher special. The glow plug has its own battery compartment at the rear of the unit and a switch on the shock strut. To those not familiar with IC or gas operated units, normally you have to carry around, a battery box which has a clip that has to be fitted to glow plug in order to fire up the engine, this special innovation could only come from the Schumacher camp. There is an excellent set of decals provided with the kit and of course these will be available as an after sales product, for those who wish to run a stable of Nitro 10's, be it 119 Sports, Panther, Evolution or Truck.

There is little in the assembly of these units, if directions are followed closely. Painting your body is the most time consuming aspect of the whole project.

The special design features I feel I must mention have Cecil Schumacher written all over them.

1. Battery box for glow plug and battery pack for receiver with two switches.

2. Brake which operates off bell housing.

3. Excellent recoil starter fitted with one way clutch, which takes away any risk of damage to motor.

4. Exhaust system which makes the noise level almost non-existent, quite acceptable even to the most severe critics without taking away the sense of power.

In essence these four units are once again superior kits for the RC fanatic, whether it is for racing or just plain helling around.

At the recent UK 1/8th scale off road Nationals, Schumacher entered two Panthers fitted with truck wheels and tyres. You must take note that in 1/8th scale racing at National level in UK

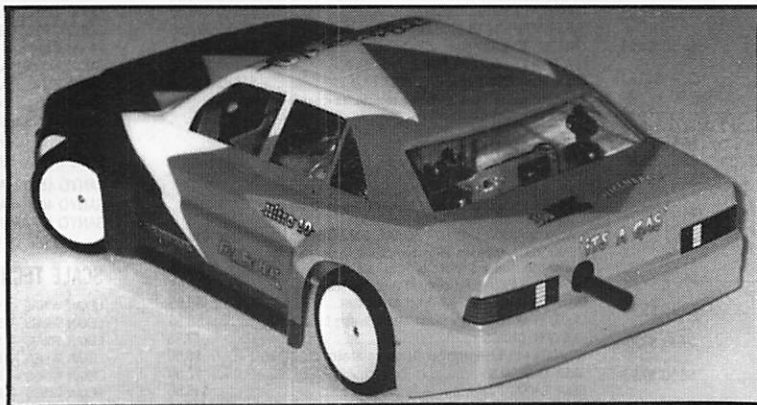
contenders use .21 or .36cc turbo motors and are 4WD. The two Panthers finished 32nd and 35th out of 100 starters. Reliable Informants tell us that they were beaten on the corners and lacked nothing in speed.

After running the truck we have found that our present 1/10th off road tracks, are too small for these awesome creatures. Running on grass the unit will stand on its rear wheels while the straight line speed is unbelievable. Traction on our existing off road tracks is almost impossible, on grass the performance is eye bailing. Fitted with sponge tyres the 190 Evolution and the 911 Porsche will be something else on the 1.8th or 1/10th scale circuit tracks using the treaded tyres fitted on purchase. A lot of car parks will become the scene of impromptu race meetings. Having driven the units I can safely say there will be many a grin on the face of the purchasers when they go out to try these RC flyers - but take a word of warning....take it easy! You have never driven a more potent RC car. A calculated opinion would be three to four times more powerful than the hottest RC electric car.

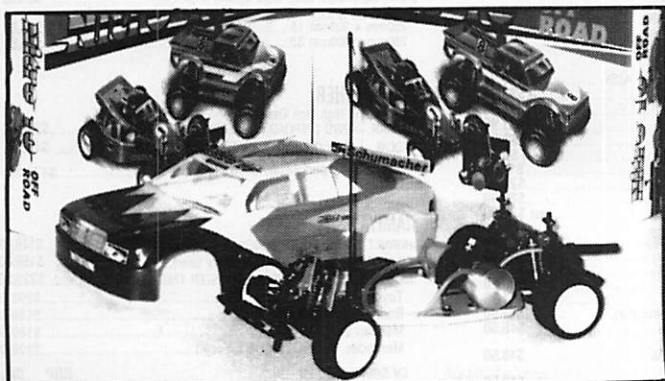
### Warning - Nitro 10's can be dangerous

Carefully select an area where you can run your Nitro 10 without risk of danger to people, animals or property. Schumacher or their distributors are not liable for damage caused by use of the product.

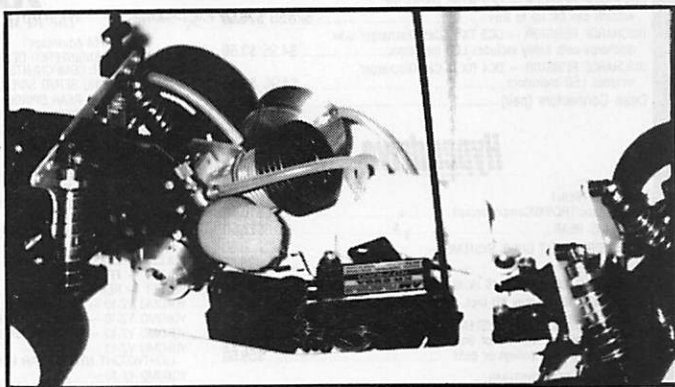
Nitro 10's are available from Grenenger Enterprises P/L, Trading as Pit Stop RC Cars and Accessories, 21 West Street, Brookvale, NSW 2100. Phone: (02) 905 6330, (02) 905 6334 or Fax: (02) 905 6332.



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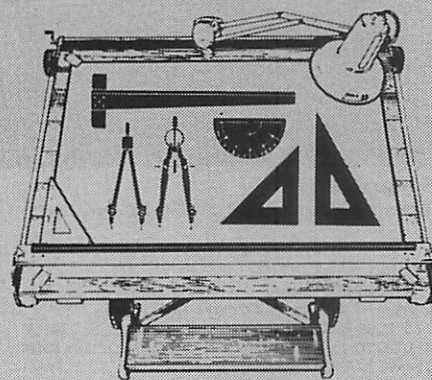
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# BOB'S TECH CORNER



WELL, life is never dull in the world of buggy motors. There always seems to be something new on the horizon. This issue, I have five motors for you, four from Trinity and one from Parma.

The Equalizer and Torkzilla were announced in the Trade Notes of D&T No.18 pages 44 and 45. These were among those we tested.

## TRINITY STOCK EQUALIZER

This motor is designed not to be tampered with. The end bell fully encloses the commy and brushes. This would make it difficult to clean and I expect the only way is to dip the motor in a bath of metho etc.

As a stock motor, it will be 27 turns of 0.65 wire with bushed bearings. I am told the brushes are radial type ie; they are the same as conventional motors not the tangential leaf type as in the Mabuchi 540 design. At the shaft end the housing has holes in it for air but around the outside only, so you can see the magnets but not the armature. There is no way anyone can get inside to twist the armature. It seems a move in the right direction.

## TRINITY MONSTER STOCK

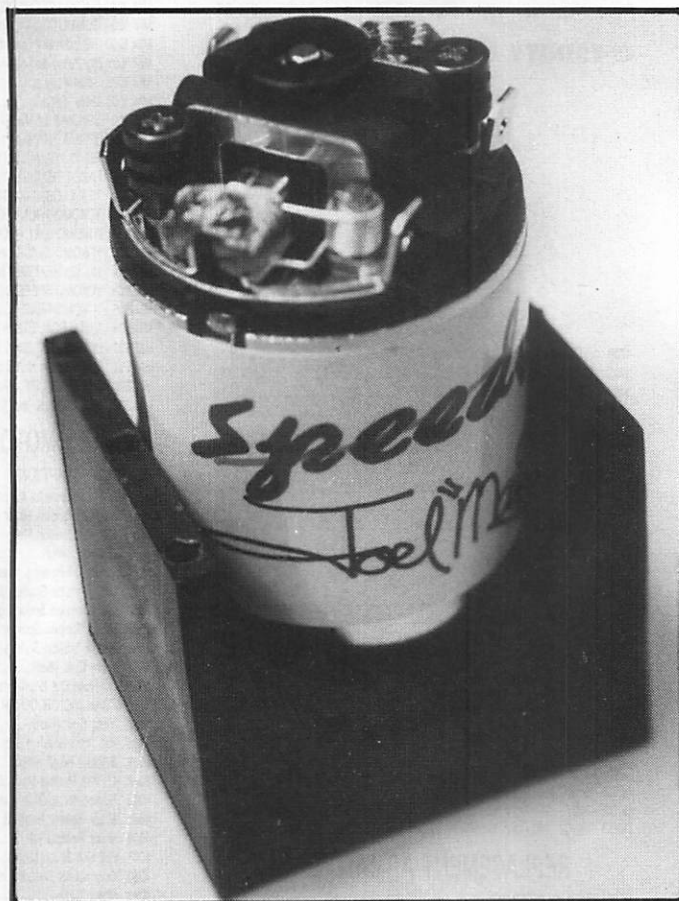
Again being a stock motor it is 27 turns of 0.65 wire but the magnets are "zapped" and it is pre-twisted to 34 degrees or 11mm. Normal twist is about 6mm. Although these twisted motors run quite high when free at about 25-28000 RPM, when the load comes in they drop back well below 20,000 but the end result is they deliver more power.



*Latest Trinity Monster stock shown on workbench, motor block also from Trinity.*

## TRINITY STOCK JOEL "MAGIC" JOHNSON

This motor looks similar to the 'Monster' having 34 degrees advance but the results differ between the two motors. The Monster produces more power above 14,000 RPM but the Johnson is better lower down up to 14,000 RPM. See my curves for the variations.



*New Joel Johnson stock motor shown in handy motor block from Trinity.*

## MODIFIED MOTORS

Now we come to the interesting comparisons. Here we have two motors, both 13 turns. By looking at my data, you can see the Parma has 1.0 diameter wire, the air gap between the magnet and armature is 0.25 and the magnet strength is 28 whereas the Torkzilla is 1.2 diameter wire, air gap 0.45 and the magnet is only 7.

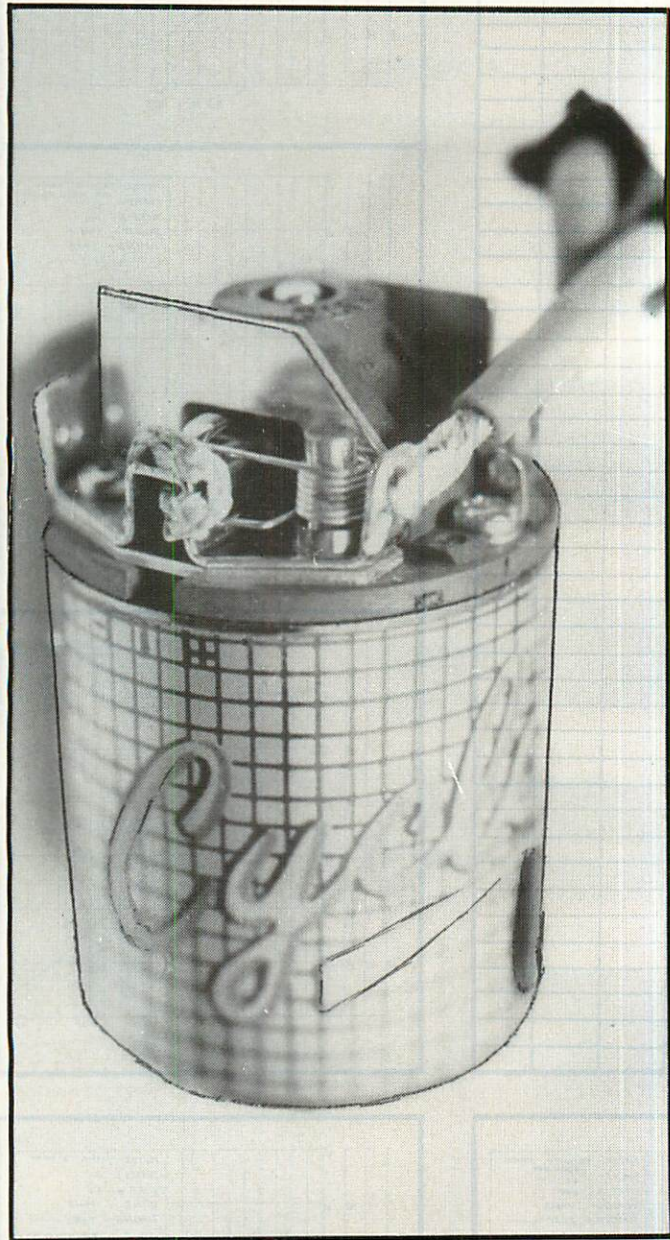
Consult the graphs and note the power curve and its relation to the amp. line. The power output of the Torkzilla is considerable, in fact, it is the most powerful motor I have tested. The RH slope of the power curve is very steep ie; the power increases with a smaller drop in revs. Look at 30,000, the power is about 30 watts yet it is only taking 20 amps. The other interesting point is the motor produced its best result when set at zero twist or timing.



The motors were run-in when I received them and the results shown are what I achieved. After several tests the power dropped off, but it was still excellent.

I did this test before, but to prove the point I put the Torkzilla armature in the Parma body and the results are shown in the extra graph. The power is up on the Parma but down on the complete Trinity motor.

The Parma Cyclone II is a mild 13 turn motor and again by looking at the curves you can see the difference in the power, torque and amp line to that of the Torkzilla. The amp curve is flatter and in starting it would not pull the current of the Torkzilla.



**Parma Cyclone II in 13 turn.**

The Torkzilla is well suited to oval racing where the revs can be kept more or less constant in the 30,000 plus area.

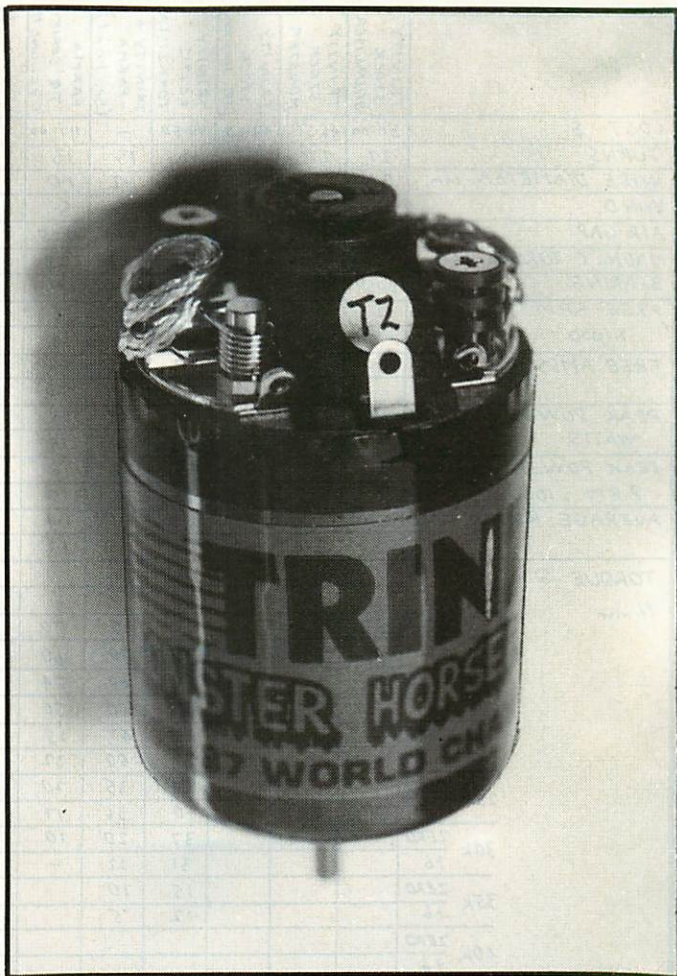
Because of the high power output of the Torkzilla it would suit other constant power duties such as in a speed boat or driving a propeller in a model aircraft. I have been doing tests on aircraft propellers and took the opportunity to use the Torkzilla in my test rig. When geared at the correct ratio to a larger propeller it produced the maximum thrust available mainly because of its power output.

Throughout my tests I used standard 7.2 volt SCR batteries charged up to maximum for each "run".

Remember with these high revving motors you must gear them low to suit each motor's characteristics.

Another good session with motors.

Bye for now, Bob Roach.



**Trinity Torkzilla had most power of any motor tested to date.**

## READING THE RESULTS

The charts and graphs on the following page provide much valuable information - providing you know how to read them. Below are some meanings of the terms used and a guide to interpreting the results.

**TORQUE:** Newton-millimetres (Nmm) is the correct unit for torque (actually it should be N-metres, but this is too small a figure, so I have multiplied the result by 1000 to give Nmm). A Newton is close to 100gm, so a result of 50 Nmm is 100gm at 50mm radius or arm. The figure doesn't matter, as long as readings are relative to one another.

**AMPS:** This is important as it is an indication of battery drain. The figures are high, and care must be taken on the current flow path (more on this later).

**POWER:** This curve shows you where on the rev band the best power is obtained. It helps you choose the correct gear ratio.

**RATIO of TORQUE to AMPS:** This is an indication of the efficiency of the motor; i.e. how the motor can turn Amps into Torque at various rpm. You will see that although 'hot' motors put out more torque, they also draw a lot of current (Amps). An efficient motor has a ratio of about 3.0 — like the Mabuchi 540.

**WIND:** This is shown as S-single, D-double, T-treble and Q-quadruple.

**AIRGAP:** This is the gap between the armature and the magnet. Normally a small gap gives a stronger magnetic flux.

**MAGNET TORQUE:** This is expressed in Nmm, the same as the motor torque. It is the amount of torque needed to turn the armature against the magnet. When you turn over a motor, it feels lumpy and this is a measurement of this "lumpiness". Some motors are quite strong, whereas the 540 is weak.

I have tabulated the graph results for torque and Amps as these are the most important factors and it is easier to select a rev band and read across the various motor performances. Each rev band has two readings, one for Zero timing; i.e. with the brushes midway to the magnets and plus 6mm of advance (20 degrees). This is the normal amount the motor manufacturers recommend.

You need to look at the power curves and study their shape, but I have listed the peak power and revs for easy reference.









# ZAPPER

by Bob Roach

No, it's not a word from Batman but a procedure to re-activate your magnets of the drive motor.

Recently I reviewed a unit to zap motors manufactured by Endurance Racing Products (ERP) of USA. It is powered by 12 volts DC (the usual car battery) and takes about 10 amps of current.

The idea is that you can zap your motors at the trackside and bring them up to scratch just before a critical race.

Depending on how you gear your motor and how well ventilated it is in the car, it can get very hot and this heat will degrade the magnets in the motor. The unit is 240mm long and 130mm square and is quite heavy. There are two small fans at either end, one a sucker the other a blower to cool the internal coils. Two heavy coils of copper wire are wrapped around poles of cast iron this metal will not retain its magnetism which extend up through the top of the box to end in pole pieces. You place your motor between these poles and switch it on for about 20 to 30 minutes. You should orientate the motor so the magnets inside are adjacent to the poles.

At 10 Amps current draw you need to watch the battery capacity as it will soon flatten if the zapper is left on too long and you still need capacity to change your batteries.

Well, the result of my tests are that I saw no improvement in the motors I tested. I admit I had a limited number available to test but although the motors were down on performance this may not have been the magnets. The magnets in motors, measured as I do in my tests, can range from a figure of 5 for a Mabuchi 540 to over 35 for a wet magnet in an advanced modified motor. I tested some 540's before and after being zapped with no change in magnet strength and I put this down to the magnet material being only capable of a certain strength. I had thought that a zap would really make a difference but it didn't. I also tried

some stronger motors of about 25 on my scale but these did not alter either. I was not game to try a super motor in case the result came out to be worse than before the zap.

Tests by another reviewer in America said it worked but I expect this was with motors that were "cooked". If your type of racing is to burn up a 1700 mAh battery in say two minutes, you will develop a lot of heat that may de rate the magnets but if you run 1200 mAh batteries over a five minute race I doubt if the motor will get hot enough to reduce the magnet strength.

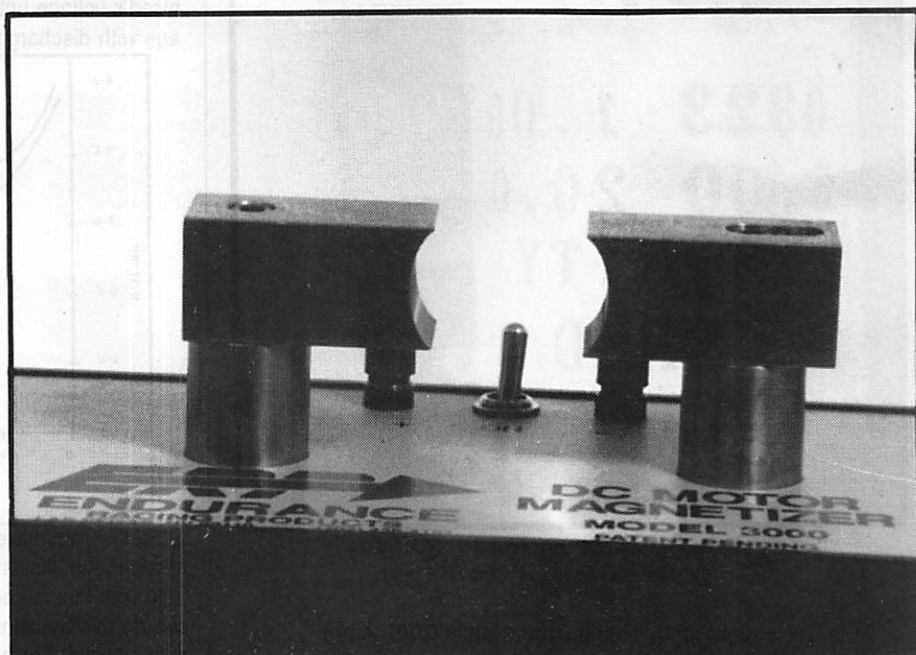
I understand the cost of the unit is \$250 in

the USA so here it may well cost quite a bit more. Depending on how well healed you are, I think this device has limited use. The best motor maintenance is to keep it clean and attend to the commy and brushes.

Bye for Now.

## Editors Note:

*In the States ERP have now released their master 2 Zapper, that is mains powered and claims to zap magnets only one second. There is no news of their original magnetizing machine and it remains to be seen if their new Zapper is any improvement.*



**This view of the ERP Motor Magnetizer shows the cast iron poles between which your electric motor is placed for a "rejuvenating ZAP". Results were of dubious benefit on motors tested.**

# NI-CAD CONFUSION

by Mathew Prentis

**W**HEN it comes time to replace our ni-cad packs we want to be able to buy a pack that is equal to or better than the ones we had before. To do this we need to be able to compare ni-cads, remembering that price does not always determine quality.

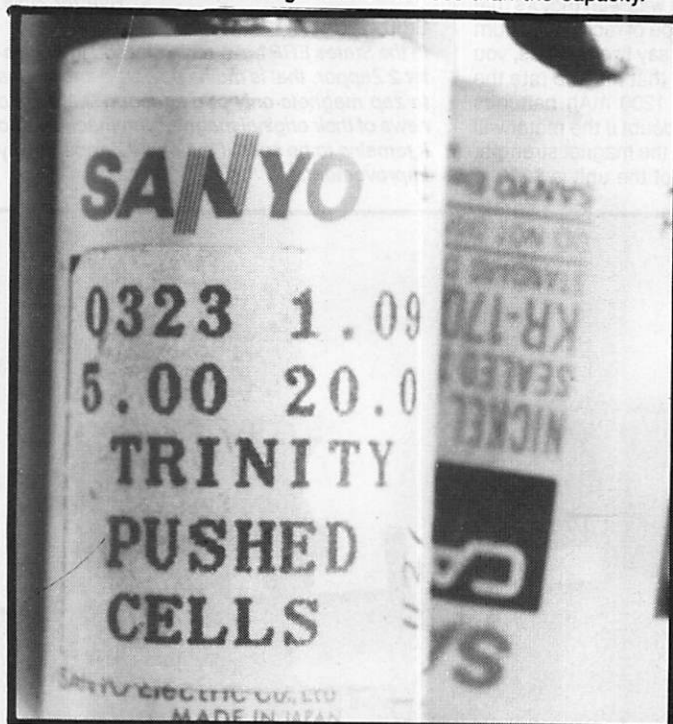
The main function of a ni-cad is to store energy so that energy can be used at a later date to move our electric cars. So, to compare ni-cads we need to compare their energy storing capabilities.

In the following article, we will look at two different methods of calculating the energy storage capability of a ni-cad. The first method is mA<sup>h</sup> or milli Amp Hours which is the normal way of showing capacity or energy storage capability.

The capacity of a ni-cad is measured in Amp Hours which, put simply, is the time it takes a fully charged ni-cad to go flat if a constant current is drawn.

Before we can test a ni-cad we should look at the set standards to work to. The first is at what voltage a ni-cad is said to be flat. Well, normally if the ni-cad voltage falls below 1.1 Volts it is said to be flat, remembering that we are talking about one ni-cad or cell in which there are six in a normal racing pack. The second standard is the time it takes to discharge the ni-cad, which is normally 10 hours. There is a third standard discharge current which we will look at later.

So with these standards let's look at a normal 1700 mA<sup>h</sup> sub C size ni-cad (SCE). If a current of 170 mA is drawn from a fully charged cell, it should discharge to 1.1 Volts after 10 hours. This discharge rate is called c/10 as the discharge rate is 10x less than the capacity.



*Trinity SCEs (refer to text for explanation of readings).*

(m equals milli, 1 milli Amp equals 0.001 Amp)  
mA<sup>h</sup> equals Id x Time

Id equals current (milli Amp) rate at which ni-cad was discharged  
Time equals the time taken to discharge the ni-cad in hours

If we were to repeat the discharge of the same ni-cad again but at an increased current of 1700 mA, the fully charged ni-cad should discharge to 1.1 Volts after one hour. This discharge rate is called c/1 or c rate as discharge time would be around 55 minutes. This decreased time shows that there is a loss of capacity (mA<sup>h</sup>) if the ni-cad is discharged faster.

When we use a ni-cad in our buggies, the average current draw is between 10 and 22 Amps. This means the discharge rate would be about c/0.1 or 10x greater than c/1 rate.

With such a large discharge rate the capacity will be reduced. The capacity (mA<sup>h</sup>) figure we would come up with if we did a capacity calculation would be called our usable capacity

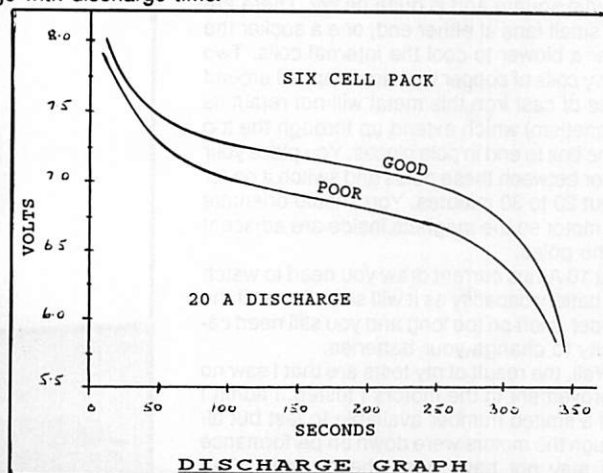
The difference between our usable capacity and our marked capacity would be governed by the quality of the ni-cad, the age and, when used in a racing pack, the matching of the ni-cads.

The industrial standard discharge time of 10 hours is fine for ni-cads used in calculators and other hand held equipment but not for electric cars.

So to use mA<sup>h</sup> as a way of comparing ni-cads you should discharge them at a rate close to their normal discharge rate and then compare the time it takes for them to go flat. The ni-cads that last the longest should be the best ones. I use the word "should" because if we use mA<sup>h</sup> as a way of comparing ni-cads, we leave out an important variable that will effect the comparison.

Most people would have had a ni-cad pack that was okay for the time but for some reason the buggy lost the get up and go out of corners or that speed down the straights. Well, the simple reason for that is the pack voltage. If the pack voltage is low then the voltage to the motor is low which will have the effect of reducing the RPMs of the motor and also the torque the motor produces.

If we use mA<sup>h</sup>s to compare a ni-cad, we don't take into account the ni-cad's voltage until the end. Look at the graph which compares voltage with discharge time.



Both ni-cads have the same discharge time but it is obvious that the ni-cad that holds its voltage is better than the one that is low in voltage.

To compare ni-cads we need to have voltage in our calculations. We can do this by using Joules. A Joule is a unit of energy the same as power (watts) but has a time factor in the calculation.

Joule equals Volts x Amps x Time  
Time is in units of seconds.



One Joule of energy is released if a voltage of one Volt causes a current of one Amp to flow for the time of one second.

Or a 60 Watt globe will release 60 Joules of energy every second.

The Joule as a unit is a bit small to use so the normal unit of Joules is Kilo Joules (1000 Joules) so 40 Kilo Joules equals 40,000 Joules.

To use the formula, we need to discharge the ni-cad at a constant current (as we did for mAHs) and at set intervals take voltage readings until the ni-cad is flat (1.1 Volts/Cell).

We then put the Voltage, Current and time interval into the formula.

Do the maths and you will then have a Joule reading for that interval. You now repeat the step for all the time intervals and add the individual Joule readings together for total Joules.

eg;

Voltage	Current	time interval	Joules
7.2	10 Amps.	20 seconds	$7.2 \times 10 \times 20 = 1440$
7.1	10	20	$7.1 \times 10 \times 20 = 1420$
6.9	10	20	$6.9 \times 10 \times 20 = 1380$
6.6	10	20	$6.6 \times 10 \times 20 = 1320$
			total Joules = 5560
			or 5.56 Kilo Joules

As with mAHs, the discharge current will vary the Joules reading so to get an accurate reading, the discharge rate should be the same as the working rate, between 10 and two Amps.

Neither mAHs or Joules system of comparing ni-cads will work if standards are not set, so end voltages and discharge rates should be stated when quoting mAHs or Joules readings.

The problem when buying a ni-cad pack is knowing how good it is. Okay, if you buy a ni-cad pack you can take it home and compare it with your other packs but you have already purchased the pack and you can't take it back if it is no good.

So what is the answer? All ni-cad packs should be tested and a joule reading placed on them. The end voltage and discharge rate should also be stated.

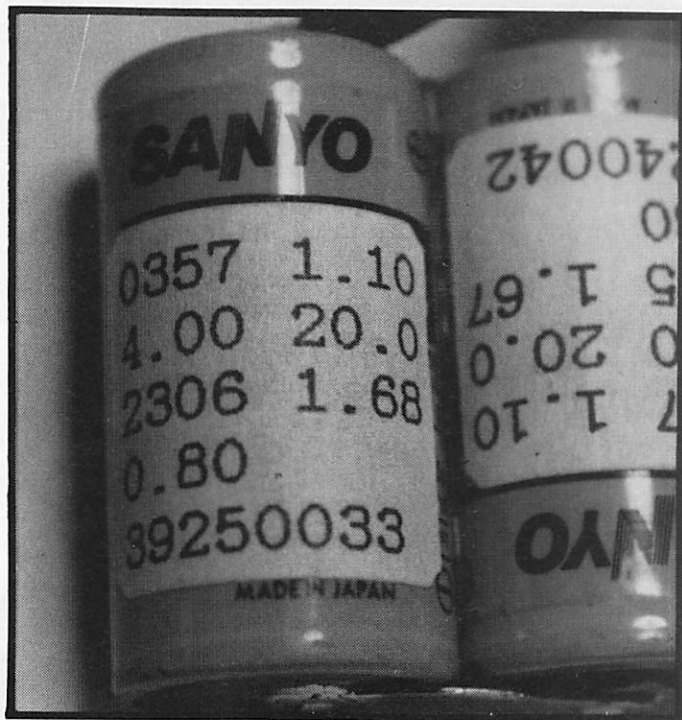
You may think this is extra work for the ni-cad manufacturer or seller but the truth is that all ni-cads used for electric r/c cars are checked at least once by the time they get to the shops. When I say at least once, I think I am being a bit generous. Maybe if the ni-cad is very good or poor the ni-cad may get checked once. If the ni-cad is somewhere in between, who can guess the number of times it has been checked.

You may be wondering how I can make such a statement. Let's follow through the path a ni-cad will take before it comes into our possession.

Ni-cad manufacturers will test some cells from each batch to check quality, then sell to large wholesalers who will check most or all the cells to find the best for their team or other teams who are willing to pay big dollars for good cells.

Wholesalers will sell remainder of cells to large dealers or large retailers, each of whom may check the cells and select the best until, finally, we get to buy the cells or ni-cad packs. I'm not saying that what the sellers are doing is wrong because, let's face it, the ni-cads the top guns are using would be wasted on the normal Sunday driver.

There are some notable exceptions. Take a look at the two photos of competition SCE packs from A&D and Trinity. Here's how to interpret the figures. The numbers 0323 or 0357 refer to the discharge time in seconds. The next figure is the average voltage during discharge, in these cases 1.09 or 1.10 Volts. The charge rate is stated as either five or four Amps and the discharge rate as 20.00 Amps. The A&D cells give more information ie; charge time in seconds (2306), peak charge voltage (1.68) and terminal discharge voltage (0.08 per cell). It is relatively easy to calculate the Joule rating of these packs. Assuming all six cells in the pack are rated the same then the Trinity's would be 42.2 Kilo Joules (1.09V 20A 323s 6/1000) and the A&D's 47.1 Kilo Joules (1.10V 20A 357s 6/1000).

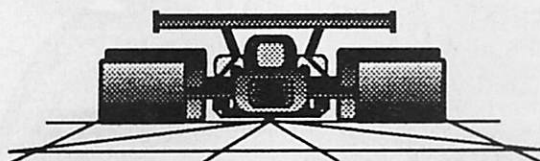


**A&D Cells**

What I am trying to say is that the people who are checking and grading the ni-cad should mark all the cells with their Joules rating so everybody who buys a cell or ni-cad pack will know how good it is.

After saying that, there are some people who sell ni-cad packs with Joule ratings on them. As an example, "guaranteed 50 Kilo Joules" means the ni-cad pack has better than 50 Kilo Joules capacity. So to improve the sport of electric cars/buggies let's put Joule ratings on the ni-cads so the Sunday drivers who carry the sport can be confident when selecting their next packs.

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Celica - Vanquish **\$479.00**. Astute **\$445.00**

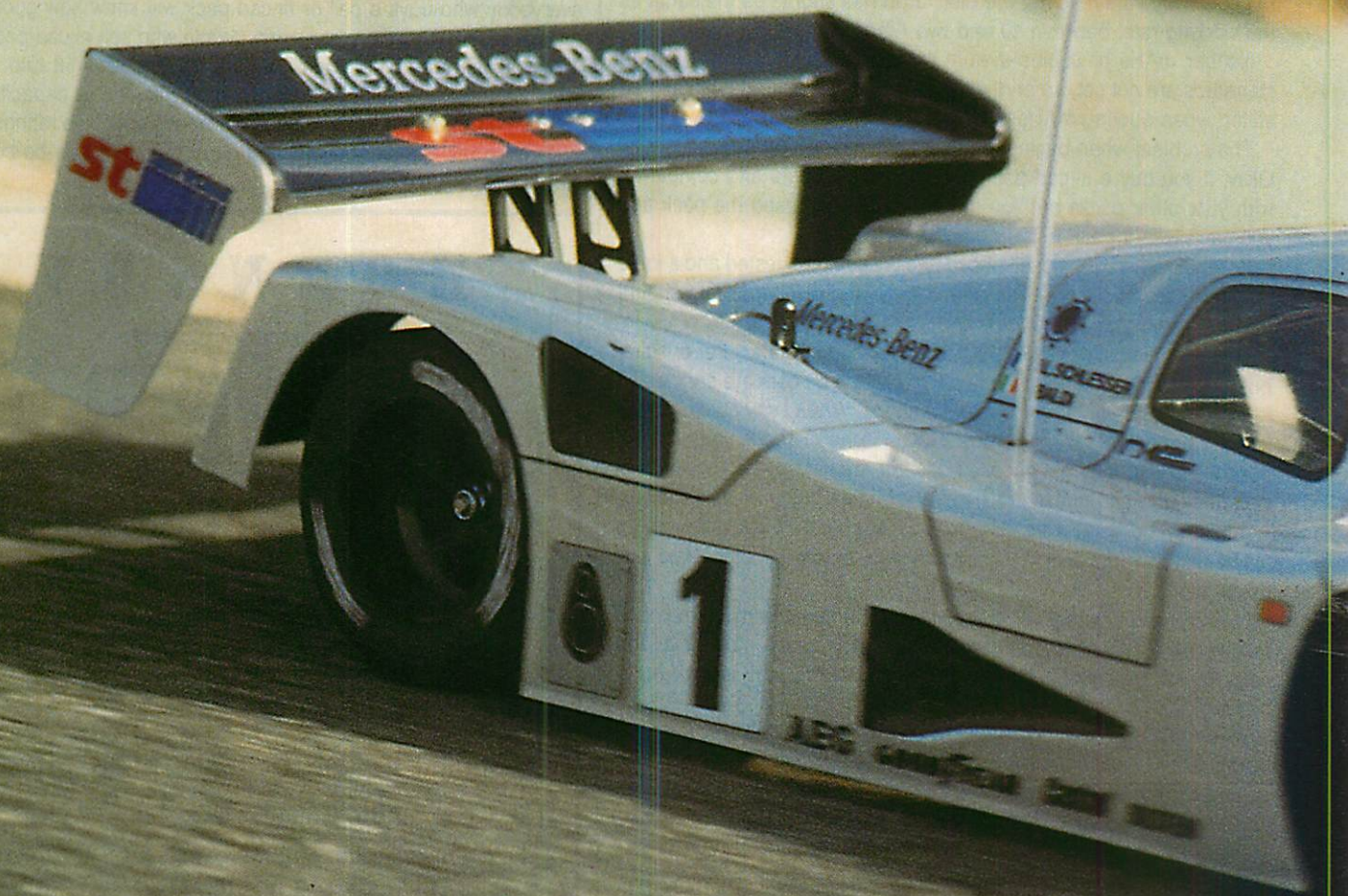
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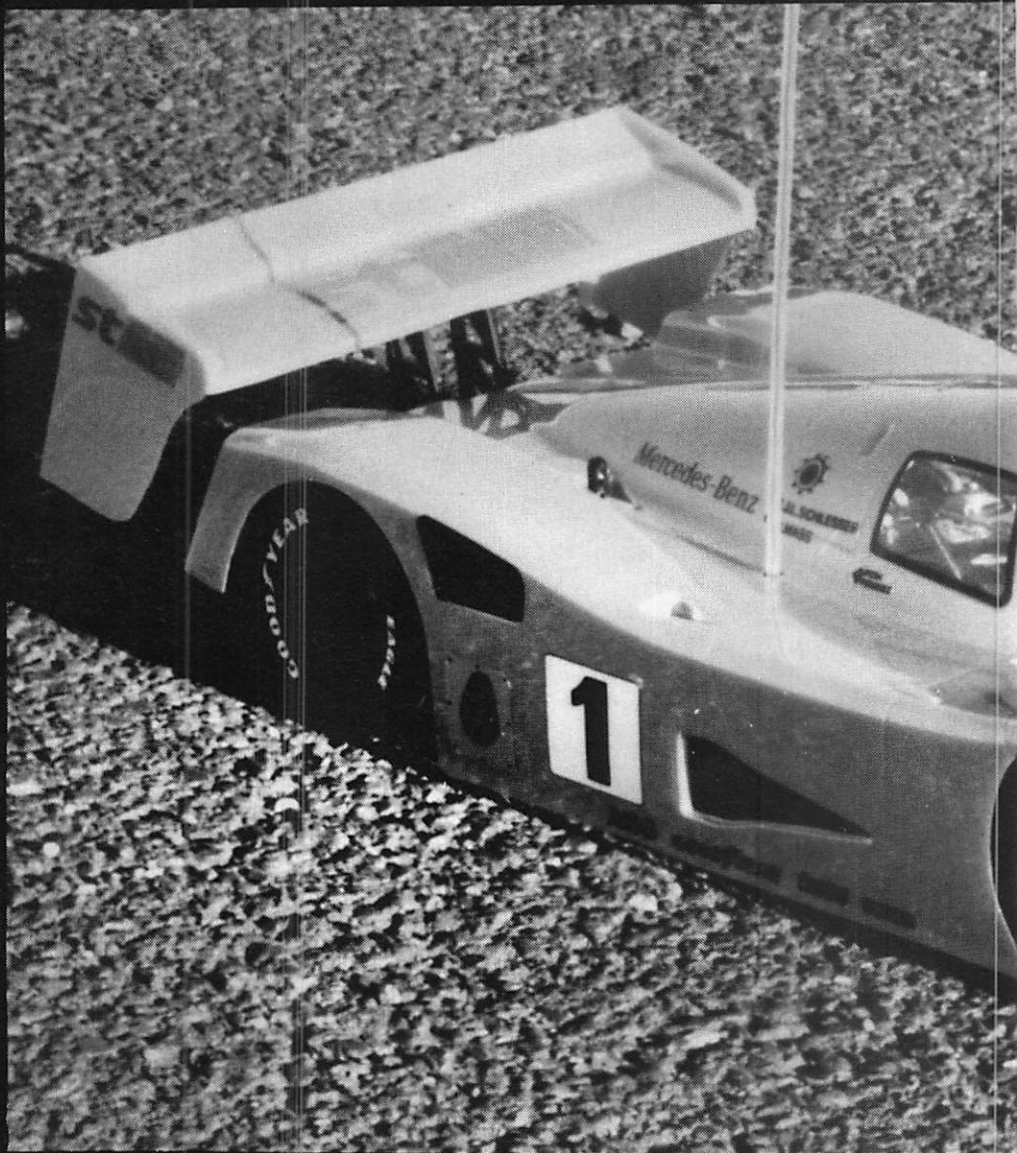






# Tamiya's 1/10 Mercedes-Benz C11

## On Road Fun



The name Mercedes-Benz is synonymous with quality and innovation. When it comes to racing, the company has a long and illustrious history. The name Tamiya, hasn't been around as long as Mercedes-Benz, but it too has built up a history in the world of radio control racing for its quality and innovation. At some time nearly every RC driver has owned a Tamiya off-road buggy, monster truck, or 1/24th or 1/10th scale on-road car, such is the diversity of Tamiya's range of cars.

The latest of being from the boys at Shizuoka - City in 1/10th the scale on-road is the Group C, Mercedes-Benz C11, all conquering Le Mans winner. I was becoming a little bored with the same hassles of cleaning mud and dirt from every nook and cranny on my assortment of buggies, so when the boss asked me if I'd like to go "on-road" I jumped at the opportunity, grabbed the kit and ran.

My experience with 1/10th on-road cars has been that of a flat plate type chassis, rear motor pod and heaps of speed. The Tamiya offering differs in that it incorporates conventional materials together with the "Hi-tech" FRP chassis plate at the front and a T-shaped gear

casing mount is used at the rear. The main chassis component is an ABS resin bathtub combined with front and rear space frames for added rigidity. Suspension for the front is a scaled down version of the real thing with independent coil springs while the rear power train uses a single coil over oil filled C.V.A. shock absorbers. Simple - but it works. Ride height can be adjusted by using spacers to alter clearance according to local track conditions.

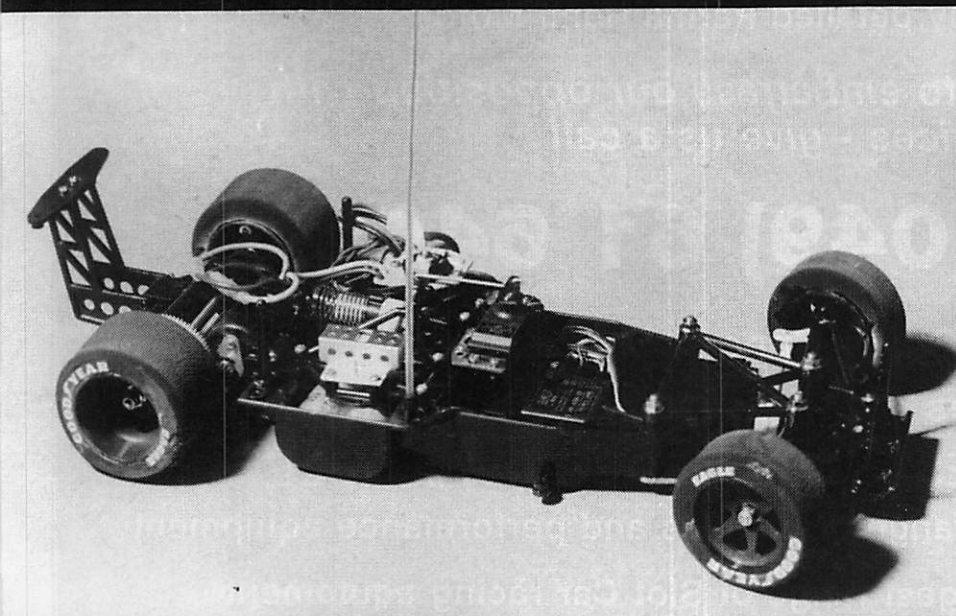
I left my car standard and haven't had too many clearance problems - just the odd stone scrape! The motor pod, fitted on top of the T-shaped gear casing is injection moulded and quite rugged.

When fitting the motor, file the slot for the motor adjustment so that should you want to fit a larger pinion you can do so, because as the slot is at the moment, a larger pinion will fit too tightly into the teeth of the spun gear and A: Chew out the spun gear; B: reduce power and over load motor and battery. If this is carefully done prior to installation you can use any pinion you want.

The tyres supplied are low profile sponge



by Laurie St. John



slicks, front and rear. The rubber is soft which will give good grip, but the front will suffer wear problems quickly. When you've had your fur with the car for a couple of meetings, upgrade to a slightly harder compound and you won't oversteer, the tyres will also last longer. One problem I had was the double sided tape used to stick the tyres onto the rims. The instruction book suggests that there are 3 components to this tape. After half an hour I lost my cool and threw the tape away in frustration. Even with my specs on I couldn't see a separate film to remove from the tape to make it stick to the tyre. One side is quite easy, the other - forget it! A quick line up on the rim with the tyre and a few drops of Cyano (Super Glue or the like) and all was well again. Building the ball differential is a snap. The instruction book is clear and will present no problem even to the inexperienced builder. The rear axle is ball raced, while the front wheels are bronze bushed. A little extra money spent at your local hobby shop will see you off with a set of ball raced bearings at the front, not to mention a better car to boot.

I have run-in the motor and being asked by the boss to review the kit as an "out of the box" type article, I left my electronic speedo in the off-roader and fitted the kit supplied resistive speed controller.

The weight of the vehicle is increased because you need to fit an extra (second) servo, but unless your getting serious about racing this isn't too much of a problem. The standard motor (RS540 Sport Tuned) gives good top end speed while the resistive speedy gives an economical means of controlling your speed.

#### BODY

The sleek lines of this car are a credit to modern automotive design. I had the pleasure, approximately 18 months ago to see a real C11 at the Melbourne Motor Show. After fighting ones way through a six deep crowd, the impression left in ones mind is, speed - speed - speed.

The lexan body is a good, sleek aerodynamic sculpture of the real thing. I recently purchased a pair of Tamiya scissors, specifically designed for cutting body shell. These make the world of difference if you have been used to using kitchen scissors. Highly recommended!

Paint colour was a bit of a guess as I was in a rush and not close to any hobby stores. The local K-Mart auto parts department came in handy. I chose a can of Power Plus Touch-Up for a Nissan. The colour as luck would have it is a near perfect match to the silver on the decal sheet. The colour I chose was "Silver sheen Metallic" (S/T No.1114). I wasn't too fussed about a full scale appearance and opted not to fit the realistic looking headlights as supplied in the kit. If this is your thing fit them and you'll have a great looking car, but don't forget to mask out the windows as well as the headlights when spraying. All body part holes are pre done for you so there are no excuses for a body that doesn't sit squarely. Cut the decals from the sheet and fit them as indicated and you will have a very attractive Merc. that will be the envy of all your friends.

#### CONCLUSION

An easy to build, rugged 1/10th on-road racer that will give good performance and value. Spend a little extra for front ball races and a electronic speedo and you will have a vehicle that will give hours of fun - and no mud to clean off!



## REVIEW AT A GLANCE

Quality of Instructions ★★★★★  
 Ease of Construction ★★★★★  
 Quality of Materials ★★★★★  
 Motor Supplied ★★★★★  
 Chassis ★★★★★  
 Suspension ★★★★★

Ball-raced

Motor Accessibility ★★★★★  
 Balley Accessibility - ★★★★★  
 Stick pack only

Speed Control 3 Step Resistive  
 Body Shell Polycarbonate

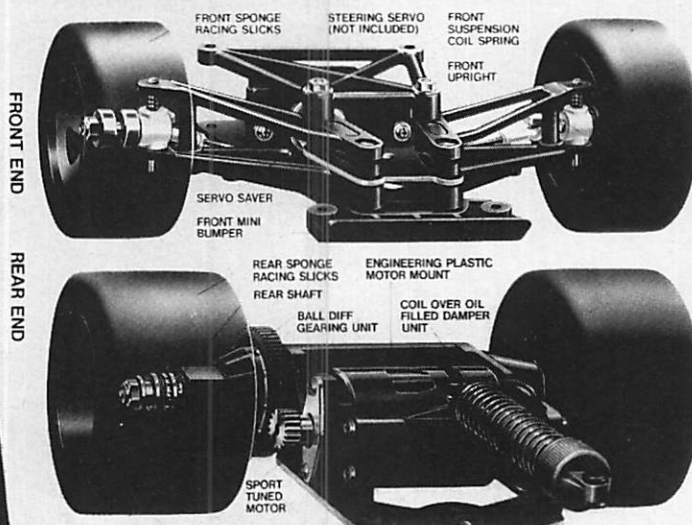
Balance of Car ★★★★★

Handling ★★★★★

Ease of Set Up ★★★★★

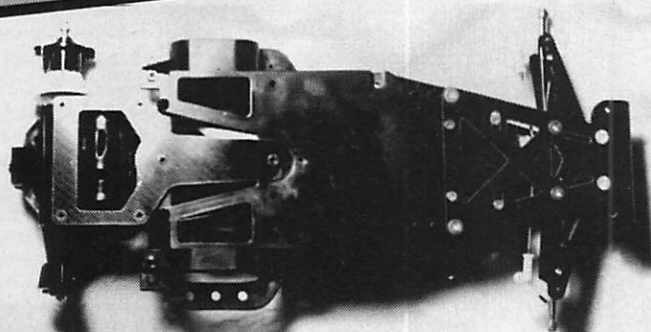
Value for Money ★★★★★

Spot Tuned RS540  
 Bathub with space frame  
 Front - Independent Coil  
 Rear - Single Coil over  
 Oil filled Shock  
 Rear - Yes  
 Front - Brushes

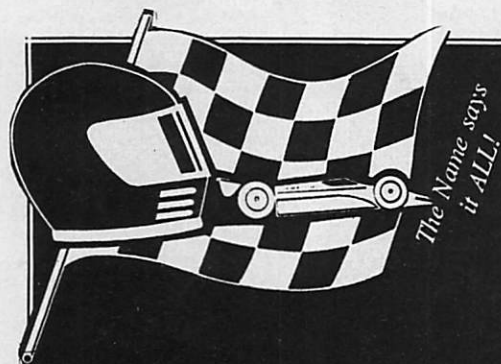
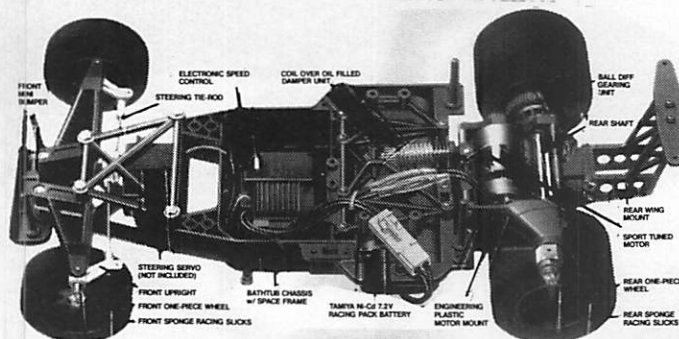


*These artist impressions give an excellent idea of the front and rear set ups.*

*An option that most racers will include in their shapping is electronic speedo's or Tamiyas all in one Adspec, CPR (Control Processing Receiver) unit. The tub has enough for even the biggest of speedo's.*



*Underview of the chassis showing FRP T-shaped gear casing mount and front FRP chassis plate.*



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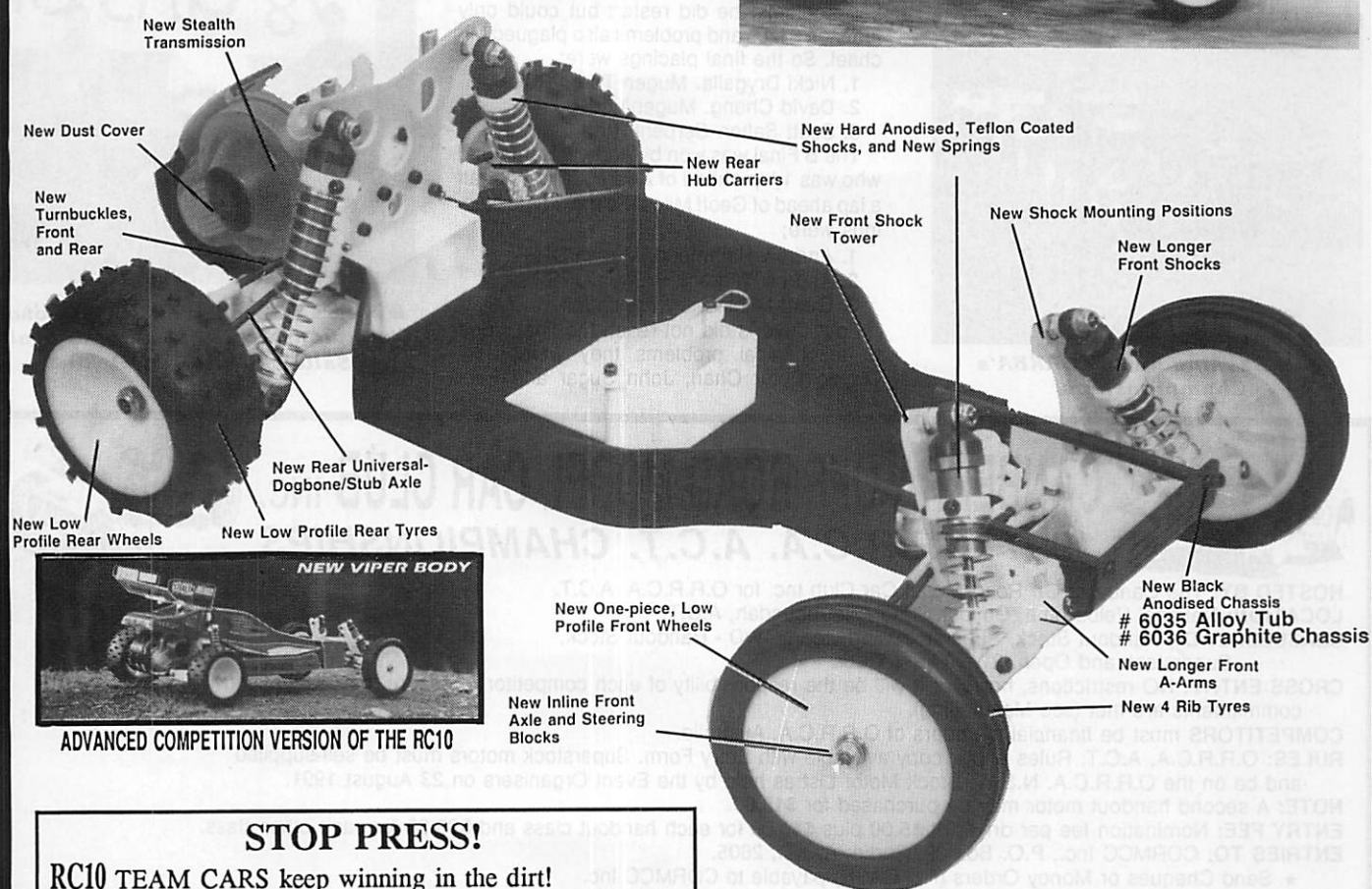
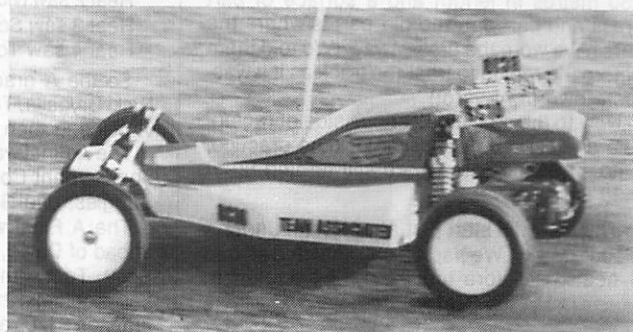


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 FIRST 1991 "Modified" St Ives Cup (Andrew Bolton)  
 FIRST 1991 ORRCA Shield (Modified) Knox (Reece Birtles)  
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# 1/8 SCALE OFF ROAD CHAMPIONSHIPS.

Sunday 19th May saw the running of our second Club Championship. Our club and also another club the Southern Suburb's Club joined together to make it a full field of entrants.

The track is purpose built for gas buggies 250 metres in length and a surface of part grass and part dirt, the dirt part is where the cars have worn the grass away. (We told them before the racing to treat the track as if it was there own front yard!)

Now to the so called serious side of racing. The day started at 8am for 2 hours practice, but some members were still turning up at 9.30 am.

The race did start just after 10 am under a cloudless sky. We had 12 entrants and all had 4 heats, 2 before lunch and 2 after lunch.



**1/8 Gas line up at CORRBA's Championships.**

Within those heats each driver had to race the clock for 6 minutes and complete the most amount of laps to see who qualified for the A and B final.

Heat 1 saw Nicki the fastest with 14.1 laps.

Heat 2 saw Nicki again fastest with 13.6 laps.

Heat 3 saw Scott the fastest with 13.2 laps.

Heat 4 saw Tom the fastest with 13.6 laps.

So the A grade final starting line up was Nicki Drygalla, Tom Drygalla, Scott Salter, David Cheng then Michael Roberts.

The A Final was made up of 4 Mugen's and one Serpent Cobra, the engines were 3 Rex Buggies, one Rossi and one OPS.

The A Final was won by Nicki, half a lap ahead of David, a further half a lap back was Scott, Tom withdrew on lap 3 with mechanical problems, he did restart but could only manage 6 laps and problems also plagued Michael. So the final placings were;

1. Nicki Drygalla. Mugen Turbo/Rex
2. David Cheng. Mugen/OPS
3. Scott Salter. Serpent/Rossi

The B Final was won by Andrew Hammond who was 1 lap ahead of Andrew Tilbrook half a lap ahead of Geoff Miles. So the B final placings were;

1. Andrew Hammond. Mugen/OPS
2. Andrew Tilbrook. Mugen/OPS
3. Geoff Miles. Mugen/Mondial

Four driver's did not reach the final's due to mechanical problems they were; Joel Dwyer, Peter Chan, John Sugar and Paul

Savoy.

Everyone enjoyed themselves. The BBQ lunch was cooked by Wendy and Mary. Everyone is looking forward to the next race which will be a State Championship held on the 21st and 22nd of September.

Anyone interested please contact Tom, President of C.O.R.R.B.A. I would also like to thank all the contestants for making the whole day a very enjoyable and pleasurable event. Hoping to hear from anyone interested in joining us in 1/8 gas Off-Road.

Tom Dygalla  
President of C.O.R.R.B.A.  
PH: (046) 27 2235.



**Winners at Sydney's 1/8 Off-Road Championships. Left to right: Scott Salter, Nicki Drygalla and David Cheng.**



## CANBERRA OFF ROAD MODEL CAR CLUB INC. 1991 O.R.R.C.A. A.C.T. CHAMPIONSHIPS



**HOSTED BY:** The Canberra Off Road Model Car Club Inc. for O.R.R.C.A. A.C.T.

**LOCATION:** National Velodrome, Goyder Street, Narrabundah, A.C.T.

**CLASSES:** 2WD - Handout Stock, Superstock and Open. 4WD - Handout Stock, Superstock and Open. 2WD Open Truck.

**CROSS ENTRY:** NO restrictions, however it will be the responsibility of each competitor to ensure that marshalling commitments are met (see Marshalling).

**COMPETITORS** must be financial members of O.R.R.C.A. Australia.

**RULES:** O.R.R.C.A. A.C.T. Rules apply, copy available with Entry Form. Superstock motors must be self-supplied and be on the O.R.R.C.A. N.S.W. Stock Motor List as held by the Event Organisers on 23 August 1991.

**NOTE:** A second handout motor may be purchased for \$15.00.

**ENTRY FEE:** Nomination fee per driver of \$5.00 plus \$40.00 for each handout class and \$25.00 for each other class.

**ENTRIES TO:** CORMCC Inc., P.O. Box 39, Curtin, A.C.T., 2605.

★ Send Cheques or Money Orders (NO CASH) payable to CORMCC Inc.

★ Entry fee includes return postage, SSAE not required.

★ No phone entries accepted.

**CLOSING DATE:** 12th August 1991.

**ENTRY LIMITS:** Minimum of 16 entries per class, Maximum of 96 per day (12 heats). First come, first served.

**MARSHALLING:** Race after yours. Failure to marshal will mean loss of best laps. Substitute marshals allowed - organisers must be advised.

**STRUCTURE:** Four (staggered start) heats, followed by finals. A Finals will be best two out of three (draws will be decided on third result).

All other finals to be one-off. It is intended to run finals for all competitors.

**START TIME:** Sign on from 7am, drivers' meeting and 7.30am, racing from 8am.

**SCHEDULE:** (subject to change if circumstances dictate)

★ Thursday 22 - official practice, 10am to 4pm.

★ Friday 23 - official practice, 10am to 4pm.

★ Saturday 24 - 2WD heats and finals and presentation ceremony.

★ Sunday 25 - 4WD and 2wd Truck heats and finals and presentation ceremony.

★ Monday 26 - rain provision.

**RAIN PLAN:** Wash out Saturday will push 2WD to Sunday and 4Wd and Truck to Monday. Wash out Sunday will defer 4Wd and Truck to Monday.

★ Wash out Saturday and Sunday will postpone meeting.

★ Rain after two full rounds of heats will mean results declared on best laps.

**SCRUTINEERING:** Scales and gauge box will be available. All buggies to be scrutineered after each race. Scrutineering failure means no result.

**PROTEST:** To be lodged within five minutes of completion of the race with \$30.00 deposit, non-refundable if protest fails.

**ENTRY FORMS AVAILABLE FROM YOUR CLUB SECRETARY OF WRITE TO CORMCC INC.**



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PRO Panther Dampner Support Plate.....	\$8.38
PRO Panther 10 Top Dampner Post.....	\$4.34
PRO Panther 10 Dampner Supports.....	\$6.21
PRO Panther 10 Dampner Supports.....	\$7.45
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PRO Panther 10 Rock Ball Set.....	\$18.75
PRO Panther 10 Rear Flex Spacer.....	\$3.68
PRO Panther 10 Rear Hub Set.....	\$22.32
PRO Panther Ride Height Cams.....	\$22.32
PRO Panther 10 Fibreglass Chassis.....	\$22.32
PRO Panther 10 Fibreglass Chassis.....	\$22.32



## 1/18 CAR KIT

Associated RC250 PAN.....\$235.00

## 1/10 CAR KITS

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TRC Lynx.....\$370.00  
TRC Pro10 Sport.....\$200.00



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Frewer VN Commodore.....	\$36.00
Frewer Universal Mounts.....	\$6.50

## TEAM ASSOCIATED

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Thunder Tiger Power Panel.....	\$28.00
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## PARMA 1/10 BODIES

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# CLEANING YOUR BALLS!

## Here's The Low Down On A Simple But Important Procedure

The question of the best way to look after ball races often comes up in letters to the magazine. These little fellows take quite a hiding from dirt, water, side and shock loads. Some of the ball bearings in the races are only a millimetre or so in diameter which makes them very vulnerable. The only maintenance required, or indeed possible, is regular cleaning. Fortunately this is easily achieved - the most difficult part is often gaining access to the bearing.

### WHEN TO CLEAN

Serious racers (no pun intended, just note the subtle difference between racers and races) will pull their cars apart before every major race day and sometimes before EVERY race day. I hear that Cliff Lett does it before every race but this is probably an urban myth. This keeps the cars 100 percent (or 110 percent as some like to think!) ready but is an overkill for the average enthusiast. Get to know how freely the wheels, shafts, gearbox etc spins so that you can detect any change. With a gearbox, a slowing down could mean wear on the gear teeth but for every other moving part the culprit is usually dirty or damaged ballraces. The wheel bearings usually play up first and a quick way to check for tightness is to utilise the play in the driver train to gently rock the wheel backwards and forwards. This way, any grittiness or tightening up can be detected without any dismantling.

### REMOVING RACES

No, this is not what happens when the club ratbag gets thrown off the track. Most bearings are only a push fit and will come out easily but care should still be taken. Strictly speaking you should only push on the outside ring of the

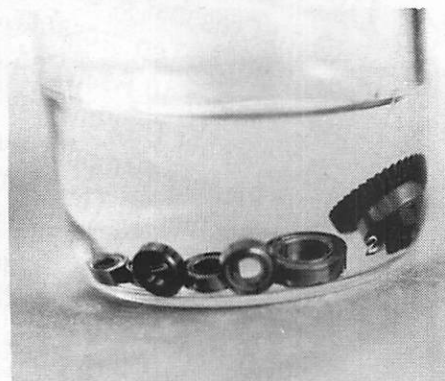
bearing when it is in a housing or on the inside ring of the bearing if stuck on a shaft. Any force applied that has to be transferred through the small balls may distort the bearing and render it useless. With bearings ranging from \$4 to \$40 each it pays to take care. Never push on the seals that are located between the inside and outside rings. These are only made of a soft material that can easily get pushed into the balls. Mistakes cost money.

### REVIVING RACES

All that's needed is a pair of tweezers, some solvent and a toothbrush. We take no responsibility for readers that pinch their mums or sisters toothbrush to dip into dirt infested metho!

Use the toothbrush to remove any obvious dirt on the outside of the bearing then place the bearing into a jar of solvent. There are a number of solvents that can be used but I hesitate to recommend the one that I personally use because of its dangers. Petrol is cheap and effective, but note the warning. Petrol, and particularly its vapour is highly dangerous. Any naked flames, even metres away, can ignite the invisible petrol vapour and cause the petrol to explode in its container. Petrol can also effect the skin. Safer to use lighter fluid (available in cans from larger hardware stores) or metholated spirits (metho). Swish the bearing around in the solvent or leave to soak for a while. Use a new batch of solvent when it gets visibly contaminated.

I find the best way to hold and manipulate the bearings is with a pair of tweezers. See photograph. These types of pointed tweezers are a must in our hobby and are available in some chemists or at Dick Smith Electronics. Slide the tweezers into the bearing and remove from the solvent. Then with the bearing still on the tweezers you can spin the bearing



*Swish the bearings around in a glass jar containing metho or lighter fluid.*

to throw out the solvent and check that the bearing is clean and free. If not, swish around in the solvent some more. Note, do not spin an un-lubricated bearing for long since wear is accelerated. If the bearing still does not spin freely then the only recourse is to replace it.

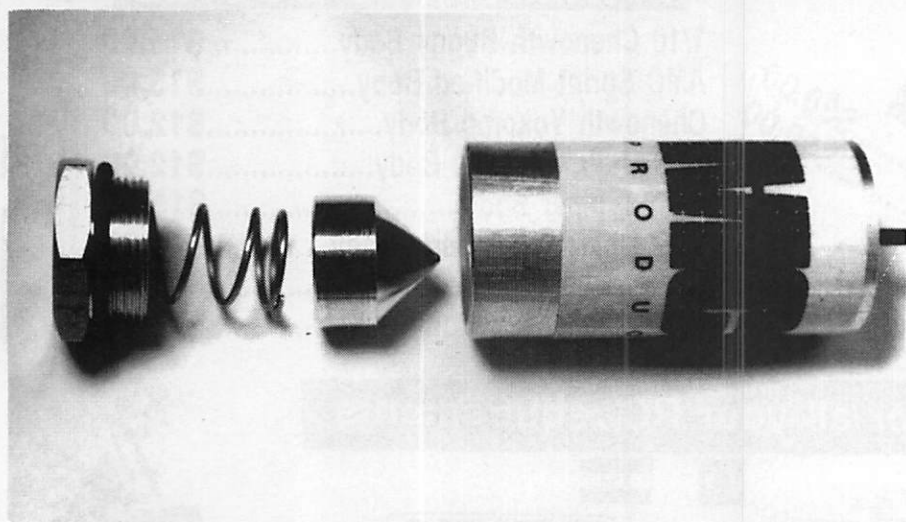
Sometimes it may be possible to carefully remove the metal seals and dislodge any stubborn grit but I wouldn't count on it.

Some bearings have synthetic seals that do an excellent job of keeping out the muck. Do not clean these bearings unless you really have to. The synthetic seals can be removed by careful prising with a pin but do not bend the seal or it may rub on the walls when re-inserted.

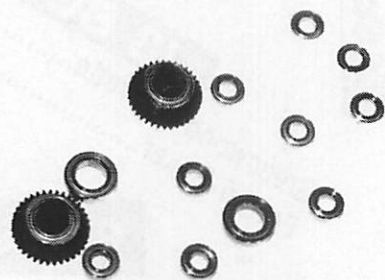
### LUBRICATION OF A NATION

All that remains is to lubricate the bearing before putting it back in the car. If you want to live really dangerously you can run with dry bearings. Some enthusiasts are silly enough to do this. The races spin very freely but are junk after a very short time. Expensive, and not necessary with modern lubricants.

We covered the various lubricants in the "What's New and What's Due" section last issue. To re-cap, you can use any light oil (no



*For quick trackside maintenance there's the MCS bearing cleaner.*



*Lay bearings on clean white paper after cleaning.*



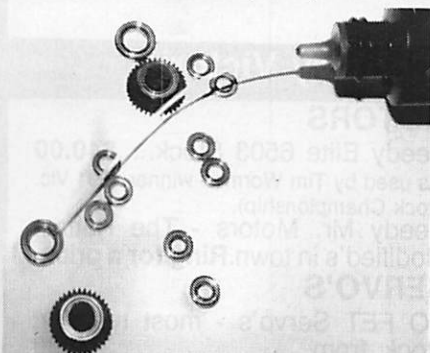
motor oils or axle greases please!) such as 3-in-one, Tri-Flo, or maybe WD 40, but the latest synthetics such as Hyspin are the best. Don't over do the application. You only need enough oil to lightly coat the balls which translates to just one or two drops. Any more is just

wasted and can attract more muck.

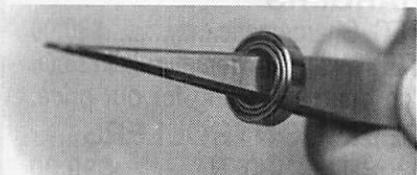
Finally, give the inside and outside of the race a wipe with a clean cloth to remove any lubricant. We don't want to encourage the bearing to spin on it's shaft or in it's housing. As a further safeguard I recommend a small

amount of Loktite 242 threadlock to secure the bearing on the shaft and in the housing. This makes for a more permanently tight shaft with minimum play.

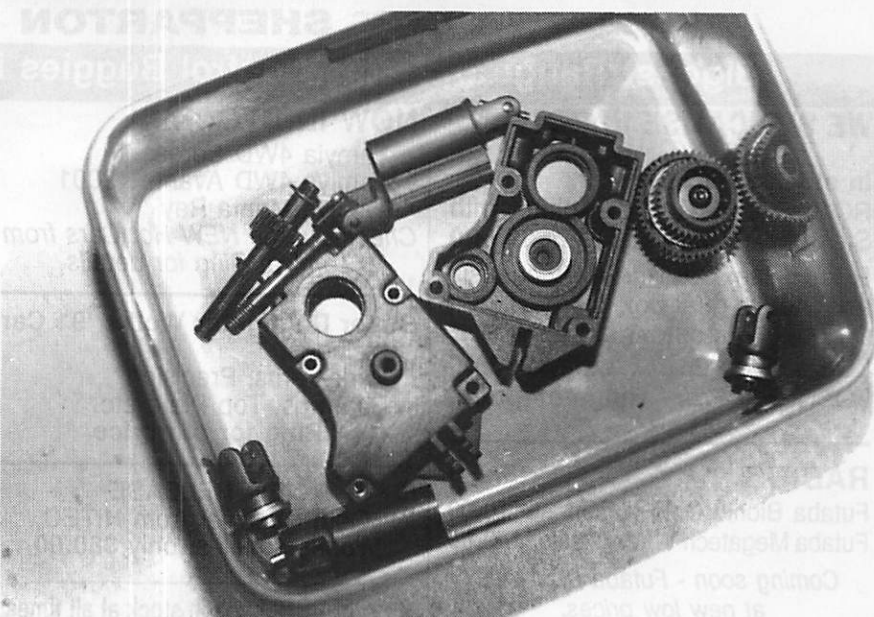
Remember, keep your balls clean and you'll have a more potent weapon!



*Oil bearings sparingly and allow to drain excess into paper.*



*Tweezers are ideal for handling and testing bearings.*



*Always keep dismantled parts in a clean container.*



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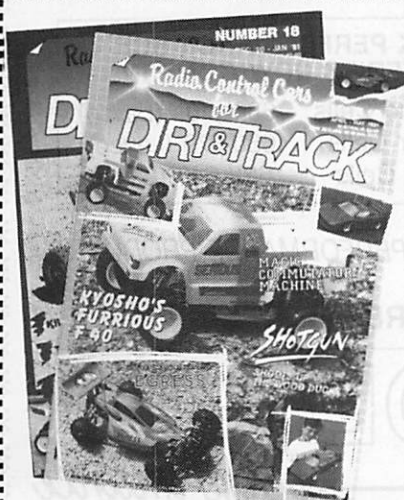
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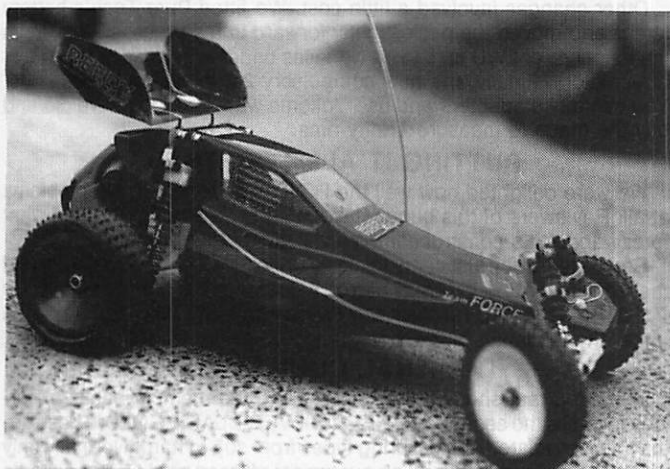
# RC 10 GRAPHITE TEAM CAR

## *Latest Version of the Worlds Most Successful Buggy*

The indefatigable RC10. Associated's all conquering two wheel drive that's been around so long the name is almost generic. Like the Swedish Volvo, the RC10 does not need a cosmetic face lift every year. The basic design was so sound and so advanced that changes are usually subtle. Such as the incorporation of new materials as they become available and changes to the suspension geometry. Like the Volvo, the RC10 is solid and reliable but unlike the pondering Swedish marque it is race bred and extremely competitive. It must be the most successful RC car of all time and at all levels from street racing to world champs.

Obviously a new RC10 is a major event in RC land. The Graphite Team Car is such an animal and the kit contains all the latest refinements. Enough to make this version almost world titles ready - straight out of the box. A fact that has not escaped our top drivers and Associated aficionados who have quickly updated to the Team Car.

The experts do not need convincing but what about the rest? The new chum who is looking for his first, and maybe last, competition 2WD. There are at least three other comparable machines to choose from so we will take a critical eye to the latest RC10. We won't dwell on it's heritage or where it came from - only where it is going.



**New Viper body gives RC10 Team Car the lean and mean look.**

### SHOCK ABSORBERS

The original RX10 shocks are the standard by which others are compared and they are commonly found as "hot ups" on other buggies. Associated must have had a difficult job improving them. But improve them they did with a new design that is even smoother and more durable. Grit is the mortal enemy of shocks, it grinds away the stem and seals and causes them to operate inconsistently and to leak oil. The new shocks have a hard anodised coating which resists abrasion better and makes for a smoother ride. As a bonus, the coating prevents the piston slowly eroding the aluminium and this means that the shock oil stays clean. The oil does not turn the usual yucky grey colour. The all important stem seal is also changed. This is a very critical area that has to keep the oil in and the dirt out whilst not resisting the movement of the shaft. The new shocks have a conventional two "O" ring seal but the innovation is that the seal components are inserted from the inside of the shock body thereby allowing a split nylon washer. See sketch.

Some tips on shock building. Lay out the parts on a piece of clean white paper. This helps prevent loss of the small components, keeps things clean and looks professional. As usual I prefer to screw the plastic ball link onto the shaft and then insert the shaft up into the shock body and affix the piston and E clips. This is in lieu of passing the threads on the shaft through the O rings which can damage them. I also like to file a slight flat on the shaft, just above the threads, to enable it to be gripped with side cutters whilst screwing on the plastic ball links. Always check the piston edges for burrs etc., (none were found) and that the shaft/piston slides smoothly in the body before filling with oil. The adjustable spring clamp comes with a thin flange that spaces the spring away from the shock body. Don't do as I did and cut this flange away after I had mistaken it for mould flash. Yokomo have an option of clip-on spring spacers of various sizes (like schumacher's) that give more precise spacing.

The associated shocks do not contain a diaphragm or any method of

absorbing the displaced oil when the shaft moves into the body but this doesn't seem to matter. They are still one of the best shocks around - for a long time.

### STEALTH GEAR BOX

What can we say? The Birtles said it all last issue. Many superlatives have been heaped on Associated's new 'box' and they are all true. It's light, strong, easy to build, durable, dirt resistant and very free. It comes with a superb 12 ball differential and an adjustable slipping clutch. It's the only one of the top three 2WD buggies with a slipper as standard.

Why should you want a slipper clutch? After all, loosening off a ball diff gives a similar effect. This is what I thought until running the Team Car convinced me otherwise. Sometimes, like on a high traction track, you may want to run the diff fairly tight but have the drive slip just a little to take the edge off the initial power surge from today's hideously powerful motors. The added adjustment of the slipper lets you do just that. Also, a slight amount of slip should always be present in the drive train to cushion the shock loads when landing after a jump. There have been other slipping devices supplied with kit cars but none as good as this.

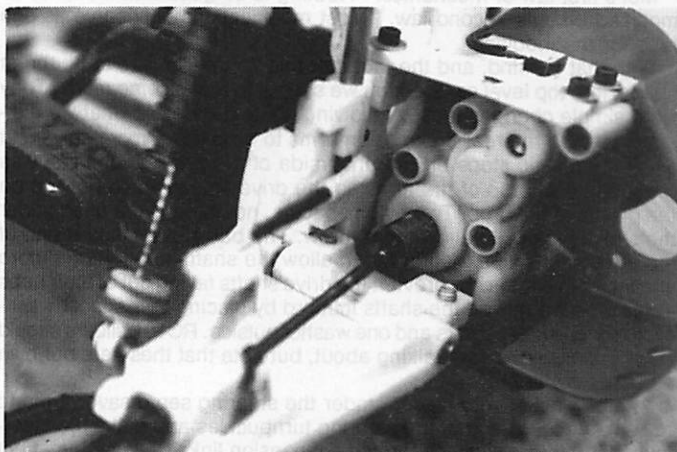
For the typical super slippery track the Stealth's differential can be set as recommended, but still not slip when taking up the power. There are now some very nice diffs around in model cardom but this one takes the cake. Actually I think it owes much of it's smoothness to the supplied Stealth Diff lube (part No. 6591) since I have tried this lube on other diffs with amazing results. Associated make the usual claims about the lube being the best available - countless hours of testing to find it - do not substitute - etc, but in this case they have a point. Do yourself a favor and use it.

### OTHER BITS

We've covered the new components, which also happen to be the most significant parts of the latest RC10, but what else do you get for the money?

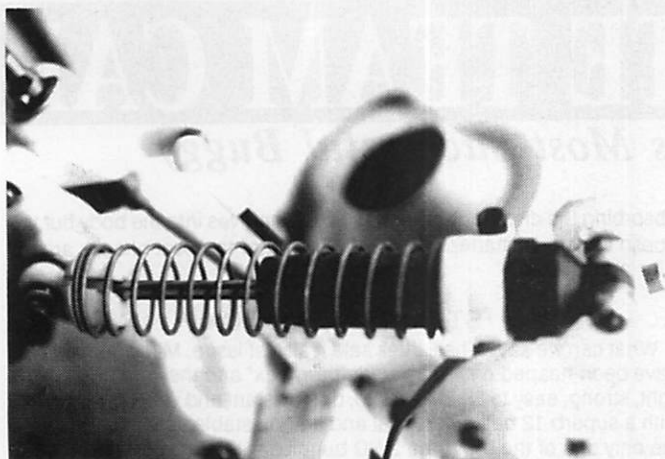
The graphite chassis (or Carbon Reinforced Plastic, CRP, to give it the correct name), plays a major part in the effectiveness of the car and the Associated version is quality stuff. Light, stiff, beautifully moulded and with clean countersunk holes to present a smooth bottom to the rough track. It is very important that the chassis holes are accurately drilled to prevent binding in the various components and mis-alignment between them. Here, Associated reap the benefit of their years of development and improvements since everything fitted perfectly. I always check that the wheel exles are at 90 degrees to the chassis centreline and that the wheelbase is within 1mm each side and the RC10 was spot on. It's little things like this that make a champion.

As with all CRP parts I strongly recommend that super-glue be spread around the edges. This seals the layers in the composite and stops them fraying like a poor girls petticoat. Particularly important along the front edge of the chassis if a bumper is not used. The Team Car is also available with a black aluminium tub chassis. Although heavier, this version is cheaper and claims better vibration damping qualities.



**The heart of the new Associated - Superb Stealth gearbox.**





**Are these now the Ultimate Shocks?**

Other goodies include:

- Universal jointed, steel drive shafts.
- Turnbuckle adjusters (left and right hand threaded rods) for steering ties and suspension camber adjustment.
- Ball bearings throughout - naturally.
- Fibreglass (or FRP) shock mounts.
- One piece lightweight wheels, 2 inch diameter rears and 2.1 inch fronts.

Over the years Associated have refined the manufacturing, the engineering, and made subtle changes to the car geometry and set-up. These are items you cannot easily perceive or brag about to your mates. This, as much as any new development, is responsible for the world beating performance of the latest RC10.

### THE TERRIBLE TRUTH

Let's get real for a moment. any would-be purchaser of this competition machine is going to look closely at the opposition as well. Assuming our potential customer has an IQ somewhat over the speed limit it wouldn't take him/her long to see where the RC10 still appears to lag behind the others. The suspension arms are a give-away. At a time when other manufacturers are striving to make the arms as long as physically possible (longer arms have theoretical advantages during cornering and on bumpy tracks) the RC10's arms look wimpish by comparison. A design change would be easy to make since there is an obvious gap between the inboard end of the rear arms and the outside of the gearbox, and the front of the chassis seems unnecessarily wide. Look at the front end of Masami's world titles winning Associated to see what can be done. Then we still have the heavy steel dog-bones and universal joint drive shaft arrangement when the lower rotating mass of plastic sliding shafts would be preferable.

Apart from re-tooling costs there doesn't appear to be any practical reason why Associated hasn't adopted these changes. I suspect the motives are more to do with marketing strategy. We might see these changes eventually but why mess around with a proven design when the present configuration is good enough to at least keep up with the opposition? The current design may have a few theoretical disadvantages but theory doesn't mean a hoot if the thing still performs. And the competitive results of near standard Team Cars show how well it performs - as we were soon to find out.

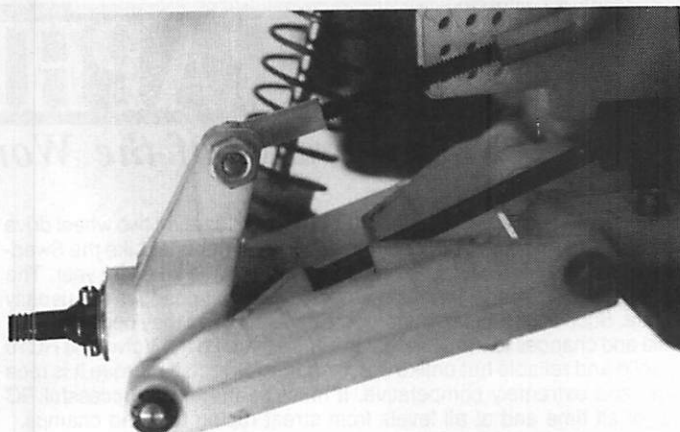
### MODIFICATION OF A NATION

Mel's first law of mechanics. "Nothing is so good that it cannot be modified". Mel's second law, "Most modifications only serve as ego trips for the modifier".

With that in mind, and the fact that this Team Car was to be thrust straight into top level competition we set out to make some mods. They were simple changes mostly involving no costs. Here's what we did:-

We wanted the rear suspension arms to drop down more so we cut away the plastic stops on the underside of the arms. A channel was ground into the top of the arms so the drive shafts would not rub on the plastic at full drop. Two nylon spacers, not three, were used under the shock pistons to allow more throw. The ball at the inboard end of the drive shafts was ground flat to allow the shafts to penetrate more into their drive hubs. To prevent the drive shafts falling out of their hubs at full drop we moved the shafts inboard by placing four spacer washers inside the hub carriers and one washer outside. RC10 builders should know exactly what I am talking about, but note that these are our own personal preferences.

A thick washer was placed under the steering servo saver arms to raise the inboard end of the steering turnbuckles and make the steering link more parallel with the top suspension link. This has the effect of inducing less bump steer with suspension movement and is essential if 20 degree caster blocks are fitted.



**Mods. to the D&T RC10 give more rear suspension droop.**

Also at the front end we fitted tie wraps around the supplied servo saver, thereby rendering it ineffective, and used the more positive Kimbro servo saver on the servo output arm.

We like to lightly radius the edges of the CRP chassis with emery paper before sealing with super-glue and we dispensed with the wheel wing nuts in favour of aluminium locknuts.

Other changes involved a little cost. We fitted Pure Tech's battery straps and moved the pack slightly forward in the process. This stops the tendency of 2WD cars to do wheelies under acceleration from powerful motors. Finally, the now compulsory 2.2 inch rims were fitted. You can make adapters and use Yokomo wheels or do as we did and buy the made to measure Trinity rims.

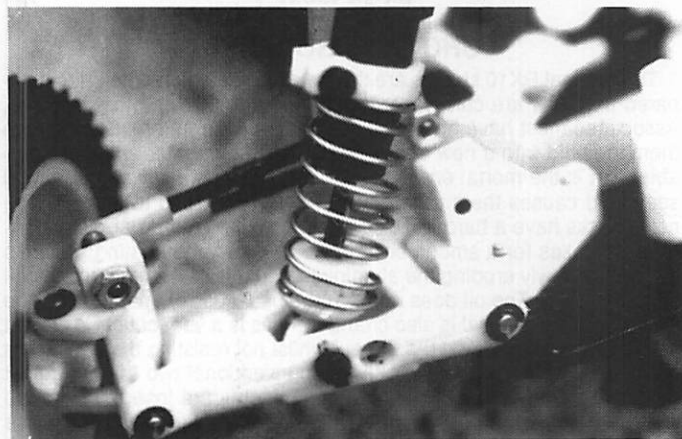
### PUTTING IT ALL TOGETHER

We were delighted how well the RC10 went together. No problems at all. Reviewers of this buggy have more problems figuring out what to say about it's construction! We will say nothing more.

Rear wheel track just came in nicely under the 250mm maximum and the front track about 10mm narrow. Ready to run weight with a KO PS901BH servo, KO receiver and Purge Force SEC was half an ounce under the minimum of 3 1/4 pounds.

### THE FINAL COUNTDOWN

One thing that should be in-grained into the memory banks of serious racers is the sequence GREEN-SILVER-BLACK-GOLD. These are the four Associated shock spring types from soft to hard. Normally only greens and silvers are used on our typical off-road tracks. Associated's high grade silicone shock oil was used - 30 weight rear and 20 front.



**Front end features new grey shocks, turnbuckle adjusters and 15 degree castor blocks.**

The RC10 manual will be a big help to newer racers. Not just for setting up the car but also things like battery charging/discharging. This may be a world class car but during it's evolution Associated have not forgotten that it will be bought by anything but world class drivers. It still makes a great entry level buggy - providing you slow it down.

This is what your editor had to do for the first race outing. Our normal open type motor was just too quick for the local track so I had to go up a wind. That's the Stealth gearbox for you, it is incredibly efficient. The other first impression was of terrific turn-in. Steering response is so quick and positive that it almost feels like a four wheel drive car. This was on a fairly smooth track and with the supplied 15 degree front castor blocks fitted. Twenty five degree (giving more lean-back to the front axles) are available which should improve high speed turning even more. We did some fine tuning of the shocks and even had the mae-

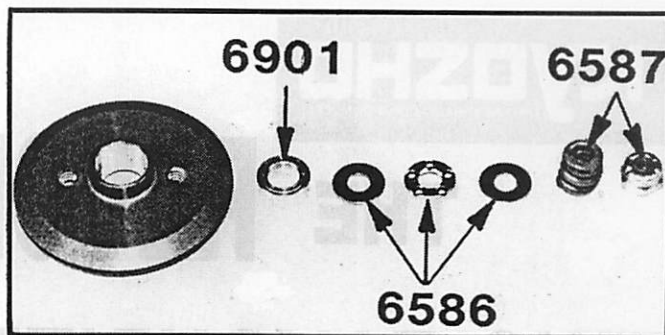


stro Birtles breath a little on the car but it works very well the way it comes.

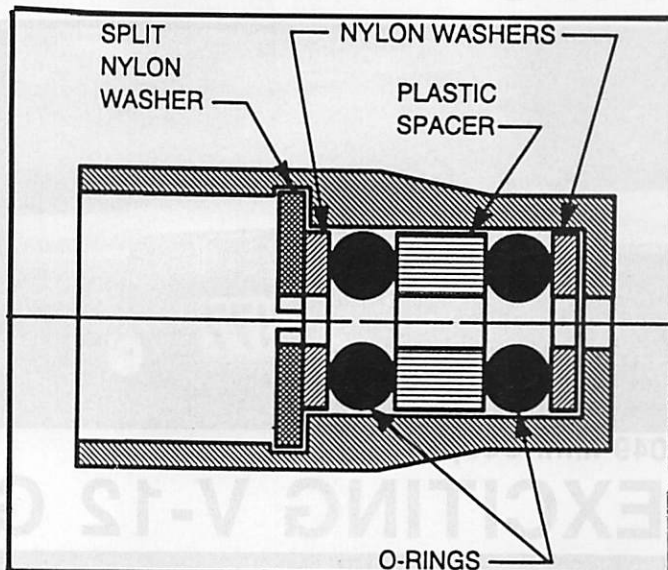
We've told it like it is with this latest in the long line of indefatigable RC 10's. The car is a mixture of brilliance and anachronism but the fact is that it really can make you a winner - and give a long and reliable life to boot.

## REVIEW AT A GLANCE

Quality of instructions	★★★★
Ease of construction	★★★★
Quality of materials	★★★★
Motor	Not supplied
Speed controller	Not supplied
Chassis Type	CRP (graphite)
Suspension type	Lower A arms. Adjustable top links
Shock type	Oil damped, sprung shaft
Differential	12 ball
Ball races	Throughout
Motor accessibility	★★★★
Body shell	Polycarbonate, Viper body
Handling as tested	★★★★
Approx Price	\$470.00



The RC10 Slipper clutch.



Cross section of new shock seal.

## Dirt & Track CLASSIFIED

For Sale: Tamiya Boomerang 4WD, Acoms Techniplus radio, Technigold motor, dual front shocks,, 8.4V battery and charge leads, heaps of spares, great condition. \$325.00 ONO. Phone James after 5pm. (08) 49 3735. Adelaide.

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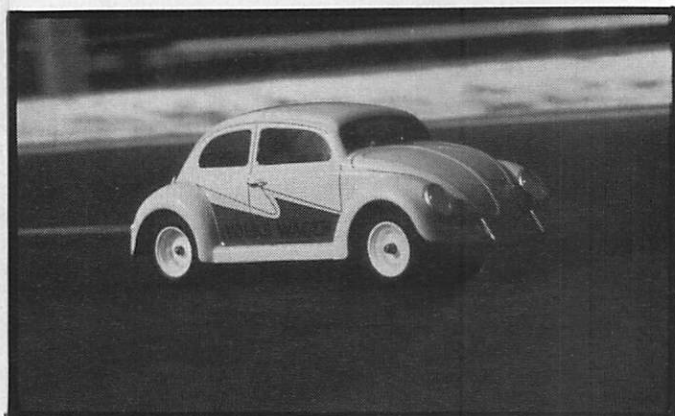
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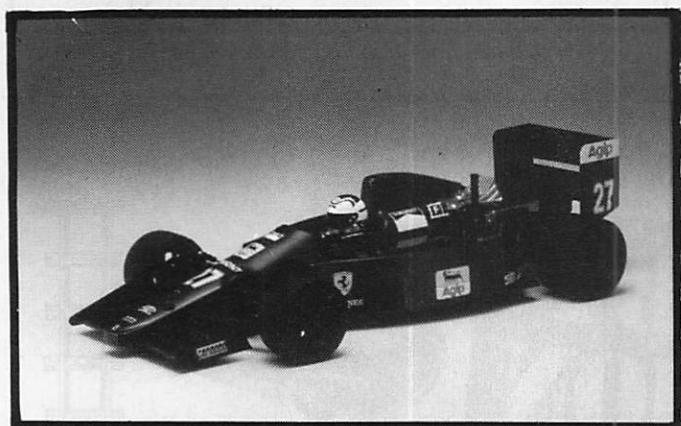


049 Mini Cooper

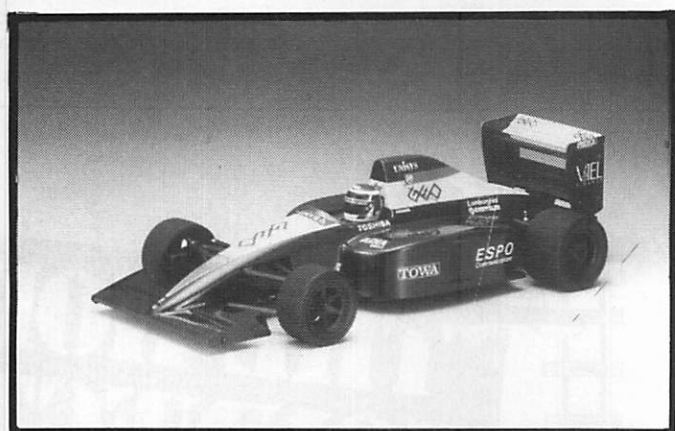


049 VW Beetle

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For those who have Formula One aspirations Kyosho have produced two scale V12 models, the Ferrari F 189 and the Espo Larrousse. Both powered by Cox .049 motors. These large scale 1/10th models have detailed aerodynamic bodies and wings as per the full size cars. The throttle equipped .049 motors have built in priming pumps. Just a twist of the rear wheel for easy starting will have you on your way.

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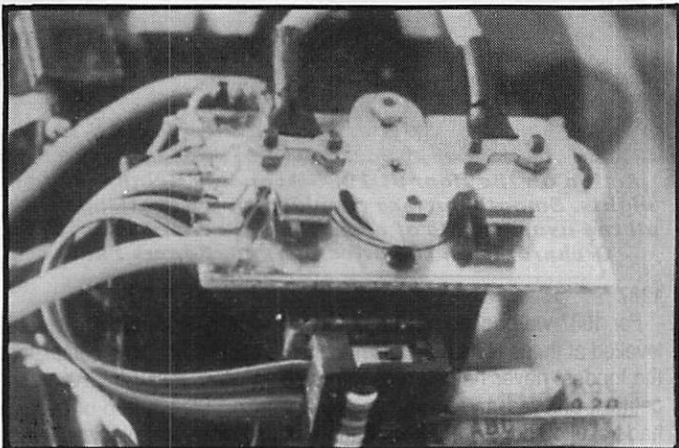


# WHERE WERE YOU IN '83?

by Bob Roxburgh

**Editors Introduction.** We may think of RC cars as a new sport but time rapidly gets away and it's now actually seven years since the inaugural electric off-road nationals, (gas car titles go back even further). We thought it might be interesting to take a brief look at past Nationals. It helps to see where we are going if we know where we've been. We asked one of the originals, Bob Roxburgh from Sydney, to search his memory banks and enlighten us with his recollections of those earlier days. Here's Bob's potted history.

When the Editor asked me to jot down a few comments on the previous Nationals I was rather flattered, that is until he added: "You're the only one old enough to have been around for the first one!" Thanks Mel! Despite the insults I decided to proceed before it was too late.

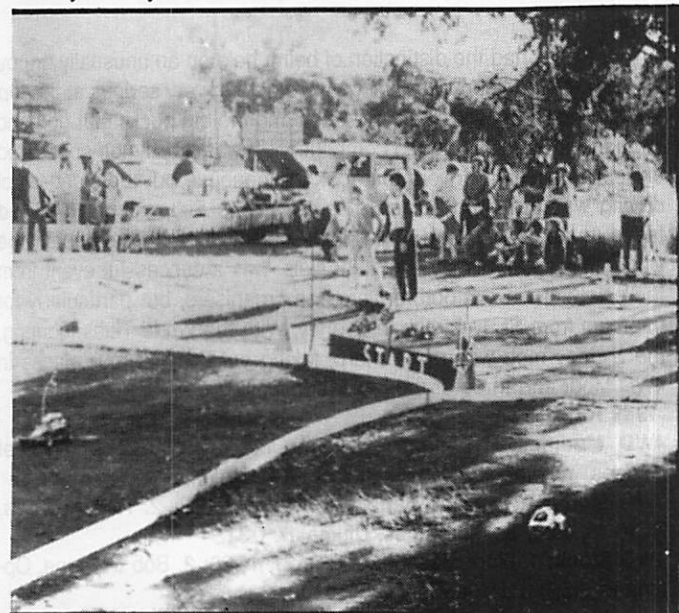


*In 1983, this speedo was considered pretty hi-tech. The ABC speed controller with the plug-in resistors in the foreground, connected by ribbon wiring to the circuit board. Photo M.J.*

## 1983

The very first Titles were held at the St. Ives track in Sydney in January 1983, and attracted a total of 48 competitors. In those days, it was real off-road racing and the track was purposely left to break up during practice. The cars were virtually all Tamiya based, some heavily modified with American after market parts from RCH and MIP. A couple of Tamiya Super Champs were brought out for the event and this created a lot of interest but there wasn't enough time to set them up to be competitive. The only non Tamiya cars were AYK's driven by Rob Lowe and Colin Greneger which were placed third and fourth in Unlimited class.

The first Nationals were a lot of fun and included a barbecue lunch and drinks for all competitors. I remember a 12-year-old kid who came to the showgrounds to watch a dog show. He asked me how he could join the club. His name was Andrew Bolton — winner of 4WD at the Nationals just six years later.



*Interested spectators at the 1984 NSW round one contest at North Ryde.*

## TOP THREE IN '83

**Unlimited:** 1. Jeff Greneger, 19.8 laps, RCH; 2. Trevor Harrop, 18.2 laps, Tamiya; 3. Rob Lowe, 18.0 laps, AYK.

**Modified:** 1. Robert Bolger, 16.2 laps, Tamiya; 2. David Barbera, 15.9 laps, Tamiya; 3. Shawn McPhee, 15.3 laps, Scorpion.

**Stock:** 1. Dean Blaxell, 14.7 laps, Tamiya; 2. Eric Artitsch, 14.5 laps, AYK; 3. Michael Brooks, 13.7 laps, Tamiya.

**Concourse winner:** Greg Harlock.

## 1984

Having survived the 1983 event, and now feeling fairly confident, the clubs decided to do it again in 1984. It should be pointed out that in those days there was no formal organising body and these events were all joint efforts by the various clubs existing at the time. We decided that the next Titles should be at a "neutral" venue (which was a story in itself) and were fortunate to acquire the horse marshalling yards at the Sydney Exhibition Centre during the Motor Show. All the drivers got used to the strange aroma emanating from the track!

This was the first major event at which 4WD buggies were entered. Mark Mason driving a modified Hirobo Zerda and Chris Oxford with a Kyosho Progress took out Senior Stock and Unlimited respectively. The thing that stands out in my mind about the '84 Nationals was the Unlimited A final. The race between Oxford and Col Greneger was the best and closest race I have ever seen with the lead changing several times and both cars never being more than a couple of feet apart.



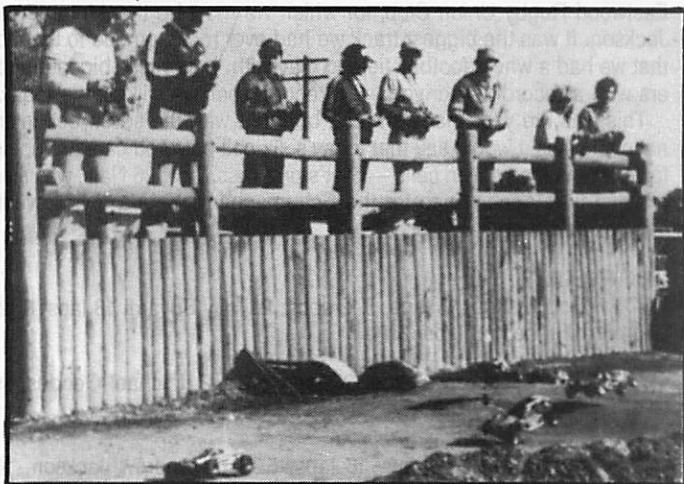
*The "new" 1984 Wollongong Club track at Reed Park, Dapto, scene of round 2 of the NSW Interclub Shield. Photo from Mel Gillot.*

## 1984 RESULTS

**Junior Stock:** 1. Michael Toms, 14.55; 2. Byron Jones, 14.35; 3. Jason Sawtell, 13.95.

**Senior Stock:** 1. Mark Mason, 15.4; 2. Bob Beniston, 14.55; 3. Scott Seville, 14.55.

**Unlimited:** 1. Chris Oxford, 15.65; 2. Colin Greneger, 15.55; 3. Paul Jones, 15.35.



*Three machines airborne in lap one of the 1984 Senior Stock race at the State Champs. Already the placegetters have achieved their finishing order after only 10 metres! Bankstown Club drivers' stand seems substantial enough! Pic by Colin Greneger.*



## 1985

By this stage, off-road racing had taken off in the other states and Queensland had been given the honour of hosting the 1985 Titles. Unfortunately I was unable to attend this meeting but have gleaned some details from the report in Airborne magazine. There were 114 entries at the Lawnton Showgrounds and the quality of driving was excellent on the tight track, (the tracks are always tight when you're going fast!). This was a time when the top guys were finding drastic things to do to stock motors to make them go faster without breaking the rules — a situation that had some of the locals amazed. Other notables included a separate class for the smaller 380 size motors and an obvious corner cutting incident during the Unlimited final. And just look at those future champions in Junior Stock!

One other historical event at this meeting was the formation of a National governing body for off-road, ORRCA Australia.

### 1985 RESULTS

**380 Class:** 1. Greg Aplin, 16.35; 2. Craig Gil, 14.3; 3. Peter Dawson, 14.3.

**Junior Stock:** 1. David Conroy, 19.0; 2. Andrew Bolton 18.55; 3. Andrew Nelson, 18.4.

**Senior Stock:** 1. Ross Enticknapp, 19.0; 2. Robert Muwhinney, 17.95; 3. Scott Kennedy, 17.9.

**Unlimited:** 1. Peter Philiposian, 19.1; 2. Colin Greneger, 18.9; 3. Michael Toms, 18.35.



*No prize for guessing where these people came from to attend the 1985 NSW State Titles.  
Photo from Michael Jersey.*

## 1986

Back in NSW again. This year was special to me because at the time I was Chairman of ORRCA NSW and thus received a first hand appreciation of the work involved in organising one of these events.

Mike Reedy from the USA also attended the '86 Nationals which elevated the event in status. The track was custom built at the Ryde-Eastwood Rugby Union Club, for which we must be thankful to Dave Jackson. It was the biggest track we had ever raced on due to the fact that we had a whole football field to play with. It was also big in numbers with a record 200 drivers — a record I believe still stands today.

This was the year that we had a brief flirt with the seven cell International class. I would say that today's six cell powered cars are going faster than those seven cells — that's progress. The '86 Nats, was also the first time appearance for the Schumacher CAT in a major event. The rest is history.

### 1986 RESULTS

**2WD:** 1. Rob Bishop, 18 laps, 6.12 secs; 2. Tony Bovard, 18 laps, 6.12; 3. Craig Klingbeil 18 laps, 6.14.

**4WD Stock:** 1. Andrew Bolton, 20 laps, 6.24; 2. Michael Geddes, 19 laps, 6.03; 3. Winston Bartolo 19 laps, 6.12.

**Unlimited:** 1. Craig Bowring, 16 laps, 5.08; 2. Andrew Jackson, 16 laps, 5.14; 3. Michael Bramble 16 laps, 5.23.

**International:** 1. Jeff Greneger, 20 laps, 5.04; 2. Guy Evans, 20 laps, 5.08; 3. Ray Wood, 19 laps, 5.00.



*Action on the floor at 1986 Avondale Heights buggy nights. Smooth surface provides a new challenge with all the usual thrills of close racing. Prime mover, Peter Orchard, is on the drivers stand. Rogers Photo.*

## 1987

For 1987 we packed our bags for Melbourne. A lot of criticism was levelled at these Nats but as is mostly the case, those who complained the loudest never helped when volunteers were called for. As a competitor I enjoyed myself immensely because of the group of people I had travelled down with. If we hadn't had so many late nights we might have qualified higher than we did! These Nationals were more important than usual since they were the first selection round for the 1987 World Titles to be held in the UK. We also saw the introduction of the three final system. The Schumacher CATs were the ones to beat although the Mugen was still a force to be reckoned with. In the end the CAT was dominant.

### 1987 RESULTS

**2WD Stock:** 1. Jason Forte; 2. Peter Orchard; 3. Jensen Spencer (jnr).

**4WD Stock:** 1. Michael Geddes; 2. Winston Bartolo; 3. Terry Williams.

**Unlimited:** 1. David Conroy; 2. Andrew Reade; 3. Craig Bowring.

**International:** 1. Mike Farnan; 2. Maurice Ahahumada; 3. Brian Sawtell.

## 1988

Just two years ago the Nationals were back at my own track of St. Ives in Sydney. The first attempt at Easter was a disaster as the heavens opened and turned the place into a swamp. The Titles were postponed until the October long weekend when the weather proved perfect. Naturally the organisation was great, having had a "dry" run (!) earlier in the year. The highlight of this event was the participa-

## 1989

These titles had the distinction of being held on an unusually grippy indoor track in Melbourne. Things were getting very serious at the top levels of our sport with ultra high tech and the big bucks that go hand in hand with well developed competition. It was mostly the sponsored or semi-sponsored drivers that took top honours, but the standard of driving was now world class. The era of the Schumacher CAT had faded (temporarily?) and in its place were two cars from Japan, the Dogfighter and Optima. The 1989 Nats. was a successful event from the points of view of both drivers and organisers, but particularly for the team from St. Ives club in Sydney. With the World Titles looming, the Sydney mob was razor sharp, taking out the first four places in 4WD Mod. and three of the top five in 2WD Mod.

### 1989 RESULTS

**4WD Modified:** 1. Andrew Bolton, Optima 19, 9.66; 2. Michael Geddes, Yokomo 19, 12.8; 3. Rick Bartolozzi, Yokomo 19, 13.8.

**2WD Modified:** 1. Rick Bartolozzi, Losi 18, 12.8; 2. Reece Birtles, RC10 18, 9.23; 3. Vail Riches, Ultima 17, 0.32.

**4WD Stock:** 1. Mark Mason, Maxima 21, 14.26; 2. Bob Burbage, Optima 21, 15.9; 3. Dean Fisk, CAT 21, 12.12.

**2WD Stock:** 1. David Crowe, Ultima 20, 4.32; 2. Stephen Ferriggi, RC10 19, 5.4; 3. Craig Simpson, Ultima 19, 6.45.



1990

And so to last year's Nationals. This was distinguished by being extremely slippery, but with a good atmosphere and a successful public relations exercise. Held indoors in conjunction with the Adelaide International Motor Show, it was also the time of the Bartolozzi blitz. The capacity crowd, including 180 race entries, was treated to novelty events and some very skilful racing which culminated in Ric's wins in the two modified classes with Yokomo Dogfighter and Losi JR-X2. Jim Richards, of Australian touring car fame, proved himself another sort of champ by taking out the celebrity race.

Mabuchi classes were also run in addition to Super Stock and the larger 2.2 inch tyres made their first Nats. appearance. Wildly timed/short life Stock motors were imperative in Stock. All told a top show from Wayne Currie and the SA crew.

#### 1990 RESULTS

**4WD Modified:** 1. Ric Bartolozzi, Yokomo; 2. Reece Birtles, Yokomo; 3. Darin Campbell, Pro-Cat.

**2WD Modified:** 1. Ric Bartolozzi, Losi; 2. Reece Birtles, Assoc.; 3. David Crowe, Losi.

**4WD Stock:** 1. Andy Tonero, Pro-Cat; 2. Shaun Summerill, Pro-Cat; 3. Lyle Harbour, Pro-Cat.

**2WD Stock:** 1. Chris Marshall, Losi; 2. Brendan Coleman, Losi; 3. Mathew Roberts, Assoc.

**4WD Mabuchi:** 1. Stephen Brown, Schumacher; 2. Rod Choy, Kyo-sho; 3. Darren Slape.

**2WD Mabuchi:** 1. Chris Brown, Losi; 2. Michael Bodner, Kyosho; 3. Jason Brand, Losi.

With so much progress in so short a time, what will the nineties bring? Has development reached a plateau or will there be another technological explosion? Only time will tell.

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*In my eyes the hobby has taken a couple of wrong turns, and it may be due to the high level of competition we are used to.*

*In D&T #8 Danny Laws wrote to the editor about the fact that we build flat tracks that are like speedway or rally tracks, not the real off road tracks that the full size cars race on. The Newcastle R/C Car Club have realised this and gone half way there but a real off-road track with hills, bogs and different surfaces would surely put driving skill in front of high performance cars and accessories.*

*Along with non scale tracks are buggles that look nothing like the full size cars you'd see in a Baja 1000 race. Take a look at the new Tamiya Egress and you'll see what I mean. Just because our cars are electric doesn't mean they should look like solar car racers. I wonder if a member of the public watching a race meet would even recognise that we are racing models of the full size. We should all be using VW and proper buggy bodies*

## SOAPBOX

*and 4WD's should have pickup bodies. Tamiya's Wild One comes close to what I mean. And while on the subject of bodies I have noticed that a number of concourse winning bodies won because they had detailed pictures of people on them. Pictures like that belong on a canvas, a real concourse winning body should look like a buggy and be covered with sponsor stickers and drivers name etc.*

*Monster trucks seem to have taken the same wrong turn that buggles have. First we just raced them on our so called buggy tracks and now they are turning into buggles. The Clod Buster is the only real monster truck, big wheels a scale body and lots of power for doing what trucks are meant to do. Now the wheels have shrunk to near buggy size and we treat them just like buggles. Monster trucks are meant to be monsters and they don't be-*

*long on buggy tracks, they belong on truck pull strips, mud bog races and car crushing shows or hill climbs. Lets put big wheels on our monster trucks and race them the way they are meant to be raced. I have a Clod Buster and although it couldn't go a quarter of the speed of today's trucks it could pull three of them if tied back to back.*

*So lets race scale cars in a scale manner and I'm sure the fun factor will increase ten fold, along with a lot more public interest.*

*One last comment on the question of Stock motors V's 540. I reckon it's time the 540 was updated with today's technology. We should be able to build a similar motor, just as bullet proof, tamper proof and long lasting but also a bit faster to set a new standard. It needn't be as complicated as the Equaliser but incorporating a few features of today's motors.*

*Stock motors could be kept as an intermediate class for those clubs with enough members to support it.*

**- M. D. Johnson**



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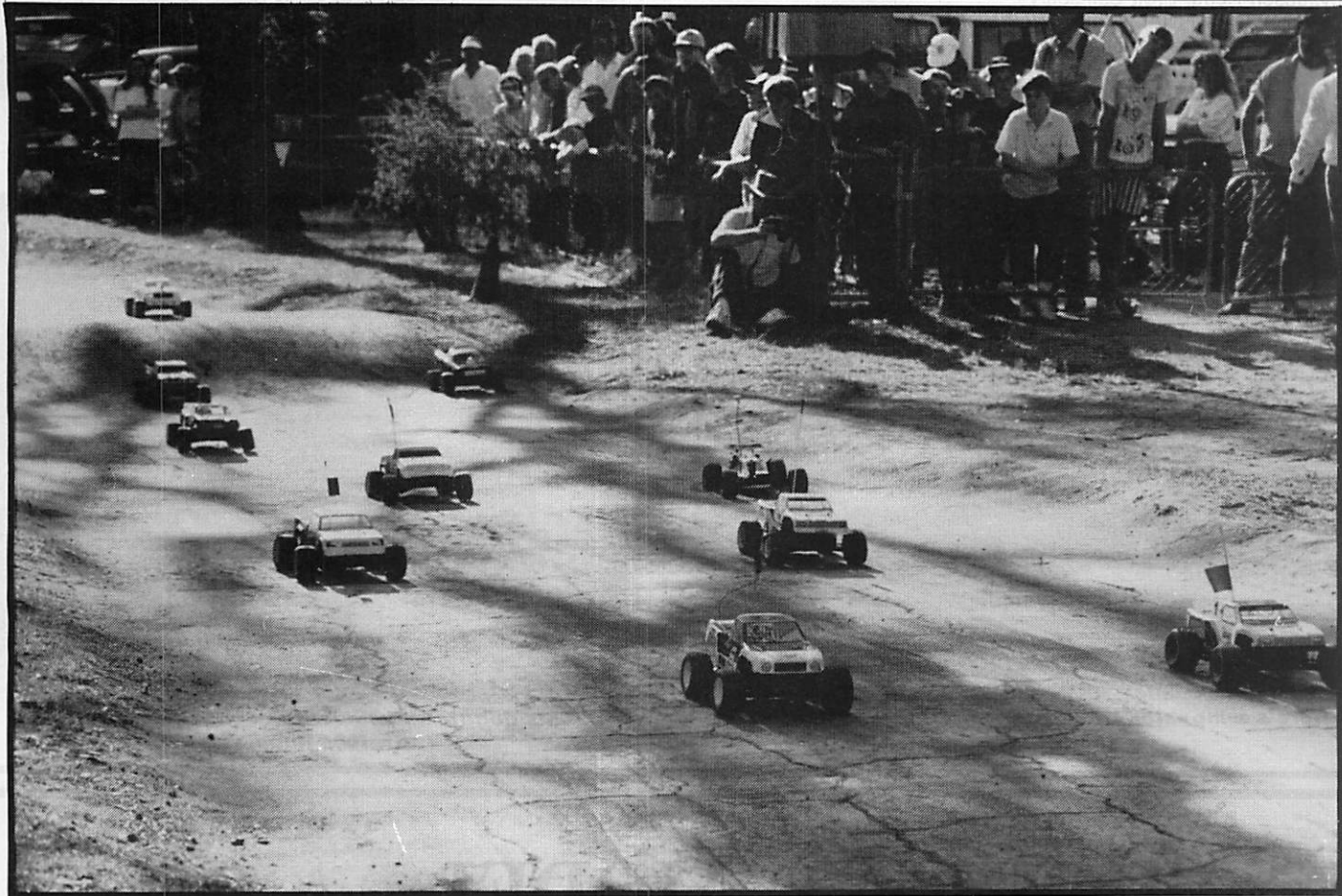
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# SYDNEY SCENE



**Truck racing is catching on. Line up is for a race during St. Ives Cup.**

Two big buggy race meetings recently took place on consecutive weekends in Sydney. The classes were the same but the format was quite different.

The second annual BORMAC Grand Prix and Race of Champions was a relatively serious affair which included the top eight drivers in Australia running 12 races, six each in two and 4WD open, for the right to earn the title of Champion of Champions. This was modelled off the famous Reedy races of champions that are held throughout the world. In addition, the usual classes were run for the rest of the competitors including a Production class for 540 motors.

Tim and Trent McLure easily cleaned-up the latter events with wins in 2WD (Losi) and 4WD respectively. In fact their times were equal to the best in the normal Stock classes which shows what can be done with a simple, cheap and legal (we hope) Johnson 540.

Stock and Open classes enjoyed their usual close and fast racing. Open in particular was a chance for someone to make a name for themselves with the absence of the top eight drivers. Jason Arnold did exactly this in 2WD and made up for his defeat at last years Young Guns and another local lad, Wayne Worboys was ecstatic over his win in 4WD. Wayne builds a very tidy car but his driving has been weaker until now. Perseverance pays!

Organiser Dave Smith and the Bankstown crew had given this event a lot of thought and effort and it paid off. The track was fearful and

the suspense of the champions racing lasted all weekend. It was close, but despite a second behind Greg Brooks (Yokomo/Reedy) in 4WD, Darrin Campbell used his home track advantage and the Schumacher Cougar/LRP win in 2WD to end up the overall champion.

The following weekend the action moved to St. Ives showground and the site of the last world titles. Severe storms had damaged the picturesque grounds earlier in the year and this forced the postponement of this event from its traditional March dateline. This is always a very popular event (most classes were oversubscribed) not only for the racing, good prizes and organisation but also the atmosphere and attractions. Held in conjunction with the Ag. Show there is always plenty to see and do, (refer also From The Drivers Seat this issue).

Like most clubs, St. Ives do what they can to encourage newcomers and they are not forgotten on the clubs big day. You do not need the latest expensive machine to do well in this class, just a reliable car and a level head. Congrats to Cameron, Tanya and George for taking top honours. Nearly as novel to watch was the truck race which saw 10 drivers of varied experience levels having lots of fun driving across the track (instead of around) and giving the many spectators their monies worth. They didn't handle the killer jump too well but that only increased the entertainment value. Let's hold on to the fun aspect in this class as long as we can.

Who cares who won?!

Not too many surprises in the other classes, just splendid racing. Most of the "name" drivers lived up to their reputations so a special mention to Ari Bakla for a great second place in 4WD Junior-Stock and to Justin Watts for a fine comeback to feature in the 4WD Open results. Andrew "the legend" Bolton took out the double in Unlimited racing to the delight of his mother and the home crowd using RC 10, Yokomo and PP motors of course. Many others went home happy thanks to the great give-aways courtesy of the Cup sponsors. If I remember correctly these were Dawn Trading (Associated/Yokomo/Reedy) and Trinity.

Remember to put these two events on the Sydney Scene in your diaries for next year.

## **BORMAC 1991 RACE OF CHAMPIONS FINAL POINTSCORE**

Driver	2WD	4WD	Total
Darrin Campbell	9	8	17
Andrew Nelson	16	8	24
Reece Birtles	13	13	26
Greg Brooks	8	19	27
Michael Chard	31	22	53
Dallas Gardiner	25	34	59
Ross Kramer	30	32	62
David Crowe	30	34	64

## **2WD BORMAC GRAND PRIX RESULTS**

A FINAL - PRODUCTION 2WD: Tim McGlure, David Ryan, Matthew Martin

JUNIOR STOCK 2WD - A FINAL: Craig Mazik, Daniel Watt, Robert Gibson.

SENIOR STOCK 2WD - A FINAL: Matthew

Brown, Alex Richardson, Brett Sainsbury  
OPEN 2WD - A FINAL: Jason Arnold, Matthew  
Roberts, Michael Toms.

**4WD BORMAC GRAND PRIX RESULTS**  
PRODUCTION 4WD - A FINAL: Trent  
McGlure, Darrin Cains, Troy Mayberry.

JUNIOR STOCK 4WD - A FINAL: Craig Ma-  
zik, Sunny Chan, Danny Curby.

SENIOR STOCK 4WD - A FINAL: Chris Scal-  
ley, Jason Head, Brett Sainsbury

OPEN 4WD - A FINAL: Wayne Worboys, An-  
drew Gillott, Chris Bozloh.

**ST. IVES CUP RESULTS -**

NOVICE: 1. Cameron Pope, 2. Tanya Moss,  
3. George Wee.

TRUCK RACE: 1. Alex Richardson, 2. David  
Crowther, 3. Rick Bartolozzi

2WD STOCK A: 1. Alex Richardson, 2. Mat-  
thew Brown, 3. Ben Panic

2WD MODIFIED A: 1. Andrew Bolton, 2. Dal-  
las Gardiner, 3. Greg Brooks

JUNIOR 4WD - STOCK A: 1. David Crowther,  
2. Ari Bakla, 3. Ben Trinder.

SENIOR 4WD - STOCK A: 1. Ben Panic, 2. Ad-  
rian Monk, 3. Brent Adams.

4WD MODIFIED A: 1. Andrew Bolton, 2. Greg  
Brooks, 3. Justin Watts.



**Tomorrow's Hero's Novice final  
drivers at the '91 St. Ives Cup.**



**Here's a monster truck just begging for attention at  
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**This doggie show how to come off the big  
St. Ives jump.**

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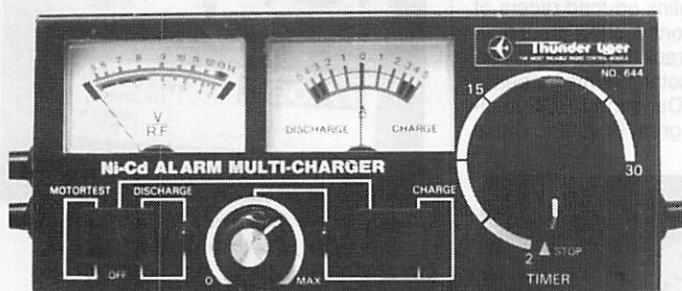


# THUNDER TIGER ALARM MULTI-CHARGER

Here's a Ni-Cad charger for the discerning beginner or the expert who needs a reliable spare. It works off a 12 volt Auto. battery and uses a clockwork timer to terminate the charge. The Alarm Multi-Charger also has a number of other useful features.

## Adjustable current

A knob on the front panel allows the charging current to be varied between zero and about 4 amps. A higher current allows the battery to be charged quicker at the expense of slightly shorter battery life. Also, different sizes of batteries may be charged — from the 500 mAh pen-cells in a transmitter (set charger at about 1 amp) to the 1700 mAh (set at about 3.6 Amps) sub C cells that power some buggies. This means that all the household nicads may be charged — a good excuse for paying a little more for this model.



**New T.T. Charger uses basic circuitry but has upmarket features.**

## Thirty minute timer

Many charger timers only go to 15 minutes and often need re-setting for a full charge. A nicad is fully charged when it just starts to get warm so you will soon learn how long to set the timer for.

## Discharger

For best charging results a battery should be fully discharged first. The Alarm Multi-Charger will do this and also allow you to monitor the current and watch the voltage reduce.

## Audio visual

Respective red lights show when a charge or discharge is taking place and a buzzer will tell you when charging is completed. Hint — if you find the buzzer annoying carefully remove the charger cover and put some sticky tape over the top of the buzzer unit.

## Motor test

By hooking up a charged battery and then connecting the two extra leads to an electric motor the current draw of the motor may be measured. Generally, the more current the faster the motor is turning but it is also using up the battery quicker. The analogue meters are not as accurate as a digital readout but this facility is still useful for comparing motor performance.

## Transmitter R.F. check

Here is a feature not found on any other charger or indeed on many other accessories in our sport. Simply connect any of the two large 12 volt battery clips to the antenna of a transmitter and the left hand meter will read R.F. (radio frequency) output of the TX in watts. The R.F. is the invisible radiated waves that communicate with the receiver in your car. Although some transmitters have R.F. meters built-in, others simply measure the battery voltage. This gadget will allow you to compare actual power output of several transmitters.

## Monitoring meters

The right hand meter shows the charge or discharge current and the left hand meter shows either the Ni-Cad voltage (watch it rise to a peak as the battery takes the charge) or the R.F. emitted by a transmitter. All in black and white

## All in black and white

The instruction sheet is actually well written and does a good job of explaining the operation and purpose of the various functions. Even the English is good — no Japlish here.

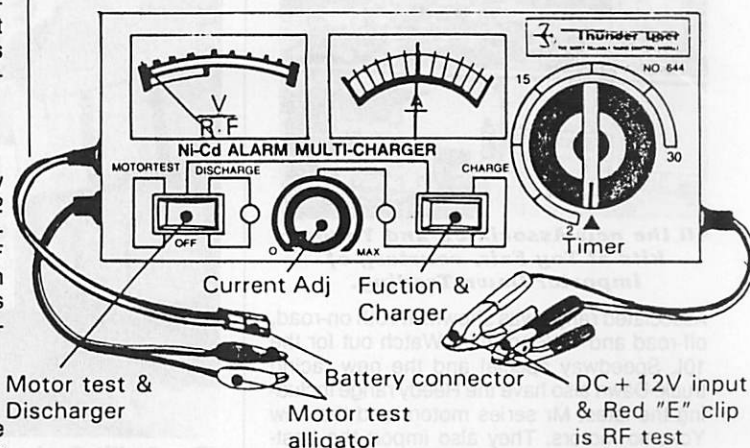
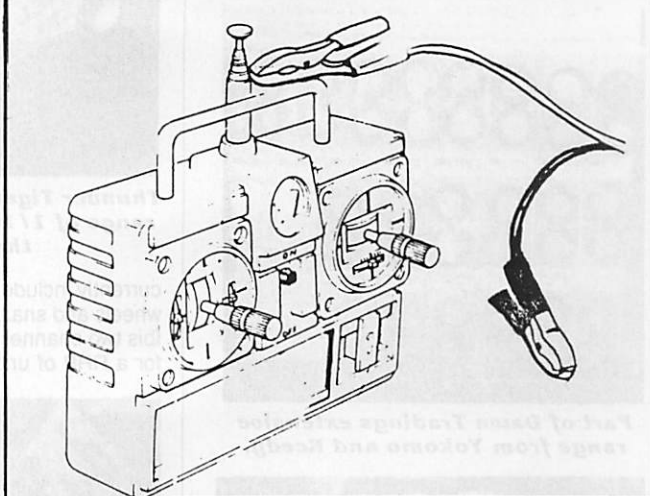
## In the field

We didn't actually operate the Alarm Multi-Charger in a field but we did use it at a race track. Large crocodile clips fasten well to the 12 volt auto battery and a Tamiya type plug is provided to hook-up to the Ni-Cad pack. The case looks smart and purposeful and it's about the right size. It doesn't get too warm and is fairly robust. All works well, so what more can we say?

Why would more expert racers use a simply timer type charger over the peak voltage detection type? The latter ensures a full charge but is more expensive and cannot always be relied upon, especially when charging well worn cells. It can cut-out due to a false peak leaving you with an uncharged battery if left unattended. The main disadvantage of this simple resistor type charger is the current fluctuation during charging. There is none of the constant current circuitry of the more expensive chargers. If the amps. are set at say 4.0 you can watch this initially climb slightly then drop to maybe only 2.0 when the pack is nearly charged. This is the main objection to this type of charger for the serious racer — you need full amps at the end of the charge for best results. However, with the Alarm Multi-Charger it is a simple matter to turn up the current manually when you see the meter falling.

This charger has some useful features but it doesn't have any fancy electronics to malfunction so is suitable for the newcomer. The same reasoning makes the Thunder Tiger Alarm Multi-Charger worth considering for the novice and intermediate racer alike.

## TRANSMITTER RF - POWER OUTPUT CHECK:



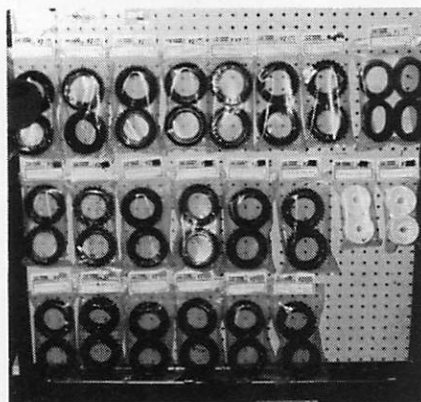
Test sample courtesy of Radio Control Supplies.

# The 27th International Toy and Hobby Fair

This showpiece of the Australian Toy Associations held every year at Sydney's Darling Harbour Exhibition Centre. Although mainly toy oriented there is also a decent sprinkling of hobby distributors eager to show their wares. It may not be on a par with the famous fairs in Europe and the States but the ITHF is still a grand and professionally presented exhibition. Toys are serious big business - so serious that young kids are not admitted! As always, Dirt and Track was there to check out the model car scene.

## DAWN TRADING:

The importers of Associated, Yokomo and Parma hold prime position at the fair - just inside the main entry. The new and long awaited Works 91 dogfighter was on display for the first time. More details elsewhere this issue. Their display showed the now big range of 33 series tyres (2.2 inch diameters) including two new patterns. These are now the only choice of top competitors and are in so much demand that supply cannot always be met. Naturally the full



Part of Dawn Tradings extensive range from Yokomo and Reedy.



All the new Associated and Yokomo kits at Toy Fair, courtesy of importer Dawn Trading.

Associated range was shown: 1/10th on-road, off-road and 1/12 on-road. Watch out for the 10L Speedway special and the new racing truck. Dawn also have the Reedy range including the latest Mr series motors and the new Yokomo motors. They also import the best-buy motor of all time - the Johnson 540. On the Parma side we see a resurgence of slot

car activity and a good stock of Parma's quality wind tunnel tested bodies. Managing Director, Carl Melvey was on hand, as was their RC car specialist Ian Bannister.

## RADIO CONTROL SUPPLIES

Specialising in affordable gear, RCS carry a good range of Panda and Thunder Tiger cars. Their 1/10th range of gas powered vehicles are proving very popular. Moving up-market a little to the Bolink on-road racers of which the Eliminator Sports is still a great buy. Reviewed in Dirt and Track 16 the latest version has aluminium motor mounts for better heat dissipation. Tony Duggan of RCS is always on the lookout for great buys and these



Thunder Tigers Peugeot is one of a range of 1/10th gassies available through RCS.

currently include Pure Tech accessories, HPI wheels and snazzy Panda Pit Bags. The new Ibis two channel stick radio looks very classy for a RRP of under \$90.00.



Panda Pit Packs in flouro colours for all the best dressed racers.



New Ibis 2 channel looks too good for it's low price tag.

## MODEL ENGINES

Mike and Tony Farnan showed the latest version of the HITEC 1802N speed controller which now sports a rigid case and smarter appearance. Still the cheapest around at under \$100.00. See them also for Mabuchi motors. Mike caused a minor sensation at the show by regularly demonstrating the Kalt Whisper RC electric helicopter. This baby is no toy. It flies exceedingly well for about 5 minutes on a 340 size motor and eight cell battery pack. Although Mike made it look easy, we should point out that it takes many hours of practice to fly a RC heli., you can't just pick one up and go like a car.



All electric Kalt Whisper helicopter was regularly demonstrated at the Toy Fair.

## TOY TRADERS

Tamiya started it all and although it may be a few years since their heyday, Toy Traders still import and sell a goodly quantity of Tamiya RC vehicles. Visiting their stand helps to appreciate the huge range that Tamiya has. Nothing to surprise us this year but the Avante 2001, Egress, Astute and Bullhead were spotted. Look out for forthcoming releases in the Jaguar GTP and upgradable 2WD Bearhawk.





**Tamiya almost make too many RC cars for one photo. Here's Toy Traders display at the Toy and Hobby fair.**

#### MASTER INSTRUMENTS

The Sanyo distributors had all their NiCads on display and M.D. Ron Dunn was also accompanied by a representative from Sanyo. Sanyo manufacture a lot more than the sub C size cells that we can legally use and even have some sub C's that we do not use. For example high temperature (H series with blue/red packaging) and heat resistance (K series, blue/black). The 1400 SCR's are now readily available and also the new 1500 SC's which should give longer than a sub C (and illegal for competition racing) but strongly denied the pending release of a sub C with more capacity than the present 1700 SCE.



**Even in black and white the Pactra range looks good and is now widely available.**

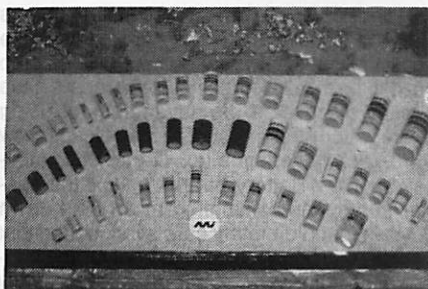
#### OTHERS

We couldn't resist checking out some of the pure toys and even found interesting items for our information hungry readers.

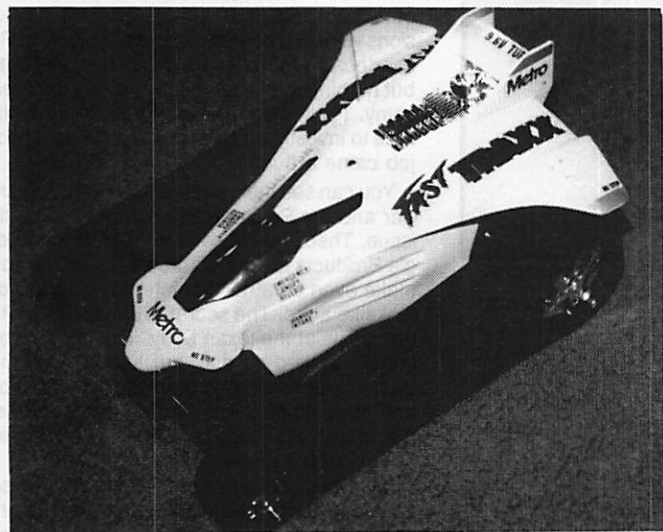
The Pactra range of polycarbonate paints is one of the best available both in quality and range but has always been hard to get here. Now Testors have acquired the Pactra range and by now both bottles and cans should be

readily available. Their metallics, candies and flours should now be seen on many more Concourse winners.

Each year an item is voted best of show and several years ago it was the famous (or infamous) Jet Hopper. That went on to sell in it's thousands and introduced many youngster to the real RC hobby. This year the winner was another RC toy along the same lines as the Jet Hopper - but more inovative. Metro's Fast Traxx really lived up to it's name. Looking like a cross between a spaceship and a tank it has front and rear rims joined by a caterpillar track and is steered by varying speed of each track. It zips around like a mosquito on steroids and turns like now. Almost 1/10th scale in size we would like to see half a dozen in a race.



**Can you pick the race legal cells from the big Sanyo range?**



**Whose for a Traxx racing class? New Metro was a hit of the Toy Fair.**



**The boys from Master Instruments showed full Sanyo Nicad range.**

## RACING IN OZ

### *Dirt and Tracks National Calendar of Events*

NOTE Clubs and Associations are invited to send details of their major events direct to the Editor for publication in this section. Notice must be received at least two months and no more than 12 months before the event.

**JUNE 30th**  
EVENT: NSW ORRCA Shield  
VENUE: Newcastle  
CONTACT: Ralph Gibson  
PHONE: (049) 77 2050

**JUNE 30th**  
EVENT: NSW ORRCA Cup  
VENUE: Hornsby  
CONTACT: Gordon Creed  
PHONE: (02) 476 1017

**JULY 14th**  
EVENT: Central Coast Cup  
VENUE: Central Coast  
CONTACT: Derek Adams  
PHONE: (043) 84 3541

**AUGUST 4th**  
EVENT: SE QLD Champs Rd. 3  
VENUE: Mt Gravatt  
CONTACT: Bob White  
PHONE: (07) 349 8694

**AUGUST 4 - 11th**  
EVENT: World Buggy Champs  
VENUE: Detroit, USA  
CONTACT: Barbara Bolton  
PHONE: (02) 451 7775

**AUGUST 10 - 11th**  
EVENT: Vic. ORRCA Shield  
VENUE: Keilor  
CONTACT: Les Bone  
PHONE: (03) 743 1153

**AUGUST 24 - 25th**  
EVENT: ACT Titles 1/10 Off Road  
VENUE: Capital Velodrome  
CONTACT: Gary Davey  
PHONE: (06) 231 8306

**AUGUST 25th**  
EVENT: WA Interclub  
VENUE: WCMR  
CONTACT: Tim Vickeridge  
PHONE: (09) 335 3338

**SEPTEMBER 21 - 22nd**  
EVENT: NSW Titles 1/10 Off Road  
VENUE: BORMAC  
CONTACT: Dave Smith  
PHONE: (02) 892 1463

**SEPTEMBER 28 - 29th**  
EVENT: WA Titles 1/10 Off Road  
VENUE: Bayswater  
CONTACT: Tim Vickridge  
PHONE: (09) 335 3757

**SEPTEMBER 29th**  
EVENT: NSW ORRCA Shield  
VENUE: Illawarra  
CONTACT: Alex Mazik  
PHONE: (042) 56 6215

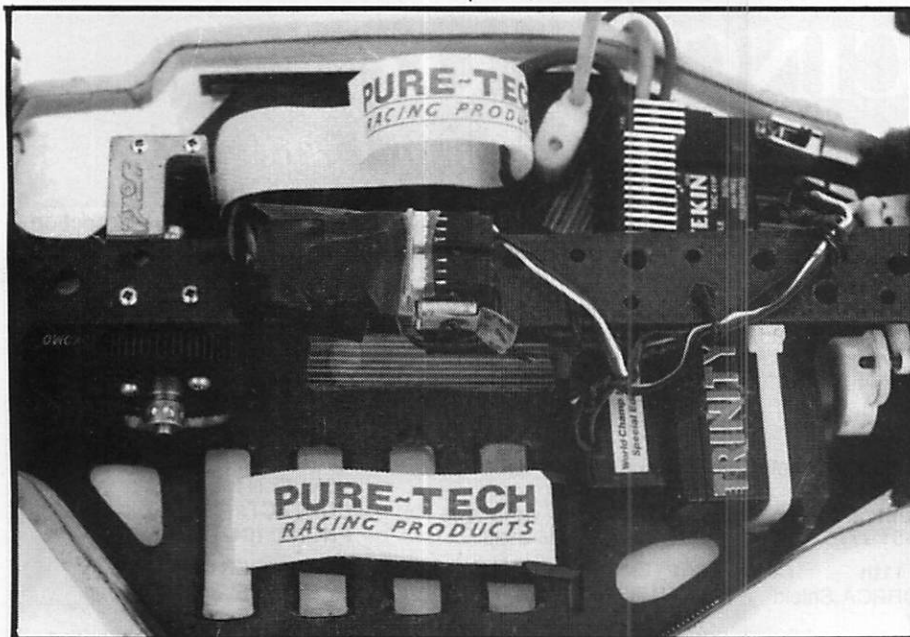
**SEPTEMBER 29th**  
EVENT: NSW ORRCA Cup  
VENUE: Sutherland  
CONTACT: Robert Shoebridge  
PHONE: (02) 525 3692

# WHAT'S NEW & WHAT'S DUE

## HOOK-UP WITH VELCRO

Listen up. Here is an accessory that is cheap, attractive, easy to fit, very easy to use and let's your electric car go faster. Sound too good to be true? Not really. Some racers have already discovered the advantages of using velcro watch straps to secure their nicads, now Pure Tech have come up with a better mousetrap. Their Battery Straps replace the heavier and space consuming nicad hold down devices found on many cars and function just as well. The flouro colours are not for the conservative but really brighten up the usually black chassis.

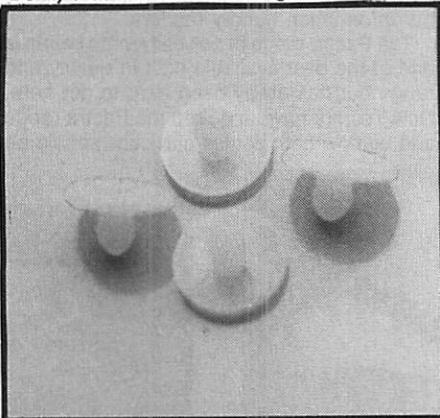
Compared to velcro watch straps, which we have used for sometime, the Pure Tech Battery Straps and Pro Battery Straps are specifically designed for our purposes with lightweight plastic buckets and are just the right length. They are available in two types, either for saddle pack nicads (Pro Battery Straps) or stick configuration. The latter coming with built-in end stops to fully secure the pack. You can also use the standard Battery Straps with saddle packs in a 3 + 3 configuration in a chassis that does not have slots for the cells. We tried this on our RC10 Graphite (see review photo's) and it looked choice but to be safe we super glued a divider strip down the middle of the chassis to prevent shorting should the two pairs of cells decide to migrate a little. Do try these straps, they're one of the cheapest and most effective "hot-ups" around. Pure Tech also have some copper Battery Bars (sounds like a pub for chooks!) for easier soldering of adjacent cells in a battery pack. A packet of ten come for under \$11. Dealers can ring RCS in Sydney for supply.



Here's a weight watchers Yokomo with Pure Tech's Pro Battery Straps.

## POP FASTENERS

Big, maybe beautiful but sometimes it's the little things that make life better. Take Hyperdrives Nylon Pop Fasteners for example. They are so small as to be nearly invisible. Chances are you've never noticed them on a car or hanging in the model shop. But it is their inconspicuousness (the longest word yet in D&T!) that makes them so good.



Hyperdrives nylon Pop Fasteners.

What are Pop Fasteners? A new cap for soft drinks? A new belt for dad's trousers? No, they are tiny plastic studs like press studs, used for holding together thin sheets of material like lexan. They are great for customising bodies and or repairing bodies but their most common use is to fasten side dams or fins on to wings. It's simple. Just drill a 1/16 hole through the two sheets of polycarbonate (lexan) and force in the fastener. Providing the hole is not drilled oversize it would take a tank to break the joint. We have been using these fasten-

ers in this application for some time and although the plastics starting to look daggy the little nylon rivets have held. Although you can get Super-Glue to suit lexan the resulting joint is not as strong as these Pop Fasteners. It's worth keeping a packet handy. Hobby World in Sydney have them through GM Trading.

## DOING IT WITH DECALS

I want to tell you about the best decals since the industrial revolution. The ones in question were sent in the customary brown paper parcel (the postie thinks I'm the weirdest customer in his whole drop area) from Tony Duggan of Radio Control Supplies (047) 31 4145 with no other packaging or instructions. First impressions were just ho-hum. There are plenty of RC car decals around and this batch looked okay but nothing special. Also they didn't look very shiny. I put them aside and made a mental note to investigate further when the next body job came around.

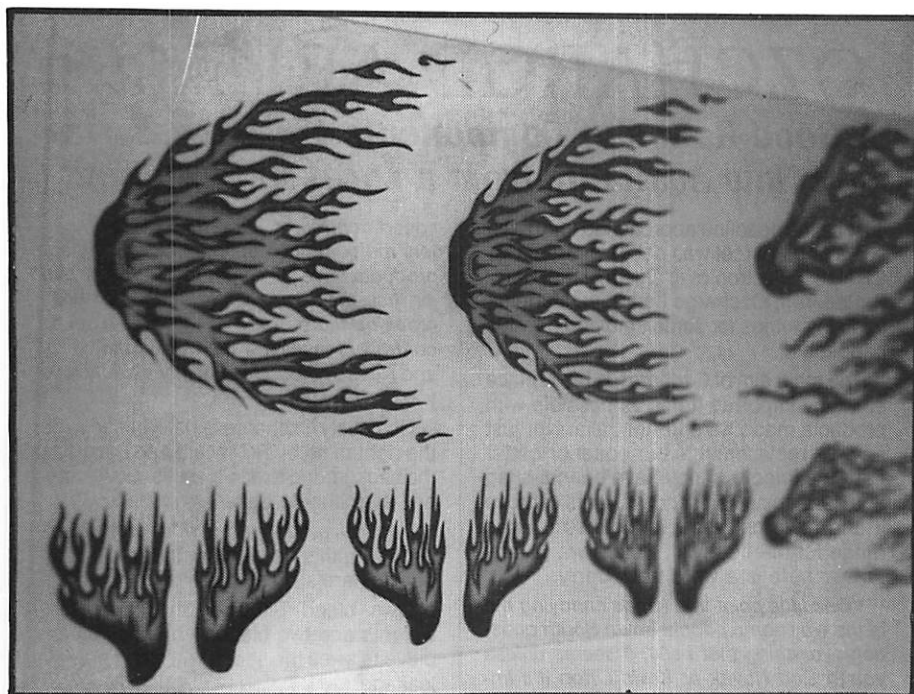
You can see the results on the RC10G Team Car and the ProCat bodies elsewhere in this issue. Thses new face down decals from Eagle Products are an RC dream come true and make even a pathetic painter like your editor look like a pro. The secret is that they stick to the inside of the lexan body. That's why they initially looked so dull, but just peel off the translucent protective strip to reveal flouros and other colours in all their splendour. Yes, the adhesive is on top of the colours but it does not affect the impact.

More pleasant surprises were in store when I came to apply the stickers. Some decals are brittle and will not conform to curved surfaces but the Eagle face down decals vinyl like composition allows you to place them on quite severe compound curves without fear of wrinkling. Speaking of wrinkling, this is what happens when you try and paint over many decals - but not these. Our usual paint (Pactra RC Racing car pressure pack of polycarbonate) did not creep under the edges of the decal or affect it in any way. You can get the Eagle Products decals in a number of imaginative designs including flames in addition to shadowed numbers and pin stripes. The colours are wild and vivid and the price is under \$14 a sheet.

## MORE HI-IQ

You have to go back almost to the beginning of time, late 1989 in fact, to find a D&T article that must have been just too high for many readers. That's the only explanation I have for the many queries we receive regarding Victor Engineering's ultimate nicad manager, the HI-IQ. The article in question, and the subsequent short follow-up in issue 16, comprehensively covered his marvellous magic box soon after it was introduced. Too soon, it seems, since there was not much interest in a \$700 charger at the time but now it has finally caught on. Before you ask us what wonders this little beauty can perform please read





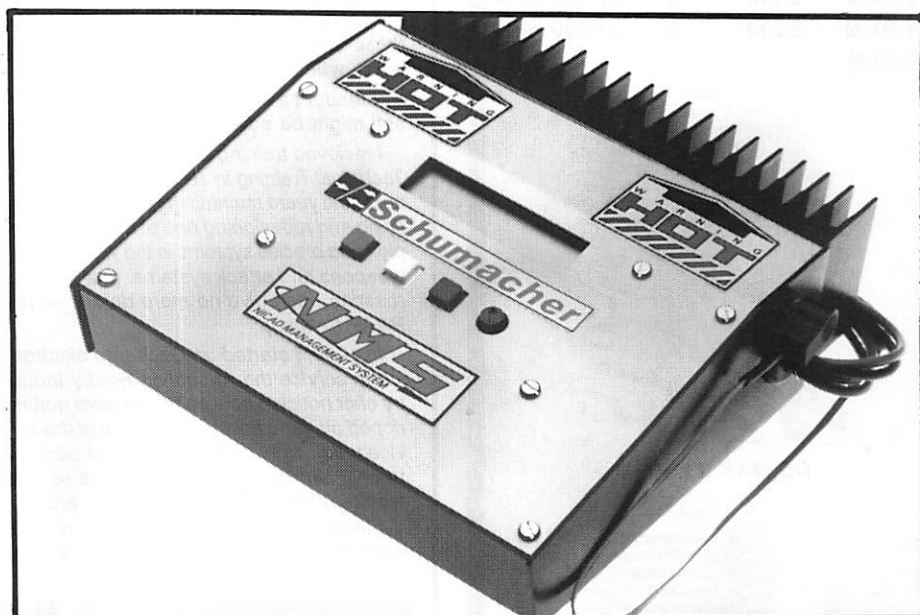
**H P F's truck wheels include adaptors for most M.T's and buggies.**

**Just one example of Eagle Products face down decals.**

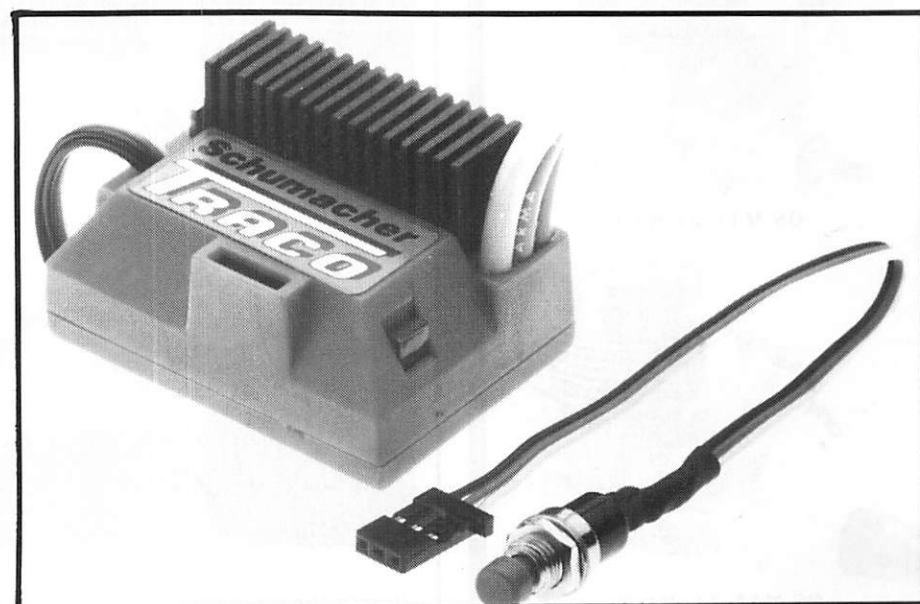
the original articles.

We have finally lashed out and updated our HI-IQ to the Senior model which gives more features including the ability to discharge at a more representative 20 amps. The Senior seems to work quicker too. True to their original word. Victor are for ever introducing more add-ons to the HI-IQ which makes it easily the most comprehensive and versatile piece of equipment in the sport. It also makes it obsolescent proof. To whet your appetite;

**Shocker/Revival.** This applies a 2 second, 30 amp shock to nicads either as a reviver or top-up just before a race. Included with the Senior. **Motor Break-in.** This ID's the motor type then runs at random revs to break-in motors and even gearbox's. Included with the Senior. **IQ Boost 2000.** Up to 100 amps can be applied to up to 28 cell-sor testing cells for Drag racing or Tractor pull events. Optional. A new Super-IQ is available which will discharge at 30 amps, charge in the reflex mode, have variable negative slope cut-off and your own custom sequences may be programmed into the memory. Other features too. All of the accessories mentioned in the earlier article are now available. Where will it all end? Victor now produce power supplies, and watch out for their IQ-FET speed controller.



**Latest in electronic NiCad wizardry comes from Schumacher in the U.K.**



**New Schumacher controller comes with programming button and cord.**

Fully computerised with adjustable ultra high frequency and many other innovative features.

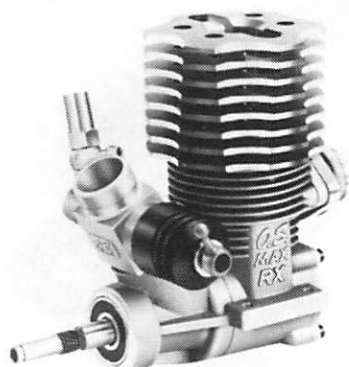
More down to earth, they now include some very good operating hints with the HI-IQ. This was sadly lacking with earlier models but the latest sheet should remove many of the problems owners of this precision equipment may encounter. These are the best guidelines we have seen for nicads applied to RC cars. Their storage ideas are particularly worth repeating, i.e.: Never use resistors or light globes to fully flatten a pack since these networks force the lowest cells in the pack to reverse polarity. This causes the pack to be mismatched thereafter and often permanent damage to the reversed cells. Single cells may be discharged completely. With the HI-IQ you can discharge a pack to the equivalent of 0.6 volts per cell then discharge each individual cell to zero. Time consuming, but the only way to keep packs in peak condition.

## TRADE NOTES

OS have just sent us data on the soon to be released 21 RX super high performance engine series. The RX Series has been developed from the EX, and now has higher power output and even better response. The significant changes made by OS will make this a top level competition engine. Firstly, the engine mounts are wider for better rigidity, larger heatsink heads, improved combustion chamber for better radiant efficiency, crankshaft and cylinder liners have been designed with different timing and shape for each of the different engines in the 21 RX range, piston, connecting rod and cover plate have been further tuned for better overall performance. Slide carburettors also feature on the new engines, with ball link and a newly designed needle with a screw driver slot for "through the body" turning. All in all numerous modifications that will really make the 21 RX Series humm.

21 RX-R	2.2 HP	@	32,000 RPM
21 RX-B	2.1 HP	@	30,000 RPM
21 RX-M	2.2 HP	@	33,500 RPM

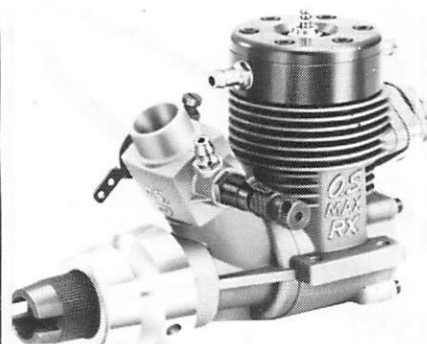
(Marine)



OS MAX 21 RX-R



OS MAX 21 RX-B



OS MAX 21 RX-M

## OZCHARGE ARRIVES

### A Good Range of Components and Accessories are Now Available from a Local Manufacturer

Just as the deadline approached for this issue a large parcel was delivered from OZCHARGE Electronics in Queensland. Barry Puttee from Ozcharge had been planning to do big things for some time and now it's happened.

The main aim of Ozcharge is to replace as many imported items as possible with products made here in Australia. Not just any old replacements but equal or better than the imports. They have been testing and developing items for two years to prove it and have only now introduced a large range for the hobbyist. Before we go any further here is a word from Barry.

*"One little point that keeps annoying me is the way some people down South question everything that I say. It seems unless you're Bob Novak or Kevin Orton it's impossible for an Australian to know what he's talking about. Even more infuriating, the people who are the worst offenders are those with no technical training or knowledge whatsoever."*

*I thought a little background info on myself might be advisable!*

*I received training at the RAAF School of Technical Training in 1982. Then I spent the next nine years maintaining, repairing, modifying and redesigning one of the most complex and precise systems in the world. F-111 weapons and attack systems. (For obvious reasons I can give no more details on my RAAF training).*

*In 1989, I started up Ozcharge electronics to service the Australian Hobby Industry after noticing how badly we were getting ripped off, (and how terrible some of the service was). Until I left the airforce I decided to only service QLD otherwise the service would not have been to my standards.*

*Since starting operations we have designed and distributed our own charger and*

*speed controllers as well as our own battery matching computer. People using our products have taken out almost every major race meet in QLD. We have also been repairing their brand chargers and speed controllers including the new digital Tekin and Novak types. (I'm not just a pretty face y'know!)"*

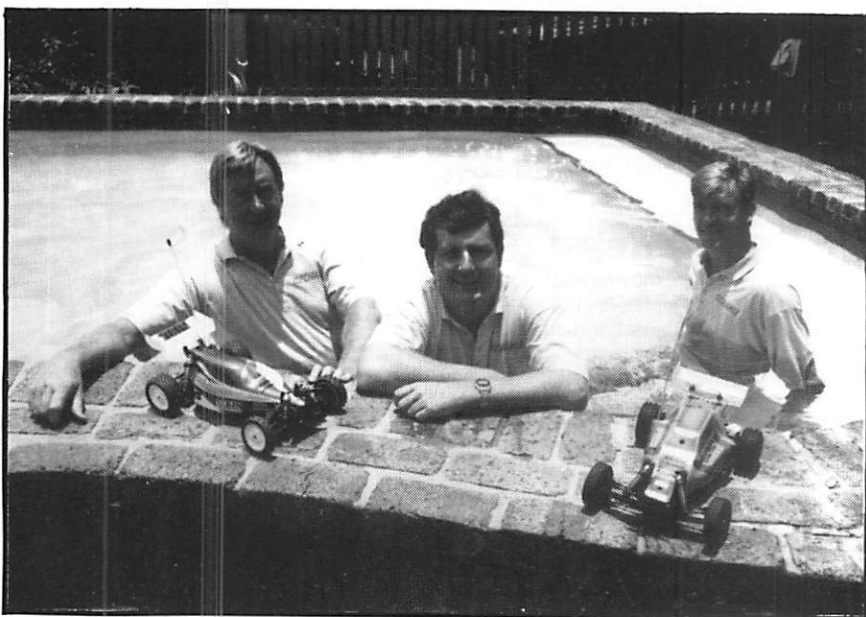
Obviously Ozcharge is determined to do the right thing by RC racers and Barry has the background to achieve this. Now everyone else should benefit.

Enough propaganda, what can we expect from this new and enthusiastic company? Here's a sample;

Own blend Silicone Shock Oil in 5 weights and two blends - one has an additive to swell the shock seals and prevent leakage.

Heat shrink of all sizes. High and low melting point solder especially for our application. Battery braid, storage resistors and cyclers. Servo tape and polycarbonate sheet. Motor accessories including high tensile screws and precision bearings. Baz in a Can (what a name!) motor spray. Three grades of diff. lubricant. quality peak detection charger for under \$100 and finally nicad cells matched on his own designed, unique, battery computer. More items will be introduced regularly.

We will be doing in-depth testing and reporting on products from this new enterprise so watch out next issue for more details. First impressions are very good and there seems little doubt that Ozcharge have so far met their aims of beating the imports. Packaging and presentation is nice and best of all the prices are better than the equivalent from offshore. Their stickers are actually free. Ask for Ozcharge at your retailer and do Barry, Paul Keating and yourself a favour!

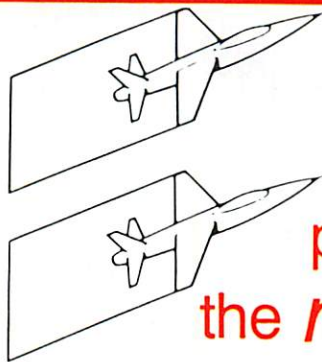


Here's the Ozcharge boffins in their think tank. Left to right; Bob White, Barry Puttee and Chris White.





# WINGS 'N' THINGS

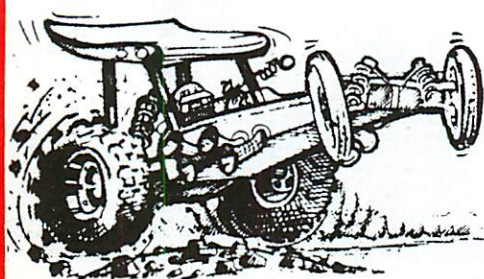


The most efficient purchase is the *right parts* the *first time!*

For the best expertise behind the counter speak to Andy, Ray or Gilly, all World Titles Competitors

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# ELIMINATOR

FROM

**BoLINK**

## Gold Edition

**THE ELIMINATOR GOLD EDITION IS OUR FINEST 1/10 SCALE CAR KIT. IT USES THE FAMILIAR RACE WINNING ELIMINATOR 10 TECHNOLOGY WITH ACCESSORIES THAT CAN MAKE IT A WINNER ON ANY TRACK SURFACE**

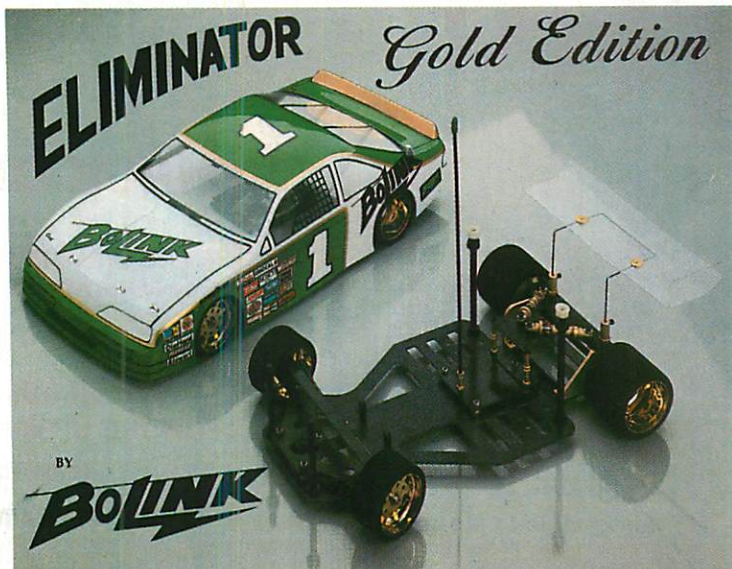
Graphite Chassis and front axle plate

Ball type rear suspension and new kingpin brace for more precise handling

Graphite rear axle with 5 ball bearings and precision aluminium rear hubs

New "Gold" rear blocks with adjustable axle height

Gold coloured aluminium chassis parts and gold stock car wheels



Wind tunnel tested stock car body and special "Gold" Decals

Ball joint steering linkage with adjust-a-links

**LOOK FOR THE ELIMINATOR GOLD EDITION TODAY!**

# ELIMINATOR

## Sport

BoLINK introduces the Eliminator Sport to its proven line of 1/10th scale Eliminators. The sport is based on the E-10 chassis and front end, and features the Roundtracker rear pod.

The Sport is a very good entry level car, and very competitive right out of the box. It can easily be updated to a full Eliminator 10.

The Sport comes in basic kit form with body and tyres, and is also available with motor and speed control.



Unit 7, Lot 14 Dean Place,  
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