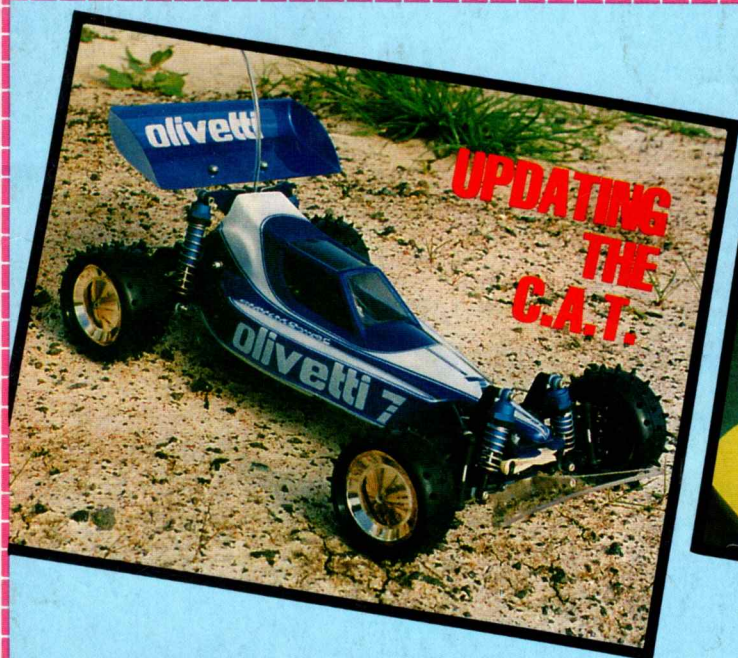


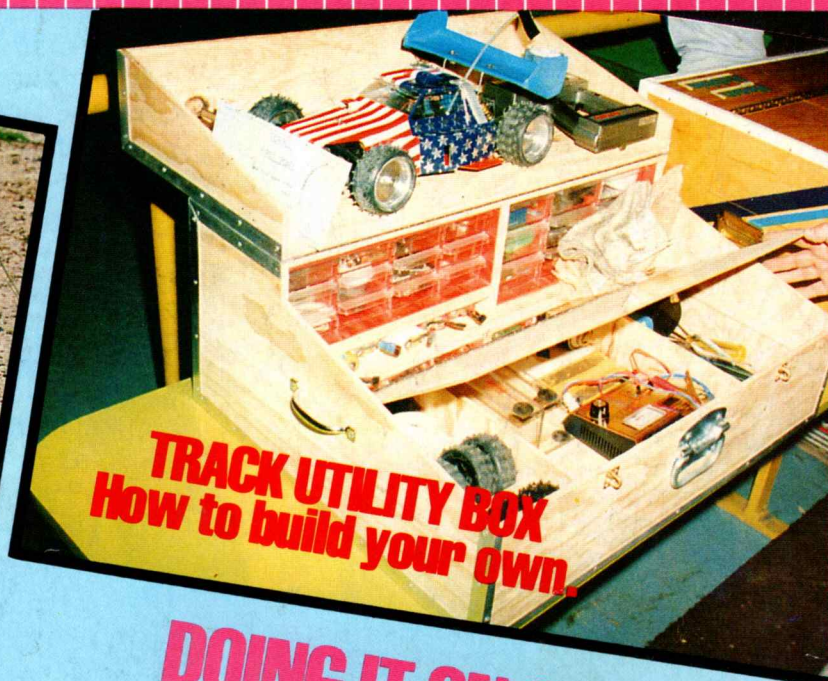
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COVER:

Tamiya's Monster Beetle. Review on pages 16 & 17.
Schumacher CAT XL, owned by Martin Dykes, with a stunning paint job by Mark Windsor. BMW Formula 1 colours as raced in Adelaide Grand Prix 1985. See CAT Update article on page 51.

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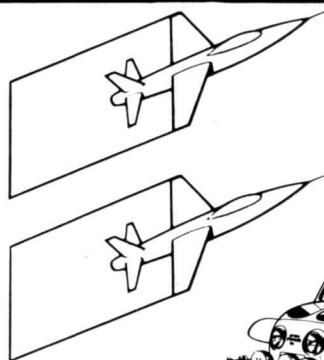
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BIRD TORQUE

by Paul H. Bird

When two drivers of equal skill, driving identically prepared buggies, go for the line, the winning edge is more than likely going to go to the competitor with the best tuned motor and the best battery pack. In the last issue of *Dirt & Track* articles dealt with batteries and charging, and with preparing stock motors, so now I'm going to look at how to get the most from a modified motor.

Having bought a modified motor, you'll need to spend some time running it in. Time and care invested in the motor at this point will pay dividends in the long term. The purpose of running in is to ensure that the brushes gently 'bed' to fit the commutator surface, and that the bearings get properly seated.

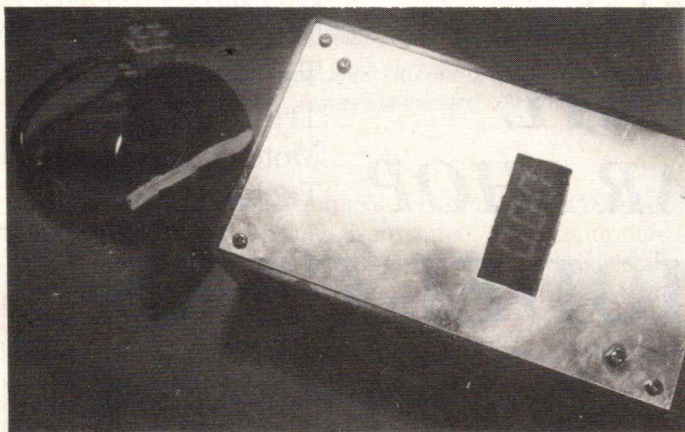
RUNNING IN

There are essentially two ways of running in a modified motor: on a battery, or with commutator-brush additives. In either case, start by putting just a drop of Teflon oil on the ball races at each end of the motor, so that the bearings stay lubricated during the running in process. If the bearing dries out it isn't going to last very long.

Running in with a battery is very simple, but time consuming. You'll need a 3 volt supply. I find that a couple of re-chargeable torch batteries work well. Hook up the supply to the motor, and let it run for about 3 hours, making sure that it doesn't get too hot. If the motor does get hot, just disconnect the supply, wait until the motor cools down, then re-connect the supply. The motor is run in when the brushes are nice and shiny on the surface which matches the commutator.

Commutator drops provide a quicker means of running in. Normally, brushes in modified motors are made of a fairly hard compound, to meet the motor's demands for electrical current, and commutator drops serve to soften the brushes slightly so that they can bed in more quickly. As the drops evaporate, the brushes dry out and return to their original hardness.

To my mind both methods are equally satisfactory, and it's probably advisable to combine both techniques for the best results. Personally I would not recommend using the 'dipping' method (where the running motor is totally immersed in either water or special solution) for modified motors, as it may well damage the ball-race bearings.



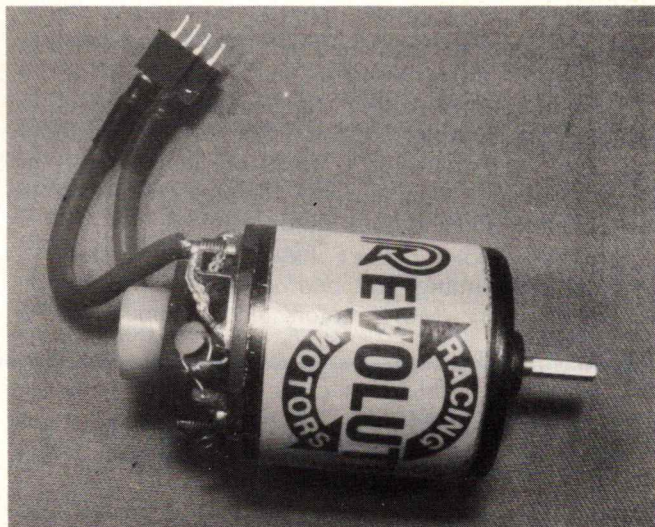
A light-activated tachometer. The disc is fitted to the motor, and when it spins rapidly, reflects light into the tacho, which gives a reading in revs per minute.

TUNING

Having run the motor in, it will now need to be properly tuned for optimum performance, as the factory settings aren't always the best.

The first thing you should do is have a look at how the brushes are connected to the motor. Usually a tab is screwed onto the metal end-plate on the end-bell, and the brush shunt wire is crimped to this tab. On some motors the shunt wire is soldered to the tab, and if this is the case with your motor, leave it like that. Soldered connections have less resistance than crimped ones, allowing more current to flow to the brushes, and to the commutator.

If the shunt wire connections are crimped, carefully cut the wire, hard against the tab, and then solder it to the tab. It's not a good idea to remove the grub screw holding the tab, as these screws usually fit into plastic, and it is very easy to strip the fine threads in the plastic.



This modified motor comes with the brush shunt wires soldered to the connector lug, for improved current flow.

It's now time to measure the motor's performance, to provide a reference point so that you can easily see if your tuning changes have improved the performance (or gone the other way!).

At this stage you'll need some reference equipment. The best method is a **dynamometer**, or dyno, as this will test the motor under simulated running conditions (load). There are a couple of types of dyno around: one tests the motor out of the buggy, and the other (a roller dyno) allows the motor to be checked while it is still in the buggy. Both types of dyno work well, both will show you motor revolutions and current draw, and both are expensive to buy!

Another system involves the use of a light-operated tachometer, and an ammeter. A special disc is fitted to the motor shaft, a light is shone onto the disc, and the tacho measures the light reflections, to give an rpm reading. The ammeter measures current consumption in amps. The disadvantage of this system is that simulating a load is rather difficult.



A Dyno. On this machine, motor performance can be tested under load, with the buggy sitting on rollers in the machine. Or, the motor can be tested on its own, by plugging the shaft into the connector on the left of the picture.

Finally, a cheap 'dyno' can be made, as described in this column in the last issue of *Dirt & Track*.

Now to the good bits. The first thing to check is **brush spring tension**, and for a full explanation about this, see Todd Cameron's article on stock motors in the last issue. Spring tension changes are the same for both modified and stock motors.

Modified motors don't have to be twisted to **advance the timing**: the end-bell is designed to be rotated instead. Most motors even come with a

timing scale on the can, but if yours doesn't have this, don't do anything until you've scratched a reference mark on the can and end-bell. This is very important, because if the factory setting turns out to be the best, you'll need to be able to come back to it.

With the motor running, slowly adjust the end-bell, turning into the direction of rotation (usually anti-clockwise when looking at the motor from the brush end). You'll notice that the engine revs will increase, and so will the current consumption. Turning the end-bell the other way will result in a decrease in revs and current consumption. You will need to experiment with settings to find the one which best suits your buggy, batteries, track and driving style. Don't be disheartened if your batteries dump the first time out; after all, there are lots of variables, like gear ratios, nicad capacities, track surface, and even the type of speed controller you use, that will have an effect on how low your batteries can go and still deliver power.

SPEED CONTROLLERS

As the name implies, these little units control how much juice gets to the motor, and, of course, how quickly it goes. There are three main types of speed controller, covering a wide price range, but with rather different degrees of efficiency. The more efficient the controller, the less drain on the battery, and the more power going where it should - to the motor.

Mechanical

Quite a few buggies come equipped with a mechanical speed controller, which usually consists of a resistive plate, and a servo operated wiper, providing

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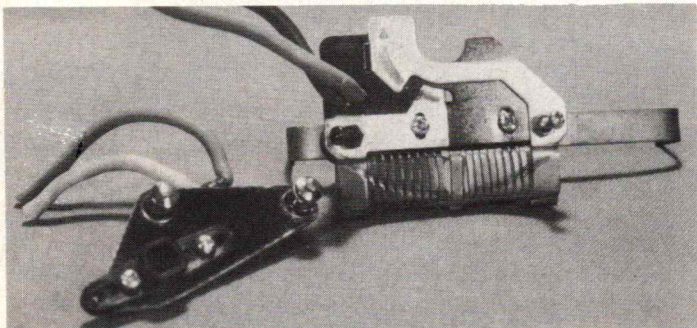
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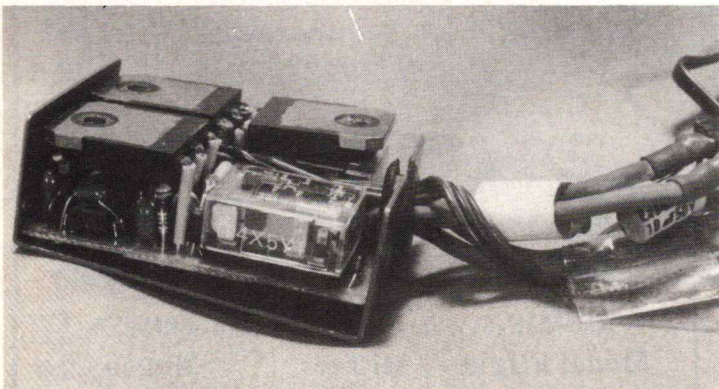
three forward speeds, braking and reverse. These are notoriously inefficient, and require a servo to drive them, which adds weight, plus the extra current draw of the servo. Mechanical speed controllers are very susceptible to dust, and they have a tendency to burn out quickly if you're using a high current drawing motor. However, for a beginner, they are probably quite satisfactory, until a more expensive electronic speed control unit can be afforded.



A resistive plate speed controller. The operating arm on the left is fitted to a servo arm, and moves across the windings to vary motor speed.

Electronic

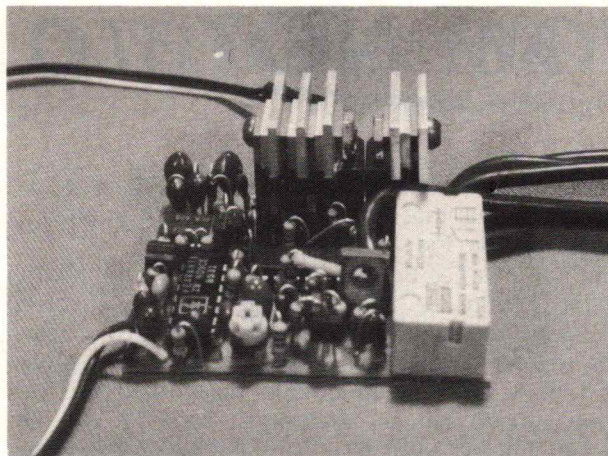
Electronic speed controllers are self-contained, eliminating the need for a servo, and also supplying power to the receiver, so you can throw out those four penlight cells which powered the on-board radio gear. These speed controllers give fully proportional forward (not stepped as with the mechanical units), dynamic braking, and some models have reverse. However, these controllers usually use transistors for all speeds less than full throttle, then use a relay to switch full power to the motor. This is a disadvantage, because relay contacts can get dirty, or can stick, making the controller inoperative, and battery power is being siphoned off to run the relay.



An electronic speed controller. This one uses the relay (front right) for full power. Slower speeds are controlled by the three transistors.

FET Control

The ultimate speed controller is one which uses all power FETs (Field Effect Transistors). FET controllers have no relays (unless the controller is fitted with reverse), and motor power is provided through high power transistors, allowing almost 100% of the power to go to the motor. The norm for FET speed controllers is fully proportional forwards, and dynamic braking, but no reverse. The controller supplies power for the receiver, and these controllers will handle even the most powerful motors. FET controllers are small, and will cost upwards from \$150. For serious racing they are the way to go.



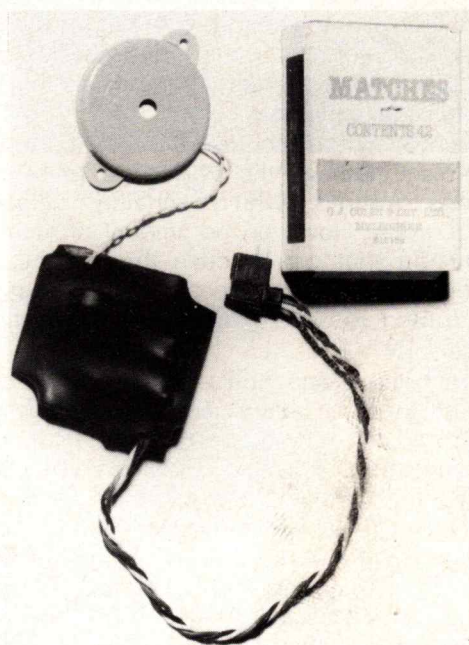
FET Speed Control. Power is supplied to the motor via the 6 Field Effect Transistors at the rear. This controller also has reverse, hence the relay.

THE LAST WORD

Finally, a word about a very useful little gadget which should be in every racing box: the **Century Systems Lost Model Alarm**. Now, while this product is designed for model aeroplanes, it has an important application for us buggy drivers. It can be used to **detect radio interference, or faulty radio gear!** Simply plug the Alarm into your receiver and, if there's radio interference or you've got radio problems, it will let out an ear-piercing screech, letting you know that there's something wrong.

This little unit can also be used to **test transmitter range**. Plug it into the receiver, switch on the transmitter, and go for a walk. When your receiver goes out of range of the transmitter, the Alarm will screech. I think that it's a nifty little device, available from Century Systems, 71 Bull Street, Bendigo, Vic., 3550; phone (054) 42 4708 for more details and price.

If you have any tips, hints or helpful ideas which will assist other drivers get more out of this sport, drop me a line here at Dirt & Track, and tell me about your idea: it might end up in print!



Century Systems Lost Model Alarm, plugs into your receiver and detects faulty radio gear and radio interference.

HOW NOT TO CHARGE A NICAD

by Les Bone

As much as this makes me feel ashamed and annoyed, I feel that I must recall my story in order to save others from the same fate.

My name is Les Bone. I am President of the Melton club (T.O.R.R.C.C.) and have been actively involved with radio controlled electric cars for almost 2 years. With regular racing and constant practice I estimate that I have charged about 800 nicad batteries. Fast charge, trickle charge, discharge, from 12 volt DC and 240 volt AC, using \$10 leads and \$200 peak detection units. In short, I should know what I am doing.

On 11th July (election day) I worked in my garage. I spent a few hours stripping and rebuilding my CAT and giving it a test drive up and down the court. Like most of our sports' enthusiasts, I own the obligatory carry-tool box, and have my battery charger screwed to its lid. Being lazy, and not needing a peaked nicad just to test run my car, I simply boosted the nicads using fast charge leads. This is all very well, and, having done it hundreds of times before, I thought nothing of it. My Volvo, parked in the garage, was a simple answer to a problem.

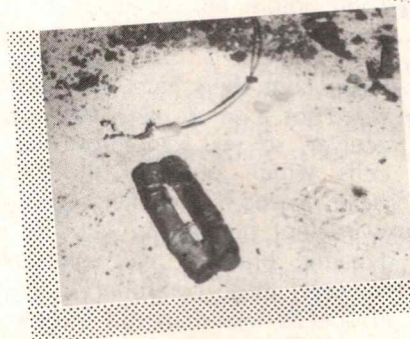
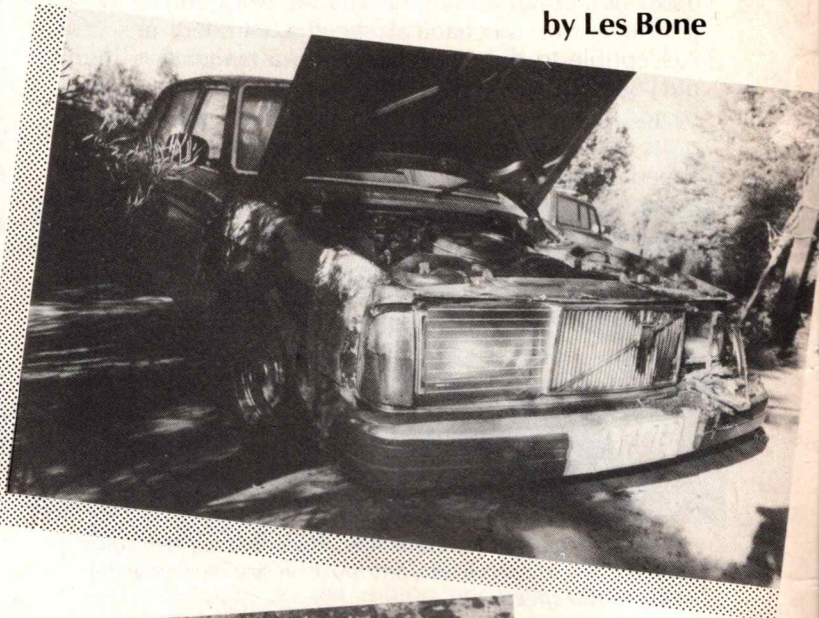
At 5.30 p.m. my wife called me in for tea. She called again at 5.45, then again at 6.00. (You have all done it, so don't laugh.) I quickly packed up my gear, disconnected everything I thought, and went in for tea. At 9.50 p.m. my wife and I were startled by a loud thud. We thought that one of the kids had fallen out of bed. Further bangs and pops drew our attention to the garage, where, on opening the door, we were met with a wall of smoke and flames.

Don't let anyone tell you that in a situation like that you must stay calm. I was in bare feet and dressing gown. My wife rang the fire brigade while I attempted to pull the Volvo from the garage. Unfortunately, the right front tyre had blown, and molten rubber was stuck to the concrete floor. I managed to pull my wife's Fiat out of the garage before help arrived, and then we were able to drag the Volvo out. My biggest fear was that, as the garage is attached to the house, both would go up in flames.

As it turned out, structural damage to the garage was minimal, although the Volvo had to be written off. I was insured, which certainly helped the financial burden. However, no amount of money can cover the dirt that gets trodden through the house, the inconvenience, the sleepless nights and the damage caused to the contents that had sentimental value.

The fire brigade and police inspected the charred remains of the car battery and couldn't determine whether I had left my nicad on charge or if, when I had disconnected it from the car battery, the lead had laid across the terminals and caused a short circuit. Either way, I no longer use charge leads.

Now that I can look back at the incident and try to see it in an impartial light, I shouldn't be too harsh on the old fast charge leads. They had served me well and, used correctly, they are a cheap, effective way of charging nicads. But please, take a warning. Use me as your lesson: use them with caution.



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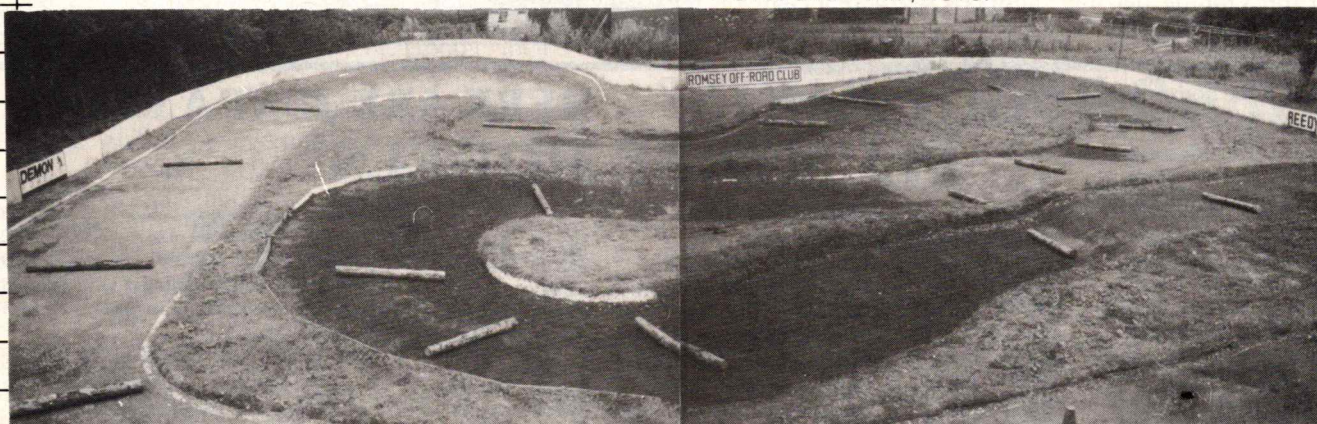
1/10 SCALE WORLD TITLES; 1987

ROMSEY, U.K. from Jack Grenenger

This report was made possible by the invaluable assistance of Ian Kennedy, Col Grenenger and Andrew Bolton, who have all just returned from this, the most closely contested world event ever.

The Australian team consisted of: N.S.W. — Colin Grenenger (Captain), Andrew Bolton, Michael Toms, Scott Kennedy, Scott Salter, Guy Evans, Ian Kennedy (non-racing Team Manager); S.A. — Andrew Reade, Rob Reade. As there was a lack of communication between ORRCA (AUST) and the world body, it was found out after the team was selected that there were more places available for Australians, so several other drivers decided to 'have a go'. They were: NSW - Tony Bovard; Victoria - Greg Collings, Jenson Spencer, Robert French. In my column in the first issue of Dirt & Track I criticised the way in which the team was selected for this event, and, although the results were excellent from the Australian point of view, I think that they could have been better. More on that later.

The World Titles for 1987 were granted to the European body (EFRA), who granted the titles to the United Kingdom, who in turn granted the right to stage the event to the Romsey Club. Romsey is situated in southern England, and is famous as the home of the late Earl Mountbatten of Burma. The Romsey circuit is situated 3 miles out of Romsey, at the Malthouse Inn.



1987 World Championship track at Romsey, England. Note banked corners and steep drop-offs and climbs mid-course. Logs on the track were to prevent any unauthorised practice by competitors; not part of the regular circuit to test drivers' slalom ability!

The officials of the club would not allow any early practice, so, although competitors from many countries arrived early, they were barred from using the track. This was a pity really, as later events were to reveal. The track was a mixture of many compounds, from dirt mixed with cement powder to oiled dirt, and everything in between. The circuit looked reasonable on paper, but on looking at the real thing it was found that the circuit dropped at one point by 24 inches at an angle of 60 degrees, and then 50 feet later, after transversing a 180 degree hairpin, went up by 24 inches at an angle of 45 degrees!!

The pits consisted of a large marquee, which was not large enough for the 120 competitors and crews. (A lesson to be learnt for the next World Titles.) Technical inspection, or scrutineering, was very strict, and was conducted by Cecil Schumacher and Keith Plestead of PB, with weight limits being

checked before and after racing. Scoring was by way of AMB transponders.

2WD CLASS

Drivers from the following countries competed in this event: Australia (6); Austria (2); Belgium (2); Finland (1); France (9); Great Britain (26); Holland (2); Hong Kong (3); Ireland (2); Italy (4); Japan (15); Sweden (2); Switzerland (2); U.S.A. (39); West Germany (5).

Of course, the majority of cars were RC10s, but Kyosho of Japan put up an enormous effort with their new Ultima. The Americans were truly a picture to watch. They have 2 wheel drive class down to a T.

Both Andrew Reade in a PB and Colin Grenenger in a 2WD CAT were amongst the leaders. Andrew finished the 2WD series in 46th position, and Colin in 56th. Our other Australians finished as follows: Jenson Spencer, 95th; Tony Bovard, 104th; Scott Salter, 110th; and Robert French 114th.

The overall winners, though, were Kyosho with their Ultima, taking 1st, 2nd and 3rd positions: Joel Johnson of the USA was 1st, Katsunori Kondo of Japan 2nd, and Kris Moore of the USA 3rd. The champagne corks were popping in the Kyosho tent for hours afterwards. 3.4 seconds separated 1st from 2nd, and 3.5 seconds separated 2nd from 3rd. The remaining positions in the A Final were taken by 6 RC10s and 1 MIP/RC10.



Australian World Titles team members from NSW. From left to right they are Gary Evans, Scott Kennedy, Andrew Bolton, Col Grenenger, Scott Salter and Michael Toms (sitting).

And so to the major class:

4WD CLASS

119 drivers from the following countries started in this event: Australia, (9); Austria, (2); Belgium, (2); Denmark, (1); Finland, (1); France, (6); Great Britain, (15); Holland, (3); Hong Kong, (5); Ireland, (1); Italy, (5); Japan, (15); Norway, (2); Sweden, (1); Switzerland, (1); U.S.A., (39); West Germany, (10).

Cars represented were: Schumacher CAT, 36; Kyosho Optima, 35; Yokomo, 17; PB, 11; RC10/MIP, 5; TAG/Coyote, 4; Mugen, 4; AYK, 2; Scratch Built, 2; Tamiya, 1; Walker Special, 1; Novak Special, 1.

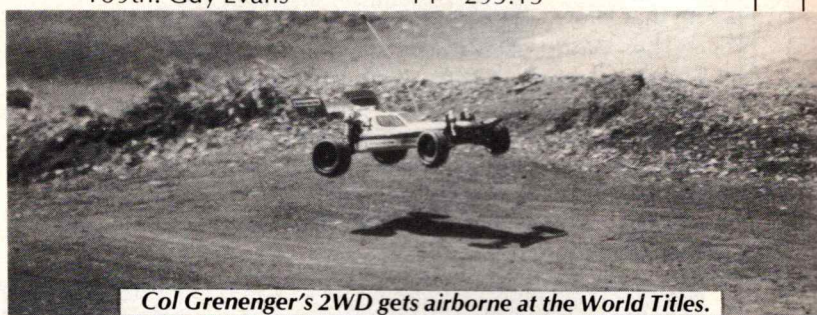
Open practice was allowed between 9.00 am and 3.00 pm on Friday, with no more than 10 cars allowed on the track at any time. This was a problem, as there were 119 drivers competing for this time, which meant that drivers were lucky to obtain four practice sessions throughout the day; in other words, twenty minutes. One good idea was that of organised practice. This was done in heat form to ensure that no radio frequency problems existed between each of the ten drivers.

The competition started at 9.00 am on Saturday morning, with five heats conducted on the Saturday, and 1 heat and the finals on the Sunday. The overall strength of the competition surprised the Americans. Jay Halsey, the current title holder, was on everyone's lips as the 'hot' property, but there were many who pushed him hard each round. The Japanese contingent was very strong, with Kyosho putting in an enormous effort, and Mugen sending a team of four to race their new 1/10 scale car. But overall the CAT and the Optima had the numbers. It was like running a 'Brockie' at Bathurst.

To make the A Final required 17 laps or a very high 16 laps. By the end of qualifying, 6 drivers had obtained 17 laps, with 15 year old Masami Hirotsuka of Japan top qualifying. He was followed by Joel Johnson and Jay Halsey of the USA. Katsunori Kondo (Japan) was fourth, Jamie Booth (GB) fifth, Cliff Lett (USA) sixth, Pete Stevens (GB) seventh, Junichi Koma (Japan) eighth, Eric Soderquist (USA) ninth, and Mike Christensen (USA) tenth. It should be understood that 17s and 16s were the fastest drivers, and only 27 seconds separated 1st and 69th!! In the last heat, on Sunday morning, an American driver improved his time by 3.75 seconds and went up 26 places!

At the completion of qualifying, Australians were placed as follows:

34th. Colin Grenenger	16	309.46
57th. Michael Toms	16	316.90
58th. Andrew Bolton	16	316.98
63rd. Scott Kennedy	16	319.11
73rd. Andrew Reade	15	301.78
81st. Greg Collings	15	304.05
97th. Rob Reade	15	313.50
98th. Scott Salter	15	313.76
109th. Guy Evans	14	293.15



Col Grenenger's 2WD gets airborne at the World Titles.

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The **A Final** was conducted over three legs, with no driver winning more than one. The overall winner was the top qualifier, Masami Hirosaka of Japan, driving a Schumacher CAT, and he was a deserving winner. Ian Kennedy saw the actual split times to 1/100 of a second, and Hirosaka had, in one of the finals, eight consecutive laps within 2/100 of a second of each other. Really quite amazing. A great win also for Cecil Schumacher. At the presentation, when the champagne was being sprayed everywhere, Cecil and his wife were standing next to Ian, and Mrs. Schumacher said "Move out of the way Cecil, or you'll get wet." Cecil replied, "I'm feeling so good that I couldn't care if they drowned me in it!"

At the completion of the finals, Australians finished as follows: Colin Grenenger, 32nd; Andrew Bolton, 51st; Michael Toms, 56th; Scott Kennedy, 62nd; Andrew Reade, 65th; Greg Collings, 81st; Scott Salter, 95th; Rob Reade, 99th; Guy Evans, 106th.



Australian pit area at the 1/10 Scale World Titles. Much comment was made about the flags.

Some Comments from Ian Kennedy

The marshalling was terrible. Overall the Australians showed what marshalling is really about, and received a lot of comment about their terrific marshalling.

IFMAR will make a decision within a year on the format of the next World Titles. It will certainly be both 2WD and 4WD, but the decision on whether it will be 7 cells and four minutes, or 6 cells and five minutes will depend on a vote of the member regions. A decision on how Australia votes will have to be taken by ORRCA Australia.

The next World Titles will be held under the guidance of FEMCA, and both Australia and Japan have submitted applications to host the event. It will be decided by a vote of the FEMCA countries some time over the next four months. We hope very much that the vote will go Australia's way.

All of the Australians who visited the World Titles were outstanding ambassadors for Australia and for the sport, and we should all be proud of our drivers.

Technology still remains the greatest problem to Australians, and where the technology appears to matter the most now is in the choice of cells. An enormous amount of effort and matching has gone into the top drivers' batteries, and the standard of batteries that were raced at Romsey compared to what we buy over the counter is like the difference between a Rolls Royce and a Mini Minor! An area we will have to watch and learn to live with.

In driving skill we are up there with the best. A close look at lap times shows that our drivers were lapping at times similar to the top 10. They were just not as consistent. If we are to obtain world standards, the only way we can do it is through competitions such as Romsey, and by keeping a close watch on world technology.

IAN KENNEDY finished his report of the World Titles with this comment: "ORRCA Australia should start **now** to commence plans for the next World Titles, no matter where they are held. Decisions should be made now for the way our drivers will qualify, and the conditions under which they may qualify. It would be my recommendation that a condition of qualifying be that drivers must run in both classes."

He went on to say that 2WD Open Class should be introduced at club level, and clubs should allow dual entries from open class drivers at each club day, in order to be better prepared for future international competitions.

Once again I would like to thank Ian, Andrew and Colin for their efforts, particularly Ian who supplied most of the written data.

I would like to conclude this report with a reminder. When Colin and I returned from the World Titles in '85 we made the same recommendations that Ian made above. However, there were some who claimed that we were making these suggestions because of commercial interests, and we were ignored. It is to be hoped that this time, with the large contingent of non-commercial participants who are saying the same thing, that others will take notice and do something about it. What the knockers fail to realise is that without the commercial interests there would not be a sport. The strongest country in our sport is the USA, and it is totally commercial, including the tracks. Those with commercial interests obviously care about the sport as a whole, because their livelihood depends on its survival and growth.

2WD FINAL RESULTS

1. Joel Johnson	USA	Kyosho Ultima
2. Katsunori Kondo	Japan	Kyosho Ultima
3. Kris Moore	USA	Kyosho Ultima
4. Mike Christensen	USA	Associated RC10-MIP
5. Jamie Booth	G.B.	Associated RC10-MIP
6. Kevin Moore	G.B.	Kyosho Ultima
7. Jay Halsey	U.S.A.	Associated RC10
8. Masami Hirosaka	Japan	Kyosho Ultima
9. Rory Cull	G.B.	Associated RC10
10. Eustace Moore	U.S.A.	M.I.P.

4WD FINAL RESULTS

Masami Hirosaka	Japan	Schumacher XL CAT
2. Jamie Booth	G.B.	Schumacher XL CAT
3. Cliff Lett	U.S.A.	Schumacher XL CAT
4. Joel Johnson	U.S.A.	Kyosho Optima
5. Katsunori Kondo	Japan	Kyosho Optima
6. Junichi Koma	Japan	Kyosho Optima
7. Pete Stevens	G.B.	Kyosho Optima
8. Jay Halsey	U.S.A.	Yokomo Dogfighter
9. Eric Soderquist	U.S.A.	Kyosho Optima
10. Mike Christensen	U.S.A.	MIP-Associated RC10



The ten A Finalists, left to right: Pete Stevens (GB), Katsunori Kondo (Japan), Junichi Koma (Japan), Mike Christensen (USA), Joel Johnson (USA), Jamie Booth (GB), Eric Soderquist (USA), Jay Halsey (USA), Cliff Lett (USA), and Masami Hirsaka (Japan), the winner.

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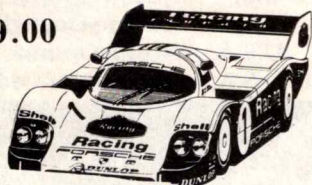
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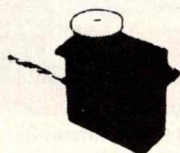
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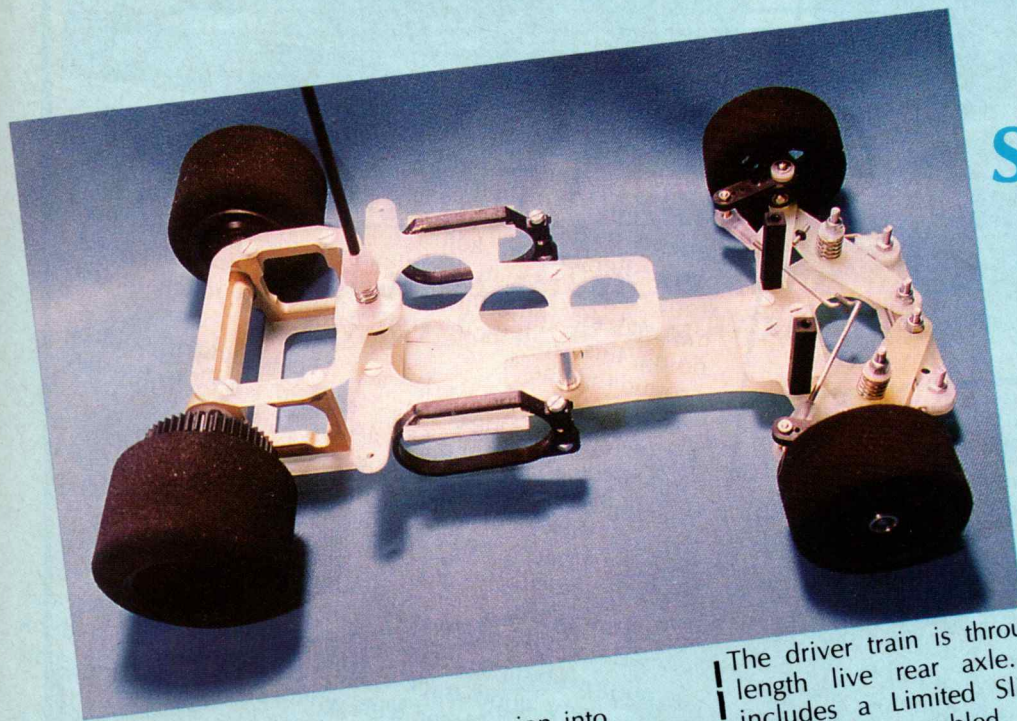
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C CAR DOING IT ON CARPET

THE SCHUMACHER C CAR IN REVIEW

by Paul Bird



Being an addicted off-road racer, an excursion into the world of 1/12 scale cars is quite a novelty, and I don't mean that in a derogatory way. I was quite excited when presented with a small cardboard box containing the components with which to build a Schumacher C Car.

Compared with the off-road buggies that I'm used to, this little circuit car is very simple to build: so simple, in fact, that the instruction 'book' is a single sheet of paper with an exploded view of the C Car, which shows you how all the bits fit together. However, I do have one criticism. The numbers on the plastic bags containing the parts bear no relation to the part numbers shown on the assembly diagram, making it a little difficult to be completely sure that you're using the correct screw, spacer, or O ring. That aside, the C car is a good example of extremely simple design, making use of available technology to produce a purpose-built car.

Assembly

The chassis is made from heavy gauge fibreglass, which really keeps the weight down, yet is very strong.

The rear axle pod, which also holds the motor, is joined to the main chassis plate with three screws, O rings, and two fibreglass plates. This pivot is also used as an adjuster for setting up the car. The pivot, combined with the flexibility of the fibreglass, makes up the rear suspension.

The upper section of the pod links to the main top plate with a spring assembly (holding the aerial rod), which allows movement, to absorb any roughness in the track surface.

The front wishbones are made from two fibreglass arms, and attach to the chassis with bolts, fitted through O rings and spacers. A longer bolt, fitted with a spring, goes through each wishbone assembly to provide the suspension. The front end is also fitted with a stabiliser bar.

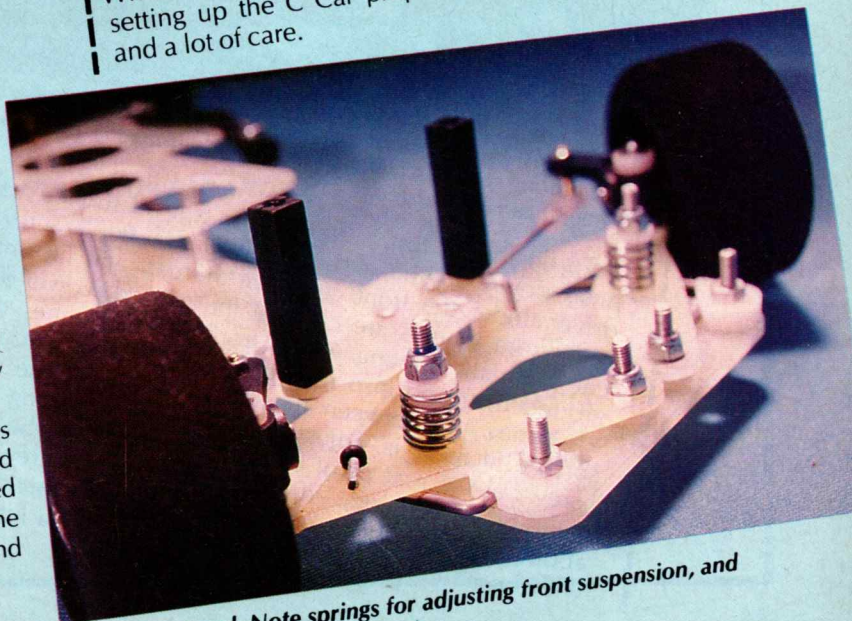
The driver train is through a gear fitted to a full-length live rear axle. The axle assembly also includes a Limited Slip Ball Differential, which comes fully assembled.

The large, super grippy rear foam tyres slide onto the rim, and are retained by an O ring in a groove in the rim. Easy to fit, easy to change; yet the tyres won't come off while you're racing.

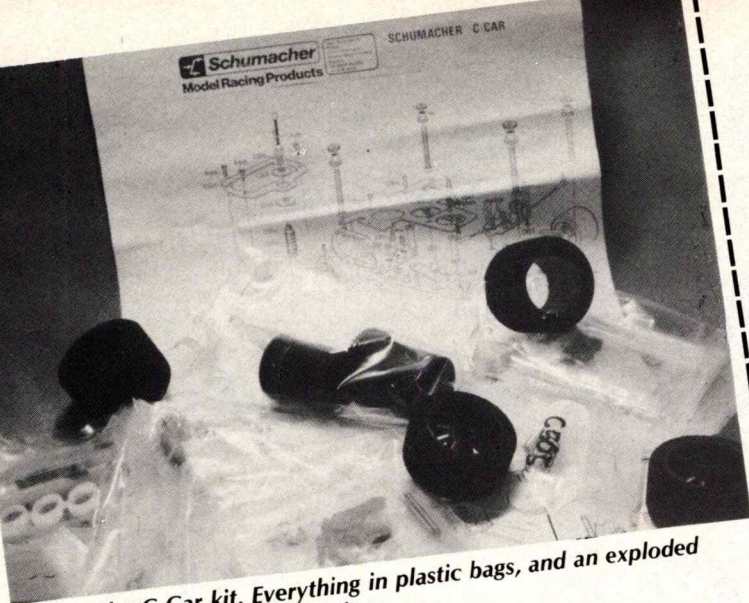
Naturally, the axle assembly is ball raced, and ride height can be adjusted by changing two nylon supports which hold the assembly onto the rear pod. Three different height settings are possible. The front shafts are the ball-raced, live axle type, and the wheel-tyre assembly is retained on the axle by an O ring in a groove on the end of the axle itself.

Given the size of the C Car, there's a surprising amount of room for radio gear, and a good, solid mounting is supplied for the steering servo. A very strong and efficient servo-saver comes with the car kit.

While construction is straight-forward enough, setting up the C Car properly requires a little time, and a lot of care.



Front end. Note springs for adjusting front suspension, and stabiliser bar.



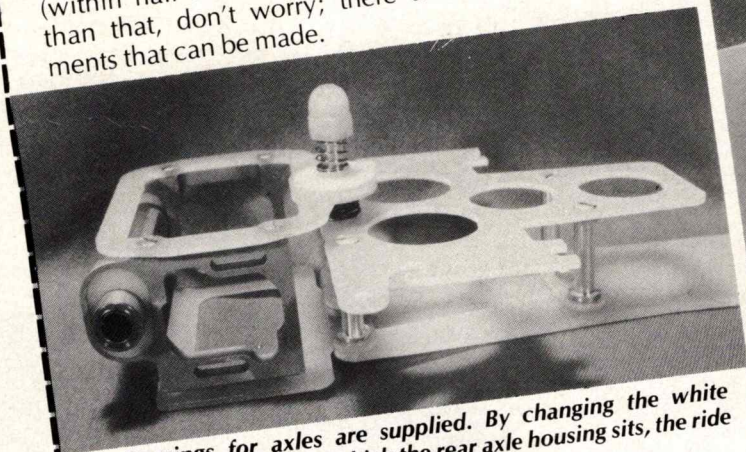
The C Car kit. Everything in plastic bags, and an exploded diagram for the instructions.

Setting Up

There are two tests to carry out to set the car up properly: the Wedge Test and the Lift Test. Instructions are given on how to make the wedge needed for setting up and getting the chassis square. If it's not square, the car won't handle properly.

To carry out the wedge test, have the car ready to race, but without the body. Place it on a flat, level surface (a kitchen bench will do fine), and push the wedge all the way under the right rear tyre. Now push the right front wheel down until it touches the ground, then let it go. Set the wheel spinning, and, while holding the left rear tyre, withdraw the wedge slowly, until the right wheel contacts the surface and stops spinning. Take note of the number reading shown on the wedge. Use the reading closest to the rear sidewall.

Repeat this procedure with the left side. Hopefully the two readings will be the same, or very close (within half a division). If there's a larger discrepancy than that, don't worry; there are some more adjustments that can be made.



Bearings for axles are supplied. By changing the white mounting spacer in which the rear axle housing sits, the ride height can be changed.

To do the lift test, sit the car on a level surface and push down on the aerial a few times. Put a screwdriver under the front centre of the car, and lift until both front wheels are clear of the ground. Lower the car gradually, noting which front wheel touches the ground first, and also noting if there's more than a 1 to 2 mm gap between the other wheel and the flat surface. If there is, adjustment can be made using the screws at the rear pivot point. If, say, the left wheel is clear of the ground, adjust the right hand screw by about a quarter of a turn. You'll have to experiment with loosening or tightening these screws, as a lot will



The rear suspension pod, and pivot point.

depend on how tightly you did them up in the first place. **Remember**, adjust the screw opposite to the front wheel which is clear of the ground. After making the adjustment, repeat the lift test. Keep doing this until both front wheels are touching the ground together.

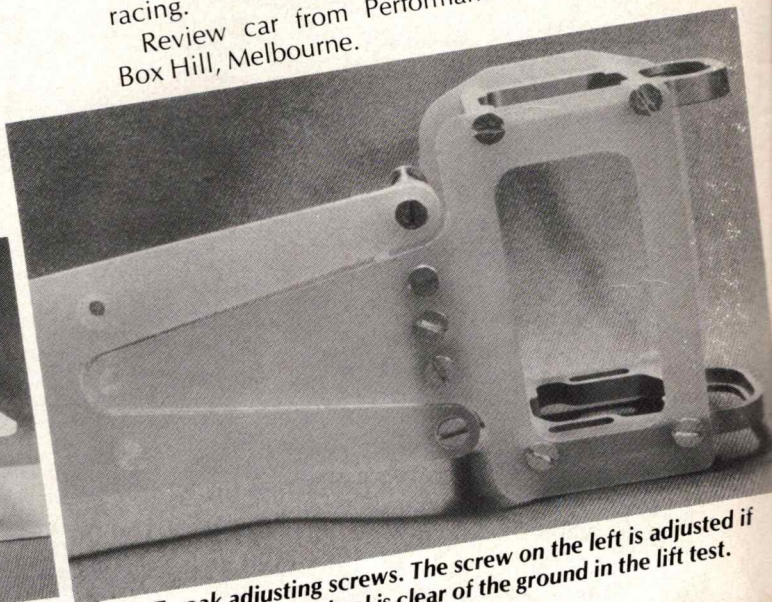
Now repeat the wedge test. The readings should be close for both sides. If they are still not close enough, repeat the lift test, and adjust again.

Finally, a word about ride height. Low is good, but not so low that the suspension bottoms out on the track surface, because that won't help handling or performance.

Summing Up

The Schumacher C Car is a simple piece of purpose-built engineering. It is easy to assemble, and has very good track handling characteristics. I think that it's a good car with which to get into 1/12 scale racing.

Review car from Performance Hobby Supplies of Box Hill, Melbourne.



Tweak adjusting screws. The screw on the left is adjusted if the right front wheel is clear of the ground in the lift test.

REVIEW AT A GLANCE

Quality of Instructions:	★★★★
Ease of Construction:	★★★★★
Quality of Materials:	★★★★★
Motor Supplied?:	No
Chassis Type:	Fibreglass plate
Suspension Type:	Fibreglass pivot & spring
Shocks Type:	None
Sway Bars?:	Front only
Ball Races Supplied?:	Yes
Motor Accessibility:	★★★★
Battery Accessibility:	★★★★★
Speed Controller Supplied?:	No
Steering Servo Saver:	★★★★★
Body Shell:	Not supplied
Balance of Car:	★★★★★
Handling on Track (as tested):	★★★★★
Ease of Setting Up:	★★★★

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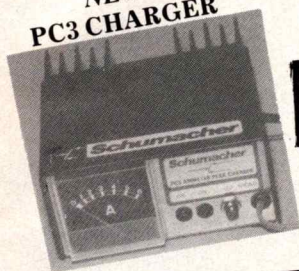
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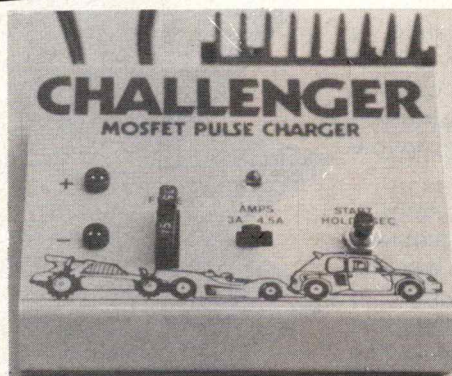
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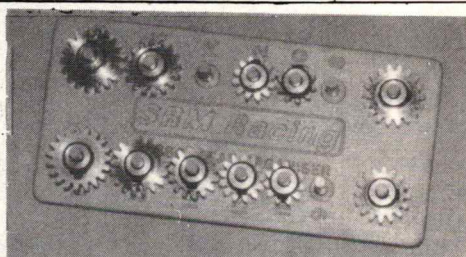
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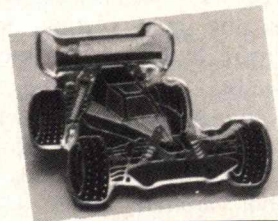
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There's a **MONSTER BEETLE**

in my garden

by John Rogers

Once upon a time there was a car with which nearly everyone had a 'love-hate' relationship. Its lines were simple, its engineering and reliability a legend. There will be many readers out there too young to remember its virtues, and even some who don't know its name: the 'Vee-Dub', 'Volksey', 'Vee Wee'; remember it now? Of course you do. One of the more common and endearing names give to the Volkswagen was the 'Beetle', which is now the subject of Tamiya's design team.

It is packaged in typical Tamiya style, with all major components individually packaged in see-through blister packs or bags, with all parts clearly numbered, making individual part identification a breeze. Those of you who have built Tamiya RC vehicles previously will be familiar with the excellent instruction book layouts which are so easy to follow that a beginner will have no trouble.

CRUSHER

The 1/10 scale Beetle really is a monster, being shod with 130 mm tyres that have no trouble crossing the roughest of terrain. At first glance one would think that the 50 mm ground clearance would make the Monster Beetle top heavy; NOT SO. The positioning of the ni-cad pack gives the Beetle a relatively low centre of gravity, which gives it the ability to go over jumps at full tilt and land on those over-sized balloons that the people from Tamiya like to call tyres. Whilst on the subject of wheels, the gold plating on the rims is really tops. It adds a real touch of class to the vehicle.

The chassis, which is identical to that of the Frog, is coupled to a Johnson RS-540 motor, which gives heaps more power than the Mabuchi. Quite a thrill to see a real fire-breathing beetle.

Incidentally all you Frog drivers out there, why not hop down to your nearest Tamiya stockist and buy the Monster Beetle wheels, tyres, mounting post, front axles, body, servo saver, steering arms, front uprights and steering linkages, and turn your Frog into a Beetle? Is this a metamorphosis, or a conjuring trick?!

The ABS resin chassis provides protection for the mechanics whilst being light and durable, providing a good home for radio gear and speed controller. The body is injection moulded, high impact plastic, showing a good degree of detail. Unlike the clear lexan body shells which **should** be painted on the inside, the Beetle body can be painted over (if you don't like the red body shell), to the colour(s) of your choice.





REVIEW AT A GLANCE

Quality of Instructions:	★★★★★
Ease of Construction:	★★★★★
Quality of Materials:	★★★★★
Motor Supplied?:	Yes; Johnson RS-540
Chassis Type:	ABS Resin
Suspension Type:	4 wheel independent
Shocks Type:	Oil-filled, coil over
Sway Bars?:	No
Ball Races Supplied?:	2 only, plus bronze bushes
Motor Accessibility:	★★★★
Battery Accessibility:	★★★★
Speed Controller Supplied?:	Yes mechanical resistance plate
Steering Servo Saver:	★★★★
Body Shell:	ABS Plastic
Balance of Car:	★★★★
Handling on Track (as tested):	★★★★
Ease of Setting Up:	★★★★

As previously mentioned, the motor now powering the Monster is a Johnson RS-540. This little beauty has heaps of grunt, and powers the Beetle along at quite a gallop. A sealed gearbox-differential unit transfers the power from the Johnson to the wheels quite nicely, keeping nasties out of gears and pinions. Those with a spare Tamiya Black motor or similar lying around, will find that it will fit, but the Monster already has heaps of speed, and could climb the garden wall!

Suspension is 4 wheel independent, utilising double wishbone at the front and trailing arm at the rear, and it has oil filled, coil over shock absorbers to take the sting out of the bumps and jumps.

The performance of the Beetle won't win you the ORRCA Titles, but it will give you hours of fun. It makes for a great change of pace, and is capable of absorbing a lot of 'battle damage'. In short, the Monster Beetle is made to take a serious thrashing.

If you are thinking of driving your Monster around the local supermarket car park, or up and down the street, the tyre spikes won't handle the bitumen very well; i.e. they will disappear very quickly. The Blackfoot's tyres are more suited to that type of driving. Save the Beetle's tyres for off-roading.

Conclusion

The Tamiya people have come up with an entertainment package rolled up into the shape of an over-shod VW. It's built for fun, and that's what it delivers. If you're tired of the same old cars, go buy a 'Monster Beetle' — it's a winner!

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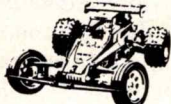
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3. The Tamiya Road Wizard is a Formula 1 car. It has decal sheets for which 2 Formula 1 Teams?

All entries must be submitted on this entry form. (Copies or facsimiles will not be accepted.)

Please place my entry in the draw for the Tamiya Fox. My answers are:

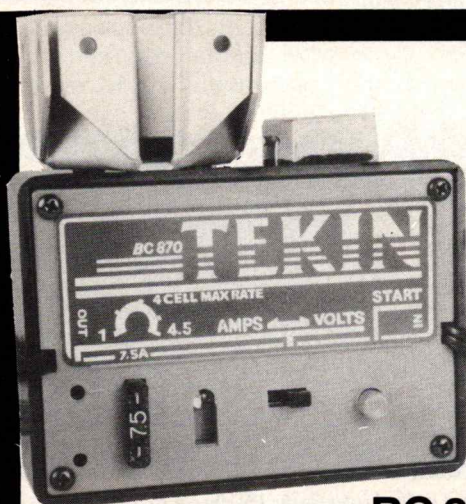
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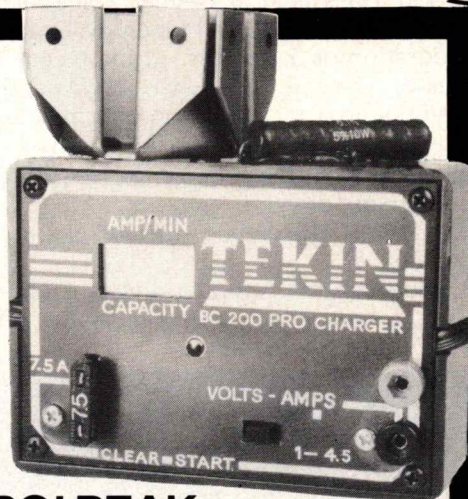
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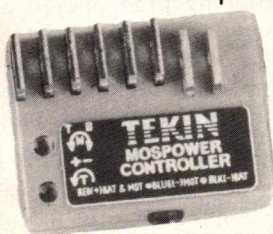
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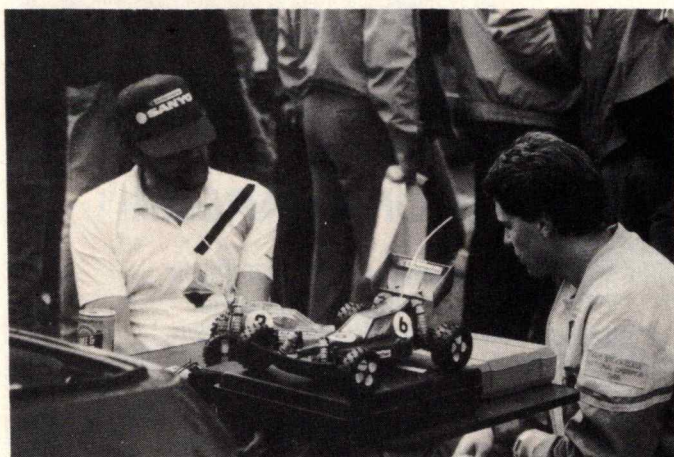
"AS I SEE IT"

by Jack Grenenger

Our new magazine has met with a warm reception from racers from all over the country. I have had calls and letters telling me so. In order to make it even better, I ask you, the readers, to send in your ideas about what you would like to see in the magazine, any hints you might have that would help other buggy racers, and even articles; if they warrant printing they will take their place in future issues.

Another **World Title** event has come and gone, and a resume of same follows later, but first I would like to talk about the next World Titles. From all accounts it appears that Australia has a better than even chance of being the host in 1989. If this is to be the case, we, as participants in the sport, need to know a few things, and I ask the powers that be the following questions:

1. Who decides what classes are to run? (In the 1985 World Titles held at Delmar, California, it was 6 Cell Stock 2WD, and 7 Cell Open 4WD; both races having a duration of 5 minutes. At the recent 1987 Titles the classes were 6 Cell Open 2WD, and 6 Cell Open 4WD, with a race duration of 5 minutes.) It is imperative that we in Australia know what classes will be allowed if and when we get the Titles, in order to prepare our drivers.
2. How is the venue decided upon, and who will decide?
3. How are the Australia drivers going to be selected? (Not, I hope, the same way as the selection for the 1987 Titles was made.)



Tim Walden, General Manager of Schumacher, going over details with Andrew Bolton.

Some may say that these questions are premature, but they are not. If we are lucky enough to be allocated the 1989 Titles, we have to start now to get our act together. We in Australia have the capabilities of organising and running the best yet. We have the expertise and the people, and as soon as it is official we should be ready to act. My suggestion is that a World Titles Committee be formed, preferably of about six members for the initial ground work. This committee could be enlarged at a later date if need be, but we do need a committee whose purpose is to co-ordinate, recommend and communicate, suggest and implement all the various contingencies that will arise in the next two years.

If the Interstate ORRCA Shield come to fruition, and it should, this would be an ideal venue to pit top

drivers against each other to give an indication of their ranking, together with State Titles and National events. The committee should have the power to rate drivers, as they do in tennis and golf, and the ratings be published, and for once we would know where we are going.

The various classes to be run at a World Titles and our own classes should be brought into line, to help us choose the best drivers for the events and to help our drivers to prepare. We will never have a better opportunity to have a World Champion than in 1989 if we get to host this most prestigious event. I think that we should try to show the rest of the world that down under we are no longer the poor relations, but that we are up there amongst the leading countries. If you look at the results of the 1987 Championships, you will see that this is not an idle or wishful dream. We can do it: let's start now.



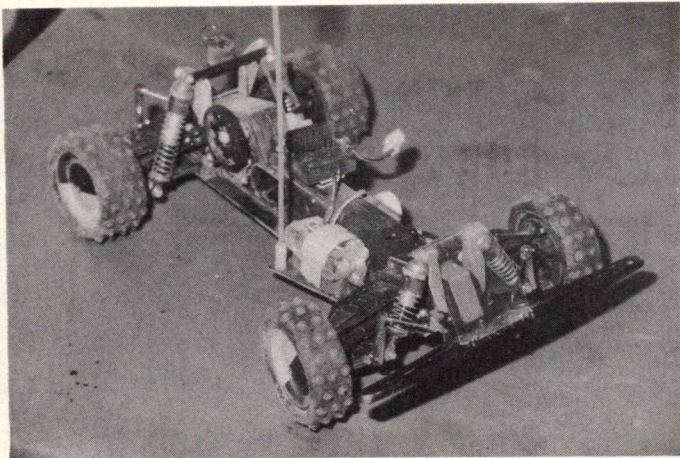
On a recent trip I called into Peter Hodgson's Cycle Shop in Mildura, and Peter was kind enough to show me their new track. With a lot of work still to be done, it is a tight circuit for the faster cars, and I felt that a bit of widening would make it easier for the new chums and juniors. Good to see more tracks opening and a bit of effort being put into the sport. Keep up the good work, Peter.

TO TWIST OR NOT TO TWIST?

At the World Titles in 1985, each driver was given 2 05Rs (for the 2WD Stock class). They were instructed to choose which motor they were going to run and to return the other, which was marked and stored. Because someone started jumping up and down about top teams twisting motors, and in practice it appeared as if they were running mod. motors (they were so much faster), it was announced that Mike Reedy would twist motors for others who wanted him to. This he did, and I stood and watched him for nearly an hour. However, no-one who had a motor twisted this way went as fast as the teams drivers, and the reasons were:

1. The motors weren't twisted as far.
2. The didn't have the battery power.
3. They didn't have the technology on spring tension, nor the time to work out ratios to suit that track with that motor and those batteries.

You see, when you get to State, National and World level, even here in Australia, the people who have more technical knowledge on batteries, motors and ratios are going to go faster than Mr. Average.



Keith Campbell's 'KC' after racing, as you can see from the dirt.

When we arrived back in Australia in '85 we went to Queensland for the Nationals, which we won, and then proceeded to twist stock motors for those racers who wanted to go faster. We were accused of cheating, and twisting was banned by the ORRCA, mainly because some delegates didn't really know what it was all about. One of those delegates has admitted to me since that he was against it then because he couldn't do it.

Eighteen months later, when these people eventually found out what it's all about and how it is done, the rules are changed, and it is now legal to twist a stock motor. This came about because of the Nationals in Victoria. We had been saying for eighteen months that stock motors can vary from anything up to 15° in advance out of the box. So now the rules say that you can twist a motor. (Well, they don't say that.) The rules are quite specific: the motor must have 27 turns or 28 turns of 22 gauge or .065 wire, must run bronze bushes, must be of 05 configuration, and the end bell must not be removed. At last the Stock driver is going to have a fair go. Don't you believe it!

ORRCA(NSW) is charging \$35.00 entry fee for the Stock classes at the NSW State Titles, for which you will receive only one 05R. If you get a dud you can pay an extra \$38.00 and get another one. (You can only buy one.) You will not be allowed to use that screamer of a stock motor that you own already. I think that this sort of decision should be made by a vote by all the clubs, so that we get what the majority of clubs, and particularly the racers, want, rather than a decision by 6 delegates. The opinions I have heard from racers is that they would like to use their own motors, and, with the variety of hot stock motors around (which are legal by the present rules), why not?

It is time that you people, the racers, started demanding some say in these matters. The way things are going ORRCA might as well decide to supply motors for Open class as well. What's the difference? The stock motors cost only about \$15 from the importer, so a charge of \$38 for a second one seems excessive.

This particular situation applies to the NSW State Titles. Is the same thing going to happen in Victoria and Queensland? Each issue I am going to analyse and comment on what is happen in the administration of our sport so that you are made aware of what

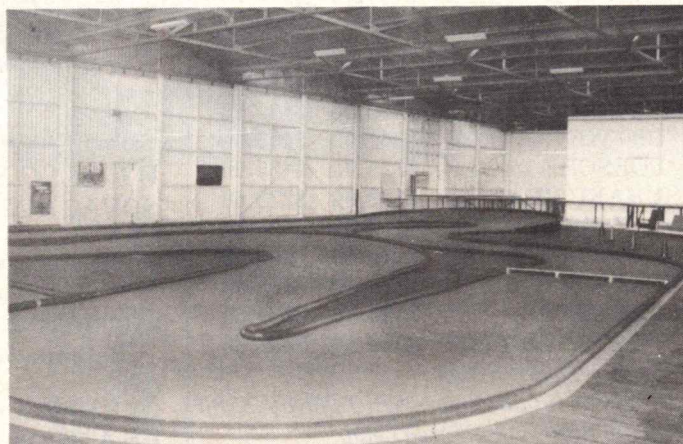
is happening. I hope that if you don't like what you hear that you will start demanding to have a say in the decisions about rules. This process has to start at club level.

I would like to give you an example of the sort of thing that is happening. I had a phone call from a club president from the North Coast recently. It is only a small club of about 50 members. He rang because at their last meeting one young lad had run a twisted stock motor and was disqualified. The youngster said that the hobby shop owner had told him that it was legal to run twisted motors by ORRCA rules. My caller asked if this was true. My answer was that yes, it is legal to run a twisted motor in stock class, and gave him the ORRCA ruling. He claimed that they had had no correspondence on the matter; in fact, correspondence from ORRCA was non-existent. He said that he has copies of 4 letters that he has sent to ORRCA over a period of 6 months, and yet he has received no replies.

I have spoken to representative of ORRCA and am told that all correspondence is dealt with by the secretary. ORRCA Secretary, Judy Sawtell, informed me that minutes of every ORRCA meeting are mailed to all affiliated clubs within 3 days of an ORRCA meeting. Judy is a very efficient lady, and if she says that this is the procedure, then that is how it is. So now we are back to club level. If club members are uninformed, the club secretary must be the one to ask about it. My advice is to get onto your secretary and demand that these minutes be read at club meetings and also be made available to be read by anyone who wants to.

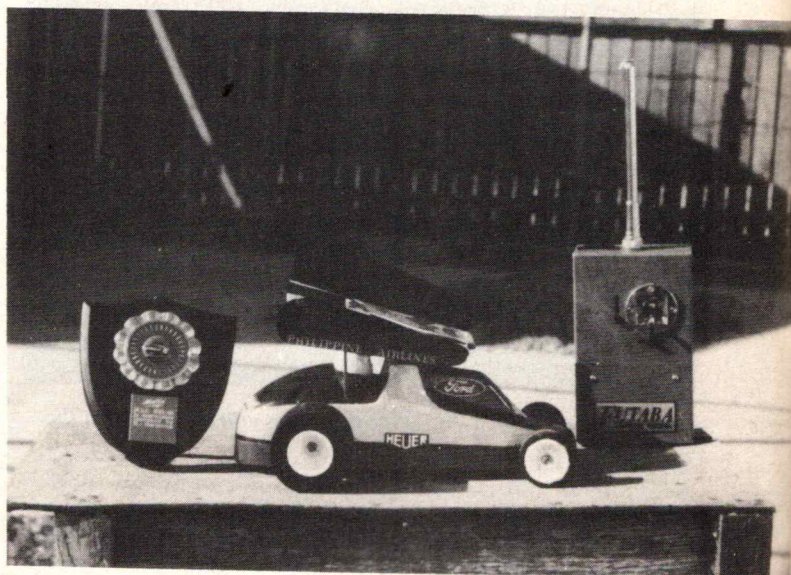
Through my investigations I have found that ORRCA(NSW) still has the old P.O. box number at Guildford. It is rarely cleared, so if clubs are still using that address that is probably the reason why no answers are forthcoming to their correspondence. Therefore, if you write directly to Mrs. Judy Sawtell at 2 Nursery Place, Belrose, NSW, 2085, Judy assures me that your correspondence will be answered. For those of you who wish to ring, the phone number is (02) 451 9571. Judy will try to answer any questions that you have.

Now, having taken some of the blame away from ORRCA and placed it back onto the clubs, there is still a lot to be done to improve the situation at the top. As I said before, I think that the ORRCA should not make rules and regulations that affect us, the racers, with-



Ballarat Indoor Circuit. Carpeted layout provided excellent traction and fast racing. It is a great pity that this excellent track was not given the support that it truly deserved.

out allowing us to have a say. I was instrumental in starting ORRCA, and, as I understand it, unless somewhere along the way the rules have been changed, an agenda of coming meetings should be sent to all clubs. They should then vote on the matters on the agenda at club level and should then advise their delegate of the way he is to vote at the meeting, or mail the club decision to the ORRCA Secretary prior to the meeting. This is not happening, and I would like to know why, wouldn't you?



For those not familiar with the item on the right, it IS a radio transmitter; a 'golden oldie', 2 channel, single stick type, and still going strong. Another photo from Martin Fleming from the ACT showing his trophy-winning speedway car which he runs at the ACT Speedway Club. (Contact Martin at 19 Arunta St., Narrabundah, ACT, 2604 for club details.)

Col Grenenger's CAT really flying at the Dapto track (NSW) recently. Col is off to England soon to compete in his 2nd World Titles. He was part of the small band that went to the World Titles in California 2 years ago. R. Wood photo.

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Why Not — GO GAS?

1/8 Scale Gas Off Road Racing from John Duggan

It is unfortunate that such a top section of competition model cars has such a small following in this country. In the six years that I have been associated with 1/8 gas off road racing, there has been only a very slow rate of growth. The main reason for this, I believe, is due to the fact that when buggies suffer the inevitable maintenance problems (broken gear boxes, suspensions, and so on), the less experienced, and to a degree, the less affluent are lost to the sport because, no matter how often the faults were rectified, they would raise their ugly heads time after time, due to poor kit manufacturing techniques or selection of the wrong materials for the job. These constant breakages caused such frustration that a lot of modellers simply gave up and went to other avenues of the RC hobby field.

ENGINES

The 3.5 cc engines, of high revving power, are all quite reliable, providing that you exercise some common sense, and follow some basic operating rules. Nobody wants bent or broken con rods due to over-revving, scored pistons, liners and bearings because they didn't think it necessary to fit efficient air filters to keep the nasties out. From the most expensive to the cheaper brands, all can be set up to run reliably and give many, many hours of trouble-free running.

CHASSIS

The chassis is of paramount importance if you are to have a successful, rock-solid vehicle. Components must be of good quality materials, preferably hardened alloys. Plastic components, if any, must

also be of robust design and construction, to minimise breakages yet retain a degree of flexibility as needed for their individual jobs.

WEIGHT

Some 1/10 scale racers might be surprised by the weight and speed of these fire breathers. Weighing between 3 and 4½ kg (6½ to 9½ lb), these brutes can move out to terminal speeds of 70 to 80 kph, with engines producing .8 to 1.6 BHP. Try doing these speeds with your 1/10 off roader!

COMPETITION

In Europe, where 1/8 gas has quite a following, race meetings have ½ hour heats and 1 hour finals, on large and sometimes bumpy tracks. The duration of these races means that cars have to pit for fuel about 3 times in heats, and 5 or 6 times in finals, all adding to the fun and excitement.

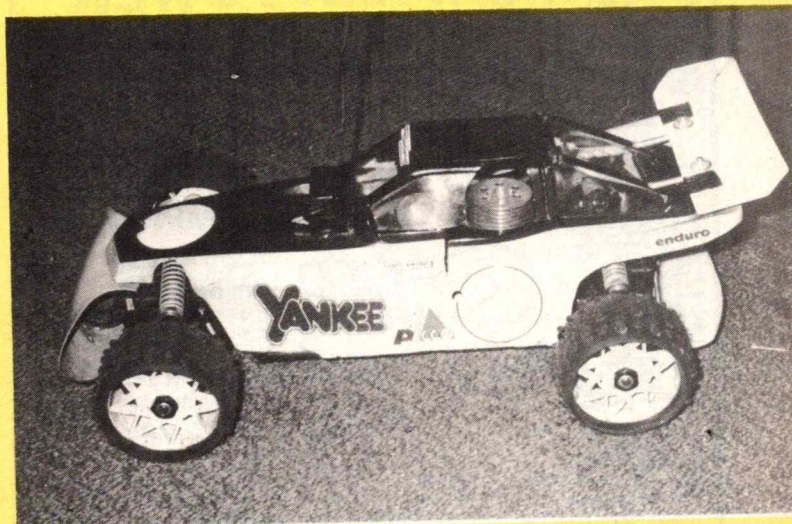
During the last 6 years I have run just about every 1/8 off road car on the Australian market, and my experience has shown that you get only what you pay for. In my opinion, European models are better engineered than any others on today's market. This is borne out when you consider all their victories, including the 1986 World Champs, which was won by the 'Yankee'. There are some new models due from Europe shortly, and we in our club are hoping for a big increase in membership, and some good racing in the future, with a view to holding the State Championships in 1988.

YANKEE — a 1/8 4WD Gasser

Despite the American-sounding name, the Yankee is, in fact, of European origin, with a long heritage, first taking out the French Championships way back in 1977.

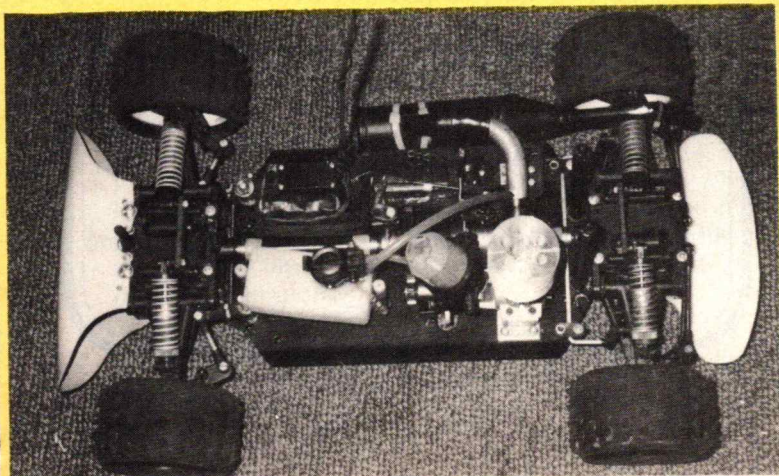
The quality and reliability of the Yankee are second to none, and are a guide to the rest of the industry. Yankee 4WDs have been European gas champions for four years, and won the 1986 World Championships, which were held in Grenoble, France.

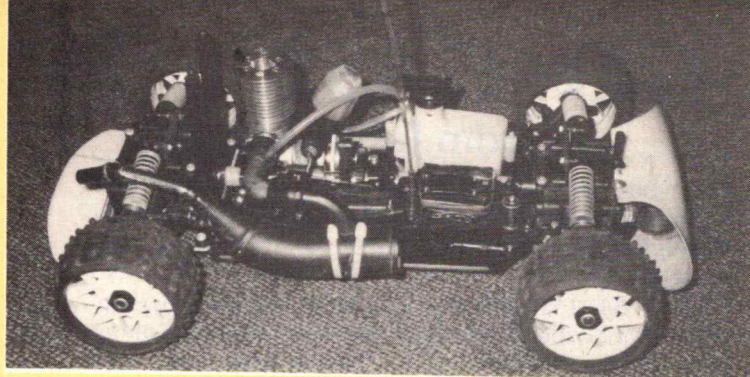
The Yankee 4WD, like some of the more sophisticated 1/10 scale dirt diggers, has **3 differentials**, one on each axle and the third on the centre drive shaft. The **chassis** is flat aluminium, with the **gearbox** units screwed onto each end of the chassis plate. Gearboxes are interchangeable, and are of quality construction, using hardened steel axles, simple design, and very accurate machining on all metal parts.



The **engine** sits in the left hand rear section of the car, and the exhaust runs over the top of the drive shaft and along the other side of the car to exit over the right rear shock unit. The **exhaust** is similar to that of a trail bike (2 stroke), and, of course, the length of the pipe is very important in determining the performance of the motor (tuned length). My observations are that most cars tend to be run on too short a pipe.

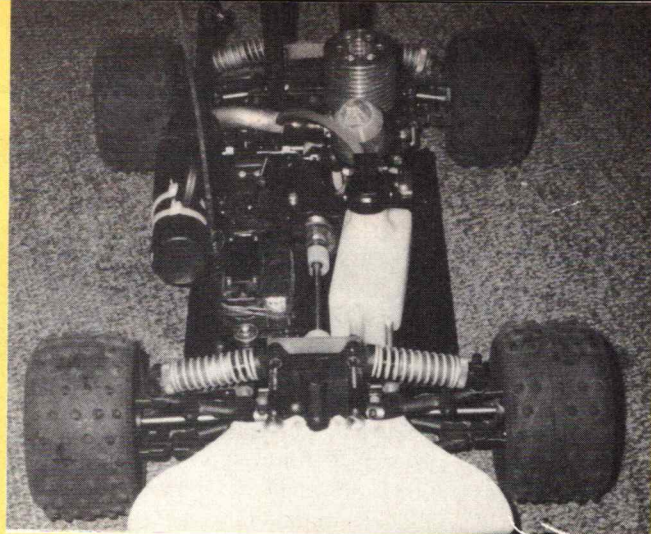
Shocks are blue anodised aluminium with coil over springs. It also has front and rear stabiliser bars.





The diffs have planetary bevel gears of good quality steel, and are very smooth in operation. To get the gearbox cases together requires clamping and drilling so that they are aligned straight. It is very important for them to be symmetrical.

The car has an SG type tank, and uses muffler pressure. The radio gear is mounted on a removable radio plate held in by body clips, and can be easily removed for cleaning. Once you have the gearbox fitted the car goes together very easily.



Our test car was fitted with a Picco buggy engine; the same motor that was used by the top qualifier at the World Champs.

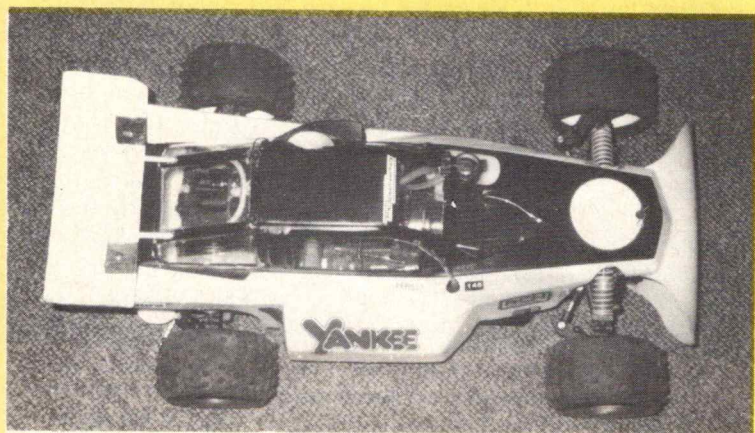
Driving

My first impression of the car was that it was like a circuit car to drive: it sits low and drives very flat, with no body roll. When pressed too hard it spins out, but has no tendency to being 'tippy toed' or wanting to roll. I have found the car to be easy to drive fast, and it is very forgiving to the heavy handed driver.

It is interesting to note that Yankees have won every trophy meeting that our club has run, and our test car, the oldest in the club, has run over 15 hours without **any** mechanical problems. It has been 100% reliable, which is why our club now has 6 Yankee 4x4s running.

For more information on 1/8 scale gas buggy racing, contact:

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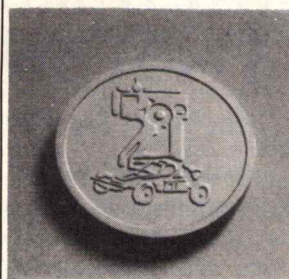
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BUGGIES FOR FUN

by Michael Borthwick

With emphasis given to competition results and reviews of the latest 'hot' (read expensive) items for buggies in this magazine and others, you could be excused for believing that all that buggy enthusiasts do is race. Not so! I am quite sure that in this, as in any hobby, the majority of people are involved at a non-competitive and low budget level. The focus for these people is on FUN.

In the RC buggy scene this translates into giving your car a run for perhaps an hour after school or work, and occasionally getting together with a few mates for the fun of running a few cars together; perhaps literally!

I am certainly not denigrating all those people who obtain a great deal of enjoyment from racing, and especially those who devote precious spare time to organising such activities. Competition is great because it gets people together, swapping ideas, making friends and basically just getting outside and doing something social instead of having their brains sucked out by the TV.

However, when you examine the statistics, the number of buggies and 2 channel radios sold is substantially greater than the total membership of clubs, but the competition side of the sport seems to receive a disproportionately high amount of coverage in the magazines.

So I'm back where I started this discussion. The point that I'm trying to make is, don't feel left out or uninvolved just because you aren't a serious racer. Serious competitors are definitely in the minority as far as buggy ownership goes, but, because of their high level of commitment and enthusiasm, they are, naturally enough, the people most active in clubs, and can also tend to monopolise the flow of information in the sport. The problem is that both competitive and recreational drivers read buggy magazines and both like to be catered for in their pages.

There is an army of people who own common or garden variety cars like the Frog or Pegasus and their equivalents from other manufacturers, and who use inexpensive resistive charge leads, and whose buggies are equipped with a simple and reliable mechanical speed controller, in lieu of the more expensive FET speed controllers.

When you're into RC cars for pleasure, it is very hard for a lot of enthusiasts to justify the high cost of upgrading; either to a new buggy, or improving the performance of their existing one with after-market parts. The winning edge that a competition driver might enjoy, for example, uprated suspension components, might not be appreciated by the average driver using his vehicle on the nearest patch of vacant land. Certainly there are times when you may upgrade parts; perhaps a kydex bumper when the original breaks, or a set of ballraces which will prolong the life of many of your car's moving parts by reducing vibration.

What about a new buggy? As I've already mentioned, the cost of spare parts is quite high, and it is often

a better option financially to purchase a new buggy rather than doing major work on your old one, since the cost of significant repairs or upgrading often amounts to a substantial proportion of the price of a new car. This is particularly true since you will already have the radio, nicads and some kind of charging system. This pricing situation has a parallel in the computer market, where the original system may be exceptionally cheap, but the price skyrockets when you start considering items such as disk drive, printer and software. Remember that reviews of glamorous new buggies are particularly relevant to the competitive and affluent, since in this sport competition success depends on both your level of talent and the size of your cheque book.

Why does the focus seem to be weighted so heavily towards the very latest products in both cars and components? One reason is that the area of RC buggies is very exciting and rapidly changing, so naturally the emphasis is at the leading edge of development. In buggies the latest advances in materials technology, such as carbon fibre composites and lightweight alloys, become incorporated very quickly into new buggy designs or as improvements for existing cars. Other developments such as four wheel drive, and especially four wheel steering, appear in 1/10 scale bodies before they are released on full-size production cars.

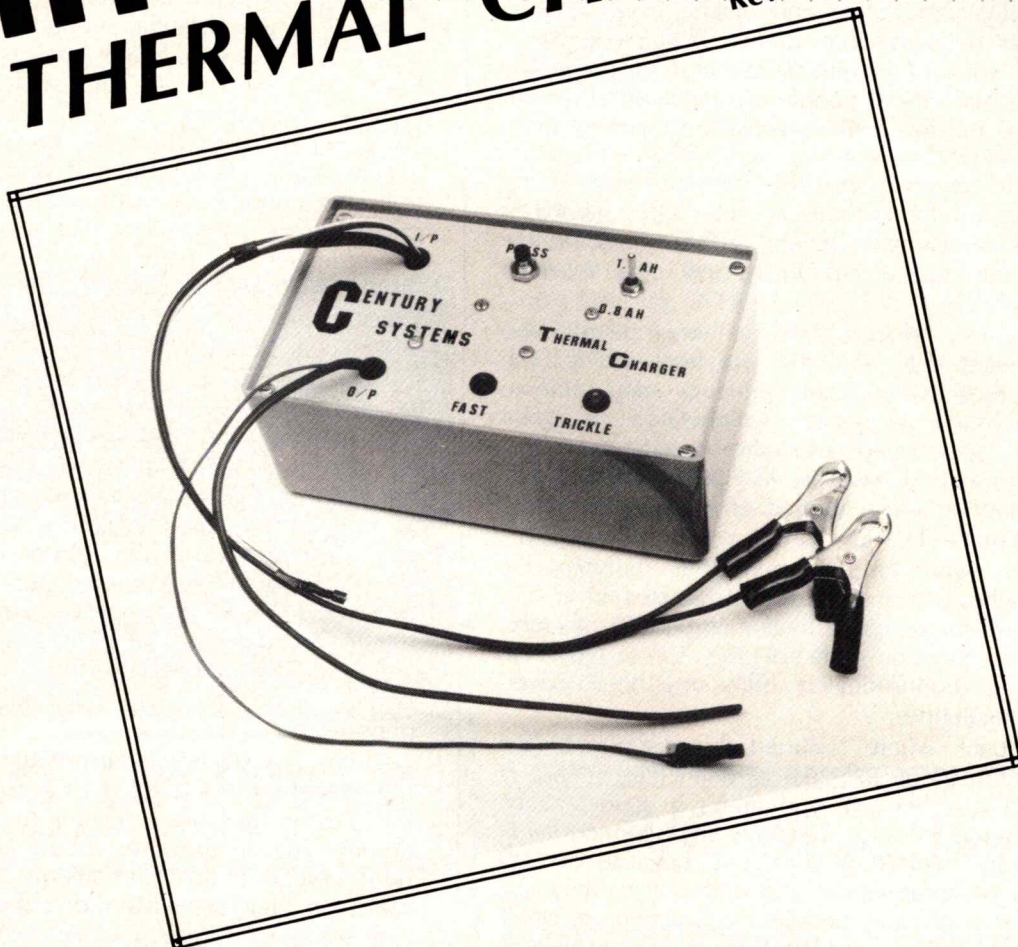
There are several factors which contribute to the high popularity of buggies as a branch of RC modelling. Firstly, they are a lot less frustrating for the first-timer, because they are robust and reliable. I have built several planes and gliders, but the few weeks spent on their assembly didn't seem to be worth the five minutes it took me to destroy them. Buggies, however, can withstand a great deal of abuse, and if they do sustain damage it is usually only a minor part that breaks: chassis don't break in half the same way that fuselages do! The reliability factor is important too, because you know when you take the buggy out for a run that the motor is going to start. I think that those .049 engines turn as many inexperienced people away from modelling as they introduce to the hobby through control line planes. (Squirt 2 drops of fuel into exhaust port, connect battery, flick prop; engine will now start!) Actually, when I received an electric starter for Xmas, modelling with i.c. engines took on a whole new dimension, because I could actually start them!

All these factors mean that buggies are likely to provide the first-time RC modeller with more enjoyment and less aggravation, and this is, after all, why people have hobbies.

This has been a brief, fairly personal examination of 1/10 scale RC off-road modelling, with the emphasis on the backyard driver. This is not because I am against clubs; I encourage you to join one. However, for a variety of reasons many buggy drivers are not members of clubs, and so my articles will be written with this group in mind.

CENTURY SYSTEMS THERMAL CHARGER

Reviewed by Frank Hughes



There's been a great deal written about charging nicads, and one thing which comes through very strongly is that if you over-charge the pack, it could self-destruct. Peak detection chargers seem to be losing their popularity, and are being replaced by thermal cut-off chargers. These monitor the temperature of the cells inside the nicad pack, and switch off when the pack reaches a pre-set temperature.

Charging nicads this way means that capacities in excess of nominal can be obtained safely. When a nicad is fast-charged it gets warm. When the pack is fully charged it is not capable of storing more charge, and the excess is converted to heat. The temperature rises quickly, and it is this increase which a thermal cut-off charger detects.

Thermal cut-off chargers have been on the market for some time, but the imported ones tend to be rather expensive. This thermal charger comes from Century Systems (Aust.) who are based in Bendigo, Victoria. This local company is able to put an excellent product onto the market for just \$145, ready to use; and even less as a kit.

The Kit

As with all Century Systems kits, the instructions are very comprehensive, and, provided you read

them thoroughly, you won't have any problems building a very accurate and reliable charger. It is important to read the instructions before you take any parts out of the packaging.

Everything is included in the kit. A box is supplied to put the finished charger in, and the face-plate comes ready screened, with pre-drilled holes. The first step is to make sure that the printed circuit board (PCB) fits into the slots on the side of the box. The PCB will finish up in the slots on the extreme left hand side. If it doesn't slide firmly into place, just lightly file the sides until it does.

Following the instructions, the next step is to start fitting components onto the PCB. Start with the relay and switch. It is important to make sure that they both sit flush with the board. Next install the resistors. There's a tricky bit here: R1 and R13 are both the same value, but are different wattages. If you've read the instructions you won't be caught out. Then install the capacitors, integrated circuit, a transistor, and the diodes.

Next move on to the box lid, which is also the front panel of the charger. Once again, following the instructions, install all the components. Then wire up the printed circuit board.

The most important parts of the kit are the two temperature sensors. One of these reads the ambient temperature, while the other is attached to the nicad being charged, and reads its temperature. You'll need to take some care how you mount the ambient sensor, as it can be influenced by the heat of the charger itself, and by the battery heat. Don't use the charger in direct sunlight either, as this can affect the ambient sensor's reading. These sensors are quite sensitive, and if you fool the sensor you could end up either under-charging your nicad, or worse, over-charging it.

The ambient sensor is designed to be mounted to the PCB on flying leads, and then attached to the input cable with a piece of heat shrink. The nicad sensor is on another set of flying leads, and plugs into a little aluminium tube fitted into the nicad. The kit comes with three of these little tubes, and if you need more of them for other packs you can buy them from Century Systems.

Setting Up

Once the unit has been wired up, it's time to calibrate it, ready for use. This is comprehensively described in the instructions, but I'll run through the procedure with you.

Firstly, hook up a well charged 12 volt car battery, making sure to connect positive to positive and negative to negative. Then move the internal switch to the 'Run' position and connect a reliable digital volt meter between point A (marked on the instructions, off R10), and the 0 volt line. You'll need to turn RV1 until you get a reading of 3 volts on the meter. Now, it's important to note that the 3 volt reading is

for a room, or ambient temperature of 21° C. If the temperature is not 21, subtract 10 mV from the reading for every degree under, or add 10 mV for every degree over 21.

Next, move the switch to 'Cal', hold down the push-button, and adjust the 22K pot on the nicad sensor lead until the red fast charge indicator just comes on. Move the switch back to the 'run' position, and that's it. What you've just done is calibrate the charger so that it will stop fast-charging when the nicad temperature reaches 10°C higher than the ambient temperature.

You can calibrate the charger to give whatever pack temperature you want. For example, it can be set to charge SCR packs to 45 degrees.

Put some heat shrink over the remote sensor, but make sure that it doesn't cover the flat face on the sensor, as this is the part which has to make a good contact with the aluminium tube in the nicad pack. To put the tube into the pack, just make a small slit in the outer covering, slide in the tube, and glue it in place with some epoxy resin or silicone adhesive. This will not damage your nicads if you do it carefully.

How To Use It

That's really all there is to the making stage, so just a few words about using your new Century Systems Thermal Charger. It is easy to use: just connect to a well-charger 12 volt battery, select either 1.2 AH or 0.8 AH charge rate, and attach the nicad. You'll notice that the nicad is now trickle charging. Put the remote sensor into the nicad, press the press button, and the Fast Charge indicator should light up. In about half an hour, if the nicad was fully discharged, the charger

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will switch back to Trickle, and your pack is as fully charged as it's ever going to be.

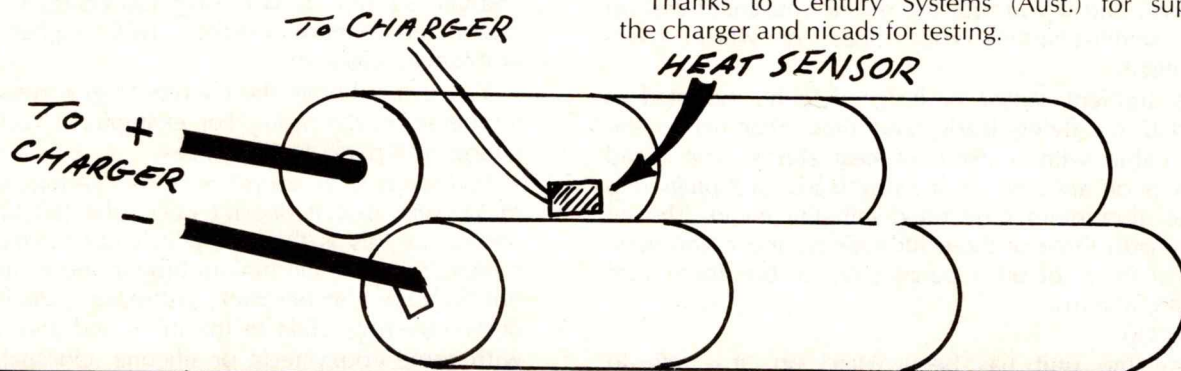
And that, as they say, is that. As with most Century Systems kits, the Thermal Charger is available fully built and ready to run, although it will cost you a few dollars more to cover the building charge.

I've tested the charger and I'm pleased with the result. Every time it gave a good, full charge, with the nicad just warm to the touch.

Recommendation

If you're looking for a way to charge your nicads so that you get a full charge every time, then I'd recommend a Century Systems Thermal Charger. Quick charge leads and the clockwork timer type of chargers are cheap, but you'll probably get only a 75% charge. With this charger you'll get 100% every time. This leads to good performance and maximum running time.

Thanks to Century Systems (Aust.) for supplying the charger and nicads for testing.



WINNERS

Congratulations to the following subscription contest winners from Dirt & Track issue No. 1

Winner of the Kyosho Salute is:.....O. Minter, Jesmond, NSW.

Winner of the JR Alpina Wheel Radio is:L. Lawson, Springwood, NSW.

Winner of the NEA 800B Speed Controller is:.....B. Ford, Hurstbridge, Victoria.

(See page 19 for this issue's contest)

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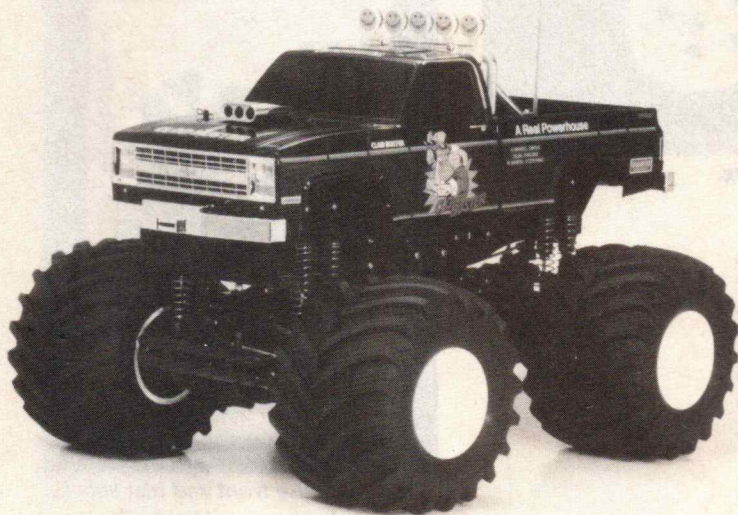
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PRODUCT NEWS

CLOD BUSTER Chevy Pick-Up Truck



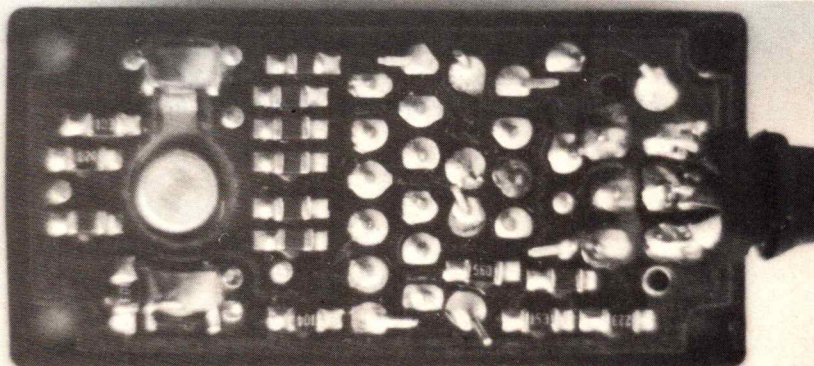
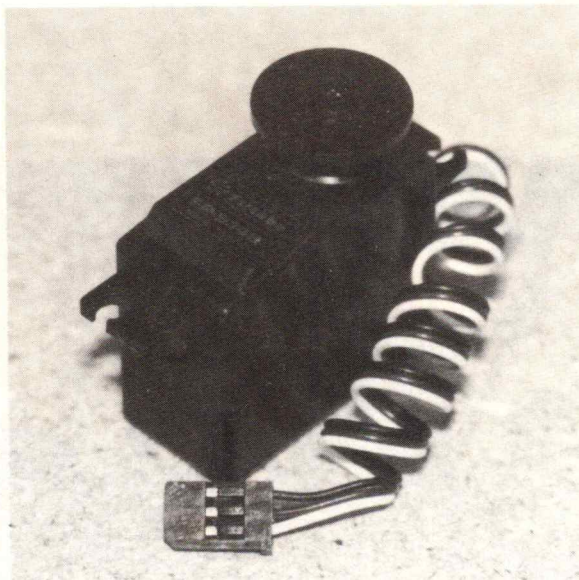
Tamiya will be releasing, in the near future, another 'Monster'. Named the Clod Buster, this 1/10 scale Chevy pick-up truck is sure to give that sleeping pet cat a fright, as the Chevy drives over all that gets in its way with mammoth 165 mm diameter tyres.

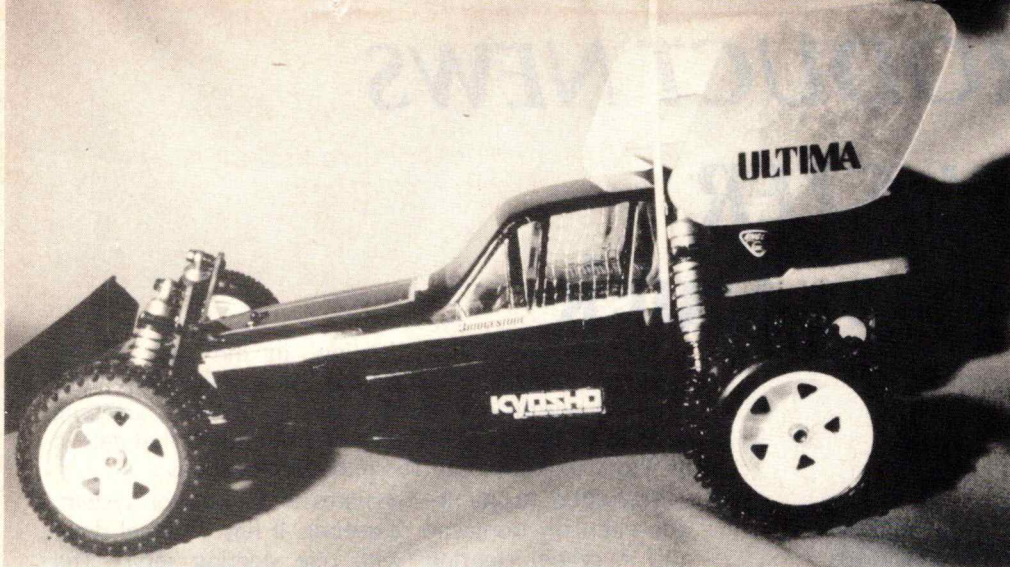
The Clod Buster incorporates a dual-motor system, one each for front and rear ends. It has 4 wheel drive and 4 wheel steering, with one steering servo. The motors can be switched to parallel or series operation, for power or economy drive modes. The suspension system is a rugged link type, single trailing arm, rigid axle both front and rear, and damped by eight coil spring shock units, fitted two to each wheel. They can be replaced with oil filled CVA Long Shock Units. The kit includes a heavy duty forward-reverse 3-step speed controller and two 540 type motors. It accepts a Tamiya nicad 7.2 V Racing Pack. This car can use the standard or BEC proportional radio units.

The injection molded body accurately reproduces the popular Chevrolet pick-up truck. The kit has many plated parts, such as front grille, bumpers, air-intake, and so on. The body can be easily decorated using plastic model paints and the included decal stickers. Headlights can be made operable by using the Tamiya RC light bulb set.



From Futaba comes the new series 2 channel Bionic Gold Radio. Transmitter has contemporary styling with smooth operating gimbals for superior control. Receiver features BEC (Battery Eliminator Circuitry) system allowing use of the conventional, supplied, battery case for servos and receiver power, or power can be taken directly from the car's (or aircraft's) own nicad pack. The servos (S-148s) are also new, and feature direct wiring onto the circuitry, reduced height, 3 kg. cm. torque, and .22 seconds per 60 degrees. Altogether a faster, smaller and tougher servo. Trade enquiries to Futaba Sales, 1 Derby Rd., East Caulfield, Vic., 3145; phone (03) 211 4788.





Ultima fitted with Frewer Optima body and 7 inch wing.

Kyosho's contribution to two wheel drive buggies bears a remarkable resemblance to another popular two wheel drive race winner. However, to ensure that the Ultima regularly appears in the winners' circle, some modifications are advisable; but that's not unusual for most buggies, and the modifications required are all listed in the Ultima manual as optional parts.

This Ultima started life straight out of the box, but a desire to improve its already good handling on the track prompted changes, and, of course, these changes meant that some other things had to be changes as well. That's what happens when you start tinkering!

IS AN ULTIMA THE ULTIMATE?

by Chris Young

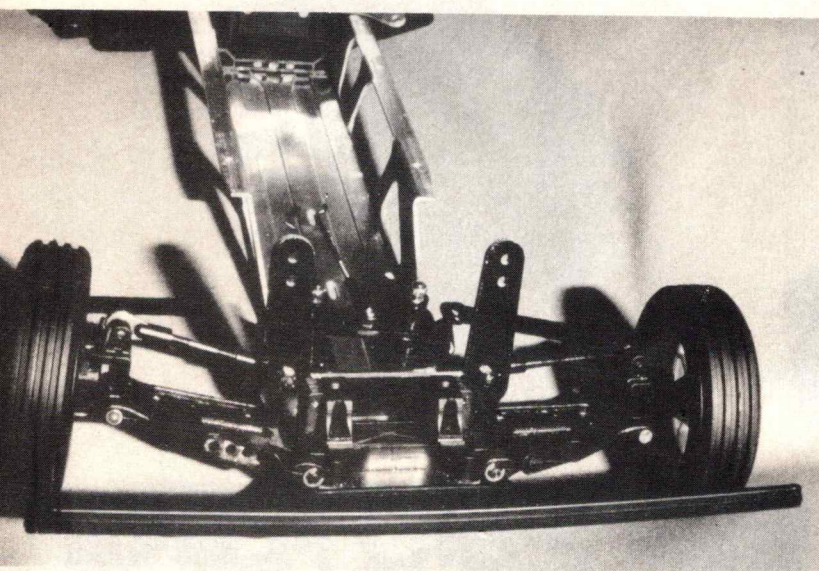
The first change to the kit was to fit ball races to all friction points, replacing the nylon and metal bushes provided. The bearings certainly enabled shafts and axles to rotate freely.

I found the suspension to be lacking in response, making the car less than predictable, especially in the corners, so the next change was to invest in some new shocks. The Kyosho Option House range boasts a set of oversize coil-over shocks which are significantly larger and more responsive than the small red shocks fitted to the Ultima as standard.

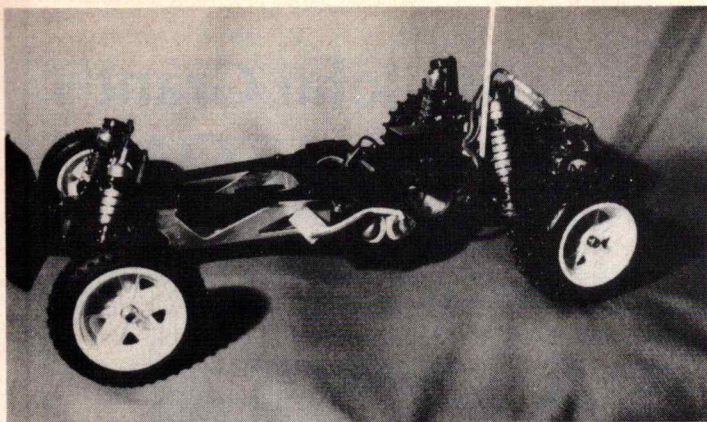
Of course, the Option House shocks will not fit on the existing front and rear mounts, so these had to be replaced with new ones. The fibreglass replacement mounts also have the benefit of allowing greater ride height adjustment, so the buggy can be better 'tuned' to different surfaces. When set correctly, the rear axle shafts should be parallel with the ground when the battery, motor and radio gear are fitted. With this suspension setting, some bottoming out may occur when landing after a jump, but in normal usage the suspension soaks up the bumps without the rear end bouncing around and going off line. About 5 mm of heavy gauge silicon tubing on each rear shock absorber shaft will prevent bottoming. Obviously, the front suspension should be set to a similar height, but marginally softer than the rear.



Option House front and rear shocks. Use 3 hole piston and light oil.



Front optional shock mounting - note Kyosho tie rod set.



Ultima with mods fitted. Note rocky front bumper and wheels.

In the gear box, the optional hard final pinion gear can be fitted, but requires a carefully filed D-Cut on the shaft. The die cast bevel gears in this diff can be assembled and lapped with fine valve grinding paste.

Dust or fine grit can badly damage the idler gears which link the motor pinion to the gear box. I have found that the main point of entry for dirt is through the motor. This problem can be eliminated by fitting both the optional cooling plate between the motor and the frame, and a dust boot over the motor.

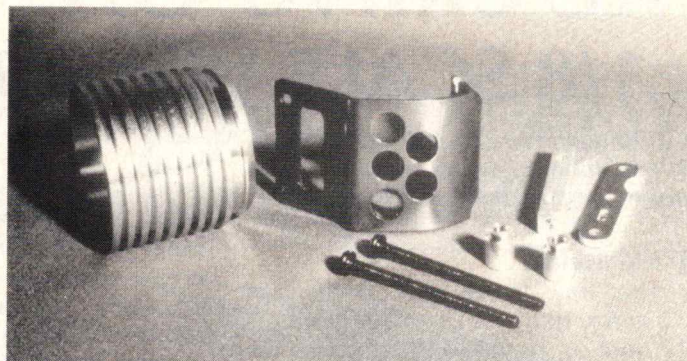
Another important option is the Ultima motor guard. It provides protection for the motor in the event of a rear end shunt. To make room for the Kyosho heat sink I extended the length of the motor guard by using part of the original rear aluminium shock absorber mounting plate. The original Ultima body mounting hole at the rear of the motor mounting plate is the exact position for mounting the extended motor guard.

One of the design problems with the Ultima is that there is no provision for camber adjustment. However, the addition of the optional tie-rod set allows full adjustment to be quickly made. The Optima pillow balls provide a much firmer knuckle mount for the tie rods.

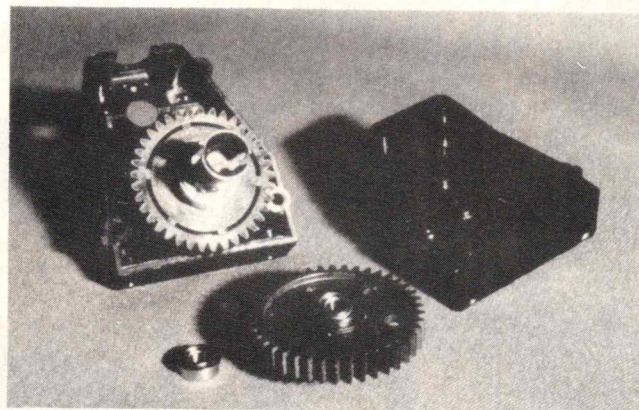
A Frewer Optima body shell was fitted and, by using the optional Optima wing mounting set, a Frewer wing can also be used. Naturally, for optimum performance, the mechanical speed controller is replaced with an electronic or mosfet controller.

Editors Note:

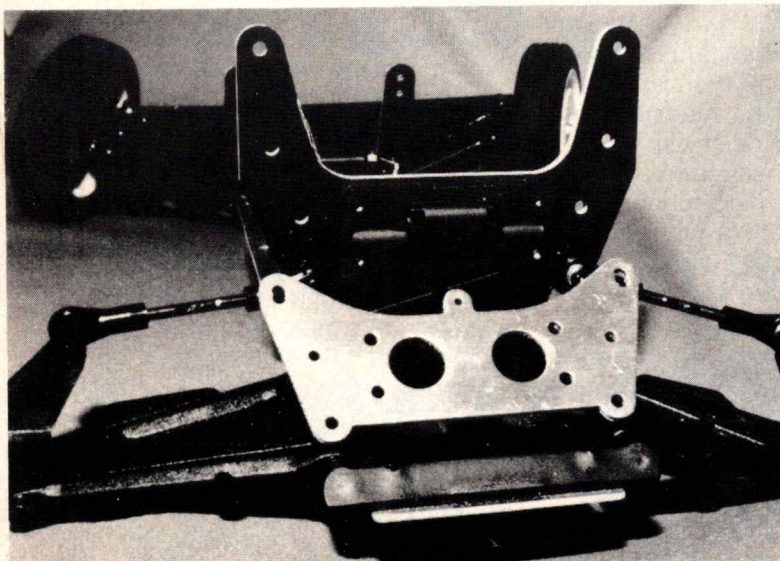
"At the recent IFMAR World Championships, Ultima filled the FIRST THREE PLACES in 2WD Class. Quite an accomplishment!"



Ultima motor guard and Kyosho heat sink. Great for heat dissipation.



Ultima gearbox with ball bearings. Note the similarity to the Optima gearbox.



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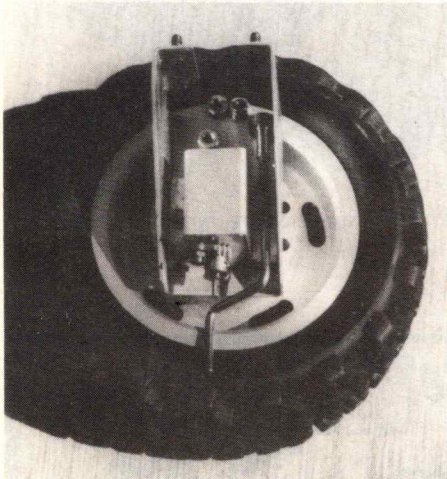
with John Grant's

1/8 SCALE VOLVO PANTECHNICON

Continued from Dirt & Track No. 1, where John Grant described tools required, power plant and truck details.

Trailer Details

The tray frame was made from 12 mm x 10 mm alloy channel with 14 12 mm x 10 mm alloy angle cross braces. A 1150 mm x 325 mm x 1.6 mm alloy sheet tray was rivetted to the frame. The trailer bogie consists of spring hangars 3 mm alloy plate. Springs are the same as in the prime mover (made from VW torsion bar). The axles were machined from 25 mm square alloy bar, and the hubs from 40 mm round bar. The wheels are the same as on the prime mover, as are the tyres.



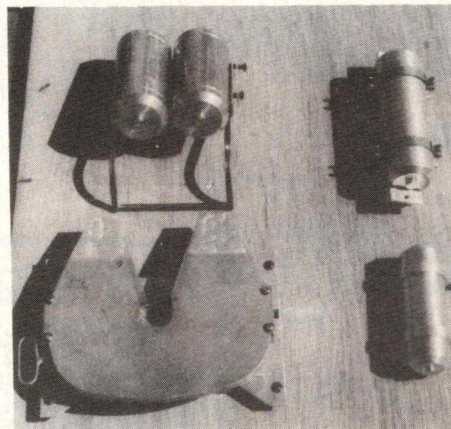
Volvo spare wheel. Chassis mounting bracket has winch for lowering and raising wheel. Nuts are lying loose inside the bracket.

The trailer uprights from 12 mm square tube and 8 mm square bar were machined to slide inside other square tube. There are two pieces of 4 mm steel bar (threaded) to move uprights up or down, and four brass gears to operate them. The crank handle and shaft are from 3 mm piano wire. The feet were machined from 40 mm square alloy bar.

The top of the pantec was folded from 1.6 mm alloy sheet of 1150 mm x 450 mm x 325 mm x 450 mm. This will be removable so that the two 1/8 RC GT cars can be seen. The tool box is from 1 mm folded alloy sheet. Other

details include opening side and back doors and tyre rack for the pantec, spare wheel racks and two spare wheels for the trailer, windscreen wipers and windscreen washer (both workable), horns, extra lights, trailer lights and back-up warning horn connected to reverse selector. There is also a grease gun, oil can, jack, and tools in the tool box. The truck has a diesel engine sound which is connected to the throttle so that the engine noise increases with throttle advance, air-brake noise connected to brake movement and trafficators connected to the steering.

All screws are 4/40 cheese head or oval head allen key with nylocks. Wheel bolts are 3 mm stainless with nylocks. All hubs are fitted with ball races.



Turntable and air tanks. Simple turning operation to make the tanks, with more involved techniques for mounting strap and brackets.

Finishing Off

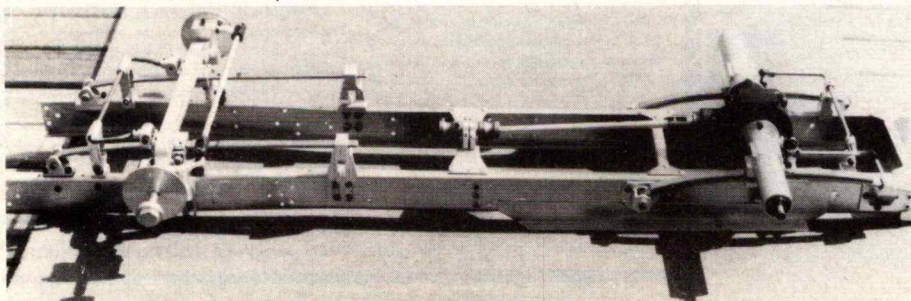
On completing the panels for the cab, I had to put it together somehow. Welding was out of the question as I knew that I was not a good enough alloy welder to tackle the job, and I felt that it would take away some of the details of the cab joints, so I settled on rivets. Aircraft rivets were used: 1/16 inch diameter by 1/4 inch long with countersunk heads. Marking out and drilling of the holes commenced, and 320 rivets later the job was completed. I was a little

worried at this stage that they might finish up looking a bit agricultural, but by the time the job was finished they blended in very well and are hardly noticeable. At that time it was my intention to paint the cab, but after many comments from interested parties who felt that painting would detract from the original project, I have left the whole truck plain aluminium.

The next parts to be made were the mirrors, which were machined from alloy plate, and then I decided that you cannot have mirrors that do not work, so a trip was made to the local glaziers and one of the workers there, who is an acquaintance of mine, said that he could cut the mirrors from some mirror plate which was 1/16 inch thick. The mirrors are 60 mm long by 20 mm wide. Another mirror, which is for parking, and is 30 x 15 mm, was also cut. A small incident occurred while the mirrors were being cut on their automatic machine. As the chap was doing them, the boss and owner happened to pass by and asked what they were. "They're truck mirrors" was the reply. The boss gave him a startled look, shook his head and walked off in disbelief!

Back to the monster. The windscreen is made from 1/6 inch perspex. Fitting the screen was a problem, as the only rubber I could find was that used in the Kavan helicopters for fitting their screens. After many attempts this was put aside as being not good enough. After much thought and a lot of searching through different rubber items at work, I was looking at full-size windscreen wiper rubbers to be cut down and used for the windscreen wipers (which worked very well) when, on closer inspection, I noticed that these rubbers were also a double channel. So I telephoned our supplier and received a length of windscreen rubber long enough to go around the windscreen opening in one piece, removed the unwanted blade section, and finished up with a windscreen rubber that was nearly perfect.

The truck horns were then machined from a brass bar. While in Japan for the 1/8 scale RC Car World Champs, I bought some small speakers which are used in my model trains for sound. These speakers are 1/2



32 Prime mover chassis with front and rear suspensions attached. Note drive shaft to power axle, anti-roll bar on front suspension, left.

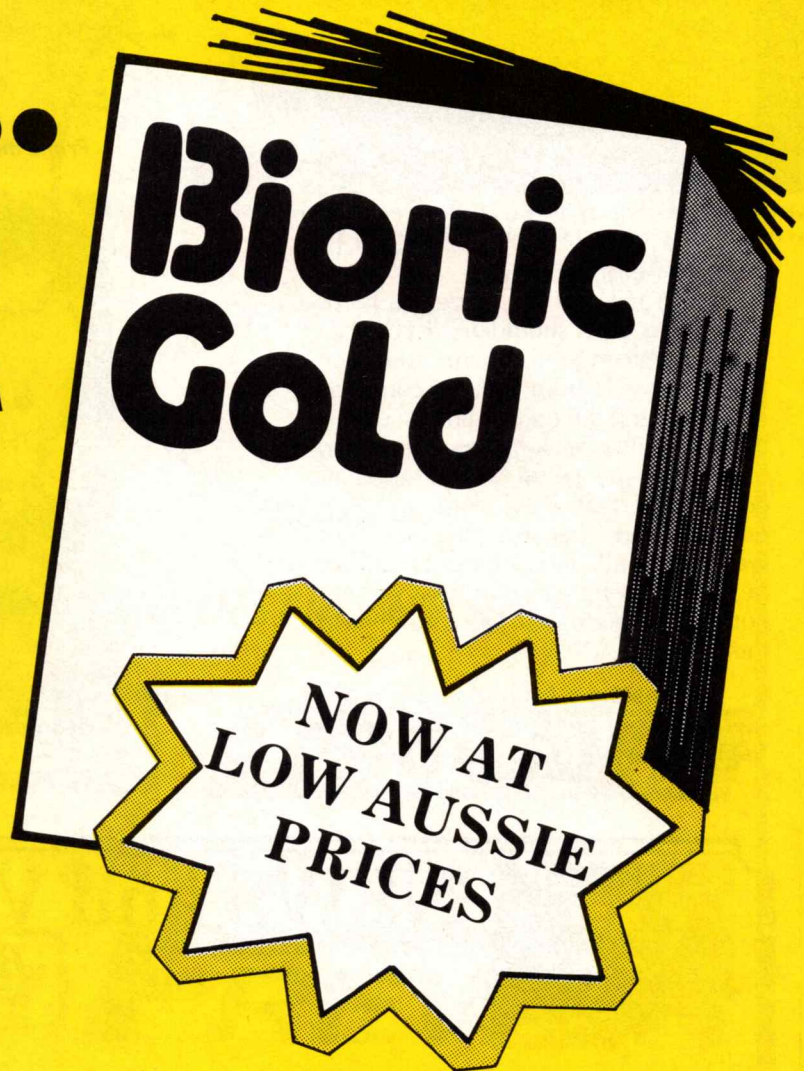
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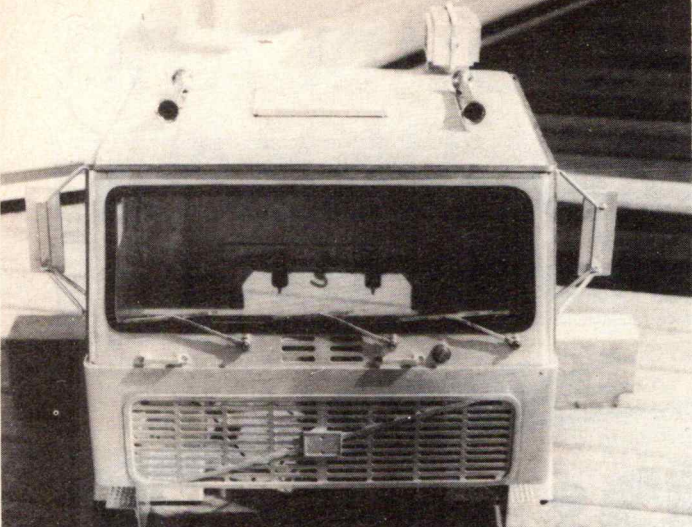


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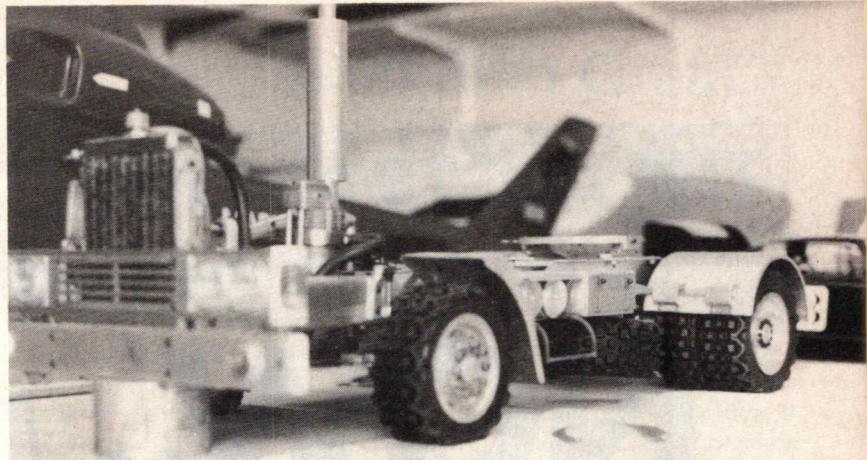
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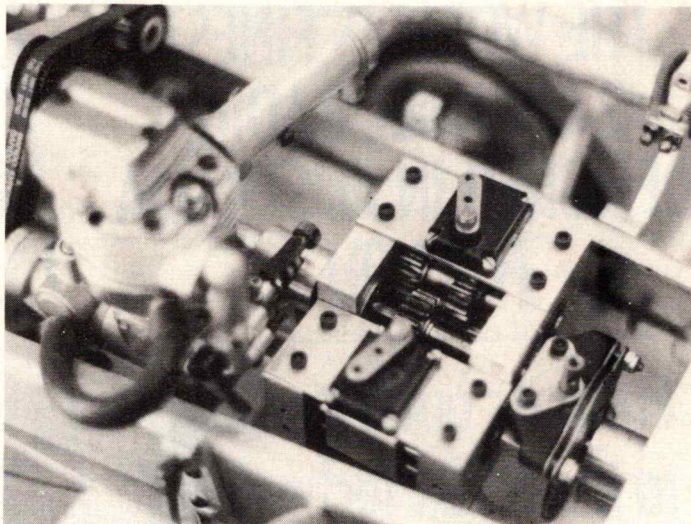
Cab with mirrors, wipers, horns, air cleaner and sun roof. Each part has its own story. See text for some of them.



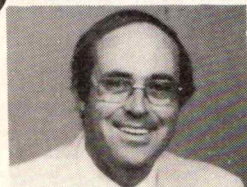
Prime mover chassis with OS FS 40 (water cooled) clearly visible.

inch in outside diameter, and it occurred to me that if I made the horns hollow, as they should be, I could fit these speakers into them and then the electronic horn system could be coupled straight to the horns. Unfortunately, after making one horn and fitting the speaker, I was disappointed to find that they were not loud enough and, because the speakers were so small, the volume could not be increased sufficiently without complete distortion. (You can't win them all!)

The story of this amazing project will be continued in the next issue of Dirt & Track.



Gearbox of John's 1/8 scale Volvo. Attention to detail is amazing.



NEWS and VIEWS

Rob Reade



Hi.
I do have some news for this second great issue of 'Dirt and Track'.
Firstly our trip to the 1/10 buggy World Champs in the UK. We came home feeling a little disappointed, although eldest son, Andrew, did achieve the best result of any Australian and beat some of the very well known overseas stars in the 2WD class, a class which we had never competed in before. That was quite pleasing. However, the 4WD class, which we were feeling quite confident about, didn't turn out quite as well. From being right on the pace in open practice, and running mid 18 second lap times (which was as fast as anybody at the time), the faster drivers got a little faster and Andrew went slower! Highly frustrating. I can tell you, but never the less, he learnt a lot, and as they say next time! For my own part, I was under no illusion that I would personally achieve any great result amongst all the young hot shots. The target that I set myself was to at least beat the father in a well-known American father and son team; and that I did!
Some new prototype LWB, high efficiency, 4WD 'Mustang Supers' were waiting for us at the PB factory when we arrived, and they proved to be extremely fast, but the extra speed did create some handling problems at

Romsey as the track got rougher. The lessons learnt at Romsey have meant some further debugging work on the Mustang Super is required, however, even before we left the UK the 'Guvnor', Keith Plested, had already made some changes for further testing at the World Champs Romsey track by his development team.
It is intended that the Mustang Super (this is a project name, and may change on release) will be released as a top-of-the-range professional buggy to complement the Mini Mustang. The current Mini Mustangs will continue unchanged, as the Super will carry a higher price tag. The Super will feature the high efficiency drive system, universal joint drive shafts (one way at the front), ball raced belt tensioner, wing kit, and a new body style which incorporates a lexan under tray to keep all that dirt out and keep the works clean! Also expect some differences in the suspension department.
Some of these parts will be available shortly as 'bolt on goodies' for all Mini Mustangs. In fact, by the time you read this the universal joint drive shafts should be here.
It was great to spend some time at the PB factory again (the last time was in 1983), and to renew acquaintances with our many friends there, see the latest developments and discuss future plans. Certainly CAD/CAM (comp-

uter aided design/manufacture) was much in evidence, and I can tell you that there are some exciting new projects in hand.
I was also able to spend some time with the SRM people in England, and we will now have much better availability of all those beautifully made 1/10 buggy accessories that they make for all brands.
Now it is 'Bargain Shop' time.
The Mini Mustang VIP kit is now available again. If you are in the market for a 1/10 electric buggy, please check out the VIP at your local PB dealer. (If your local hobby shop is unaware of this very special model, please get them to contact us for details.) The VIP is indeed super, super value for money, and remember, if and when you need spare parts, they are readily available and CHEAP. One pleasing aspect of our trip to the World Champs in the UK was to talk to hobby shop owners there and hear of the excellent reputation that the Mini Mustang has established for reliability, low maintenance time and cheap running costs. Certainly points to be considered when purchasing a racing buggy.
Happy Racing.

PB

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"TWEAKED & DUMPED"

1/12 SCALE ON-ROAD ELECTRIC RACING

by Jonathan Borthwick

Well, I hope that everyone enjoyed the first issue of this magazine. As promised, this issue we will look at some of the 1/12 cars available, and start a series examining critical areas of the cars and racing technique. This issue it is gluing tyres; the bane of all racers. Truing comes in for the treatment next issue.

CHOOSING A 1/12 SCALE CAR

Let me say from the outset that there are 1/12 cars, and there are 1/12 cars. Put simply, not all cars will do all jobs as well as each other.

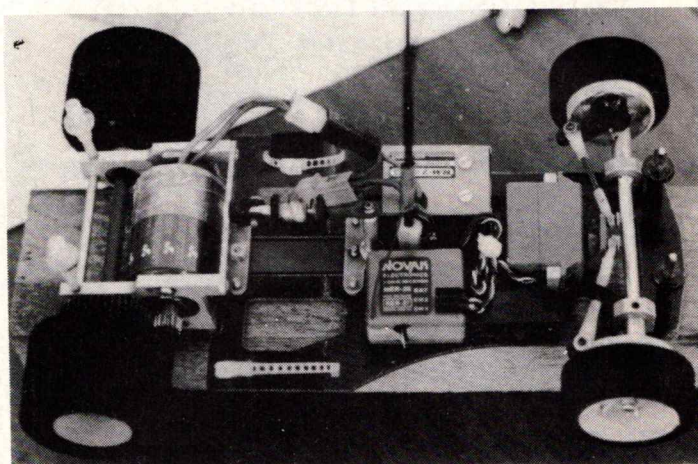
The first thing is to determine what we are looking for in a model car. For me it is a car which is able to be tuned to a very high degree, and is capable of winning a National or State Title. It must weigh 880 gram (the minimum weight for our racing), take knocks that inevitable happen in racing, be easy to repair, and, above all, be consistently quick. Going further, I like a car which is twitchy enough so that it turns into a corner like crazy, yet is able to be placed wherever I want it on the track to work past an opponent.

To get this I am prepared to compromise a few things, if need be. For a start, I have to run a certain type of body shell where I may (but don't!) prefer a different style which might be more aesthetically pleasing but doesn't work as well. I may also have to tolerate spending an hour setting up for an eight minute race, by the time I check tweak and other factors, properly charge my packs and strap them in, apply traction compound to my tyres, and fiddle with the motor. In short, these are things that I am prepared to do which the general model car racer would find inconvenient and tedious.

Working in a model shop, I know that we sell more bodies that don't work (by my standards) than those that do (I include Sports/GT bodies like the TOJ, Porsche 956 and Kremer Porsche as bodies that work) by a figure of about 3 to 1. I cannot see (but respect it all the same) how anyone can get satisfaction out of charging up and down the street or driveway by themselves, but there are a lot of people who do just that, and totally modify components to suit. I have seen a number of methods of holding batteries so that they can be quickly and easily changed. These

vary from engineering masterpieces through to something that Thug and his cavemen mates would be ashamed of.

By far the biggest market sector are the casual racers who get a couple of cars and drivers together initially, and bash around a shopping centre or cul-de-sac, gradually adding cars and drivers to their ranks, but never taking it seriously. For them, any race is probably as exciting and as satisfying (and occasionally as frustrating and as disappointing) as any National final I may have been in.

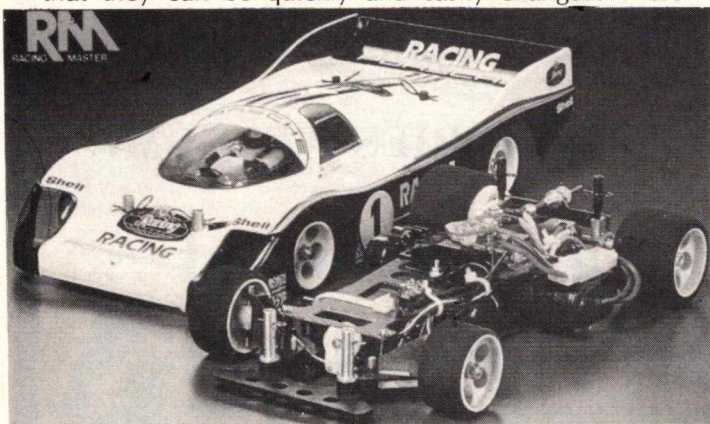


AYK Road Runner NX101. Very competitive 2WD chassis. Note uncluttered layout, typical of top race cars.

The most popular cars in 1/12 are the **Tamiya range**. Tamiya have been at the forefront of radio controlled racing for over 10 years, yet have never won a major State or National Title. Ask them if they care and I can tell you the answer. Quite simply, they are not into that area. That is not to say that if someone took one of their cars, made a few changes and won a 'big one' they wouldn't complain. Their range has been rationalised of late to include only the very successful **Porsche 956** and the **Road Wizard**. As the Road Wizard is 1/10 scale we shall have to exclude it in this comparison, however, it is a very competent car, in the same way that the Porsche 956 is.

The 956 was released in the Tamiya Racing Master series a few years back, and was deservedly a big mover for a 1/12 car. The designers obviously had a careful look at Associated's RC12i car, and incorporated the sprung front end and rear ride height adjuster features, but that is where the similarity ends.

The chassis is stiffened by a radio tray, securely bolted down to limit chassis flex, and to form a nice box set-up which is quite typical of cars three years ago. At the front there is no option as far as spring rates go. The springs supplied are quite firm, giving a car which will understeer. This is great for the newcomer, but can prove to be a handicap on the track when everyone goes sailing underneath you on the turns. The rear features a gear differential which works nicely until it gobbles a rock, so forget about trying to run the car on anything but smooth and clean bitumen.



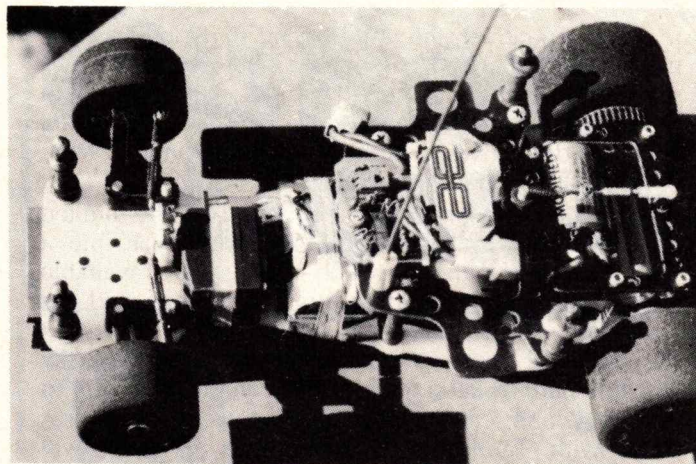
Probably the most successful cars in terms of sales, Tamiya's Racing Master Porsche 956 & Toyota Toms are competent club cars, and a great introduction to 1/12 racing.

But, the part of the car that people notice most is the body shell. With many purist race cars the body is merely a way of clothing the all-important mechanicals. With the Tamiya Porsche 956 it is the body that catches people's attention. Beautifully molded, and complete with accurately detailed decals, the finished product is a masterpiece which will have the owner thinking that he or she is Jackie Ickx or Vern Schuppan, exhausted after winning the Le Mans 24 hour race.

So, the car scores maximum points for attracting people to 1/12 and for providing a basis for getting started. On the race track, against other makes, the performance is down a little, however, with some work the Tamiya Porsche 956 will make a very good club car. The fact that Tamiya spares are so readily available is a great advantage also.

Staying with the Oriental manufacturers, we have Kyosho, AYK and Mugen, who have a similar policy to Tamiya, albeit somewhat more race oriented (no pun!). While **Kyosho** have never done much here, in Asia they have some big wins to their credit.

AYK threatened Associated at State and National levels in Australia for many years, but never quite managed to win the Australian Title. They were so keen to win that in 1983 the importer of the car imported two fully sponsored AYK drivers from Japan to supplement his already very talented local line-up. Between them these imported drivers had a number of Japanese National titles, yet could only place 4th and 10th overall in Australia. Part of the reason for this is that the sheer number of people racing in Asia requires organisers to run only two or four minute (in



Associated RC12i. The most successful chassis in the country, with National wins from 1982 to the present, uninterrupted.

lieu of 8 minute) heats, and their cars and motors are set up accordingly. This was demonstrated at the first World Titles in 1982, when the Japanese cars would scream around the track looking like world champions for four or five minutes, only to fall in a hole and dump soon after.

Mugen cars have made a resurgence after some fairly unusual designs earlier in the 1980s. Their new **Cosmic** and **Super Tempest** cars can, and do, win, as evidenced by Dennis Beilby's fine second place at both the Victorian and National Titles.

Kyosho and AYK are very big on four wheel drive, which has never impressed me much in 1/12 scale racing, as too much is traded off. By that I mean that, to make a 4WD as light as a 2WD (which must be done

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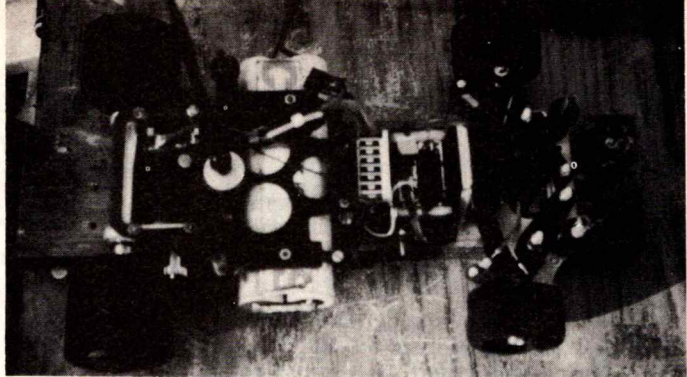
to be competitive), the whole thing starts to look very fragile in all but the best hands, and the question of reliability creeps in. The silly thing is that they both have very competitive 2WD cars in the **Plazma** (Kyosho) derivatives, and the **AYK Road Runners**, without the fiddling of 4WD.

Where the Japanese amaze me is in the limited lead-in time required to develop a prototype into a highly successful model which can be made available to the public. The manufacturers in Europe and the USA seem to take forever to bring a car to reality, yet the Japanese keep on pumping them out so quickly that it is hard to keep track. For this reason it is hard to pick out one car from each manufacturer, as was done with Tamiya, and fully dissect it, as it will probably be out of date by the time this is read.

Fortunately the whole process seems to have slowed down with the off-road boom. For an insight into a typically well-engineered and competent car, see my Pitstop column in *Airborne* Nos. 82 and 83, featuring the Mugen Super Tempest. In general though, cars from these manufacturers more fully cover the full spectrum of racers, although it must be pointed out that, due to the ongoing technical development, parts supply can be a problem if you are away from a major city, as cars become outdated and are replaced. Also, because they are developed more with racing in mind, they may not respond as well as some other makes to any concerted abuse out in the street. In conclusion, Mugen, AYK and Kyosho produce cars that, with a lot less work than with the aforementioned Porsche 956, and in the hands of a good driver, can win against anybody else.

Finally we come to what could be classed as the purpose-built race cars, from manufacturers like **Schumacher, Delta, Parma, Bolink, TRC, Corally**, and, of course, the best known of all, **Team Associated**. Unlike the Japanese, who primarily make cars to sell a lot, of which only a few will go racing seriously, these people are interested in selling racing cars and winning races. That is not to say that they will refuse to sell a car to someone to play with in the street, but their priorities lie in winning world titles and the likes. For someone who wants to bolt together a car, and doesn't have the luxury of a fully equipped machine shop in their garage, then go no further.

Generally things don't have to be pinned or have a different diff and rear axle assembly installed, necessitating costly and/or time consuming modifications. This work should have been done by the factory for you. A classic example of this was Barry Corie's effort at this year's 1/12 Nationals, where he took a brand new car, had a couple of practice runs (first time ever on the track), and managed to come fifth overall, and getting faster. What he had was the basis of a very good race car, which required only a few adjustments to cope with the track peculiarities to be right up there with the best in the country. This is no accident, as anyone who has witnessed a major 1/12 race overseas will testify. The amount of development, and the size of the teams run by the manufacturers (particularly Associated) forced the development of a constructors association, where the size of race teams was limited, to hopefully make running at a Nationals less awesome if you happen to be one of the few that isn't sponsored.



The Schumacher C Car is yet another top-notch 2WD 1/12 scale race car. Like Associated's new RC12L car, the C Car was designed for carpet racing, but such is its ability to be tuned, that it is equally at home on asphalt tracks.

A word of warning to those buying secondhand or unusual cars. Remember that these are essentially race cars, and the demands we place on them far exceed any that you might place on your family car, or even a full size race car. From that point of view, always keep in mind the spare parts supply for your car, and keep up to date with what stocks of spares are available, particularly in the case of some of the Japanese manufacturers. The turnover of car models is phenomenal, and it is just impractical for importers, wholesalers and retailers to stock a full complement of parts for all cars built since, say 1977. However, even the Japanese are reducing the number of times they totally retool a car, preferring instead to use a lot of common parts across the board, which must decrease everybody's costs. Another thing to watch out for is to make sure that the rims supplied will accept tyres offered for 1/12 scale cars.

If anyone has any queries or comments, please write to me at: **39 Copeland St., Milton, Qld., 4064.**

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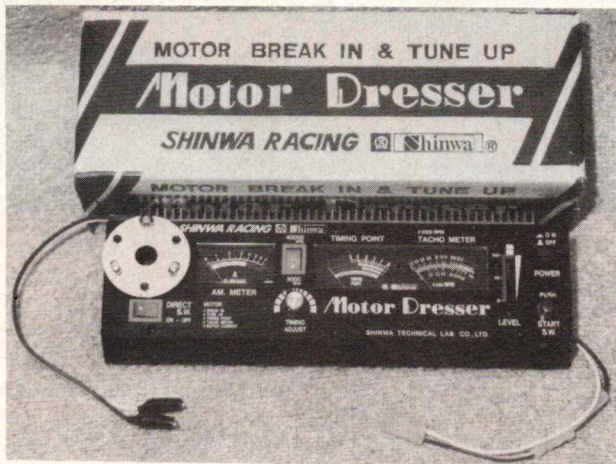
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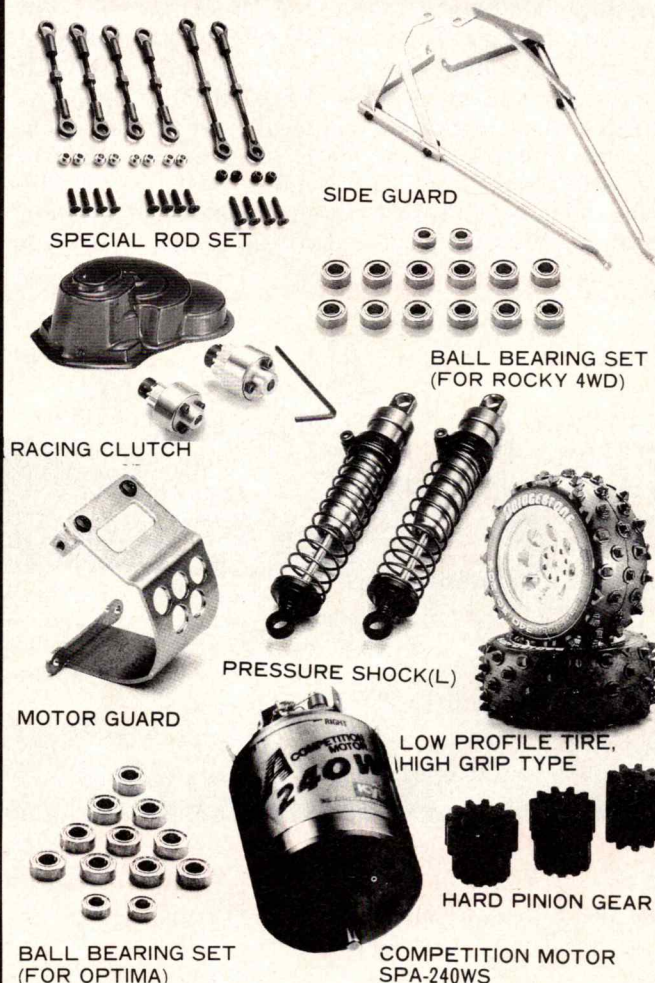
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Jeff Grenenger, an ex Team Pit Stop member, and winner of the first Australian Nationals in 1981 and Australian 7 Cell Champion in 1987, recently moved to Queensland, and has taken a position as store manager of Mr. Toys Toyworld in Lawnton. Nick Maggacis, the owner, who has another store in Springwood, is stocking his two stores with all the up date goodies, and hopes that, with Jeff's expertise, the Brisbaneites will soon catch up to their southern cousins. Jeff is only too pleased to help those that need assistance in the Lawnton area, as is Daryl Laffin, well-known to Queenslanders as a 2WD exponent, who manages the Springwood store. They are forming a team and hope to make their mark in Queensland.

Option House



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W-0102	SIDE GUARD	●	●								
W-0103	GOLD PLATE SET										
W-1001	HIGH CARBON PLATE 1.7	▲	▲	▲		▲				▲	
W-5001	PRESSURE SHOCK(S) (PAIR)	○	●					UM.26		●	
W-5002	PRESSURE SHOCK(L) (PAIR)	○	●		●			1" M.26			
W-5009	HARD PINION GEAR 9T	○									
W-5010	HARD PINION GEAR 10T										
W-5011	HARD PINION GEAR 11T	●	●								
W-5005	SPECIAL ROD SET	●	●		●		●				
W-5061	UNIVERSAL SWING SHAFT	●	●								
W-5062	UNIVERSAL SWING SHAFT				●						
W-5040	RACING CLUTCH 10T	●	●								
W-5042	RACING CLUTCH 12T	●	●		●						
W-5044	RACING CLUTCH 14T	●	●		●						
W-5046	RACING CLUTCH 16T	●	●		●						
W-5048	RACING CLUTCH 18T	●	●		●						
W-5021	LOW PROFILE WHEEL (PAIR)							○			●
W-5031	LOW PROFILE TIRE ALKALOID TYPE (PAIR NOT INCLUDED)	●	●		●		●	●			▽
W-5032	LOW PROFILE TIRE HIGH GRIP TYPE (PAIR WHEEL IS NOT INCLUDED)	●	●		●		●	●			■
W-1011	COMPETITION MOTOR SPA-240WS	●	●		●		●	●		●	■
W-1012	COMPETITION MOTOR SPA-480WT	●	●		●		●	●		●	■

1987 I.F.M.A.R. WORLD CHAMPIONSHIPS FOR 1/8 SCALE R.C. CARS

by Stewart Grant

The 1987 IFMAR 1/8 Scale World Championships were held in sunny (smoggy) California, at Gil Losi's Ranch Pit Shop Raceway, the site of the inaugural World Championships in 1977. The track was well laid out and, in many respects, was similar to the Cross-roads circuit in Sydney, although some of the infield corners were extremely tight. With a full complement of 120 drivers from 21 countries, including, for the first time, 2 Hungarian drivers from behind the Iron Curtain, racing was expected to be fast and furious.

The Cars

The majority of entries were using Serpent cars, with Associated, Mantua, SG and Delta also represented. Perhaps the most surprising thing was the lack of PB cars; a sign of the times.

The Serpent factory cars were highly modified, to a form that should be available about October this year, with carbon fibre chassis and radio trays, lightweight wheels, ball and pin driveshafts and, for this track, solid axles replacing the differential.



Gil Losi's 'Ranch Pit Shop' Raceway, California, USA, site of the 1987



The Australian contingent (second group from right) at the opening ceremony.

As usual, the Associated cars were highly modified, with titanium, magnesium and carbon fibre used extensively to lighten the cars. Associated had tested extensively at the circuit, and had many small revisions to the car to make it highly suitable for the venue.

The other cars used were more or less standard, therefore no description is necessary. One disappointing aspect was the failure of the SG team to attend. Although the car would seem to be fairly fast, as shown by Mauricio Busnardo from Venezuela, in the high temperature, high traction conditions in America the car seemed to be extremely fragile.

Practice.

Most racers were at the circuit by Monday, and the track was constantly crowded. From the outset it was obvious that the Associated cars of Burch, Kloeber, Neisinger and Smeltzer were the quickest, with engines that seemed to have amazing power, both down the straight and out of the corners. Rody Roem, the defending World Champion, was also in there, but one felt that he was competitive through driving skill more than by having a car that was suited to the circuit. Gary Kyes and Gil Losi Jnr, with the Ranch Pit Shop modified Serpents, were also very quick, but they seemed to be having trouble with breaking clutch nuts, such was the power of their engines.

One very noticeable point was the noise emitting from some of the cars. With single cone silencers allowed to be used, the American cars were very loud, and the O'Donnell pipe was definitely the pipe to use.

As for the lone Australian team, we struggled for the whole three days of practice trying to get an engine to run reliably, and therefore, because of our limited practice time, had little time to get the chassis handling well. Due to the tight corners of the track, the front end of our car was not really suited to the circuit, and understeer was a big problem. Therefore the decision was taken to purchase a Serpent kit with lightweight components and run that. Hardly the recipe for success, the night before qualifying starts! However, after much oil burning, and advice from virtually the whole Dutch and Belgian teams in the motel room, we had a completed car by the time qualifying commenced the next morning.

Qualifying

Each driver had six 10 minute qualifying heats, and, as always at a World Championships, it was extremely important to qualify into at least the 1/4 finals, if only to have a rest day while the other 80 drivers battled it out through the lower finals.

At the end of qualifying most drivers had managed a good run, although for some, like yours truly, it was a very close run thing. Gil Losi Jnr. just managed to pip Ralph Burch by 0.4 seconds to claim the coveted TQ position, with 35 laps 612.0. Roddy Roem was third on 35 615.8, and Tony Neisinger fourth on 35 618.2. These four drivers went straight into Sunday's final. We managed to qualify seventeenth, into the odd semi-final, although this was after changing back to a less powerful OPS engine in the search for reliability after a great deal of trouble with the new Nova-Rossi engines.



1/8 scale World Championships. Composite photo from Stewart Grant.



The new 1/8 Scale World Champion, Repete Fusco from Brooklyn, New York City, upon presentation of his trophy, laurel wreath and bottle of 'bubbly'. The scoreboard in the background gave instant results and times throughout the running of events.

Lower Finals.

The 1/256 to 1/8 finals were all closely contested, many placings being decided by fractions of a second. Francisco Carrilo of Brazil progressed from the 1/32 to the 1/8 final, and a young lad, Herman Matticoli from Argentina, showed great promise by progressing from the 1/32 to the semi-final. Kevin Mercandante of the USA, driving a Serpent, went from the 1/8 final to qualify ninth in the final, and finished second overall: a really great performance.

Quarter Finals.

Some of the best racing that I have ever witnessed took place in the 1/4 finals with, in one instance, the whole ten car field running nose to tail every lap for 10 minutes of the 20 minute race, with hardly an accident, and overtaking on every corner. All in all some superb racing, which the large crowd thoroughly enjoyed. After the two 1/4 finals, the six drivers to progress to the semis were: Albert Grob, Switzerland; Roger Sahli, Switzerland; Michael Salven, WGR; Kevin Mercandante, USA; Herman Matticoli, Argentina; and Maurizio Margarucci, Italy.

Semi Finals.

With the semi finals over 30 minutes, the racing was very tight; one mistake virtually putting the driver out of contention. Gary Culver of the UK was very unlucky not to go through to the final after running out

of fuel a couple of times, although it must be said that this is one aspect of Gary's racing that really needs to be looked at, as it seems to happen in most finals that he is in. Anyway, the lucky six drivers to progress to the final were Barry Grossenbacher, Repete Fusco, Curtis Husting, Ron Rossetti, Kevin Mercandante and Butch Kloeber. My car suffered from handling problems, as traction changed dramatically with temperature changes, but I managed to finish fifth in my semi, and fourteenth overall, the highest placing that an Australian has achieved so far at an RC Car World Champs.

Final.

So, after a week of solid racing, the final consisted of 6 Associated and 4 Serpent cars, although perhaps the most telling statistic is that there were 9 American and only 1 European driver. The race started with Losi Jnr jumping to an immediate lead, and opening it to about 3 seconds, but by the ten minute mark Rody Roem was closing in, until a collision with Neisinger lost him about three laps. Burch never seemed to be on the pace, and Fusco was putting in an immaculate drive, never losing touch with the leaders, but just waiting for something to happen. Kloeber dropped out early with problems, and Burch dropped back with mechanical problems.

At this stage Fusco took over the lead, and steady driving brought him home over the last half hour. Kevin Mercandante finished a fine second after a consistent drive, with Neisinger third after experiencing a few problems. All in all an exceptionally well driven race by Repete Fusco who, as Alan Jones would say, won the race in the slowest possible time: always the best way to win.

The Championships were well run, and deservedly won by Repet Fusco, who is sure to be an outstanding ambassador for the sport. The domination by the Americans does not really reflect that standards of the rest of the world, and I am sure that the results in Holland in 1989 will be entirely different, with the Europeans being much more to the fore.

I.F.M.A.R. BI-ANNUAL GENERAL MEETING.

The world governing body's bi-annual general meeting was held, as usual, after the completion of the 1/8 scale World Champs. The main points to arise were that the minimum weight for 4WD cars at World Champs will be 2.5 kg. Also, all mufflers, whether home-built or factory manufactured, must have an EFRA homologation number. This entails forwarding the muffler to Germany to an IFMAR authorised laboratory, where it will be tested in a controlled environment in which mufflers have already been tested for EFRA and a formula has been devised to control the noise. If a muffler is not stamped with the homologation number it is illegal, and will not be allowed after January 1989.

Holland will hold the 1988 1/12 Scale World Champs and the 1989 1/8 Scale World Champs. Italy will be the hosts for the 1988 1/8 Scale Off-Road World Champs. It is FEMCA's turn to hold the 1989 1/10 Scale event, and FEMCA has taken up the option to do so.

Ted Longshaw of England was re-elected President. Bernard Poupeart of France is again the Secretary, and Mike Reedy of the USA the Vice-President.

F.E.M.C.A. BI-ANNUAL GENERAL MEETING.

The Far East Model Car Association also met, with representatives from its member countries including Singapore, Thailand, Indonesia, Hong Kong, Australia and Japan. The main decision was that the annual affiliation fee to FEMCA from each country will be reduced from \$US500 to \$US300, thus relieving some of the financial burden which loyal FEMCA countries have had to bear. This decision was able to be made due to the fact that three more countries have recently joined FEMCA. John Grant of Australia was elected President, and Hon Shiu of Hong Kong remains the Secretary.

Results:

1. Repete Fusco	U.S.A.	Associated	O'Donnell Rossi	195 laps
2. Kevin Mercandante	U.S.A.	RPS Serpent	Paris OPS	188 laps
3. Tony Neisinger	U.S.A.	Associated	Paris OPS	181 laps
4. Gil Losi Jnr.	U.S.A.	RPS Serpent	Paris OPS	174 laps
5. Curtis Husting	U.S.A.	Associated	Paris OPS	174 laps
6. Rody Roem	Holland	Serpent	Paris OPS	153 laps
7. Ralph Burch	U.S.A.	Associated	Paris OPS	143 laps
8. Barry Grossenbacher	U.S.A.	Associated	Rossi	116 laps
9. Ron Rossetti	U.S.A.	RPS Serpent	Paris OPS	102 laps
10. Butch Kloeber	U.S.A.	Associated	Paris OPS	61 laps

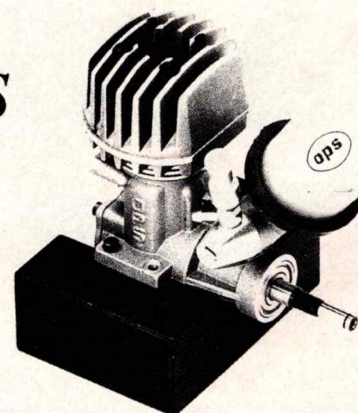


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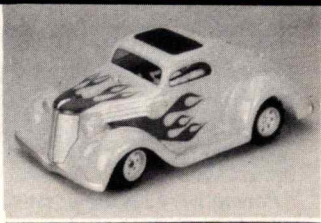
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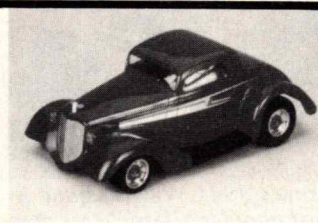
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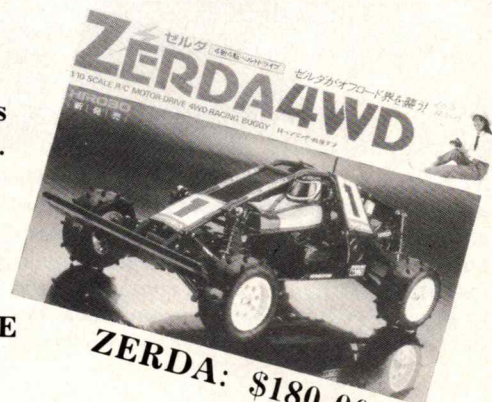
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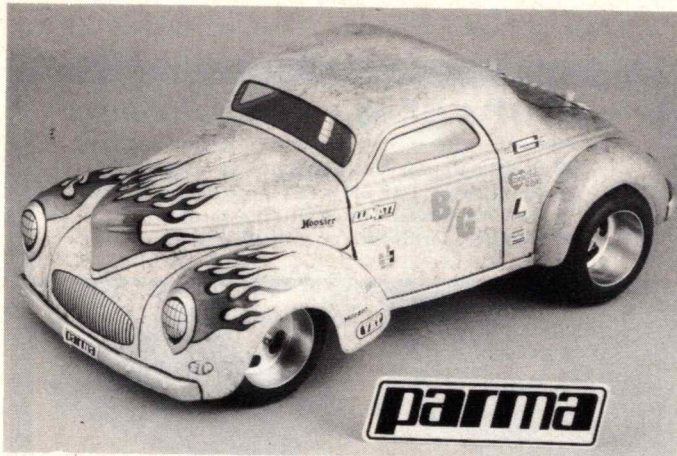
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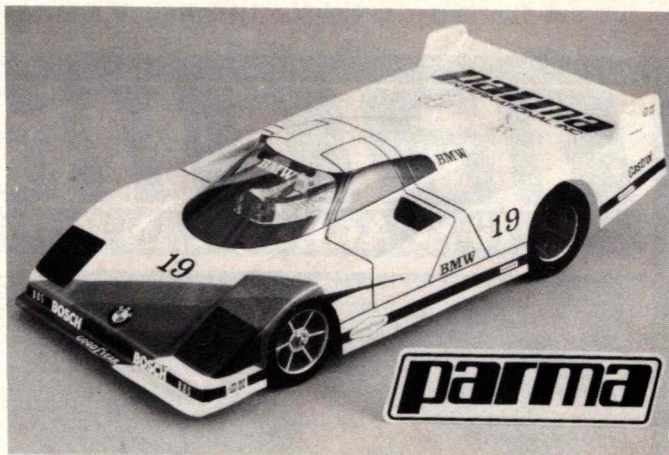
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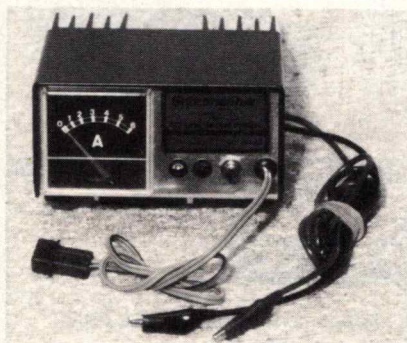
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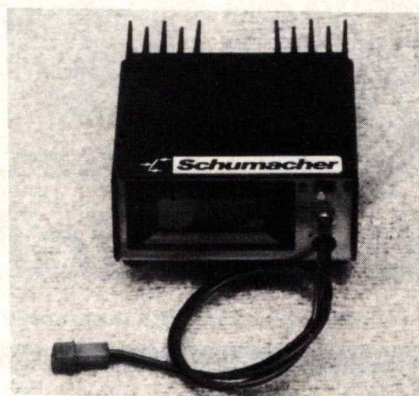
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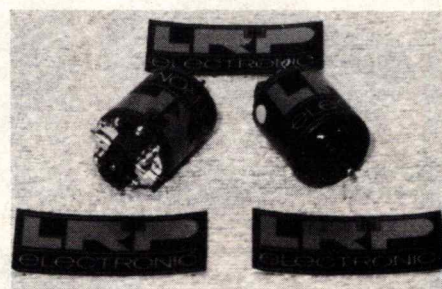
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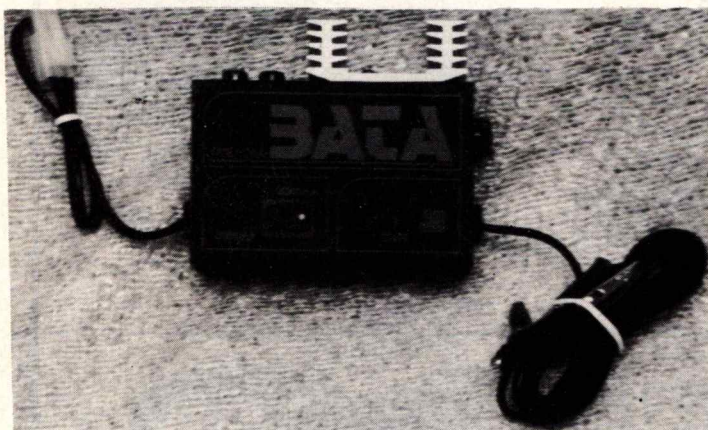
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A new range of DYNAMITE TYRES to suit Schumacher CAT and Tamiya Hot Shots, front and rear, at \$14.50 per pair, is now available from Performance Hobby Supplies, P.O. Box 96, Box Hill, Vic., 3128; phone (03) 898 2791.



From BATA ENTERPRISES come these two all-new Mosfet Speed Controls; the SC1000 and the SC2000. The SC1000, for the budget-minded racer, has a current rating of 72 amps, and the SC2000, for the top end racer, has a current rating of 180 amps. Enquiries to Pitstop RC Cars, (02) 98 9716.

THE BOOMERANG RETURNS

by Mel Gillott

Strange heading, you might say. After all, Tamiya's well-known Boomerang buggy has never left; so it could hardly return. But, to get my drift you have to watch TV at cartoon time, or eat Uncle Toby's Muesli Bars.

Still confused? OK. I will get to the point: the **Tamiya Challenge**. The Tamiya people must be spending lots of lolly trying to make the great unwashed aware of this event, which should be good for them, and the sport too. Hopefully they will sell myriads more off-roaders and bring more potential world champions into the sport. Need to know more about the Tamiya Challenge? Go buy a muesli bar, watch the TV ads during cartoons or, if you're really desperate, read Ray Wood's column (sorry Ray) in the first issue of *Dirt & Track*.

So, here we are with a burning desire to enter the Tamiya Challenge, burn the socks off all others, and win a trip to the land of \$100 steaks, Japan. We already have the car, or intend buying one. Trouble is, there are hundreds of others with the same desire, so how do we get an edge on the opposition? Read on, of course!

On the basis that Tamiya's Super Shot, Boomerang and Big Wig buggies (all similar) are going to win the 4WD bikkies, we scoured the country (well, sort of) to find the best operator of these cars. What we found was Russell, Bradley and Brian Coe, with the following credentials:

During the past 18 months they have owned 3 Boomerangs, 1 Super Shot and 1 Big Wig (they also have a Schumacher CAT). In the last 6 months, 13 year old Brad has achieved 3 wins in the Open A Final, and Russell (head mechanic, team manager, and father) has had a 2nd, 3rd

and 4th in Open A. Younger son, Brian (11 years) is up and coming in 4WD Stock with his Super Shot. All races were at Illawarra Club's track, which is shorter than most. To achieve these results the Coes have had to overcome the usual opposition from some very determined drivers of the English buggies. Naturally the Coes' cars are fast and handle well. They also find that their modified Boomerangs are easy to drive, and they recommend them to newcomers. So, *Dirt & Track* cornered the Coes and gave them the third degree.

Russ and Brad now race their modified Boomerangs almost exclusively, and of all the Tamiya 4WDs they feel that this buggy offers the best basis for an all-out racer. First change was to fit ball races throughout. Substitution of the front mono-shock with twin shocks was next, and here they hit on the idea of using Big Wig shock mounts instead of the more common Super Shot mount. This gives better performance, they say, and noted that others are now copying the idea. Other mods to the car are:

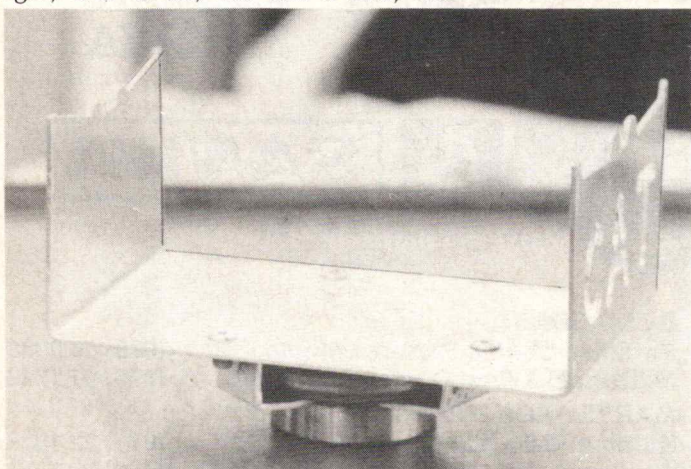
- Home made front stabiliser, using either 14 or 16 gauge wire.
- Home made rear stabiliser using 16 gauge wire.
- Steering link balls increased in size.
- King pin balls changed from aluminium to steel.
- The usual silicone tubing placed at the bottom of the shocker stems to act as a bump stop. Rear is about 12 mm long and front about 5 mm long.
- Bradley has Big Wig wheels fitted, mainly because he likes the look of them.
- Piano wire radio antenna was replaced with a yellow Nyrod tube.

- The pins in the drive shafts wore out so they were replaced with small roll pins. Neat trick!

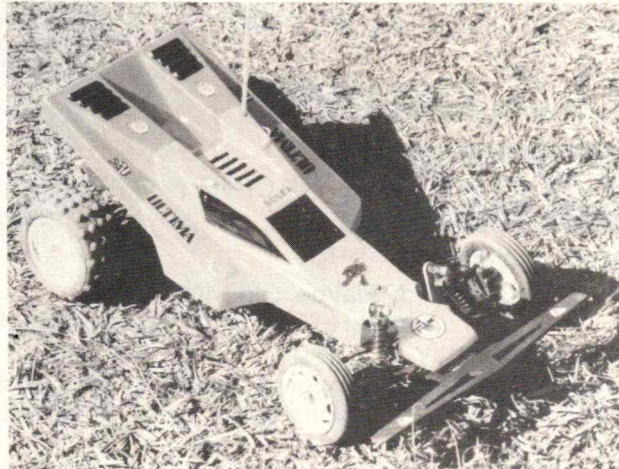
That's all! There are no other changes to the cars, so the brain-picking session continued with their all-important set-up, preparation and maintenance procedures. Most buggies are fast when new; keeping them that way is the hard bit.

Firstly, motors and drive. I must admit to being surprised to find that Tamiya's Technipower provided the urge in both Boomerangs. They have other, more exotic motors, but find that the Technipower suits the car and track very well. As an aside, also find that this motor is less suitable in their CAT. The Technipowers are absolutely standard, and they are on their second set of brushes. They use Tamiya plugs between speed controller and motor, and Associated plugs between speed controller and battery. Motor timing is kept wound up to maximum, and they use a 16 motor pinion in dry conditions, or a 15 pinion for a heavier track. Russell's motor cleaning procedure is to remove the endball (not applicable for stock motors), clean commutator with pencil eraser, and wash out with methylated spirits. A cotton bud cleans the hard-to-get-at places, and the armature is removed from the can only when necessary, for short periods only.

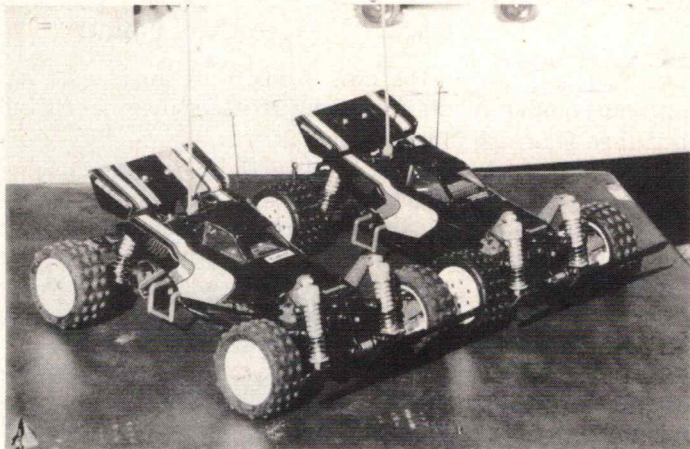
There is nothing exotic (or expensive) about their batteries, either. Both use the Plessey battery that comes in blue shrink wrap with red coloured end caps. There are as many ways to charge nicads as there are modellers, and Russell's method is as novel as any. After a race day he connects a resistor and discharges until the pack voltage drops to 1.0



Is this the ultimate in one-upmanship? Well made, aluminium swivelling car stand looks neat and is helpful during track and bench maintenance. Ian Stimson has already taken orders on (042) 96 1050. Mel Gillott photo.



The World Champion 2WD buggy?! Well, not exactly. This disguised Kyosho Ultima shows great potential in the hands of young Linda Entwistle. MG pic.



Bradley Coe's (left) and Russell Coe's nearly identical Boomerangs. Both highly competitive and just the job for the Tamiya Challenge races. Young Brad likes his car to slide, hence worn tyres. MG pic.



Hollywood would be proud of this stunt! The Beetle-bodied Zerde of Jeanette Inglis appears unperturbed as the CAT flies by. Action at Bankstown, Sydney, caught by the camera of Bob Inglis.

volt. Then he removes the resistor, wraps the pack in a rag, and places it in the fridge until the day before race day. (Then remove from the fridge, reheat in microwave for 3 minutes and serve with garlic and Chardonnay. Sorry, I do get carried away at times!) The pack is, in fact, removed from the fridge the day before the race and quick charged, followed by a booster charge just before the race.

There's not much setting up to do on a Boomerang, but for the record, the Coes settings are:

- Steering track-rods adjusted to give

slight wheel toe-in.

- Shocker oil is Tamiya Light on the front, and 30 wt. on the rear.

- Pistons in the shocks are single hole all round.

- Front shocks have one large spacer inserted, whilst at the back there is one large plus one small spacer.

The Coes' Boomerangs run very freely, so I interrogated Russell in an attempt to find the secret. He claims that a significant improvement can be made by applying only a minimum of grease to the differentials. Packing with grease as per the instructions

only increases drag. Also, he says to keep an eye on wear of the diff gears. The wheels should spin, in opposite directions, very freely. If they start to grab and shudder, then it is time for remedial action.

Close attention is paid to ball race maintenance. If anything doesn't spin freely, then the procedure is to remove the offending race and soak it for a while in Turps, then rinse it with Meths. When the race is spinning freely again he lubricates with 3 in 1 oil. (Triflo gun oil is better, or Selleys Ezyglide if the race is directly

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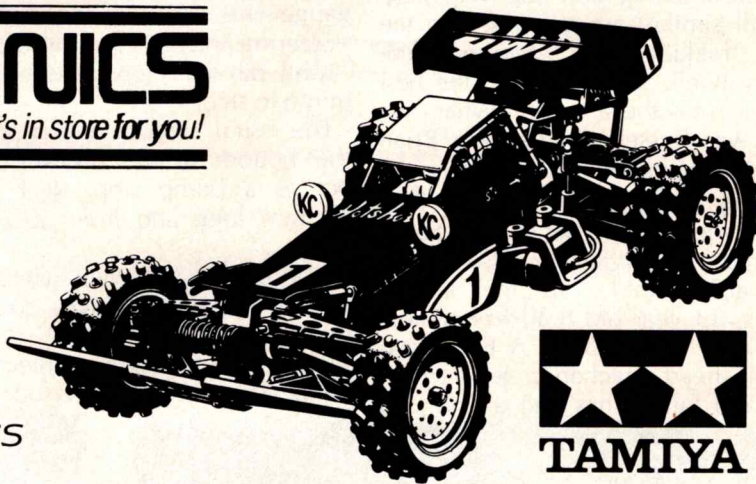


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exposed to dust. MG)

Finally, Russell says to check that the suspension wishbones move freely. The wishbone pins must not be excessively tightened.

The Coes' Boomerangs are guided by Hi-Tec 2PX pistol grip radios, which perform well, as do the KO CX2R and MK 600 electronic speed controllers. Of course, these speed controllers will have to be replaced with the standard mechanical device for the Tamiya Challenge. For these races all parts must be Tamiya, except for the radio and battery. However, the stock speed controller is quite a good one, so this step is not expected to greatly affect performance. Note that all other modifications and procedures listed in this article are permissible in the Open Class of the Challenge.

The Coes always begin a race with clean and tidy-looking cars. A clean car usually equates to good prepara-

tion, and to clean driving also. It's the dirty cars that break down the most. This brings us to one performance secret that cannot be learned from magazines. Good drivers come from experience and cool disposition. Races are won by picking the best line, making no mistakes, and keeping out of harm's way. Our younger drivers, in particular, have to learn that it is better to drive past the car in front, rather than through it.

The Coes know this, and their particular combination of car and driver has brought the successes. The mods and procedures outlined are not the only ways to skin a cat (!!!), nor are they necessarily all the best ways. But they work for the Coes, and they can work for you. We wish them, and all our participating readers, every success in the Tamiya Challenge. And thanks to Tamiya and Toy Traders for bringing it to us. Now, where's my Museli Bar

THE NEW TEAM LOSI MOTORS

A new range of motors being brought into Australia from the U.S. by Greg Collings of Performance Hobby Supplies, is the **Team Losi Revolution** series.

These modified motors are real screamers, and there's one for virtually every application. Greg has available the Revolution IV, a 19 turn wind; the Revolution Oval, a 17 turn triple wind which is very good in a four wheel drive off-road buggy; and the 15 turn triple wind Revolution Insane, a high revver with an appropriate name!

The Team Losi Revolution motors are built up from Yokomo components, and premium quality wire has been used for the armature windings. Commutator connections are welded, rather than being crimped or soldered, and the commutators are diamond trued, to ensure accuracy and smooth running. Revolution motors use high quality ball races, and feature special compound brushes.

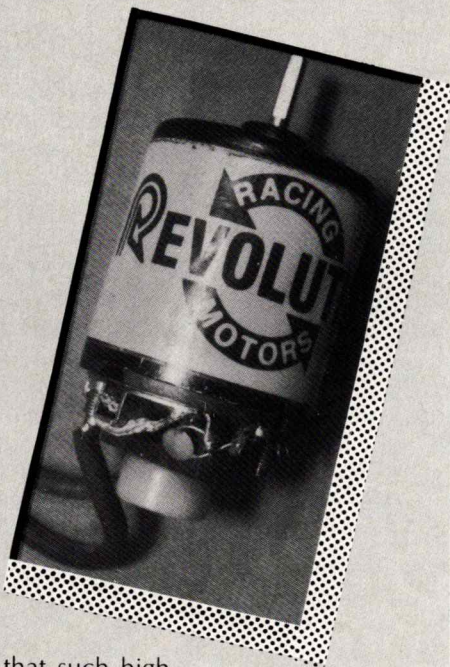
These motors have good torque and incredible revs, yet are smooth, right across the entire power band.

At first, it seems hard to believe that such high revving motors will allow a full five minute race without the battery dumping, but, with careful gearing, lasting the distance isn't a problem. Retail price is about \$175.00, which isn't really a lot to pay for a race-winning, high performance motor.

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by Paul H. Bird



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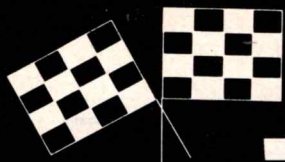
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RACE TUNE

by John Bowring

The need for up-to-date information about race tuning has been apparent for some time now, and because of the number of questions asked at the track, that need has resulted in this column.

No one single item is going to result in you being elevated from a C to an A Finalist. However, you should experience a steady progression through the ranks as your skill and knowledge reach full 'Race Tune'. Having reached the top of the heap, it is another thing to stay there. To remain at the top you need the ability to assess new products, as they come on the market, for their worth and suitability for your needs. Don't be afraid to experiment, but when you do, make only one change or modification at a time so that you can be sure whether there is an improvement or a deterioration in the performance as a result of that change.

One thing that is often overlooked is the necessity to really get to know your car: that is, how it can be tuned for either over or under steer, mild over-steer being preferred by at least one driver that I know; what to do when faced with extremely slippery, twisty tracks and only 2 wheel drive; and so on. This sort of information can be gained only by moving about and racing on other circuits.

Likewise, racecraft, i.e. the ability to thread your way past slower cars without causing a tangle and thus allowing someone that you have just passed to get in front again, is only really improved by racing against as many different people as your time and pocket will allow. Your turn as marshall should be used to observe other drivers, their good and bad points, for when you come up against them in the finals. A look at your opposition will tell you to look out for driver X, who has been known to T-bone when under pressure, so you will need to alter your line for a corner if he/she is close behind. Similarly, X should learn that, if he/she is being passed, it can mean that they will be one lap behind, and there is no point in racing a faster car to the next corner.

We in Australia, with one or two exceptions, have to import most of the gear needed to improve the performance of both on-road and off-road electric cars. In the case of batteries, one has to be especially careful when selecting for a particular purpose. Most nicad batteries used for our purpose are made in Japan, with some being packaged here in Australia. Care must be exercised when reading the manufacturers' instructions regarding charging rates. There is an enormous difference between what a modern racer considers 'fast charging', and what is printed on the box; a difference of 10 hours is not uncommon. One major Australian company that packages Japanese cells markets two types of nicad packs. On reading the outside of the box a purchaser may be inclined to buy one pack instead of the other. This is where care must be exercised. If you read carefully you will find that one type of cell, although similar, has a lower rating than the other. This allows the batteries to be charged faster, but they also discharge more quickly. These batteries are very good for stock class and electric flight, but in racing terms there is no substitute for capacity: many a race is won or lost in the last minute. The battery that hangs in the longest will be the best choice, so do some reading when selecting nicads.

A word of caution here. The rate at which modern on-road and off-road battery packs are charged far exceeds the manufacturers' specifications by a big margin. There is always the risk of the pack venting, or at worst, exploding. In six years of racing I have seen (or heard) only one pack explode. (That was in Denmark at the 1/12 scale World Titles, where some terrible things were done in an effort to improve lap scores.) The car was damaged, but no person suffered any injury. Please be aware of the dangers when trying to get that bit more into a pack.

Speed controls today have to withstand enormous punishment. If you are running a competitive buggy or on-road car, 'hot dogging' is out. Running the car for fun up and down the footpath and slamming it into reverse when travelling at full speed forward, thus making the car spin, will almost certainly cause the speed control to have a fatal heart attack. The resulting smoking mess usually cannot be effectively repaired. Even under race conditions the loads can be such that a partial failure may occur. The cure for all this would seem to be the use of speed controls that use Mosfets. These tricky little items can withstand quite high temperatures, as well as allow high amp loading, and they control current flow with a smoothness not found with any other type. This smoothness is a great help to on-road racers when having to deal with slippery tracks. This benefit is not lost on off-road drivers, who also find the smoothness allows them to power on earlier than would otherwise be possible.

When setting any speed control, full power should **not** coincide with maximum trigger travel. Full power should be available not later than 7/8 trigger travel. With Mosfet controls a pulse checker should be used to check for full power. One way to damage a Mosfet control is to run it without allowing full power to be achieved. This causes over-heating and failure. The reason for having full power at 7/8 travel is that, as the power runs down in the main supply, there will not be sufficient control current to fully open the gate in the speed control.

Whilst on the subject of current, have you checked your connector plugs recently? The standard plugs-sockets that come with your car do not have a very long effective life if left unattended. What usually happens is that the female part expands, leaving the male pin loose, or just making point contact. The result of this is rapid battery drain, because of the need to overcome a poor connection, together with minor radio interference, caused by fizzing at the poor connection. As the battery runs down, if you are supplying the receiver with power from the main battery, the current to the receiver will drop below 4 volts, and you will lose control. The remedy for this is to replace the standard connectors with a different type. The most satisfactory replacement would seem to be the 4 pin Dean's Plug. We have been using the K.O. Digiace version of these for about 4 years now without any problems. The conversion is not cheap, as not only do you need to change the connectors for your battery-speed control, but also the speed control-motor, and charger-battery lead, and they can cost upwards of \$6 per pair. However, the benefits are well worth the expense, as you will then have reliable connections, longer running time and no dead car after a minor prang.

TRACK UTILITY BOX

by Les Bone

Sometimes I sit and daydream, remembering days long ago when life was simple. I'm not talking about horse and cart travel or low interest housing loans. I mean really simple; like arriving at the race track with only one car, one battery, a transmitter and a fast charge lead. All that has changed: we have a hobby shop of spare parts to carry around from track to track. As this is now a fact of life, it makes good sense to own a box that will hold all your RC equipment, and double up as a work bench too.

The box described here is a modification of an original design by Jason Forte (current National 2WD Champion). This doesn't mean that by owning a box like his you will be able to drive like he does. However, being better prepared and organised will certainly help.

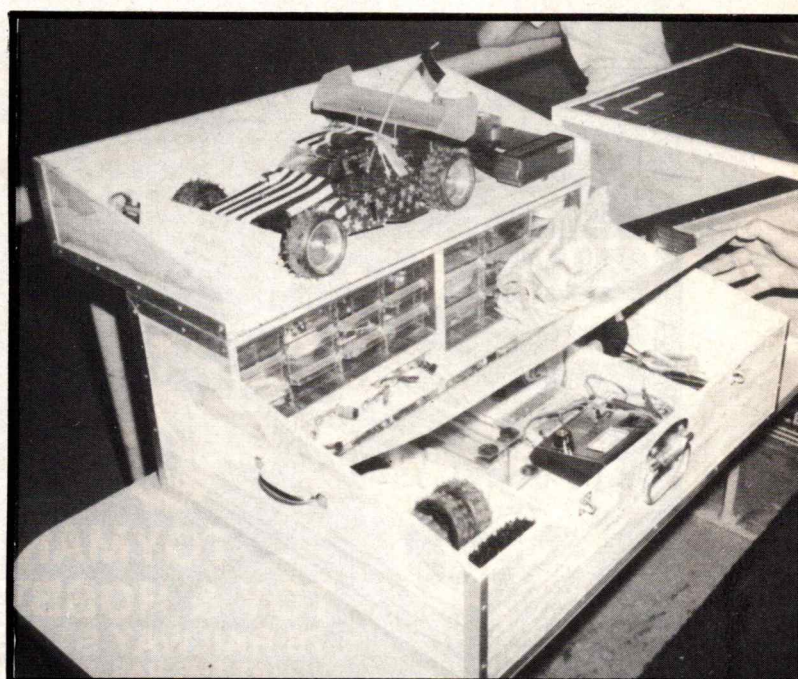
Now to get down to the technical bit. You will need to buy:

- 1.8 x 1.2 metre sheet of 10 mm plywood (actually 9 mm thick).
- 2 multi-purpose drawer cabinets (available from any hardware store).
- 2 piano hinges 600 mm long.
- 1 bag of 20 mm panel pins.
- 1 bottle of PVA glue (Aquadhere or similar).
- 6.3 metres of 12 x 12 aluminium angle.
- 650 x 300 x 3 mm thick plywood.
- 2 casket handles and case locks.

I will start by giving you the reasons for the dimensions of this box. Although it is quite heavy, it couldn't be smaller and still have all the benefits it has. The height is dependent on (a) the width of your transmitter and (b) the multi-purpose drawers selected. The width is determined by the width of the two multi-purpose drawers, side by side. The length could be less, but I prefer a large working area and room to store 2 cars.



The finished article. An easily transportable spare parts and tool carrier, complete with a stable work area.

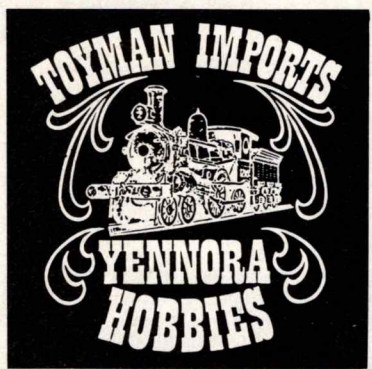
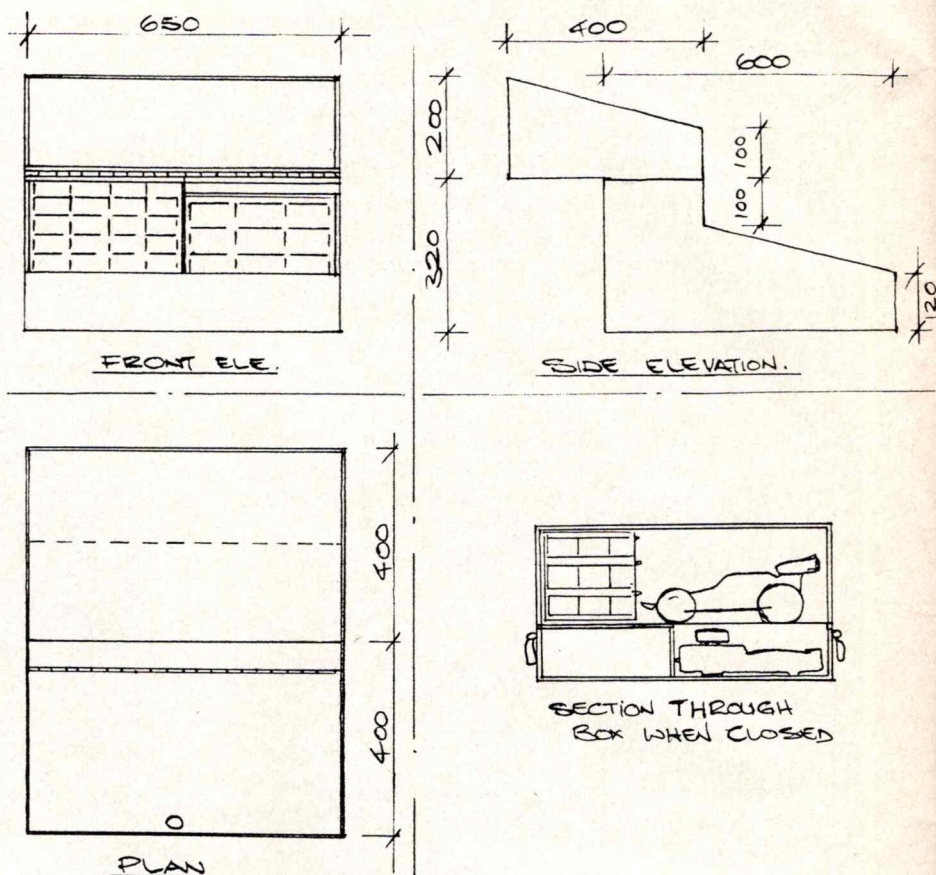


Two other examples of track utility boxes, both following similar plans to the one described in this article. Don Rodda showing off his handiwork at left, with Alan Gould's design at right.

The actual construction of the box is quite simple, using all lap joints, glued and nailed. The aluminium angle screwed around the outside covers all the rough joints! Of course, anyone with the skills and tools necessary would be able to dovetail the side panels and would then not need to use the aluminium angle.

Important: The secret of success in making this box is not to attempt to make the box and its lid separately. Instead, join all 6 sides together to make an enclosed box; nailed and glued solid. Then, at the hinge location, saw through the top and down the sides by 20 mm only. The piano hinge can then be screwed across the saw cut. Finally, the rest of the lid can be cut from the box.

Internal divisions in the base of the box are cut from 10 mm plywood and arranged to suit your own requirements. The 3 mm plywood base lid will need a strip of 10 mm plywood fixed to it so that the second piano hinge can be screwed to the ply. Finish off with a few coats of paint or varnish, and carry handles to suit.



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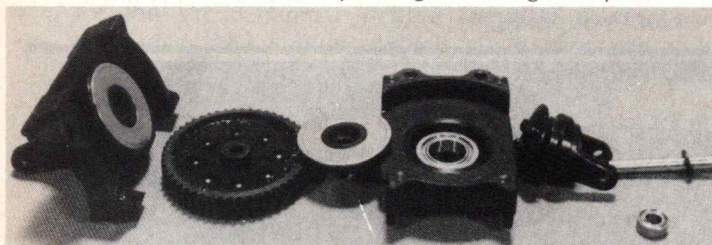
by Paul Bird

There's nothing wrong with the Schumacher CAT straight out of the box: after all, it's a race winner. Even so, it is smart to take advantage of research and development, because even the best can often be improved on. The Schumacher R & D programme has produced some updates for the CAT which are well worth considering, as they improve the handling of this thoroughbred buggy.

Front Differential

One such update is a ball differential unit to replace the original front gearbox assembly. This unit consists of a shaft driving both front wheels via one-way clutches. In the original system both front wheels are evenly driven, which is fine when running in a straight line, but when cornering, the inside wheel out-drives the outer wheel, because it is being rotated at the same speed.

The ball differential update solves this problem. The main belt drives a gear wheel, which contains a number of steel balls in a race. On each side of this gear, a thrust washer assembly presses against the balls, transferring the power to the front axles. If one front wheel locks up, the other wheel will continue to rotate. The differential action provided by the update means that when cornering, the front wheels travel at the appropriate speed (the outer wheel turns faster than the inner wheel), improving cornering ability.



Update ball differential assembly, fully ball raced. The balls in the cage on the belt wheel allow full differential action.

Front Drive Shafts

However, the ball differential update dispenses with the one-way clutches, which were a feature of the CAT. These clutches provided a free-wheeling action on the front wheels, effectively making the CAT a rear wheel drive car, with front wheel assist. The front wheels were driven only when the back wheels lost traction, meaning less drain on the battery. The one-way hubs were part of the original gear box, and for those racers who wanted free wheeling front hubs, Cecil Schumacher has come up with another update which complements the ball



One-way drive-shafts. They do the same job as the original one-way hubs, but work with the update ball diff.

diffs: one-way front drive shafts.

These drive shafts incorporate a set of one-way clutches, so you can still have the advantage of a free-wheeling front end, combined with the ball differential; giving the best of both worlds.

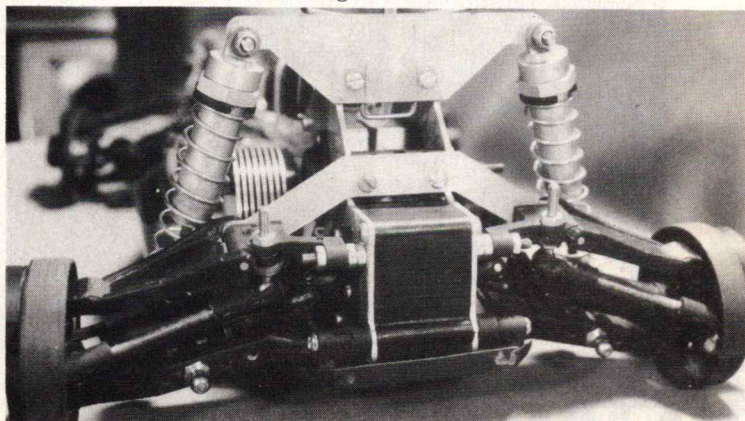
The ball differential update and the one-way drive shafts each retail at about \$95.

Thrust Bearings

One item on the CAT which certainly needed updating is the bearing on the screw shafts which go through the integrator, and through the front ball differential. The integrator shaft is tightened to increase the amount of front wheel drive, but if you do it up too tightly, the small bearing collapses, with its insides pulled out by the shaft head. This problem has been solved with a thrust-race update, which replaces the bearing on the shaft. Of course, you'll need one thrust race for the integrator, and another for the front ball diff (if fitted).

The thrust race consists of two grooved plates, a nylon bearing cage, and some very small balls. The balls are fitted into the cage, which is sandwiched between the two plates. The end result is that, no matter how hard you do up the integrator shaft, the ball race won't collapse. A neat idea, and well worth fitting to your CAT.

Careful research in the Schumacher camp has resulted in some updates to the suspension of the CAT which really improve the handling quite dramatically. There are two changes. One is an alteration of the angle at which the rear suspension arms operate, and the other is a widening of the wheel base.



Fully updated rear suspension. Note spacers for widening, and note how upper wishbone angle has been changed.

Suspension — Wider

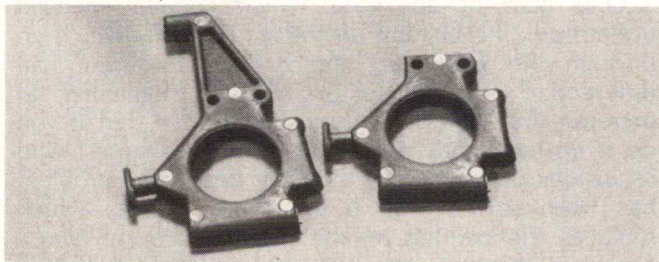
The entire wheel base has been widened; by 12 mm at the front and 8 mm at the rear. Although this sounds a lot, the CAT is still within the legal maximum width of 250 mm (with original wheels and tyres).

Widening the front end is carried out by adding an additional front upright to each side, after first cutting off the shocker mounting. Don't forget to use longer screws to hold each pair of uprights together, and to hold the upper wishbone mounting to the upright. Also, you'll need to increase the length of each tie-rod by 6 mm. Some 3 mm threaded rod, cut to the right length, will replace the original parts quite nicely.

The rear end is widened by inserting a 4 mm spacer at each wishbone mounting point, between the gearbox housing and the wishbone pivot. Longer mounting screws are needed here; 25 mm is the length required.

The upper rear arms are widened by using the new, wider fibreglass mounting support, and, once again, using longer bolts and a 4 mm spacer (or two Schumacher 3 mm nuts) between the arm and the gearbox housing.

Widening is an easy update to carry out, and it certainly does improve stability in the corners, even though the stabiliser bars have to be discarded because they won't fit the wider wheelbase.

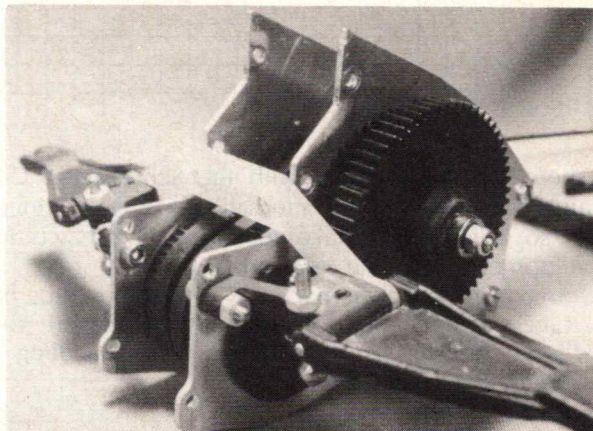


To widen the front end, use two of these uprights, but cut off the top as shown on the upright on the right.

Suspension — Angle

The final update also affects the rear suspension, and changes the operating angle from parallel to the ground to a slight rearwards angle. This update results in less bounce at the rear on the bumps, and more stability during cornering.

This update is easy to carry out. New gearbox side plates are available, with an additional hole drilled about 5 mm below the original top wishbone mount-



To change angle of upper wishbones, drill an additional hole in the gearbox sideplates, about 5 mm below the original hole.

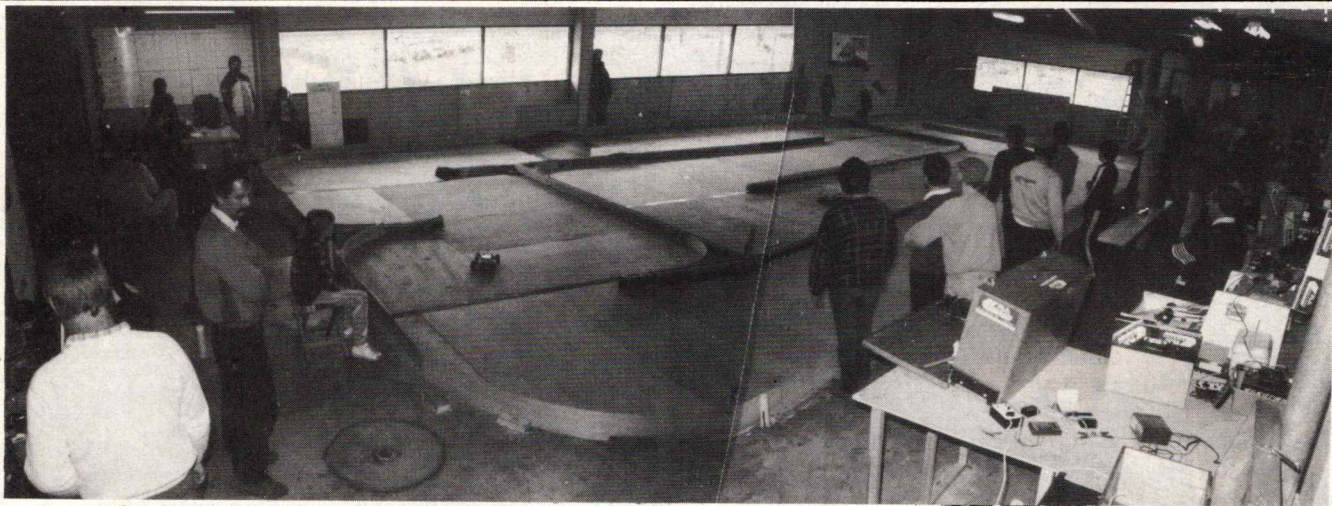
ing hole. Of course, you can drill your own holes in your existing sideplates, and save some money.

To change the angle of the lower wishbone arms, simply use the existing front mounting block, and re-fit it, upside-down and back-to-front. This puts the lower arms at the same angle as the upper arms.

When carrying out this update, be prepared to grind off some of the mounting block which locates under the differential gear. A 58 tooth spur will foul the block unless this is done.

None of these updates is essential (except perhaps the thrust races), but all of them will work to improve your CAT's performance and handling.

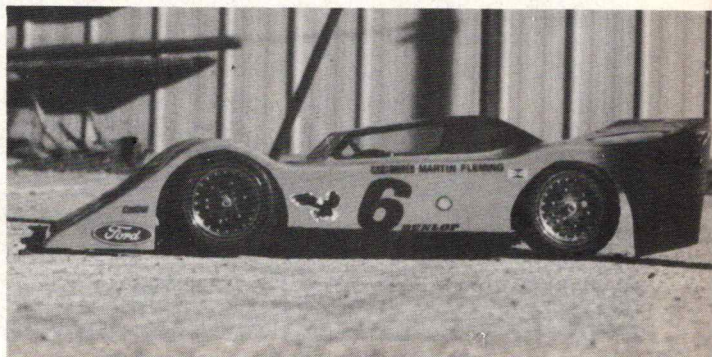
Update parts were supplied by Performance Hobby Supplies.



Melton TORRCC indoor track, situated upstairs at the Melton Market, Victoria. Racing is on alternate Friday evenings, and Sunday afternoons. The surface is 3 mm plywood, which gives surprisingly good adhesion. For further details contact Les Bone on (03) 743 1153. The track is also available for hire, outside of the above hours.



Martin Fleming, President of the Canberra Eagles Speedway Club, pictured here with his 1/10 scale Ford T Bird Grand National Sedan. The club also races Sprint Cars and Super Sedans on a hot mix track. The ACT Speedway Club is looking for new members, so if you are interested, contact Martin at: 19 Arunta St., Narrabundah, ACT, 2604.



This side view shows clearly the wedge shape low drag of his 1/10 T Bird Sedan

CLUB NEWS

TEMPLESTOWE CUP REPORT

by Paul Francis

Fifty-five buggy drivers contested the inaugural Templestowe Cup off road meeting, hosted by the Templestowe Off-Road Radio Control Car Club on Sunday 23 August. The Cup meeting, sponsored by Century Systems (Aust.), was organised as a prelude to the 1987 Victorian Championships, which will be held at the Templestowe track in October.

In practice on the Saturday, most drivers found the re-surfaced track hard to come to grips with because of the slippery surface, but on race day the track surface was good and hard, with lots of traction. The track was constructed using a rotary-hoe, and ploughing in many bags of cement. The surface was then rolled and watered, leaving it hard and grippy, with very little break-up. While the weather may have contributed to the low numbers, the meeting ran very smoothly, with only a few minor hiccoughs. As for the rain, it held off, until the trophy presentation.

Three classes were run: two wheel drive stock, four wheel drive stock, and modified. A two wheel modified class had been planned, but as there were only three entries the class was dropped. Race direction was admirably carried out by John Bowring, and there were few problems requiring an official ruling. The Templestowe track facilities for the Cup (and also for the Vic. Champs) include adequate parking and pit areas, and catering which covers hot and cold drinks, hamburgers, hot dogs, and so on.

The driving standard was high, with some tough competition for the top places, with most competitors regarding the event as a warm-up and practice for the Victorian Titles. Race Director, John Bowring, awarded the Century Systems prize for the 'Best and Fairest Driver' to a junior, Craig Kermond. Craig was thrilled with his Thermal Cut-off Charger and SCR Nicad pack, kindly donated by the Bendigo company.

Scoring was by means of the number of laps driven, plus the time taken to complete the last lap, in 100ths of a second.



RESULTS				
Driver	Club	Car	Laps	
2WD STOCK A FINAL				
1. R. Birtles	Templestowe	RC10	15	8.96
2. I. McPherson	Templestowe	RC10	14	5.62
3. T. Lauder	Keilor	RC10	14	12.72
4. C. Young	Templestowe	Ultima	14	21.06
5. J. Forte	Melton	RC10	14	23.72
6. M. Farnan	Templestowe	Kangaroo	14	26.02
7. P. Orchard	Keilor	RC10	13	26.79
8. D. Seckold	Keilor	RC10	13	36.96
2WD STOCK B FINAL				
1. J. Spencer	Keilor	RC10	13	15.04
2. G. McPherson	Templestowe	RC10	12	2.64
3. M. Borg	Keilor	RC10	12	24.8
4. A. Sutherland	Geelong	RC10	12	DNF
5. N. Pooley	Templestowe	RC10	11	3.72
6. T. Gray	Keilor	Ultima	11	9.1
7. A. Speechley	Templestowe	RC10	11	20.84
8. D. Spencer	Keilor	RC10	11	DNF
4WD STOCK A FINAL				
1. T. Williams	Geelong	Bulldog	15	5.46
2. D. Seidel	Templestowe	Bulldog	15	7.62
3. N. Millard	Templestowe	Optima	15	15.33
4. W. Rehberg	Templestowe	CAT	14	12.99
5. P. Bracka	Ballarat	Mini Mustang	14	17.99
6. M. Dykers	Templestowe	CAT	14	21.42
7. R. Lang	Keilor	CAT	14	48.17
8. A. Bishop	Templestowe	CAT	12	DNF
4WD STOCK B FINAL				
<i>(Lap scoring system malfunction)</i>				
1. P. Collier	Ballarat	CAT	14	
2. L. Harbour	Keilor	Mini Mustang	14	
3. B. Amplett	Keilor	Mini Mustang	14	
4. E. Garay	Keilor	Mini Mustang	14	
5. P. Pelchen	Ballarat	CAT	13	
6. B. Peatling	Templestowe	CAT	13	
7. C. Kermond	Templestowe	Optima	10	
8. G. Drury	Templestowe	Bulldog	DNF	
MODIFIED A FINAL				
1. S. Frahm	Templestowe	Bulldog	14	19.76
2. D. Radley	Templestowe	CAT	13	4.82
3. P. Marlan	Templestowe	CAT	13	9.55
4. R. Bishop	Templestowe	CAT	13	12.76
5. G. Collings	Templestowe	CAT	13	15.79
6. T. Sandford	Ballarat	CAT	12	18.24
7. P. Tougher	Templestowe	CAT	12	52.42
8. S. Boyle	Templestowe	CAT	12	DNF
MODIFIED B FINAL				
1. J. Clark	Templestowe	CAT	12	4.94
2. D. Fisk	Geelong	Dogfighter	12	11.39
3. D. Cain	Keilor	Optima	11	9.97
4. J van Rosmalen	Keilor	Ninja	11	13.56
5. J. Dykers	Templestowe	CAT	11	15.45
6. M. Wynyard	Keilor	Salute	10	20.5
7. D. Crawley	Keilor	CAT	10	49.49
8. R. Polak	Templestowe	CAT	DNF	

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