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NUMBER 3
Dec. 1987
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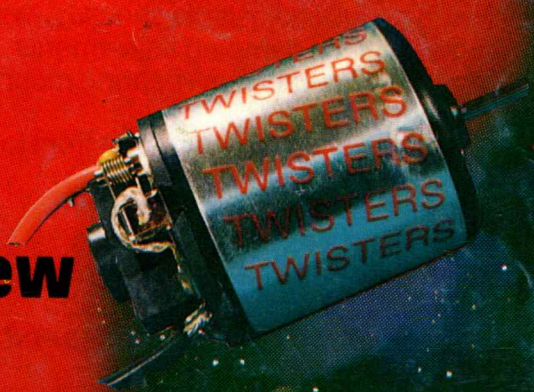
Win a PB Mini Mustang
Details Inside

Challenger 250

Mugen Mercury



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Registered by Australia Post Publication No. VBQ8237

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DIRT&TRACK

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FASTEST BUGGY-TOP QUALIFIER IN 4WD UNLIMITED (WORLD CHAMPIONSHIP CLASS) AT THE AUSTRALIAN CHAMPIONSHIPS 1987

Mini Mustang

TECHNICAL SPECIFICATION

Overall Length: 410mm
Overall Width: 241mm
Wheelbase: 267mm
Track – Front: 212mm
Track – Rear: 204mm
Max Ground Clearance: 45mm
Suspension Movement: 50mm
Weight (depending on equipment) 1.36 to 1.47kg (3 to 3¼lbs)

Based upon our many years of model car design, and developed as a result of many, many races the Mini Mustang offers that very rare combination of an easy-to-drive car with supreme speed and performance.

The range of three cars:- 2 wheel drive, 4 wheel drive and 4 wheel drive-2 speed, is based upon the same components. You can change from one specification to another at minimum cost and with maximum simplicity.

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Readily available spares.	You won't be sidelined waiting for a part. PB understand the importance of keeping you racing.
Adjustable toe-in at both front and rear plus rear roll induced steering effect.	With these simple adjustments you can "tune" the Mini Mustang to suit your driving style and the particular track conditions.
Fully ballraced.	You don't need to spend a fortune on ballraces after you've bought the kit. The Mini Mustang's ballraces give it long life and high efficiency as standard.
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NOVAROSSI

BIRD TORQUE

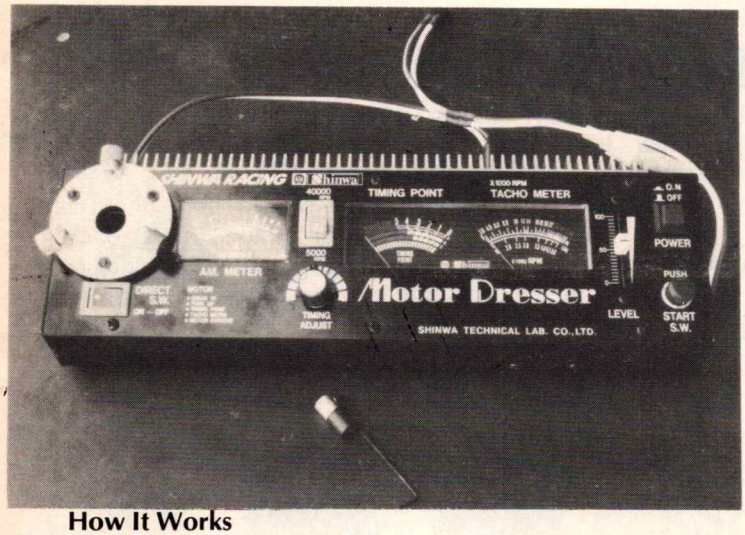
by Paul H. Bird

In this column in Dirt & Track No. 2 I wrote about tuning modified motors. I said then that a dyno is the best way of getting the most from your modified, but that only a few people can afford one. That situation has now changed, thanks to the boffins at the Shinwa Company in Japan, and to Jack Grenenger of Pitstop RC Cars in Sydney who gave me the opportunity to play with what I can only describe as a technological marvel.

What I'm raving about is the **SHINWA MOTOR DRESSER,** a piece of equipment which will enable you to do wonderful things to motors. It's so comprehensive that it almost sits up and sings. Being serious (for a change), with a Shinwa Motor Dresser you can:

* Run-in a modified or stock motor on low voltage and low revs;
* See at a glance how many Amps the motor is drawing;
* See how fast the motor is revving;
* With a modified motor, easily find the zero degrees timing point;
* Find out the optimum timing setting for the motor under test; and
* More easily see the effects of changes such as brush filing and changes to the spring tension.

In other words, it performs similar functions to a dyno, except that it cannot test a motor under load. All of that will cost you about $240.



How It Works

The heart of the Shinwa Motor Dresser is a mounting plate on the left hand side, above a hole into the unit. As I understand it, the tacho is operated by a Hall Effect type of device (similar to the system used in cars with electronic ignitions) which is triggered by a magnet fitted to the shaft of the motor under test.

I've compared the results given by the tacho on the Motor Dresser with the readings for the same motor using an accurate light-operated tacho, and the Shinwa's tachometer is accurate enough for most needs. In fact, at 30,000 rpm it's not far out at all. My only real complaint is that I would have preferred digital instead of analogue meters.

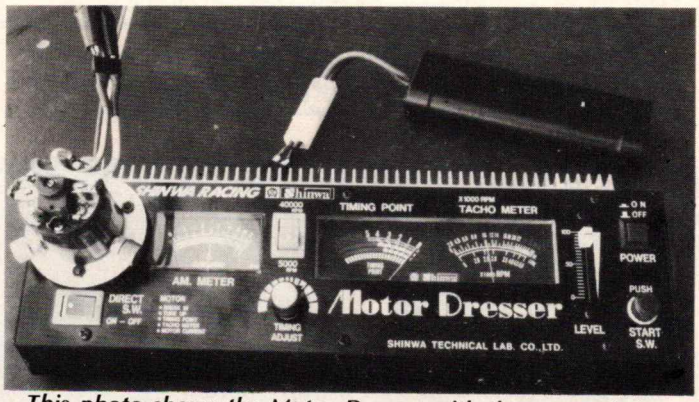
The Instructions

Naturally, the Shinwa Motor Dresser comes with a set of instructions, which are probably excellent if you are a fluent reader of Japlish. It seems that the original Japanese instructions have been translated into English quite literally, and as a result they can be a little (or is that a rittre) confusing. Nevertheless, a little time spent with the instructions, and doing some careful experimentation, will result in you being able to work this magic unit.

Doing It

Secure the magnet supplied to the shaft of the motor to be tested, mount the motor carefully into the clamp fitting supplied, hook up the wires, connect a fully charged nicad, and you're ready to start.

The instructions suggest many methods of running-in motors, the only difference being the speed used and the time taken. They suggest that a motor can be run-in for two hours at about 5,000 rpm, one hour at 8,000 rpm, or ten minutes at full speed. Of course, by using the variable voltage slider you can set the motor running at any speed you like, starting at just a few hundred rpm. Of course, you'll need to remember to lubricate the bearings from time to time, and to watch out for excessive heat build up.



This photo shows the Motor Dresser with the motor timing having been set to 0 degrees, in accordance with the unit's instructions. Full revs are not required for this operation, as indicated in the text.

Timing

A feature which I really like is the ability to find the Zero Degrees Timing Point on a modified motor, and to compare this with the manufacturer's setting (assuming that the motor is new and hasn't been played with yet). Before tinkering, it's a good idea to make a note of where the manufacturer has set the motor.

The procedure is quite simple. Connect up the motor and set it running to between 6,000 and 8,000 rpm. Use the Timing Meter Adjuster knob to set the Timing Meter's needle in the middle of its scale. Loosen the motor's end-bell screws and gently move the end-bell from side to side until you find a point where the nedle on the Timing Meter won't move any further to the right. Change the rev setting to 10,000 rpm, and very gently move the end-bell again from side to side, once again finding the point where the Timing Meter needle doesn't move. Secure the end-bell, as this is the zero degrees point. Move the rev setting back to 8,000 and, using the adjuster knob, set the needle on the Timing Meter to zero. If you then switch the motor to full voltage by turning on the motor switch you can make a note of the rpm and amp draw for future reference. Don't worry about the fact that the timing meter needle will have gone off the scale.

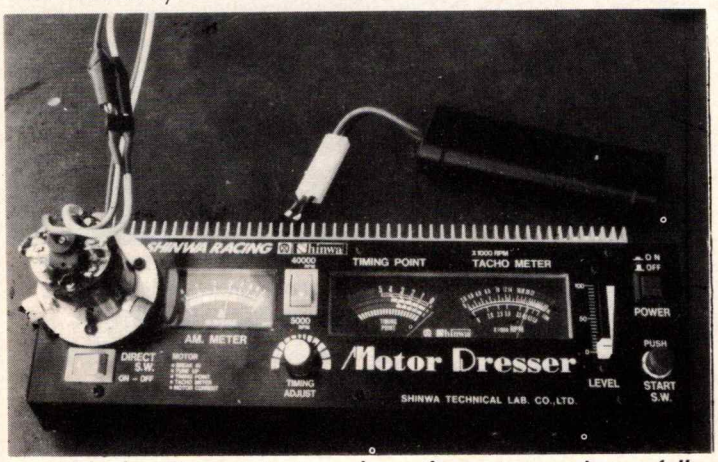
Tuning

Using the Shinwa Motor Dresser, it is not difficult to tune your motor for its optimum performance. Continuing on after having found the zero degrees point, switch the motor to full revs, loosen off the end-bell and turn it in an anti-clockwise direction. You'll notice that the revs will increase, and so will the Amps! By the way, you won't need to turn the end-bell very much; start with about 2 mm.

Switch the motor switch off (this allows the variable voltage control to take over, and the motor will drop back to about the 8,000 rpm mark), and watch the Timing Meter. The needle will swing over to the left, probably indicating a number. This represents an approximation of the number of degrees that the timing has been advanced. Keep repeating this procedure until the Timing Meter needle swings to the left, and then starts to drop back towards the right. Back the timing off a tad, and that's the optimum setting for most efficient running.

However, this setting does not necessarily mean that the motor will give you the speed or duration that you want. That can be found only by experimentation, and it is always a compromise between revs and current consumption.

It is interesting to note the final position that you end up with after using the Shinwa, and compare it with the motor setting when you bought it. Some manufacturers are better than others when it comes to setting motors for efficiency.



With the Direct S.W. turned on, the motor receives a full 7.2 Volts. Here the Motor Dresser indicates that the motor is doing 21,000 rpm, and drawing 3 Amps. Correct timing advancement will be given when the Direct S.W. switch is turned off.

At The Track

Obviously, track conditions, gearing and batteries are all going to have an effect on your car's performance. I've found that the Shinwa Motor Dresser is useful out at the track as a quick and easy way of playing with a motor to get the most out of it. You see a lot of drivers adjust motors by ear, but, unless you're very experienced, that's not a good way to go because it's not easy to detect a difference of a thousand revs just by listening. The Motor Dresser lets you make fine adjustments of current and revs quickly, easily and accurately at the track.

CHANGING THE SUBJECT

I recently had the opportunity to drop into Model Engines, where Mike Farnan showed me around a fabulous range of goodies. (Before you go rushing off, Model Engines sell only to the hobby trade.) Apart from drooling at all the good gear, I did come away with a range of bits and pieces, like a Twister motor (see review elsewhere in this magazine), a battery charger (also reviewed this issue) and some useful items that most racers should have.

It's always useful to have a length of nicad-sized heat-shrink on hand, ready to replace the old heat-shrink on the pack when it has split, or when you've built up a new pack from separate cells.

The little clippers are very useful too, for cutting wire and even for trimming Lexan shells, especially when you suddenly find the need for a little more clearance around a wheel arch, spur gear, or whatever.

Ever noticed how hard it can sometimes be to remove pins from axles and the like? If you use vice-grips you run the risk of damaging the pin, and having to replace it. From Model Engines comes a very neat little pin remover. It's made of brass and could be a worthwhile addition to your toolbox.

Something which none of us should be without is silicone-coated wire. It's great for motors, nicad packs and speed controllers, and, best of all, the insulation doesn't fall off when the wire gets super hot. To me this wire seems to be a lot more flexible than that covered with the standard plastic or rubber insulation.

Finally, some tyres which will suit the needs of the backyard and street brigade. I think that these will fit Frogs and Hornets etc., and they're ideal for anything other than serious competition. They can be used on the footpath or whatever; they wear well and also have good grip.

SUPPORT YOUR LOCAL HOBBY SHOP

Without hobby shops there would be very few of the wonderful bits'n'pieces which are currently available for the hobbyist, and hobby shops can't operate without customers. Don't be disheartened if your local hobby shop doesn't have what you want; just ask them to order it in for you.

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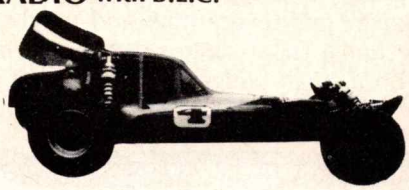

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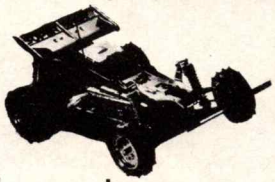

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PRO★STAR NICAD CHARGER

Reviewed by Paul Bird

It seems that very little escapes the advances of technology; even the humble clockwork timer type of charger has felt the march of progress. It must be daunting for newcomers to car racing to look around the pit area at a race meeting and see a large range of fancy, expensive nicad chargers.

A few years ago the next step up from fast charge leads was a charger with a 15 minute clockwork timer. You set the time you wanted to charge your pack for (up to 15 minutes), and when the timer ran out the charger switched over to trickle or, in some cases, switched off completely. These chargers worked well but, because there were no safeguards to prevent over-charging, and, because the clockwork mechanism had the potential to jam, every now and then a nicad pack put the Big Bang Theory into practice. A costly exercise for racers on a small budget! The beauty of these clockwork chargers was that they were, and still are, comparatively cheap.

Enter the era of technological change, and a cheap charger which will be an alternative to the clockwork one as the next step up from quick charge leads. The Texson company is producing a charger called the **Pro-Star 70270,** which is an electronic version of the clockwork unit, but which also has over-charge protection. However, do not be confused, this is **not** a peak detection unit; they cost rather more than the $40 to $45 that the Pro-Star sells for. The Pro-Star is simple yet very effective, and comes complete with comprehensive instructions, which you should follow to achieve a good charge.

How It Works

Operation is easy. Simply connect the Pro-Star to a fully charged 12 volt car battery (observing polarity; red is +ve, black is −ve) and connect the nicad you want to charge. The 'Trickle' light will come on, indicating that the nicad is being trickle (slow) charged.

To commence fast charging, simply press the 'Start' button. This will cause the red fast-charge indicator to flash, showing that the nicad is being fast charged. Assume that the nicad was completely flat when it was put on the charger. (This normally means that the pack would require about 25 minutes to reach 100% charge.) After 15 minutes the Pro-Star charger will automatically switch back to trickle charge. You can check to see if the nicad has been fully charged by pressing the 'Start' button again. If the red light does not stay on, the nicad is fully charged, but if the light starts flashing again, the pack needs more charging.

The Pro-Star does have a safety protection to prevent over-charging. When the pack reaches about 10 volts the charger will automatically switch back to trickle mode. Of course, if you charge a nicad which was not completely discharged, the Pro-Star will automatically revert back to trickle mode when the pack voltage reaches about 10 volts.

Warnings

There are a couple of important warnings in the instructions which come with this charger. Firstly, don't hold the Start button down in an effort to make the unit fast charge if it doesn't want to. Your nicad is probably fully charged, and holding the Start button down could result in a blown charger, or an exploding nicad. Secondly, the instructions say that the over-charge protection will work only if the power supply (12 volt car battery) is fully charged.

Read the instructions which come with this charger, as they also contain some very valuable information about charging and caring for your nicads in general. Batteries are expensive, but if you look after them they'll serve you well for quite some time.

Conclusion

While quick-charge leads are cheap, the Texson Pro-Star charger is a good next step up for the beginner to the sport of radio control racing. Read and follow the instructions, and this charger will serve you well, and give a good charge.

The Pro-Star for review was supplied by the importers, Model Engines, 57 Crown St., Richmond, Vic., 3121.

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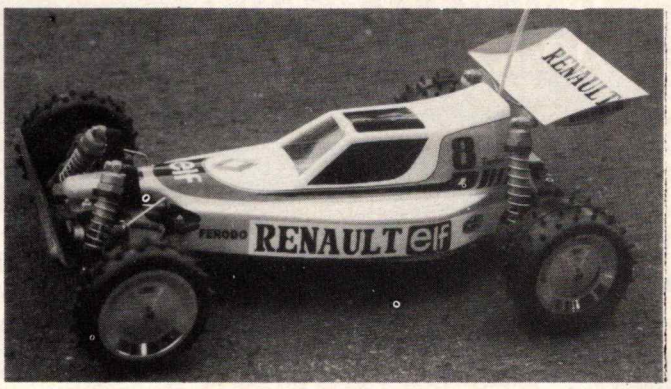

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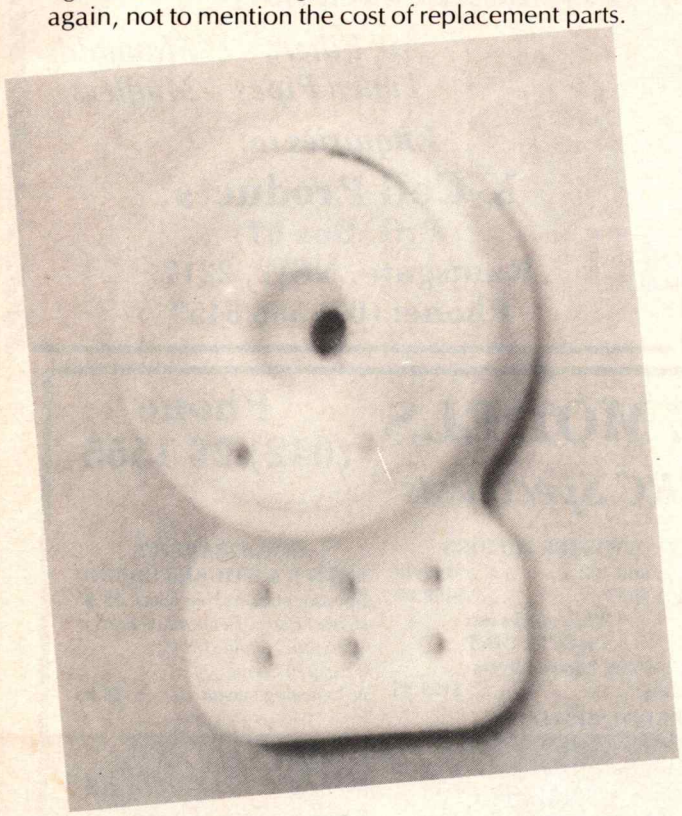
SERVO SAVERS

by John Rogers

Have you ever wondered why a servo saver is such a vital piece of your car's steering? The answer can be summed up in a few words: it prevents many lost dollars and plenty of inconvenience.

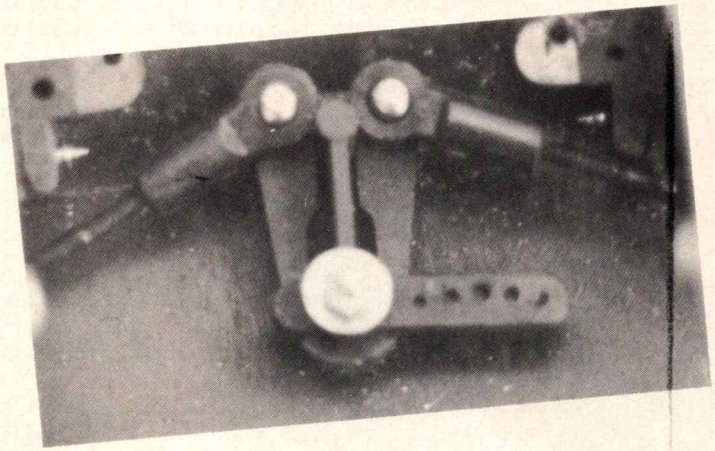
Have you ever given thought to carrying a full set of servo gears as part of your regular spare parts back-up? You should if your vehicle isn't fitted with a correctly functioning servo saver.

As the name suggests, a servo saver is designed to prevent damage to the steering servo by absorbing all stressful shock transmitted through the wheels and steering geometry. Without a servo saver the transmitted shock often results in stripped gears inside the servo. If you aren't familiar with the gear layout of your servo, and you are unfortunate enough to suffer a stripped gear, you can spend quite some time trying to figure out how to get the whole mess back together again, not to mention the cost of replacement parts.

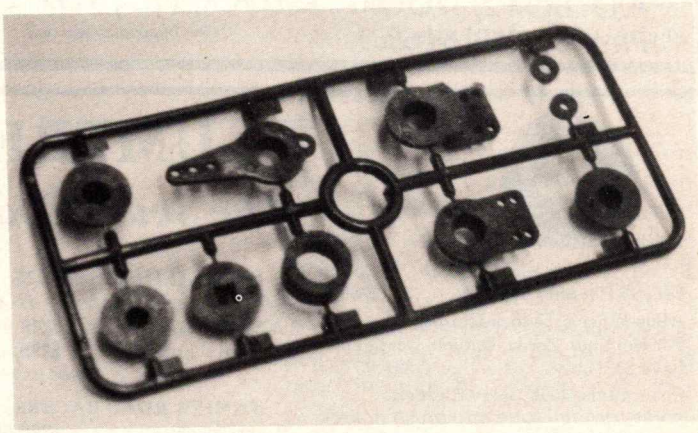


The most common types of servo saver have some kind of in-built spring which will not give under normal driving conditions, thus ensuring full steering control, but, in the event of the vehicle hitting a wall, another car, or even having a bad landing after a jump, the spring action of the servo saver then absorbs the force of impact and does not pass this on to the servo gear train. Good insurance!

When mounting the servo saver you have a few options. The more common types mount directly onto the servo itself by simply removing the servo horn and securing the servo saver onto the output shaft of the servo. An important thing for the beginner to remember when buying a servo saver is to tell your local supplier the type of servo you have, otherwise you run the risk of buying a mismatched pattern for your output shaft, as most manufacturers have different styles and patterns on the output shafts.



The next most common mounting position is midway between the steering (front) wheels. The servo saver is connected to the front wheels via tie rods, and to the servo (which in this configuration can be mounted some way further towards the centre-rear of the chassis) by means of another threaded rod with either ball joints or clevis fittings. This system is usually one that is supplied with a kit and designed for a specific type of vehicle.



Many of the servo savers supplied as part of car kits have interchangeable adapters allowing a host of different servos to fit the one servo saver. Although a useful idea, experience has shown that this type of servo saver is prone to breakages after a heavy crash, and one type would not allow the steering to centre again after a crash, causing under steer on one side and oversteer on the other. Not too good for the nerves!

Another important factor to take into consideration is the transfer of power from the servo to the front wheels. Should you be using a bent or Z shaped piece of piano wire as a coupling, there is a good chance of unnecessary drag being exerted on your servo, which in turn will consume more power from your battery and increase steering reaction time. Try to fit ball links wherever possible, and reduce the strain on those servo gears.

Next time that you go to the track, park or supermarket car park, spare a thought for your steering servo. A servo saver is cheap insurance for your car.

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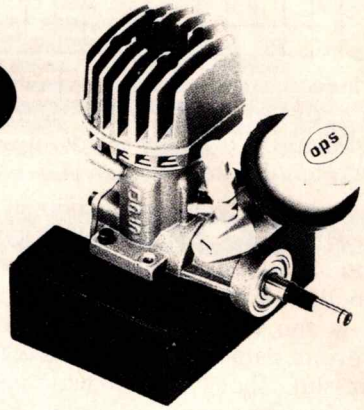

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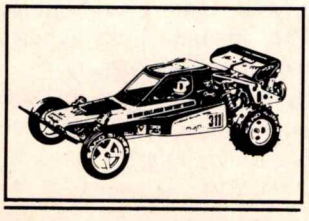

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HOP INTO R.C. CARS —

CHALLENGER Kangaroo

Reviewed by Paul Bird

Sporting a name like the Kangaroo, one could be forgiven for thinking that this one tenth scale electric off-roader had been made in Australia, but that's not the case; in fact, it is made in Korea. This explains why the Kangaroo can be sold ready-built and complete with two channel radio, receiver, servo and electronic speed controller, for less than $300.

The Kangaroo comes in a neat cardboard carry-case, which has everything you need except for nicad packs and charger. The only assembly required is to attach the front bumper to the chassis, and also to apply some stickers (supplied) to brighten up the rather bare yellow body shell. Charge up a 7.2 volt nicad, put it in, and the Kangaroo is off and hopping. Don't forget to buy eight AA batteries for the transmitter.

REALLY FOR FUN

Despite its looks, the Kangaroo isn't really meant for serious off-road competition. Yes, you'll probably see some of these buggies hammering around different tracks, both indoor and outdoor, but, while this buggy can be raced with a reasonable degree of competitiveness, it's really designed as a toy for the backyard or street-racer brigade.

I think that this is important because, if the sport of RC racing is to keep growing, it needs to have more people interested in trying their hand at it. The Kangaroo fills the bill in this regard. It represents a cheap way into the sport, and, while it isn't as competitive as some other two wheel drive off-roaders, it is far more akin to a racing buggy than it is to a toy. Some have been raced with a few minor modifications and done rather well.

SPECIFICS

The Challenger Kangaroo is a two wheel drive buggy, with power supplied by a trusty Mabuchi 540 motor (supplied), driving the rear wheels through a full differential action, single speed gearbox.

Power is controlled by a transistorised electronic speed controller, which is fitted with very substantial heat sinking. This speed controller seems to be virtually bullet-proof, and should survive all but the roughest treatment (like a prolonged direct short across the motor leads).

In fact, I let my five year old son give the review buggy a run around the back yard; he had a wonderful time, and the Kangaroo came through the ordeal with flying colours!

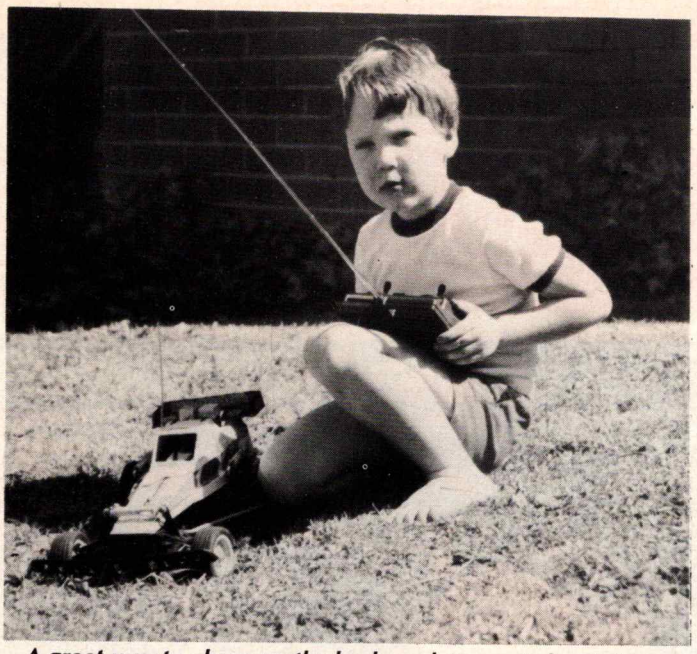
The speed controller also supplies a regulated voltage to power the receiver, so there's no need for an additional receiver battery on-board.

WHERE THE RUBBER HITS THE ROAD

The Kangaroo's rear boots are business-like rubber with knobs, suitable for dirt, grass or carpet, but don't expect them to last overly long when running the car on concrete or similar.

The Kangaroo is supplied with coil over, oil-filled shocks as the suspension units. Each rear suspension arm is fitted with a shocker laid out horizontally, and, while they seem to work quite well, they are a little jumpy. *(Maybe that's how the buggy got its name! ED)*

At the front end, suspension is provided by a transverse monoshock, which again works quite well. Front tyres are the fairly standard narrow ribbed affairs, and the steering servo is fitted with a very substantial servo saver.



A great way to churn up the back yard. Young Luke Bird was quite capable of driving the review Kangaroo buggy.

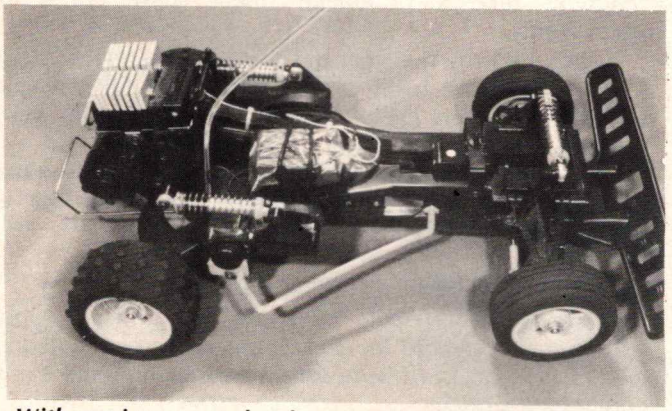
ELECTRONICS

All the radio gear, and the speed controller, can be removed from the Kangaroo and used in something else, like an electric motor powered plane or boat.

The speed controller and receiver are held in place in the buggy with very large and strong rubber bands, and the receiver is covered by a plastic bag to keep out any dirt and moisture.

The transmitter itself is quite remarkable, given the total cost of the package. It's a two channel stick radio which boasts features usually found on some of the more expensive radio. (See Challenger 250 review this issue.) For example, the Challenger radio includes a charging socket so that you can use nicads to power the radio, servo reversing switches, a carry handle, and, of course, the facility to change crystals.

The Challenger electronics, while being comparatively cheap, are quite acceptable performers, especially when one considers the main purpose of the buggy: back-yard racing.



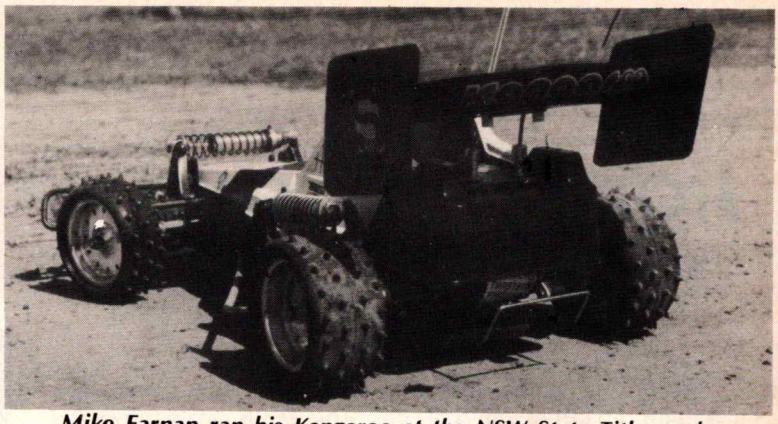
With receiver secured and wrapped in plastic to keep out dirt and grit, the Kangaroo needs only its battery pack to get hopping. Note the size of the heat sinks on the speed controller.

HOW IT PERFORMS

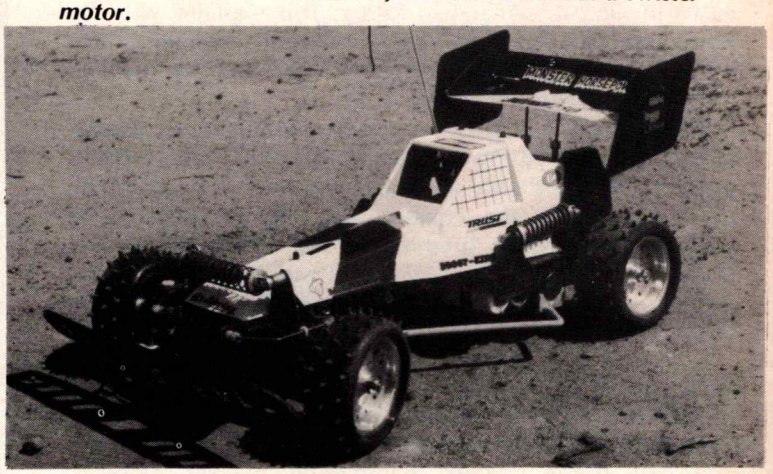
No doubt about it, the Kangaroo has a good straight line speed; the Mabuchi 540 really is a very willing revver, and, of course, it can be replaced with a different motor if you want to spend the extra money.

The suspension is adequate for the car, and does soak up most of the bunps, although at times the Kangaroo lives up to its name.

General handling is good, and the buggy is a lot of fun to drive. If you get tired of playing in the back yard, the Kangaroo will survive on a proper racing track at club level competition, although it might not handle quite as well as some of the more exotic (and expensive) two wheel drive buggies. You might not win the A Final, but you'll certainly have a good time.



Mike Farnan ran his Kangaroo at the NSW State Titles and finished 7th in the A Main. Major modification was a Twister motor.



CONCLUSIONS

The Challenger Kangaroo is exceptionally good value for money, especially when you consider that the radio gear can be removed and used in another model. Essentially, the Kangaroo represents a complete buggy package for about the same price as a two channel radio kit and speed controller.

The buggy comes with some spare gears, and can easily be pulled apart to repair any breakages, if they occur. Don't be alarmed though; this buggy is very tough, so repair costs should be minimal.

As a starter buggy, or up-market toy, the Kangaroo is the way to go.

If your local hobby shop doesn't have the Kangaroo in stock, tell them to contact the importers, Mike and Tony Farnan of Model Engines Aust., 57 Crown Street, Richmond, Victoria, 3121; phone (03) 429 2925 (trade enquiries only).

The review car was supplied by the importers.

REVIEW AT A GLANCE

Quality of Instructions:	*Nil; Ready-built*
Ease of Construction:	*Ready-built*
Quality of Materials:	★★★★★
Motor Supplied?:	*Yes; Mabuchi RS540*
Chassis Type:	*Box section*
Suspension Type:	*Independent arm rear. Monoshock front*
Shocks Type:	*Oil-filled coil over*
Sway Bars?:	*No*
Ball Races Supplied?:	
Motor Accessibility:	★★★★
Speed Controller Supplied?:	*Yes; electronic*
Steering Servo Saver:	★★★★
Body Shell:	*Pre-coloured lexan*
Balance of Car:	★★★★
Handling on Track (as tested):	★★★
Ease of Setting Up:	★★★★

Note: All radio gear is supplied with the Kangaroo buggy.

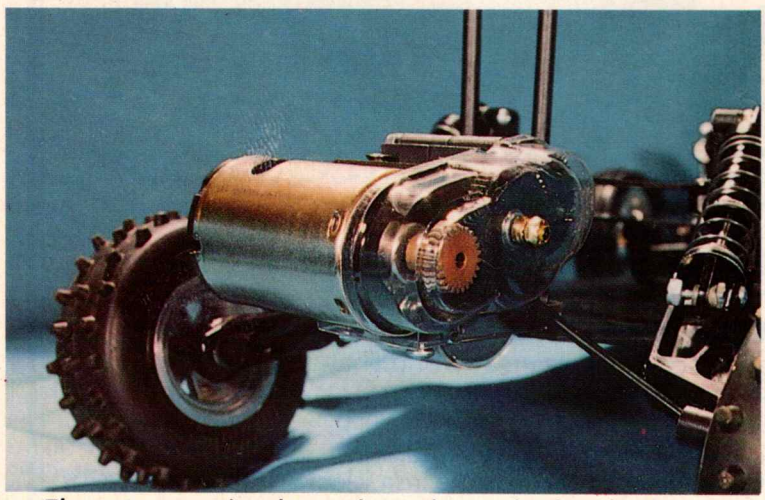
FROM AMERICA

PRO-110

by Frank Hughes

The American company, Model Racing Products, has an enviable reputation for producing high quality and well developed RC racing products, especially in the buggy area. Unfortunately, I don't believe that the MRP Pro-110 off-road buggy comes up to scratch, as far as MRP's reputation is concerned, when compared with other American two wheel drive off-roaders. Certainly the Pro-110 has some features which demonstrate the high level of research and development that have gone into this buggy, but as far as I'm concerned, some of the finishing, and some of the construction basics leave a lot to be desired.

The MRP Pro-110 is a two-wheel drive, off-road, competition buggy, built on a chassis plate made from aircraft-grade aluminium. There are two instruction manuals which cover the kit assembly; one has the text and the other the pictures, which are drawings rather than photographs. I found this system to be unnecessarily complex, and the drawings needed to be made clearer. The process could have been simplified by matching the text to the drawings, combining them in just one manual.



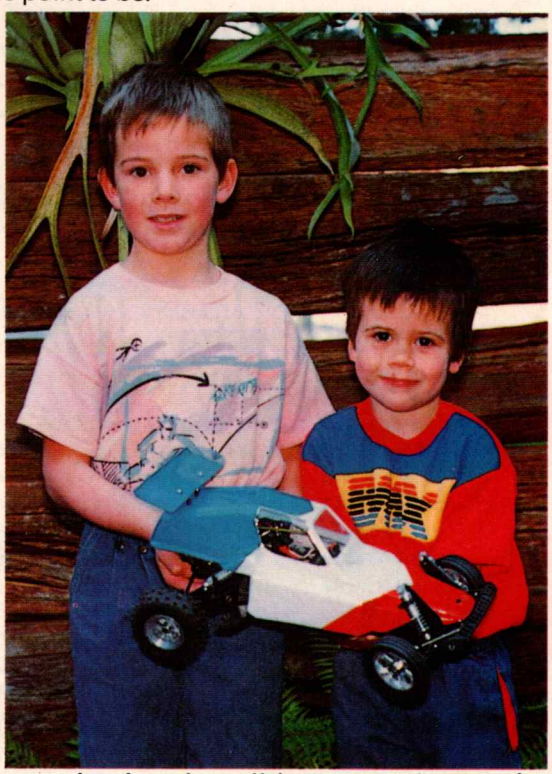
The motor mounting plate on the gearbox can be altered so that the motor can be mounted either fore or aft of the gearbox, depending on where you want the balance point to be.

Features

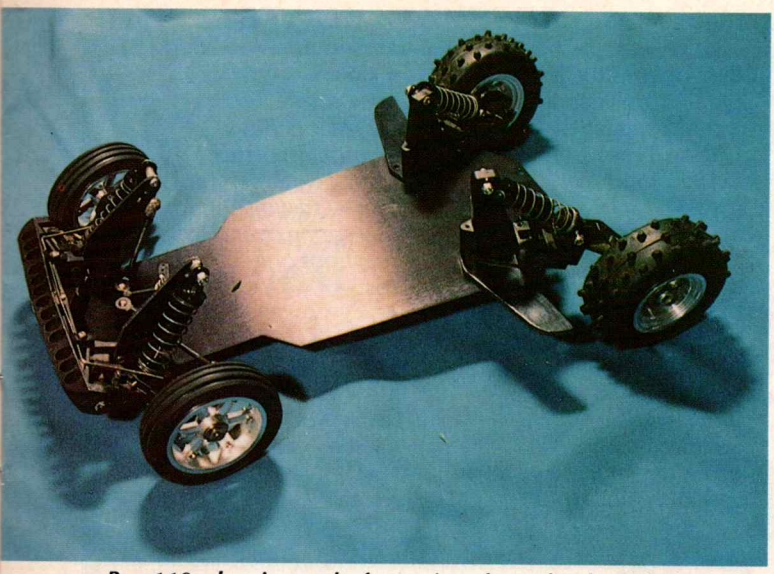
As standard, the Pro-110 is fully ball-raced, has oil-filled shocks which are fitted with bleed screws, and two grades of oil are supplied.

Castor and camber can be easily adjusted by rotating a hexagonal eccentric nut fitted to each wishbone pivot point, and the centre of balance can be changed by careful choice of one of the three transverse nicad mounting positions.

The motor mounting plate on the gearbox can be altered so that the motor can be mounted either fore or aft of the gearbox, depending on where you want the balance point to be.



Steven and Andrew show off the Pro-110 prior to track testing. Rear wing is mounted in the rearmost position, indicating that the motor has been mounted in the fore position on the gearbox.



Pro-110 chassis, made from aircraft grade aluminium, with suspension fitted.

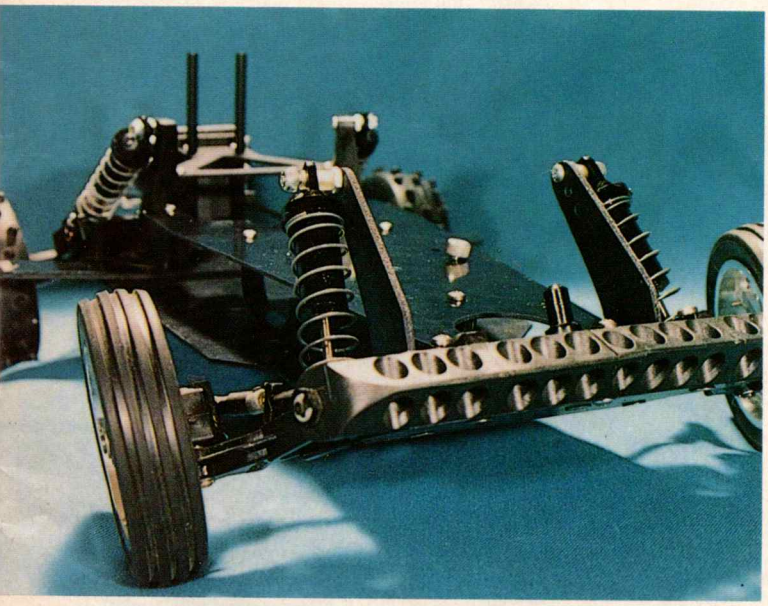
With the Pro-110, dropping a drive shaft should be a thing of the past. Inside each rear axle yoke is a spring which applies pressure to the shaft end, forcing it back into the gearbox yoke. This is a great idea; it works and should be a standrad fitting on more buggies.

While the chassis plate is aluminium, the radio plate is fibreglass to keep the weight down. The Pro-110 comes with two Lexan body shells; one has the driver moulded into it and fits over the radio plate to keep the dirt out, and the other goes over everything to provide the finished look.

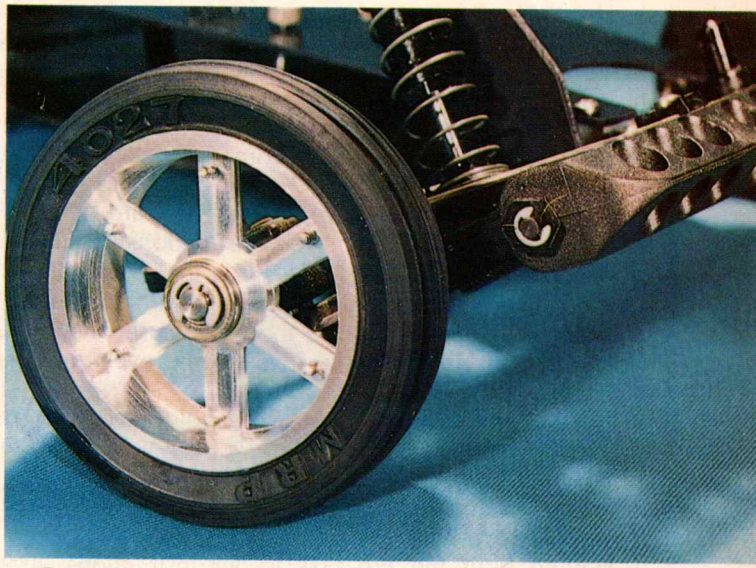
The track width of the Pro-110 can easily be widened for better handling, and it's done without add-on bits; simply reverse the wheels on the stub axles.

Painting the outer Lexan shell is made a little easier by the provision of adhesive masking shapes which are pre-cut to fit the window areas. This is another good idea which other manufacturers could take notice of.

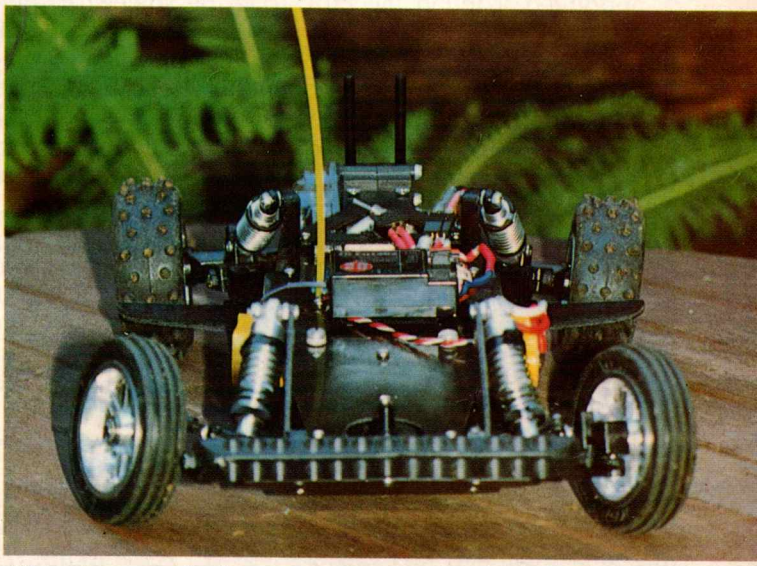
A very effective mechanical resistive speed controller is supplied. It has proportional forward, and also braking. Unlike some resistive controllers, this one is a heavy-duty unit, and should take a lot of punishment.



Radio plate, made from fibreglass, now mounted. Leaves plenty of room for steering servo, although adjustment to steering throw can be tricky. Battery can also be moved fore and aft to get better ride by means of relocating the mount.



Eccentric nut, mounted on the front wishbone, allows camber to be adjusted quite easily.



All ready to go. The Pro-110 easily accommodates all RC gear and battery. Note that the motor, although unseen here, has been moved to the forward position on the gearbox, and Option House shocks fitted for better handling.

Criticisms

While the features are good, there are some bad points which could well indicate a lack of thought in the design of the Pro-110.

The front shocks are fitted to the wishbones by just a self-tapping screw. This screw goes through a plastic-nylon section, then emerges, leaving a length of screw protruding across the top of the wishbone itself. While I'm sure that the self-tapper will hold the shock quite firmly, it's a shoddy piece of engineering which should not have been allowed out of the factory.

As I've already mentioned, there are two motor mounting positions, and both of them have their problems. If the motor is mounted in the outboard position, the wing mounts have to be moved forward a good 12 mm, bringing the wing to a point where it probably won't do very much. No, you can't leave out the wing mounts, because these two tubes also hold down the Lexan shell at the rear. With the motor mounted in the inboard position (as suggested and shown in the instructions), the body and wing mounts are fine, but changing or adjusting the motor is a nightmare! It is a case of removing one rear suspension assembly completely to get at the motor retaining screws, or removing the entire gearbox. Both methods take time.

The rear suspension seems to be very badly designed, leaving the back end with excessive ground clearance, even when the shocks have reached the end of their travel. There's no risk of scraping the gearbox on anything, but the high back end does tend to make the Pro-110 rather unstable in tight corners.

Construction

The kit construction is very straightforward. It really is just a case of following the instructions in the two books. The only slightly tricky bit is the assembly of the gearbox and differential unit: a ball-differential construction which will require the liberal use of grease to hold the balls in the centre gear, while everything goes together.

Grease will also be needed to hold the thrust race assembly together on the shaft, which goes through the differential and allows the diff action and tension to be adjusted to suit track conditions and driving style.

Testing the Pro-110

Having built the Pro-110 as per instructions, it was taken out for a test run, and frankly, I was a little disappointed. I found the Pro-110 to be somewhat unpredictable in the corners (possibly because of the high rear end), with a tendency to tuck the back wheels underneath and roll. No doubt this is caused by the amount of positive camber on the rear wheels. This camber cannot be removed by using the castor-camber adjusters; they just don't have enough adjustment available.

Conclusions

The MRP Pro-110 is not a buggy that I felt I could regularly drive with any real confidence. It is a fascinating combination of good and bad design engineering, making this buggy one for the adventurous, or perhaps for those not afraid to do some extensive modification work.

REVIEW AT A GLANCE

Quality of Instructions:	★★★★
Ease of Construction:	★★★★★
Quality of Materials:	★★★★
Motor Supplied?:	*Yes; Mabuchi 540*
Chassis Type:	*Aluminium plate*
Suspension Type:	*Front — independent arm*
	Rear — trailing arm
Shocks Type:	*Coil spring over oil filled shock*
Sway Bars?:	*Yes; front only*
Ball Races Supplied?:	*Yes*
Motor Accessibility:	★
Battery Accessibility:	★★★★★
Speed Controller Supplied?:	*Yes; mechanical resistor type*
Steering Servo Saver:	★★★★
Body Shell:	*Lexan; you cut out and paint*
Balance of Car:	★★★★
Handling on Track (as tested):	★★
Ease of Setting Up:	★★★★

THE 19 TURN SCHUMACHER-YOKOMO MODIFIED MOTOR

by Paul H. Bird

With a retail price of about $130.00, the 19 turn Schumacher-Yokomo modified motor falls into the middle of the range price bracket. It's a case of 'you get what you pay for': this motor has middle of the range performance. It develops good torque, but lacks the top end rev range of some of the more expensive motors, and, with a 19 turn wind on the armature, that's to be expected.

As you'd expect with a modified motor, it is ball-raced, and has an adjustable end bell, fitted to a black Yokomo 05 can. For its price, the 19 turn Scumacher-Yokomo is good value for money. It is a motor which would be ideal for the newcomer to modified class, or perhaps to use when getting used to a new buggy. The motor can also be used in 1/12 scale cars.

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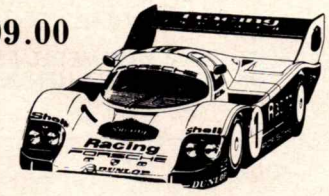

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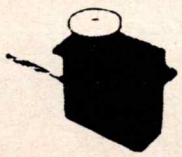

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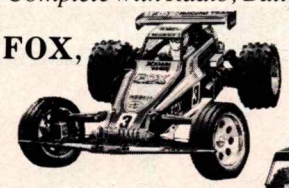

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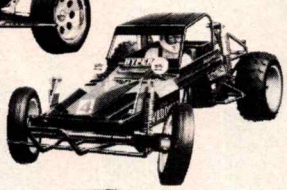
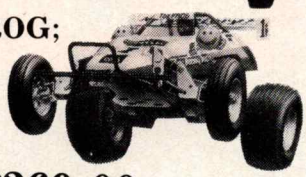


FROG;



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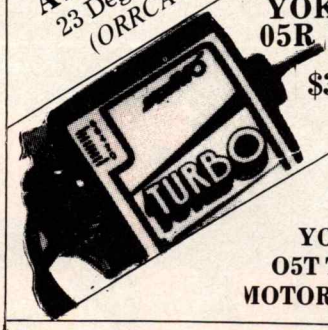

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TAMIYA – WAY OUT IN FRONT

Off Road Radio Control Association Of Australia.

O.R.R.C.A. OZ NEWS

from Dennis Beilby
O.R.R.C.A. OZ PRESIDENT

1989 WORLD CHAMPIONSHIPS

Australia has been awarded the 1989 World Champs.

ORRCA NSW applied to ORRCA OZ about two years ago for permission to try to secure and run this event in 1989. All our thanks go to Mr. Ian Kennedy, ORRCA NSW Chairman, who, with a tremendous amount of effort, secured these titles for Australia.

The titles will be organised by ORRCA NSW in conjunction with ORRCA Australia, and run to IFMAR rules. I firmly believe that we can make these titles the best World Championships ever held.

I.F.M.A.R. RULES

We have been informed that the rules for the 1989 World Champs will be essentially the same as current IFMAR rules (i.e. two wheel drive modified and four wheel drive modified as the two classes, and the same general specifications as at present), with one exception: whether to run 6 cell (5 minutes), or 7 cell (4 or 5 minutes).

The Americans (ROAR) are proposing that we change to 7 cell, with 4 or 5 minute racing, but the Europeans (EFRA) disagree, and would prefer 6 cell with 5 minute racing. Far East (FEMCA, including Australia and Japan) will probably have the deciding vote. The decision is very important, and will affect your racing, as by necessity the ORRCA OZ sanctioned events, i.e. National and State Champs, must offer the World Champs classes to prepare our drivers and to select our team.

To start this debate, I will offer a few pros and cons regarding changing to 7 cell - 4 minutes.

For 7 Cell - 4 Minutes:

- faster and more spectacular;
- more emphasis on driver skill, because cars are grossly over-powered;
- reduces running time for events, or increases number of rounds.

Aganist 7 Cell - 4 Minutes:

- approximately 70% of current tracks in Australia would be unsuitable, as large, high traction tracks are needed;
- more expense, more batteries, and in some cases, new and more expensive speed controllers and chargers would be needed;
- change-over cost for drivers would be high; e.g. 5 new 7 cell battery packs to be competitive.

These are but a few of the arguments regarding this subject.

O.R.R.C.A. — WHAT IS IT? Part 1.

ORRCA OZ currently has 50 clubs, and close to 3,500 members affiliated.

HISTORY

ORRCA OZ is still very young. It was formed in 1985 out of ORRCA NSW, with the initial aim of sending an Australian team to the first World Champs in California that year.

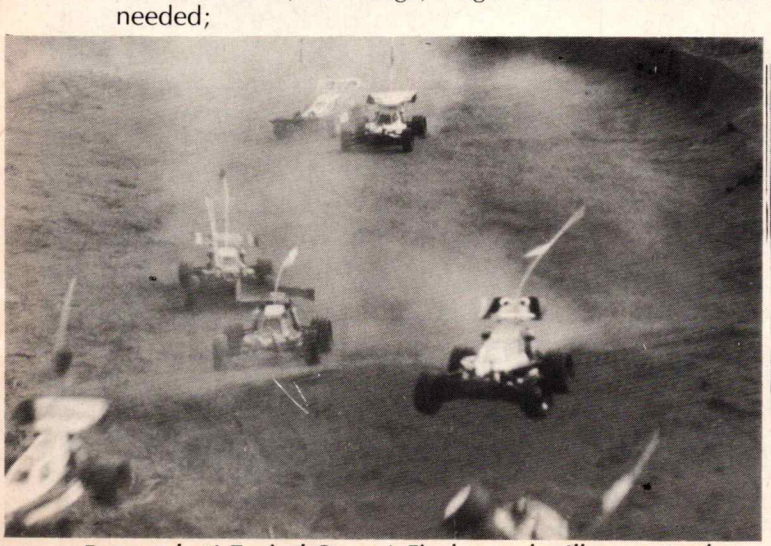
Two drivers, both from NSW, attended that year and, although behind in technology, Colin Grenenger and Paul Jones excelled in representing Australia, both with their driving and with their conduct.

In that year the first ORRCA OZ AGM was held in Queensland, in conjunction with the Nationals. Both Queensland and Victoria joined the body at that stage. At the meeting the fees were set at $1.00 per person per year, payable to ORRCA OZ (the state bodies usually charge an additional fee to cover state administration), and the then current ORRCA NSW committee of Tony Bovard, Jenni Thorn and Chris Heberd, accepted the positions of Treasurer, Secretary and President.

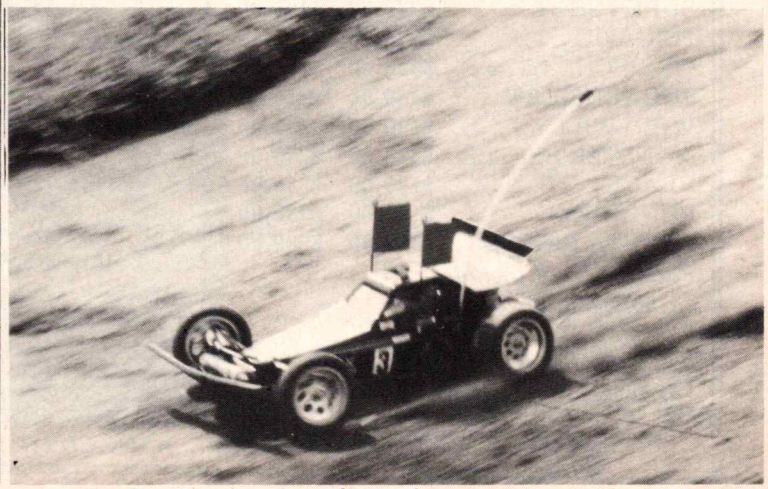
Also decided at that meeting were: voting would be done on the basis of one vote per affiliated state or territory; the Nationals should, if possible, be held on neutral territory (i.e. on a track purpose-built for the Nationals), and rotate from state to state each year.

The committee is made up of three people who must all be from the same state, to be nominated as a team by that state. (It was stated elsewhere that they must come from the state that holds the Nationals that year and that they may only stand for one year, both of which are incorrect.)

All ORRCA correspondence should be sent to:
O.R.R.C.A. OZ, P.O. BOX 222, BELMONT, VIC., 3216.



Eat my dust! Typical Open A Final on a dry Illawarra track. Spectacular, but not conducive to long motor and bearing life!



Tamiya Fox is a popular and competitive 2WD. Michael Brown's version has front stabiliser, larger wing and twin roll-over aerials.

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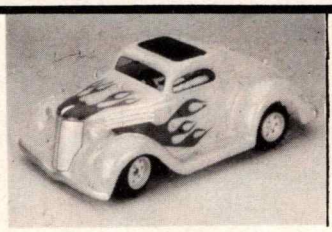
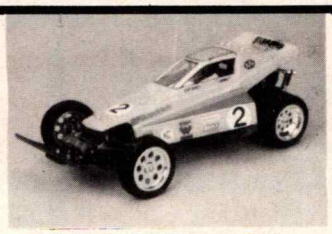

'36 FORD



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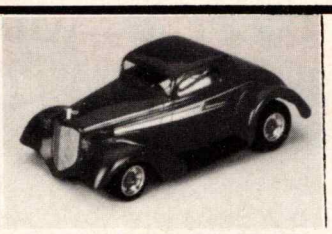
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*BOOMERANG	$225.00	$355.00
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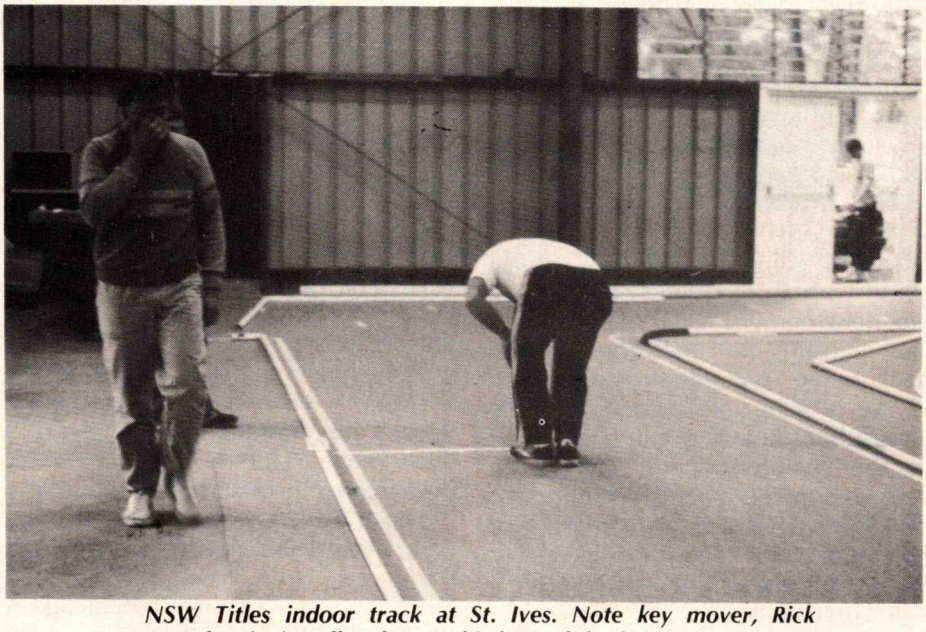
"TWEAKED & DUMPED"

1/12 SCALE ON-ROAD ELECTRIC RACING

by Jonathan Borthwick

No prizes for spotting the goof-up last issue. Due to lack of space, my article on tyre gluing had to be held over until this issue. Still, I am sure it will be worth the wait. Unfortunately, the gremlins got at the copy and didn't amend my opening paragraph to delete reference to said tyre matters.

This issue the main item is the NSW State Titles, held for the first time on carpet. We will also (hopefully!) look at 1/12 tyre gluing, and other matters. This issue is quite historical as, for the first time, it incorporates my long-running Pitstop column, which has transferred from our sister magazine, magazine. I have been writing Pitstop since 1981, so I feel that this is the breath of fresh air that it needs. I was going to continue with two columns, one aimed at the expert and the other at the newcomer, but feel that it is neater to amalgamate the two.



NSW Titles indoor track at St. Ives. Note key mover, Rick Bartolozzi, virtually asleep on his feet at left of pic.

INAUGURAL 1/12 SCALE N.S.W. INDOOR STATE CHAMPS

What a mouthful, and what an event! For organiser and accomplished 1/12 racer, Rick Bartolozzi, the weekend of September 26 & 27 was the culmination of a lot of work and enterprise.

Almost on his own, Rick, with partner Phil, has been trying to put 1/12 back onto the map. After talking to a number of racers who had raced on carpet overseas, Rick decided to take the initiative, raise the cash, and go carpet racing.

After purchasing the carpet (no small task in itself, given the considerable expense), Rick formed an indoor, carpet-racing club, and set up operations in a hall at the St. Ives Showgrounds, holding race meetings each Friday night for the past few months.

The response in Sydney has been tremendous, with a lot of racers from interstate itching to have a go. Most keen were Barry Corfe and myself, two of Australia's three representatives at the most recent World Titles in Las Vegas, which were held on carpet. We were just two of six drivers to come from interstate, in addition to some NSW country-based drivers who came from as far away as Lennox Head and Coffs Harbour for a go.

Another angle of the St. Ives track. PVC pipe linked by swimming pool vacuum pipe used with great success.

The result? A unanimous vote of support for what Rick and Phil are doing, even if the organisational side and a bout of 'flu did take the edge off Rick's competitiveness on the weekend! The whole experiment was fascinating, as it was the firs chance to see if the competitiveness of the overseas cars designed mainly for carpet would carry through to our little backyard of 1/12 scale.

It seemed that Associated RC12Ls, both graphite and fibreglass, were coming out of the woodwork, relatively fresh from last year's World Champs win on carpet. The Schumacher contingent was, as always, there in strength, along with the usual AYK and Associated RC12i chassis. One car of great interest was Kevin Chu's new Delta P12 chassis. After top qualifying in stock, and winning the modified titles at the recent US Nationals on carpet, this seemed to be the car of the moment. That Kevin was able to qualify for the A

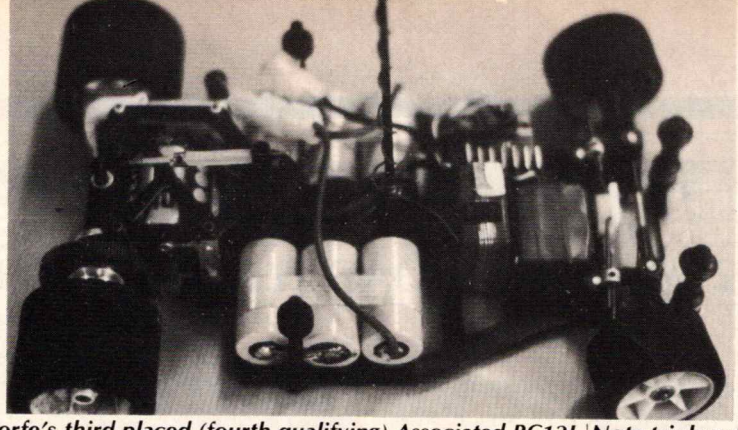
Main at St. Ives was evidence enough of its potential, particularly given that Kevin is a relative newcomer, and getting better all the time.

Rick had himself a virtual National Indoor Title field, with the exception of a couple of Victorian and South Australian drivers. Present were current National Champ, Rodney Denning, three-time National Champ, Jonathan Borthwick, Barry Corfe, Patrick Tougher, Colin Grenenger, Frank Phelan, Rob Lowe and, of course, Rick Bartolozzi.

The track was a very challenging one to drive around consistently. Rick had come up with a compact layout with a nice blend of fast bends and tight corners, which kept drivers and marshals on their toes. It was great to see how people have adapted to running on carpet, and the enthusiasm they had for it. Sales of Tractite (carpet traction compound) were enormous, as it is the best stuff to use. The advantage over outdoor compounds and racing is that finding traction for eight minutes just isn't a drama on carpet.

Qualifying

Seven heats of six cars each were run, with each driver getting four runs. Rodney Denning (RC12L) was in heat one, and straight away set a 49 lap pace. Jonathan Borthwick, having his first race since May, got straight into stride to be second qualifier with his RC12L after the first round, a scant two seconds behind Denning. There was a bit of a gap after that, with a couple of slow 48 lappers.



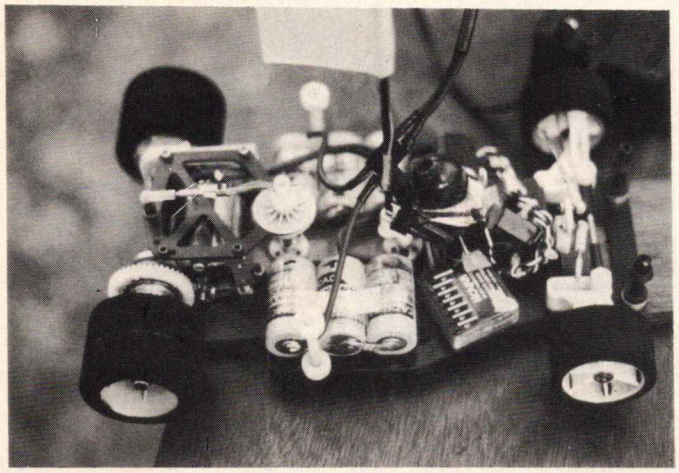
Barry Corfe's third placed (fourth qualifying) Associated RC12L. Note triple yellow dot Reedy motor! 64 Pitch gears used here also. Must be leftovers from last year's World Titles.

The Finals

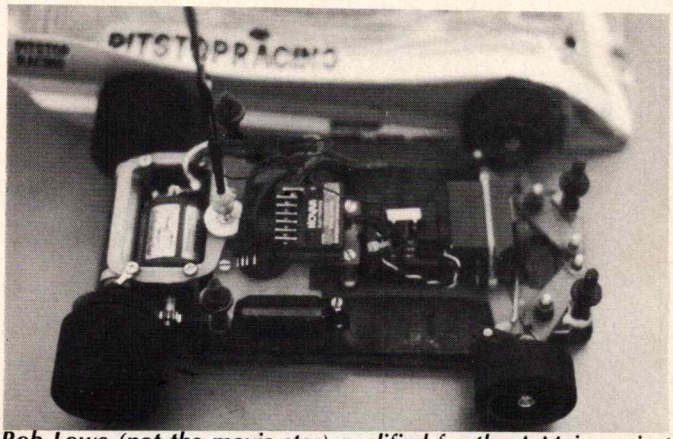
There were sufficient entries to run 5 Mains, each with eight racers. Results for all Mains are at the end of this article, but I have space to discuss only the A and B Mains.

The **B Main** was an all star line-up, with names like Phelan, Tougher and Bartolozzi, who have been around for a long time and are credentialed A finalists as a rule. The scene was set for a great B Main, and it didn't disappoint. For a while it looked as though three up-and-comers would star in this event: David Seidel (fibreglass RC12L), Craig Klingbiel (graphite RC12L) and Kyle Hazel really gave the Schumacher trio of Bartolozzi, Tougher and Phelan a fright. Frank Phelan finally won from David Seidel, with Patrick Tougher third.

David is a very competent driver who will do great things. His fibreglass Associated RC12L sported a very neat Bowring-inspired rear sway bar which, once untweaked, seemed to work well on the carpet. Maybe John Bowring will give us some information on it in a future issue. Rick Bartolozzi's less than brilliant weekend didn't get any better in the final. He finished seventh ahead of an equally luckless Scott Salter. So, with Schumacher taking the win in the B Main, it was on to the major race of the weekend.



Rodney Denning's top qualifying and winning Associated RC12L. No real tricks here.



Rob Lowe (not the movie star) qualified for the A Main against some stiff competition, but was devastated by radio interference in the finals and didn't run in the second and third legs. No frills, uncluttered Schumacher C Car.

With 4 graphite Associated RC12L cars (Denning, Borthwick, Corfe and Wood), 3 Schumacher C Cars (Grenenger, Bartolo and Lowe) and the lone Delta P12 Spyder (Chu), the **A Main** was to be an interesting race. As noted, Denning top qualified by a narrow margin from Grenenger, who had produced the amazing MIH 'pushed' cells to become second qualifier. Straight away' Rodney Denning showed why he was top qualifier and current Australian National Champion, by racing off in the distance to lead home Colin Grenenger by almost a full lap. Barry Corfe was third, with Kevin Chu fourth. Rob Lowe had distressing radio trouble and pulled out after only 2 laps. The problem was so bad that he declined to race in the other two finals. Jonathan Borthwick had similar problems, with a car that would turn hard left at the end of the straight, but they were nothing compared to Rob's. They would, however, plague him in the remaining two finals.

Grenenger won the second final after Denning had problems early on and missed a few laps. Corfe drove the race of his life to shadow Grenenger for almost the entire race but was unable to get past and clipped a barrier trying a little too hard. Borthwick managed to struggle into third, followed by Chu. So, with a win apiece to Denning and Grenenger, the NSW Title would go into the last leg.

Corfe got the holeshot in this one, while Denning got bumped around and Borthwick retired after only 32 laps with radio problems. Meanwhile out front, Grenenger started wearing Corfe down, but Denning was catching them both, took the lead and drove on to win a well-deserved fifth consecutive NSW Title. Corfe dumped for the first time all weekend, which allowed Grenenger into second, and second overall. Corfe finished a well-deserved third outright, ahead of Chu, Borthwick, Wood, Bartolo and the unfortunate Lowe. The Associated RC12Ls took the honours as far as placings go, with 1st, 3rd, 5th and 6th in the A Main.

The event concluded with the usual trophy presentation, which Barry Corfe and I had to miss as we had a plane to catch. Overall it was one of the most enjoyable meetings that I have been to. Rick was a most congenial host, and very attentive to some of the radio problems that affected a number of racers. As always, time was a problem due to the restrictive nature of hall hire and the setting up and pulling down time required. However, the meeting was successful because there were a large number of racers and organisers who made it that way.

I realise that I have given this event as much space as I would a Nationals, however, this can be justified, as the event was virtually a National event, as well as being of great historical significance as the first major race meeting on carpet in this country. The verdict? Brilliant! Thanks Rick and Phil and everyone that helped with lap counting.

FINAL PLACINGS: A MAIN
(best 2 heats of 3)

1. Rodney Denning	**Associated RC12L**
2. Colin Grenenger	**Schumacher C Car**
3. Barry Corfe	**Associated RC12L**
4. Kevin Chu	**Delta P12 Spyder**
5. Jonathan Borthwick	**Associated RC12L**
6. Ray Wood	**Associated RC12L**
7. Winston Bartolo	**Schumacher C Car**
8. Rob Lowe	**Schumacher C Car**

STATESIDE NEWS

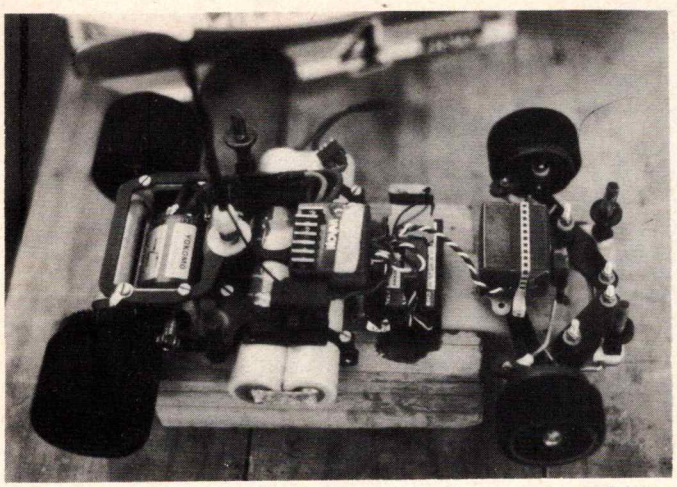
I received a phone call the other day from Craig Bowring's father, John, keeping me up to date with Craig's progress in the US. John was bursting with pride when he advised me that Craig is the new Region Six (incorporating California and Arizona) Southern Regional Champion in Modified Class, after cleaning up a top class field, including current World Champion, Tony Neissenger, in Arizona.

The shock was that, for the first time ever, Craig wasn't using an Associated car, but an oddly named 'Lucas-Kelly-Delta' car, with Peak Performance motors. The chassis appears to be something of a bitser, based on the TRC chassis, with a Schumacher rear pod and lots of trick bits.

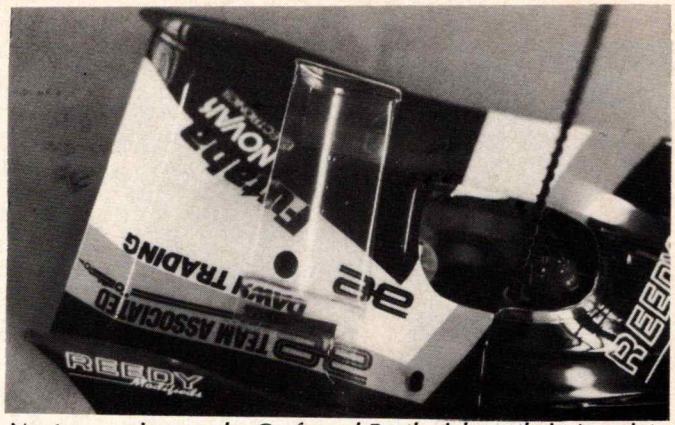
Craig qualified fifth in his first run with the car, and kept gearing up, so that by the time of the final he just walked away from the field.

I haven't much information on the car, except that it is sold only in a built-up state (no kit is available), and it is really making its presence felt. I will try to find out more, however, the word is that the car is not cheap, as one would expect, given the use of expensive materials in its construction. Hopefully I will be able to persuade Craig to send me details of what he is up to.

We are off to the Gold Coast in Queensland for the State Titles on 22nd November. Full report and photos next issue.



Col Grenenger's second placed (and second qualifying) Schumacher C Car. Are they the amazing 'pushed' cells it situ? Note small earth strap of the rear blocks to reduce carpet fuzz sticking to the axle.



Neat rear wing run by Corfe and Borthwick on their Associated RC12L cars. Wing is Associated part #3184, folded and attached to the body with double-sided tape. Similar idea to the muletta wing that Ferrari used to run on their Formula One cars on tight circuits like Monaco. Wing affords good downforce and stability on the straights without greatly affecting top line speed or turn in to corners.

1/12 SCALE TYRES

One of the biggest stumbling blocks to aspiring 1/12 racers is that of gluing and truing tyres. In actual fact, this is not the big drama that it is made out to be, but rather, something that is time consuming and potentially messy. The key to tyre truing is that the means will determine how satisfactory the end is. What we are aiming for is a tyre that looks good and works well. Hopefully, if you take note of what follows, that will be the end result.

Tools

To get started you need a pair of rubber gloves and a large table or work-bench. Cover it with either newspaper or plastic sheet. (Plastic is better, as the glue won't stick to it.) A range of sandpapers is required, varying from about 200 grade through to the stuff that they dragged through the local quarry.

Some of these should be glued onto a plywood paddle which offers a handle. A good contact type glue is also needed. Baer and 3M stuff work quite well, although lately I have found the new Twinn K Black Magic tyre Glue to be excellent. While on adhesives, a super glue will also be needed later.

If you have a decent sized lathe then you are laughing, although I have seen many good jobs obtained using a vertical or horizontal drill press. Whatever, as long as it provides a stable platform and is safe.

Other tools are a flat-bladed screwdriver about 10 inches long, and a sharp Exacto or PO type knife with the blade securely locked in the handle.

Method

First job is to soak off the old rubber. I fill a tin can or glass jar with petrol and leave the tyres in it overnight. Thinners work very well also. Whatever the choice, be very careful and keep it away from flames, little hands, mouths, noses and so on.

The next morning the rims should just pop out cleanly. (Some racers salvage the rear rubber for use on front rims once all the petrol has dried out.) Now take a very rough grade of sandpaper and roughen up the bare rims, checking for any splits or chips which will make the exercise worthless.

Before we go too far, it should be pointed out that it is a lot easier to do multipe rim-tyre sets at a time, rather than just one pair. The mess is the same!

Set the rims aside, take the tyres to be fitted, and lightly roughen them up inside. This is to help the bonding process. Take one tyre and stretch it so that the inside hole is as large as possible. You can use the handles of a pair of multigrips to get extra leverage. Put on the rubber gloves and coat both tyre and rim quite liberally with glue.

At this point there are two different schools of thought on the way to do the next bit. One school prefers to do it tough by jamming the rim with a second coat of glue onto the tyre and hoping that it all lines up before it sets (about 3 seconds!), and then wiping off the mess with thinners. The second (and more scientific) way is to coat both tyre and rim with glue, leave it to get tacky (about 10 minutes), then coat the rim with some thinners to soften the glue and carefully slide it into the tyre. Again, any excess glue should be wiped off while still damp with some thinners on a rag. The thinners evaporates very quickly and leaves the glue to stick.

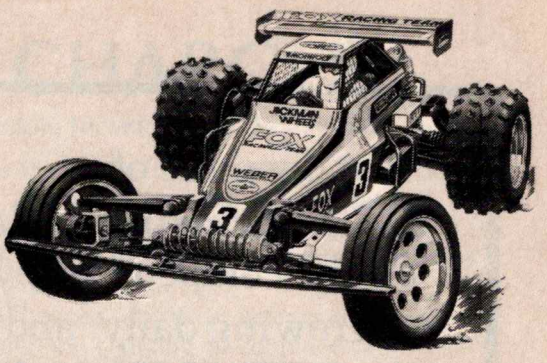
Whichever way you choose, always check that, in the case of a split compound, the correct compound is in the correct position and not reversed. Take a glued tyre and straight away roll it on your hand or across a flat surface to fully seat it in place. There is nothing worse that a tyre which starts to work loose.

Now set all the tyres away until the next day. Come back and carefully check the edge of the tyre on the rim. It should be firmly glued down. If not, take some super glue and run a bead along the rim and tyre to make sure.

Now we are set to true, but out of space, so see you next issue.

AJ's 'Black Magic Tire (sic) Glue'.

TAMIYA FOX COMPETITION WINNER



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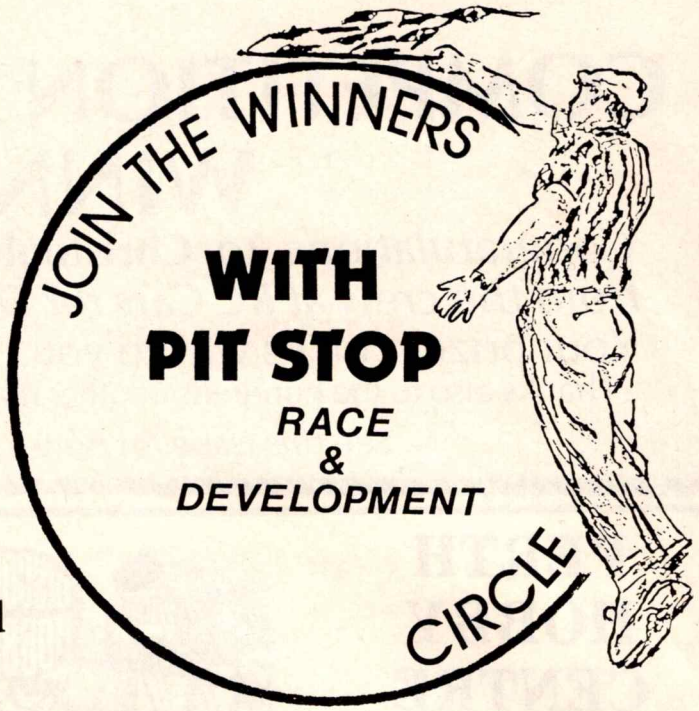

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CAD CHARGE FAST CHARGER

Review by Luke McDonald, Testing Technician, R&D Laboratory.

On being asked to review the Cad Charge Fast Charger, one thinks in terms of, well, just another charger, but with battery packs costing nearly $90, one cannot take charging lightly. Charging and discharging at high rates, as is done by radio controlled cars, is a nicad battery nightmare, and considerably reduces the number of recharges obtainable from your battery pack.

The competitive nature of the sport and the necessity of getting a full charge to give a longer duration run time, over-ride the quest for obtaining hundreds and hundreds of recharges. But it should be noted that there are different ways of detecting when to stop charging. The method incorporated in the Cad Charge fast charger is called Peak Detection. This method electronically detects when the battery pack has obtained a full charge, to ensure maximum capacity without over-charging and thus avoids destruction of the cell.

this charger does it all. Cad Charge had obviously done their homework and come up with a unit that can be used by the serious competitor to gain that vital edge, or by the weekend novice to maximise running time and save on expensive battery packs.

Before getting bogged down in technical hoo-ha, I thought I'd simply try charging a couple of my well-flattened (in anticipation of this review) batteries. First thing to note was a lack of connecting plugs on the end of the charge leads. It doesn't take much to work out that, with so many different plug-socket configurations on the market, it seems pointless to be paying for connectors that you'll probably end up throwing out. Having connected crocodile clips to one end and the appropriate socket on the other, I connected the battery pack to the charger and the clips to the car battery.

Briefly what happens is that nickle cadmium batteries exhibit a characteristic of a small voltage drop after full charge capacity has been reached. The electronics detect this and then either switch off, or drop to a trickle charge rate.

On first receiving the unit I was a little surprised by its appearance. The unit looks more like a space shuttle cockpit that a battery charger for RC cars! With a burst of inquisitiveness I set about reading the operating instructions. First impressions soon melted away as I read the brief, but concise leaflet. It was soon apparent that

Playing the part of the village idiot I deliberately clipped the wires to the car battery the wrong way round. This could happen if one is not familiar with the polarity of the vehicle or if the battery terminals are not clearly marked. The charger has polarity protection, so instead of going into a cell-detroying haemorrhage, a red LED (Light Emitting Diode) lit up to indicate wrong polarity. On reversing the leads the green (low charge rate) LED came on. A press of the red re-set button brought on a red LED, and charging had commenced. Twelve minutes later the red LED went out, the green

LED came on, my batteries were fully charged, and I then proceeded to charge two other packs in the same manner with no problems.

At this point I should mention some of the niceties of the charger. One in particular is the ability to watch the batteries charge via the on-board meter. The unit has a switch which enables you to see both input voltage (the condition of your car battery) or output voltage (battery pack). This feature enables you to decide whether a quick fast charge, or a moderately long low charge will be what is required. It also lets you know how your car battery is holding up and whether you would be better off running the car for a while to top up the battery instead of catching the bus home.

Other features of the charger include an output to top up both the receiver (Rx) and the transmitter (Tx) batteries. The wires for connecting to both Tx and Rx were not connected to the charger, but were supplied in the packaging. As per instructions supplied, no soldering was necessary. Low current rate charging is used to top-up Tx and Rx batteries, a good idea when contemplating all-day events. When using the Tx-Rx top-up facility I found that it worked well, but because of the low charge rate, it takes longer to obtain a full charge than it does for the battery pack.

The unit also has connection facility to an external mechanical timer. This is used as a full cut-off to prevent over-charging while the charger is unattended.

Conclusion

The Cad Charge Fast Charger charges at a high current rate of four amps, and, on electronic detection of full charge of the battery pack, the charger automatically changes over to the low charge rate of 115 mAmps, and continues to trickle charge. This was found to work well on all the batteries tested in the lab.

Although the peak detection works only on the main battery pack, I liked the ability to top up both the transmitter and receiver battery packs while not in use. The reverse polarity protection is also a worthwhile addition, and can save both equipment and time if incorrect connection to the car battery is made. The external timer connection is also a useful addition to an already complete charger. I used this facility before going home one evening, connected to an ordinary relay type timer. The next day all was off, as expected.

I attempted to use the charger through the cigarette lighter, but had poor results. The built-in meter soon made it apparent that the ignition was draining all my voltage. A quick rewire soon had my lighter outlet charging battery packs. After using a fast charger with built-in input and output meter, I would hesitate to charge batteries without it again.

I found the charger to be simple to use, and effective in its performance. I must note that the peak detection worked well, and the additional features were nice to have. For those who are proficient in the use of a soldering iron, I understand that the unit is also available in kit form.

The charger is available from Cad Charge Industries, 7 Larnook Close, Greensborough, Vic., 3088. (See advertisement this issue.)

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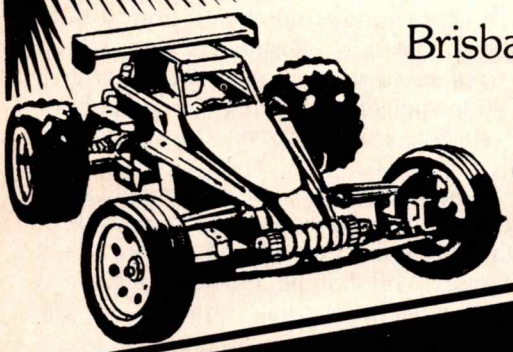

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MERCURY

Messenger of the Gods

by Paul Bird

On the off-road scene, Mugen has been well-known for the four-wheel drive BULLDOG which, in the right hands, has been known to cost some CATS several of their nine lives. However, the Bulldog has been getting rather long in the tooth of late, so the back-room boys at Mugen have put the Mercury together.

FEATURES

* four fully adjustable shocks which are vertically mounted;
* adjustable toe-in and camber settings;
* new design drive shafts;
* three differentials which allow variable drive rates to the front and rear wheels;
* double bell-crank steering;
* belt drive
* monocoque frame;
* anti-dust and waterproof side pontoons (Formula One style);
* a nice new body shell, replacing the frame type of design.

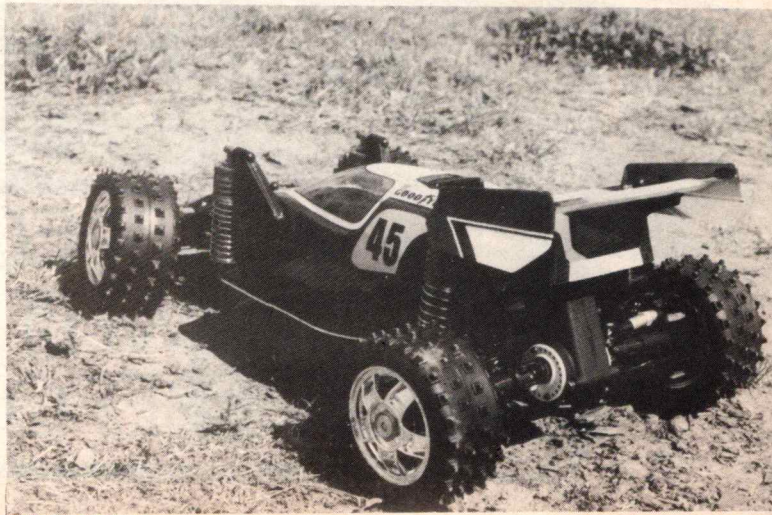
From an initial close-up look at the Mercury I came away feeling that the Mugen boffins had taken the best features from other race-winning buggies and combined them, but, like foreign language jokes told in English, something seems to have been lost in the translation. That aside, let's hop into the Mercury and take a test drive.

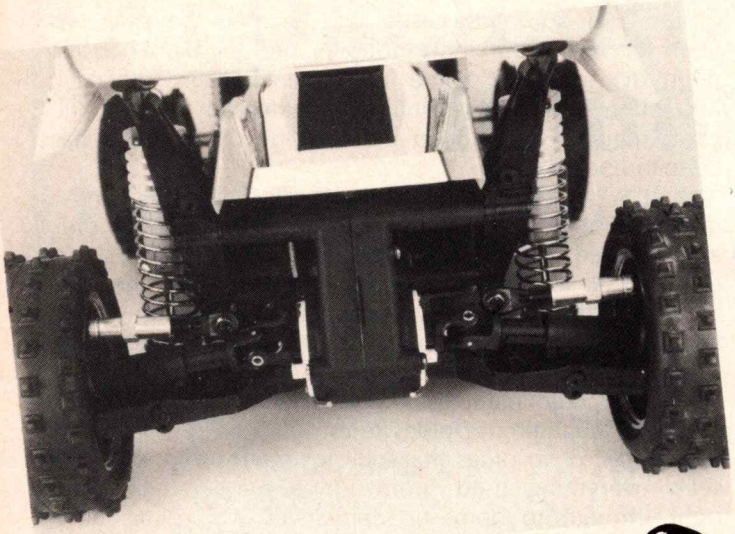
SUSPENSION

Apart from the body shell, the first thing that catches the eye is the suspension. It's a bottom wishbone arrangement with an adjustable rod holding the top section of the knuckle joint, allowing infinite changes to camber.

The oil-filled shocks are vertically mounted, and feature an extremely useful adjuster arrangement which makes it possible to change damping without changing the oil or pistons. The adjuster ring is easily accessible on the top of each shock, and is numbered from 0 (soft) to 9 (hard). The way that this adjuster has been set up makes it a vast improvement over other shocks with a similar feature. Ride height is altered by adding or removing plastic spacers from between the spring and the shocker top.

The wishbones, and the suspension in general, seem to be well designed, and solid enough to take a lot of punishment. With the camber, toe-in and shocks all set correctly, the Mercury will handle most surfaces in a way that keeps the tyres where they belong - on the ground.





DRIVE SHAFTS

Moving right along, from the wheels inwards, Mugen have replaced the traditional dog-bone style drive shafts with proper sliding shafts coupled up with universal joints at each end. The shafts are in two sections. One section slides into the other with a matching tongue and groove set-up for minimum wear, and good power transfer. The kind of universal joint that we've seen in the past has been very fiddly to fit, as it is a single piece, but Mugen have improved on this with the Mercury U-Js. The joint comprises a shaft with a hole to take a pin inserted at right angles, and secured with a grub-screw. Providing that a thread-lock is used on the grub screw, this system works well, and allows very quick and easy removal of the drive shafts. There is no messing around with special tools.

Of course, the advantage of this shaft and universal joint arrangement is that the chance of throwing a shaft in a shunt is virtually non-existent. Also, the turning circle can be increased because the shaft joints are more flexible.

BELT DRIVE

As mentioned before, the Mercury is belt-driven via a centre differential to the front and rear axle diffs. Belt drives tend to be more efficient than chains, because of a lower friction co-efficient, however, belts seem to be more prone to stretching.

Belt tension adjustment on the Mercury is quite simple, and a vast improvement of the Bulldog where the belt couldn't be adjusted at all! On each side of the front and rear diffs are eccentric rings, which are rotated to tighten or loosen the belt, as required. They won't slip because they are secured with screws. There's even a special belt hatch which can be removed to make it easier to measure the tension.

The belt hatch is necessary because the differentials and belts are fully enclosed in the monocoque chassis, which forms the backbone of the Mercury. It's made up of two plastic sections, and everything else bolts onto these sections.

The centre differential takes the drive from the motor to the front and rear diffs via two separate belts. This diff can be adjusted to alter the torque split between the front and rear wheels.

IMPRESSIVE

I am impressed with the way that the Mercury has been designed to incorporate the radio control gear. Servos for steering, and the supplied mechanical speed control, fit neatly onto the backbone, with the receiver sandwiched under one of the servos. One criticism, though; it might be hard to change crystals quickly.

The Mugen Mercury is one of the few buggies on the market which provides proper mounts for the servos, and doesn't rely on double-sided tape. If you've ever had a servo come loose during a race, you'll appreciate what I mean.

Steering response should be very positive, thanks to the double bell-crank steering linkages. The linkage is designed in such a way that bumps or cornering pressure won't push the car off line, so it will go where you point it.

Servo savers are supplied for both the steering and speed control servos, and they appear to be quite adequate.

One of the unusual features about the Mercury is the Formula One type side pods, which serve to protect the radio gear, and keep dust and water out of the works. I think that they add to the buggy's visual appeal as well.

These pods also house the 7.2 volt nicad pack. One of the pods has a hatch which opens to allow battery changes. The nicads are kept nice and clean, and it's possible to take the battery out without having to remove the Lexan shell.

One of the reasons that the Mercury handles well is its low centre of gravity. This is achieved by mounting as much as possible as low as possible on the chassis.

CRITICISMS

I was disappointed that the Mercury does not come completely ball-raced. Six bearings are supplied, but none of them are for the wheels. The axles are fitted with metal bushes, and I think that this buggy deserves better.

CONCLUSIONS

The Mugen Mercury is a high performance buggy which will suit both the beginner and the experienced racer. It has some innovative design features which work well to ensure that it handles well and drives predictably.

FOOTNOTE

The Mugen Mercury has scored its first major win in Australia by taking out the 4WD Modified Class of the Victorian O.R.R.C.A. Shield round held recently at Warrnambool.

REVIEW AT A GLANCE

Quality of Instructions:	★★★★★
Ease of Construction:	★★★★★
Quality of Materials:	★★★★★
Motor Supplied?:	*Yes; Mabuchi RS540*
Chassis Type:	*Backbone*
Suspension Type:	*Independent arm*
Shocks Type:	*Coil over, oil-filled*
Sway Bars?:	*No*
Ball Races Supplied?:	*Six; plus bushes*
Motor Accessibility:	★★★★
Battery Accessibility:	★★★★★
Speed Controller Supplied?:	*Yes; mechanical*
Steering Servo Saver:	★★★★
Body Shell:	*Lexan; you cut and paint*
Balance of Car:	★★★★
Handling on Track (as tested):	★★★★
Ease of Setting Up:	★★★★★

THE CASE FOR THE HUMBLE CHARGE CORD

I am employed by a major hobby retailer, and sponsored by the importer of a very popular brand of car. Like many, I was horrified to read in D&T No. 2 of Les Bone's terrible misfortune with his charge cord. I suppose that what befell Les is a dramatic example of why we must pay attention, and beware of casual bad habits. We have sold thousands of charge cords, and have had very few problems. Initially we sold them in unassembled form, however, we had to start supplying them ready-to-use, as there were many mistakes made in assembly by the purchasers.

Why even bother with charge cords?

Firstly, they are one of the best ways of quickly and effectively charging a 7.2 volt battery. Secondly, they are quite cheap and, as such, are great for the entry level racers buying their first ever race cars. I believe that as retailers we should get people started as cheaply as possible, but not sell them rubbish. If they enjoy the sport (which they usually do) they will come back and purchase the high zoot stuff.

One point that should be made from the outset is that Les Bone's accident would not necessarily have been avoided if he had used a timer charger, or even a top dollar peak charger. There are some cheap chargers on the market with timers which are somewhat unreliable. It may only be a small percentage, but timer failures can occur. It is a misconception that, because your new charger has a timer, you can therefore walk away and leave it go. This is a sure recipe for disaster, and most instructions tell you to check the pack for excessive heat every three to four minutes. I have even seen some of the most expensive chargers mysteriously cook a battery when the timer became jammed on. Mind you, I have also seen the owners of these same chargers throw them around the pits and drag them by their leads, so what do you expect? It hardly qualifies as machine failure.

So, how do you avoid causing a major catastrophe such as that in the accompanying cartoon?

Firstly, use common sense!

Don't walk away from your pack and expect that everything will be okay. Assume the worst and monitor it all the time. The only exception might be when you are trickle charging.

Read the instructions very carefully as they relate to your charger and batteries. Some cells just aren't designed to be fast charged, so check with your local hobby store.

Always charge outside your car, both real and model, and start with a fully discharged racing pack. The number of times that I have seen a battery destroy itself inside a model car is pathetic. Don't do it! I have also seen cases where a pack has been over-charged inside a full size vehicle, with disastrous results to the seats. Again, don't do it!

If your charger has a cigarette lighter attachment, get rid of it. Apart from giving a less than brilliant charge, they also confine you to charging inside the vehicle, with the ignition key on in many cases. In older cars this can burn out the solenoid. Alligator clips are a far better idea, although you must always check polarity (i.e. red to positive, black to negative and so on). It is best to get someone qualified to check this for you.

Most problems start when the pack is so over-charged that it starts exploding and throwing its contents around. I am not sure exactly what happens, as I have never cooked a pack in 10 years of charging (two and a half of those with exactly the same sort of charge cords that we sell today!), but I have seen more than my share in retailing. In many cases it is because the cord has been left on for a number of hours, and the pack has just plain over-charged. Some have been because the pack has either shorted internally or externally, while the great majority have been because the charge cord has been tampered with.

That is right. There is a small but nonetheless annoying element who just cannot leave well alone. The cords are supplied ready to run; yet we get people who shorten them (to as little as 3 inches in one case) in the false belief that they will safely charge faster. They will charge fast all right, but won't be much use when the cells are making like a string of sausages!

Another cute habit that the Eddies (the experts) pick up is the changing of plugs from polarised to non polarised plugs, or to plugs that will not stand up to it. I have seen everything used, from Volvo mate-m-lock plugs right through to domestic appliances wall plugs (they didn't use the earth pin!).

If you are using a charge cord (and there is no reason why you shouldn't), pay particular attention to the polarity of your clips on the battery terminal (see above). Stretch out the charge cord so that there are no kinks or knots in it, check polarity again, then plug in your 7.2 volt pack. Leave to charge for fifteen minutes only, unless you have a digital multimeter and can closely monitor the peak of the pack. Check the pack every four minutes to see that it isn't getting too hot. It should be warm to the touch, as should the clear lead on the charge cord in the case of the Associated type cord with which I am most familiar. By the way, this lead is generally a clear coated resistance lead which is tuned to the length supplied. Never shorten it, as you will certainly trash a battery pack. If you are not certain about the lead, get it checked out by the store that you bought it from. If you follow these instructions you will not have any problems. If you don't, then you almost certainly will cause yourself, and maybe someone else, a lot of distress.

Finally, I am always amazed at the number of people who light and smoke cigarettes close to the lead acid batteries from which we charge. 12 volt lead acid batteries, particularly the older type with individual caps, have an acid as a major ingredient which, by way of chemical reaction with the lead plates produces hydrogen gas. This gas is highly flammable if exposed to an open flame, and could cause a disastrous explosion if not respected.

I know that this all sounds very dramatic and dangerous, however, a little responsibility and care are all that are needed.

"The cartoon is amusing, however, the message is very serious. Battery charging, whether with charge leads or a high tech charger, MUST be monitored all the time!
Cartoon courtesy of Associated Electrics Inc., California."

1/10 Scale TRACK DESIGN

by Les Bone

Right from the start, I would like it to be known that on the subject of track construction I am bound to cause arguments. To all drivers their home track is the best in the world. Biased, of course, but then I am a driver too, and so for the purpose of this article I aim to give you my ideas on the design and construction of a good track.

HISTORY

In the good old days when the sport was in its infancy, when Frogs and Wild Willies were the norm, any bit of paddock was used. Short cut grass, gravel car parks and unused BMX tracks were all found to be satisfactory. All that was required were a few witches hats marking out a track width of about 2 metres.

However, as the sport developed cars became faster, driving skill increased, people became more fussy, and track construction became an art in itself. Experiments on track materials were carried out with the aim of trying to find the balance between off-road loose surface, good adhesion and hard wearing properties. Track lay-out, with all of its possible combinations, has, by trial and error, been refined, so that now a broad set of guidelines can be drawn up.

LAYOUT

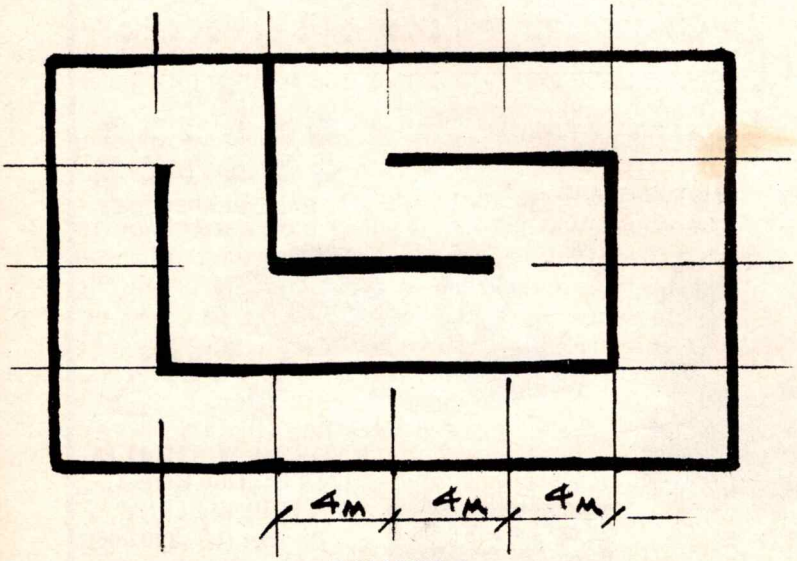
I suppose that the first person to draw any attention to the number one rule of what **not** to do was Jack Grenenger. Quite rightly, he pointed out that the worst place for a 180° turn is at the end of the first straight. Eight cars in a group will never take the first corner cleanly at racing speed. The Warrnambool Club has produced a very good answer to this problem. Their straight is normal: 20 to 25 metres long and 3 metres wide; but the first corner is a 90° right hander, banked 1 metre high on an even grading, with the track widened to 4 metres on the curve. This gives the driver a choice, governed by his driving skill. He can either go flat out with his fast motor round the outside of the curve, or he can slow down and take the shorter driving line. After watching many heats I rarely saw a bingle on the first corner.

Track layout is obviously influenced by the natural surroundings, such as fall of the land and the area available. Of course, finance is also a critical factor. So, given that a good track length has been established at about 150 metres, I believe that the unused areas between the track should be kept to a minimum.

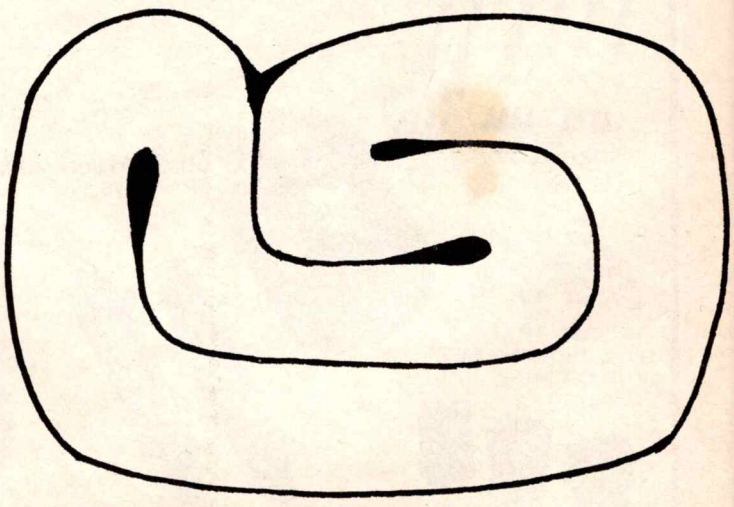
Try drawing out a proposed layout on graph paper using a 4 or 5 metre grid system (see example 1). This enables an economical use of land (maximum track length on minimum area) and eases the setting out. NOTE: 150 metres x 4 metres wide = 600 square metres; say a 20 x 30 metre block. Remember also, that the 600 square metres is the track only. Marshalling, spectator and driving stand areas take up almost as much space. Although on the drawing it looks as though the track would be too geometrical, try then to draw the best driving line around the track, and you will see that most of the straights turn into curves through use anyway (see example 2). Of course, this example is a very basic design and would vary to suit the area available. See the layout of the new Melton track for a development of the idea.

Another reason for keeping the area between the tracks down to about 1 metre is the ease with which the layout can be changed. Simply by removing the mound at a strategic position, two or three different layouts are available. This system was used very successfully at Ryde, NSW, where a different layout was used for each class, reducing wear on the tight corners, and therefore keeping track maintenance down. I am well aware of the danger of rogue cars crossing the mounds into the on-coming traffic, but by keeping the mounds high in the danger spots this can be avoided.

In total contrast to all that I have said about maximum length for minimum area, take a look at the track at Bright in north eastern Victoria. With no shortage of

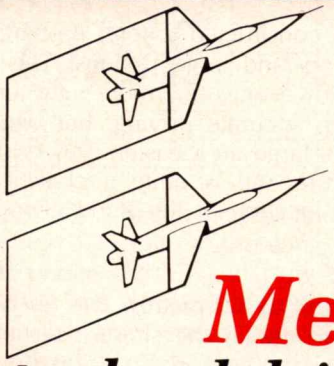


EXAMPLE 1



EXAMPLE 2

WINGS 'N' THINGS HOBBIES



Mercury

4 wheel drive, high performance racing buggy by — MUGEN

The Mercury is designed and produced by Mugen, who introduced the 'Bulldog', which won more major races in Australia in 1986 than any other brand.

SPECIAL FEATURES

- 4 new type fully adjustable shocks .. with simple 'dial-in' damping adjustments.
- Efficient and durable ball bearing mounted type differentials.
- Adjustable centre differential for front to rear drive proportioning.
- Lightweight, efficient drive belt with independent tension adjustments.
- Rigid monocoque frame with lightweight streamlined body shell.
- Aerodynamic wing with end plates and moulded mounting brackets.
- Exclusive Formula One type aerodynamic side pods for equipment protection, with cooling ducts.
- New design linear action forward-reverse speed controller with heat sink and B.E.C. system.

The MERCURY is suitable for beginners and club enthusiasts ... easy to assembly and maintain, and backed up by a full range of spares.

Come and **See** the MERCURY at Wings 'N' Things:
We drive it, and our price will delight you.

WINGS 'N' THINGS 236 VICTORIA ROAD, GLADESVILLE, N.S.W., 2111

Telephone: (02) 816 2699

available land, they have constructed a long, fast track ideally suited to hot motors and large pinions. This in itself is not a bad thing. However, a few more tight turns would not only encourage accurate driving, but would also make marshalling this large area easier. The bridge makes an interesting feature and is quite a challenge, even with the height and location of the stand giving a perfect view.

GENERAL RULES

— Track width should be 2.4 to 3.0 metres. This encourages correct driving line to obtain the shortest distance travelled, and also allows enough room to overtake slower cars.

— Track length should be between 120 and 170 metres. Any shorter and the lap counters go frantic counting 8 cars; any longer and problems arise when using the 6 minute and last lap system. On a 200 metre track the last lap could take 1 minute! (Mmmm interesting challenge eh!)

— Give some thought to future events on the track when deciding:

(a) location of lap counters;

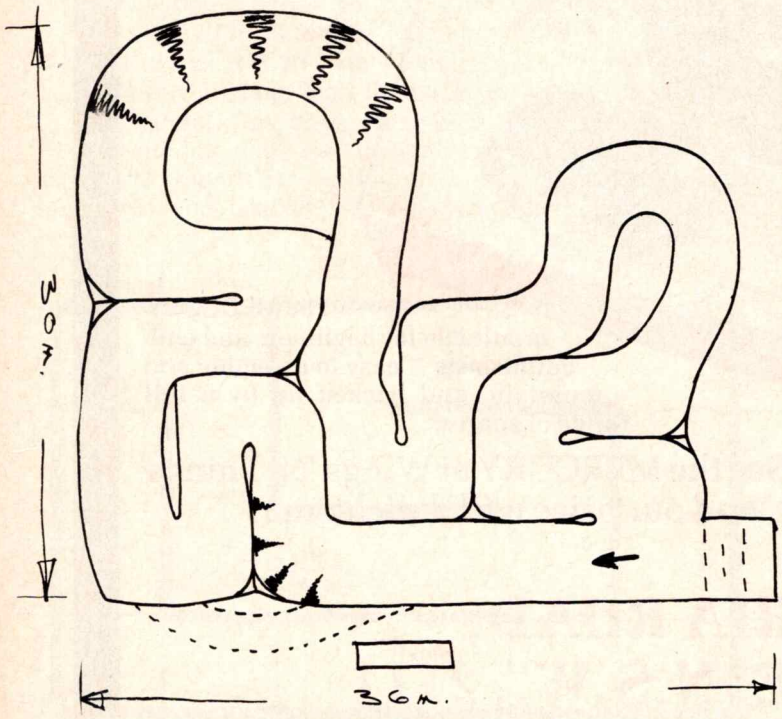
(b) location of scrutineers;

(c) location of spectators;

(d) location of pits (especially for endurance events);

(e) location of refreshments.

Imagine that you have to stage a State Title, and allocate areas for the above so that a smooth flow through of competitors is achieved. Even if you don't get to stage the event, you will be able to have professionally run club events.



Melton T.O.R.R.C.C. Track
Located at McPherson's Park,
Coburns Rd., Melton.
Track length 160 metres.

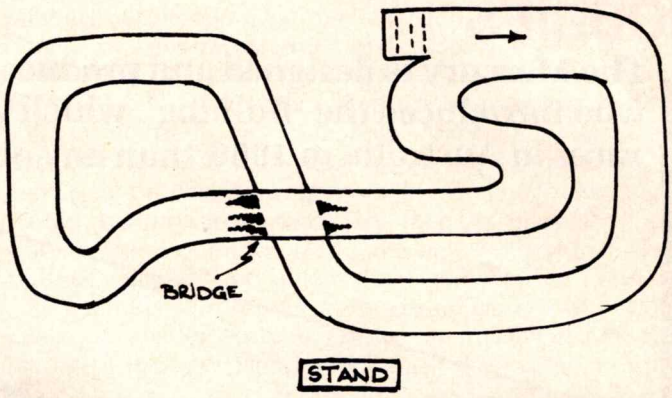
— Keep jumps to within a reasonable height for the speed of each part of the track. If you don't believe that a lot of damage can be caused, try driving flat out around a BMX track!

— Variation is the key word. By using the alternative track method like Ryde, drivers can experience a tight, twisting track or a long, fast track without going far from home.

In the next issue I will discuss track materials, drainage and drivers' stand construction. Meanwhile, I would ask any club members to send in a diagram of the layout of their home track, giving its dimensions and address. I know of a lot of drivers who will travel for hours to race on a **good** track.

BRIGHT R.C.C.C.

Contact Leigh Kennedy on (057) 55 1607 for more information



RACE TUNE

by John Bowring

Race preparation does not start the night before a major event. Your sights should be set on a goal, say State Titles, and, at least 2 months in advance, the Class (i.e. Junior or Senior, 2WD or 4WD, Unlimited or International) should be selected, and the brand of car to be used chosen. Having made these decisions, it's time to start preparing the car.

On-road cars need very fine tuning, both of chassis and body, so your outings at club meetings should now be used to fine tune your car. The chassis must be new, and free of twist or warp. Place the new chassis on a flat surface and check to see if any warp (or twist) exists. In fact, this can be done on the glass topped counter at the shop. Should the chassis be faulty, hand it back and ask for another.

Having established that the chassis is OK, fit all the ancillary parts, discarding any that are worn or doubtful. If weight is a consideration, the parts to be lightened should be attended to before fitting. As assembly progresses, each unit should be checked for freedom of movement.

Once the rolling chassis stage is reached, and before the installation of radio gear, speed controller and motor, the car is checked for tweak (twist or warp). This can be done with the help of a Tweak Board, or wedge. It is of vital importance that both front tyres are the same size, exactly, as must be the rear tyres. If the car shows a slight tweak it will tend to turn OK in one direction but be sluggish in the opposite direction.

It is necessary to find the cause of any tweak that has been detected. First undo the radio tray screws and chock the car on the Tweak Board again. If this has corrected the problem, it would appear that perhaps one of the radio tray posts may be longer or shorter than the others. Determine which it is and correct the error. Should the problem not be solved in this area, the radio tray screws should be re-tightened and the problem looked for elsewhere. If required, aluminium foil can be used as packing shim. Make sure that it cannot be dislodged during racing.

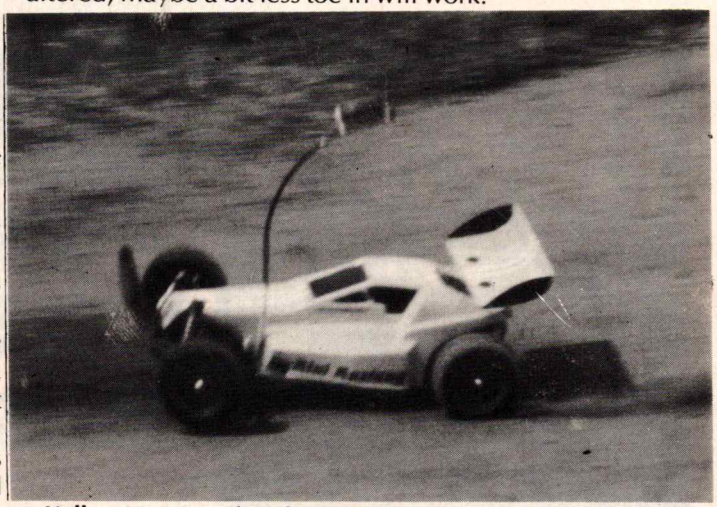
Having solved any tweak problems, install the radio gear, speed controller and motor. When wiring, use silicone covered, multi-strand wire and keep all wires as short as possible, because the further the current has to travel the less current is available at the other end. When positioning radio gear, keep in mind to have it mounted as low as practical. If using a speed controller with Mosfets, it should be placed where some cooling air can reach it, otherwise it may be necessary to run with a heat sink, which means more weight.

The car should be checked again for tweak. It is unusual for the installation of the radio gear to cause any problem, but it must be checked, all the same.

Gear mesh is another tricky area. Too tight and the power losses can be high; too loose and the efficiency drops off, again causing power loss. With a correctly meshed gear set the car should be silent as it goes down the straight, with just a light whistle as the power is applied coming out of a tight corner.

Now, with the car set up, the body is the next part to come under scrutiny. Just enough ground clearance so that the body does not scrape the ground at the 7.50 sec mark, wing height and position varied to find the ideal position. Do not get the wing too close to the body as it will choke the air and slow the car down the straight. Whilst the wing will produce downforce to increase road adhesion, speed down the straight should not be sacrificed, as it is easier to overtake down the straight than in the middle of a corner.

Note how the car is handling, first on the long, fast, sweeping turns. Does the car wash out on the exit. Then note the handling on the slow, tight turns. Is the car slow to turn? It could be that a change of front tyre compound or a slight adjustment to the camber of the front wheels is required. If the front camber cannot be altered, maybe a bit less toe in will work.



Yellow Mustang of Michael Santalab doing its thing at Illawarra Club's track. PB car is highly competitive, though photo shows that this one needs rear end stiffening after this first run.

Now, having got the car handling smoothly, your lap times should be improving; i.e. the number of laps in 8 minutes going up. If you were leading the race before, you should be looking at increasing the amount by which you win.

The next step is to gear the car up. If you are running 13/48, gear up to 13/44. But I won't make the time, you say! Exactly! The point of this exercise is to run the car faster than race speed to bring to light any handling faults lurking just beneath race speed. Now, knowing that the car is over-geared, you drive conservatively and smoothly. The car is fast down the straight and quick through the sweepers. Knowing that the car is over-geared, you lift off early for slow corners instead of using the brakes. Surprise, surprise. The car lasts 8 minutes and sets a new lap record. The moral here is to change your driving style. More practice is needed. Just what is the right gearing? Well, you'll only find out by trying! The next step is 14/46.

Most modern transmitters have a variety of adjustments available which, as your degree of skill rises, will mean greater ability for fine tuning. With the steering, the ability to increase or decrease the rate with your thumb whilst the car is on the move can be a great advantage because, if track conditions change, you are able to compensate during the race. Steering balance allows you to either equalise both LH and RH locks, or set more lock on one side should there be a predom-

inance of, say, LH corners. Exponential dulls the first part of the movement, only to be caught up with at full lock. As you become more proficient, you should be able to do without it.

The Go pedal or trigger also has many adjustments, all of which need to be adjusted in unison if you are using electronic speed controls. It is important to get the neutral adjusted so that when the trigger is let go the motor goes into free run. As the power is applied, full power should be available no later than 7/8 travel of the trigger. The reason for this is that if full power is set at maximum travel, as the battery runs down, there will not be sufficient current to operate the full power relay. In some speed controls an audible click is heard as full power is engaged. With Mosfet controls no sound is heard, so you have to resort to a pulse checker which comes with the KO Digiace unit. This device has green and red lights. When attached to the speed control in place of the motor, no light shows in neutral; the green light comes on as the trigger is squeezed and the red light comes on when full power is available. Again, it is advisable not to have full power at maximum trigger travel.

In speed controls with reverse, it is usually obtained by push back of the trigger. However, reverse will not occur until the motor armature ceases to rotate. This is to prevent over-loading of the electronic circuitry. The initial push back of the throttle trigger will cause the brake to function. Some transmitters have an adjustment to limit the amount of brake, no matter how far back the trigger is pushed. With others, the further you push the more brake you get. The very latest transmitters have thumb wheel brake rate, making brake adjustment available on the track.

One very important point to remember is to never, I say again, **never,** stop your car on the circuit to make a transmitter adjustment. Even if you are the only one on the circuit at the time. This creates bad habits, and the accident that it can cause will damage both cars.

When all else has failed when setting up the transmitter and speed controls, resort to reading the manufacturer's instruction sheet. It does contain some useful information!

The OZIFET
Electronic Speed Controller
NEW FROM:
CENTURY SYSTEMS (Aust.)

Designed specifically for the serious racer who uses ultra-high-performance motors in cars and buggies. The **OZIFET Speed Controller** *features 6 forward power FETs, fully proportional forward speed control and dynamic braking. It also provides power for the receiver, reducing weight by eliminating the receiver nicads.*

The **OZIFET** *has been specially designed in Australia to cope with harsh conditions, high current-drawing motors and extreme temperatures. The* **OZIFET's** *extra large heat sink will cope with the 'hottest' motors on the hottest days.*

The Century Systems **OZIFET** *has a forward "On Resistance" of just .01 Ohms; less than a 2 inch long piece of wire!*

SPECIFICATIONS (at 25°C)

● **Operating System:**	**6 FET forward; dynamic braking.**
● **Voltage Input:**	**7.2 to 12 Volts.**
● **Regulator Output:**	**6 Volt (max).**
● **Continuous Maximum Current:**	**150 Amps.**
● **Size (excluding heat sink):**	**55.5mm x 35.7mm x 19.8mm**

Normal Retail Price:.....$170.00

★ *SPECIAL OFFER* ★

If you order the* OZIFET *before February 1, 1988, and send a copy of this advertisement with your order, the* OZIFET *will be yours for just:

★ $150.00 ★

(When ordering, please specify connector; i.e. Futaba, JR, Sanwa,)

Special Discounts also available to the trade until February 1st 1988.

To order, or for a catalogue of all our products, contact:

CENTURY SYSTEMS (Aust.)

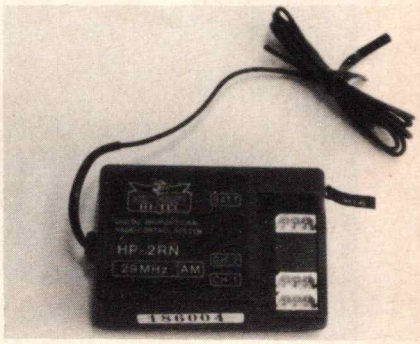
137-139 Mollison St., Bendigo, Victoria, 3550 or phone (054) 42 4708

TRANSMITTER

- **Multi-purpose control stick assembly.**
- **2 selectable control stick lengths.**
- **Adjustable neutral position (external).**
- **Spring or ratchet throttle control.**
- **Servo reverse switch.**
- **Charger connector for optional nicad.**
- **LED RF output indicator.**
- **LED battery indicator.**
- **LED low-power flashing indicator.**
- **Fuel-resistant plastic case.**
- **Neck strap connector.**
- **Extended transmission range.**

CHALLENGER 250

by John Rogers



For this issue I managed to lay my hands on a 2 channel Radio Control unit that has some rather neat features, yet won't break the bank.

TRANSMITTER

When I opened the box, the first thing that I noticed was the size (or lack of it) of the Challenger 250's transmitter, being only 155 mm wide, 115 mm high (not including the carry handle) and 53 mm at its thickest point, near the trims. On the upper left hand side of the case is a moulded carry handle, giving the transmitter a distinctive appearance.

In the centre of the transmitter console are four LEDs. The top LED (green) is the 'On Air' indicator meaning that the Tx is switched on. Below this are three red LEDs. With fully charged batteries the top (High) LED is lit. As the batteries decrease in power the remaining two indicators will light up in turn; first the Normal then the Low. When Low is indicated, it's time to change or re-charge the batteries.

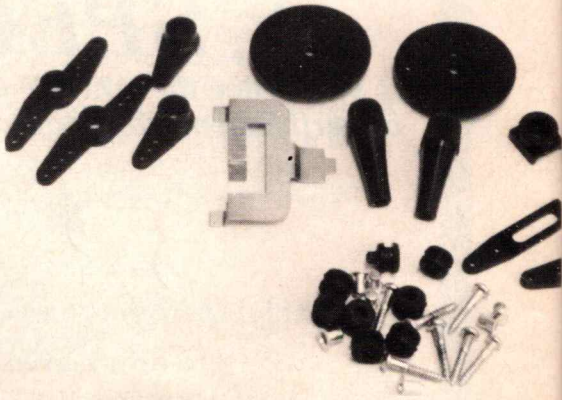
The left control stick is spring-loaded throttle, with a neat feature usually found only on more expensive transmitters: a Neutral Position Adjuster. A what? you ask! OK; let's explain. In the normal mode the throttle can be moved forward 50° from the neutral position. With the Neutral Position Adjuster switch moved to its second position you move the neutral position back 20°. The throttle now has 70° forward movement and 30° reverse.

The right hand control stick is used for steering (you knew that anyway, didn't you!) with turn control at the bottom.

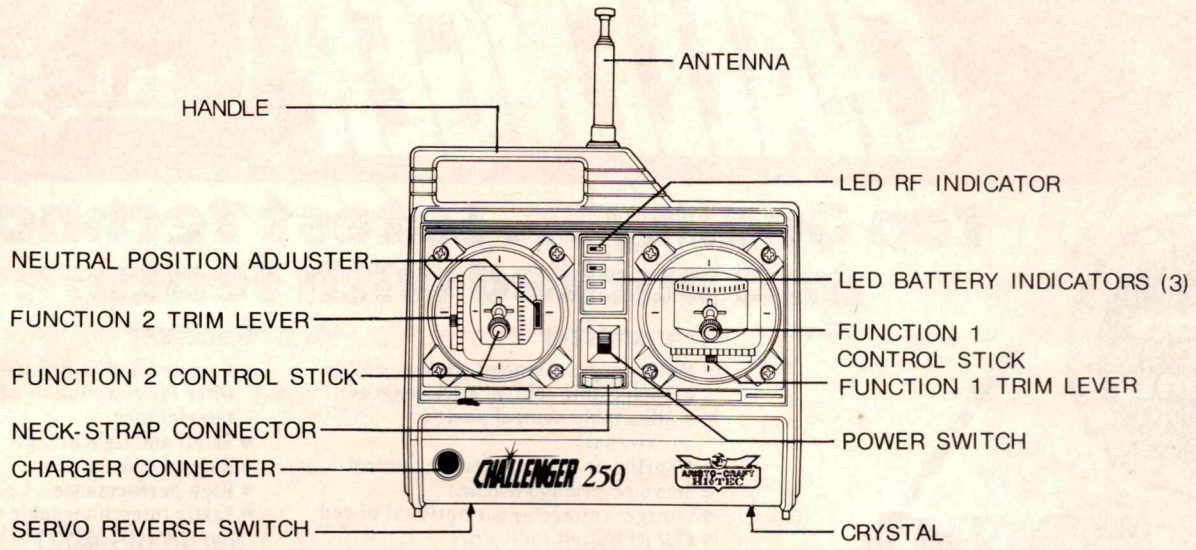
What other goodies does the Challenger 250 transmitter have? OK. Let's take a look at the base. Neatly recessed, slightly left of centre, we find another couple of trick bits, again usually found only on more expensive sets: Reversing Switches. These little beauties allow you to reverse the direction of your servos simply by moving a switch. The crystal is also located on the base, and is easily removed should you need to change frequencies.

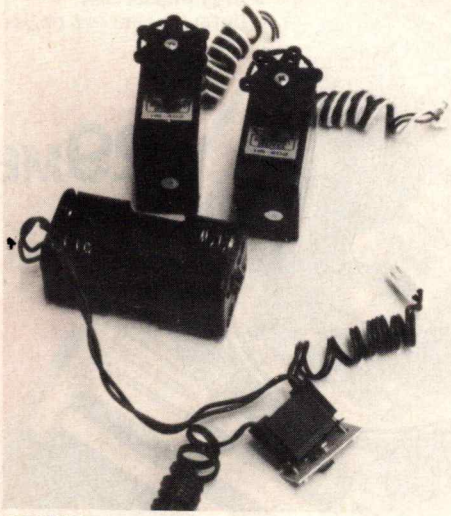
The weight of the transmitter, with 8 AA size batteries fitted, is a mere 500 grams. Compared to some of my other sets, this transmitter weighs in as a fly-weight.

On the lower left side of the Tx is a charging jack. This should be used only if using nicad batteries and an appropriate charger. **NEVER** try to charge carbon or alkaline batteries. This is a real NO, NO!



TRANSMITTER LAYOUT





SERVO

- **Dimensions: 52 x 20 x 49 mm.**
- **Weight: 50 gram.**
- **Operating angle: Rotary System; one side 40° or greater (including trim).**
- **Power requirement: 4.8 or 6.0 volt (shared with receiver)**
- **Operating speed: .24 seconds per 60°.**
- **Torque: 3 kg-cm**
- **Water resistant.**
- **High impact case.**
- **Indirect drive gear train protection.**

RECEIVER

- **Small, lightweight, rugged.**
- **2 Channel AM.**
- **Narrow band design using ceramic filter for resistance of adjacent channel interference.**
- **Power requirement: 4.8 volt nicad or 6.0 volt alkaline.**
- **Current drain: 15 mA at 6.0 volt.**
- **Dimensions: 55 x 37 x 20 mm.**
- **Weight: 37 gram.**

SERVOS

The servos are fairly standard, featuring water and dust proof case with O ring seal, 275 mm long leads with polarity protected plugs, 3 kg-cm torque, and a rate of .24 seconds per 60°. They weigh 50 grams. As the output arm is splined, the servo horn can be adjusted for correct centering.

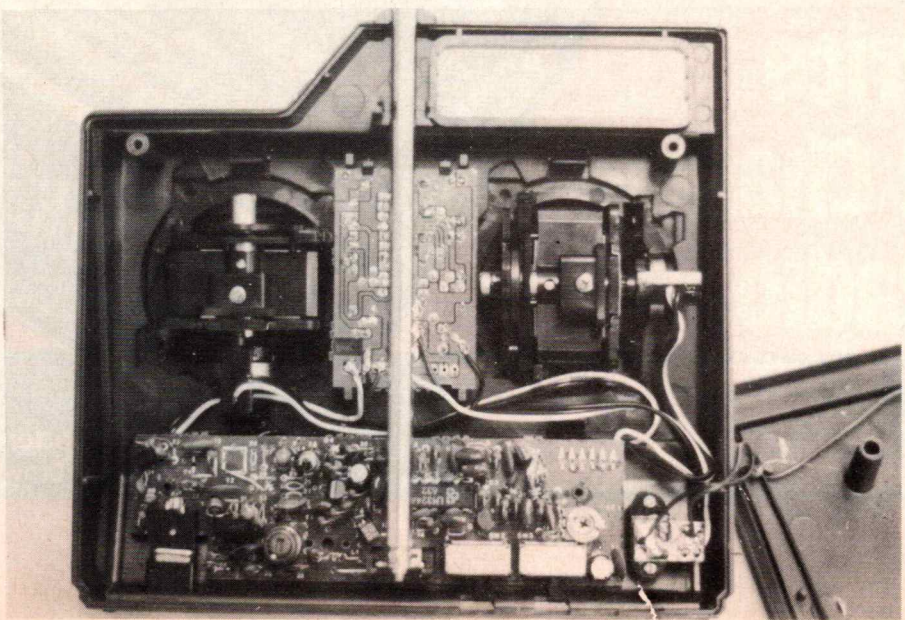
RECEIVER

The receiver is 4.8 to 6.0 volt powered, small (55 x 37 x 20 mm), light (37 gram) and has a narrow band ceramic filter for resistance to adjacent channel interference.

ACCESSORIES

As is usual with most other brands, the Challenger 250 comes with a host of spare and assorted servo horns, mounting screws, grommets and so on. One interesting accessory is the inclusion of longer control stick knobs. I find these to be quite useful when using the 2 channel set for boats. The other inclusion is a 'spring defeat', which enables you to use the throttle in a ratchet action simply by installing the metallic strip-type spring. Again, ideal for boating, where throttle changes are not required anywhere near as often as when racing buggies.

Set for review supplied by the importers, Model Engines (Aust.), 57 Crown St., Richmond, Vic., 3121; phone (03) 429 2925.



The Latest! 250 CHALLENGER

ARISTO-CRAFT HI-TEC

6 Months COMPREHENSIVE Warranty

Top Quality . . . Latest Technology and packed with features

Transmitter

- Multi-purpose control stick assembly
  - 2 selectable control stick lengths
  - Adjustable neutral position (external)
  - Spring or ratchet throttle control
- Servo reversing switches
- Charger connector for optional ni-cad
- LED RF output indicator
- LED battery indicator
- LED low-power flashing indicator
- Fuel resistant plastic case
- Neck-strap connector

Receiver

- Narrow band design using a ceramic filter for rejection of adjacent channel interference
- Small and lightweight
- Rugged construction
- High performance
- Easily interchangeable crystal

Servo (HS-402)

- Indirect drive for F.B. pot protection
- Water resistant
- High impact case
- Output torque: 42 oz/inch (3 kg/cm)

29MEGS

It's the Lowest Price 2 Channel Radio

HI-TECH SERVICE DIVISION – all work done on the premises by our own technician.

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57 Crown Street Richmond 3121 Melb. Telex 31336

WOT D'YA MEAN?

by Todd Cameron

They speak it in France, Germany and Japan, and if you're new to the sport (or perhaps a veteran too proud to ask), 'Track Talk', as it is affectionately known, is a language spoken in and around dusty sections of land called tracks, and in most good hobby shops. The people by whom this language is spoken are from a land called 'R.C.' in which there are provinces called Associated, Tamiya, Kyosho, Schumacher, PB and the like, the inhabitants of which all speak slightly different dialects of the National Language. Following are descriptive definitions of the words most widely used, from the RC Dictionary:

2WD & 4WD

To introduce you to the language, here are a couple of easy ones to start with. Two and four wheel-drive mean exactly what they imply; that is, the number of driven wheels. They are often abbreviated to 2WD and 4WD.

TRANSMITTER

This device fits snugly into your hands and is essentially the brain of your car. It is with this that you control the functions of your car. The transmitter (Tx) works by sending commands to the car by means of radio waves, in the same way as a radio station sends music to your radio set at home by radio waves.

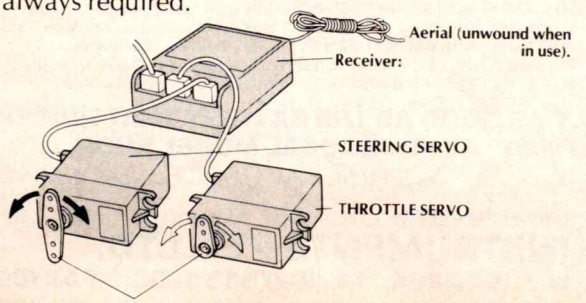
There are two basic types of transmitter, and these are the Pistol Grip and the Stick transmitters, the latter being more popular, since they are generally cheaper. The former can be easily recognised, since they look like guns, often resembling something out of Star Wars. Transmitters can be easily identified since they will almost certainly have a thing which looks like a long silver nail sticking out of the top. This is called the aerial and should not be broken!

RECEIVER

This little gizmo is the nerve-centre of your car, since it receives messages from the transmitter and converts them to actions. It is a relatively small device with a tuned length of wire (an aerial) snaking out of it. (Never cut this wire as it will affect the interference and range of your control.) The receiver (Rx) can be likened to a radio set in the way it receives radio waves and converts them to some other form.

SERVO

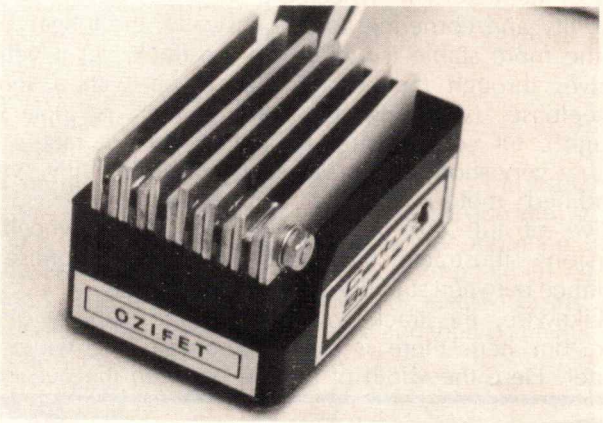
The end of the line in the 'radio chain', it converts the pulses from the receiver into physical movements, according or relating to your commands from the transmitter. A car may have one or two servos, depending on the type of speed controller, but there are always two 'functions'. With a mechanical (e.g. wiper) speed controller, one servo will be required to operate the steering function and the other to operate throttle or speed function. With an electronic speed controller, the speed control and throttle servo are essentially combined into a small, more efficient, single unit. A steering servo is always required.



STEERING & THROTTLE SERVO HORNS

MOSFET (Speed Control)

This sounds great: real high tech jargon. For those who are either interested or just wish to further baffle an audience, here is what it actually stands for: **M**etal **O**xide **S**emi-conductor **F**ield **E**ffect **T**ransistor! In fact, this is really just the name of the major components which are used to regulate the power to the motor. MOSFET Speed Controllers are usually smaller than mortal (ordinary) speed controllers, and are usually expensive. However, they are very efficient (almost 100% efficient in some cases) since they are fully electronic, whereas ordinary electronic speed controllers have a relay for top speed which causes some reduction in power since it is a dry touch contact, and this power loss increases with the use of the speed controller.



NI-CAD

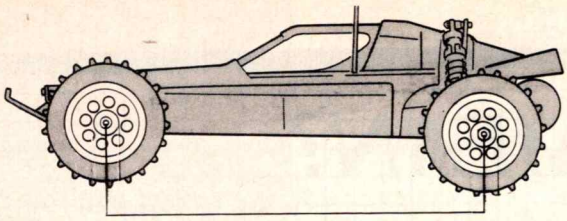
Without a battery pack your car would not go. The rechargeable battery packs used in this sport are usually referred to as Ni-Cads, and this is because these metals, Nickel and Cadmium, are the major components of the cell. They are generally in a six-cell configuration of 7.2 volts and 1.2 Ah. Care must be taken with Ni-Cads, because the cells have an extremely low internal resistance, and consequently, if they are shorted out, can produce up to 100 Amps instantaneously, which often results in fire, an explosion, or at the very least, smoke and some hot wires. The latter of these is affectionately known as a Bar-B-Q.

BUMP STEER

A phenomenon which affects the majority of cars on the market today. Not to be confused with 'bum steer'. As you may have guessed, it occurs when your car strikes a bump, and the wheels move up and down relative to the main chassis of the car. When the wheel moves up and down the steering angle of the wheel changes, due to a fault in the steering geometry, and this causes the car to over-steer or under-steer slightly and mistrack in the rough stuff. The only ways of curing bump steer are to either buy a car without it in the first place, or else engineer it out of the car by experimenting with new servo positions, different heights of steering balls, and so on.

DIFFERENTIAL

Hopefully your car will be equipped with one of these marvellous inventions. Nowadays most RC cars are equipped with a diff, and in basic terms it simply allows the rear wheels to rotate at different speeds. This is because the inner wheel prescribes a smaller circle,



Wheelbase: the distance between the front and rear wheels.

since it is closer to the centre of the circle, than the outside wheel. There are two basic types of differential: ball and gear. Ball differentials are usually standard only on more expensive, highly competitive cars. This is because they are more expensive, more complex and they allow varying amounts of drive to each wheel while cornering, thus they are often called Limited Slip Diffs. However, a gear diff has a set amount of drive to be transmitted to each wheel while cornering, determined by internal ratios in the diff itself. Without a diff, trying to drive a car around corners at speed would be hairy, to say the least!

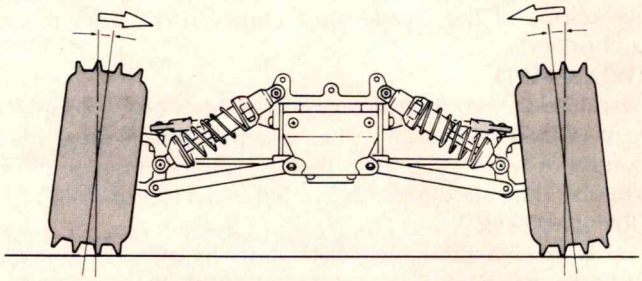
WHEELBASE; TRACK WIDTH

Wheelbase is the distance between the front and rear wheel centres. The wheelbase of a car determines its stability and cornering ability. Basically, the longer a car is the more stable it will be on the track, yet it will be slower through the corners than a car with a shorter wheelbase (assuming that the corner is not very rough!). Of course, most people would not race a car with a very short wheelbase, such as a Wild Willy, with a modified motor, and be competitive. However, the move of full size rally drivers to shorter wheelbase versions illustrates the need for a compromise: a balance between stability and cornering ability.

Likewise, the track width affects the stability of the car, but here there is no compromise: the wider the better. Here the width of the car between the outside of the front wheels, and also the rear wheels, should ideally be the maximum legal width.

CAMBER

This one is a bit more involved, so I'll give you an idea of just the basics. Camber is the way the wheels (and tyres) tilt into or away from the car at the top. When the top of the wheels dip in towards the car the camber is said to be negative, and when the top of the wheels dip away from the car the camber is positive. Neutral is when the tops of the wheels are in the centre. Most cars are produced with slight negative, or neutral, camber, the theory being that when the car leans in corners the tyre footprint will remain fairly flat and stable. However, there are too many variables to cover here.



Suspension showing negative camber (top of tyre leaning inwards).

Well, there you have it: the basics of car-speak, but not the be-all and end-all of dictionaries. For instance, you may often hear Schumachians talking about their integrators. If you need further explanations, the track is probably the best place to ask. There will usually be someone there willing to help.

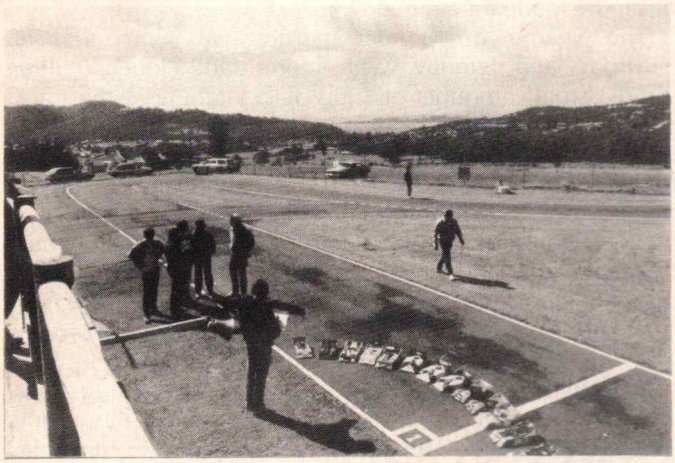
9TH AUSTRALIAN CHAMPIONSHIPS FOR 1/8 SCALE R.C. CARS

from John Grant

This year the Australian Championships for 1/8 scale gas circuit Sports GT cars were held in 'sunny' Hobart, Tasmania, at the Hobart Radio Control Car Club's track at Kingston. This was the 9th year of the championships.

The format for racing this year was to hold a maximum of six rounds of ten minute heats. There were two classes of entry: Open Class, which was for drivers who wished to enter 4WD or 2WD, the only stipulation being that, if a driver entered in Open Class he could not run in the Restricted Class, which was for 2WD cars without a gearbox. Qualifying would be determined from a driver's best individual heat.

Most competitors had arrived on Thursday night and were raring to go on Friday, 9th October, which was designated mainly for free practice and scrutineering. Friday dawned with rain, cloud, cold winds, and a little sunshine. Most drivers managed some practice in between showers.



Now to the racing. The first heat in each round was for the Restricted Class cars (those entered in 2WD only). By the end of racing on Saturday the club had managed to get three complete rounds in, which was no mean feat, I can assure you. At this stage the Restricted Class was being led by M. Sargeant on 35 laps in 10:00.5. This score was good enough to maintain top qualifying position throughout the 2WD heats.

The second heat, which was the first of the 4WD class, was of interest as it consisted of A. Harrison (SA), P. Chan (NSW), R. Reade (SA), I. Williams (Tas), S. Burgess (NSW) and D. Burgess (Tas). This was of major interest as the feeling was that top qualifier would be between S. Burgess and T. Warren, who was in heat 4. In heat 2 Burgess put up 42 laps in 10:02.0, with the next closest being P. Chan on 39 in 10:04.8.

Heat 3 was won by G. Cox (Tas) on 40 in 10:08.7. Heat 4, which was the next heat of major interest, was won by L. Campfield (NSW) with 39 laps in 10:07.3. T. Warren bombed out with 16 laps in 5:45.0.

After more rain, more cold and more wind, the second round got underway. In heat 2 of this round S. Burgess bombed out with 6 laps, and P. Chan increased his laps to 41 in 10:07.4. G. Cox did 40 in 10:07.3 in heat 3, which was slightly faster than he did in the first round. In heat 4 C. Ballard (ACT) came home with 39 in 10:07.2 and J. Boyd (SA) came second with 39 in 10:04.6.

By this stage in proceedings, time was running out (so were patience and body heat). Snow was starting to appear on Mt. Wellington and the winds were stronger and colder, with more cold rain (or was it sleet?!). Somehow the third round of heats was run, with S. Burgess doing 43 laps in 10:11.3 in heat two. In heat three G. Cox upped his score to 41 in 10:10.3, R. Chan did 40 in 10:13.4, and D. Popplewell (SA) did 40 laps in 10:08.7. In heat four T. Warren finally managed a good time, doing 42 in 10:10.8, J. Boyd (SA) did 39 in 10:09.5 and Rob Morphett (SA), who was recovering from heart surgery but who did not want to interrupt his record of attending all Australian Nats held, did a creditable 38 in 10:03.2.

Saturday night was spent drying out the BBC system in front of heaters, and thankfully, by 1 o'clock Sunday morning all was in working order again.

Sunday dawned colder, wetter, windier, and with more snow on Mt. Wellington. After a delayed start to allow the track to dry, round four was underway. In heat one (2WD), three drivers increased their scores: R. Clarke did 34 in 10:15.1, K. Graetz (NT) did 33 in 10:13.6 and L. Howell (NT) upped his score to 33 in 10:07.6.

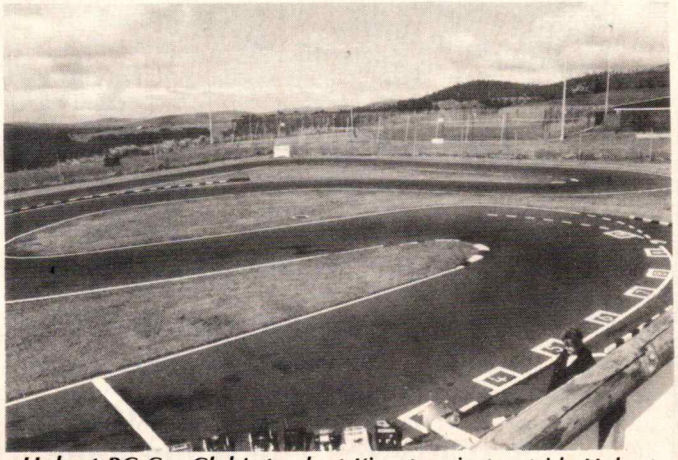
Therefore, qualifying for 2WD was:

1. M. Sergeant	35	10:00.5
2. R. Harrisom	34	10:13.9
3. R. Clarke	34	10:15.1
4. L. Howell	33	10:07.6
5. K. Graetz	33	10:13.6
6. G. Richardson	28	10:00.1
7. K. Whitton	11	4:57.0

In round four A. Harrison increased to 37 in 10:07.9, P. Chan improved to 42 in 10:14.5, R. Reade did 38 in 10:00.5, R. McArthur (ACT), after a disappointing run, increased to 40 in 10:12.4, and L. Campfield to 40 in 10:05.3. The rest did not improve, or elected to just go and do a few laps to check their cars, and then come in.

Qualifying results were as follows:

1. S. Burgess	43	10:11.3
2. T. Warren	42	10:10.8
3. P.Chan	42	10:14.5
4. G. Cox	41	10:10.3
5. L. Campfield	40	10:05.3
6. D. Popplewell	40	10:08.7
7. R. McArthur	40	10:12.4
8. R. Chan	40	10:13.4
9. C. Ballard	39	10:07.2
10. L. Robinson	39	10:08.1
11. J. Boyd	39	10:09.5
12. R. Reade	38	10:00.5
13. R. Morphett	38	10:03.2
14. A. Harrison	37	10:07.9
15. C. Whitton	37	10:14.2
16. I. Williams	36	10:03.0
17. D. Burgess	35	10:12.4
18. S. Williams	12	7.56.1



Hobart RC Car Club's track at Kingston, just outside Hobart, Tasmania. Site of the 9th Australian 1/8 Scale Gas Championships.

The first four went straight into the final.

The **Quarter Final** consisted of those placed from 9 to 18. It was a fifteen minute race and was won by L. Robinson driving a steady race, with instructions from his pit crew on how far ahead he was per minute so that he did not overstress his car or himself. Second was S. Williams, third C. Ballard, fourth R. Reade, fifth I. Williams and sixth J. Boyd. These six progressed to the semi final, which already consisted of L. Campfield, D. Popplewell, R. McArthur and R. Chan.

The **Semi Final** was a twenty minute race. Ray Chan was unlucky in this event, stripping a drive belt and completing only 36 laps. Ray McArthur, recovering from a period in the doldrums after the second round heats, won the semi on 77 laps, with D. Popplewell second on 75, L. Robinson third on 73, J. Boyd fourth with 68, R. Reade fifth on 67 and L. Campfield sixth on 61 laps. This completed qualifying for the final.

The next event to be run was the **2WD Final.** Only six drivers started, with K. Whitton, the only lady competing at the Championships, electing not to start. I don't blame her, as it was much colder by this time, with stronger winds, occasional light rain, and certainly some fine snow falling. Mt. Wellington, which is just behind the track, had a lot more snow on its peak by this time, and there were very threatening dark clouds. The 2WD Final was a thirty minute race, and was won by Kevin Graetz with a steady drive, followed by M. Sergeant having an unlucky run, with his engine cutting once, thus having to push hard to try to regain the lead but failing in this attempt with a few excursions into the wet grass. Third was L. Howell, followed by R. Clarke, R. Harrison and G. Richardson.

By this time on Sunday the weather was very bad and the light was diminishing, so a meeting was held and it was decided to delay the 4WD Final, which would decide the Australian Champion for 1987, to the rain day, which was Monday. Tony Warren was not happy with this decision and attempted to drive his car on the track to show the other drivers that the event could be run, but after a few 'offs' and spinning under brakes, it was decided that it was not possible. One of the reasons that some people wanted to run the race at this time was because some competitors and organisers had not allowed for the rain day in their planning, and had to return to work on the Monday. This attitude seems hard to understand, as this is not the first year that a rain day has had to be used. It seems a complete waste of time and money to go to an Australian Championships and not allow for the extra day in your planning, particularly when it is part of the rules and regulations that provision has to be made for a rain day.

The weather on Monday morning was worse than on Saturday and Sunday, with more dark clouds, cutting winds, small amounts of snow flakes falling at the track, a very wet track and not much sun peeping through to dry it. Mt. Wellington had a large amount of snow on top by this time! A meeting was called and all drivers agreed to a cut-off time of 12.30 pm; i.e., if the practice for the final could not be started by 12.30 the race would be called off, and finishing order would be decided by qualifying positions.

At approximately 11.00 am practice got underway, and the **4WD Final** was organised to commence. Race time arrived and cars went out for their warm-up laps, when Rob Reade struck trouble and called a ten minute delay to the start. (This is allowed in the rules, and may

be called up to the time that the cars are about to line up on the grid, but the ten minute delay can be called only once.) The cars lined up on the Le Mans grid, although Rob Reade was still missing, as he had stripped a gear-box and had broken a one-way bearing, but he was able to join the race after losing approximately one minute.

On the start hooter Burgess took the lead, with Warren .5 seconds behind. These two were pulling away from the rest at a rapid rate. For the first five laps this gap remained constant, but by lap ten Burgess had pulled out a 6 second lead, as Warren had spun off on lap six, costing him at least 4 seonds. By lap fifteen Warren had caught up to be 5.7 seconds behind, but by lap twenty Burgess had pulled it out to a 10.5 second lead by putting in two quick laps of 13.8 and 13.9 seconds. Warren stopped for fuel on lap twenty one and had a time for this lap, including fuel stop, of 24.6 seconds. Burgess came in on lap twenty two for fuel and had a lap time of 22.0 seconds, thus gaining another 2.6 seconds in the fuel stop. By lap twenty five Burgess had lapped Warren and had a lead of 14.1 seconds. By lap thirty Burgess had a lead of 23.3 seconds, which meant that he was within 3 or 4 seconds of lapping Warren for the second time. Warren, knowing this, was trying very hard, and on lap twenty nine had an excursion at the end of the main straight which cost him nearly 7 seconds. By lap thirty Burgess had a lead of 25.1 seconds over Warren. These two cars had pulled out at least a two lap lead over the next fastest cars, the order at this point being: S. Burgess, T. Warren, G. Fox, R. McArthur, J. Boyd, L. Campfield, D. Popplewell, P. Chan (who had stripped a gear on lap 27 and retired), R. Reade and L. Robinson (flat receiver battery).

Colin Whitton, Secretary of the Hobart RC Car Club, hard at work between heats.

Unfortunately, at this time the rain started again, and the race had to be stopped after less than ten minutes of racing. This was the end of any chance to race further, as the rain set in and saturated the track. The rules state that if the race is stopped within the first ten minutes there is a complete re-run (which was impossible in this case). If there is rain in the second ten minutes (i.e. between ten and twenty minutes), the race will be stopped, restarted when the track dries, and both sections of the race will be added together to obtain a result. If there is rain in the last ten minutes, the race will be declared on the positions at the time the race was stopped.

As the final did not run long enough for a result, the Australian Champion for 1987 was decided on qualifying positions (as previously listed). This was an unfortunate end to a weekend which was very difficult, and the Hobart Club has been commended on a meeting that was well run under the circumstances.

QUEENSLAND 1/8 SCALE GAS CAR STATE CHAMPIONSHIPS

from Keith Berry

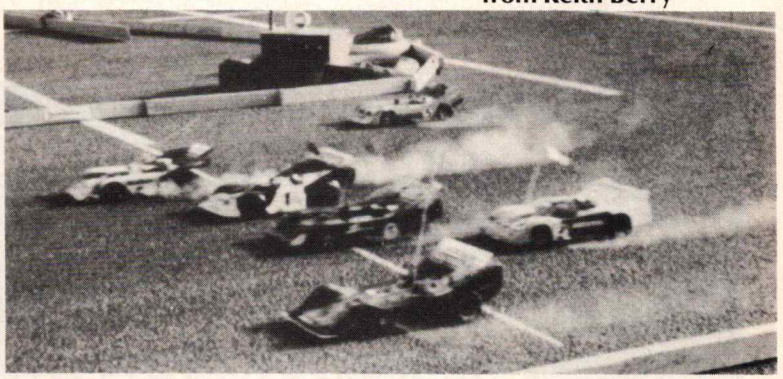
This event was sponsored by Strathpine Toyota, and was held at the Northside 1/8 Scale Car Club's new track at Slash City Shopping Centre, Strathpine, on the 19th & 20th of September. A strong local contingent entered; 99% of the club's active drivers. The southern states were represented by the Chan brothers, Tom, Peter and Ray, from Sydney, and Joann and Ray McArthur from the ACT. There were twenty six drivers in all.

The surface of the new track, only recently acquired by the club, needed plenty of work prior to the meeting. Years of dust had built up on the car park surface, and this presented a serious problem. With assistance from the Chairman of the Pine Rivers Shire, Mr. Rob Askers, in the form of a massive street cleaning machine, the surface was made to look almost new. A final touch was added with industrial vacuum cleaners supplied by Coates Hire Equipment, and the track was ready for practice at 1.00 pm Saturday.

Practice commenced at 1.30 pm, and the grip was disappointing at first, but as the afternoon wore on and a drive line came up, smiles started to appear, replacing the worried expressions on many faces. By late afternoon the lap times were improving; they fell from the high 18s to the low 16s.

Sunday dawned with blue skies and a forecast top temperature of 24 degrees; a perfect day for racing. Early practice commenced at 8.30 am, and continued to 9.30. The grip kept improving, and within the 4x4 camps the hurriedly found rear wings looked like being discarded. All was set for a great day's racing.

The final started at 4.00 pm, and could only be described as a 30 minute sprint. The pace took its toll; Peter Chan was first to go off the track for a lengthy pit stop, with Barry Corfe and Robbie Watt also spending some time in the pits. By contrast, Ray McArthur and Keith Berry had trouble-free runs, and made only fuel stops. Congratulations to Ray McArthur on a fine win.



The Northside 1/8 Car Club wishes to thank sponsors for their support, and all competitors for the sportsmanship shown throughout the meeting.

OFFICIAL RESULTS

A Final (30 minutes)

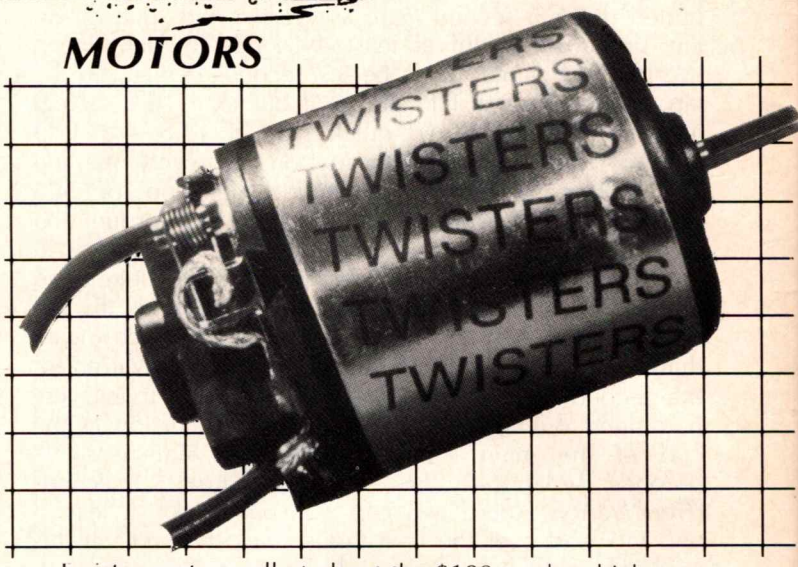
		Car	Engine	Laps
1. Ray McArthur	**ACT**	**Serpent 4WD**	**Mondial**	**98.24**
2. Ray Chan	**NSW**	**SG Space 4WD**	**Nova Rossi**	**97.53**
3. Robbie Watt	**Qld.**	**Associated 2WD**	**Picco**	**92.74**
4. Keith Berry	**Qld.**	**PB Nova 2WD**	**OS R**	**91.33**
5. Barry Corfe	**Qld.,**	**Associated 4WD**	**Rossi**	**84.14**
6. Peter Chan	**NSW**	**Serpent 4WD**	**Nova Rossi**	**54.00**

B Final (15 minutes)

1. Tom Chan	**NSW**	**SG Space 4WD**	**Nova Rossi**	**44.91**
2. Joanne McArthur	**ACT**	**Serpent 4WD**	**Mondial**	**44.7**
3. Dean Redsell	**Qld.**	**PB Alpha 2WD**	**OS**	**43.43**
4. Les Canfield	**Qld.,**	**PB Nova 2WD**	**OS**	**38.99**
5. Rodger Walker	**Qld.**	**Serpent 4WD**	**OPS**	**19.00**
6. Alan Smith	**Qld.**	**SG 4WD**	**Picco**	**7.00**

Paul Bird Takes a Look at

TWISTER MOTORS



Twister is a name well known to may RC car and buggy drivers, and basically it means lots of controllable power.

The Twister 401 is a 19 turn modified motor, designed for use in four-wheel drive buggies and cars, in both outdoor and indoor situations.

The test motor was run-in on low voltage for two hours, then put on a Shinwa Motor Dresser to check current consumption and free running revs. At zero degrees, the 401 motor ran at 22,000 rpm and drew 2.25 amps, which should allow most drivers to run a reasonable gear ratio for good speed, yet still make race time.

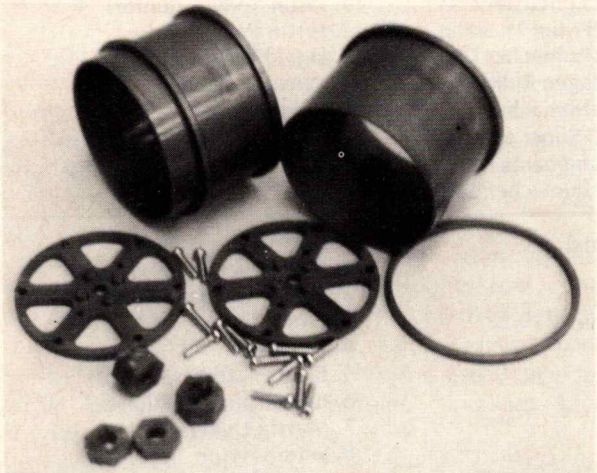
I ran the 401 in a Schumacher CAT, both indoors and off-road, and found it to be a good performer. The test car was running an overall ratio of 10.84:1, and, with the Twister motor set at zero degrees, both speed and torque were exceptionally good on both track surfaces.

The Twister 401 is just one in a range of motors, which covers two and four wheel drive applications, for both indoor and outdoor racing. The four wheel drive range includes: the 401; the 402, a 17 turn modified motor for inside and outside running; and the 501, which is a high performance 16 turn indoor screamer.

Twister motors sell at about the $180 mark, which puts them in the same price bracket as most top range competition motors, however, it's money well spent for a power plant that will hold its own with the others.

The test Twister 401 motor was supplied for review by the importers, Model Engines, 57 Crown St., Richmond, Vic., 3121.

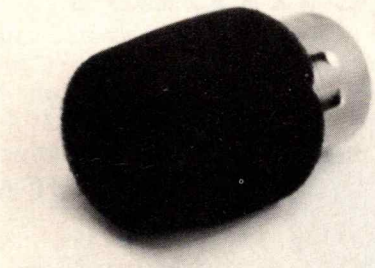
PRODUCT NEWS



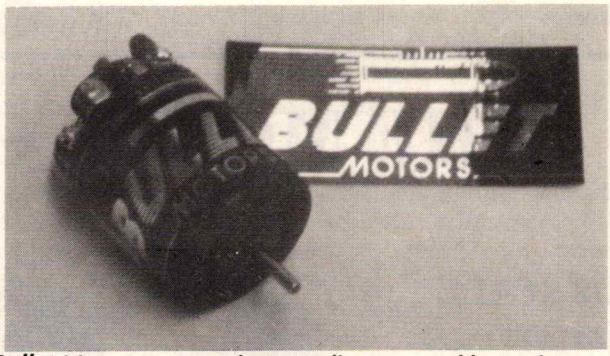
Adjustable width wheels, enabling an endless variety of tyres to be fitted to the one wheel rim. Simply trim wheel to desired width, glue on rim, and fit hubs with screws supplied. (See diagram.) Trade enquiries to Performance Hobby Supplies, (03) 898 2791. R.R.P. $10.95.

Dynamite High Performance tyres just released in Australia. Super Spikes (rears only) and soft studs (front and rear) are now available to suit Hot Shot, Super Shot, C.A.T., PB, Mugen, etc. Enquiries (trade only) to Performance Hobby Supplies on (03) 898 2791. R.R.P. $14.95 per pair.

Dynamite High Performance Wheels for 1/10 scale off roaders have landed. Made from high impact nylon 66, for Fox, Wild One and Associated RC10, with adapter WS-661A, which are also available. R.R.P. $5.95. Trade enquiries to Performance Hobby Supplies, (03) 898 2791.



Protect your motor from harmful dirt and dust simply by fitting this one-piece foam engine cover: the life of your motor will be greatly increased. R.R.P. $2.50. Enquiries (trade only) to Performance Hobby Supplies on (03) 898 2791.



Bullet Motors are now in Australia. Imported by Performance Hobby Supplies, these motors feature zap magnets, 24 ct. gold plated end bell, diamond trued commutator, dynamically balanced, new silver shunt brushes, capacitors and silicone wire fitted and fully adjustable end bell. American made. R.R.P. $135.00. For trade enquiries phone (03) 898 2791

THE 1987 VICTORIAN CHAMPIONSHIPS — OFF ROAD STYLE

by Ford Prefect

More than one hundred 1/10 scale off-road buggy drivers congregated at the home of the Templestwoe Off-Road Radio Control Car Club for the running of the main event on the Victorian buggy calendar: the 1987 Victorian Championships.

Drivers from inter-state and intra-state competed in four classes:
2 wheel drive stock and modified, & 4 wheel drive stock and modified; and the standard was amazingly high!

The two-day meeting was held on the weekend of October 24th & 25th, with the track being open for practice from the Wednesday preceeding the event.

Most drivers found tyre selection to be a critical factor in their performance, as the Templestowe track is dirt, heavily 'seeded' with cement, making for a hard, fast and slippery surface. In fact, the legendary Schumacher tyres seemed to be outclassed by the Kyosho block pattern rubber tyres.

The first of Saturday's four qualifying heats in all classes set the tone of the meeting, with quick times being recorded consistently by the top drivers. In 4WD Modified (the Premier event), 14 laps were needed to be sure of a place in the A Final. Of course, in the other classes the battle was equally tough, with everyone giving each heat their best shot.

The Templestowe track held together well for the weekend's competition, and spectators were treated to some exciting dices in all heats, some spectacular shunts, and good food from the catering tent.

By and large, the 1987 Victorian Champs had all the ingredients of a

top quality race meeting: close racing and the opportunity to renew old friendships and make new ones, and to further the sport by helping others with less knowledge than ourselves. One person who did this to a 'tee' was Col Grenenger of Pitstop in Sydney. Col was happy to help the younger drivers get the most from their stock motors, and freely gave others the benefit of his wide range of experience. It is this attitude which enables our sport to grow, and helps the young drivers to improve.

Unfortunately there will always be some people who are dissatisfied for one reason or another, and this year's Vic Champs was no exception. However, those people seemed to be well and truly in the minority, with most drivers and their crews having a great time.

I was pleased to see that, for a change, nearly every competitor had a chance of winning something, either through one of several raffles, random name draws, or through good marshalling. A variety of sponsors, including Pitstop, Century Systems, Model Engines and Hearns Hobbies, donated goodies for the competitors. Those goods included nicad packs, stock and modified motors, FET speed controllers, tyres and decals.

RESULTS

4WD Modified — A Final

1. G. Collings	Schumacher CAT
2. A. Reade	PB Mini Mustang
3. C. Grenenger	Schumacher CAT
4. S. Frahm	Mugen Bulldog
5. P. Marlan	Schumacher CAT
6. G. Evans	PB Super Mustang
7. P. Tougher	Schumacher CAT
8. R. Bishop	Schumacher CAT

4WD Modified — B Final

1. Mike Farnan
2. Derek Radley
3. Jarrad Clark (top junior)
4. Brad Martin
5. Dennis Beilby
6. Roger Polak
7. Shem Boyle
8. Ray Wood

4WD Modified — C Final

1. Luke French (junior)
2. Aloyz Kolenc
3. Michael Wyngaard
4. Dennis Cain
5. John van Rosmalen (junior)
6. Brett Willoughby (junior)
7. Peter Bracka
8. Andrew Edwards

RESULTS

4WD Stock — A Final

1. M. Geddes	Schumacher CAT
2. N. Millard	Kyosho Optima
3. D. Spinney	Schumacher CAT
4. B. Burbage	Mugen Bulldog
5. D. Seidel	Mugen Bulldog
6. P. Hallworth	PB Mini Mustang
7. A. Bishop	Schumacher CAT
8. T. Williams	Mugen Bulldog

4WD Stock — B Final

1. Jason Rodger (junior)
2. Justin Watts (junior)
3. David Seckold
4. Winston Bartolo
5. Gary Drury
6. Kevin Seckold
7. Wolf Renberg
8. Lyle Harbour

4WD Stock — C Final

1. John Dykers (junior)
2. David Watson (junior)
3. Eddie Garay
4. Dean Fisk
5. Brad Peatling (junior)
6. Brent Amphlett (junior)
7. Martin Dykers
8. Simon Ayton

2WD Modified — A Final

1. J. Spencer	Associated RC10
2. P. Orchard	Associated RC10
3. T. Lauder	Associated RC10
4. S. Salter	Schumacher CAT
5. A. Gould	Associated RC10
6. J. Forte	Associated RC10
7. P. Brady	Associated RC10
8. R. Stevens	Associated RC10

2WD Stock — A Final

1. R. Birtles	Associated RC10
2. I. McPherson	Associated RC10
3. D. Griffin	Kyosho Ultima
4. C. Young	Kyosho Ultima
5. D. Spencer	Associated RC10
6. R. Poole	Associated RC10
7. G. McPherson	Associated RC10
8. A. Uren	Associated RC10

CANBERRA O.R.M.C.C. 300 LAP ENDURO

from Gary Davey

In September 1987, a 300-lap enduro for 1/10 scale buggies was run at Rose Cottage Raceway. The race, the second enduro held by the club, was well attended, with seven teams, a total of over 30 members plus some 20 support persons, being involved. The weather was typically fine, with a blue sky, a light breeze and a dry, deceiving surface consisting of 50% concrete-stabilised dirt, 40% compacted dirt and 10% holes, which can make for tricky driving.

The field of seven teams, all running sedan bodies, included three Mini Mustangs, two Boomerangs, one CAT and a Bulldog. the Bulldog was fielded by Jeremy Mills, Justin and Chris Kearney and Dick Dondas from Young. These guys travel to Canberra (a distance of about 150 km.) regularly to compete, and are very popular with the Rose Cottage gang.

Preliminaries aside, the Model Shop Heroes Qualifying was held. Each team had two chances over three flying laps to set pole position. We added the two best laps together for each attempt and the results were used to grade the start positions. When the dust settled pole had gone to the Geri(atric) Team, with Mad Barry at the wheel. Interestingly, the oldies set best time using a slightly modded M&Y 600ST in their Peugot-bodied Mustang. This combination went round very smoothly with a minimum of fuss, to set a 50.53 aggregate time. Bob Benniston took the Model Shop CAT with a Checkpoint hottie under the Pug shell into second spot with a 51.45 aggregate. Third grid spot went to Team Holeshot's Darren Johnson with 51.74 with an oval-spec Twister in a Mini Mustang running super-low gearing and a Ford RS200 body. Other teams tried, but these three had set the stage for an engrossing duel. Who could do what, with what, and what would be the end result?

From the start Tony Haseler and Barry Leech set their mark on the race. By the ½ hour mark the Geris had a lead of eight laps on the Model Shop Boys and Team Mills, with the Team Holeshot effort being hampered by an unstuck ball-joint back a few laps. The balance of the field was spread back as the better prepared teams asserted themselves on the event. The Professional Buggy Supplies' PB failed to start, and the guys were given permission to start a substitute Boomerang after all attempts to start the Mustang had failed.

After an hour the Geris had opened up a lead of over 20 laps, and their teamwork, controlled by John Schweitzer, was wonderful, with stop watches and so on. At this stage second place was held by the Bulldog of Team Mills, with the Model Shop CAT and the fast-gaining Holeshot PB in hot pursuit. With each battery change Adam Davey, Darren Johnson and Ian Buckham were reeling in the second and third placed runners.

The three hour mark will long be remembered by all those present as the time when the going got really tough. Setting aside the robot-smooth Geris, 30 laps away in the distance, second to fourth places were separated by one very small lap. The Model Shop CAT and the Holeshot Mustang were on equal laps, with the Mills Bulldog back one. Meanwhile, the Performance Buggy Supply Boomerang had moved past the Jet Racing PB and the Fosters Raiders Boomerang. This was a great effort after their delayed start.

The Rose Cottage Inn Track, complete with a group of friends.

With the Haseler-Leech Mini Mustang approaching the 290 laps, the Model Shop effort looked doomed, with the Holeshot PB closing fast. Suddenly fate stepped in and yours truly changed a battery, only to have a battery lead fall off! A rapid switch over, courtesy of Daniel Gillogly, was made, to no avail. Starship Geriatric crossed the line for the 300th time at 3.20 pm., for a total elapsed time of one hour, thirty two minutes and twenty seconds. Second place went to the Model Shop Team of Bob and Adam Benniston, Scott Blair and Mark Phelan. Just three laps back lay the Holeshot PB Team of Ian Buckham, Darren Johnson and Adam and Gary Davey. Another three laps back was the Mills Bulldog driven by the boys from Young. The other teams drove well. The substitute Boomerang fielded by Performance Buggy Supplies and driven by Allan Huggett, Chris Johnson and Ian Bush, completed 238 laps, despite their troubles. Jet Racing put in a fine 143 laps, and the trouble-plagued Fosters Raiders Special ran up 95 laps. Compared to the other experienced teams, the effort put in by the two last teams, consisting of the Cavanough brothers, Messrs. Choung and Awizen, Jeremy and Damion Knight and Damon Lynch, was highly thought of by everyone in attendance.

An important aspect of the event was the presentation of trophies to all those who participated. All in attendance enjoyed the day, and many yarns will be told of the stories within the story. Tales of 'if only' and 'why didn't' were heard. These were, however, blended into a common 'Next time we'll...'

Of course, thanks are due to those who counted the laps and manned the ship. People like Richard Wheatley, Paul Gillogly, Doug Blair, Anthony Miller and others assisted tirelessly. A special mention goes to Mandy Leech who assisted the Geris all day, and was invaluable in keeping their wheel-chair tyres pumped up!

The field, left to right: Geri Mini Mustang; Model Shop CAT; Holeshot Mini Mustang; Mills Bulldog; Raiders Boomerang; Jet Mini Mustang; and PB Supplies Boomerang.

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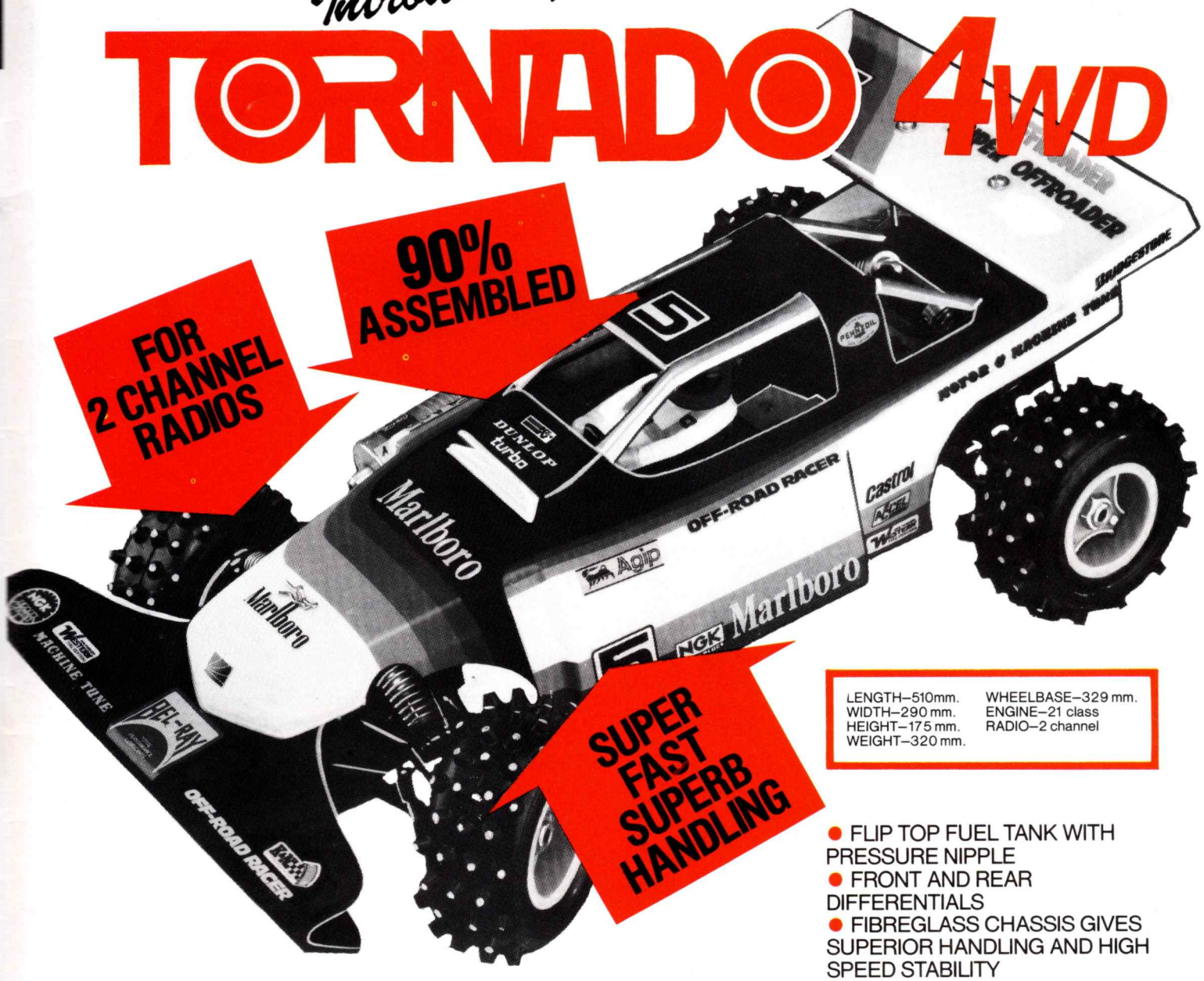

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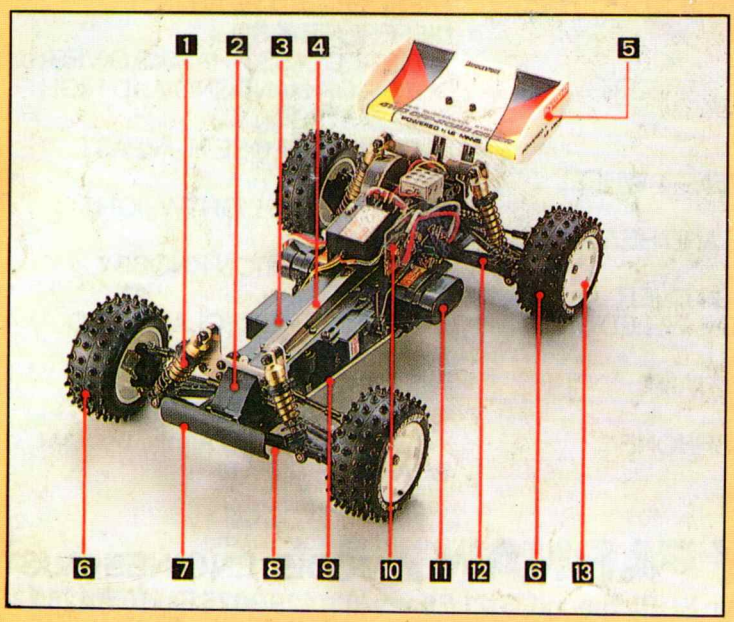

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