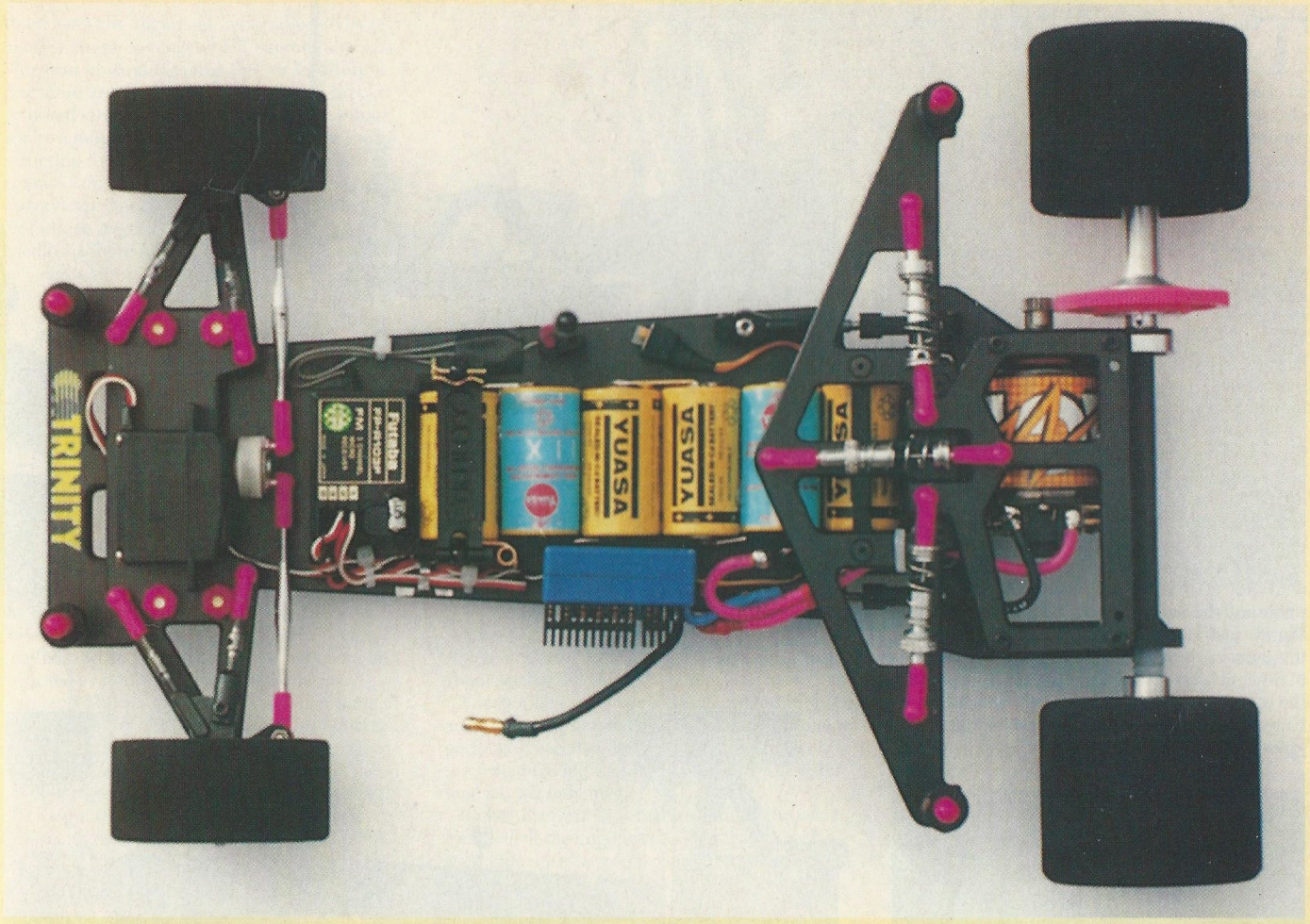
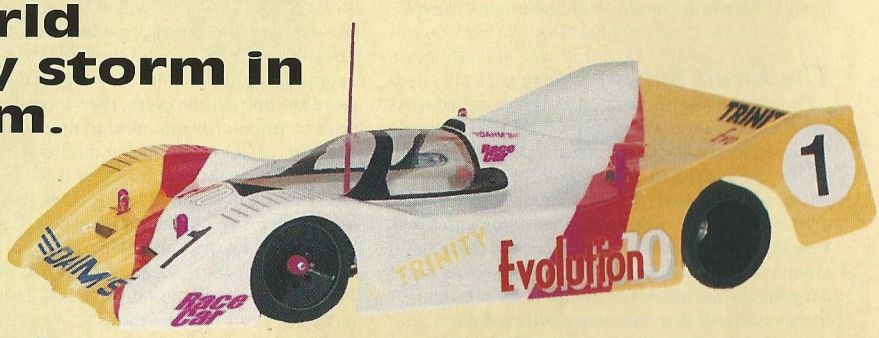


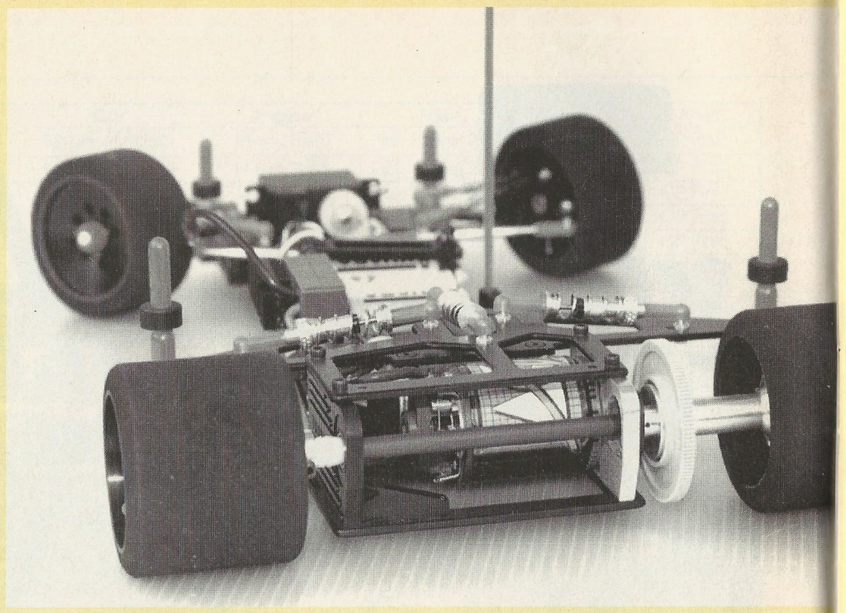
TRINITY EVOLUTION 10

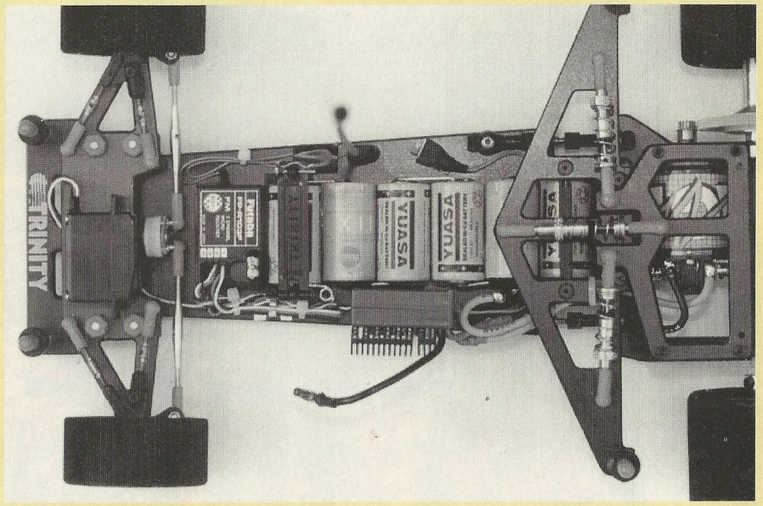
The Trinity Evolution 10 took the first 1/10 scale on-road World Championships by storm in its prototype form. Unique in design, the production version of Trinity's Worlds winner is reviewed at length by Jonty Walkeden.



The Trinity name is usually associated with pushed battery packs and powerful motors, and a large line up of tools and spares for all classes of electric racing. What a large number of racers in Europe aren't aware of, is that in America, the Trinity Reflex 10 dirt-oval car, designed by Jim Dieter, is a very popular car indeed yet it wasn't widely known that Trinity produce their own chassis until the win in Pomona last autumn. Joel 'Magic' Johnson had already won the ROAR Nationals driving an RC10L, and was ready to take on the world at the Ranch Pit Stop track driving such a car, when Jim Dieter presented Joel with a prototype of the Evolution at the start of practice. After only a few laps, Joel was apparently putting in faster laps than he had ever done before, so the new car was definitely the car to run at the meeting!

The Evolution was obviously impressive during the qualifying heats, therefore becoming 'the' car that everyone wanted to photograph, but due to the fact that it represented a new concept, and Ernie Provetti didn't want the other manufacturers present to incorporate any of the new car's features, it was constantly shrouded with a towel to foil prying camera lenses. RRC published the first photographs of the car in the World's press in the January issue, revealing that the car, now dubbed the 'Evolution 10', differed in three main areas from the competition, making the car quite unique. We've been waiting with baited breath ever since for the review kit to arrive!





What Makes It So Different?

The Chassis.

The first thing that strikes you is the fact that the cells are situated down the centre line of the car, as they are in the majority of 2wd off-road cars. Mounting the cells in this fashion is a real departure from the accepted 1/10 on road norm of using saddle pack cells. The weight distribution is such that the car has a very low polar moment of inertia, this meaning the car has the ability to change direction quickly. The chassis is also very narrow, being about 3 3/4" wide at the widest section, this means that room for the radio gear is at a premium, but more on this later.

The chassis itself is the thickest I've ever seen, being no less than .110" thick, nicely produced in 'quasi-isotropic' graphite which I am sure will not 'tweak'! The only holes in the chassis are at the front, under the plate that serves as the suspension mounting, but despite this the material is very light, so it would appear that any form of lightening mods would be unnecessary.

The Front Suspension.

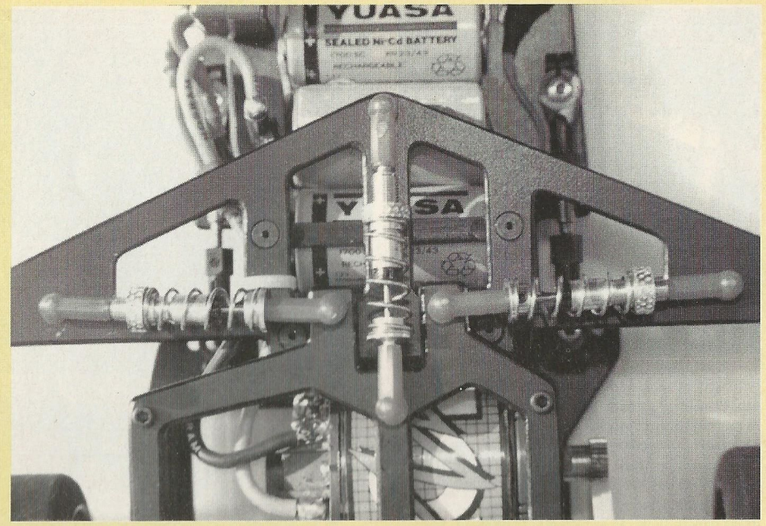
The second feature is the new design for the front suspension, the set-up on the Evolution being dubbed a 'reactive caster' design, the idea being that as the suspension loads up as the car enters a corner, then the kingpin angle changes to a lesser degree or even zero, thus giving a sharp turn in if desired, but reverting back to the set amount of caster when the load decreases as the car exits the corner. Caster helps a car through the second half of a corner and aids stability down the straight, so it would appear that the reactive caster system on the Evolution offers the best of both worlds.

The graphite front suspension plate, mounted on removable spacers of varying thickness to give ride height adjustment, is fitted with a nylon bushing through which the extra long kingpin slides. The .022" springs, and the 'O' ring that provides the damping are situated at the lower end of the kingpin, retained by the usual 'E' clip. The damping can be adjusted by using thick or thin silicone 'goop' around the lower end of the kingpin. The centre point steering blocks go above the suspension plate, then the unique 'upper wishbone' is mounted to the suspension plate via ball joints, the nylon moulding that provides the anchorage for the top of the kingpin has a nylon ball snapped into it through which the kingpin slides, while the ball is allowed to rotate to allow for changes in the kingpin angle as the suspension moves through its travel. The more the rear inner pick up point is raised, by washers under the pivot ball, the more the caster angle of the kingpin is decreased when load is put upon the suspension, while the length of the arms can easily be adjusted by the neat turnbuckles to change the degree of camber. (I slipped up slightly when assembling the front suspension, as I used four pivot balls, the threads of which were flush with the nut when assembled, whilst for the rear shock mounting balls I used balls that had longer threads that had to be shortened to avoid them sticking through too far. Guess what ? I should have used the long ones for the front, to allow the packing up of the pivot balls to adjust the reactive caster).

This is really the most innovative, infinitely adjustable set up yet seen on a Pro 10 car, and hopefully will mean that the traditional British racer's pitbox won't have to be so full of the tyres that have been needed in the past to tune a car to a particular track.

The Rear Suspension.

The third feature that sets the Evolution 10 apart from the competition is the 'Triad' rear suspension system. The motor pod is pivoted on a central mono-ball pivot, rather than a GRP T-Piece, with the alignment being adjusted by two tie rods, these pivoting on 1/4" aluminium balls. The most obvious sign that this car is different, is that there are three miniature coil over shockers, mounted virtually horizontally, from the motor pod to a graphite plate that also serves as the mounting for the rear body posts. This plate is mounted on two aluminium posts and the rear battery cup. These will provide for virtually any preference regarding the way that a car should handle, as there are alternative springs available in weights from 5lb to 23lb for the rear end, the springs provided in the kit being rated at 15lb. The variation in spring rates, along with different weights of oil in the shocks should allow really fine tuning to take place, if time allows, that is ! Good damping is one of the key factors involved in achieving rear end grip and stability, especially at high speed, so I am looking forward to trying the car at my home track, which seems to have a reputation for being bumpy (but I don't care!).



The Power Train.

The rear motor pod is conventional (just about the only thing on the car that is!), and consists of the usual aluminium motor plate, with a nylon plate on the other side, sandwiched between graphite top and bottom plates. What could be regarded as unusual, is that the Evolution features a hollow graphite axle, so when filing a small flat on the axle to accept the fixed hub grub screw, don't be too keen! (a small dab with the cyanoacrylate will help the graphite retain its strength here). The usual method of providing ride height adjustment is used; three sets of bearing carriers are provided, giving in total 5 alternative ride height settings.

The differential is fully ball raced, with the 120 tooth Magic Motorsports 64 d.p. spur gear also running on a bearing. The outer race has a cone and thin washer to rest against the inner part of the bearing, rather than a thrust race and washers, and the diff action realised was very good indeed.

The Build.

All the parts were bagged to correspond with the 5 stages of construction. A nice touch is that not only does the kit have a pictorial instruction manual, the idea being to tick off a box as each stage is completed, but a written manual to supplement the other and give tips on how to go about setting the car up.

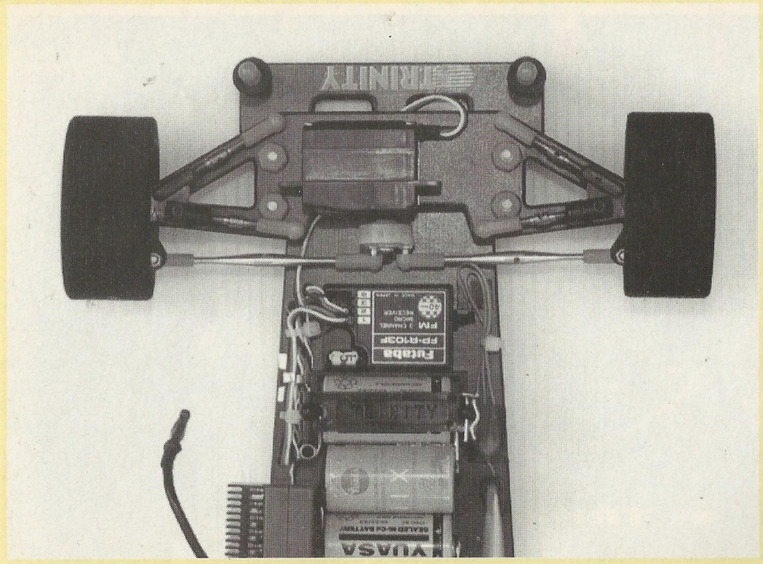
The graphite parts were cleanly routed to shape and nicely countersunk, the only part not done to perfection was the lower motor pod plate, as the screws protruded slightly below the surface, but that was my only niggle.

Before I started to actually assemble the car, I rounded all the edges of the graphite parts off with a file and wet and dry paper, used wet in the kitchen sink (a little washing up liquid helps here). A quick whip round with a black marker pen to darken the edges, then a careful application of cyanoacrylate to help prevent the graphite delaminating, saw all the chassis parts looking and feeling very smooth and smart. It doesn't take very long to do this and, I think, adds a lot to the cars' appearance.

The front suspension went together as per the instructions and, as stated in the text, the kingpin bushings did need some fettling to achieve a nice action, but I felt that the instructions were a little ambiguous when it came to setting up the kingpin geometry. Lengths are given for the arms, but following these I ended up with rather a large amount of negative caster! However, this was quickly rectified by a few turns on the turnbuckles.

The rear end build went totally to plan, everything fitted as it should, and even the shocks went together first time without needing any bleeding. The shocks will be recognised by many 1/12 racers as the popular Delta type, and provide a nice smooth damping action. When it came to installing the axle, the manual tells the builder to use a spacer of equal thickness on either side of the rear pod. I did so, then realised that something looked rather peculiar. On measuring from the centre of the car, it became apparent that one of all the three thicknesses of spacers had to be used on the nearside of the axle to achieve an equal track. In fact, when I closed the manual later, the illustration on the cover shows the Evolution with the spacers just so!

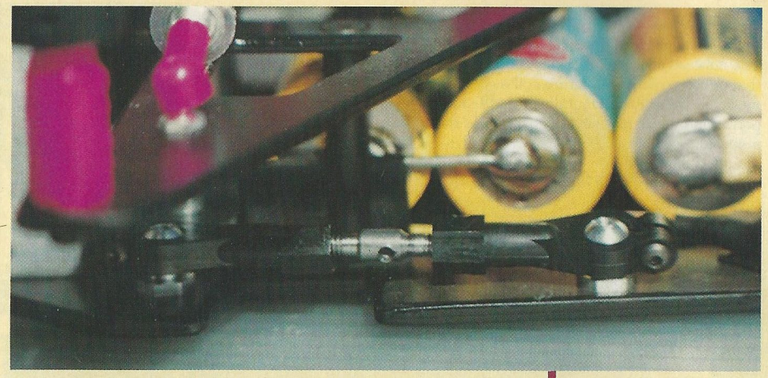
To check that the rear pod was correctly aligned, I laid some masking tape on the front suspension plate, marked the centreline, then another at 90 degrees, and measured back from this point to the forward, outer edges of the rear wheels. The wheels and tyres supplied are so true (TRC ZR-1 wheels with Green dot rubber), that I am not planning to use them , but will put them by for setting up the chassis. The tie rods needed very little adjustment to bring the rear axle into alignment, having been made up to the length suggested, the turnbuckles again proving very useful.



The Finishing Touches.

My choice for the shell was a Dahm's Racing Bodies Lola GT, as I thought that it would be nice to feature something other than a Nissan shell (Pro 10 is going the way of 1/12 in that everybody seems to run identical bodyshells). Nicely moulded, this very pretty and low shell should soon be available in this country from a new distributor, thanks Ira! Painted in my usual colours with Pactra aerosol, I hope you'll agree it certainly makes a change.

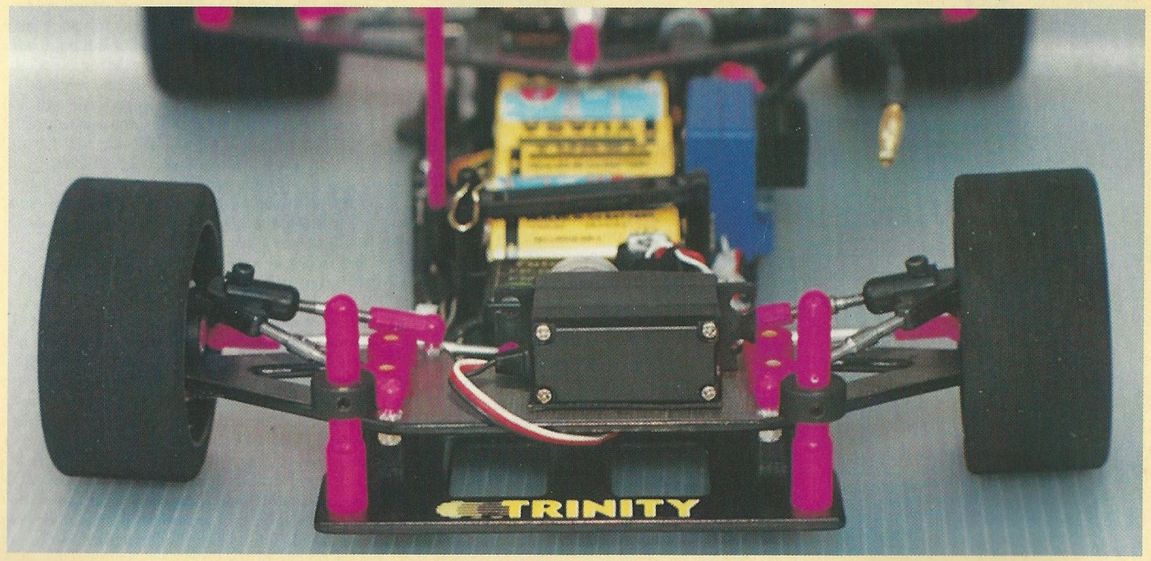
The chassis is very narrow indeed, leaving little room for the radio installation. The method suggested is to mount the speedo and receiver on their sides with servo tape. The speedo to be used was a Nosram Dominator, the receiver a mini Futaba 40 mhz, with the servo a Futaba 132H. The speedo fitted well enough, but the receiver

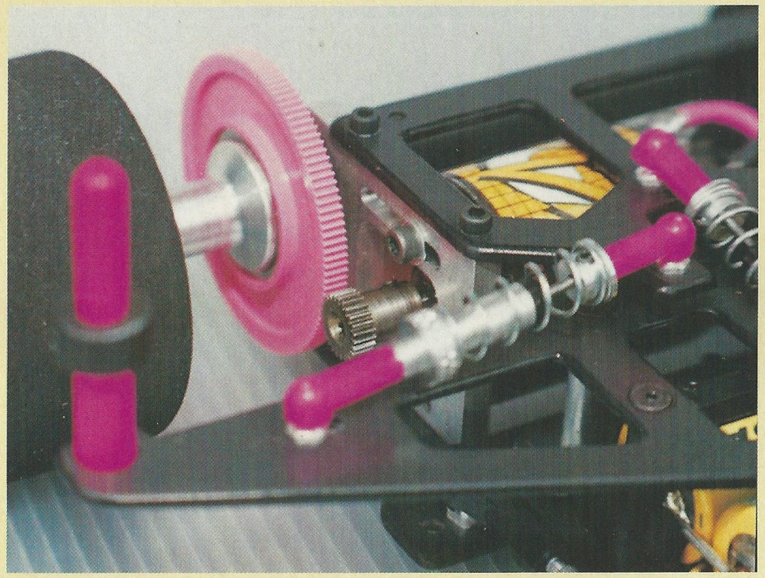


wouldn't fit in the space between the rear tie rod and the aerial mount. Not wanting to redrill the aerial mount hole at this stage, I mounted the receiver in front of the front battery cup (this went against the grain a little here, as a model plane flier I would never position the Rx in front of the nicad pack). The cells fitted snugly in their cups, but I didn't want to have to hard wire them (portable soldering irons probably warm up faster in the warm American climate!), so I used Yokomo Gold bars, soldered to the cells, to extend out from the battery cups to provide a mounting for Corally connectors(thanks for the tip, Lee). I tried to make things as neat as possible because the available room is pretty limited.

The new BRCA regulations for Pro 10 racing have removed the weight limit of 1200 grammes, so I eagerly weighed the car to see just how light it was, and was surprised to find that minus the shell it came out at 1020 grammes, and complete 1128. This is in totally stock configuration, I am sure that some racers will improve upon this figure, the problem then will be how to keep the car on the ground I should think!

Having built and run the car now, with the gear in this configuration, I'm going to make up a graphite plate to sit atop the cells, on which to mount the radio gear, clamped in place by body clips through the battery cup posts. Why, you may well ask? Well, the British weather doesn't really allow for speed controllers 10 mm off the ground in pouring rain, so the idea is to make up a waterproof box in which to keep the valuable electronics nice and dry.





The Track Test.

The venue for my first runs with the Evolution 10 just had to be the Ashby track, the site of the 1992 European Championships, and my home track. Not exactly the smoothest 1/10 scale track in the country, but with its combination of tight infield corners and high speed banked bend off the straight, it has been proved to be a good circuit and capable of testing any car to the limit.

The motive power for the Evolution was provided by an AGR motor, the wind being unknown as it was a prototype, but Andy suggested that I geared it on 42mm/rev, using a combination of GaleForce Panasonic P-170 and Fabiix 1700SCKR cells. As stated earlier, I wanted to retain the kit tyres for setting up the chassis, so I put on a set of TRC Greens that had been used at the Euro's for only about 10 laps during practise. The front end was set up with 2 degrees of negative camber and 2 degrees of caster, with the rear pivot balls flat on the suspension mounting plate (in other words, very little reactive caster. If a close look is taken at Joel's winning car, it can be seen that the rear pivot is packed up by at least 1/8" off the plate, giving a much larger amount of change in the caster angle).

The first run was a revelation for me, as the Evolution seemed to glide around the track, staying nicely glued to the fairly bumpy straight, without any feeling of instability at the entry to the fast banked bend at the end of the straight. I literally felt more at home with this car than any other that I have driven to date, as the grip it generates is simply fantastic! (I wasn't using a wing mounted from the pod, a Bud's stabilising wing on the shell proving perfectly adequate). Using 3/4 rates, the turn in to the chicane was better than I have previously experienced, the accuracy and entry speed being very good indeed.

Examining the car after the first run revealed that, despite a ride height of 5mm, too much movement due to a combination of too soft a spring rate and damping had lead to the chassis grounding. I think that for the great majority of circuits the kit springs and oil will suffice, but obviously for Ashby a different set up is desirable. To gauge the effect of altering the reactive caster, I then packed up the rear ball joint by 1/8", turned the rates down slightly, and tried again. Awesome! The turn in was even better than before, and because it did so without having to ease off the throttle so much, the cornering speed was better. The best thing about it was that the chassis works so well, the steering response was achieved without the rear end sliding. Another facet of the front end was that the tyre wear rate was very low indeed, yet on the second run, I was doing lap times that would have seen an A final place at last year's Euro's but took very little rubber off the tyres.

This car represents the first really radical development in the design of 1/10 circuit cars since the class was introduced, and Jim Dieter has really come up with a winner. If the great majority of 1/10 off-road drivers tried this car, then it would soon be as hard to get an entry at a Pro 10 National, as it is for an off-road meeting. My verdict on this car is that it isn't as easy to build as some, although the set up is soon mastered, but the fantastic performance far outweighs the relative complexity. Excellent!

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