

# BoLINK ELIMINATOR

## 1/10<sup>th</sup> on Road

Colin Leake tries his hand at electric circuit racing

**W**hen it comes to racing tenth scale cars on tarmac surfaces, three distinct categories are beginning to emerge. With this branch of model car racing only just beginning to take off in this country, the most numerous cars are converted buggies of one form or another that have been lowered and fitted with suitable wheels. In many respects they do have an advantage over the other cars. They are rugged and with four wheel drive are easy to drive in any conditions. In addition they have the added advantage of being virtually dual purpose in that they can easily be converted back to off road use. The main potential disadvantage is that by virtue of their weight and relative mechanical inefficiency they are unable to compete with more specialised circuit cars.

With the rapid growth of tenth scale circuit racing on a worldwide basis the Japanese have, as ever, rapidly moved in

to satisfy the demand, and have produced a range of cheap cars specifically designed for circuit racing. The *Tamiya* 'Road Wizard' is a classic example of this type of car that is already available in this country. Many alternatives are due to follow soon. Their principle advantages are that they are cheap and effective and hence provide an economical way to go racing. They are already very popular in the north and no doubt we shall soon see them gaining rapidly in popularity down south, when they become more readily available. Such cars as these form the second category.

The third category takes the form of very specialised tenth scale circuit cars built specifically to win races. Those that I have so far encountered employ the technology developed so successfully over the years for twelfth scale cars with some subtle changes made to make them more suitable for use on tarmac. In effect they are scaled up twelfth scale cars.

Most originated in America where this form of racing has gained rapidly in popularity. They reflect to a large extent the character of the typical American who loves to race and likes to win just for the hell of it. Such cars as these are the fastest, most effective racing machines they could devise for their conditions. The only potential problem with these cars is that they are designed for dry tracks with good traction. Pitted against them under these conditions no converted buggy or current Japanese import would stand a chance. The problem is of course that under wet conditions the position would be completely reversed. What is clearly going to be needed, if we are to avoid the ridiculous situation of drivers needing to have two cars to compete seriously, is the creation of two distinct classes. Certainly we in the London Club have already at least begun to think along these lines.

The *BoLink* 'Eliminator 10' that is the subject of this review falls fairly and squarely into this third category.

The car is sold in three different forms. I will go into the relevant merits of the three later but for the sake of clarity it is perhaps best that I start the review by listing the basic differences between the three. At the bottom of the scale priced at £99.00 comes the basic fibreglass kit complete with body but with no electrics at all. Next in line at £135.00 is

the same kit but inclusive of all the electrics except the batteries. The speed controller included in this kit is *BoLinks* own resistor type. The bearings in both the forgoing kits are of the Oilite type. *BoLink* offer a choice of two body types with these kits. What they refer to as a stock car body is what we would call a saloon body and what they refer to as a track body we would call sports GT.

Top of the range is the competition kit at £179.00. No body or electrics are included in this kit. However, the chassis and the plate that serves as a front axle are both made of an incredibly lightweight and strong graphite composite material, whilst the heavy steel rear axle used in the other kits is replaced by a graphite rod. Curiously *BoLink* have chosen not to include body posts in this kit. The reason for this decision escapes me.

Given that our esteemed Editor is or will shortly be reviewing a rival product, that also emanates from the U.S.A., an element of competitiveness has crept into the proceedings, at least as far as we are concerned it has. That being the case, and in the knowledge that he may well be using eight cells against our six, we chose to build the light weight competition kit.

The kit is packed in one of *BoLinks* distinctive green black and white boxes with the contents divided up in sensible groups in clearly numbered plastic bags.

The instructions leave a little to be desired in some respects. They are very amateurishly produced, the quality of the printing of the photographs is appalling and there have been product changes that have only found their way into parts of the instructions. For instance the rear brace has been changed. Fortunately this can be seen on the photograph on the front cover, but it has not been changed on the exploded diagram.

Having said that the car is basically so simple and logical that I'm sure even a novice would have little difficulty in making a good job of assembling the car. The only thing that caused me to have to stop and engage brain box was to decide which way round to fit the rear T-plate.

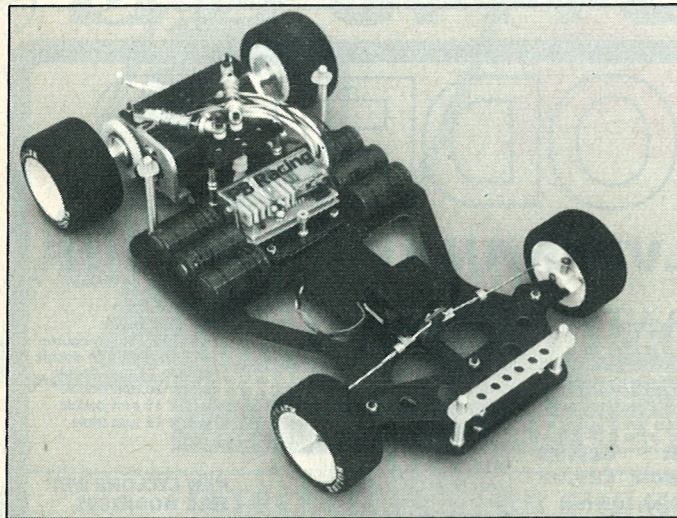
Paradoxically if the instructions are poor in one respect they are superb in others. The text leads one through the assembly step by step with great clarity. Since only one size thread is used on the bolts they are easily identified by the type of head and the length. Using this each step of the instructions tells one precisely where each bolt goes, which direction it is inserted from and which bag it will be found in. They also indicate those on which thread locking compound should be used and give explicit advice as to which compound to use. Likewise only two types of nuts are used, plain and locknuts, which also helps to make life simple.

Another aspect that I found was that at the end of the instructions a section had been inclined on how to set up the car. Nothing was taken for granted in respect of the builder having any knowledge of model cars. For instance when dealing with castor they explained what it was, which was positive and negative, how to adjust it, what the effect would be on the cars handling and gave a recommended setting. Full marks to *BoLink* for this. I don't think I have ever seen this sort of thing so clearly explained in a set of instructions before.

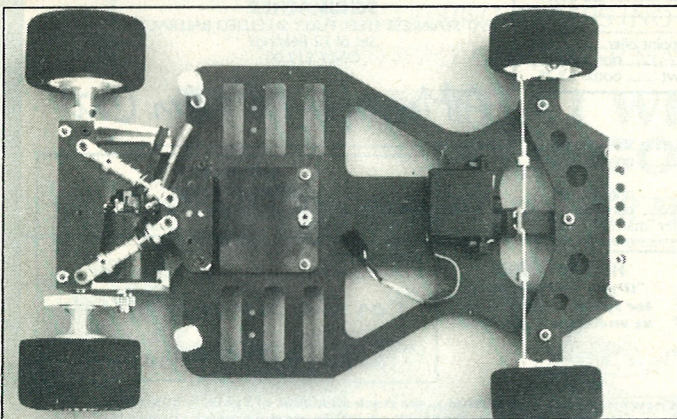
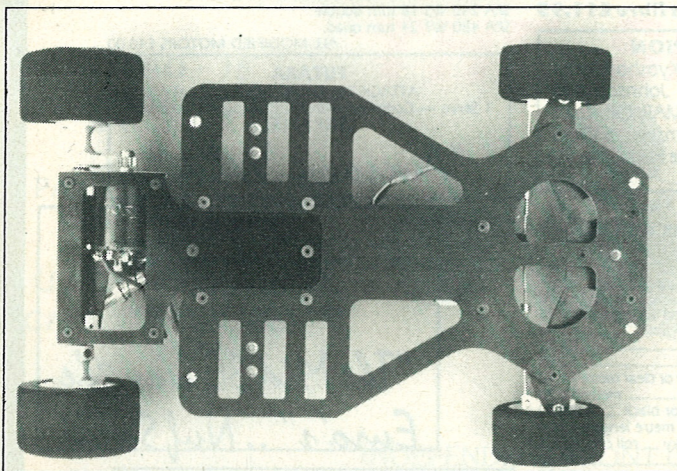
Interestingly they recommend using fairly hard tyres and obtaining the grip by use of traction additives, pointing out that the use of ever softer tyres can produce problems with rear end hop. Food for thought here perhaps.

A small tool kit is provided with the car consisting of three allen keys. This is no doubt adequate in the U.S.A. but I would have appreciated a small pressed spanner for the nuts as well. I have an extensive collection of small spanners and two socket sets but was unable to find one that would fit, in the end I had to resort to using a small adjustable spanner. Mind you I have to admit that Steve dropped my best socket set in a field and there are a couple of sockets missing.

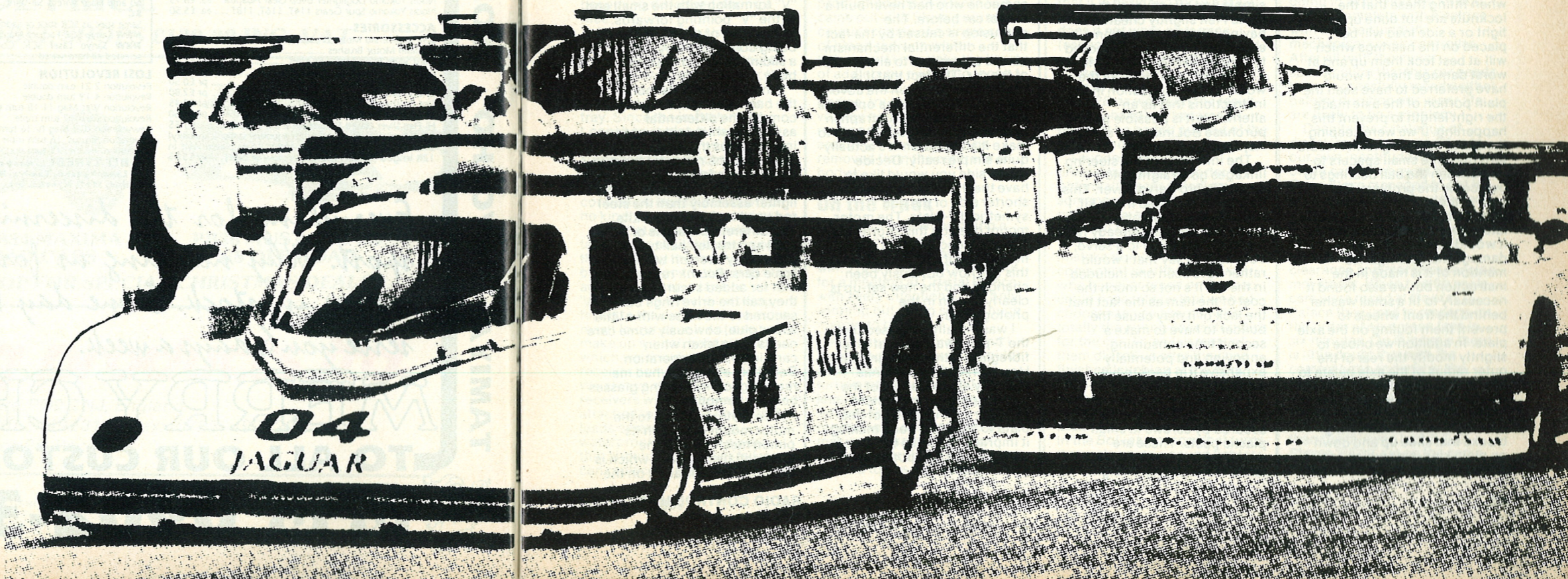
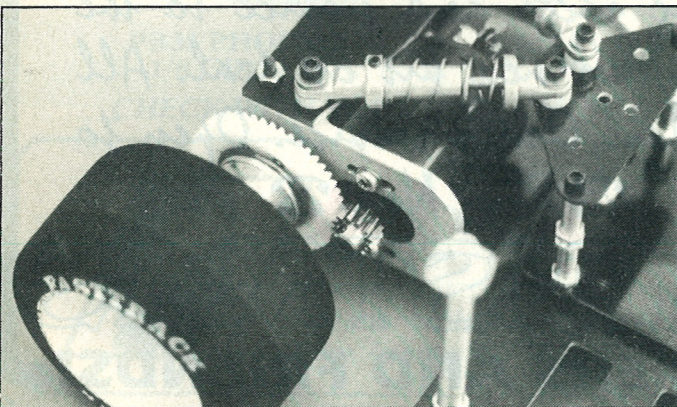
The front suspension unit takes the form of a shaped graphite plate which is described in the instructions as

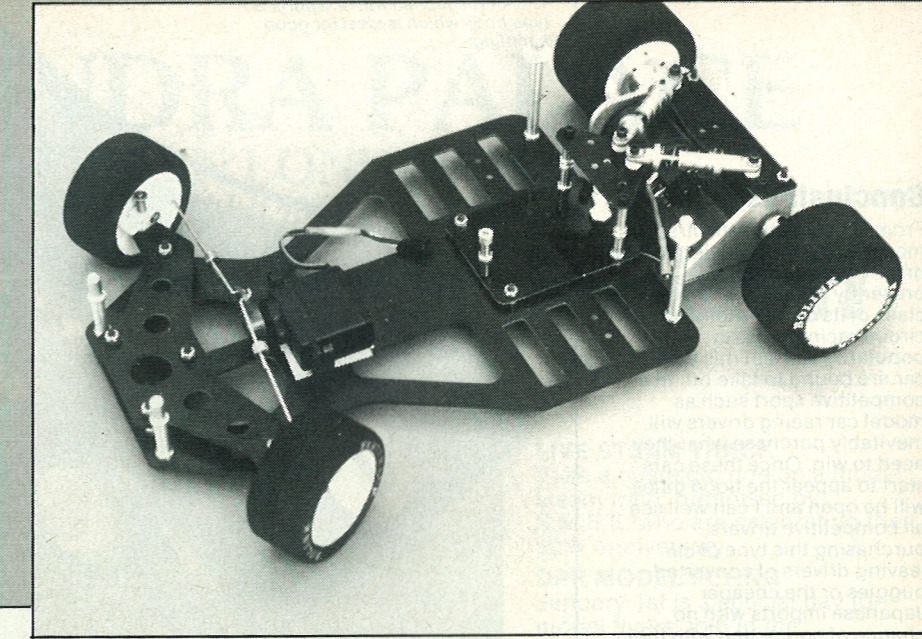
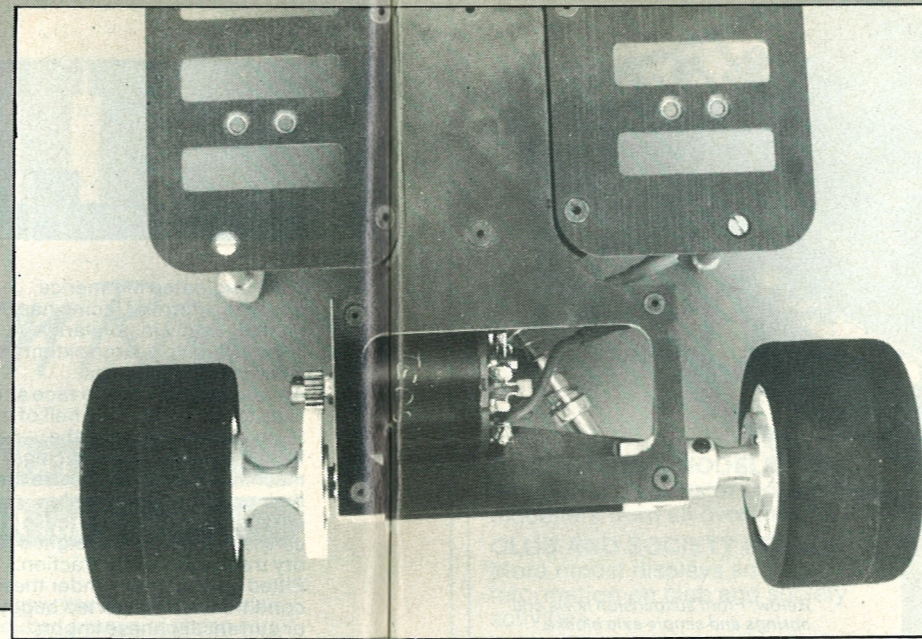
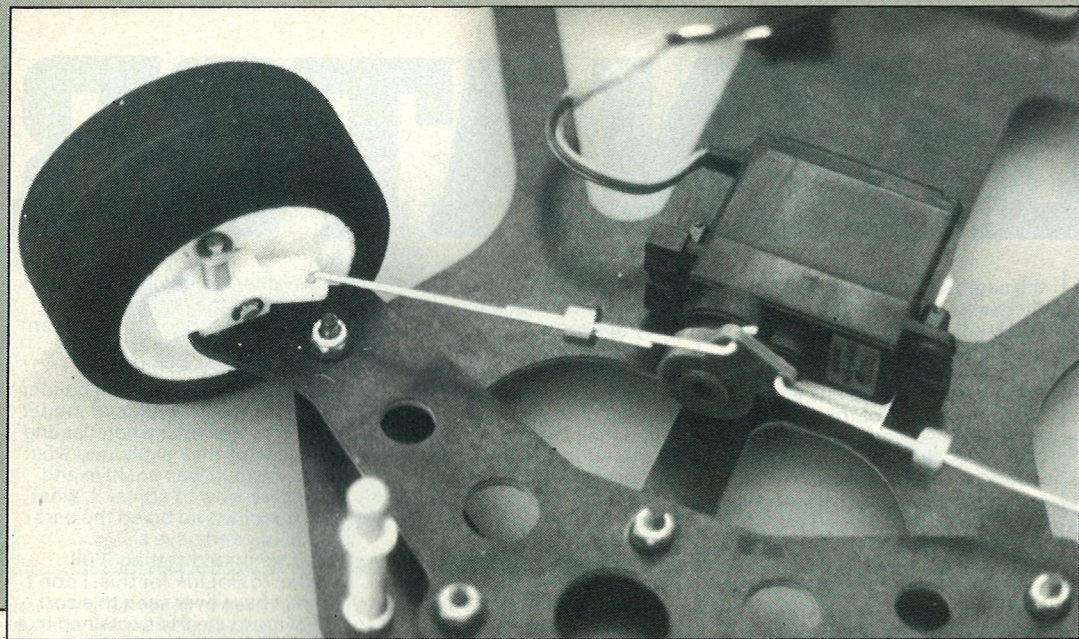


Above: The 'Eliminator' is basically a scaled up 1/12th car with a similar layout. Below: Underneath the chassis is flush and looks neat in black.



Above: The chassis is simple and is designed for a 6 cell layout. Below: Drive is through the standard 32 dp drive gear system.





the front axle. It is deceptively simple looking but in fact is actually very clear. At the front it is supported on two aluminium spacers that are rounded at the top where they come into contact with the plate. These effectively form pivot points which allow the plate to be tilted backwards and forwards. At the rear three bolts are used to secure the plate but this time the spacers are formed from short lengths of thick silicon rubber tube. By tightening or slackening all three nuts can be moved in such a way as to change the castor of the front wheels. The camber is adjusted by operating the centre nut only in such a way as to distort the plate to produce the desired change. It's simple, ingenious, rugged and above all effective.

Ball bearings are pushed into the front wheels which are secured to short stub axles by locknuts. Care has to be taken when fitting these that the locknuts are not done up too tight or a side load will be placed on the bearings which will at best lock them up and at worst damage them. I would have preferred to have seen the plain portion of the axle made the right length to prevent this happening. If we were keeping the car to race long term I would turn up some small spacers to go between the ball bearings to overcome the problem. Taking care in the workshop is one thing but in the panic to effect a late wheel change at a meeting it would be all too easy to damage the bearings. No mention of it is made in the instruction but we also found it necessary to fit a small washer behind the front wheels to prevent them fouling on the axle plate. In addition we chose to slightly modify the rear of the outer radius of the axle plate to provide increased steering lock without the inner wheel fouling.

The stub axles are themselves pressed into plastic steering blocks that slide up and down on plain king-pins which are bolted ridgedly to the front axle

plate. The suspension is provided by small coil springs that are secured by "C" clips above the steering blocks. We lubricated ours with Holts Plastic and Rubber Lubricant. One moved freely but the one on the other side persisted in binding. We eventually solved the problem by polishing the king-pin along its axis (vertically) with some very fine wet and dry paper and carefully cleaned the hole cut in the plastic block with a fine needle file. When doing this it is important to remove as little material as possible. The last thing you want is a sloppy fit.

The steering linkage is formed by two pieces of bent wire per side held together with a collet. To adjust the length of the linkage all that is needed is to slacken the collet off and move the wires. This system is found on many kits including some of the most expensive ones. I must admit that it is simple and effective, all the same I felt slightly cheated at having this cheap solution employed on what is supposed to be the top of the range kit. This feeling was made all the worse by the suggestion in the instructions that as an alternative it is possible to purchase BoLinks own super Adjust-a-Link system!

The inner end of the steering linkages go straight onto a small Kimbro Servo Saver. This item is not included in the kit. I suppose the assumption is made that one may already have one available fitted to a servo, but I have to say that I would rather have seen one included in the kit. It's not so much the cost of the item as the fact that the lack of it may cause the builder to have to make a second time consuming, annoying and potentially expensive trip back to his supplier.

The steering servo is located across the front of the car and secured by screws to small plastic posts. These are designed to accept the type of small miniature lightweight

servo normally found on twelfth scale cars. Not having one of these to hand we elected to use one of the larger servos from our eight scale cars. Apart from the fact that we needed to make some new posts to suit our servos no problem was encountered in this respect.

The next job was to fit the small radio plate which is located securely on aluminium spacers by steel-bolts. Unlike the chassis and front axle this is made of fibreglass that has been dyed black rather than graphite. The next step advised by the instructions is to fit the shock plate, in fact we found out that this is easier if this is left until after the rear T-plate has been fitted.

Next comes the fitting of what BoLink call the T-plate assembly but which I would prefer to refer to as the motor pod assembly. This is the one area in which some confusion might briefly be caused to someone who had never built a model car before. The confusion is caused by the fact that the differential mechanism can be assembled to either side of the car. The fact that it is shown on one side in the cover photograph and on the opposite side in the detail photograph in the instructions does not help to make it any clearer. It's actually quite simple really. Decide which side you would like to have the diff. This then is the shorter side of the non symmetrical T-plate. The motor mount goes on this shorter side. The exploded diagram shows a motor mount on both sides but this has now obviously been changed and the new set-up is clearly shown in the photographs.

I was initially surprised that the T-plate was made of black fibreglass rather than graphite. However, when one thinks logically about it some of the rear suspension movement comes from the ability of this plate to twist and bend making it impractical to use the ultra stiff graphite composite used elsewhere.

The T-plate is fitted to the rest of the car by being bolted under the radio plate with two bolts. At the front end of the plate the mounting is made ridged by the use of a small aluminium spacer, whilst at the rear the bolt passes through a large grommet which allows the assembly to both pivot and move vertically up and down. The pressure exerted in this grommet serving to vary the resistance to such movements. In addition the radio plate has been drilled to accept two screws that act on the T-plate and may be adjusted to limit the total amount of roll that can occur.

The springing for the rear end is provided by two units having coil springs located over conventional hydraulic dampers. These are located on one shock plate mounted on posts above the radio tray, and a second shock plate mounted at the rear of the motor pod, in a "V" formation with the small end of the "V" pointing forwards. The degree of spring pressure being controllable by means of a sliding collar on the damper body.

Finally, on the assembly of the basic rolling chassis we come to the differential assembly which in this case incorporates the rear axle. In this top of the range kit the rear axle is made from graphite rod which results in a considerably lighter assembly than the steel rod used in the cheaper kits. The differential itself is of the tried and trusted ball type that is universally used on twelfth scale cars. BoLink recommend that for added security what they call the drive rings be secured to the hubs with a little super glue, obviously some care needs to be taken when carrying out this operation. Definitely one which had me reaching for my reading glasses before attempting it!

The motor is bolted to the motor mount plate with its pinion meshing with the differential drive gear, which is itself mounted straight on the

rear axle to give the most direct and efficient drive system possible. It is here that this type of design scores so heavily over converted buggies. With a strictly limited amount of power available to last the five minutes of a heat the light-weight and low-rolling resistance of cars designed in this manner gives them an enormous advantage.

Moving on to the electrics we come to the battery pack. This takes the form often referred to as a saddle pack configuration. Basically this means that they are arranged in packs of three with one located each side of the car. In the 'Eliminator' they sit in three small cut-outs in the chassis and are held in place by BoLink's excellent system of two small shaped plastic blocks that are trapped between the rear pair of cells. These blocks are secured to the chassis with two bolts. With a system as fool proof as this there should be no danger of battery packs becoming dislodged during a race.

Assuming that an electronic speed controller is being used BoLink recommend that this be mounted with servo tape, or the now more fashionable, and practical 'Velcro' on the radio tray. Since the importer Ted Longshaw is also a main PB distributor it came as no surprise to find that he had included one of the new very robust and efficient PB controllers in with the kit which he kindly loaned us for review.

As most speed controllers will take up the available space on the radio tray the receiver must be mounted on the chassis, again using servo tape or 'Velcro'. The aerial wire being taped to the outside of the radio mast! In our case we chose to make up a small bent plate to which we could mount our receiver complete with aerial. We always make up for receivers with the aerial attached to the case and with fly leads emerging from the waterproofing in such a way that should the receiver fail we can replace it in a matter of

seconds.

The car is completed by the addition of BoLink's own very pretty sports GT body. In common with some other American manufacturers the cockpit area is left blank devoid of any driver figure which always seems to me to spoil an otherwise very good body. Certainly the overall quality of the tool from which the body was made and the vacuum forming is of a very high order. The BoLink instructions contain a whole page on how to go about painting and cutting out the body. I give BoLink top marks for this. All too often manufacturers assume that the builders of their kits will be experienced, and neglect to provide this simple type of basic advice which is so necessary to the first time builder. I'm afraid in our case I was about to paint a batch of eight scale bodies ready for next year so the 'Eliminator's' body went on the production line as it were and came out with Steve's normal colour scheme of a single coat of blood red with white lettering. If I may take the liberty of adding my own tip to those given by BoLink for cutting out bodies, try using a small low voltage high speed drill with a routing bit for those difficult areas that often have to be removed from the centre of a body.

### On the track

It's always nice when doing a track test to be able to take whatever is being tested and win. Thus it was that we set out for a meeting at Crystal Palace with every intention of not only winning but doing so by a huge margin to boot.

Honesty has to prevail and I have to admit that what should have been a triumph rapidly turned into a fiasco. Still, at least we learned a few valuable lessons that are worth recording to prevent others making the same mistakes.

Our first problem was that we elected to use the tyres that

came with the kit. These tyres may be very well suited to the high traction conditions found in the States but they are, to put it mildly, less than ideal for a cold grey morning in the middle of winter in the UK. It was the rear tyres in particular that were the cause of the problem. On the grounds that later at the same meeting Steve reverted to his two wheel drive Associated 'RC10' with Bajoma '114 tyres' on the rear and set F.T.D., I can only suggest that the kit tyres should be removed and these, or similar tyres, be put in their place.

Mistake number two was to attempt to correct the situation as suggested by BoLink with the use of a tyre additive. Had we used the additive they recommend all may have been well, but no, we used the additive that came most readily to hand, and covered the tyres with Tractite. Now whilst this works very well on the surfaces that it is designed for, what we did not know, is that not only does it not work on tarmac (especially damp tarmac) but it actually makes the situation worse. I put some on the rear tyres of Shaun's four wheel drive PB as well with the result that the handling became so bad that he had to pull out of the first round of heats.

I suppose one of the problems that an importer potentially faces in letting someone not used to electric cars review his product is that they will fail to get the best out of it, which leads me to classic mistake number three. Any competent twelfth scale driver who has ever raced on Tarmac could have told us that we had chosen to use a motor with totally the wrong characteristics for the car. To be fair most of them did tell us after they had finished laughing at the cars antics. Just because we had been winning with seventeen turn triples in the buggies we assumed that these would win in the BoLink. In a car that turns the scales over a pound lighter than our Associated 'RC10' the

Far left: Servo connections are kept simple using a bolt-on servo saver. Centre: T-piece is standard 1/12th scale technology giving good rear end grip. Above: Neat and simple - the car allows lots of room for radio installation.

result was devastating. The use of this motor, combined with the other problems we encountered made it very difficult to even get the car off the line never mind race it. It needed extreme caution to avoid the bar being left doing a fair imitation of Nigel Mansels party trick (rotating in circles with the back wheels spinning). We should have gone for say twenty-six turn double.

I also suspect that the rapid response of the electronics speed controller, so desirable in getting buggies, and twelfth scale circuit cars on carpet, off the line was more of a hindrance than a help. BoLink may well know what they are doing in supplying the kit that comes complete with electrics with a more sluggish mechanical speed controller. After all with the motor specification that this car needs to be successfully raced neither battery duration nor wiper life are likely to be a problem.

Despite the catalogue of disasters that occurred due to our own ineptitude the potential of the car still showed through. Once Steve managed to get it off the line it was, as expected, very much faster than the buggies. Essentially it is an enlarged version of a twelfth scale car with more ground clearance and more suspension movement. When twelfth scale cars were raced at Crystal Palace they used to manage in the order of seventeen laps in six minutes. On this basis there is little doubt that with the correct tyres and motor the BoLink would be capable of achieving around fourteen or fifteen laps in five minutes. That is to say one or two laps quicker than the thirteen laps F.T.D. Steves 'RC10' set on the same day!

## Conclusions

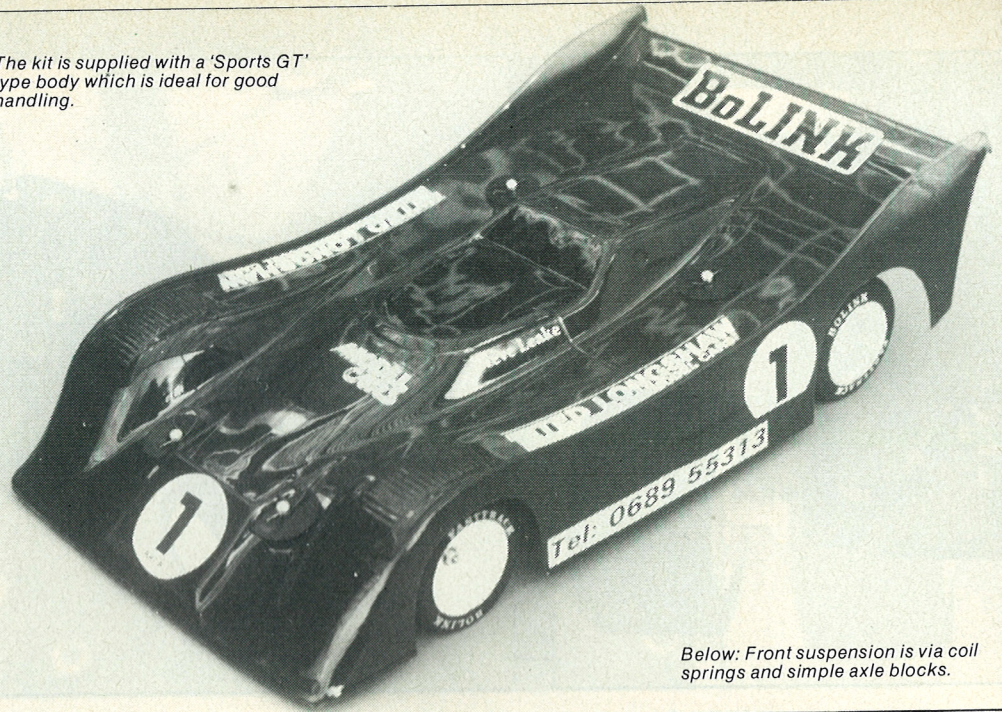
From the track test the first and most obvious conclusion to be drawn is that this car is presently quite literally in a class of its own. As tenth scale circuit racing gains in popularity sales of this type of car are bound to take off. In a competitive sport such as model car racing drivers will inevitably purchase what they need to win. Once these cars start to appear the flood gates will be open and I can well see all competitive drivers purchasing this type of car leaving drivers of converted buggies or the cheaper Japanese imports with no chance of competing with them in the dry. It is to be hoped that before this becomes a problem the B.R.C.A. will have given a lead by creating a suitable class in which they may be raced.

The second conclusion is that this car is very easy to build and maintain. Ours is an early example so I found a number of small points to be critical of. Despite this I have to say that everything fitted together with pleasing precision and we encountered no serious problems in building the car. I have no doubt that by the time this appears in print *BoLink* will have dealt with the small discrepancies we found.

The third conclusion is that this car will be fun to drive, providing a real test of its driver's skill. As an avid eight scale fan I have been in trouble with readers before for deriding other forms of model car racing, referring as I often have to eight scale as being the real thing. We have spent part of the winter, in company with other eight scale drivers, amusing ourselves by racing converted buggies on tarmac. Whilst it has been a fascinating technical exercise in terms of getting the motors, cells and cars right one has to say that the racing has not been very exciting nor has it placed any great demands on the drivers' skills. True, we have managed to get our cars up amongst the top few but it is the cars rather than the drivers that have made. I rather suspect that any competent driver given the chance to drive one of our cars would turn in more or less identical results to those the lads have been achieving.

With the 'Eliminator' we are back to relying on the skill of the driver. The fact that the car is two wheel drive, has an impressive top speed, a good power to weight ratio, and can only use foam tyres means that it has to be driven. Given two cars with identical equipment a good driver would be considerably quicker than a less skilled or experienced driver. Driving this car requires skills to those needed to drive eight or twelfth scale circuit cars.

The kit is supplied with a 'Sports GT' type body which is ideal for good handling.



Below: Front suspension is via coil springs and simple axle blocks.

## Which one?

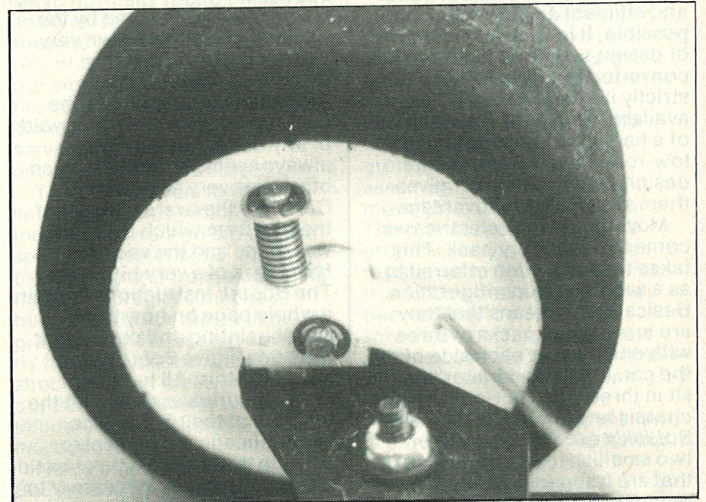
With three kits to choose from the question of which kit to purchase has to be considered.

Starting at the top of the range. If you are absolutely sure than tenth scale circuit racing is to be your thing, you intend to compete at the top, and you can find the necessary funds, then the graphite competition kit is the obvious one to go for.

If you are not sure, and just want to try your hand at the sport then you can start with one of the lesser kits and upgrade to the full graphite specification later. A careful look at the spares price list reveals that such an upgrade from one of the basic kits can be made for little more than the additional cost of purchasing the graphite kit in the first place! More especially so when one takes into consideration the fact that the basic kits include a body.

Both the cheaper kits use Olite type bearing which are to say the least less than ideal. Only six bearings are used in the kit and Ted Longshaw tells me that he will be selling a ball bearing kit to suit for somewhere in the region of £10.00 to £12.00. I can only recommend that these be purchased with the kits. If one runs the car with the Olite bearings wear will occur on the shafts with the result that they will have to be replaced before a successful conversion to ball bearings can be made.

If you already have the necessary electrics such as motors and speed controllers then the basic kit is the obvious one to go for. If not go for the one that comes complete with electrics. There is no need to be put off by the fact that it comes with a mechanical speed controller. The *BoLink* designed speed controller is a very good one. In situations where the sharp response of a good electronic speed controller can be used to good effect a mechanical type would



undoubtedly be at a disadvantage. However, this car is designed to be raced on large outdoor circuits and as such will spend much of its time running flat out with a premium of high top speed rather than acceleration. Under these circumstances a well designed mechanical speed controller is perfectly adequate. Indeed as a result of our findings in the track test it's worth bearing in mind that the motors and speed controllers you may have been using for other forms of racing may not be suitable for use with this car.

## Thanks

Lastly our thanks are due to several people who took pity on us clueless eight scale racers and provided help and advice. To Ted Longshaw for loaning us so much expensive equipment to play with, albeit under the pretext of a review. To Nick Adams, of *Demon Products*, who provided help and advice on selecting a motor. To Mick Goddard of *MG* who sportingly reworked the thirteen turn 'Double Magnum' we had somewhat optimistically purchased to a seventeen turn treble specification, after we not

surprisingly discovered we could only get three and a half minutes out of it. I might add that this motor fairly flew after that. When we were running it in a buggy it was undoubtedly the fastest motor on the track. I should perhaps, to be fair, point out that neither of those two gentlemen knew that we were going to attempt to run the motors they had originally recommended for the buggies in the *BoLink*! Finally, but by no means least, to fellow scribe Peter Winton who in the course of a twenty minute conversation at The Model Engineering Exhibition managed to fully instruct us on the facts of life as they apply to electric car racing. Correcting many misconceptions we had in the process. I only wish now we had listened to what he had to say on the subject of motors. Thinking back now he did warn us that we would need a motor with a large number of turns.

Imported by:- Ted Longshaw Model Cars, PO Box 89, Orpington, Kent.

