

Serpent 'Quattro'

A change is as good as the rest. That's what Colin Leake thought when he switched cars to the Dutch world-beating 1/8th scale circuit racer.

STEVE FINALLY DID IT. He managed to persuade me to go through the very expensive process of changing names of car mid-season so that he could join the growing band of *Serpent* drivers in the South.

Having obtained my agreement in that sphere his next bright idea was that we would go up from our home in Tonbridge, Kent, to Walt Bailey's emporium in Mansfield to collect the kit. That idea having been firmly rejected we settled down to await the worst the GPO could do. To our amazement the kit duly arrived on the following Monday morning.

On starting to assemble the car we quickly realised that the instructions were not all they appeared to be. One set refers to the basic two-wheel drive car and whilst this is reasonably clear it does in some parts totally ignore some of the components and/or fail to adequately identify some others. A separate A4

sheet gives details of the four-wheel drive conversion and has to be used in conjunction with the main instructions. This can and indeed does make the assembly somewhat difficult. The geared rear-end we ordered with the kit had no instructions at all.

Things were further complicated by the way components were packed. One set of bags contained the fittings needed for the conversion and a second set contained those needed for the original car. To make matters worse parts had been packed in bags of like products, i.e. one bag contained all the self-tapping screws whilst another contained all the grub screws etc. This meant that the work bench was quickly covered with a dozen small bags all open and in danger of spilling their vital contents. It also meant that a considerable amount of time had to be spent locating the correct component for the next

operation. Our frustration was further increased by the fact that since the instructions were actually written *Serpent* had clearly changed the lengths of some of the screws.

One can well understand that *Serpent* will have little time to correct matters this year. They must be rushed off their feet. May I however suggest that next year's car should perhaps come as standard with four-wheel drive have a geared rear-end (so we don't have to pay for a chain drive, have a geared rear-end (so new carefully written set of instructions to cover the total car. It would also be beneficial to follow the practice of other kit manufacturers and pack the components in a more logical manner.

Having got that grumble off my chest let me hasten to add that this shortcoming should not put off anyone from buying one of these kits. Just keep taking the pills every time your blood pressure rises and with a little common sense you will get there in the end. Any real problems you may have can be dealt with by a phone call to Walt Bailey if you live in the North of England or Dave Dixon at *Mick's Models* if you live in the South.

When you have completed the car you will wonder why you found it difficult, and when you first drive the car on the track all will be forgiven. We would much rather suffer a passing frustration building the machine than long term frustration trying all season to compete with an uncompetitive, ill-handling car.

One word of caution before anyone starts building. Do not discard any plastic parts however insignificant they may look. One part in particular that looks for all the world like a moulding sprue is actually needed in the rear transmission

Build-up

We decided to start by assembling what we could of the conversion kit to the radio plate. It helps when one realises that, unlike many other car kits, much of the middle and front section of the car is assembled upside down on the radio plate. This slightly unusual procedure does make the removal of the radio plate for maintenance and cleaning a little easier.

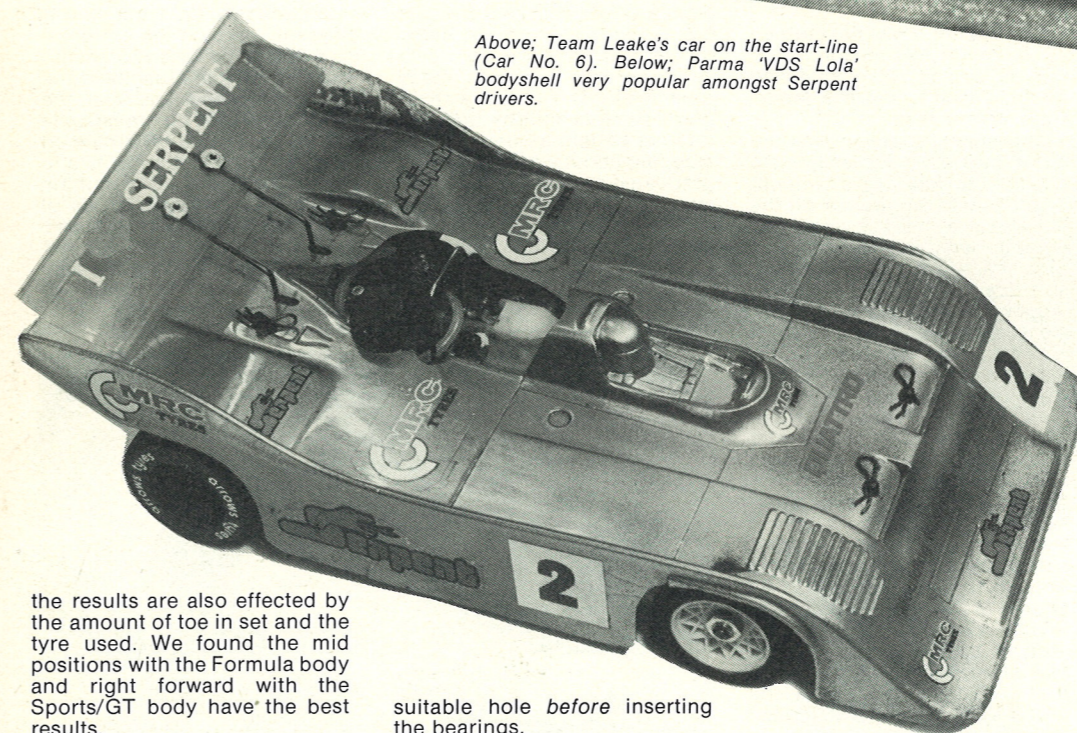
We assembled the front and middle layshafts, both fitting together exactly as the instructions specified. Later we discovered that it was necessary to shave a little plastic off the top of the front bearing blocks (that is to say the part furthest away from the radio plate) to ensure that they did not foul the front bracket.

Next we fitted the upper wishbones. The brackets to which they fitted needed a little plastic to be removed to allow them to clear the hex drive sockets. Other than that all the parts fitted well and the suspension arms moved freely on their pivots. The castor for the front suspension is adjusted by moving the upper wishbone along the pivot shaft and locking it in position with two grub screws. The instructions call for M4 x 4 but we opted for M4 x 6 partly because we could find none of the former in the pack, and partly because experience has taught us just how easily threads can be stripped in plastic components. It therefore seemed prudent to have as great a thread area as possible.

Moving the wishbone forwards decreases the castor giving more oversteer and moving it back produces more understeer. It's a matter of personal choice of course and



Above; Team Leake's car on the start-line (Car No. 6). Below; Parma 'VDS Lola' bodyshell very popular amongst *Serpent* drivers.



the results are also effected by the amount of toe in set and the tyre used. We found the mid positions with the Formula body and right forward with the Sports/GT body have the best results.

In both upper and lower wishbones the new brass spherical pivots have to be pressed into place. Take care to press them in from the right side and use a small metalwork vice rather than a hammer.

Next came the front steering block assemblies. We followed the instructions and found only one problem. The inner of the two ball races is an extremely tight fit in the plastic housing. When the ball race failed to go down using our normal method we found a short length of suitable size brass tube carefully filed the end square and used this in a small vice to gently push the bearing fully home. There was insufficient room once the bearing was in to allow us to drill a lubrication hole through the housing down between the bearings. Next time we will drill a

suitable hole before inserting the bearings.

The lower wishbones and their brackets were next on our list. Now panic set in, there were apparently no anti-roll bars packed in the kit. A phone call to Walt Bailey revealed that these had been changed. No longer are they little hooked bits of wire as shown in the instructions. Now they are straight lengths of piano wire. On the end of one a small brass ball has to be soldered and on the end of the other a small plastic moulded cup is fixed to receive the ball. A product improvement I am sure but a small slip of paper explaining the change would have saved me a long distance phone call.

Before fixing the main front-end bracket to the chassis we offered it up to the radio plate. This showed that some plastic would also have to be shaved off

the bracket to clear the layshaft bearing blocks.

The springs themselves are very unusual. They can best be described as the type you would find on a clothes peg. They appear to work extremely well providing a very linear form of smooth controlled constant rate suspension. No doubt this factor does much to explain the car's ability to handle a wide variety of track surfaces.

When we tried to pass the pivot pins through the wishbones and brackets there was a great deal of resistance from the brackets. This is no doubt intended to hold them in place. However, this could make any track-side repairs difficult. We solved the problem by reaming all the holes out to give a nice easy and free fit. Then drilled the brackets through at right angles

and inserted grub screws to correspond with flats filed on the pivot pins.

The servo saver has the reputation of developing play quite rapidly in use so again we followed the lead of many other drivers and locked the unit solid with a self-tapping screw. A *Kimborough* 1/8th scale servo saver was then purchased and fitted to the servo. After wasting a considerable amount of time searching the kit for the correct link from the servo saver to the servo we eventually worked out that the link supplied was for the old two-wheel drive kit, where the servo saver was mounted much further forward. Rather than try and mount the servo in the fuel tank we spent the next three quarters of an hour making a special link for the job. It's details like this that really let the kit down. It's not necessary and it's infuriating at the time to those of us who can find little enough spare time to work on building the car in the first place.

We also noticed that the servo saver was not ball raced onto the central post. We were tempted to install some in as there is sufficient plastic at the top and bottom. In the event we saved time and left well alone on the grounds that if slop did develop we could easily go back and do the job later. We found it necessary to enlarge the central hole in the radio plate to clear the arm of the servo saver.

Next we turned our attention to the rear-end. As mentioned previously there are no instructions to cover the geared version. Fortunately April's edition of *'Model Cars Monthly'* was to hand complete with a helpful photograph of the back end that showed clearly where

Below; kit box and contents. The 'Quattro' is available in a choice of kit specifications ranging from 'Basic' to 'Complete' which includes the 2-speed gearbox and geared rear-end. Bodyshell is not included.



things went. The first task is to push the brake pins into one of the mouldings. Note before you start that one end of the pins has three grooves running along the surface. This is the end that is pushed into the plastic.

The differential went together easily as per the instructions in the photograph showing which way round to put the gear wheel. On one end of the differential shaft is two grooves into which a circlip clearly goes. No mention is made of this in the instructions so we eventually discovered by trial and error that it goes in the inner groove.

The rest of the geared section went easily together. The small gear on the layshaft can be changed to alter the gear ratio between the front and rear-ends to change the handling of the car. In effect gearing the rear-end up relative to the front makes the car more responsive (oversteer) turning more readily into the corners especially useful on small tight tracks in high traction conditions.

Going the other way increases the work the front wheels do giving the car more understeer. Possibly a useful feature in wet conditions. Don't forget changes made here will affect the overall gear ratio and hence you may need to change the clutch bell and main gear ratio to get back to the optimum gearing for the circuit.

When fitted the suspension arms to the main mouldings insert the drive shafts at the same time. Inside each hex drive socket is a small nylon spacer. As it turned out it was necessary to cut a thin layer of plastic off the face of each to obtain the correct clearance for the drive shafts. A very sharp knife and a steady hand are most definitely needed at this point.

The final component to be fitted to the rear-end before attaching the whole thing to the chassis is the brake assembly. Sensibly situated on the right hand side of the car well away from any oil that may be thrown out by the exhaust, twin discs of *Ferodo* material are operated on by steel plates to provide the stopping power. These are of relatively small diameter but act on the layshaft rather than the more normal back axle, thus they have a mechanical advantage over the more usual brake position. The only extra work we needed to carry out here was to undercut part of the plastic support block to clear the discs and make a small plastic spacer to fit over the cam shaft and below the brake arm to stop the cam falling to low and fouling the brake discs.

We also backed off the rear edge of the brake cam. This allows one to have a positive return on the brake lever arm and ensure that the brake discs

are never dragging when the throttle is opened. We used the *Serpent* brake adjuster but found this difficult to get at to the brakes on the track so we replaced the rear collet with the SG threaded plastic adjustment nut which made matters much easier.

Once we had the rear-end mounted on the car the suspension moved with a silky smooth precision. There is very little camber on the rear wheels and almost no camber change with rear wheel movement. The ball diff is smooth in action yet can be adjusted to give sufficient resistance to act in effect as a limited device. We oiled the bearings and lubricated the gear train with a silicone spray. When we spun the rear axle there was almost no resistance showing just how efficient the drive train is.

Our attention was next turned to the motor. We decided to fit the oil cooled *Rossi* that had acquitted itself so well in a 'Model Cars' motor test.

The clutch supplied was the latest three pin type, designed to engage at high revs without clutch slip to aid the car off the line and away from slow corners. Having been warned that the pins supplied are a little on the soft side, we obtained a suitable length of ground stock silver steel (piano wire would also do) and made our own set of pins. Next we cut 5mm off the end of the crankshaft and fitted the clutch nut. In order to tighten this up we had to go out and purchase a suitable box spanner since the pins are too close to the nut to allow the use of a ring spanner.

One look at the microscopic size of the clutch bearings was enough to convince us that we should fit the two optional extra middle bearings. This is one area of the *Serpent* we would like to see improved. A clutch that would fit direct onto the motor shaft in the manner used by SG, and some decent size bearings would make a lot of sense.

When fitting the motor we were perplexed to find that no fore and aft adjustment was provided to take care of gear ratio changes. The explanation is that all *Serpent* clutch bell pinions and main layshaft gear wheels are common diameter; only the number of teeth actually vary. As we shall see, we found problems in this area later.

When fitting the radio plate to the chassis. A brace made from an old trackrod was taken from the back of the radio plate between the carburettor and the engine cylinder to the rear bulkhead to stiffen the whole car up and provide increased resistance to the chassis bending at its weakest point under the motor mounts. I understand that

a similar brace may well become a standard feature on future kits.

The chassis is known to be one of the weak points of the car in that it is easily bent. It's difficult to see why *Serpent* have not got round to improving matters. The change to an aluminium radio plate and the brace have helped but have not really solved the problem. A change to a harder aluminium alloy would surely not add that much to the cost, nor would the use of a doubler plate under the engine. Quite why it is necessary to sit the engine over such a large hole in the chassis right at its weakest point totally escapes me. I would have thought that all that is necessary here would be a small hole and a slot through which the flywheel could be reached.

The final item to fit to the radio plate was the excellent *Serpent* fuel tank. This proved to be by far the best tank we have ever come across. It comes ready assembled. The top is a really good air tight fit. The tank has internal baffles to stop the fuel slopping about and best of all is graduated so that one can easily measure the fuel left at the end of a five minute heat. In order to stop the fuel frothing up we enlarged the holes in the radio plate and used rubber (not PVC) servo grommets to pass the mounting screws through.

The two bodysells we purchased were made by *Parma*. Relatively expensive but very well made. They appear to start off by using a much thicker sheet material than most other body mouldings giving a very rigid body with no apparent weak spots. Well worth the extra few pounds they cost. A quick coat of yellow *Hobbypox* at the front merging to orange at the back followed by a coat of silver gave us a flash metallic paint job.

Next the shock absorbers. These are unusual in that not only are they the constant volume type but they also incorporate a valve that allows the oil to flow more freely in one direction than the other. The result of this is that there is little resistance when the wheel is lifted but more as the wheel returns. As the front and rear shock absorbers are mounted in different ways on the car great care has to be taken to ensure that the valve is assembled the right way round and that the shock absorbers do not become mixed up in use. We painted ours. Yellow for the fronts and black for the back to match the wheels. We took the advice of Paul Cook and Phil Hague and filled the front ones with 80 grade gearbox oil and the rear ones with the synthetic oil normally used in the fuel.

Having seen one or two

drivers have their rear shock absorbers knocked off from the lower mounting we delved into our box of assorted screws and found some long enough to pass well into the main moulding. A mod that several drivers now seem to have made.

We had lubricated the car as we built it so all that remained was to set the springs, fairly soft all round, a quick check on the tweak board to ensure that all was well and off to the track.

As far as the car's handling goes it lived up to expectations. We took the newly completed car to Wrexham, a track which we have never seen before, let alone driven on. The car was super smooth and responsive, turning so willingly into the corners that it took Steve a few minutes to adjust his driving technique to suit. The brake was a joy, smooth yet powerful and very easy to set.

The measure of the car's performance can be judged by the fact that Steve has been struggling all year to make B-finals with his old SG. This time he was second fastest qualifier in the A-final on each day. Third in the final on the Saturday and after lying second for most of the final on the Sunday eventually finished fourth despite the fact that both rear tyres had split down the centre seam. His improved form mirrors that

experienced by a number of other competitors who have made a similar change this year.

The car ran faultlessly all weekend with one single exception caused by Steve's mechanic — all right, I caused it. We decided for no good reason to tighten the ball diff and I failed to lock the adjusting screw properly. Result, less drive to the rear wheels and a stripped centre drive belt and sprockets.

The new three pin clutch worked very well engaging at high revs yet with no trace of clutch slip. Wear was negligible.

On careful examination of the car back home in the workshop we found no damage had occurred anywhere. The only mods we found necessary were to elongate the engine mounting holes in the chassis to slots to allow the use of the 50 tooth gear wheel, normally used on the 'Cobra' Off-Road buggy and now used by many *Serpent* drivers on the smaller tracks. We also found it necessary to machine slightly more material

from the front lower wishbones to improve the turning circle.

A considerable amount of dirt and compressed grass had accumulated at the bottom of some of the drive belt sprockets. This was carefully removed and will be closely watched in future least it cause drive belt problems.

Conclusions

On the track the car lives up to expectations and has for us at least proved to be very reliable. One cannot claim that the kit is easy or quick to build but as so many drivers have found out the results are well worth it. If you don't have time to build or think you lack the experience and skills needed, then *Mick's Models* in the form of Dave Dixon will happily assemble one for you at a very reasonable price.

Our thanks go to all existing *Serpent* drivers who helped by giving us many of the tips passed on here. Walt Bailey himself, Phil Hague and especially

fellow London club member Dave Dixon.

Footnote

Since finishing this report I have just learned that *Arrows* (the tyre people) are now selling a clutch for the *Serpent*. I cannot comment on its quality of effectiveness since I have not seen one. However, I do know that it comes complete with engine mount blocks and fits straight onto SG type engine crankshafts which must be good news for ex-SG drivers who will now not have to change the cranks in their engines.

Manufacturer: Berton, Holland.

UK Importer: *Elite Models*, 145 Newgate Lane, Mansfield, Notts. NG18 2QD.

Southern distributor: *Mick's Models*, 78 Fulham Palace Road, London, W6.

Price: £325.00 (special offer price including gear-drive transmission and two-speed gearbox).

