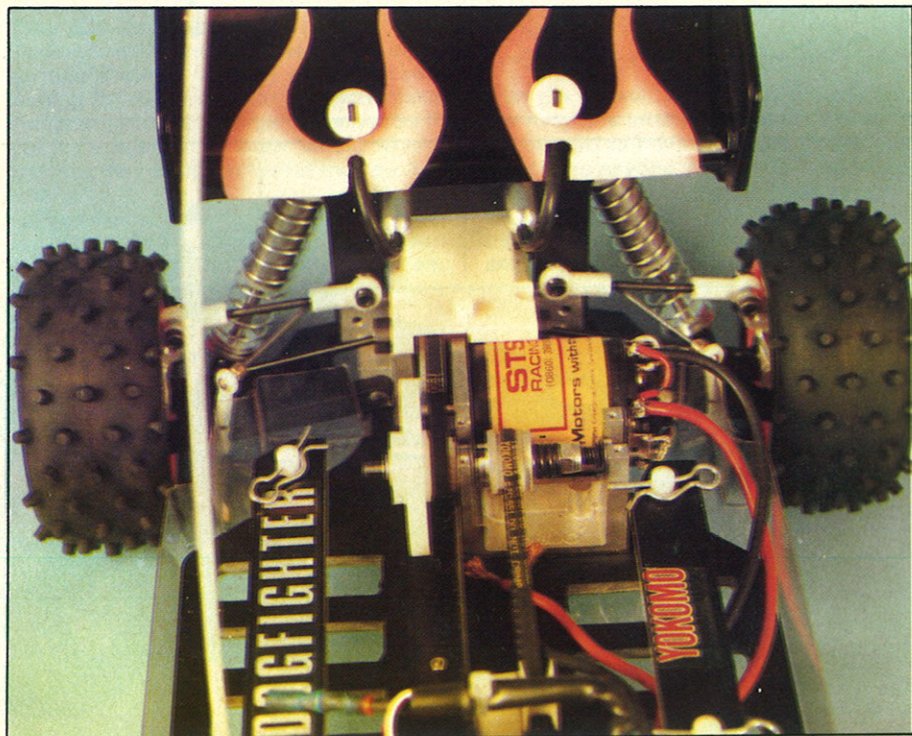


The way the components are positioned gives perfect weight distribution.

# SUPER DOG FIGHTER, YOKOMO YZ-870C



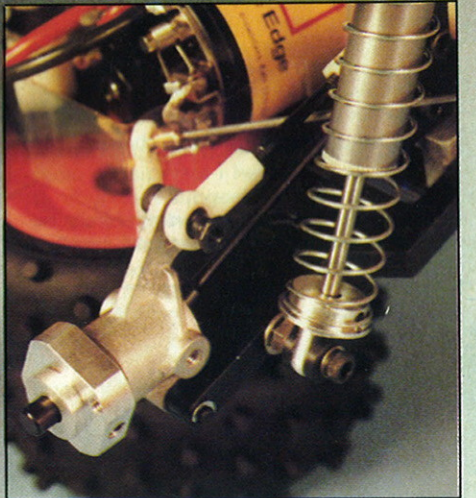
Complete transmission system can be removed if required in minutes.



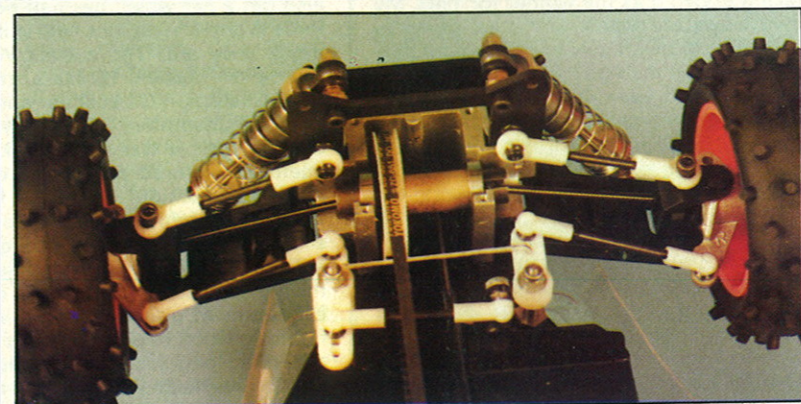
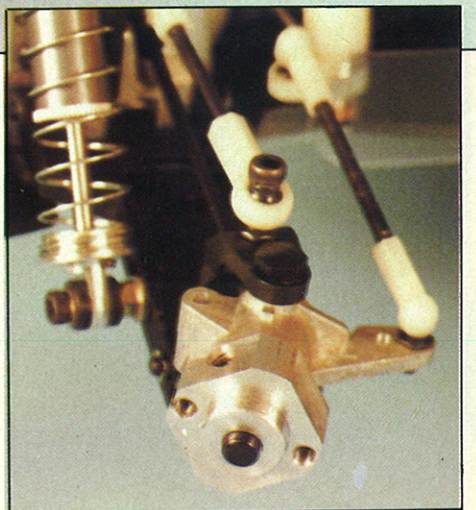
From any angle, large or small, the Yokomo looks just as good.



Right, wheel hubs are bolted to square drive flanges held on drive shaft with a grub screw.



Below right, front drive cup arrangement similar to rear except it is positioned vertically.



Narrow front diff can be removed by undoing only 4 screws. All ball joints are RC10 type.

## Jim Crabb reviews the Yokomo YZ-870C.

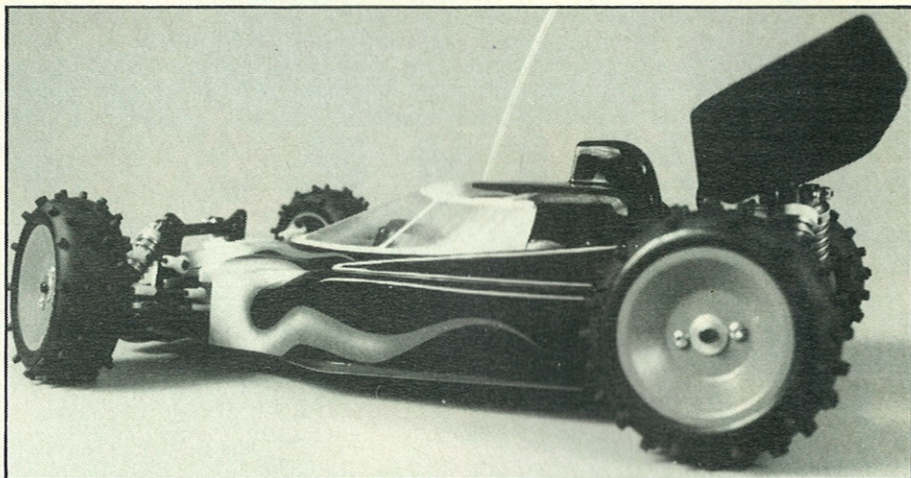
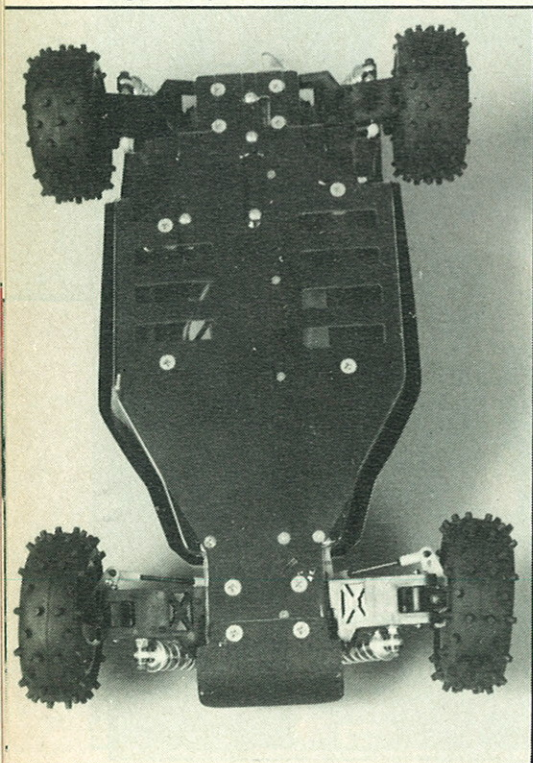
If a history of 1/10 electric racing is ever written, one of the mysteries it may unravel is why in 1986 did a car which won the World Championship have such little success in this country?

The car I am referring to is of course the Yokomo "Dogfighter", I have only ever come across one at an outdoor meeting where it was quick, but lacked ground clearance and appeared to have problems with a bumpy track.

In the 1985 World Championships held in California, the event was dominated by Gil Losi Jnr driving a Ranch Pit Stop special edition version of the Dogfighter which was christened "Wonderdog". Gil proved unbeatable and the World was at their feet, but in the UK it just didn't happen. It may have been because the lack of ground clearance did not suit the UK tracks, it may have been simply that there was lack of commitment or not sufficient aggressiveness in the marketing of the car by the UK importer and distributor.

Could it have been much more simple and it was the name that put people off. In this country to call something a dog means its a bit "tatty", whereas that other domestic pet the cat without any connotations has not suffered the same fate. All this is very interesting as the car had many features we take for granted now, maybe the car was a little ahead of its time and potential drivers were wary of its complexities. The "Wonderdog" was equipped with an integrator which allowed adjustment of torque between front and back to suit track conditions, it also featured one way bearings at the front in place of a differential, it was of course four wheel drive and chain driven

Flat bottom of clear undertray offers no resistance. Solid wishbones and small illegal bumper.



The suspension fully depressed.

and had a motor mounted inboard of the rear wheels:— All sounds very familiar does it not?

First indications that Yokomo had a new car on the stocks was the appearance of a totally new belt driven car at the last World Championships held at Romsey. The Americans Gil Losi Jnr and Jay Halsey were offered the all new belt driven car just prior to the championships as an alternative to the cat. The car was brand new and delivered to them just prior to take off for their flight to England. I am assured that the cars they used were built at 37,000 feet whilst they flew the Atlantic. It's all history now but both Gil and Jay had a good championship with Jay finishing 7th in the A Final and Yokomo indicating to all that they had a car which could compete on equal terms with the best in the world.

As to the new cars name, Yokomo have played it safe this time and in common with some Japanese saloon cars have opted for a number instead. The car is called the YZ-870C 4WD and the sole importers to the UK will be Central Models, who with their fine reputation in modelling circles will give the car both the exposure and the back up that this potential winner deserves.

### Rumours Yet More Rumours!

I thought that the Optima Mid had cornered the market in rumours but I was wrong, here is another car from Romsey last year which has generated yet another succession of rumours. Seeing how well the car has performed, I am surprised we have not seen them before now, especially as several well known authorities on model car racing tipped it as the winner for 1988. My own views are that Yokomo are going to have the car absolutely perfect before they release it and then go for the World Championship next year. One rumour that has been substantiated was that the plastic used initially was not strong enough and Yokomo have changed the mix. Injection moulding is very critical with a temperature difference as little as 3 °C within the mould causing disastrous consequences on the track. The same thing applies to the reinforcing of plastic, if the fibres do not lie longitudinally then wishbones and shock mounts will fail.

By far the most popular rumour has been about the availability of the car, it revolves around how many are being released onto the market and when. The numbers quoted range from an initial production run of 100

world wide with just 50 destined for Britain to full scale production with 100 per month being available from May.

### Has It Been Worth Waiting For?

Anyone who saw the car last August and then again at the Reedy Spring International will say "yes" and many have placed orders on the strength of those two meetings. The World Champion, since last August, has changed camps from Schumacher to Yokomo and at Romsey this year he was in a class of his own. On the Thursday he held ftd and for certain practice sessions, he put his car on the back of the grid, waited until everybody was around the first bend at the end of the straight before he set off in pursuit, it took him just four laps to work his way to the front of the pack then he pulled off. Masami Hirotsuka (who went on to win the 4WD event) was not the only driver to have instant success. Jason Varley was presented with a Yokomo whilst I was there and the first time out took 4th ftd. Three cars appeared in the 'A' Final and took 1st, 3rd and 5th places driven by Masami Hirotsuka, Butch Klobner and Jason Varley respectively. In a weeks racing at Romsey only four drivers managed 17 laps, they were the three drivers above and Jamie Booth who finished 2nd overall, so you can see why drivers are prepared to order the Yokomo without seeing what it will do in the hands of the normal club driver.

### So What Do I Get?

You get a car with a very full and comprehensive technical specification, you also get a car which has had no less than three World Champions help in its development, they are; The current World 4WD Champion Masami Hirotsuka, the 1985/86 4WD Champion Gil Losi Jnr and the 1985/86 2WD Champion, Jay Halsey. The concept for the car was simple Yokomo management required production of an "off-road competition machine for racers worldwide, with driving efficiency and simplicity of maintenance to give enjoyable racing". This was to be achieved by having "a chassis layout based on the lowest centre of gravity possible, a mid-ship motor location to give the smoothest drive available, long suspension arms front and rear to give flexible and smooth running on any rough or bumpy circuit". Yokomo felt that the most sophisticated way to eliminate loss of power transmission was to

keep the design simple with the view to "keep you on the track winning and not in the pits repairing".

Yokomo's concept cannot be faulted and the 64,000 dollar question will be "have they achieve it?"

### More Questions Than Answers:

One final question before we see how it performs on the track and that is of its physical dimensions. Two cars it is going to meet at any race meeting, at either club or international level will be the English 'Cat' and the Japanese 'Optima-Mid'. The comparison is in physical dimensions only.

Car	CAT	OPTIMA MID	YOKOMO
Type	1/10 4WD	1/10 4WD	1/10 4WD
Differentials	One, limited slip	Two, gear type	Two, limited slip
Length	345 mm	350 mm	365 mm
Track	204 mm	205 mm	207 mm
Width	236 mm	242 mm	243 mm
Wheel base	250 mm	255 mm	271 mm
Ground clearance	30 mm	35 mm	35 mm
Front tyre	85 x 32 mm	85 x 37 mm	85 x 33 mm
Rear tyre	85 x 40 mm	85 x 37 mm	85 x 39 mm
Bearings	14	18	22
Weight	1500 g	1600 g	1590 g

Looking at the differences, there is only one of significance and that is in the wheel base and the overall length to accommodate it.

There is a long wheel base (LWB) conversion for the 'Cat' and two different length conversions for the 'Optima-Mid', so it could be argued that the comparison should be with the conversions and if one did, there would be only 4 mm difference. When doing any comparison, one has to compare with the manufacturers original out of the box equipment. The final question has now been posed and that is, will the longer (16 mm) than average wheel base give the car any significant handling advantage over either of its two rivals? The answers to all the questions posed can only be given by the cars performance on the tracks, that's where the real comparison will take place and that's where the car designed for the serious racer will have to prove itself.

### Full Technical Specification

Neither a motor or speed controller are supplied in the kit. The car is four wheel drive with a mid mounted motor driving, both front and rear differentials via individual Kevlar light weight, narrow, rounded teeth belts, the drive pinion and spur gear are 48 dp. Drive to the front differential includes a one-way clutch with an adjustable torque limiter. Suspension is fully independent with extra long single wishbones of glass reinforced plastic (GRP) for strength. Damping is provided by coil over shock absorbers with silver (soft) springs, the shock oil is very low viscosity. Camber angle adjustment is provided by adjustable upperlinks for both front and rear wishbones. Ground clearance of the car is adjustable both front and rear, there are two adjustable positions on the rear wishbones and two on the front. Further adjustment is possible by relocating the position of the top damper fixing on both front (two positions) and rear (three positions) uprights. The running gear is mounted on a flat black fibre reinforced plate (FRP) with a centre backbone of carbon graphite for extra strength. The front and

rear bulkheads, motor mount, hub carriers are made of magnesium alloy. Battery location is saddle pack for either 7.2 KV or 8.4 V. Every bearing point is ballraced with shielded bearings of various sizes. Both differentials are ball type with 12 balls and three ball races, they transmit the power to the wheels via universal drive shafts both front and rear. The tyres are low-profile high grip spikes fitted to a one piece, day-glow pink dished hubs, an anti-roll bar is supplied for the rear. The body comes in three parts, a main shell, an undertray and a large rear aerofoil. The body and under-shell gives superb protection to the belt

concerned that it's performance on the track might be reflected by the lack of attention to detail in its presentation, anyone who has built an RC10 or Yankee will know what I mean, as they come packaged in a similar manner. As the saying goes, the proof of the pudding is in the eating — so we will see. One thing did come to light and that is the car has been given a name to go with the number, it comes as no real surprise that it is called the "Super Dog Fighter".

### Construction

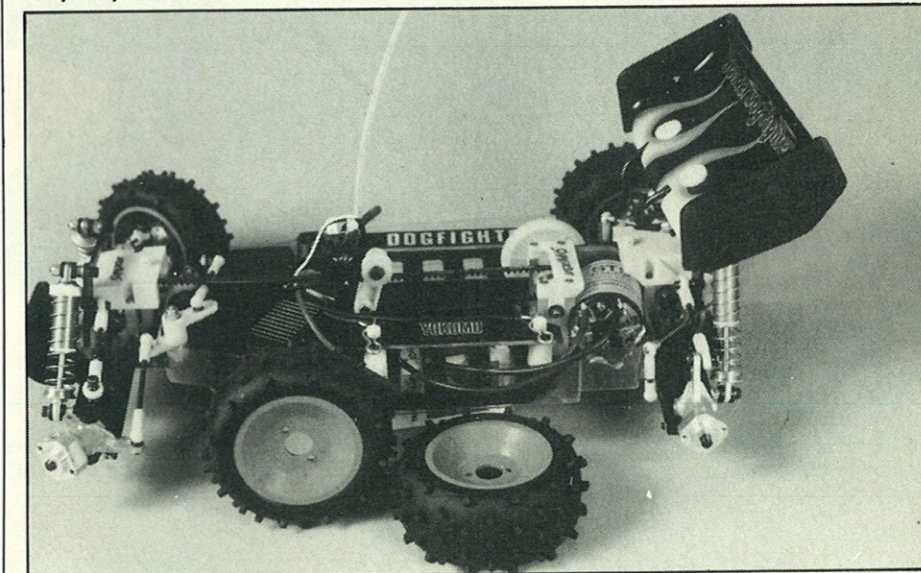
The tools supplied in the kit are three different size Allen keys for the cap headed screws used during construction, in addition, you will need long nosed pliers as there are circlips used, a small and medium Phillips screwdriver and a 3 mm and 4 mm spanner for the nuts. A model knife and the scissors are required to trim the undertray body shell and the wing. Three further essential items are required but not supplied, they are thread lock, grease, superglue and rubber glue. A drill is also required to drill a 2 mm hole in the chassis and a couple of 5 mm holes in the bodywork.

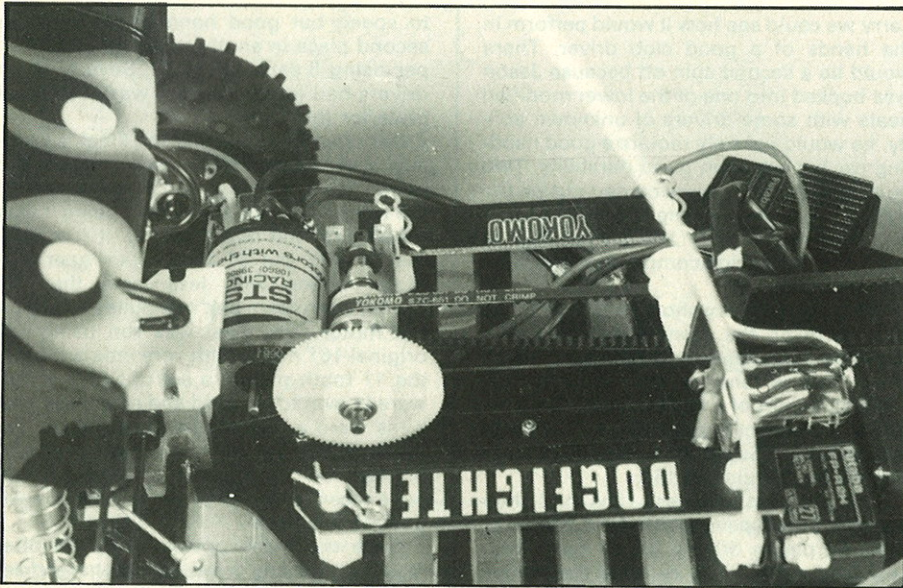
Two club drivers, the father and son team of Larry and Jason Cook wanted to be involved with the building of the car, as they were both drivers who would be potential owners of a "Super Dog Fighter" having seen it perform at the last two Romsey meetings. We set ourselves a tight schedule, construction was to start on Monday evening, to have the cars baptism by fire in Medways 4WD Radio Race Car round the following Sunday. Our thoughts were, if the Americans can do it at 37,000 feet we should be OK at sea level in Kent. The advantage the Americans had over us was that their car did not have to be photographed.

### Presentation

On opening the small box, I was taken aback by the contents. Unlike most major Japanese and some British manufacturers who take great care to give a visual display of the more aesthetic parts of the kit, Yokomo's presentation can only, at the kindest, be described as practical. Compared to kits I have reviewed over the last 18 months, the presentation is basic; the small box contained one large plastic bag with a further seventeen numbered bags inside, the body, the chassis, a bag with the wheels and a set of transfers. If I had not seen the car perform at Romsey and been presented with the box, I may have been

Simplicity makes for one of the quickest cars to build and the easiest to maintain.





*Do not crimp is obvious. The close proximity of the motor to the belt and pulley is shown. The words were rubbed off the belt during testing. Retaining cap on the bulkhead has been removed to show ease of maintenance of component.*

exactly the type of drive you wish, you have the choice of permanent 4WD, or part-time 4WD by using a one way roller clutch. The most probable choice would be permanent 4WD for the inexperienced or first time buyer and the semi or part 4WD for the more experienced driver. A driver who wishes to experiment with both systems will find the change over very simple and can be carried out at or in between meetings.

### **Putting The Pieces Together**

First part of building is removing the edges of the cut outs in the chassis to locate the saddle pack, it is a simple job of putting a chamfer on the edge of each cut out, the same procedure is applied to the outside of the chassis so as not to restrict the movement of either front or rear wishbone. A nice construction point is that the seventeen small bags of components are numbered in the numerical order in which they are used. Each bag contains every item required for that particular stage of construction. Rigidity is given to the chassis by a carbon graphite backbone or spine which has to be glued on and held in situ with screws, it is essential this operation is carried out on a flat surface. Once the chassis is complete, the front and rear bulkheads are fitted, they sit on a very thin rubber jointing which is affixed to the chassis with rubber glue, these bulkheads which are in fact the differential housings are beautifully machined from magnesium alloy and are extremely light. The motor mount made of the same material is fixed to the chassis in a similar manner. Now is the time the instructions suggested you have your tea or coke! Maybe they advise this because the next step is decision time as either the direct drive hub or the one way roller clutch has to be fitted to the torque limiter shaft.

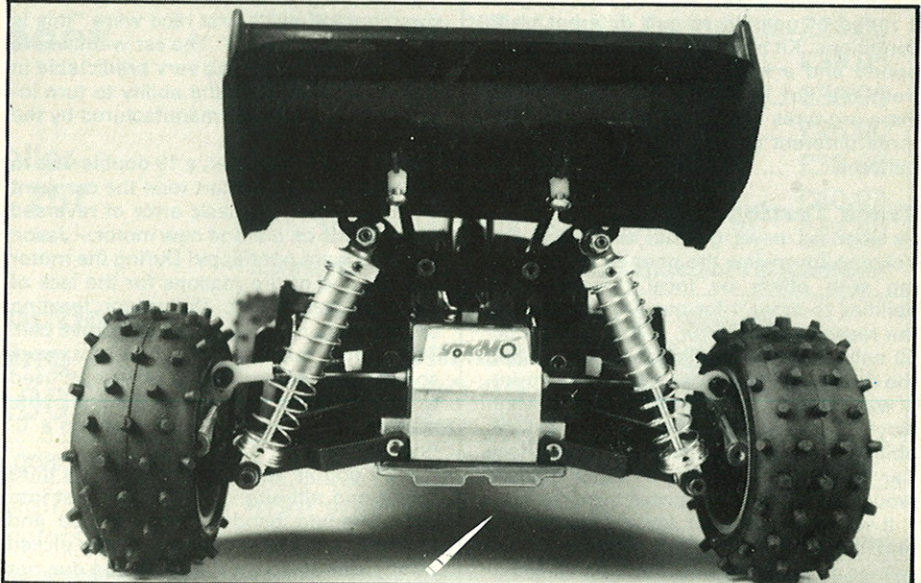
Torque limiting is achieved by a small coil spring which tightens onto a pressure plate, this governs the percentage of power transmitted to the front wheels. There was only one tricky part during construction and that was the building of the ball differentials. The limited slip in a ball differentials is achieved by increasing or decreasing the tension via a thrust collar on the dif-

ferential balls. The differential balls (12 in each differential) are easy to handle and are clipped into place in the drive sprocket. It is after the drive cups are fitted that the thrust collar has to be ballraced. Nine very small balls have to be inserted using a toothpick and a blob of grease. Both differentials are constructed in a similar manner with the exception that the front has two flanges whereas the rear has only one.

The drive train is completed by threading the long and short drive belts around their respective differentials and the torque limiter shaft. Caps on the bulkheads and motor mounts keep the components in situ. The shorter belt does not need to be tensioned, but a ballraced tensioner is supplied for the longer belt which drives the front wheels. Once the rear and front shock mounts are fitted to their respective bulkhead, the actual moving parts of the suspension can be built.

Identical hubs are fitted front and rear, care must be taken not to mix left with right on the front, but on the rear the hub with 'L' marked on it goes on the right and the one with 'R' on it goes on the left, sounds con-

*The view a lot of other cars will see of the Yokomo. Wide track, long throw dampers and anti-roll bar.*



fusing but it is not. The hub is extremely light and when weighed on a balance it weighs less than a wooden tooth pick! Perhaps, that is why magnesium alloy is called "The exotic racing material" in the instructions. The hub carrier is made of plastic and included in the kit is an extra pair in a separate bag which are said to be made of a more resilient material, so you have, in effect, been given two spares. Both front wishbones are already drilled to make the front track wider by fitting longer universal jointed drive shafts, should you choose to do so, the optional parts are ZC-405 and ZC-422.

The track rods will be very familiar to any RC10 owners as they are the same, in fact there are other associated parts used in the kit as well. A tip for owners is if the steel ball does not move smoothly within the white plastic track rod end, a "slow pinch" with a pair of pliers usually does the trick. The wishbones, track rods, drive shafts and hubs are hung from the two bulkheads, the wishbones by pins held in place by circlips, there is an anti-roll bar fitted to the rear.

A twin bellcrank linkage with incorporated servo saver supplies the turning moment for the steering and should eliminate any bump steel, this is the only part of the kit not to be ballraced but there is an optional part ZC-202 available should you wish to do so. The chassis is virtually complete except for several minor parts such as fitting the battery and aerial tube mounts. Final major part of construction is the shock absorbers, construction for front and rear is similar with the rear ones being somewhat longer. The shock absorbers have a small spring inside which gives pressure to the seal on the first reaction having just filled them and pushing the shaft down slowly was that they were leaking. I opened them up as I thought I had incorrectly assembled them, only to find there was oil inside and on reading the instructions carefully one was warned this would happen. Both damping and springing is extremely soft. Once the shock absorbers are in place, all that is left to do is fit the electrics, a speed controller and motor of your choice and the wheels. The wheels are similar to hotshot and PB hubs in the way the tyres fit, although the instructions do suggest as well as being a good friction fit,

they should be glued. Cat tyres also fit the Yokomo hubs. The hubs are fixed to alloy hub carriers with two 3 mm machine screws.

### The Body

Mr. Airbrush painted the body and said because of the width it was easy to paint as there was plenty of room to get the brush in. The large wing is located on the rear shock mount on two sprint steel extensions. Once the body is painted velcro tape (supplied) is fitted inside the bottom of the shell to line up with the rest of the tape which is stuck on the undertray. The body posts with the associated holes for body clips.

### Building Inquest

Although three people were involved with the building (Larry, Jason Cook and myself), only one person actually worked on the car at any one time, the exception being Pete Darwell who painted the body. The car was one of the easiest and quickest to build that any of us had experienced. Total building time was seven hours and with the proper instructions which will be supplied in the kit could be reduced further. Good engineering is the reason for the ease and speed, all the parts are beautifully made and fit perfectly, with every part required for each stage in a specific bag, you do not have to hunt for the correct screw of the correct length. Machine screws are used throughout construction which ensures the right screw is always in the correct hole.

When completed, two points were noted, the shorter belt appeared to be rather tight and the dampers a little stiff due to friction rather than the thickness of the oil, the dampers with a little working up and down soon freed off. If the tightness of the rear belt reduced the duration of the car the remedy would be simple, just slightly elongate the rear bulkhead mounting holes and relocate the bulkhead by about 1 mm towards the motor.

The pitch of the gears quoted is 48, but they are not interchangeable with Kyosho pinions from the Optima-Mid. When comparing a Kyosho and Yokomo pinion with the same number of teeth the Yokomo is smaller in diameter. The kit includes one 17 tooth motor pinion, team Losi 48 DP motor pinions mesh perfectly with the spur gear and can be obtained "off the shelf" to give a range of gearing to suit different track conditions. Kit tyres are of a medium compound and a knobble pattern they come from the hot lap range. Available as an extra are tyres with three different widths, three different compounds and two tread patterns.

### Track Testing

As soon as news got out that I had the Yokomo for review the phone started ringing with offers by local drivers of all abilities to drive it for me. On questioning the reason for the offer, it was about a 50/50 split of genuine interest in the car and the driver wishing to see his name in print. It was tempting to give it to one of Medways "Super Stars" to race who on driving ability alone should make the Radio Race Car 'A' Modified Final, a 'Rave Review' would then ensue but prove nothing.

It was decided to let Jason Cook drive it and look after it during the meeting, he had helped build it so with the help of father

Larry we could see how it would perform in the hands of a good club driver. There would be a second spin off because Jason was booked into one of the lower modified heats with some drivers of unknown ability, he would not only require a good handling car but one with good durability. Two quick practice runs were carried out on the track prior to the meeting to ensure the car was working correctly. We did not want to get it dirty as it's first competition was to be the concourse.

The track was very short grass which had bare earth on the corners with two long straights connected by a sweeping bend, there was a shorter but very bumpy straight as part of a tight infield. Club drivers would expect to get between 10 and 13 laps only the "Super Stars" would get a 14 and no one would get 15.

Both the first two test runs had their good and bad points, the car with its 17 tooth kit pinion driving the 81 tooth spur gear was quick and it handled the bumpy straight beautifully. The sweeping bend connecting the two straights could be taken flat out with the back end just on the limit using the kit tyres. A major problem was that the car dumped after 4½ minutes. We had anticipated this and used 1.7 SCE cells so we were naturally disappointed, it transpired that the 1.7's, although only 3 months old had "gone off", I have heard since from other drivers that this is not an unusual occurrence.

Race day dawned and the car was picked as a winner in the concourse event, the prize was not accepted as it was felt it would not be in the spirit of the event as the car had not been painted and prepared by the same person, it was a good start for the Yokomo and hopefully a good omen for the day. The track was dry and dusty and very fast so for the first heat the motor pinion was changed from 17 to 16 to ensure the car would not dump and the very "thin" kit shock oil changed for 20 grade in the rear. All four kit tyres were exchanged for Cat mini-spikes. The car went well with a 16T motor although not being the quickest it could be powered round the sweeping bend on full throttle, the bumpy shorter straight which was the undoing of many competitors could be taken flat out, the thicker oil and stiffened up rear end kept the rear wheels on the ground. Two seconds short of 13 laps put the car into a 'B' Final place after the 1st Round. Jason's comments after its first race were "this is the car for the future". The car went where it was pointed and was very predictable in its handling and had the ability to turn inside two "supercars" manufactured by the competition.

Heat 2 was a disaster, a 19 double was to be used but on the start tone the car went off backwards!!! A basic error of reversed motor leads on a brand new motor:- Jason and Dad were not happy! During the motor change one of the reasons for the lack of duration was found, the motor locating screws were rubbing on the rear drive belt. The motor location hole and slot were countersunk and countersunk screws used to overcome the problem. At the end of the second round the car had dropped to a 'C' final position.

A 21 double was to be tried in the third round and although the car was first into the sweeping bend it was T-boned and ended in last place, Jason patiently picked off the cars in his heat one by one due not

to speed but good handling to finish in second place in another very quick 12 lapper being 8 seconds off 13. Several other drivers had improved so it was a 'D' Final place for the Yokomo.

During preparations for the Final, a problem was discovered, it was noticed the words "do not crimp" had disappeared off the front drive belt, the reason being it was rubbing on the motor casing. It therefore meant with the 81 tooth spur gear any motor pinion with less teeth than 17 caused both drive belt and pulley to rub on the motor. The Final was run using the original 16T motor with very little advance, the 17 tooth pinion, a set of SCR's which were known to be good and new tyres. The tyres were a mistake because the car became skittish but we at last, had speed and finished with a slowish 13 which would have been a 'B' Final place had it been done in the heats.

Once the meeting was over, the offer was made to any driver with a charged set of cells to have a drive. Typical comments were "it's exciting and goes where you point it" (Matthew LLOYD, Redditch), "best car at the meeting across the bumps" (Reg Latter, Strood), "no twitchiness when you bang on the power" (David Still, London).

### Test Debrief

Since the track test part of the motor can has been ground off to enable both 15 and 16 teeth pinions to be used without the belt rubbing. Using the original cells that gave only 4½ minutes duration the running time has increased to 6½ minutes with a very noticeable increase in speed.

The car in race trim is spot on the 3½ lbs limit, it completed its day's racing without any breakages after being driven by a number of different drivers. It is now quick, is very stable and without any signs of twitchiness, goes exactly where you point it. The motor pinion supplied (17 teeth) overgears the car when used with a 'hot' modified motor. If there was a larger spur gear available, the problem of the pinion rubbing on the motor would be solved.

### Summary

Quick to build and once a couple of teething problems were sorted it was quick on the track, it holds the road well and travels the bumps with ease. Yokomo's initial design concept has been fulfilled and "yes" it has been worth waiting for. There is now a fourth "supercar" to join the existing three and time will tell if Jason is correct in his forecast that "it is the car for the future".

Available from Central Models and all good model shops.

**This beautiful body gives complete protection to the elements.**

