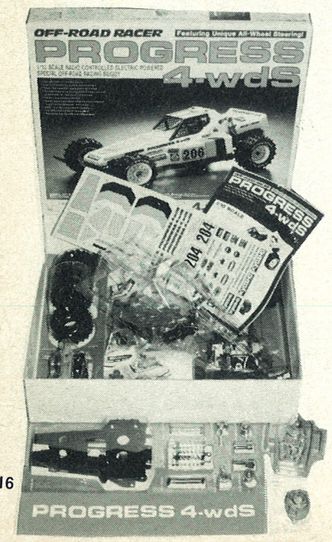
Kyosho Progress

Lewis Eckett tries out four-wheel drive, four-wheel steering, 1/10th scale Off-Roading

Above: the finished 'Progress' looking very sharp and ready for the racetrack.

FULL-SIZE motor racing is all about pace, development and innovation a fact mirrored in our own world of R/C car racing. In 50 years of motor racing, records have come and gone and true to form, 1/10th electric Off-Road racing has seen dramatic strides forward in performance during the past five years.

At the forefront of this development charge is a Japanese manufacturing company, *Kyosho* who have been producing the 'competitors' choice' of cars for the last couple of racing seasons. Not content with resting on the laurels gained from the success of their 'Scorpion' and 'Tomahawk' kits, the *Kyosho* design team has come up with yet another racing innovation. The apt title given to this new machine is 'Progress' and in this case the cap definitely fits. For not only is the 'Progress' a four-wheel drive racer but also features four-wheel steering!



Left: the impressive Kyosho packaging a true representation of what is in store for the builder.

The *Kyosho* track record immediately suggests that this new car will be a winner, not only on the race track but also in the hands of the uninitiated R/C car racer. This is because *Kyosho*, in producing a highly competitive piece of racing hardware, have not lost sight of the fact that not everyone is an expert model builder. Kit presentation is therefore excellent and includes an instruction booklet that will give you no alternative but to produce a precise 'Progress' 1/10th Off-Roader.

As a components package the 'Progress' kit is complete, excepting the radio control equipment and Nickel-Cadmium drive batteries. These two subjects are also dealt with in the instructions. Also, be aware that very little in the way of modelling skill is required, not much more than the ability to wield a screwdriver. Subsequently, very few tools are needed and again a list of exactly what is needed is on page 3 of the instruction booklet.

All this leads nicely into the construction part of this review.

Brief description

The 'Progress' is in fact the first R/C car of its kind to be produced and *Kyosho* are to be congratulated on taking the plunge. The prospect of producing a high performance four-wheel drive car, with four-wheel steering and fully independent suspension in 1/10th scale must have been a daunting one. After all producing a one-off is only a part of the story, turning it into kit form with 'idiot-proof' instructions is the ultimate test.

'Progress' features twin wishbone suspension front and rear with coil over shock dampers; two at the rear and a monoshock for the front end.

Drive is transmitted from the rear mounted gearbox via a chain to the front wheels. A geared differential is installed into the gearbox whilst the front wheels feature one-way roller clutches.

The four-wheel steering uses one steering servo only coupled to servo savers front and rear. Ball and pin drive shafts transmit the drive to the wheels.

The majority of components in the kit are produced from injection moulded plastic which is extremely resilient to hard knocks.

Structurally speaking

As mentioned above the 'Progress' instructions are really first rate but even so a few comments on specific areas of construction would not go amiss.

Dampers

These items are almost the same as those contained with the 'Scorpion' and 'Tomahawk' kits with one exception. A small 'bleed' screw has been set into the bottom of the damper barrel. This allows excess oil and air bubbles to be expelled when the dampers are prepared.

Oil for the dampers is included in the kit; so use it! You can mess around with alternative grades of oil later on. The coil springs are *Kyosho's* usual low rate (soft) type and can be adjusted by moving the collet up or down.

It has to be said that preparing dampers is not a once-only job; sooner or later the oil will seep out and so regular 'services' must be performed. Also take your time, follow the instructions carefully and you will have smooth acting damping.

Front drive

This is the next step of the operation and the instructions start off by showing the oilite bearings being installed into the front drive shaft holder with a hammer! Please; *don't* do this. Use a vice to gently squeeze the bearings in and remove the edge of the hole with a sharp modelling knife to ease installation of the bearings.

The drive shaft and chain sprocket assembly is clamped between the upper and lower injection moulded deck pieces. These two components are superb examples of the injection moulder's art and one shudders to think what the costs of tooling must have been. The quality of the moulding is excellent right through the kit, suspension wishbones and all other parts.

The drive chain which runs the length of the car has to be looped over the sprocket and care must be taken to ensure that the direction of the links is correct as specified in the instructions.

Various adjustments for chain tension are incorporated into the car to allow for chain stretch, the front drive shaft housing can be moved forwards and backwards because the screw holes are slotted to eliminate excessive slackness.

Front suspension

Close scrutiny of the instructions is needed here in order to make sure that the appropriate right and left hand wishbone mouldings are being used.

The front stub-axle steering blocks pivot between the wishbones on ball and socket joints. A word of advice here. In order to maintain free suspension movement and steering, the metal ball heads on the stub axle blocks must be polished with very fine emery paper. The best way to do this is to spin the balls in a drill and apply the emery paper briefly. This will ensure that the movement does not bind and thus overload the steering servo.

When both sides of the suspension have been fitted the front mono-shock damper and servo saver must be fitted. Again, when fitting this item make sure that the movement of the steering through it is free. The servo saver is there to protect the servo against overloading, but it must also pass the servo movement through to the wheels as efficiently as possible. As expected the *Kyosho* instruction book also stresses this point.

To stop the steering blocks from locking over-centre a steering limiter is fitted both sides. The steering track rods can be finely adjusted later on.

Rear suspension

The same system of assembly applies to the rear suspension, follow the instructions carefully and make sure the suspension and steering pivots are free. In fact once you have built the front-end the assembly of the rear system will follow on easily.

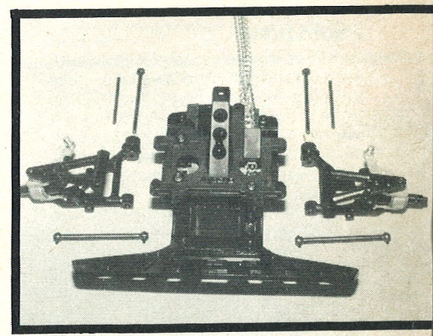
The way in which both suspension systems have been engineered suggest that *Kyosho* have made stringent efforts to keep the completed car as light as possible. Once again this is not only to please competition users who don't want sophistication at a weight cost, but also for lone hand racers who will require a reasonable running time per charge.

Main chassis assembly

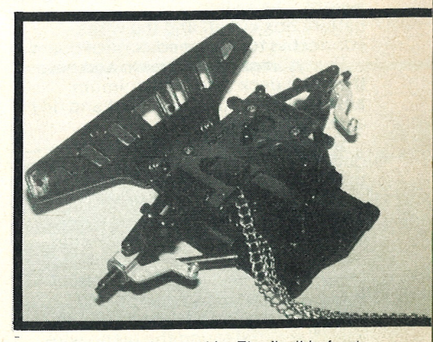
The main chassis takes the shape of a thin, stamped alloy plate, which on its own is quite flexible. However once the front and rear ends are bolted on and the top deck installed the completed box structure is very rigid.

The springing for the front suspension is via two torsion bars fitted longitudinally along the chassis. The torsion bar fits into a holder which in turn fits onto the serrated end of the lower wishbone. When the rear of the torsion bar is clamped into place the front holder can be adjusted on the serrations to twist the bar and thus increase or decrease the ride-height of the suspension.

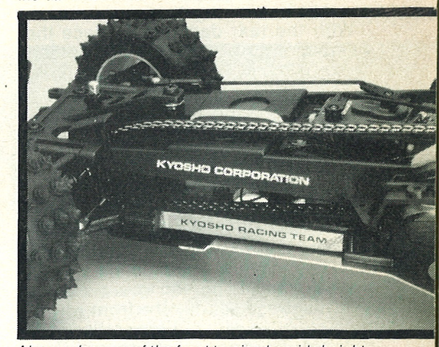
Right: the front end complete and fitted with monoshock oil dampers.



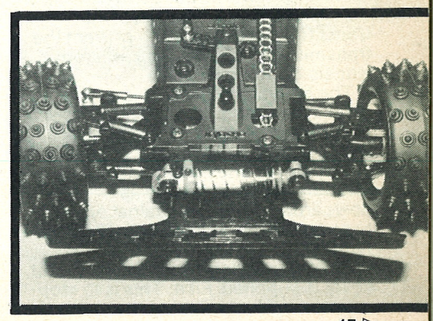
Above: the front end assembly showing front drive system and suspension/steering sub assemblies ready to fix on.



Above: the finished assembly. The flexible front bumper is fixed to the chassis so as not to damage the car in event of a collision.



Above: close up of the front torsion bar ride height system. The torsion bar holder can be twisted to achieve different settings.



Radio plate

This is the only part of the overall construction that necessitates some judicious use of a sharp modeller's knife. The radio tray or top deck as supplied features cut outs for small servos. The majority of builders will be using larger types and so the slots must be enlarged.

The instructions are very explicit on the subject of radio installation so do not be afraid to follow them.

The speed controller as supplied features a dropping diode to allow the radio gear to be run off the main drive batteries. This has the advantage of allowing the receiver battery box to be removed with a substantial saving in weight. The switch is retained but the battery box cut off and the wires connected to the speed control board.

Everything should fit into and onto the radio deck with the minimum amount of fuss and look neat and tidy at the same time.

One aspect of the instructions detailing the R/C equipment fitting that I personally don't agree with is the location of the receiver aerial. The instructions suggest that the receiver wire be fixed to the piano wire whip antenna. What this will do is extend the aerial length and de-tune the receiver making it susceptible to interference. The best method is to wind the aerial *round* the piano wire antenna or cut a length equivalent to the piano-wire whip off the receiver aerial before linking it up.

With the rear dampers in place the only major constructional element left to overcome is the motor and gearbox.

Wheels, tyres and bodyshell

The tyres are the usual plastic 'spiked' type front and rear although the fronts are about a third thinner in width. The fitting of tyre to wheel involves application of cyanoacrylate (Superglue) and this is an item that the builder needs to supply, so do not get to this point of the construction without stocking up.

As mentioned earlier the front wheel hubs are fitted with one way roller clutches. The one way clutches produce four-wheel drive when the car is moving forwards but in reverse only the rear wheels are powered, the fronts free-wheel and also prevent the transmission from braking the front wheels on the over-run.

The bodyshell supplied is a typical 'Baja' type example moulded in clear polycarbonate. Colourful decals are supplied so the shell really only needs to be painted one colour. Make sure that suitable paint is used as polycarbonate reacts against oil-based paints. Acrylic paint is the best type.

Finally, a clear polycarbonate motor cover is supplied. Fit it. This is to stop muck and grime entering the motor.

Motor and gearbox

In the 'Progress' kit the whole motor and gearbox unit is supplied factory assembled. It seems wise then to leave it that way, barring a look inside.

The differential looks slightly different to previous *Kyosho* units, in that the gears look chunkier. In fact all the gears have a wider tooth area than the examples seen before, which can only be a good thing. Also the motor and gear mounting plate is thicker than that used on the 'Scorpion' which will not bend and thus throw-out the transmission. Another introduction is a plastic brace between the motor and gearbox to prevent the motor from flexing about.

Apart from the chain sprocket exiting from one side, the gearbox assembly looks pretty much the same as the 'Scorpion' and 'Tomahawk' unit. A little bit of manual dexterity will be needed to install the gearbox, drive shafts and slip the drive chain onto the gearbox sprocket.

Setting up

Quite naturally, the complicated design of a four-wheel drive; four-wheel steering Off-Roader necessitates more complex setting up.

The various areas that have to be dealt with are as follows.

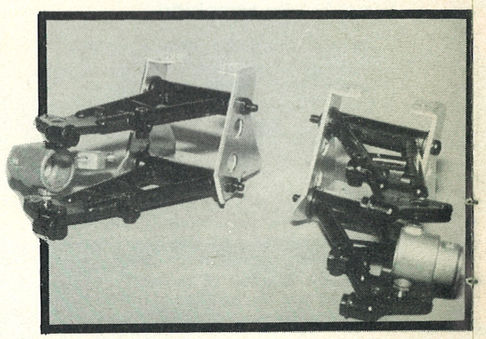
Chain tension
Suspension ride height
Damping
Steering ratio between front and rear
Gear ratios.

The chain tension can be adjusted by three methods. The first is by sliding the front drive shaft holder forwards or backwards. The second is raising the upper chain guide by screwing in or out the centre screw. Finally, chain links can be removed individually to arrive at the correct chain tension.

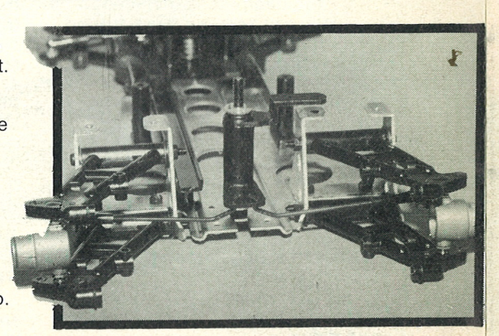
Having spoken to drivers or cars using similar drive chains I was made aware that the chain will stretch at first. This is normal and once run-in a point will be reached when the chain will no longer stretch. So after the first few runs check the chain tension each time.

The suspension front and rear should be set so that the lower wishbones are parallel with the ground when set on a flat surface. Basically the suspension must be free moving so that the car can follow the track contours.

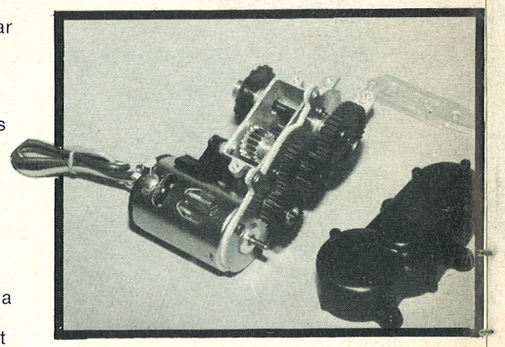
Damping therefore must be set so as not to restrict the suspension movement but compensate for the springing. As far as oil in the dampers is concerned, the grade supplied in the kit is fine, but any thinner grade of oil is not recommended. As a general rule of thumb 3 in 1 oil is probably the average grade necessary.



Above: the two rear suspension/steering/drive sub-assemblies ready for bolting onto the chassis.



Above: the two sub-assemblies in place and coupled to the rear servo saver via pre-formed track rods.



Above: the 'Progress' gearbox with the covers off to reveal chunky plastic gears. The motor is a plain bearing Mabuchi 540.

The four-wheel steering aspect demands double the necessary attention for this area. Even with the transmitter steering throw rates turned right up, the amount of steering lock looks minimal. However, because all four wheels are steering the rate of turn of the 'Progress' is actually increased. In actual fact the ratio between the front and rear wheels is 4:1 in favour of the front. If necessary however, more throw can be obtained by positioning the ball joints in the innermost hole on the servo saver output arms.

Exact adjustment of the gear ratios can be achieved on the 'Progress' because the motor mounting plate has slotted screw holes to allow fine positioning of the motor. This also allows combinations of pinion and intermediate gears to be used to achieve a precise running time depending on the track surface. Alternative gears are included in the kit but it is recommended that the low speed ratio be used first to give everything a chance to bed in.

To the races

Unfortunately due to the strictures of publishing deadlines our 'On the Track' report of the 'Progress' can only be thought of as a first impression.

We expected that driving the 'Progress' would be quite different to anything yet encountered by virtue of its four wheel drive/steering specification. Out at the local BMX circuit we met the standard British weather for Off-Road racing . . . overcast, cold and wet. Still, the track conditions were fairly sound so we went ahead.

Off the line 'Progress' was slow to get moving obviously due to the four wheel drive transmission lag. Once moving however the 'Progress' displays a respectable turn of speed, not quite enough to compete against the lightest two-wheel drive cars on the straight, but wait for the first bend! One notable aspect was that on loose dry surfaces the 'Progress' showed no tendency to spin out and power could be applied instantly to accelerate away whilst the two wheelers pirouhette on the line. The trick is to keep any buggy moving and four-wheel steering allows you to do this as the 'Progress' is virtually pulled around the corner without a loss in speed. This high velocity cornering takes some time to get used to as the natural reaction is to lift off the throttle, which isn't really necessary on all but the tightest hairpins.

The best test of this is to drive the car, flat-out, under full steering lock in as tight a circle as possible; the tendency of most four wheel drive Off-Road cars is power-on understeer, a general drift outwards and larger turning circle. With the 'Progress' use of rear wheel steering the circle is kept much tighter. It is very noticeable that the 'Progress' has very responsive steering and very small steering adjustments only are needed to alter the racing line or position on the track.

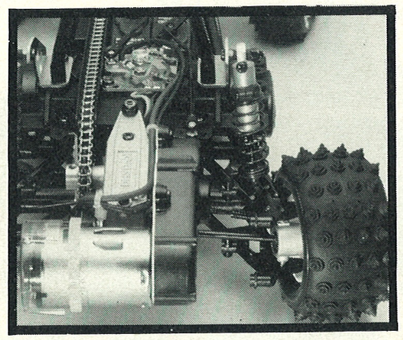
Another pleasant surprise was the ease with which a five minute race time was achieved using a car with plain bearings, a kit motor and average cells. This I can only attribute to the fact that little power is lost through wheelspin and cornering.

The trick to attaining longer running times is smoother driving which means not throwing the car between forward and reverse every lap.

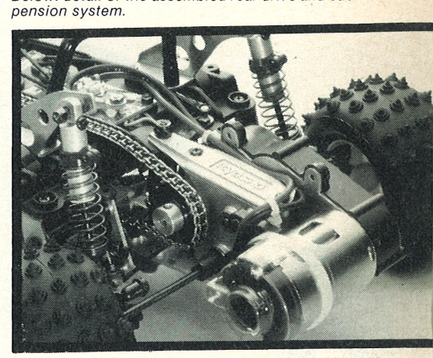
Overall, this is one fine car — *Kyosho* have once again produced the car you can't afford to be without for the top competitive level of 1/10 off-road racing.

UK importer: Ripmax Models.
Approximate price: £120.00.

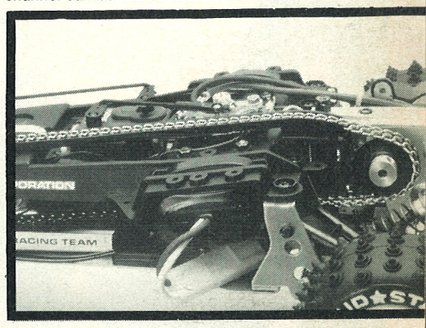
Below: another view of the 'Progress' power plant showing drive and steering to the wheels.

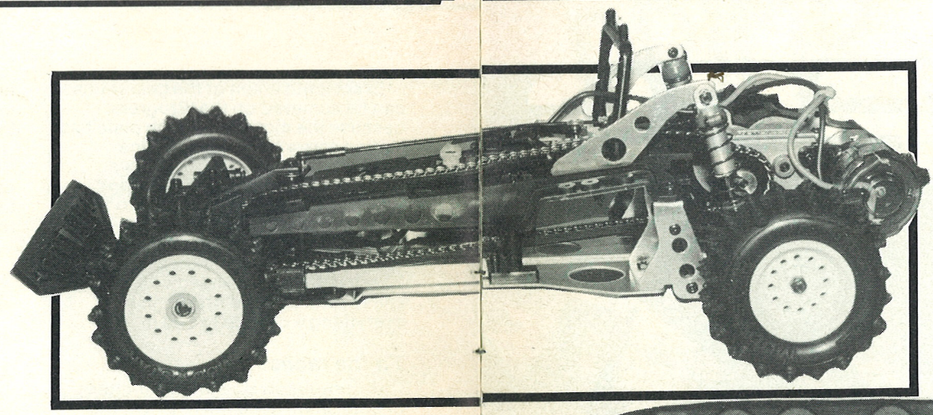


Below: detail of the assembled rear drive and suspension system.



Below: the central section of the 'Progress' with intricately moulded top deck. The top chain channel can be raised to alter chain tension.





Above: side view of the 'Progress' showing the 'box' construction to achieve light weight and maximum rigidity.

Below: the underside of the 'Progress' reveals the much lightened chassis pan. Note: slotted screw holes for the front drive shaft mount used to tension drive chain.

PROGRESS 4-wdS

KYOSHO
THE FINEST RADIO CONTROL MODELS

TECHNICAL DATA

- Length/395mm (15.6")
- Width/230mm (9.1")
- Ground clearance/27mm (1.1")
- Wheelbase/262mm (10.3")
- Front tire/85mm dia×32mm (3.35×1.25")
- Rear tire/85mm dia×40mm (3.35×1.6")
- Motor/Mabuchi RS-540S
- Total weight/1640g (57.8 oz)