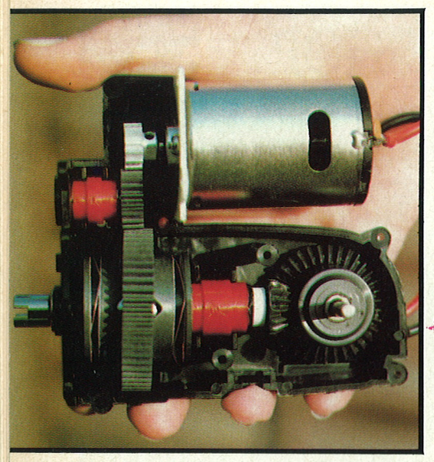


This shot shows off the centre mounting point and more importantly the limited slip differential in situ.

Nichimo LUMINOUS

GREG HALLIDAY reviews the latest 4wd car from Nichimo and finds it a winner.

There is often criticism of Japanese translations and perhaps that accounts for the unusual English name on the latest four-wheel-drive offering from Nichimo.

Nichi-who? I hear you ask! Nichimo (pronounced Ni-chi-mo) are a Japanese manufacturer who have been supplying plastic scale-model aircraft and boat kits to the UK for many years, but until now have not imported their other products, which include radio-controlled cars. In America they have a strong following and their cars are to be seen at many circuits up and down the country.

Well, back to my comment about translations. Perhaps the Japanese for 'Luminous' means 'Wildcat' or other such aggressive name; possibly they just like to be individual and that's why not only the name is different, so is the car!

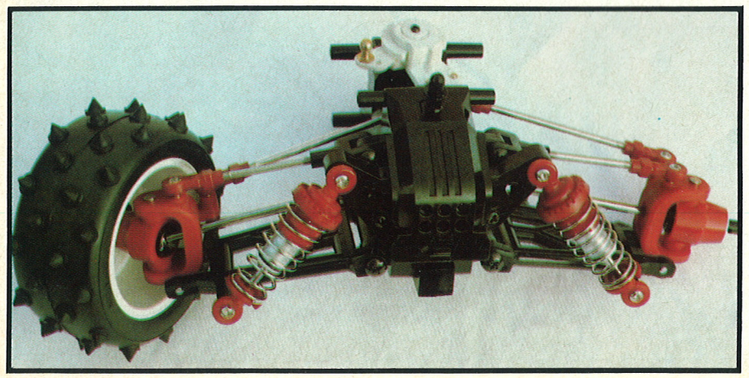
Concept

Basically the car is four-wheel-drive with a geared differential front and rear, together with a third differential immediately below the motor. Now for the really innovative part, this third differential is actually a true limited slip device for which Nichimo have applied for World patents! As I studied the kit and instructions, I realised that if this really works it could change the course of off-road racing!

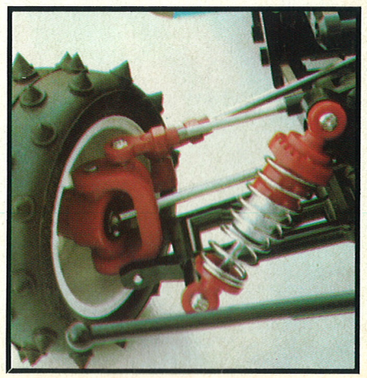
The finished Luminous, she certainly looks the part.

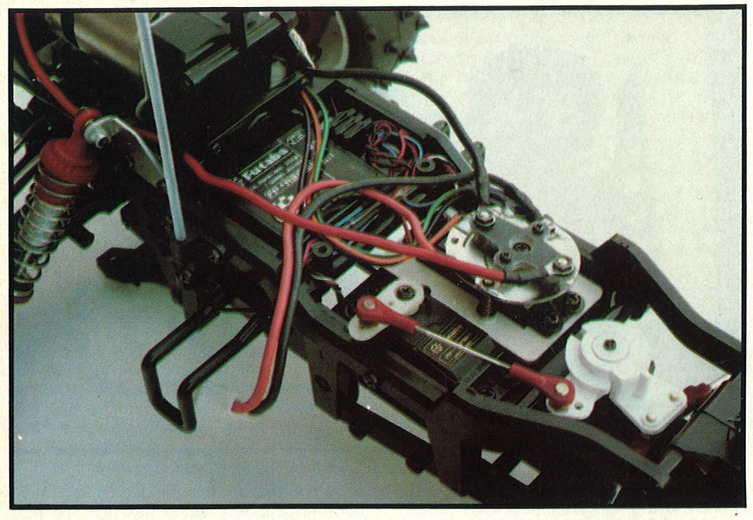
Other features are a relatively light ready to run weight of 1,550 grammes (3lb 7ozs), 10″ wheelbase for tight cornering, shaft drive, four oil-filled, coil over adjustable shock absorbers, and adjustment for two ride heights. Provision is also made for an 8.4 volt ni-cad pack, if you feel really daring!

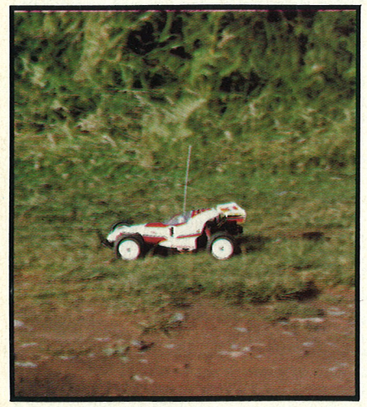
Front gearbox assembled and ready to be fitted, all mouldings are strong and true.



Front gearbox this shows well the single steel upper wishbone.



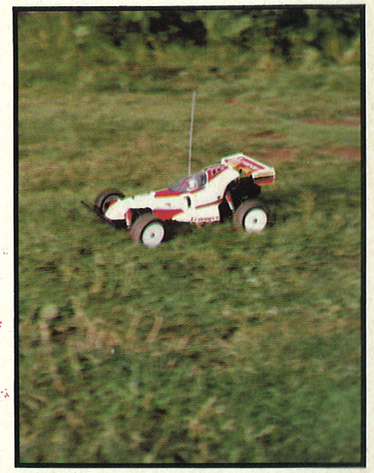




All radio gear in place, a tight squeeze but very neat once finished.

The Luminous at speed, this car could really upset current trends if it is stocked here in the U.K.

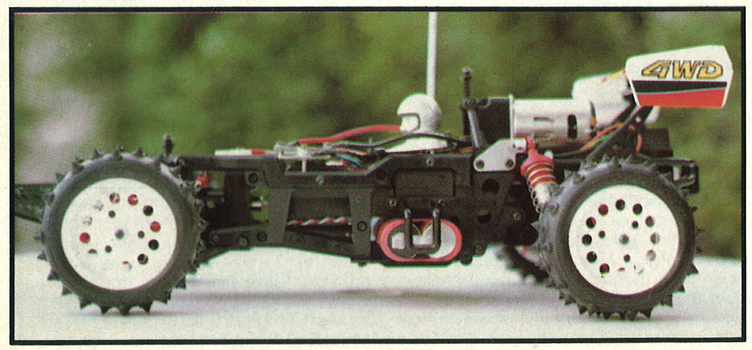
This photo shows the uncluttered lines of Nichimos new car, strong yet light seems to be the watchword.



The Kit

The box top presentation follows the best Japanese traditions in providing large full colour pictures and lots of technical information. Upon lifting the lid, you could be forgiven for thinking you were looking at another certain major manufacturer's product! Large parts are blister-packed and boxes contain the plastic parts and fiddly bits. The bodyshell and aerofoil with coloured decal sheet are placed over a virtually full-size, plan photograph of the car. Also included is a very comprehensive 32 page assembly manual.

One thing became immediately apparent to me — this car was going to take more than a couple of hours to assemble! Apart from a certain amount of 'flash' on a few of the plastic parts, the mouldings and metal parts were fabricated to a very high standard. Various grades of plastic have been used in the mouldings and they all appear to be in a form of nylon. All five drive shafts, the ball joints, tie rods and the springs are either plated or made of polished stainless steel!



Construction

This starts by ensuring your radio gear will fit, and to help you confirm this Nichimo provide maximum dimensions for servos (no larger than 41mm high x 21mm wide x 41mm between lugs) and the receiver (no larger than 24mm high x 39mm wide x 56mm long). The speed controller sits directly on top of the servo and the current dropping resistors are mounted at the back of the car. Dropping diodes are provided for the on-board radio gear. BEC radio systems can also be used.

The bare bones, the ladder frame shows up well here, this should prove to be very strong.

Having determined your equipment will fit (and most modern sets will), assembly commences by fitting a 'thermo fuse' to the resistor plate. Your radio power supply lead also has to be soldered to the speed controller and the on/off switch mounted in a plastic housing above the resistors. At this point, the 7.2 volt drive battery should be plugged in and the radio gear operation checked. If all is well, its time to build a buggy!

The front and rear shock absorbers are of two different lengths and consist of an aluminium barrel with the plastic top-mounting moulded over. They each have one shaft 'O' ring seal and are supplied with one size of piston. Due to the 'flash' previously referred to, I found it necessary to trim these pistons individually after assembling and checking the damping action. If this had not been done, the damping rates of each shock absorber would have varied. It is of course possible that this problem only applied to my kit. Damper oil is provided by Nichimo in a very neat pourer bottle, and releasing the trapped air in the units proved of little difficulty. Tapered coil springs are slid over the barrels which are provided with three adjustment settings by virtue of a simple rotating locking ring. To alter the setting you simply rotate half-a-turn, slide the ring up or down as required, and lock by a final half-turn. Screwdrivers and spanners are not required.

The front gearbox is the next item to be tackled and this contains four oilite bearings with two tiny alloy and four hard plastic gears.

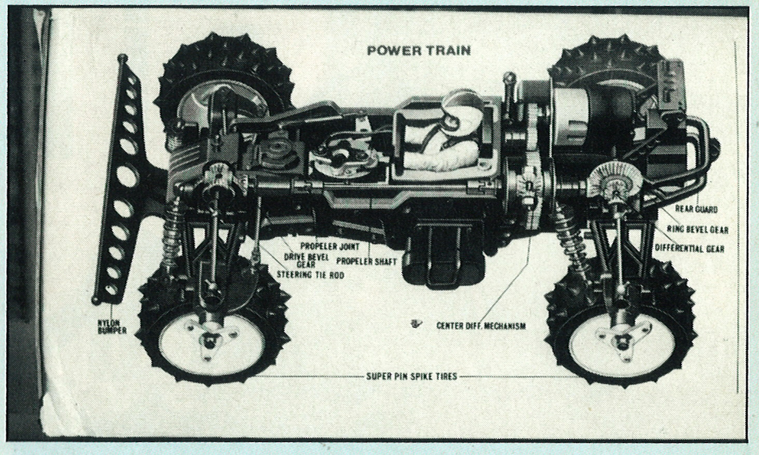
In total the kit contains 15 oilite and 8 nylon bearings together with one ballrace, and the instructions suggest 'various bearings can be used', which I take to mean ballraces could be fitted as alternatives. However, I don't think 23 ballraces would really be of much benefit as the gearboxes are quite free-running.

Much better would be to fit eight in the stub-axle carriers to replace the nylon bearings and perhaps change the four oilite outputs in the gearboxes. The ultimate would probably be to fit a further four in the rear gearbox either side of the limited slip diff. I expect Nichimo will offer an optional bearing set when UK sales are commenced.

Incidentally, a tube of molybdenum grease is supplied and the assembly manual indicates where this is to be used, which is mostly in the gearbox — perhaps this is why they are so free-running.

After checking that the front gearbox works properly, the next stage is to attach the front lower wishbones, front axles and carriers, drive shafts and adjustable top links. One point to note here is that the hinge pins are held in place by small grub screws and care should be taken not to over-tighten them as the thread cut in the plastic can be easily stripped. Completion of the front end is achieved by fitting the all-nylon servo saver, adjustable track rods and shock absorbers. Interestingly, if you set up the top links and track rods to Nichimo's instructions, the front end has positive camber and toe-out. Well, I always believe in trying things the manufacturer's way first, so I followed the directions to the letter!

The next stage of construction is to assemble the rear gearbox which contains two differentials, one as per the front end and Nichimo's 'ultimate weapon', the true limited slip device! The drive motor, a traditional Mabuchi RS.540S, sits above this gearbox facing forwards, having its power delivered down to the limited slip diff. through a ballraced idler gear. It is interesting that the manufacturer has decided to fit a ballrace in this position as I have always considered this area to be a point of great friction and stress in any design. The motor is bolted to an epoxy resin plate which has three alternative mounting positions for different pinion sizes. A neat alloy fifteen-tooth pinion is provided in the kit, and alternatives of twelve and eighteen-tooth pinions can be fitted. I would like to have seen more adjustment available here, but think a small modification of drilling a sight hole in the front of the gearbox would enable correct meshing of virtually any size pinion.



What about this limited slip diff. then? Well, the above-mentioned idler gear rotates a 54 tooth main gear which transmits the drive fore and aft. That part is simple. Within this gear are two alloy planetary gears clamped in place by two pressure rings, one on each side. Then, on each side is placed a slip ring, a brass slip ring spring, another slip ring and a pressure plate surrounding the main level gears which mesh with the planetary gears. Phew! The slip rings are a type of textile material and are coated in damper oil. Does it work? Well, the 64,000 dollar question will be answered when we road test the car! Next, the gearbox is closed up and the rear suspension, drive shafts etc fitted in a similar manner to the front end.

A couple of construction tips are useful here — don't over-tighten the long screws which hold the wishbones and top links in place; it can stop the free movement of the suspension, and the axle carriers front and rear may need reducing in width slightly where they fit into the wishbone, again to ensure free movement.

Now for the joining of the front and rear of the car! Two 'ladder' side-frames hold the car together, and platforms are inserted between them for the radio equipment. A good rigid structure is formed when all the bolts and screws are tightened down. At this point installation of the servos and receiver takes place.

I think the speed controller deserves a special mention here. It is a quite simple design with the p.c. board sitting directly above the servo. This system was used successfully for many years by manufacturers such as Mardave. However, what Nichimo have done is to refine the design in a manner the Japanese seem best at! The p.c. board is spring-loaded upward on fully adjustable posts. Silver-plated floating studs are mounted in the ends of a special output arm which rotates above it. Therefore you do not have to worry about wiper arm tension, merely twiddle the posts with your screwdriver until a satisfactory contact is made. It is also worth noting the large diameter power cabling.

Almost there! Stow the cables neatly under the driver figure, fix the aerial, put the tyres on the wheels, put the wheels on the car, and Bingo! It's finished! That is except for finishing the shell and aerofoil!

The polycarbonate shell, which is beautifully moulded, looks as if it would not be out of place on the front of a glider! Its surprising how styles change, and although the curved 'wedge' shape currently seems in vogue, I wonder if Nichimo's new shape well set future trends? Because a large multi-coloured decal sheet is provided, an elaborate colour scheme is unnecessary. A coat of white is quite sufficient. Fixing and aerial holes are pre-drilled in the shell which is a nice touch for all those people who have difficulty drilling the shell in the right place.

Construction Summary

Take care, take time, and you will be rewarded with a car that shold be strong and reliable. Use 'Loctite' threadlock, or similar, on all nuts and bolts other than electrical types, and use 'Tri-flon' on the outer wheel bushes instead of the molybdenum grease. Now then, there are eight different types of self-tapping screw and some sizes are very similar, care in selection is necessary. I know. I was short of two for the driver figure when I finished! A good point is that all the track and tie rod screw-on fixings go together very easily.

Wheels And Tyres

The wheels supplied have holes drilled in their circumference and look quite attractive. However, in line with current trends, Nichimo have provided full wheel covers to give that 'clean' streamlined look. The option of fitting is yours. I was pleased to discover that Tamiya 'Hotshot' wheels also fit, so if you have these lying around somewhere, dig them out and put them back in your pit box! Very nice, quality pin spike tyrs are simply pulled onto the wheels and

gluing is not required. These tyres attracted much admiration from the local off-roaders, so I think I had better keep an eye on them! Schumacher Cat tyres will also fit the rims.

Carpet Capers

Time and the weather were not helpful for test driving so the initial runs took place at out local 1/12 scale carpet club. The car's straight line speed was good for standard Mabuchi power but it did appear to be a little overgeared for tight courses. It also slowed somewhat on corners indicating (a) that I had not lubricated the surface between the wheel drivers and the hub bearings, and (b) that ballracing of the wheel hubs would be quite beneficial. The handling was good with the car going exactly where it was pointed, with signs of slight understeer as speed built up. At this point the car was on Cat tyres (which are narrower on the front than on the back) as I wanted to save the pin spikes for the rough stuff. This understeer may not have occurred with the standard tyres as they are the same width all round. Now to fit some real power and get out in the open air (and the rain?)!

On The Track

For a perfect test of the Luminous's limited slip differential a dry, dusty track would be required. Well it had to happen, we had four days of heavy rain around the test period and there were just two hardy (crazy?) types and myself trying to sweep the water off the C.O.B.R.A. track between showers on the actual day! A 22 turn double motor was fitted, run on a 10 tooth pinion. This was done by filing the epoxy resin motor plate to clear the bearing housing and extending the fixing screw hole.

The car shot off the line straight as an arrow and cornered smoothly; it is very easy to drive. the L.S. diff. could actually be heard working every time it locks up it 'clicks' like a belt drive car with a slipping belt! All good things come to an end and so did the test run when the heavens opened again and down came the rain! Analysing the ride we came to the conclusion a slightly thinner damper oil was needed and so changed from the kit oil (about 30WT) to 20WT oil. At this point I noticed one of the front shock absorber shafts had been bent. As the car had not crashed heavily I concluded that possibly the rod was not up to normal strength or perhaps Nichimo need to strengthen this component. Unfortunately when the rain stopped again my radio receiver decided not to operate due to water in the works. The moral here is always waterproof your radio equipment!

The $64,000 Question

Yes, the system does appear to work and although the ultimate test will be in dusty conditions, on mud, hard earth and grass the Luminous is easy to drive, with fairly neutral handling. In the short time available for testing, it was not possible to establish whether or not the L.S.D. saps any power.

I am not sure the underside of the servo's being open is a good idea and have made a small aluminium skid plate to cover them. This also prevents scooping up of grass. As there are fixing holes already on the chassis rails, I suspect a cover plate is probably available as an extra. Incidentally, having tried the manufacturers original front suspension set up, I think that a zero camber setting gives better turn-in on corners.

Conclusion

Nichimo's product is well designed and made, appears tough, looks different and drives well. It is an "out of the box" racer which, in standard form, fits just below the level of the classic full blown competition car. But that's not to say the Luminous cannot be made to perform to top standards. Fit some ballraces, an F.E.T. speed controller, take off the 'unnecessary' bits (that will reduce the weight to around 3lb 5oz) and you could have a winner! Nice one, Nichimo! Now, where did I put my Demon Pro-King?

Nichimo are currently looking for a U.K. distributor for the Luminous and other R/C cars. If you are interested contact: Nichimo Co., Ltd., 135 Kubocho, Sano-city, Tochigiken, 327 Japan.