
**Above; The Kyosho Terrano has an excellent appearance combining a scale model feel with a full working set of mechanics. Below: the real thing! Nissan's Terrano – or is it the Kyosho one?**

**"I did some quick comparisons with the real vehicle and the discrepancies were slight."**



# OFF ~ ROAD!

# *Terrano 4x4*

**Geoff Driver reviews one of the most interesting kits to come out of Japan for years!**

I guess we are all familiar with the Range Rover and its younger relation, the Discovery. These two vehicles are indigenous to the U.K. and as such they out sell just about every other 4x4 vehicle in Britain. However around the rest of the world the matter of one product domination is far from the norm. The competition is certainly fighting for a chunk of the available market in just about every other corner of the globe.

Most major manufacturers have some kind of Range Rover look alike. I suppose to be fair to Range Rover not many of them have ever looked remotely like a Range Rover, but they have fought for the same slice of the market. It seemed to me that most of the competition were styled on trucks more than passenger vehicles.

In a concerted effort to bite into the Range Rover market dominance, some makers have actually been thinking about vehicle appearance and come up with some smart looking vehicles. The Nissan Terrano (or Pathfinder in some parts of the world) is just one of them. This stylish off road estate car is the subject of an all new, novel and at the risk of sounding like a advertising copy writer, exciting model. I must say that when I first heard of this model I was fascinated by the advertising. True scale, I.C. powered and continuously variable transmission. Quite honestly I was a bit more than just interested. Being a bit of a mechanism freak I really wanted to find out what Kyosho had been up to, and the claim that everything on the car, including suspension and chassis details were as the real car made the prospect even more interesting.

So, thanks must go to Ripmax for providing us with one of the first cars in country.

Was the hype all worth it? Are the copy writers telling the truth? Is the car up to expectations?

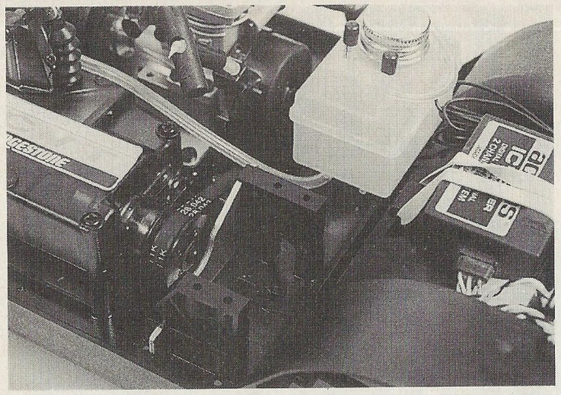
I have to tell you an unqualified YES.

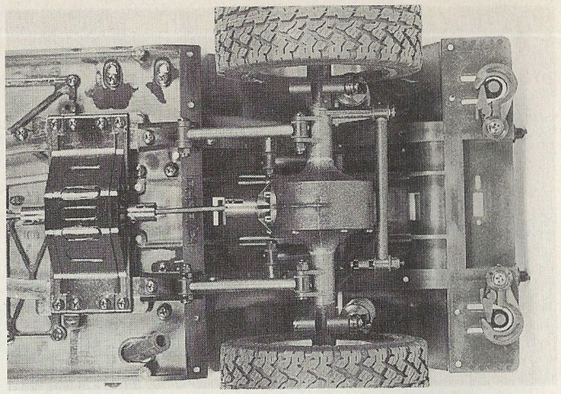
I cannot remember when I last enjoyed putting a kit together as much as I have enjoyed this one. It has not all been plain sailing with the Japanese instructions, but with the pictures plus a bit of luck all the bits fitted eventually.

It took me quite a time, but I was in no rush (hope the ed. did not notice that) around 6 hours spread over a few days.

## *What do you get?*

The kit is pretty close to scale, I did some quick comparisons with the real vehicle and the discrepancies were slight. The chassis pan is a complete bumper to bumper moulding with chassis details all included. In fact, it could possibly take an award for one of the largest and most complex injection mouldings used on an RC car. Independent front suspension





with lifelike wishbones at the front and a live rear axle at the rear with multipoint axle location including a Panhard rod for making sure the axle stays in its correct location. The rear suspension location links are all fitted with rubber bushes which act just like the suspension system on the real car. Engine included with this kit is an OS10 with recoil starter, although information provided by the importers say that this will be changed to a Kyosho engine in later models.

The engine comes with a centrifugal clutch with built in cooling fan. The engine output powers a toothed belt to drive the main transmission unit. This transmission unit is a plastic box with a single control rod for continuously varying the reduction ratio. Movement of this actuating rod takes the transmission from full speed forward right down to almost zero and then into reverse.

The transmission output is via a toothed belt to the under chassis transfer box. This transfer box is a simple gear differential giving a 50/50 torque split. Drive to front and rear axles is by prop shaft. Gear differentials are housed both in the near scale rear axle and chassis mounted front diff. moulding. Front drive to the wheels is by dog bone drive shafts.

The vac formed body contains plenty of details and there are masses of bolt on body bits including windshield wipers, radiator grill, front and rear bumper and rear wheel carrier.

Transparent lenses come with a space in the reflector for fitting working headlights should the urge for night driving take you.

All the usually glues, oils and greases add the final touches to a very complete kit.

There are quite a lot of bits in this kit, so it is quite likely that building will take you more than one session. There is little to say about building as it is really a matter of starting at page one and working to the end.

## Building

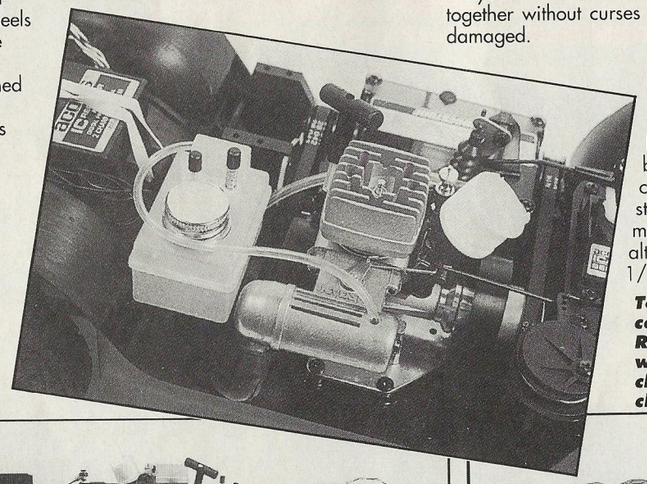
I encountered no significant problems during the build, although the front differential unit was a bit on the stiff side, and no matter what I did to it I could not free it up. I have occasionally encountered this sort of problem with other Kyosho kits, but things usually free up after driving the model for a short period.

A few screws seemed to be located in some particularly difficult places, I had visions of trying to tighten screws with banana shaped screwdrivers or worse I had to embark on a screw disfiguration programme and perform butchery to some of these awkward fixings.

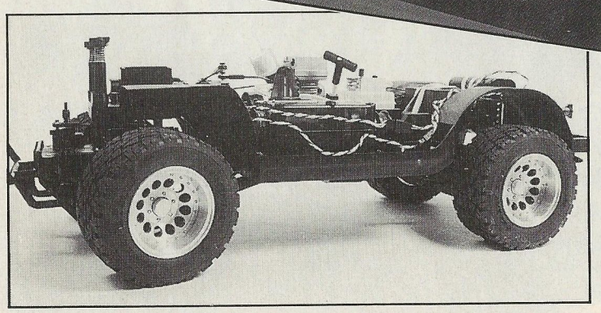
Kyosho had it sorted out, and in the end everything went together without curses or a head ache and nothing was damaged.

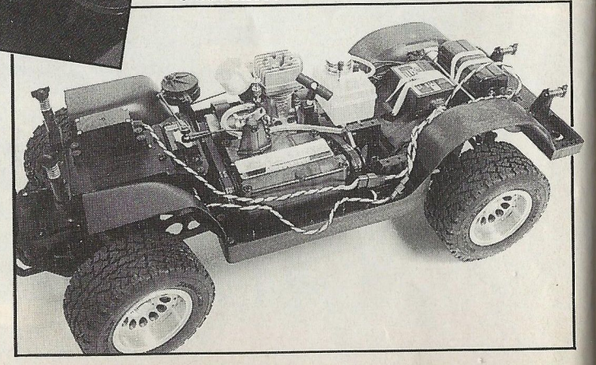
## Scale?

Well this Terrano certainly looks good. As far as true scale is concerned I am not too sure. In any case it would be virtually impossible to make all components parts of suspension and steering true scale. One thing we have mentioned before in these pages is that, although the cars may be around 1/12, 1/10 or 1/8 scale, the speeds, stresses



***Top; Left the CCVT output to the centre diff (transfer box). Right; Rear axle assembly. Left; The OS10 with recoil starter. Bottom; The chassis is neat with lots of ground clearance.***







and loads imposed on the working parts are far in excess of a set scale. Most full size cars encountering a 3 metre jump would look as though they had just done a few rounds with an Euclid dump truck, whereas an RC model car will simply shrug off the scale version of such a jump.

The suspension is double wishbone independent at the front with coil over shockers. The shocks on both front and rear are pure simulation with virtually no damping whatsoever. Seems a bit of a shame that Kyosho did not go for some proper oil filled units, but I guess that might be a matter of keeping the price down. It will be a small matter to find some proper shocks that will fit. The kit shocks do include a simple ride height adjustment which, although easy to adjust off the car, are none too easy to get your hands on when everything is fitted, especially if you are endowed with fingers that have more than a passing similarity to a bunch of bananas. In fact most parts are tricky to reach once the whole car is assembled.

Kyosho have opted for a flick over body fixing clip. Gone are the R clips so beloved by RC racers. This is fine for not loosing the bits, but they are the real devil to undo when removing the body, especially the rear ones which finish up under the spare wheel carrier. Although these new clips look Ok I still have a hankering for the simple efficiency of the R clips.

## The transmission

This all new transmission must be the jewel in the Terrano crown. I have no doubt that it will make appearances in a whole range of vehicles in the future. Word is, that it is already destined for some RC boats.

The venture appears to be a joint effort between Kyosho and the Bridgestone company. Who, you might ask are the Bridgestone company. In fact they are one of Japans industrial giants. Formed just after the last war by one Mr. Ishi Bashi. At the time Mr Ishi Bashi was looking for a name for his new tyre company. A swift re-arrangement of honourable founders name and there we have it, Bridgestone (Ishi Bashi I am told means Stone Bridge). Since those days a lot has happened to Bridgestone including becoming one of Japans largest producers of bicycles and producing tyres for a whole range of tyre companies not just under the name of Bridgestone. Whether the joint effort with Kyosho to produce this model transmission will be mentioned in the Bridgestone hall of fame, we may never know. However as an innovative piece of model engineering it is outstanding.

**"to overcome the problem of limited torque carrying they have opted to put in a torque splitter before the variable gear."**

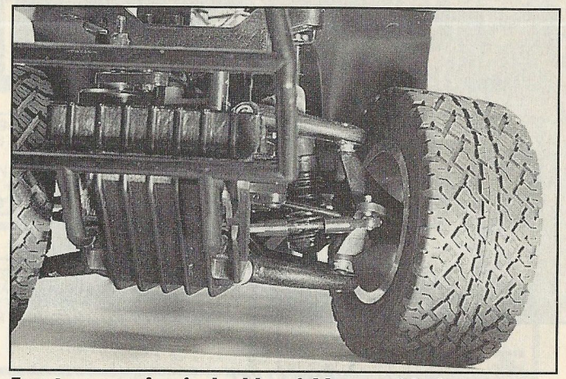
How does it work. Like all descriptions it would be better to have a drawing or picture. However a few words might help.

The basic unit for creating the speed variation comprises two rotating plates rubbing together. One plate is approximately one third the size of the other and can slide across the surface of the larger plate. If the two plates are on the same axis they will rotate at the same speed. Move the smaller plate towards the edge of the larger plate whilst they are rotating and you cause the larger plate to slow down. This is the basic principle behind the reduction unit. However there is more too it. The next part is my best guess on why the device is as it is, no confirmation available.

The problems with this type of unit are firstly they are pretty inefficient. This is because the two skidding surfaces rely on friction and hence must generate heat and secondly there is a limit to the amount of torque that can be transmitted by this type of device.

So I reckon to overcome the problem of limited torque carrying they have opted to put in a torque splitter before the variable gear. This simple device is nothing more than a just a couple of gears meshing together. Connection is made from





***Front suspension is double wishbone with tiny dogbones, big bumper protects the front end.***

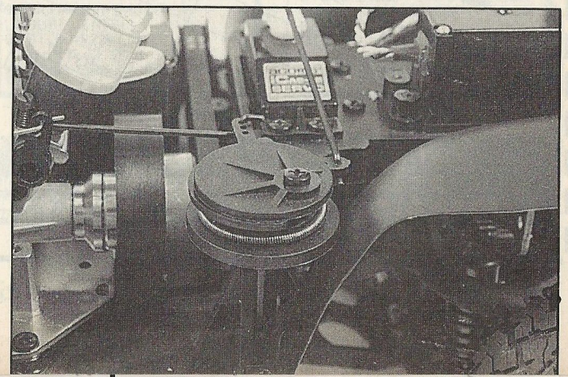
one gear directly to the centre (sun) gear of a planetary reduction unit. The second output from the torque splitter is via the variable reduction unit. The output of this vary speed unit feeds the outside of the planetary unit. The discrepancy created by the two different input speeds to the planetary unit is resolved by an output being taken from planet gears. It becomes a differential in reverse. Sounds complicated, and I suppose in a way it is, but neat. The gearbox has to be lubricated with a small amount of oil (provided in the kit). Here I did discover a bit of a disadvantage. The gear case is none too oil tight. Unless the car is maintained in roughly the horizontal position oil could leak out past the input or output bearings or through the gear case centre joint. The outcome is not serious, just messy.

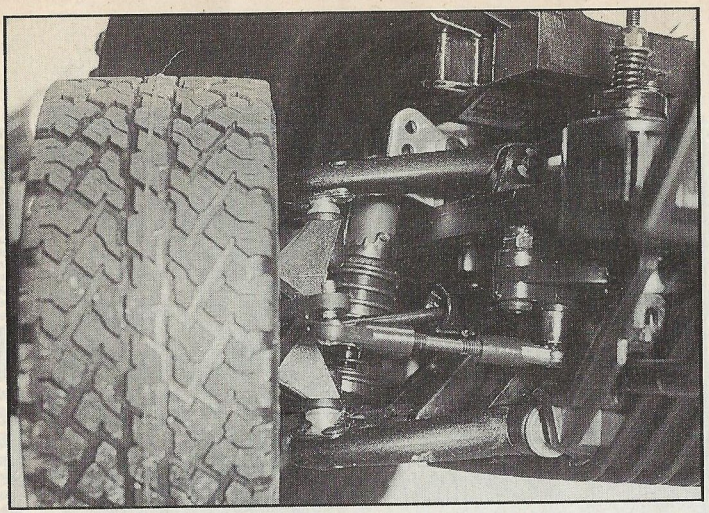
## Control

Steering is by a steering servo operating a chassis mounted servo saver. The steering geometry as set up to Kyosho's recommendations does provide what I think to be a bit too much toe in. Also there is a fair amount of bump steer. The Bridgestone Desert Dueller tyres have some really nice near scale tread pattern, I would hate to scrub that out unnecessarily. Engine control is by a very unusual linkage come saver arrangement. This is necessary as the one servo can be used to provide engine control as well as transmission control. Setting up the transmission could be a bit time consuming as engine speed has to be related to gear drive ratio. I found this part a bit difficult to get right, mainly because of the effort required to shift the transmission control arm. This was necessary to set up the linkage correctly. With perseverance it can be done. Provision is made for a separate transmission servo if you are lucky enough to have 3 (or more) channels.

The amount of effort required to operate the gear shift mechanism is high even with the wheels turning. When funds permit I am tempted to buy a high torque servo for this job.

***Rather unusual coupling to control throttle and transmission servo.***





***Detail of the front suspension showing the easily adjustable ride height on the dampers.***

# OFF-ROAD! *Terrano 4x4*

## *Starting*

The OS engine is provided with a Kyosho silencer. This has a pressure connection to the fuel tank to assist fuel flow when the engine is running. To start the engine the tank has an in-built simple primimg pump, to get fuel into the engine. Kyosho have even provided a battery holder for the engine glow plug.

With fuel, battery connected a few pulls on the starter and, well nothing.

Not being worldly wise on the secrets of I.C. I called on my local I.C. expert. He said the magic words to the engine, waved his hand in the approved manner, faced the east and blow me down the thing started.

A few adjustments to get mixture correct then tick over. The engine purred like an.....engine.

Quite a few revs were necessary to get the clutch engaged and turning the wheels. I think that the frictional losses in the transmission are quite high, and my guess about requiring a bit of setting up to get the relationship between throttle and transmission seem to be correct.

Driving this all new masterpiece is a bit of an acquired skill. I think that I would like to try a three channel set up just to see if I can manage it. A definite must are some proper shocks, just to reduce the leaping around.

In conclusion I have to say that this car is just great. I know it is a mite expensive, but with me it scores top marks as a bit of original and innovative model engineering.

Having taken my course at the Murray Walker school of excessive exaggeration and over the top comments I feel qualified to say "its a winner with me". As a fun car, educational experience or something to race,(if you are into racing off road passenger cars) which ever way you look at it this car has IT.

There was only one fairly trivial point I did not like and that was the flip over body clips, particularly at the rear of vehicle. Considering the complexity of this kit I think that to be pretty minor.

One item that is definitely not scale and that is the price. My sums tell me that the full size Terrano in Japan is around ú11,000, divide that by nine and the scale price would make this model about ú1222.00. Looks like this kit at around ú320.00 is a good deal.

Currently the full size Nissan Terrano is sold in Japan and the USA. It is not known if the car will be on sale in the U.K.

| Kyosho | Nissan |
|---|---|
| Length 545mm | 4545mm |
| Width 217mm | 1690mm |

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