Dale Burr

Japan Built in rebuilt in Coventry

Want to make a winner out of the Kyosho TF2 chassis?

The 1996 BRCA 1/10 IC series saw some interesting 'Scale' IC cars being raced alongside the main championship. Ripmax, the UK's importer for Kyosho cars, was the culprit. The series had been set up as part of Kyosho's 'World Series'. and the cars being raced were Kyosho Pure-10 IC scale saloons.

But this was only the first part of Kyosho's global plan. A year on, Ripmax made the ambitious move of going solo, in setting up their own series for 1997. As part of their effort to promote this series, each club holding a round were sent two cars to be raced in the series. Both were 4wd scale saloon type cars - one being IC powered, and the other electric powered

As race director off Bedworth club, I was the lucky recipient of one of the said electric powered scale saloons.

Opening the box

The kit was relatively low specification: alloy chassis parts, bronze bushings, friction dampers, dog-bone driveshafts and geared differentials, but as it was a 'freebie' I did not mind. But, on close inspection, it was apparent that many of the design ideas had been carried over from Kyosho's extremely competitive Lazer ZX-R. Being an ex-Lazer driver, I could see the potential hidden in this car. So out came the drawing board.

Making it go

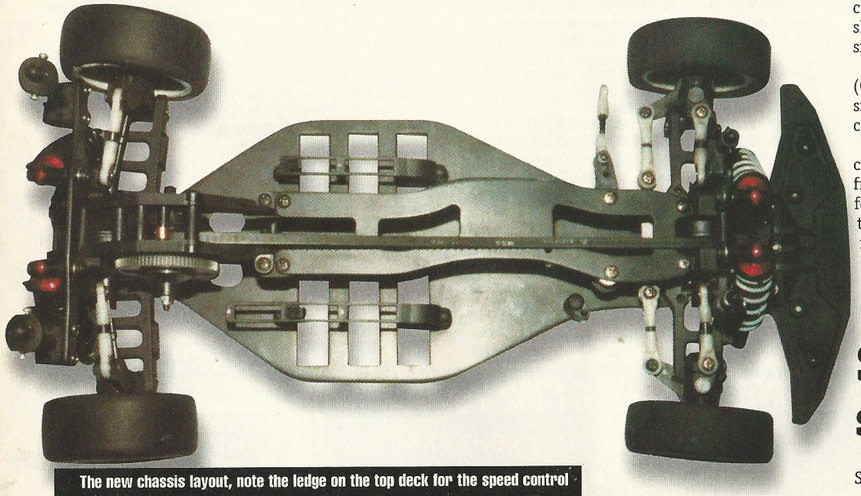
The original battery layout was to place them in stick format across the chassis. While I feel this is ideal for beginners - as most have stick batteries - I thought saddle packs would be far more suitable if the car were to be raced competitively. Running saddle packs moves the heaviest part of the car closer to the centre line of the chassis, making for a far more responsive and agile car.

The original chassis was bolted to the fibreglass sheet, so that is could be used to ensure accurate drilling of all the mounting holes. An important note here: the servo mounting holes were positioned much further to the left than before - to allow the removal of the front belt roller necessary to lift the belt over the servo. This is done to remove any possible source of friction in the transmission. A Cat 2000EC chassis was then bolted on to get the correct spacing for the cell slots, which were positioned as far back as possible for maximum rear traction. The original alloy chassis was then bolted back on, and the fibreglass sheet was cut (using a tile cutter - a saw with a circular, tungsten-coated blade) and filed to the shape of the original. Hey-presto, a new chassis.

The new chassis was produced from fibreglass (GRP) which costs as little as £5 for an A4 sized sheet. This was enough to produce a chassis, top deck and shock mounts.

The instructions suggest mounting the speed controller on a 'nerf' plate, about 5mm away from the spur gear. This can only be a recipe for disaster. We all know what can happen if a tiny pebble gets in between the spur and pinion gears - imagine the damage if a whole speed controller found it's way in!

So, a new top deck was also produced from fibreglass, making provision for the speedo on a small ledge above the repositioned servo.



The new chassis layout, note the ledge on the top deck for the speed control

Short sharp shockers

Next on the modifications list came a set of Schumacher ultra-short shock absorbers to replace the kit standard 'friction dampers' - which are about as effective as the suspension on a 2CV! The dampers were 'borrowed' off a now redundant wide bodied Cat 2000. The adjustable pistons were set to one hole, with 35wt oil for both front and rear. Black (Rate 6) springs were fitted on the rear, and Blue (Rate 15) to the front. New shock mounts were produced, again from fibreglass, to provide the facility to adjust the shock absorber angle by moving the top of the shocks to different holes drilled in the new mounts.

All Tooled up?

The tools needed to make your own parts:

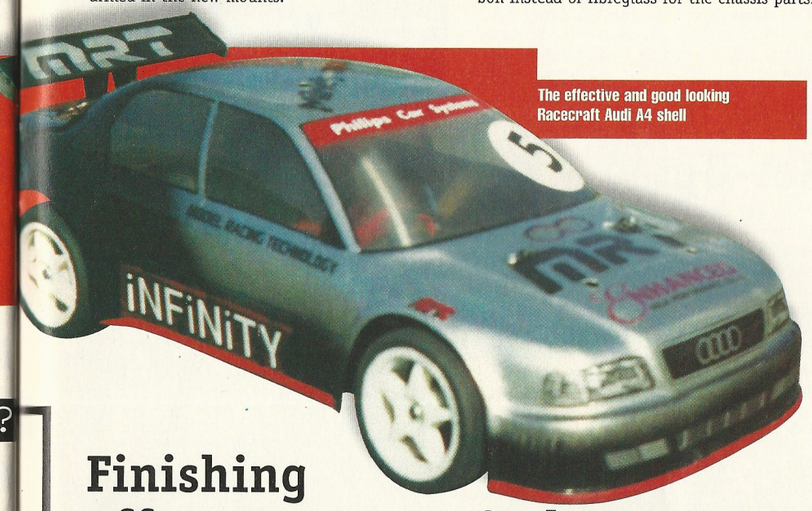
Woodworking vice (or metal vice, with wooden inserts) Tile cutter and hacksaw

Drill (hand or electric)

Files (various shapes and sizes) 3mm Drill Bit

Countersink tool

A face mask and eye protectors are also a good idea, especially if you decide to use carbon instead of fibreglass for the chassis parts.



The effective and good looking Racecraft Audi A4 shell

Finishing off

Finally, all of the fibreglass parts were sprayed Satin Black to provide a more professional finish to the car. The kit supplied bronze bushings in the transmission are actually very good, and are far superior to the plastic versions supplied in some entry-level kits. However, for the ultimate friction-free transmission, a set of ballraces were obtained from Lesro Models for the princely sum of £15. The fixed length track-rods were also dispensed with, and a set of Traxxas rod ends and turnbuckles filled their place. This is to allow the adjustment of camber, toe-in and toe-out, a vital part of any racing car. Once the car was assembled with all of the new parts fitted, three further parts of the cars design, in my opinion, needed changing:

1. The car had no rear toe-in whatsoever - which would make for a highly unstable car, spinning out at the first press of the throttle.
2. Insufficient anti-squat (or rear castor). This has a similar effect to rear toe-in.
3. Excessive front castor, causing the car to 'push', or understeer into comers.

The first two problems were rectified in one go - a new rear wishbone pivot plate was manufactured (more fibreglass!), moving the rearmost end of each pivot pin down (by 2mm), and out (by 3mm). This gave the rear of the car around 2° of toe-in, and 10° of anti-squat.

The third problem was cured by turning the front castor block upside down, which lowers the front end of the wishbone pivot pins, thus reducing the castor. The underside of the castor block then had to filed slightly to allow it to clear the front bumper.

So how does it go?

Now complete, the car was fitted with an LRP speed control, Sanwa radio gear, a Futaba 9401 servo, and for motive power, an Infinity 13x3 geared at 30mmpr. Ready to race, the car weighed just over the BRCA minimum weight at 1520g; light enough to be competitive, but not so light that it needs an anvil strapping to the chassis to make it legal.

QUICK SPEC

Weight:	1520g
Speed control:	LRP
Radio gear:	Sanwa
Servo:	Futaba 9401
Motor:	Infinity 13x3 geared at 30mmpr.
Tyres:	Take Off HSA Slicks and Ride GS
Bodyshell:	Racecraft Audi A4

Test 1 Bedworth

For it's maiden run, a 'set of Take-Off HSA slick rubber tyres were fitted, as they give excellent grip in cool conditions - which is what we were faced with at the Bedworth track. The standard car also comes fitted with a full time 4wd layshaft. This was run for the Bedworth track test, as the track has several fast straights, followed by tight hair-pin bends. This makes sharp braking a necessity, which is not possible with a one-way layshaft; because all of the braking has to be done through the rear wheels, the car is extremely unstable under braking.

Well, all of the hard work had not been in vain; on the first run the handling was very good, with fair but not excessive steering, good traction under acceleration, and rocket-ship speed down the straight. The car felt very easy to drive - perhaps a bit too easy - being a little 'safe' for my liking.

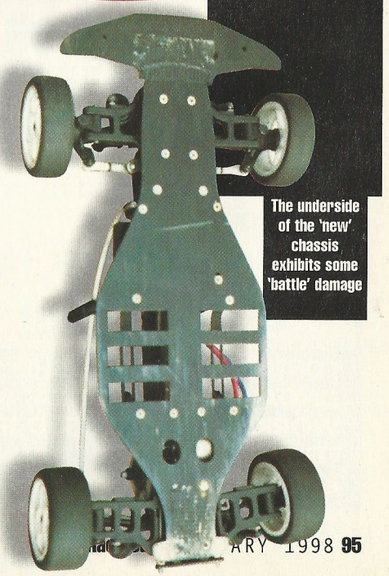
Changing the front springs to some SST Greys (rate 10) and running the front wheels with a slight amount of toe out made for a much more aggressive car, allowing it to carry more speed through the comers, making for a quicker overall lap time. This improvement had made the car a bit unpredictable under braking however, so for the third run the rear droop was reduced by screwing the wishbone grub-screws in half a turn, making the car more stable coming into the tight hair-pins.

A fourth set of batteries were peaked, and a final 'timed' run was completed. 17/301.23 was the time which would have qualified me well inside the A-Final at the recent Bedworth RRCI meeting (in much warmer conditions). Pleased? Damn right I was.

Bedworth Set-Up

Front - Shocks: 35wt oil 1 Hole Pistons Grey Springs
Shock Mounts: Wishbone-Outer Mount-Middle
Toe-Out: 2mm total
Castor: 10°
Camber: 1°
Tyres: Take-Off HSA Super-Narrow
Rear - Shocks: 35wt oil 1 Hole Pistons Black Springs
Shock Mounts: Wishbone-Middle Mount-Middle

The car was also run with a Frewer Calibra shell



The underside of the 'new' chassis exhibits some 'battle' damage

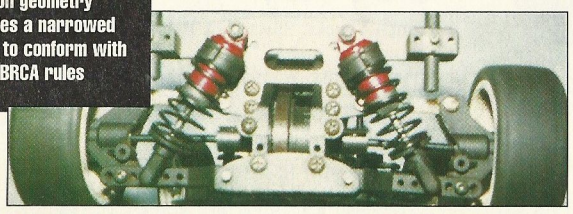
Toe-in: 6mm total
Castor: 10°
Camber: 1°
Tyres: Take-Off HSA Standard width
Motor: Infinity 13x3
Gearing: 30mmpr
Current Limit: 50A Full-Time 4wd
Bodyshell: Racecraft Audi A4

Test 2 West London

For the second test, the car was taken to a dry West London track. The weather was scorching, and the track temperature was over 40°. A good 'racing line' was down on the track from a RRCI meeting held the week before, and the grip was well up.

A set of Ride G compound tyres were fitted (standard width rear, super-narrow front), as these were the hardest tyres I had available. To combat the high grip conditions, the shock oil was changed to 50wt all round, and the springs were changed to Blue front (Rate 15) and Grey rear (Rate 10) - all in an effort to reduce body roll caused by the extra grip.

After a couple of runs to familiarise myself with the circuit, which I had only ever raced on twice before, it was clear that more steering was needed. The extra shock mounting holes I had made now came into play the front shocks were angled over more, to reduce the amount the spring is compressed for the same movement of the wishbone, effectively softening the front suspension to increase steering. On the third run, it was obvious that the change had done the business. I was able to carry more speed into the corners while still maintaining a tight racing line, making for a quicker lap time. A final timed run was made, and the time completed was 15/303.59. A quick look at some results sheets showed that this would have just got me into the A-final at the previous Sunday's meeting. And this on a track I'd only seen twice before



The revised rear suspension geometry includes a narrowed track to conform with 1997 BRCA rules

West London Set-Up:

Front - Shocks: 50wt oil 1 Hole Pistons Blue Springs
Shock Mounts: Wishbone-Outer Mount-inner
Toe-Out: 2mm total
Castor: 10°
Camber: 1°
Tyres: Ride GS
Rear - Shocks: 50wt oil 1 Hole Pistons Grey Springs
Shock Mounts: Wishbone-Middle Mount-Middle
Toe-in: 6mm total
Castor: 10°
Camber: 1°
Tyres: Ride G
Motor: Infinity 13x4
Gearing: 30.5mmpr
Current Limit: 40A Full-Time 4wd
Bodyshell: Racecraft Audi A4

Conclusions

You've probably guessed by now that I'm well impressed with my highly modified version of the car that Kyosho have named the TF2. And I'm not the only one; our Club's secretary has been racing the modified TF2 on a regular basis, putting in times not far off my own.

Development plans in store are the production of a carbon fibre chassis/mount kit. This can be done for around £25 using the same DIY method as on the fibreglass versions. This should increase the rigidity of the chassis, to allow the suspension to absorb the bumps, instead of the chassis. As an added bonus, the weight should be even closer to the BRCA limit. Also, a pair of ball diffs are to be obtained off an old Kyosho Lazer, as the bearing size and belt pitch are the same as those in the TF2. This should reduce rotating mass and improve cornering all in one go.

My 'conversion kit' for the Kyosho set me back around £50 (I did eventually have to replace the Cat 2000's shocks, as the car isn't mine!), so even a full carbon fibre car should be able to be produced for under £200 if using a 'base model' car as a starting point. Most manufacturers charge over £250 for cars of similar specifications. So, if you're after something a bit different to what everyone else is driving (or should that be Yokeing?), but still want an ultra-competitive, highly tuneable car, then give the TF2 a try - DIY style - you won't be disappointed (and nor will your wallet) RRCI