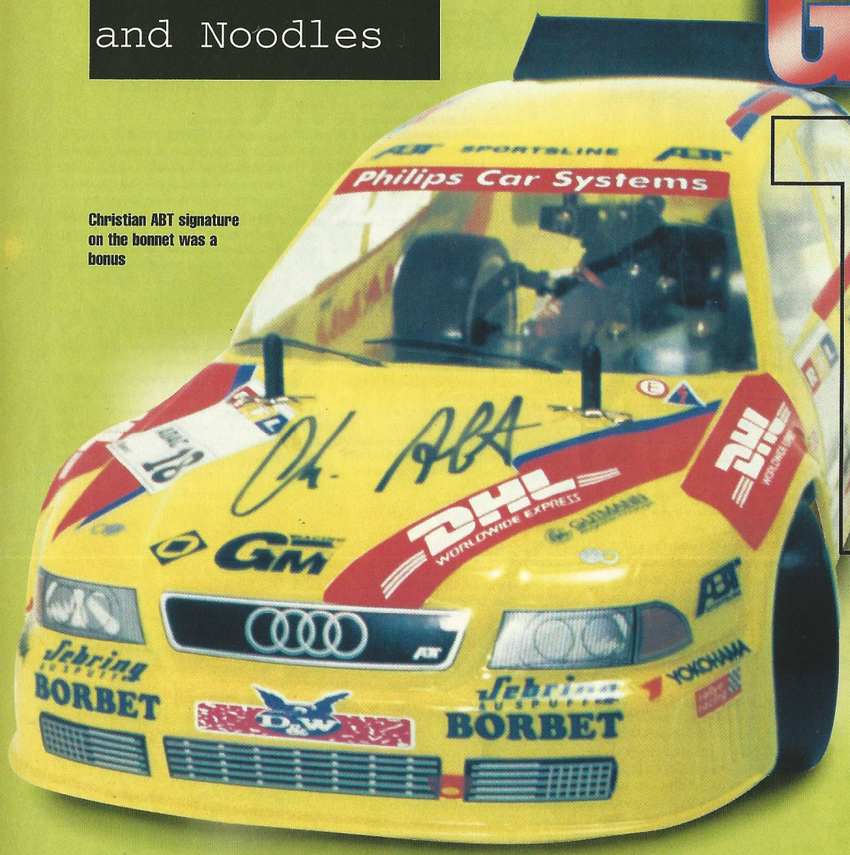
Dale Burr

Bratworst and Noodles

GM racing TC4 graphite edition



Christian ABT signature on the bonnet was a bonus

Germany is well known for its footballers, and for its sausages. And of course, for its cars. Up until now however, the smallest car to come out of Germany was the BMW Z3. But the Germans now have something smaller. Much smaller. Needless to say, there is not much room in the back. There is not much room in the front, either, because this is a one tenth scale model.

GM 18T motor supplied was replaced by a GM 11x4 for the fast Bedworth straights

Branching out

GM Racing are responsible for producing this new scale saloon kit, going under the name of either the Z-10 or Z-10 Pro, depending on which spec you opt for. Already well known for their speed controls, motors and batteries, GM have now gone one step further, to produce just about everything a racer needs to compete at any level.

As mentioned, the car is available in two different specifications. The first is the Z-10: plastic motor mount, fibreglass chassis parts, ball diffs, alloy shocks, front UJs, ballraced and fixed drive. Wheels, tyres and a bodyshell are also included.

The other car, known as the Z-10 Pro, is what we have here for review. Although basically the same car as the standard Z-10, the spec is more impressive: fully carbon, magnesium-alloy motor mount, Teflon coated shocks, saddle pack layout, one-way layshaft, rear anti-roll bar, and foam bumper. Also included is an Audi A4 shell, complete with a comprehensive decal sheet allowing you to produce an exact replica of the cars raced in the STW. Ours even came with Herr Abt's signature on the bonnet! - the driver of the full size Audi A4

The Build

The car sent to us for review came pre-built. However, retail versions will be in kit form, so I decided to carry out a complete rebuild to identify any problem areas. I won't give you a complete blow-by-blow account, because although the instructions are far from wonderful, the car is simple enough to build.

Suspension

The kit is supplied with some of the best shocks I have ever seen. They are very easy to build without having either excessive rebound or air pockets. Although oil is included with the Z-10 kit, no grade is given on the bottle. Thus, I decided to fill all four shocks with Schumacher 50wt oil. One, two and three hole pistons are provided. The car was fitted with two hole front, and three hole rear. The copper springs provided seemed very soft, probably ideal for greasy/damp winter racing. Harder springs would almost certainly be needed for high grip summer racing however.

Three positions are available on the shock mounts to alter the roll stiffness. Coupled with a range of pistons, oils and springs, the car should be easily tuneable to any track conditions.

The wishbone mounts and hubs all needed to be sanded slightly to allow the suspension arms to drop under their own weight. It is vital that this is done to produce a car that will handle consistently from one corner to the next.

The inner mounts for the top wishbones are solid, instead of conventional ball-joints, meaning that there is virtually no flex in the suspension. Along with a very stiff chassis, this will mean that the car is highly responsive to shock settings, making the car easier to set up.

Unfortunately, no adjustment of castor, anti-squat, rear toe-in or track width is possible. This is probably ideal for a beginner, as there is less chance of getting it wrong. This however creates a real problem for more experienced drivers.

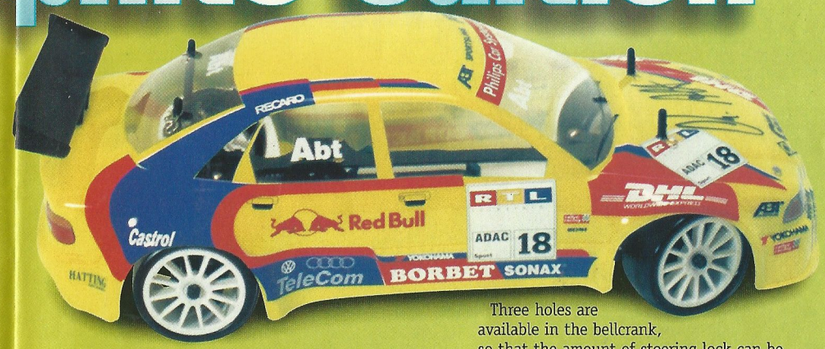
'Ours even came with Herr Abt's signature on the bonnet!'

Chassis

The chassis, top deck and shock mounts are all manufactured from extremely high quality carbon fibre. The chassis is slotted for saddle pack batteries, with beefy plastic straps to hold them in place (no sticky tape here). Mounting trays for stick packs are also provided, but a belt-roller needs to be fitted to do this, adding friction to the transmission. Saddle packs also move the heaviest part of the car closer to the centre of the chassis, making it more responsive. I highly recommend using the batteries in this formation.

The top-deck mounts to the alloy motor mount, to both bulkheads, and to the steering posts. So, although the top deck is quite narrow, the chassis is still extremely rigid. Although this produces less overall grip than a flexible chassis, it allows the car to handle more consistently through the corner. If not set up correctly, a flexible chassis can suddenly snap to oversteer in the middle of a corner as the chassis bends.

Holes are provided so that the servo may be bolted down, rather than servo taped. However, the chassis is cut away beneath the servo, so if your servo has had its lugs cut off, you'll need a new case.



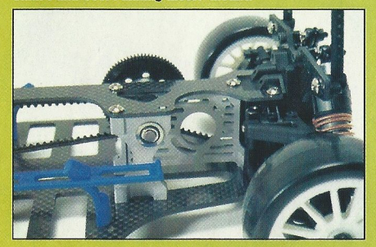
Eye searing yellow paint job is accurate for the ABT run Audis

Three holes are available in the bellcrank, so that the amount of steering lock can be adjusted, even if you do not have a 'rate' adjustment on your transmitter.

Once the shocks are set up, there is no other way of tuning the car to different track conditions: it either handles or it doesn't, and there is little the driver (or dad) can do about it.

The suspension pivot pins, instead of using e-clips, are locked in place by grub screws threaded through the wishbones, hubs and bulkheads. I suspect that these might eventually strip, so it might be a good idea to replace the pins with grooved versions to allow the fitting of e-clips (GM offer these as a hot-up).

Smart and cool running motor mount.



'The kit is supplied with some of the best shocks I have ever seen'

Transmission

The transmission is of the conventional two belt, twin ball diff type. Before the diffs can be assembled, the side plates need to be glued onto the diff pulleys. Superglue is needed for this, so be very careful. Only a tiny amount of glue is needed, and if any runs onto the pulley teeth, you will have to buy a new gear. The easiest way to do this is to apply glue to the side plate rather than to the actual gear.

Six 1/8 inch steel balls are used in each diff. However, I would recommend changing to tungsten carbide versions instead. The diffs will be smoother, and will last a lot longer between rebuilds if you do, which is a real bonus for under a tenner. Ballraces are included as standard for use in the diffs, which makes a nice change.

Once the Yokomo-clone thrust race is assembled and tightened to roughly the correct tension, as shown in the instructions, two extremely smooth differentials are created. Fine-tuning the diffs once in the car will be necessary. They should be set so that a small amount of slip is present (hold the spur gear and one wheel, then try to turn the other wheel). Something has to slip under heavy acceleration, and it is better for the diffs to slip than the belts, which will eventually damage the pulleys, the layshaft gears and the belts themselves. The diff outdrives are steel, although GM offer nylon ones as a hop-up. Any serious racer will no doubt want to change to these, as the saving in rotating mass is huge (up to 40g), greatly increasing acceleration and run times.

The front layshaft gear mounts onto a one-way bearing. This gives more high speed steering than a fixed four wheel drive system would. For low grip conditions, a fixed front gear is probably a better choice, giving more stability, and making the car easier to drive. Fortunately, GM have one available for just a few pounds. Changing the gear takes around ten minutes, as the top deck first has to be removed, and so does the spur gear. With British weather, it is probably wise to fit a fixed front gear to the Z-10, and leave it on permanently. The advantage offered by a one-way is not huge anyway.

35 tooth diff pulleys are used, with 15 tooth layshaft gears. This gives an internal drive ratio of 2.33 to 1. Three spur gears are included in the kit: 78, 82 and 85. With the large gear ratios used on scale saloons these days, a 72 and 75 might also be required, as the biggest pinion that could be meshed with the 78 spur was a 25 tooth. Any bigger, and the motor jams on the top wishbone, preventing the pinion being meshed. 25/78 only gives a final drive ratio of around 28mmpr (depending on tyre size). On large tracks such as Mendip gearings of 32/72 (40mmpr) are often needed. I suspect a portion of the top wishbone may need to be cut away to allow the motor to be moved far enough away from the spur.

The motor mount is machined from magnesium alloy, and looks very smart indeed. A blue aluminium version is also available, for the ultimate in pit posing (as an added bonus, it improves cooling as well). I did need to file the bearing holes slightly though, as the bearings were far too tight, needing to be levered out with a screwdriver. The holes should be filed using a small round file until the bearings just push into place.

The transmission is totally ballraced, as would be expected of a car of this quality. What is also a nice feature is the fact that all of the bearings have rubber seals on both faces. This means that the car can be raced in the wet without the bearings seizing up - a real bonus given British weather.

The only place on the Z-10 where GM appear to have tried to save money is on the rear driveshafts. For some reason, they have decided to include dogbone driveshafts instead of the usual universal joints (UJs). Performance should not be greatly affected though, and the cost of a pair of UJs is far less than the cost of a carbon fibre kit - I know which I would rather have.

Once assembled, the transmission is very free, and should get even better as all of the components run in. No provision is made for adjusting

The amount of steering lock can be adjusted without needing an expensive 'computer' radio

the belt tension, but none seems to be needed. As assembled, the tension is just right: as loose as possible without slipping, to provide the most efficient transmission.

Radio

A standard Futaba 3001 servo was fitted for the test, as unfortunately my KO FET does not have any lugs on it. Hugely powerful servos are not vital in an on-road car anyhow, as the steering load is far lower than on an off-road buggy.

Being a GM car, we naturally fitted a GM speed control, so that their total package could be assessed. The GM V12, as well as being very small and light, also features solder on poles, which means you can replace the motor and battery wires should you cut them too short: no more messy joins.

For motive power, a GM 11x4 was in place for the test, powered by GM-VIS 1900mAh cells.

Once all this is fitted, the only place left for the receiver is on top of the servo. Although this does raise the centre of gravity slightly, a receiver is not really heavy enough to make a huge amount of difference.

Track Test

When we arrived at the Bedworth track, we were faced with mostly dry tarmac, with just a few damp spots. The kit tyres are not belted, and nor are they BRCA legal, so I did not even bother giving them a run. Take-off HSA tyres were fitted instead: standard rear and super-narrow front.

With the new tyres bolted on, I then attempted to fit the Audi shell, and this is when the only major problem with the car appeared. With standard offset wheels, the car is 196mm wide: 6mm over the BRCA limit. Therefore, the only wheels that can be run on the Z-10 are GM's own, with which the car is 186mm wide. This is due to the very flat face of the kit wheels. Reducing the width with narrower hexes isn't possible, as the back of the wheel only just clears the hubs.

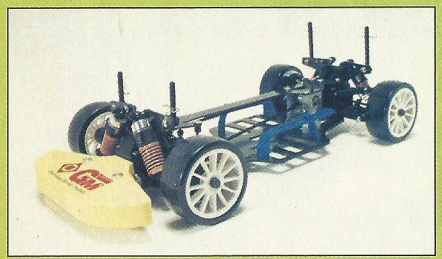
This is a real shame. At one time, all scale saloons accepted the same fitment, same offset wheels. We now three different wheel types: Yokomo/Tamiya, Losi and GM.

Anyway, onto better things. Once I had trimmed the wheel arches on the Audi shell to allow a 196mm car to fit under a 190mm bodyshell, the car was placed onto the scales. It weighed in at 1470g, so to be on the safe side, I added 40g. This was stuck to the centre of the chassis, to keep the roll centre as low as possible.

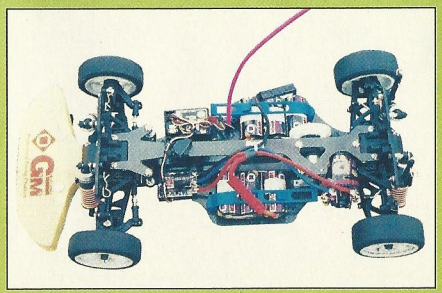
Run 1

As expected, the soft kit springs generated quite a large amount of grip, which was ideal for the damp but drying track. Despite the high grip, the car did not have excessive body roll. This is no doubt due to the low centre of gravity, and the fact that the cells and motor are positioned close to the centre of the car. Set up as described, the Z-10 was very well balanced, suffering from neither oversteer or understeer. The only time it got a little nervous was breaking hard into the Bedworth hairpin, but this was due to the fact I was still running a one-way layshaft, not designed for four wheel slides!

Chassis was supplied complete with this smart foam bumper



Rolling chassis ready for the track test



Run 2

The GM motor was initially geared at 23/78, but it reached top revs very quickly, and was short of top end. For the second run I geared it up to 25/78 to give more revs. Also, as the track had now totally dried out, and was beginning to warm up, I changed to HSB tyres.

Well, the car was now much quicker, absolutely flying down the Bedworth straights (there are four of them!) with hardly any throttle needed, meaning that battery life is conserved.

Even though I had changed to harder tyres, the car was now generating far too much grip, due to the higher track temperature. The car dumped after 4m 30s, because although the car's transmission is efficient, the excessive grip was causing most of the speed to be scrubbed off through the corners. This drains battery power, and makes for slow lap times.

Run 3

To reduce the grip, I decided to change to harder springs. Fastrax (Tamiya/J-Type) blues were fitted to the front shocks, and purple to the back, which made the car a lot stiffer. Despite running harder springs and smaller pistons on the front however, the front suspension felt softer. This is due to the fact that the shock holes on the wishbones are further in on the front than on the rear, softening the shock action. To combat this, I moved the front shocks to the middle hole on the shock tower. This done, the suspension felt roughly equal front to rear.

With the suspension changes made, I was now able to carry far more speed through the corners, especially the high speed sweeper at the end of the main straight. The car changed direction much quicker than before, allowing for a tighter line through the chicane. As well as making for a quicker lap time, these changes also allowed the car to last for the full five minutes. At the end of the timed run, I clocked 18 laps in a split of 307s, just 7 seconds off the quickest time I have ever managed around the Bedworth circuit.

Conclusion

The Z-10 is an extremely quick car. I have no doubt that by experimenting with different shock set-ups, bodyshells, tyres and gear ratios, the car will be capable of regular 19 lappers. The kit spec is such that very few after market upgrades are required.

For those of you who do like to upgrade, the list of parts available is impressive: alloy wishbones, hubs, bulkheads, shocks, and motor mount (all in electric blue). Nylon diff halves and layshaft gears are available to reduce rotating mass. A replacement chassis is also available, to allow the battery position to be adjusted (as with the YR4-M2).

Unfortunately, a few things let the Z-10 down. Non-standard wheel offset means that if you already have wheels and tyres, you will have to start all over again. This can certainly add more than a few pounds to the cost of changing cars. Even if you are starting from scratch, you are limited to using GM wheels, which can be harder to get hold of than standard wheels.

Also, as this is a car designed for serious racers, more adjustments are needed. Most importantly rear toe-in and front castor: these adjustments are vital, even if this is only done by replacement hubs and hub carriers.

Thanks go to GM for providing the model, motor and ESC, and to Andy Gordon of the Bedworth club and PeterE in the studio for the photos. **RRCI**

Quick Spec

Belt drive, graphite, ballraced, alloy shocks, one-way, front UJs, alloy motor mount & foam bumper

Testers Kit

GM V12 speed control, GM 11x4 motor, FF3 radio gear, Futaba 3001 servo, HSB tyres.

Likes

Kit Spec
Quality of components
Price
Performance

Dislikes

Wheel offset
Lack of adjustments
Grub screws strip - pivot pins drop out

The ESC from GM is very efficient and usefully small