



# The Ultimate

# Part One

# Building the **ULTIMATE** Racing the **ULTIMATE** Winning the **ULTIMATE**

**R**CMC has been building a car to the same standard that can be expected of Brian Kinwald or Jack Johnson. This doesn't mean you have to purchase the upgrades just to be competitive.

The extra parts mentioned help towards strength and reliability, but the standard kit can be modified to a high spec without spending too much money.

Pearson run a standard length chassis in graphite. Richmond Rogers and Alan Harman though, have used a plastic standard chassis to good effect at many meetings.

Drivers feel that the plastic chassis works a little better on low grip surfaces such as dirt, while a graphite chassis is more suited to grass or astro turf.

The optional graphite chassis comes

In recent years, Team Losi's XX has been the talk of the town. RCMC highlights some of the modifications Losi drivers can make to improve their own cars cheaply and easily, and gives you the chance to win the car featured on these pages

### Plastic vs graphite

The Losi XX kit comes with a plastic chassis in standard length. Losi also offers a short chassis as well as a standard chassis in graphite. This offers improved strength and rigidity.

In general, drivers such as Ellis Stafford, Kevin Moore and 'Jimbo'

with graphite braces for the servo and bulkhead, plus a graphite piece that links the steering posts; again this is stronger than the kit item.

It is important when constructing a new kit to tap out all of the screw holes in the chassis. This will eliminate any chance of snapping screws off and destroying a perfectly good chassis. Trick Bits offers a tap and handle set in 4/40 size which makes the job of building the kit somewhat easier.

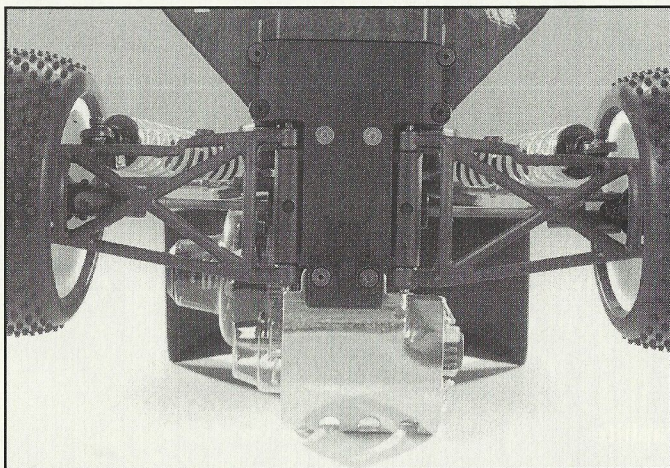
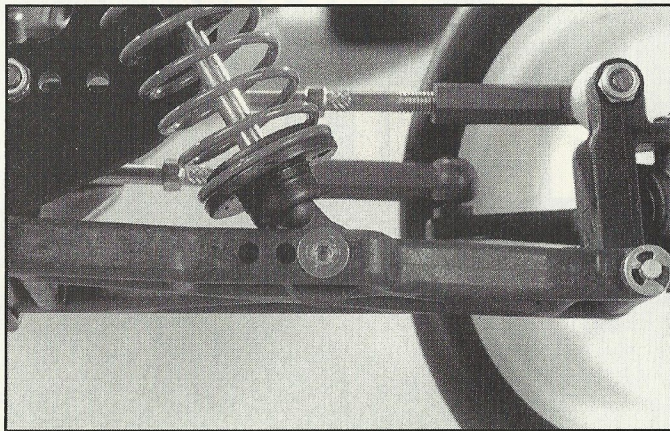
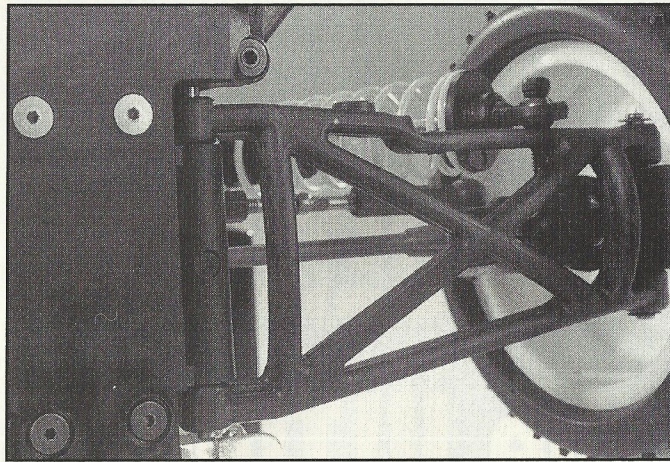
### Wishbones: graphite too!

As you would expect, we kitted out our car with the graphite wishbones front and rear. The front wishbones were drilled out to except an alloy countersunk screw which looks a little neater.

In the front bulkhead, I put 10 grams of







ead weight which is something that the Team does in both the UK and in the United States. The bumper can then be screwed on and will hold the weight in nice and safely.

### Castors

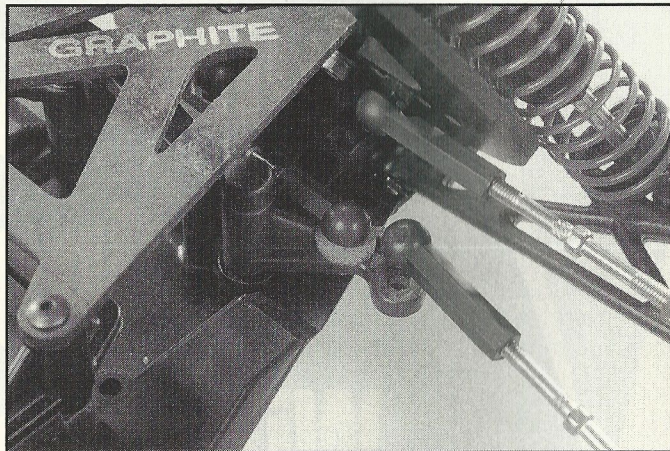
Losi offers two different castor set-ups: 30 degree castor blocks are included in the kit, while the optional blocks are sold separately and come complete with steering arms. The 25 degree castor blocks improve turn-in over the 30 degree set-up, but 25 degrees give less steering out of the corner; 30 degree blocks are much smoother and steer through a corner rather

than the more aggressive 25 degree system.

The optional 25 degree blocks come with steering arms for a very good reason. They are supplied so that there is no need to adjust the length of any of the turnbuckles. In simple terms, you can swap the blocks over and the toe-in and camber will not change if you use the supplied steering arms.

### Camber alternatives

As team drivers get more and more familiar with the car, they learn more about set-ups and the effect of small changes to the camber position. The current trend



Above; The steering modifications are easy to carry out and improve the cars steering. Left; New rear holes in wishbones and countersunk alloy from shock bolts.

Below; 2 degree anti-squat plate.

involves using the second hole at the front of the car on the shock tower. This position improves steering coming out of the corner over the original position. By using this position, the car responds better under power, and is quicker through the corner.

### Steering parts

Earlier this year, members of the British Losi Team visited the Losi factory in California and gained an invaluable insight into the set-up of American cars. A number of modifications have been tried and tested as part of Losi's on-going development of the car.

Jon Andersen is one of the US team's leading drivers and is also its research and development engineer. The steering on his car had been modified using the original arms, but with new holes. These are now an available part. As a result, he felt the steering was smoother.

I ballraced the steering rather than use the plastic bushes supplied as standard. The ballraces are very small but will remain smooth and not wear like the bushes.

The steering modifications do require longer turnbuckles as does the new longer front camber link. Turnbuckles will be discussed in the next issue.

The 'foam things' (this is the real product name!) that cover the ball joints stop dirt from getting into the joint and accelerating wear. Drivers of the British Team put these on all of the joints, even though the instructions recommend them being placed only in certain places.

### Tower of strength

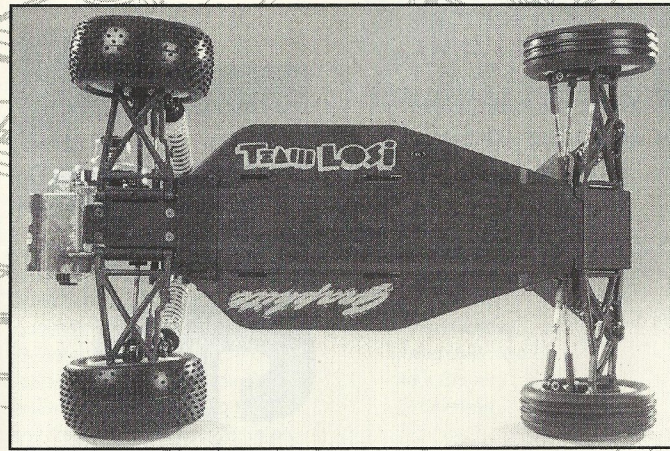
For the rear shock tower, a graphite version is also available which is more rigid than standard. This particular tower had been modified to include only three shock mounting holes rather than the standard four. In the UK, we have never used this hole; by removing it, it looks a simpler and neater.

I fixed the tower to the bulkhead using four countersunk alloy screws rather than the normal steel ones. This was carried out just for lightness and looks.

The kit was built using an alloy screw pack from the Trinity range of products. They are anodised purple and look professional when fitted. They will not rust like the steel items and thus makes a good replacement for worn-out hardware. One important note though is to make sure that you have tapped out the hole first before using an alloy screw. If you do not, the screw may snap and ruin the part.

The second important piece of information is that the alloy screws are not placed under a lot of load or stress. Otherwise they may snap or break off resulting in wasted parts. Examples of these areas are the screws that hold the top of the shocks on and the long screws that hold down the front brace. Try not to use alloy in these applications.

The rear wishbones are made of graphite as per the front items. These rear wishbones have been drilled out with two extra holes



making five rather than the normal three. The two extra holes have been drilled further out towards the wheel and they have a number of advantages. The roll of the car is reduced, making the car a little more prone to sliding.

A softer spring must be fitted when using these holes such as pink rather than the kit red spring, as the wishbone does not have as much leverage on the shock than before. Using the extra holes results in the car running flatter than before.

The holes can be drilled by cutting off the front shock brace part of the wishbone. If you then screw this piece to the outer two holes of the wishbone, leaving one hole of the brace to the outside, this will give you the dimension for the new hole. Once you have drilled this hole, it will become the fifth hole; the fourth hole is made by drilling in between the new hole and the third hole.

This is an important modification that can be made to your car and results in a noticeable improvement in handling over the standard version. Refer to the diagram for the dimensions and method of drilling the extra holes.

The new type steering and five hole wishbones will soon be manufactured with all the modifications already made.

### Two or four

There are two different rear plates available that give either two or four degrees of anti-squat. Anti-squat affects the amount of drive you get when accelerating and also the way that the car rides the bumps.

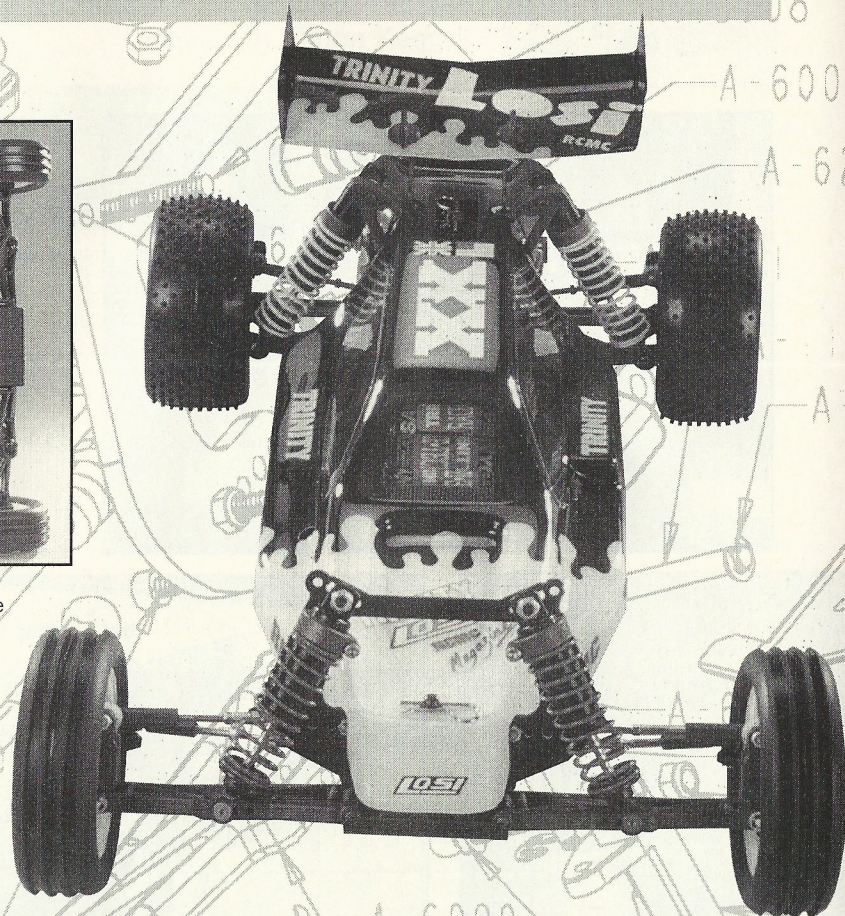
Two degrees has become the norm when setting up the car even though Losi supplies the four-degree plate as standard. The difference between the two plates is that the four degree will be more suited to very bumpy tracks. The two degree has improved drive characteristics, but is not as good in extremely bumpy conditions. As stated before, the team usually use the two degree option.

### Toe-in

The toe-in can be changed at the rear of the car, courtesy of the interchangeable blocks. The kit standard is 3.5 degrees which is the one that is most commonly used. Alternatively, the option is just 2.5 degrees toe-in which gives less grip. The grip is lost both in the corner and under acceleration. 2.5 degrees is used only in very high grip situations where you may be able to sacrifice a little of the rear end grip, to achieve a little more steering bite.

To finish off the chassis settings, the rear camber position is also adjustable and the kit offers different settings to obtain a variety of results. The amount of rear end grip can be varied by moving the link and changing the length. For example, the kit position as standard is 2 - 1.

That means position 2 on the bulkhead and 1 on the hub. This gives a lot of rear end grip in the corner. One of the alternatives to this is 7 - 4. This position will let the rear end slide a little in the



middle of a corner so is more suited to a grippy track. If you use this position on a low grip surface, the rear end may slide out in the corner making it harder to drive. This is in between the other two in terms of grip. The chart below shows this information.

BULKHEAD	HUB
2	1
<b>Most Rear End Grip</b>	
5	2
<b>Down To</b>	
7	4
<b>Least Rear End Grip</b>	

In part two, next month, we go through the shock settings including pistons, oils and springs. Also discussed will be the gearbox and such ancillaries as turnbuckles, roll-bars and battery spacing. We'll also be giving away our featured car which includes a Trinity Team Kinwald motor and Trinity Race Tech batteries.

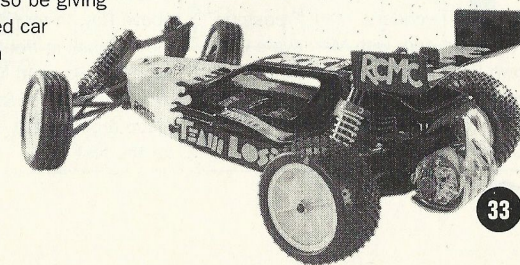
### Parts used so far...

- TB9440 4-40 UNC tap £3.75
- TB9442 Tap wrench £2.75
- A9902 Graphite chassis £51.37
- A9701 Graphite front arms £11.26
- A9801 Graphite rear arms £11.26
- A1121 25 degree blocks £9.27
- A1602 New steering parts £6.16
- A6003 Foam things (8) £1.56
- A9813 Graphite shock tower £10.22
- EV0149 Alloy screw set £10.99
- A2110 2 degree rear plate £3.08
- A9805 2.5 degree rear hubs £6.64

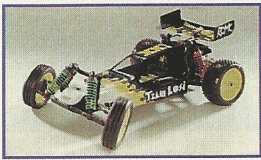
### WIN THIS XX!

We will be giving away the car you see here complete with Trinity motor and battery pack. The car will be yours - complete with all the modifications and tune up parts professionally assembled.

You will need both this issue and the next issue of RCMC to win the car so don't miss part two next month for full details of how to win!







# The Ultimate

# Part TWO

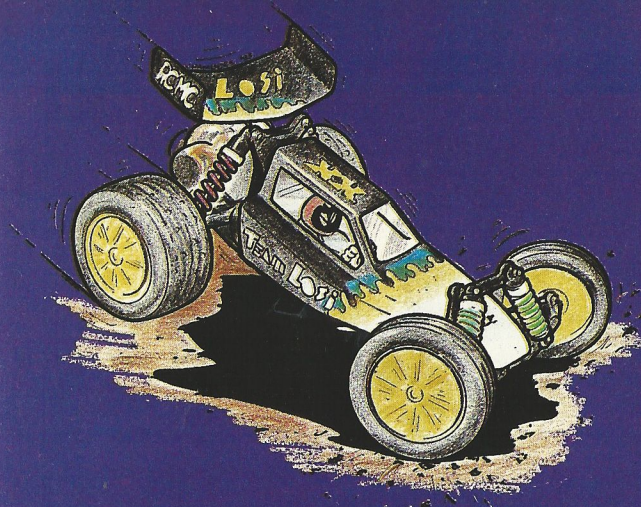
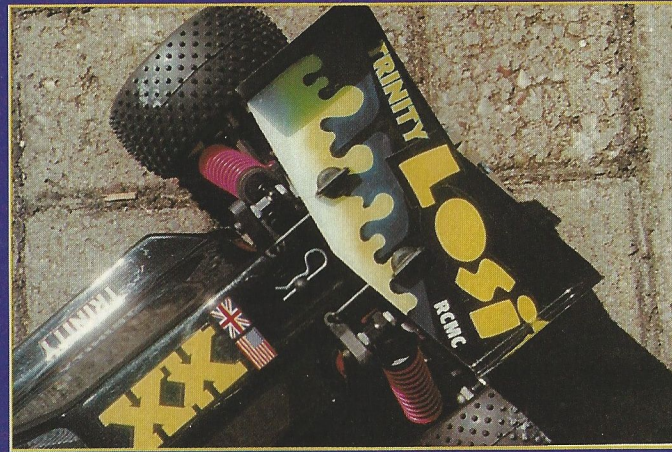
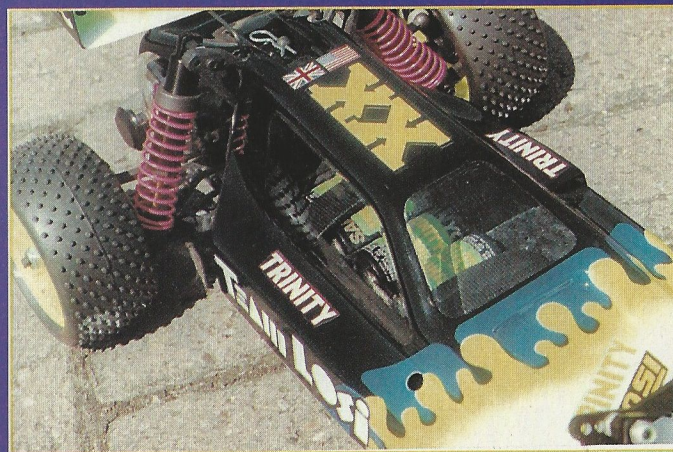
In this, the final part of the ultimate XX review, we complete the kit to World Championship winning standards so that it can be won by you

## Winning Ways

The first instalment covered the chassis, wishbones, castor, camber change, toe-in, anti-squat, steering and shock towers. This second part, aims to finish the car, including small but vital pieces of information.

### Shock tactics

We have decided to start with an essential part of any car, be it four wheel drive, two wheel drive or touring car. Shock absorbers have improved dramatically over recent years due to intense research and development. In principle, the shock absorber has two main components. Oil for damping, and a spring for rebound. For a long time, the viscosity of the oil was the main area of attention if you wished to change the characteristics of the shock absorbing effect. Team Losi though, have been hard at work playing with pistons and size of hole, as well as just the oil thickness.



A shock absorber is able to damp in two different ways. The first is static damping and this applies to the way that the car handles the bumps of any normal off road track. By changing the damping, thickness of oil, you change the amount of static damping.

The second type of damping is referred to as "pack". Pack affects the car when it lands off big jumps or when it drops into a bomb hole. Pack comes about by making the holes in the piston smaller and then using a lighter oil to compensate. For example, a kit piston, (size 56 and red in colour) when used with 30wt oil has similar static damping to a 57 piston, (natural size 60 and drilled out) with 20wt oil. The difference is that the 57 piston set up has more pack than the 56 option.

### Making choices

It must be remembered that at certain tracks though, increasing the amount of pack may not necessarily be the way to go and the car may handle better when the amount of pack is reduced. An example of too much pack would be if the front end of the car was to bounce after a jump. To cure this, you should opt for a piston with a larger hole, then use a heavier oil to compensate. Please note that the piston holes relate to American drill sizes. A 56 piston has bigger holes than a 57 piston. All pistons can be fine tuned by drilling the piston out with a suitable drill. Trick Bits offer a Piston Tuning Kit which comprises of four drills, (54, 55, 56 and 57) which are ideal for the job.

The progress and development that has been made has meant that we are able to fine tune the XX to suit a wide variety of tracks very accurately. In certain cases, by changing the size of one of the holes in a three hole piston to a size smaller, previous bottoming out can be eliminated, without affecting the handling around the remainder of the circuit.

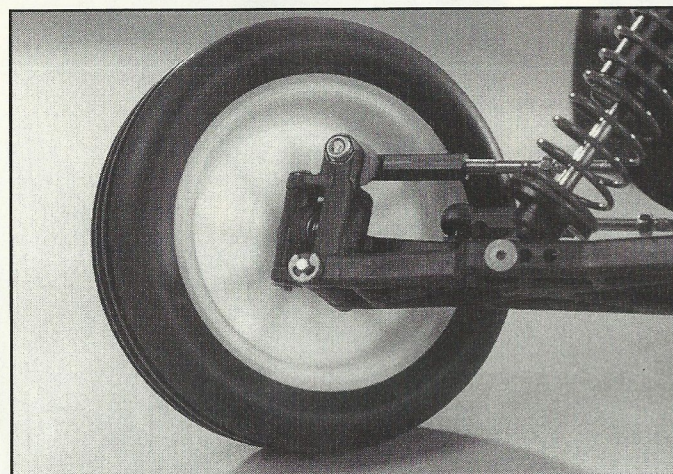
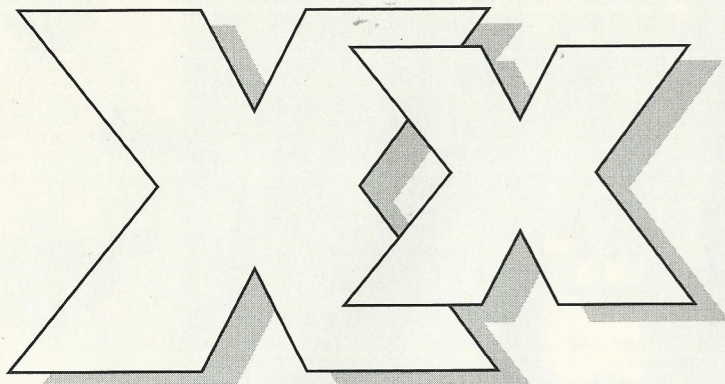
Unfortunately, there is no quick way to understand the way that this works. If you follow the principle that a track with big jumps requires pack, and a track that is very bumpy or flat doesn't, you will have a good basis to start from.

The shocks that were built for this kit uses a 56 piston, (red) in the front with 30wt oil (350/clear). This is what is advised in the instructions although the amount of drop has been limited by using a small white washer, and the shock is fixed to the outside hole of the wishbone rather than the middle hole which makes the suspension feel a little stiffer.

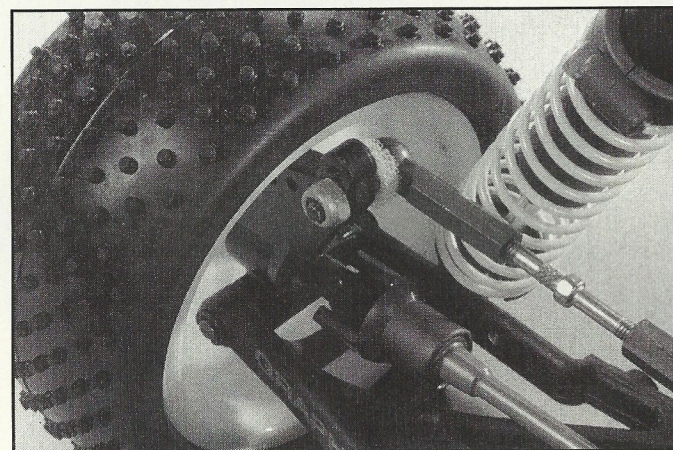
The rear shocks have a 55 piston, (orange) and are also filled with 30wt. This time, they are fitted to the new fourth hole which has been drilled into the wishbone. This was as described in the previous issue. Once again the drop was adjusted as is the amount of up travel. The drop was limited by fitting an 'A' spacer and a small white washer underneath the piston, while the up travel has been restricted so that the driveshafts do not bind on the diff outputs. A 'B' spacer and another small white washer was again used on the outside of each rear shock shaft. The shocks have been built using the Titanium Nitride shock shafts, rather than the standard steel versions. The Titanium Nitride shafts have been coated to produce a much smoother feel, while being made of Titanium, also means that they are much stronger than standard.



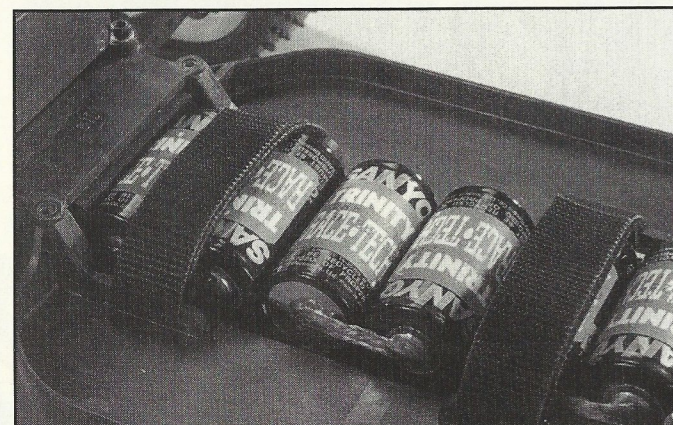




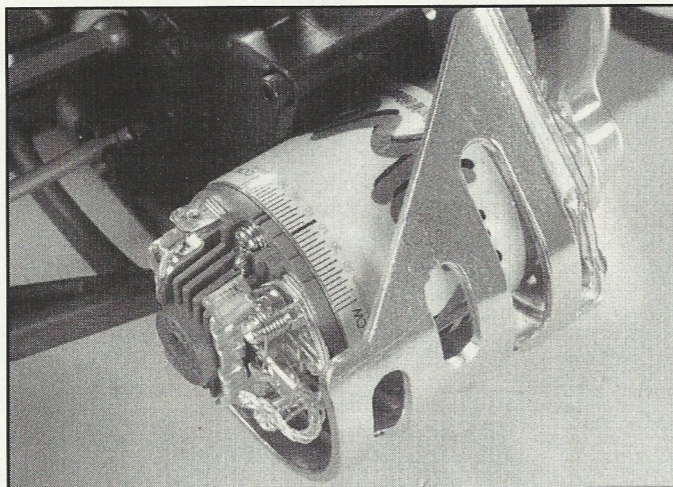
Castor blocks are standard in 30 degrees or optional in 25 degrees.



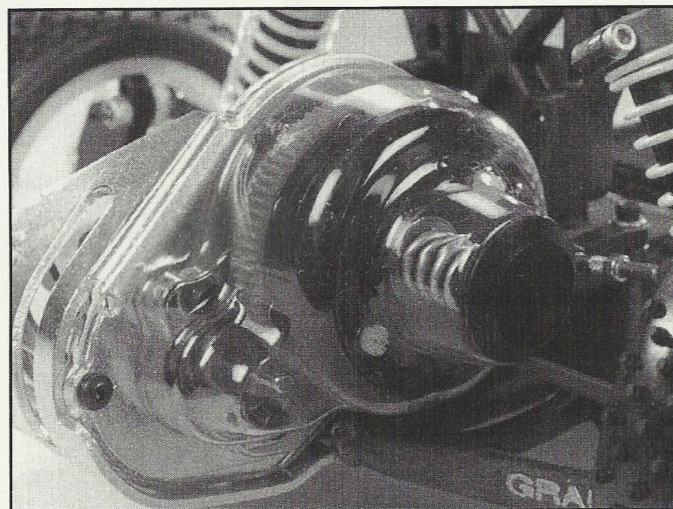
Varying shock mount positions are used as well as alternative camber positions.



Trinity's latest SCRC batteries are used in our car and will be given away in our competition too!



Optional lightweight alloy rear motor plate looks good as well as saves weight.



Hydra drive is in the kit but a small few mods will make it work better.

The small white washer is the same size as the washers that are placed on the hydradrive bleed holes and are about 0.6mm thick. It is important to note that if the fifth hole was used, the limiters would need to be reduced as to retain the same amount of drop.

#### Springs

The Green front springs are used the majority of the time as they suit most of the tracks in the UK. Sometimes an Orange spring is used which is a little softer and this works best on slippery dirt tracks with low grip. At the rear, the Team will normally run a Pink spring over the kit Red one. The Red spring works best on the 3rd hole on the wishbone while the pink works very well on the fourth. There is one more spring softer than the Pink which is Yellow. This should only be used on the fifth hole and is more commonly seen on the XXT Truck.

At the front and the rear, you should stay with the kit settings for positioning the shocks at the top of the shock tower. The team has found this to be the best for the time being. You will also notice that the shock bushings have been cut down and a nut used

instead. In previous times, we have found that the shock bush has come loose so by using a nut, there is much less chance of this occurring and the plastic is also less prone to stripping, making a more secure fit.

#### Driveshafts - steel v alloy

Many racers always want the newest trickiest items on the market. But sometimes this is not the case and the standard item is just as good and may work better in certain applications. Alloy driveshafts work differently to the standard steel versions. In America, the Team has tested and has found that due to lighter rotating mass, the alloy shafts will accelerate quicker and so are more suitable to being used on grippy tracks. The steel versions being that little bit heavier, will be smoother on acceleration making the car easier to drive on dirt or low grip surfaces. The steel shafts are also more durable, which results in longer life and more resilience to bending.

#### Top hats and sleeves

The driveshaft passes through the rear hub bearings which now have their own kit to increase the strength,

reliability and durability of the drive pin and hub bearings. Between the two bearings in the hub, is an alloy sleeve which stops the two bearings from being crushed against each other if the wheel is overtightened. This reduces the risk of crushing the bearings and affecting their on-track performance. A machined piece of alloy that looks like a top hat is now employed instead of the old alloy spacer on the end of the driveshaft. This stops the drive pin from being bent when tightened up which again could cause excess friction in the hub bearings. By fitting this kit, you can tighten up the rear wheel without having to check for binding because it can't.

#### Geared for the future

It has now become the norm for all two wheel drive gearboxes to use three gears rather than a belt drive system. The three gears from top to bottom are described as layshaft, idler and diff gear. As far as improving upon the kit gearbox, Losi offer a one piece top layshaft which incorporates the shaft and gear as one. This has been machined out of alloy for lightness while reducing the rotating mass. This improves acceleration, while the one

piece design improves reliability and the chance of breaking down.

The diff balls inside the diff should be packed well with grease so that the action of the diff should be smooth and free, but feel quite heavy. This is important as you do not want the car to "diff out" at every opportunity.

Once the gears have been installed, it is possible to put a little lubricant on them before screwing the case together. Hydradrive fluid is one option, but being silicone based, it has little lubricating properties although it does make the gearbox quieter. Diff grease is an alternative which will help lubricate the gears, but it must be remembered that the gearbox will feel a little heavier in action at first.

After a number of meetings, you may wish to strip and clean the gearbox and re-build it. Before removing the gears, mark them on one side so that after cleaning you can replace them in the same order and the same way as they came out. This is because even if you cannot see it, the gears will have worn unevenly in the gearbox and if they are replaced differently, the action will be noticeably tighter and noisier.

The gearbox casing is screwed to the motorplate which comes in two guises. The standard motor plate which

is black and the optional lightweight version which comes machined for lightness in polished alloy. The black motor plate is stronger but heavier than the polished alloy version which makes it less prone to bending. The lightweight version has been machined from the inside to remove any excess material and weight.

At this point, it is now time to complete the layshaft equipment with the slipper and hydradrive set up. The car you see in the kit uses an 84 tooth spur gear rather than the 88 tooth standard. By using the purple 84 gear, it moves the motor closer to the front of the car to give a little bit more steering, while reducing the amount of heavy overhang at the rear.

The hydradrive can be considered as being one of the many keys to this car's success. When building this unit, careful checks should be made to ensure that there is no moulding flash on or in the unit as this could seriously hamper the action and performance of the unit. The instructions state that you should fill the hydradrive unit once the two halves have been screwed together. The Team in the United States though, fill the two halves separately to ensure that the oil penetrates the veins completely before fitting the two parts

together. The unit is then topped up and bled as described in the manual.

When you come to fit the hydradrive to the slipper, Team Losi have found that it is not necessary to use all of the thrust race assembly that is supplied, as it has no function and just adds to the weight. Instead, just place one of the metal thrust race washers to the hydradrive, then place the longer and stiffer gold spring to it and finish it the same as instructed with the shaped plastic washer and lock nut. The gold spring is used because it is longer and finer adjustments can be made easier, rather than using the softer silver version.

At the end of the layshaft is the important nut that holds the assembly together. Some of the Team use a steel nut instead of an alloy version as the steel nut offers a tighter fit and so will not work loose and affect the tension or setting of the unit during a race.

Many racers seem to set up their hydradrive units as if they were slipper clutches. A hydradrive can be set much looser than a slipper and it will work just as well. You should always read the instructions and follow their advice. Believe me, if you follow the instructions and listen to Team Drivers, they will be able to help you a great deal, improving your car and the all important lap times.

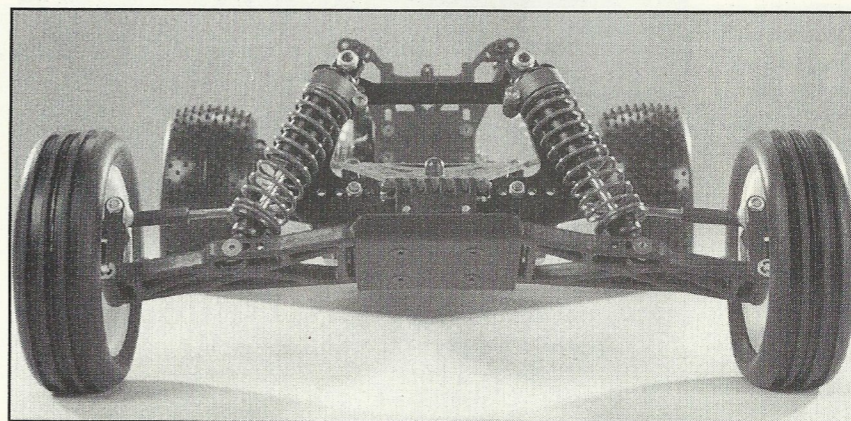
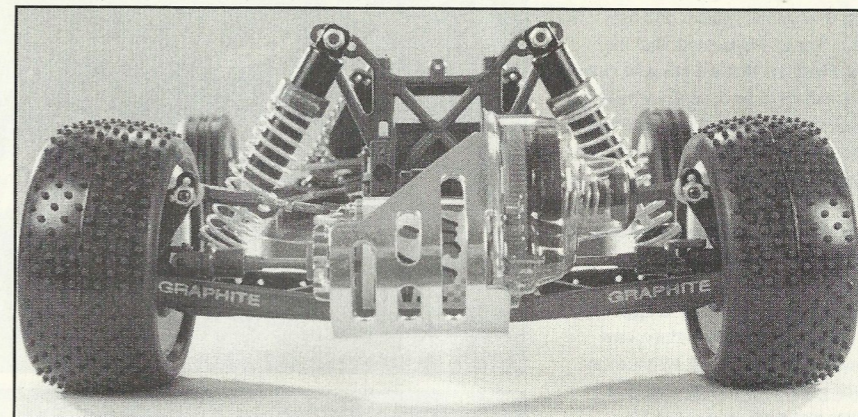
#### Important extras

It's probably one of the only weaknesses of the standard Losi kit. The turnbuckles are a little prone to bending and at worst, they snap. Losi have identified this problem and understand that there are many subsidiary companies that can offer excellent replacement items for the kit at very reasonable prices. Trick Bits are one such company and they market a wide variety of sizes of titanium turnbuckle to accommodate your XX.

#### The soft just got softer

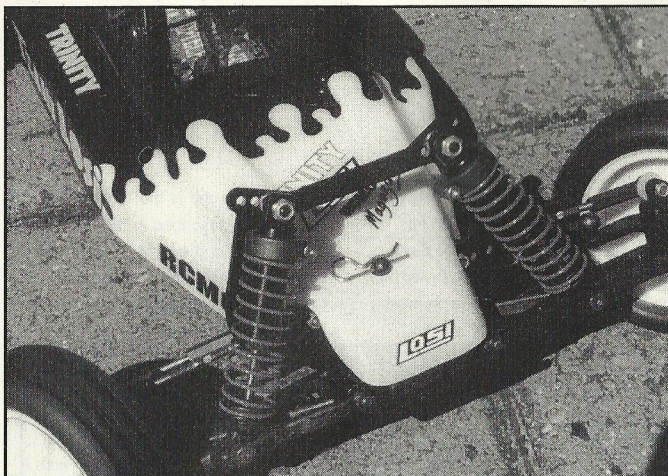
Nowadays, there are many different types, styles and compounds of rubber on the racing scene. Losi are no exception and they offer three different compounds to suit every track in the world. They are HT, Gold and Silver and they come in five styles. For the front, the main tyre is the Rib while for the rear there is the IFMAR Pin, IFMAR Stud, Mini Step Pin and Dash. The HT compound is the hardest and the Silver is the new softest compound. With all of these styles and compounds, it is unlikely that Losi do not have a tyre that would suit your particular track.

Rear of the car is set with the driveshafts level for the best handling along with the pink springs and the fourth hole on the wishbone.



Front of the car is set with the wishbones level - this gives the car a smooth turn in and steering on the way out of the corner.





*Jammin' bodyshell fits tightly to the front of the car.*

### Battery movement

The foam block that is supplied in the kit, can be cut up and positioned at the front of the battery slot or at the rear to help in the weight distribution of the car. The weight of the batteries as a percentage of the total cars weight is very high, so if you make that weight portable, then it can help to make a noticeable change in your cars handling. Moving the weight forward, (foam block at the back of the battery slot) will generally give the car more steering and make the car more aggressive. If you were to put the batteries as far back as possible, (foam block at the front) you would increase the amount of rear end grip and the front would have less grip and understeer more than previously.

The standard set up for the Team is to place the battery as far forward as possible and all of the battery block at the rear. This is something that gets changed very little so it's a very good start out point.

### Anti roll-bar

This item is something that the Team use only a very few times in the year. They normally will only use the thinnest one as this has the effect of stopping the rear of the car rolling without affecting the turn in of the car. With a thicker roll bar, you would expect it to increase the turn in of the car as well as reducing the amount of roll.

### Braced at the front and rear

The tracks that we have here in the UK are nothing like the ones in the United States. At tracks in the US like SoCal Raceway, M+N Raceway and the Ranch Pit Shop, you would find bumps, jumps and berms literally everywhere and they do a very good job of wrecking the car if you get it wrong. For this reason, the front of the Losi Truck, XXT is braced across the wishbones. This is something that can be done on the car as well although it is unlikely you will

break the car in standard form, let alone with the brace fitted. Jammin' Products offer a alloy version of that brace while Losi can supply the one that goes on the Truck. Both these braces require a longer set of wishbone pivot pins, again available through Team Losi dealers.

The top of the rear gearbox can also be braced very effectively by using a piece of Carbon Fibre or fibreglass. Just recently, I have seen many people snapping the end of the gearbox off after heavy landings or crashes. This piece should extend back towards the motor and will have the job of supporting the gearbox screws. You will need to use two longer screws as they will have to go through the Carbon Fibre first, through the gearbox and then into the bulkhead. Please note that the brass washers that are supplied in the kit are there to be used. They have a very important job in that support the screw and spread the load. The washer nearly doubles the amount of area that is put under pressure by the screw so by using them, you are greatly reducing the chance of breaking the plastic.

### Motor and battery supplied

A Trinity motor and battery were supplied for this kit and will be given away in the all inclusive prize. The Trinity motor was one out of the impressive range of Team Kinwald motors and was a 14x2 wind. This is up to the same spec as that used by all the Trinity drivers around the world. Advisable gearing for this motor in the XX would be around 84x21. This would give an overall ratio of 8.76, which will mean good top speed and punch/acceleration.

The batteries are Race Tech and are matched at Trinity using a 25amp discharge. This kind of battery is the level just below World Tech which are used in the US by the Trinity team, and have figures which are easily comparable to those in the World

Tech range. With this kind of battery, you are never going to be short of run time or performance.

### Bodyshell

The shell used is the current alternative to that of the kit XX. Once again, Jammin' Products have produced an excellent looking shell which is functional while retaining a smooth and sleek design. The shape is a little more flowing than the kit item and incorporates a small air vent to allow a flow of air towards the speed controller. This neat bodyshell is competitively priced and is a direct replacement for the original.

The wing is also a non-standard item being smaller than the XX version. It is from the older Losi car, the JRX Pro and makes a nice change from the norm. In America, this is the most popular wing to be seen on Team members cars so it appeared to be the ideal choice for this kit.

Both the bodyshell and wing were airbrushed by Jason Hampton, who has taken the time to spray the shells of nearly all of the British Losi Team. His

company, Hampton Designs has been responsible for Ellis Stafford, Richmond Rogers, Kevin Moore, James "Jimbo" Pearson and David Spashett's bodyshell artwork.

The paint job was a direct copy of that of Brian Kinwald's including all the necessary decals as far as possible including the mandatory RCMC which adorns his shell in the US. These lexan items certainly finished off a very high quality kit for which there is no compromise.

For more information regarding Trinity and Losi, phone the distributors Helger Racing who will be happy to give you more information regarding specifications and your nearest Losi/Trinity retailer.

**Thanks must go to Helger Racing for supplying the kit and all the necessary Losi and Trinity items, and to Hampton Designs for the superb artwork on the bodyshell and wing.**

