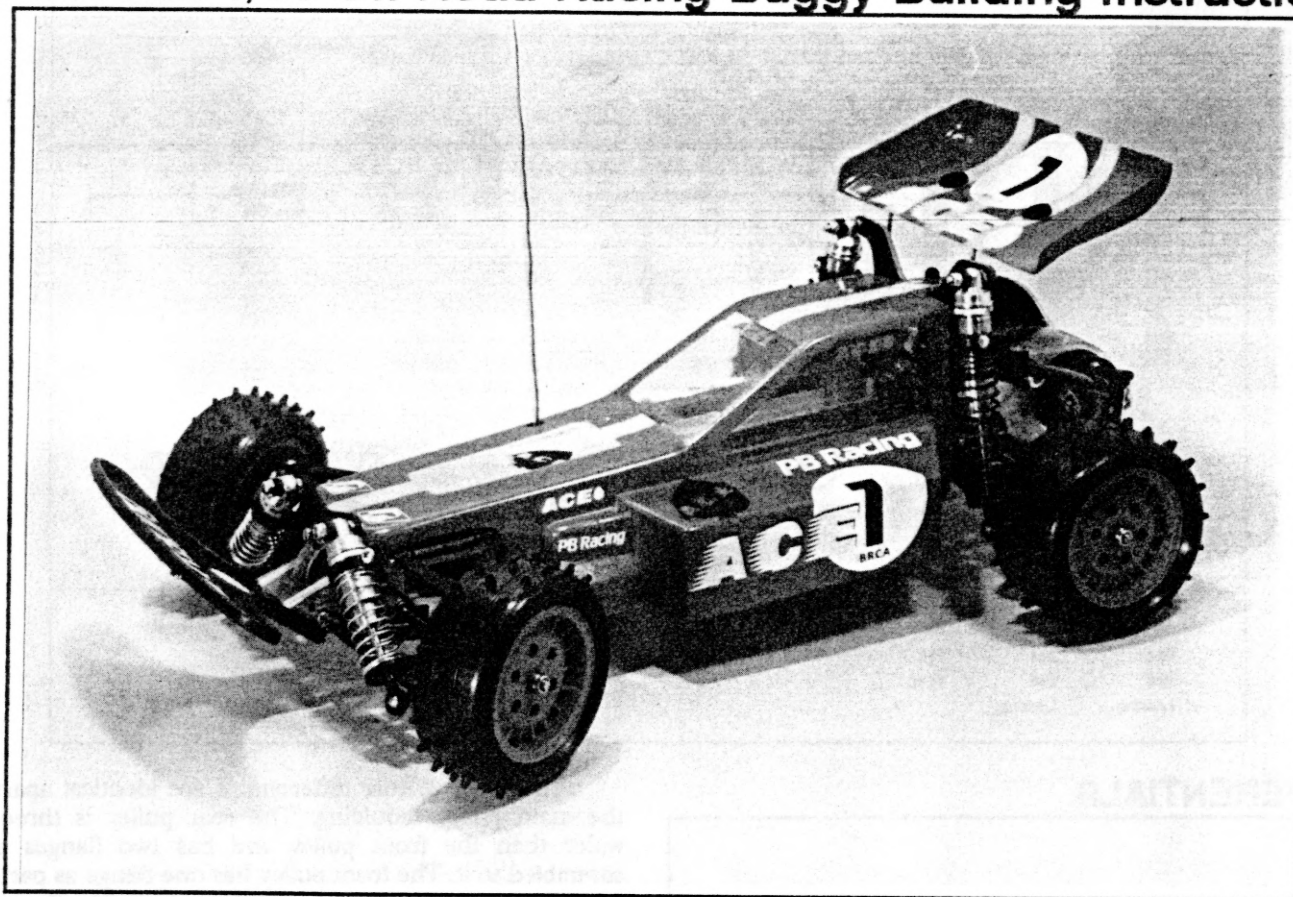




# PB 38 ACE 1/10 Off Road Racing Buggy Building Instructions



## INTRODUCTION

Welcome to the PB ACE experience!

We have used our years of model car design and manufacturing experience coupled with the data gained from racing the Mini Mustang & Maxima to bring you this state-of-the-art 1/10 scale racing car. The power train efficiency of the PB ACE is second to none and the fully adjustable suspension system provides handling and ride to match the speed and power.

These building instructions are intended as a guide to allow you to construct this race-winning car in the most time efficient way so please build and set the car as described here and assess the "standard" set up before making any modifications which you may feel desirable.

Please note that due to printing lead times, not all the parts shown in the pictures are production parts, so some parts may differ slightly to the pictures.

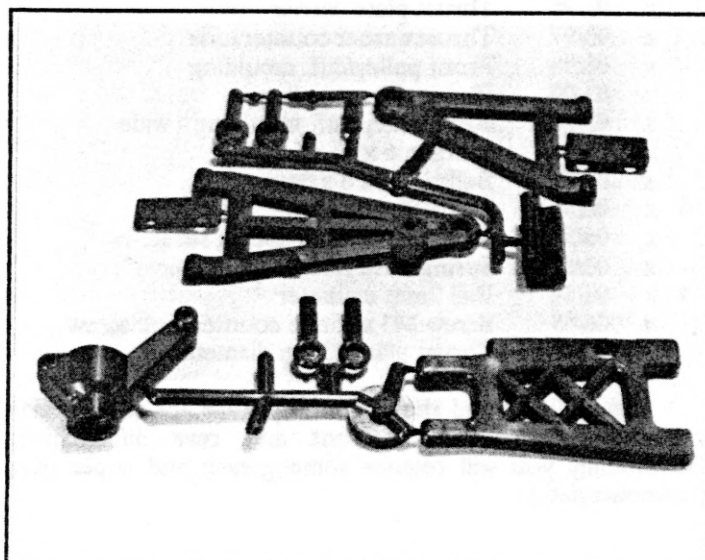
The following list of tools and materials will help you to build the ACE in the easiest, most efficient way.

Modelling knife, fine sandpaper, metric/imperial ruler, hand drill, No.1 posidrive screwdriver, thread locking compound, cyanoacrylate glue, pliers, 5.5mm across flats box spanner, 7mm across flats box spanner, a vice or large pair of adjustable pliers, small long nose pliers or tweezers, standard screwdriver (5mm to 6mm blade), circlip pliers, 1.5 & 2.0mm across flats hexagon key, pvc insulation tape, soldering iron and solder, light oil and grease, paint for the bodyshell, kitchen roll or rag, oil for the shock absorbers. You will also need 2 channel radio control with 1 servo and 1 electronic speed controller; or with 2 servos and, additionally a resistor type speed controller. One 540 size electric motor, a six cell-1.7 ampere hour nicad pack and charger. Please take care to follow the manufacturers instructions regarding use of your nicad battery pack as misuse can cause loss of performance and even explosive damage!

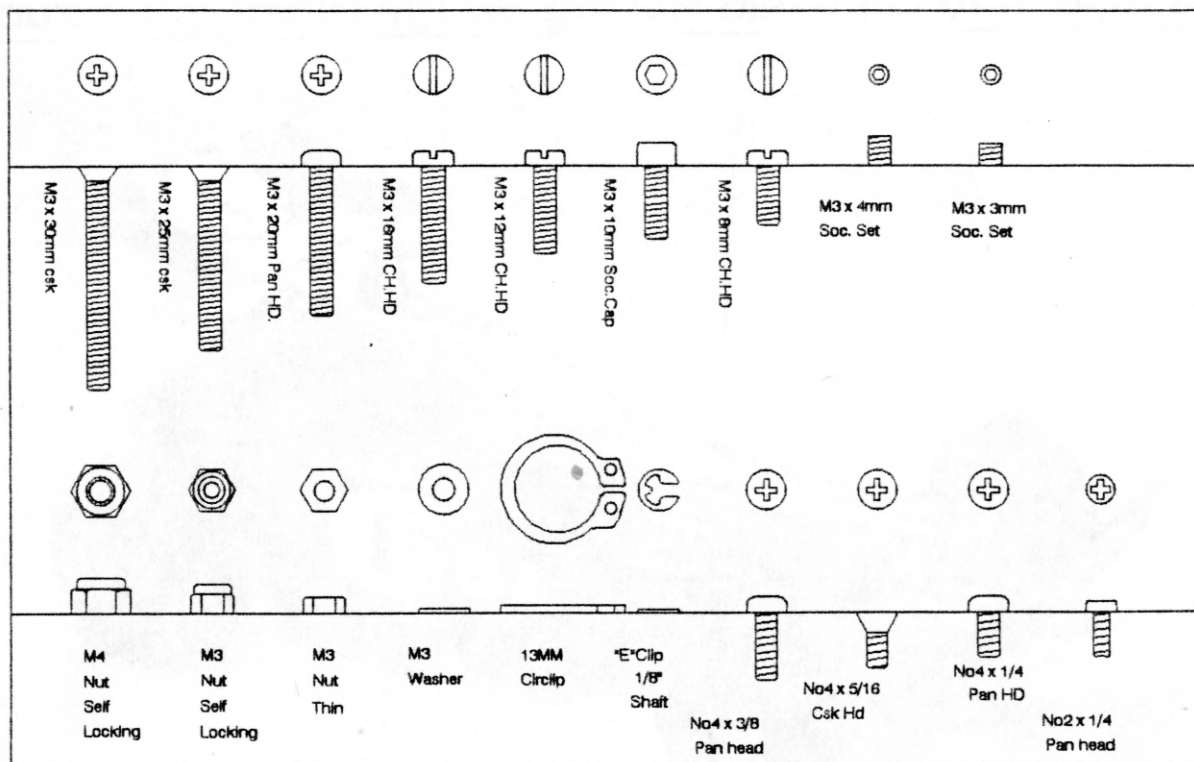
It is a good idea to assemble your car somewhere where you can leave everything undisturbed between building sessions. You could build your car in only two or three hours but it is far better to take a little more time and get it right.

Before you start it is also a good idea to have four saucers or small cups on the table, so that you can tip all the ballraces from pack 06/17 into one saucer, all the self tapping screws from pack 06/18 into another, all the nuts & bolts from pack 06/19 into a third saucer leaving the fourth saucer empty for temporarily putting other small items in to avoid losing them.

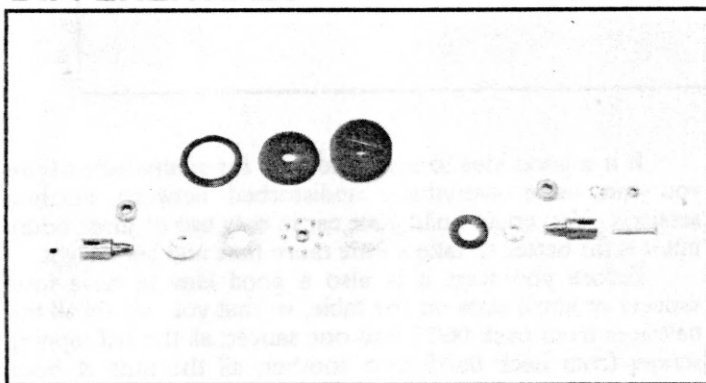
Below is a picture of the two multi part mouldings that will be referred to later in this book. The top set of mouldings are for the Front Suspension Prt.No.02/97 and the lower set are for the Rear Suspension Prt.No.02/66.



Below is a diagram to help you identify the various fixings.



## DIFFERENTIALS

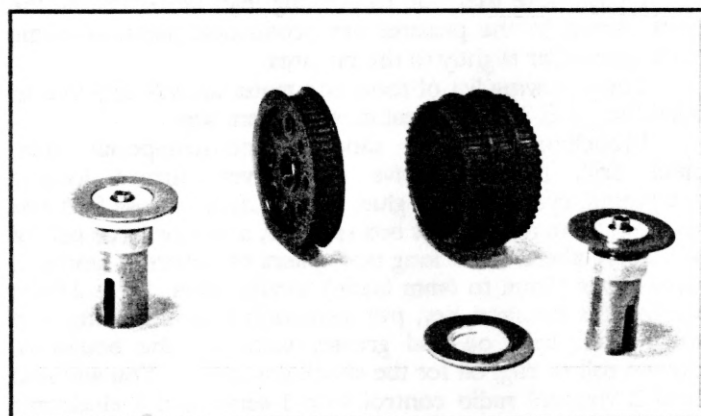


### PARTS REQUIRED

2	x	03/92	Diff. half shaft - tapped M3
2	x	03/93	Diff. half shaft - clearance M3
2	x	03/94	Diff. spring carrier
2	x	03/95	Thrust plate carrier - spring side
2	x	03/96	Thrust plate carrier - fixed
2	x	03/97	Thrustwasher countersunk
1	x	03/98	Front pulley/diff. moulding
1	x	03/99	Flange - front pulley
1	x	03/203	Rear pulley/diff. moulding - wide
4	x	06/20	ballrace 6 x 13 x 5mm
2	x	06/22	Ballrace 4 x 8 x 3mm
16	x	06/46	Ball 1/8" diameter
2	x	06/57A	Screw M3 x 3mm socket set screw
2	x	06/61	Spring Disc 22.5mm diameter
14	x	06/64	Ball 2mm diameter
2	x	06/65	Screw M3 x 25mm countersunk screw
4	x	16/410	Thrust plate 23mm diameter

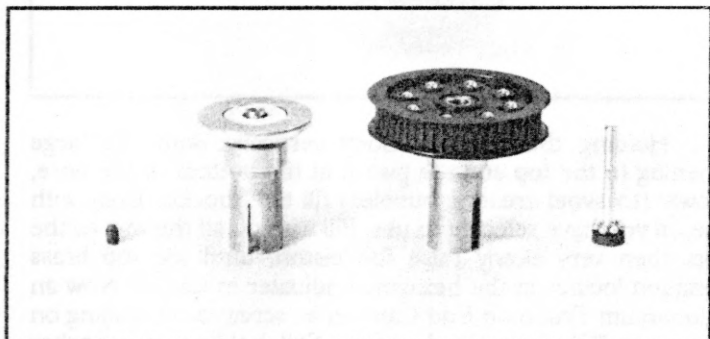
Listed above and shown in the picture are all the parts required to make both front and rear differentials. Additionally you will require some grease and super glue (Cyanoacrylate).

The front & rear differentials are identical apart from the main pulley moulding. The rear pulley is three times wider than the front pulley and has two flanges already assembled to it. The front pulley has one flange as part of the moulding and one that requires gluing to it. The first stage is to find all the above components and ensure they are clean and burr or flash free. Take the front pulley moulding and flange moulding and assemble together using a small amount of super glue. Find a Diff. half shaft with an M3 thread up the centre of it and a half shaft with a plain hole up the centre. Fit a 6 x 13 x 5mm Ballrace to each diff. half shaft. Fit the Fixed Thrust plate carrier (Alloy 23mm diameter with 6mm tapered hole) to the taper on the Diff. half shaft which has the M3 thread in it, ensuring that both the tapered mating surfaces are clean and burr free. Fit the Spring carrier (Alloy 12.7mm diameter with 6mm tapered hole) to the other Diff. half shaft with the plain hole. Place the Disc spring (Dished Steel Washer 22.5mm diameter) onto the spring carrier so that the outside edge of the spring is dished away from the carrier. Stand both Diff. half shafts upright on the table, slotted ends down.

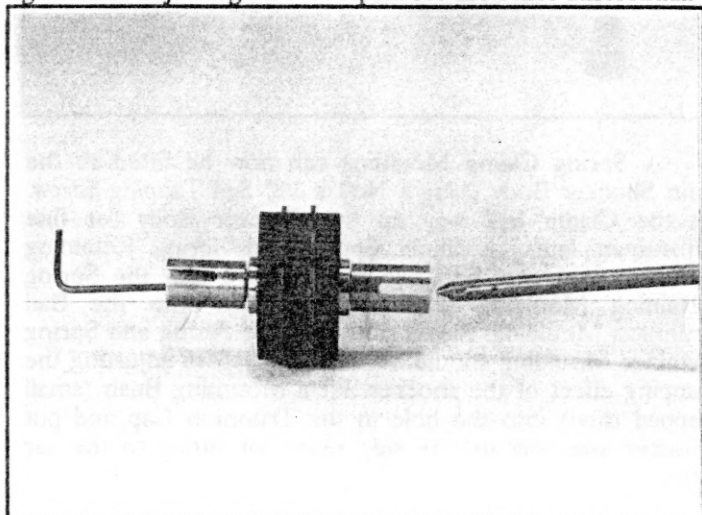


Place the Thrust plate carrier (Alloy 23mm diameter with 11.25mm hole) centrally onto the disc spring and over the spring carrier, step facing upwards. After checking again

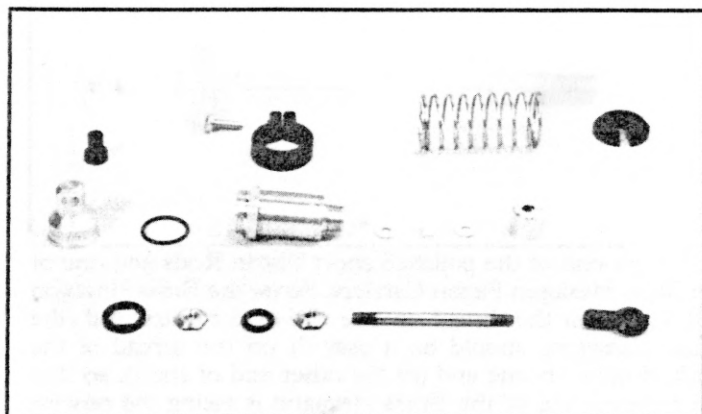
that the surfaces of the thrust plate carriers and thrust plates (Hardened steel washers 23mm diameter) are clean. Place a thrust plate onto each of the thrust plate carriers ensuring they are seated properly over the step on the carriers. Take a 4 x 8 x 3mm Ballrace and fit it to the 4mm spigot protruding from the spring side Diff. half shaft. Fit either one of the Diff. pulley mouldings onto the ballrace on the shaft, so that it rests on the thrust plate. With tweezers or a small pair of pliers, place a clean large 1/8" ball bearing into each of the eight holes around the centre of the pulley moulding.



Lift the thrust plate of the other Diff. half shaft and place centrally into the pulley moulding resting on the ball bearings. Leaving the half shaft assy with the pulley on standing on the table, but supporting it with one hand, pick up the other half shaft assy and turn it upside down, the thrust plate carrier should not fall off, unless it was assembled with dirt between the mating tapered surfaces. Place the half shaft onto the top of the assembly you are supporting in your other hand, locating the small spigot into the ballrace and ensuring that the step of the thrust plate carrier locates into the thrust plate. Leaving the assembly standing on its end. Find a M3 x 25mm countersunk screw, a 7mm diameter countersunk harden steel thrust washer and 7 small 2mm diameter ball bearings. Pass the screw through the thrust washer from the countersunk side. Put plenty of grease onto the flat ground surface of the thrust washer and then with tweezers place 7 small ball bearings around the screw on the surface of the thrust washer, (the grease will hold them in place). Carefully pick up the differential assembly and turn it up the other way. The screw with the small bearings on can now be inserted from the top and screwed up until all the end float in the differential has disappeared. You will now have a free running differential: You will want a fairly stiff differential which a further 3/4 of turn on the screw should produce. When you are happy with the adjustment (stiffness) of your differential, you can lock the setting by fitting a M3 x 3mm socket set screw to the other side of the differential half shaft and tightening up against the adjusting screw. Repeat for the other differential.



## SHOCK ABSORBERS

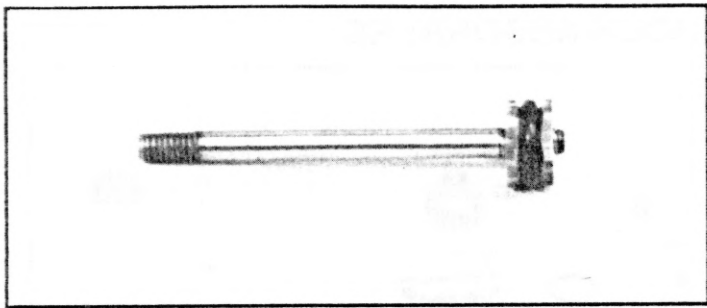


### PARTS REQUIRED

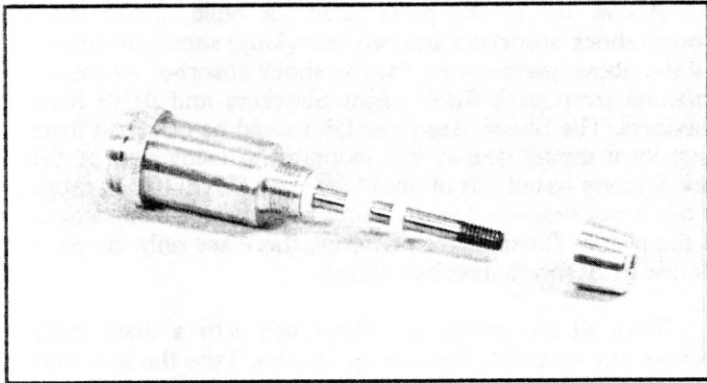
2	x	02/48	Spring Front - Short
2	x	42/233	Spring Rear - Long
2	x	02/74	Shocker Body Front - Short
2	x	02/75	Shocker Body Rear - Long
4	x	02/76	Nose Cap
4	x	02/77	Trunnion End Cap
4	x	02/78	Hexagon Adjuster Moulding
8	x	02/79	Hexagon Piston Carrier - Brass
2	x	02/80	Piston Rod Front - Short
2	x	02/81	Piston Rod Rear - Long
4	x	02/82	Bush - Piston Rod
4	x	02/83	Mounting Bush
4	x	02/90	Spring Clamp Moulding
4	x	02/91	Spring Retainer Moulding
4	x	02/96	Ball Trunnion Moulding
4	x	06/26	Screw No4 x 3/8" Pan Head
8	x	06/41	"O" Ring - Rod - White 3.1mm I/D.
4	x	06/62	"O" Ring - Piston - Black 5.4mm I/D.
4	x	06/63	"O" Ring - Cap - Black 11mm I/D.
			Shock Absorber Oil (Not inc. in kit)

Above are all the parts listed for building two front (short) shock absorbers and two rear (long) shock absorbers. All the above parts except for the shock absorber oil can be obtained from pack 01/18 Front Shockers and 01/19 Rear Shockers. The Shock Absorber Oil should be obtained from your local model dealer, We recommend using one of the new Silicone based oils of about 100 cps. (SAE 10). A range of oils is not necessary as the shock absorbers are adjustable. In the picture for the sake of clarity, there are only the parts for one front shock absorber shown.

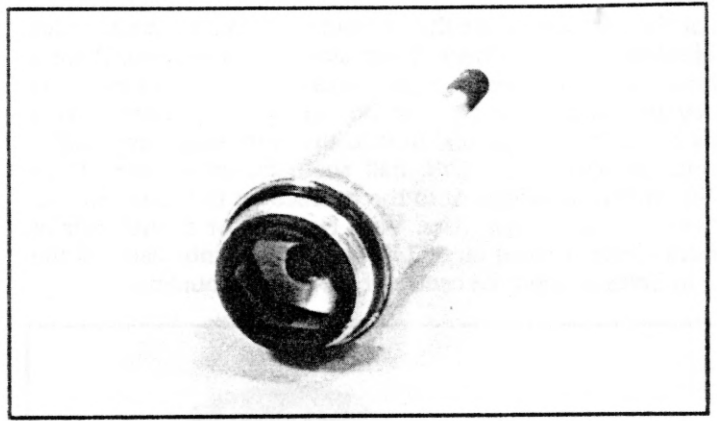
Take all the plastic mouldings and with a sharp knife remove any moulding flash or sprue pips. Take the four Ball Trunnion Mouldings and again with a sharp knife cut a small (1mm) chamfer around the entrance to the 3mm hole to provide a lead for the rod to cut its own thread into. Find a Piston Rod and your hand drill, put the Piston Rod into the chuck of the hand drill and use it to screw the rod into a Ball Trunnion Moulding, until there is only 1 to 2 turns of thread still showing, then unscrew it. Repeat for the other three Ball Trunnion Mouldings, having cut the thread at this stage, will make assembly easier later. Now all the Piston Rods should be given a light polish to ensure that they pass through the "O" rings smoothly and without excessive wear rates. This can be done by holding the Rod in the chuck of a drill and polishing one end at a time with some fine sandpaper or a grinding stone. Now all that needs to be done before assembly is to check that all the other components are clean and burr free.



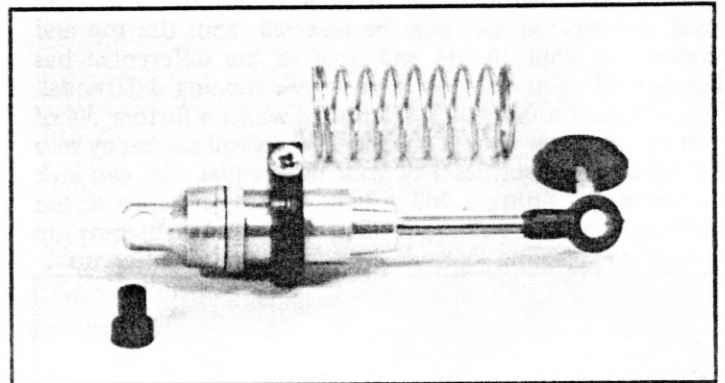
Take one of the polished short Piston Rods and one of the Brass Hexagon Piston Carriers. Screw the Brass Hexagon half way down the thread on one end of the piston rod (the Brass Hexagons should be a easy fit on the thread of the shaft, if tight on one end try the other end of shaft), so that the tapered face of the Brass Hexagon is facing the nearest end of the rod. Then put some mild thread locking compound onto the threads between the Brass Hexagon and the plain section of the rod. Screw the Brass Hexagon the rest of the way down and tighten. If you hold the rod with pliers be careful not to damage or mark the rod as this will cause premature failure of the "O" ring seal. Wipe away any excess of thread locking compound. Find a 5.4mm inside diameter Black "O" Ring and another Brass Hexagon. Pick up the Piston Rod Assembly you are half way through making, and place the Black "O" Ring over the threaded portion on the rod, so that it sits centrally on the tapered face of the Brass Hexagon. Now screw another Brass Hexagon on to the same end of the rod so that the "O" Ring is sandwiched loosely between the tappers of the two Brass Hexagons. Find a short Shocker Body and pass the Piston Rod assembly through the large hole in one end of the Shocker Body and out through the small hole in the other end. Take two of the small White "O" Rings 3mm I/D, and dip them in the shock absorber oil you intend using. Then carefully fit one to the Rod that is protruding from the shocker body. Taking care not to damage the "O" ring on the threads of the Rod. Find a white plastic Bush and fit this to the Rod behind the "O" ring, followed by the other White "O" Ring.



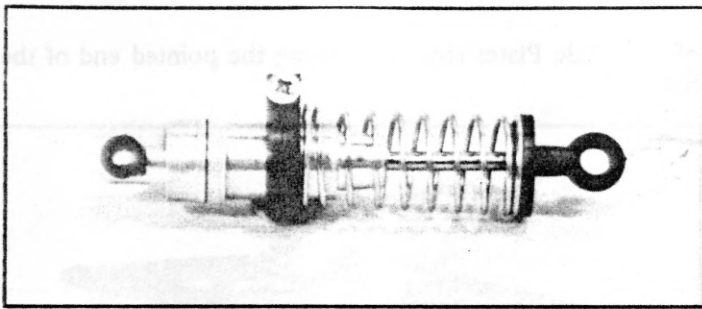
Push the "O" Rings and Bush all the way up the rod and carefully into the counterbore in the end of the shocker body. Find the Aluminium Nose Cap and fit to the end of the shocker body to retain the "O" rings in position. Do up as tightly as you can by hand. There will be small gap between the Nose Cap and the Shocker Body, this is intentional. A Ball Trunnion Moulding that you threaded earlier can now be fitted to the other end of the shaft, with thread locking compound. Find a large Black "O" Ring 11mm I/D and a Hexagon adjuster moulding (plastic washer with hexagonal hole). Fit the "O" Ring to the bottom of the large threaded portion of the shocker body. Fit the Hexagon Adjuster Moulding to the shocker body so that the small step on the moulding locates into the bore of the shocker body.



Holding the Shocker Body vertically, with the large opening to the top and the piston at the bottom of the bore, slowly (to avoid creating bubbles) fill the Shocker Body with the oil you have selected to use. Fill with oil all the way to the top, then very slowly raise the piston, until the top brass hexagon locates in the hexagonal adjuster moulding. Now an Aluminium Trunnion End Cap can be screwed on, sealing on the large "O" Ring fitted earlier. Still holding the shocker vertically work the Piston Rod up and down a few times. If it works smoothly then it can be adjusted to give the amount of damping required by, pushing the Piston Rod all the way to the top of the bore and locating the Brass Hexagon into the Hexagon Adjuster Moulding and either rotating the Piston Rod in an anti clockwise direction (viewed from the top) to stiffen the shocker or clockwise to soften the shocker. Don't forget that you should already be in the softest setting and further unscrewing will result in the Brass Hexagon coming off the end of the Rod. If you screw the Rod in so far that the shocker becomes too stiff and difficult to move do not try to force it, this will only result in damage to the piston "O" Ring. If the shocker does not operate smoothly and "lets go" of the damping action towards the top of the stroke. It means there is not enough oil in the unit. So push the Piston Rod to the top of its stroke, unscrew the Trunnion Cap pour a little more oil into the cap and screw back on. Be careful not to put too much oil into the cap as this will cause the shocker to act as an additional spring and push the rod back again when fully up.

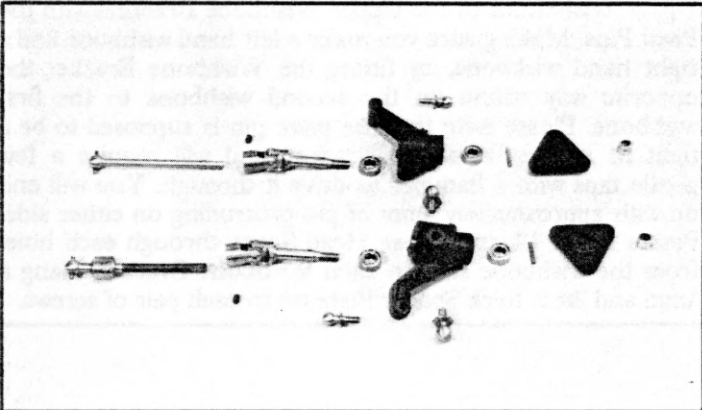


A Spring Clamp Moulding can now be fitted to the main Shocker Body using a No4 x 3/8" Self Tapping Screw. Fit the Clamp half way up the Shocker Body for fine adjustment later. A Short Spring and Spring Retaining Moulding can now be fitted making sure that the Spring Retaining Moulding is seated correctly onto the Ball Trunnion Moulding. Please note that the Spring and Spring Retainer Moulding should be removed before adjusting the damping effect of the shocker. Fit a Mounting Bush (small stepped tube) into the hole in the Trunnion Cap and put Shocker assembly to one side ready for fitting to the car later.



Repeat for the other short shocker and then for the two long shockers.

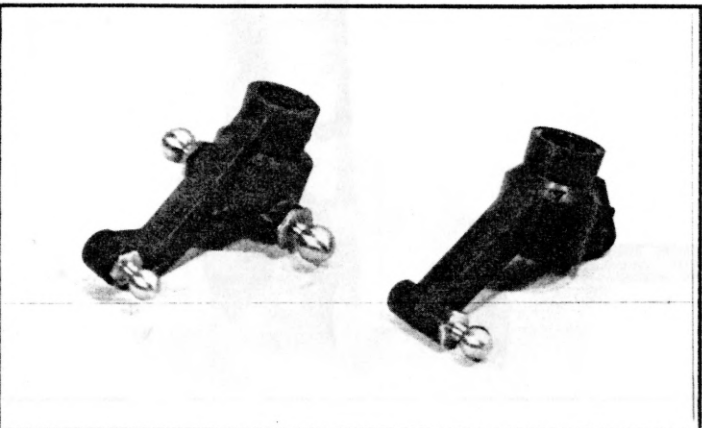
## AXLE BLOCKS, AXLES & DRIVE SHAFTS



### PARTS REQUIRED

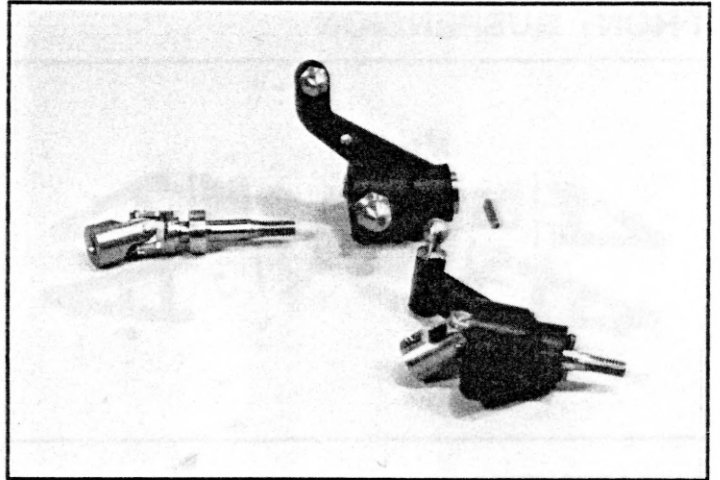
4	x	02/18	Universal Joint Axle
4	x	02/19	Rear Drive Shaft
4	x	02/24	King Pin Ball Ended Screw 4mm
4	x	02/31	Ball Ended Screw 3mm
2	x	02/66	Rear Axle Block Moulding
4	x	02/85	Wheel Driver Moulding
1	x	02/93L	Front Axle Block Moulding L.H.
1	x	02/93R	Front Axle Block Moulding R.H.
8	x	06/21	Ballrace 5 x 10 x 4mm
4	x	06/35	Nut M4 Self Locking
4	x	06/39	Drive Pin 2 x 11.8mm
4	x	06/57	Screw M3 x 4mm Socket Set Screw

Listed above are all the parts required to make two Front Axle Block & Drive Shaft assemblies and two Rear Axle Block & Drive Shaft assemblies. The Picture only shows the parts to make one of each assembly.

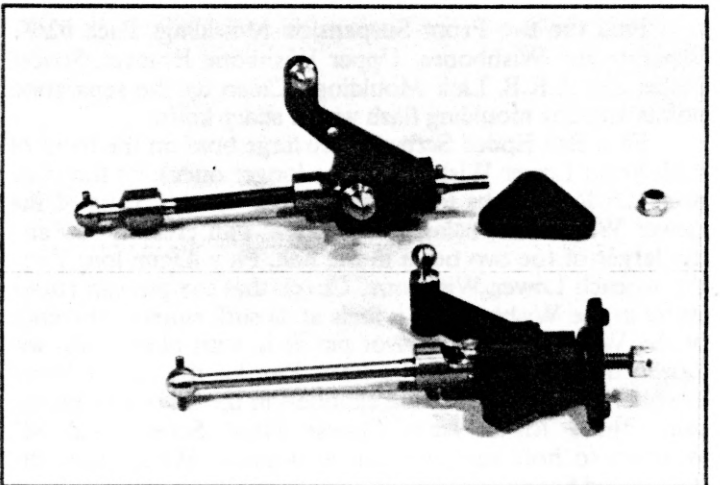


Find the two Front Axle Blocks and the two Rear Axle Blocks. The Front Axle Blocks are the ones with bent arms

and the Rear axle blocks have straight arms. With a sharp knife remove any moulding flash or sprue pips that have been left on the moulding. Find four Large Ball Ended Screws 4mm, and screw one into each of the 7.5mm bosses at the top and bottom of the Front Axle Blocks, until the hexagonal flange is touching the axle block. These Ball Ended Screws will be the King Pins, so it is important that they are screwed in square to the axle blocks, as they will form there own thread when you screw them in. Find four of the Small Ball Ended Screws 3mm, screw one into the hole at the very end of the steering arm of a Front Axle Block, and then with the other Front Axle Block screw a Ball Ended Screw into the same hole, but from the other side. This then produces a left hand axle block and a right hand axle block. The Rear Axle Blocks only require a Small Ball Ended Screw fitted to the hole at the end of the arm, and to be handed left and right as the front.

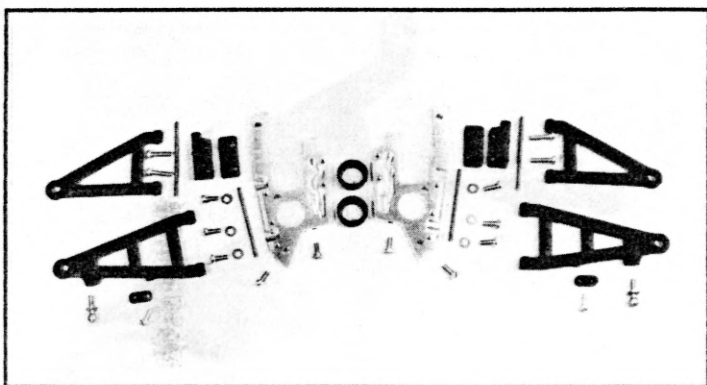


Find all eight of the 5 x 10 x 4mm Ballraces and all four Universal Joint Axle Assembly. Fit one Ballrace fully onto a U.J.Axle, and partially insert another Ballrace into the outboard (small diameter) end of a axle block. The threaded end of the axle should now be passed through the inboard (large diameter) end of the axle block and on through the outer Ballrace, now press the Axle fully into the Axle Block and the outer Ballrace fully into the outer end of the Block. There Should be a gap of 0.7mm to 1.0mm between the outer Ballrace and the inner edge of the 2mm cross hole in the Axle. The 2 x 11.8mm Drive Pin should now be pushed through the cross hole in the axle until an equal amount protrudes either side. A M3 x 4mm socket set screw should now be fitted to the coupling of each U.J. Axle, but only screwed in a couple of turns. Find two Drive Shafts. The Front and Rear Drive Shafts provided in the kit are identical and look like the ones shown in the picture fitted to the rear axle blocks.



The Drive shafts shown fitted to the Front Axle Blocks, have got One Way Roller Clutches in them and are available as an optional extra (Part No's 03/19 Left Hand & 03/120 Right Hand). Identify your left hand Front Axle Block Assy (with steering arm to the rear the small ball should be on the top). Fit a drive shaft to the U.J. Coupling and fix in position with the M3 socket set screw onto the flat at the end of the drive shaft. The correct length of the drive shaft will be set later. Repeat for the other Front Axle & Drive Shaft Assy, then fit Drive Shafts to the Rear Axle Assy. Find the four triangular Wheel Driver Mouldings, and fit one to each Axle Block Assembly, by passing the threaded section of the axle through a Wheel Driver Moulding from the slotted side. Slide all the way up the axle and locate the cross pin into the slot. Fit a M4 Self Locking Nut to the axle (this will be used to hold the wheels on when fitted).

## FRONT SUSPENSION



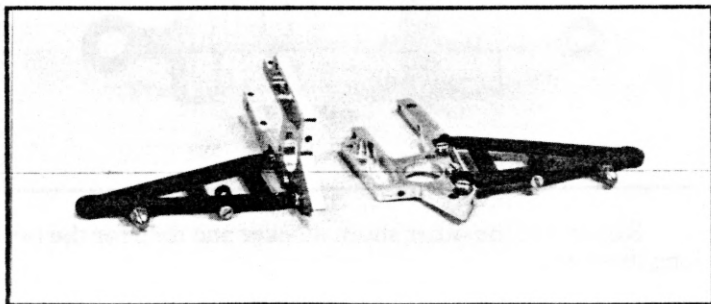
### PARTS REQUIRED

1	x	01/26	Side Plate Front L.H.S.
1	x	01/27	Side Plate Front R.H.S.
2	x	02/97part	Wishbone Front Upper
2	x	02/97part	Wishbone Front Lower
2	x	02/97part	Upper Wishbone Bracket
2	x	02/97part	Spacer Plate 1mm
2	x	02/97part	Spacer Plate 2mm
2	x	02/97part	Link - Anti Roll Bar
2	x	02/23	Pivot Pin - Upper 47mm Long
2	x	02/31	Ball Ended Screw 3mm
2	x	02/70	Pivot Pin - Lower 43mm Long
2	x	03/206	Front Ballrace Carrier Moulding
2	x	06/26	Screw No4 x 3/8" Pan Head
6	x	06/51A	Washer M3
10	x	22/211	Screw M3 x 8mm Cheese Head
4	x	22/302	Screw M3 x 12mm Cheese Head
2	x		Front Axle Block Assemblies

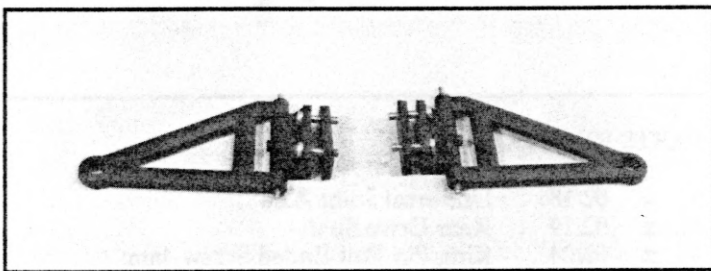
Find the two Front Suspension Mouldings Pack 02/97. Separate the Wishbones, Upper Wishbone Bracket, Spacer Plates and A.R.B. Link Mouldings. Clean up the separation points and any moulding flash with a sharp knife.

Fit a Ball Ended Screw to the large boss on the front of both Front Lower Wishbones (the longer ones). Fit the small plastic A.R.B. Links to the small boss on the front of the Lower Wishbones, using a No4 x 3/8" Pan Head Screw and the larger of the two holes in the link. Fit a 43mm long Pivot Pin to each Lower Wishbone. Check that the pin can rotate freely in the Wishbone. If it feels at all stiff, squeeze the ends of the Wishbone with a pivot pin in it, with pliers. This will loosen the wishbone on the Pivot Pin. Fit the Lower Front Wishbones to the machined channels in the front side plates, using three M3 x 8mm Cheese Head Screws and M3 Washers to hold the pivot pin in position. When fitted the Ball Ended Screw and A.R.B. Link should be facing the front

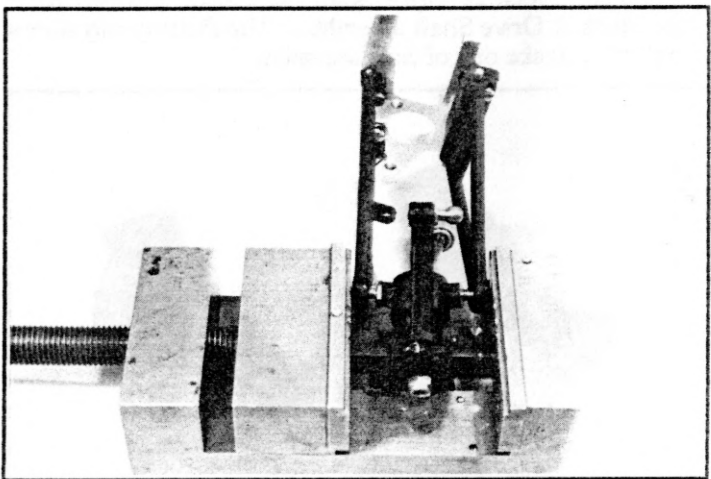
of both Side Plates (the front being the pointed end of the Side Plate).



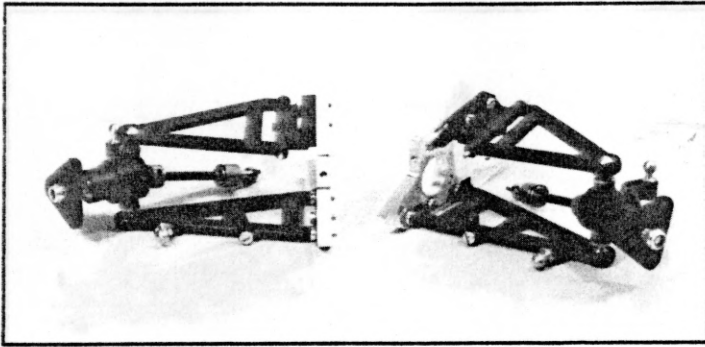
Find the two 47mm long Upper Pivot Pins, and check that they rotate freely in the Upper Front Wishbones. Fit the Upper Wishbones to the Upper Wishbone Brackets with the Pivot Pins. Making sure you make a left hand wishbone and a right hand wishbone, by fitting the Wishbone Bracket the opposite way round on the second wishbone to the first wishbone. Please note that the pivot pin is supposed to be a tight fit in the Wishbone Bracket, and will require a few gentle taps with a hammer to drive it through. You will end up with approximately 4mm of pin protruding on either side. Pass a M3 x 12mm Cheese Head Screw through each hole, from the wishbone side, in each Wishbone Bracket. Hang a 1mm and 2mm thick Spacer Plate on to each pair of screws.



These Spacer Plates can be changed for ones of different thicknesses or even completely omitted, to adjust the amount of camber on the front wheels. However 3mm thickness of Spacer Plates give you a good all round setting, so try it with these to start with. Fit the Upper Wishbone Assemblies to the upper holes in the Side Plates, using the M3 x 12mm Screws you have already fitted through the Wishbone Brackets and Spacer Plates. The Assemblies should be fitted so that the angled side of the wishbone is to the rear, and the screws are above the wishbone.

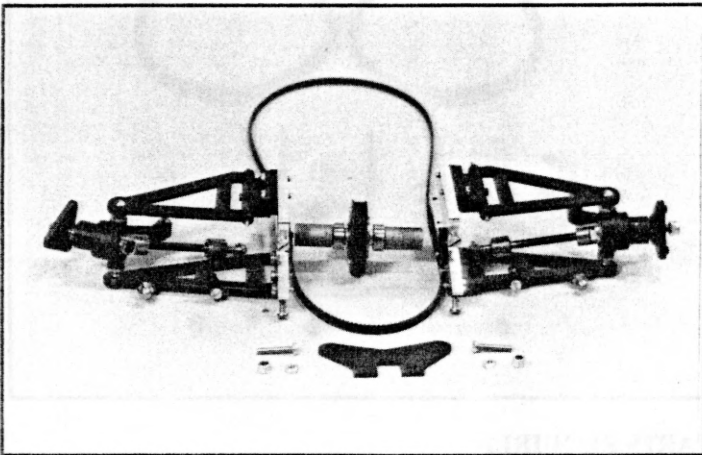


Find the two Front Axle Block Assemblies you made earlier, and fit them to the front wishbones, making sure that the Ball Ended Screw on the steering arm is to the rear of the wishbones and facing upwards. To "pop" the King Pin



Balls into the wishbones you will most probably have to squeeze the assembly together in between vice jaws (a quick squeeze works better than a slow one). Check that the Axle Blocks rotate freely in the wishbones, if they are stiff, you can squeeze the wishbone on the ball with pliers and this will free them up. Fit a M3 x 8mm Cheese Head Screw to the two threaded holes on the front edge of the side plates. Screw in a couple of turns only as you will be required to remove them later for fitting the Bumper and Front Shocker Mounting Plate. Fit the two front Ballrace Carrier mouldings to the insides of the Side Plates.

## FRONT SIDE PLATES, DIFFERENTIAL & SHOCKER MOUNTING PLATE



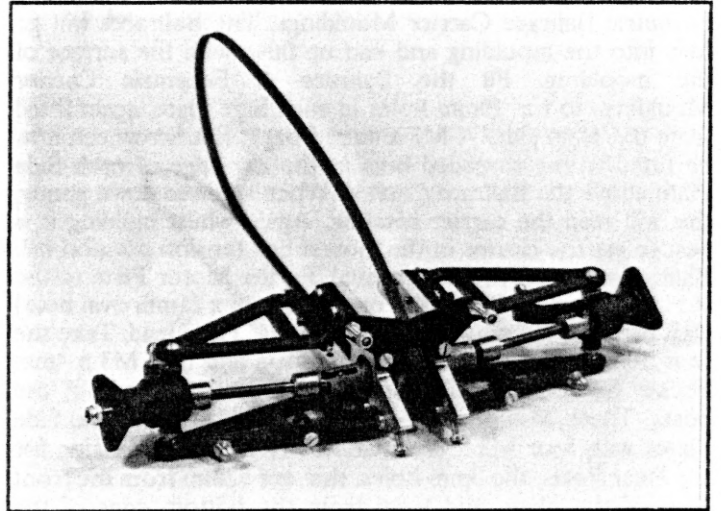
### PARTS REQUIRED

1	x	02/87	Shocker Mounting Plate - Front
1	x	03/88	Belt - Front - Long
2	x	06/30	Screw M3 x 16mm Cheese Head
2	x	06/31	Nut M3 Self Locking
2	x	06/34	Nut M3 Thin
1	x		Front Side Plate Assembly L.H.
1	x		Front Side Plate Assembly R.H.
1	x		Front Differential Assembly - Narrow

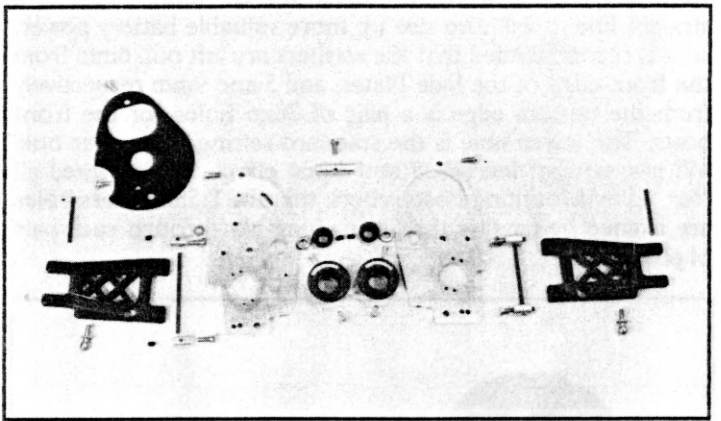
Fit from the same side a M3 x 16mm Cheese Head Screw and a M3 Thin Nut to each of the holes that are furthest apart on the Shocker Mounting Plate. Find the two M3 Self Locking Nuts and screw them on to each screw a couple of turns.

Take the narrow Front Differential Assembly and a Front Side Plate Assembly. Pass a Drive Cup of the differential, through the Ballrace Carrier Moulding in the Side Plate. Making sure you locate the Ball & Pin end of the Drive Shaft into the Drive Cup. The Differential Ballrace should completely disappear into the Ballrace Carrier Moulding. Position the Long Belt over the Differential Pulley. Now fit the other Side Plate over the Differential Drive Cup and Ballrace. Again making sure the Drive Shaft locates into the Drive Cup. To hold the two Side Plates together fix the Shocker Mounting Plate to the Side Plates

using the upper two M3 x 8mm Screws at the front of the Side Plates, making sure that the long M3 screws in the Shocker Plate are pointing forwards.



## REAR SUSPENSION



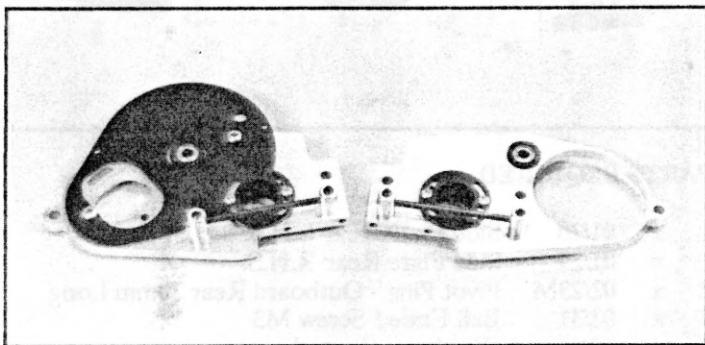
### PARTS REQUIRED

1	x	01/28	Side Plate Rear L.H.S.
1	x	01/29	Side Plate Rear R.H.S.
2	x	02/23M	Pivot Pins - Outboard Rear 30mm Long
2	x	02/31	Ball Ended Screw M3
2	x	02/66part	Wishbone Rear - Lower
2	x	02/71	Pivot Pins - Inboard Rear 50mm Long
4	x	02/72	Alloy Mounting Post - Pivot Pins
1	x	02/73	Spacer - Rear Side Plates
2	x	03/205	Eccentric B.R. Carrier Mldgs - R.Diff.
2	x	03/207	Eccentric B.R. Carrier Mldgs - Layshaft
1	x	03/211	Motor Plate
2	x	06/22	Ballrace 4 x 8 x 3mm
4	x	06/24	Screw No2 x 1/4" Pan Head
2	x	06/38	Screw No4 x 1/4" Pan Head
6	x	06/51A	Washer M3
6	x	06/57	Screw M3 x 4mm Socket Set Screw
7	x	22/211	Screw M3 x 8mm Cheese Head
2	x		Rear Axle Block Assemblies

Fit the Large Eccentric Ballrace Carrier Mouldings, to the 16mm diameter holes in each of the Rear Side Plates. They should be fitted to the outside of the Side Plates (the plain side), and retained in position by two Self Tapping Screws No2 x 1/4" Pan Heads in each. There are four holes provided for these screws, use two that are opposite each other, the other two will allow further settings to be achieved. You will notice an "O" moulded into the face of the Eccentric Carrier Mouldings, this marks the point of the greatest offset,



start of with the "O"s at the top this will make assembly easier when fitting the belts. Do not tighten the retaining screws yet, as you will want to adjust the belt tension later. Fit a small Ballrace 4 x 8 x 3mm to both of the Small Eccentric Ballrace Carrier Mouldings. The Ballraces will go fully into the moulding and end up flush with the surface of the moulding. Fit the Ballrace & Eccentric Carrier Mouldings to the 10mm holes in each Side Plate, again fitted from the plain side. A M3 x 4mm Socket Set Screw can now be fitted to the threaded hole in the top edge of each Side Plate above the Ballrace Carrier. When screwed down gently, this will stop the carrier rotating. Again whilst building it is best to set the carrier in the loosest belt tension position I.E. Ballraces nearest the Differential. Fit the Motor Plate to the R.H.S. Rear Side Plate (the one with a 18 x 21mm oval hole) with two Self Tapping Screws No4 x 1/4" Pan Head. Take the four 10mm long Alloy Mounting Posts and fit a M3 x 4mm Socket Set Screw halfway into the chamfered ends of the posts. These Mounting Posts can now be fitted to the Side Plates with four M3 x 8mm Cheese Head Screws. Using for the Rear Posts, the 3mm holes, that are 52mm from the front edge of the plate, and 9mm from the bottom edge of the plate. M3 Washers have been provided, that can be fitted between the rear posts and the side plate to give a "Toe In" Rear Suspension, which will make the car more stable in a straight line. it will also use up more valuable battery power, so it is recommended that the washers are left out. 6mm from the front edge of the Side Plates, and 5 and 9mm respectively from the bottom edge is a pair of 3mm holes for the front posts. The lower hole is the standard setting, the upper hole will give you an increased anti squat effect. Having fitted all four Alloy Mounting Posts, check that the 2.5mm cross holes are aligned by passing the 50mm long pin through each pair of posts.

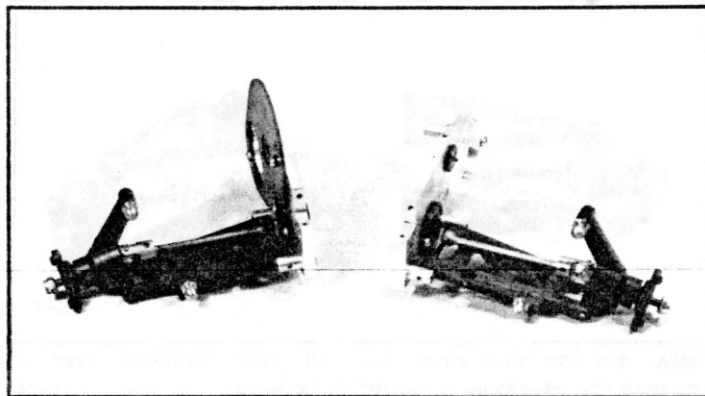


Fit a Ball Ended Screw to one of the holes along the front edge of each Rear Wishbone. We recommend using the second outer most hole for your standard setting. Moving to the inner holes will increase the ride height, and decrease the spring rates, making it more likely to roll over in a corner. Check that the pivot pins will pivot in both ends of the wishbones freely. If they are at all stiff, insert a long pivot pin into one leg of the wishbone and stretch the hole by twisting the pin with a stirring action, this will loosen the hole. Do not drill the holes out. Repeat for any other tight pivot holes. The Wishbones should pivot under there own weight.

Fit the Rear Axle Block Assemblies you made earlier to the rear wishbones using the 30mm Long Pivot Pins. The Ball Ended Screw on the Rear Axle Block Assembly should face in the same direction as the one on the wishbone. The Pivot Pin is meant to be a tight fit in the Axle Block and will require gentle tapping with a hammer to get it through.

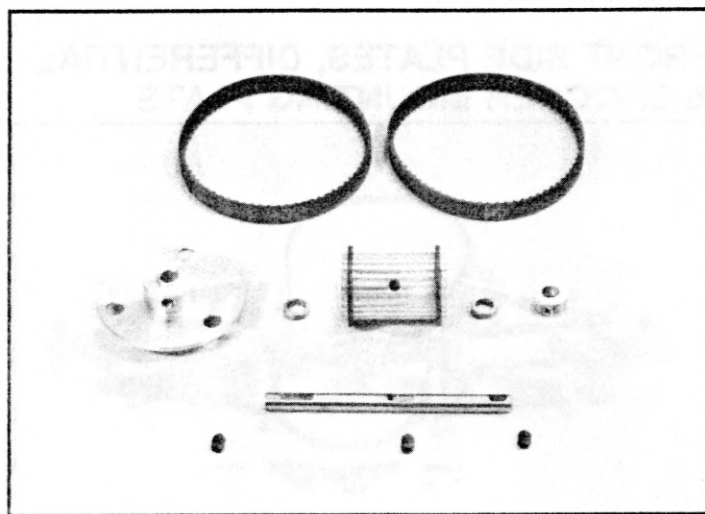
Fit the wishbones to the Side Plates in between the Alloy Mounting Posts, using the 50mm Long Pivot Pins, so that the Ball Ended Screws are facing the front. The Pivot Pins should be retained in position by use of the M3 x 4mm Socket Set Screws in the Alloy Mounting Posts.

Fit a M3 x 8mm Cheese Head Screw to the threaded hole half way down the 23mm Long Side Plate Spacer Rod.



With another M3 x 8mm Cheese Head Screw fix one end of the Spacer, to the 4mm hole at the very back of the side plate with the 40mm motor access hole in it. Making sure that the head of the screw halfway across the spacer is facing horizontally outwards.

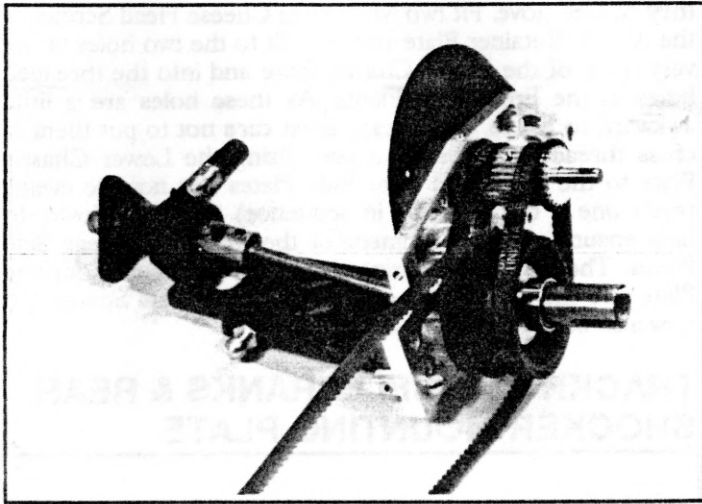
## REAR SIDE PLATES, DIFFERENTIAL, LAYSHAFT & BELTS.



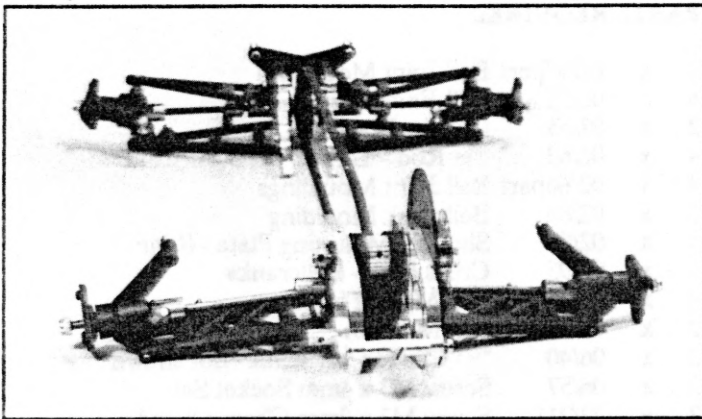
### PARTS REQUIRED

1	x	03/37	Collar 4mm I.D.
1	x	03/62	Gear Carrier
2	x	03/73	Spacer Washer
1	x	03/200	Pulley 24G
2	x	03/209	Belt - Rear - Short
1	x	03/210	Layshaft
3	x	06/57	Screw M3 x 4mm Socket Set Screw
1	x		Rear Differential Assembly
1	x		Rear L.H. Side Plate Assembly
1	x		Rear R.H. Side Plate Assembly
1	x		Front Side Plates Assembly

Fit the 33.5mm diameter Gear Carrier to the Layshaft with 3 flats on it, using a M3 x 4mm Socket Set Screw to retain it. The boss for the M3 Screw on the Gear Carrier Should be facing towards the middle of the Layshaft, and the M3 Screw should locate onto the flat that is approximately 8mm in from one end of the Layshaft. Slide a Special Spacer Washer on from the other end of the Layshaft up to the Gear Carrier. Slide the Layshaft through the small Ballrace in the Side Plate with the Motor Plate on it. Fit a M3 x 4mm Socket Set Screw to the threaded hole half way across the 24 Groove Pulley, and then fit the Pulley to the Layshaft tightening the M3 Screw onto the centre flat on the Layshaft. Take one of the Short Belts and wrap it half way round the Rear Differential to the side of one of the flanges. Hook the free end of the Short Belt over the Layshaft and Pulley, and insert

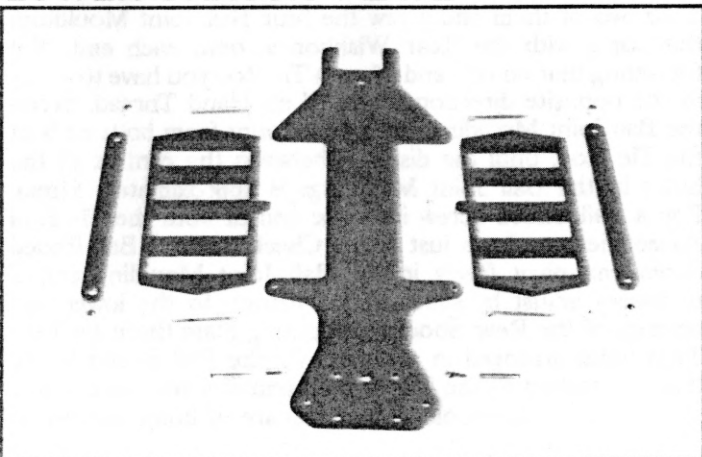


the belt side Drive Cup of the Rear Differential through the Ballrace Carrier Moulding in the Side Plate. Hook the free end of the Long Belt that is already attached to the Front Side Plates Assembly, around the middle of the Rear Differential. Hook the other Short Belt over the Layshaft Pulley and the other side of the Rear Differential. Fit the other Rear Side Plate over the Differential Drive Cup and Layshaft, and hold them together by passing a M3 x 8mm Cheese Head Screw through the 4mm hole at the very back of the Side Plate with the Motor Plate attached to it, and screw into the Side Plate Spacer, that is already fixed to the other Side Plate. Do Not Tighten Yet. Fit a Special Spacer Washer to the protruding part of the layshaft followed by the 4mm Collar which is retained by a M3 x 4mm Socket Set Screw that should be tightened down onto the flat on the Layshaft. Check that you have a small amount of end float in the layshaft and that it does not bind when rotating.



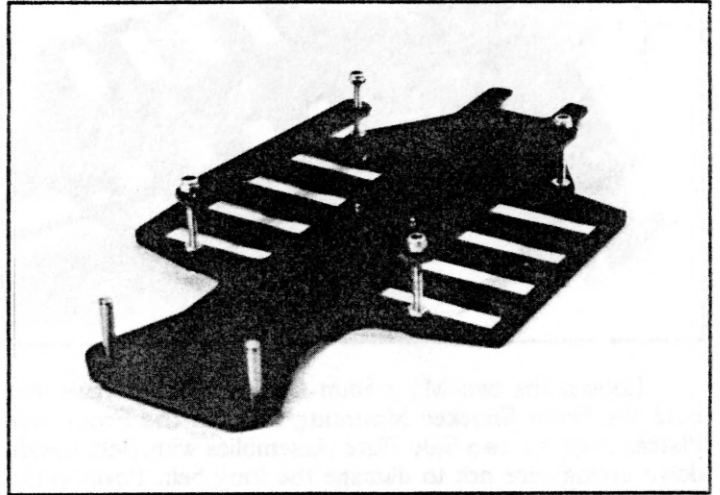
Place the Front and Rear Side Plate assemblies to one side, taking care not to kink the long belt, while you are preparing the Lower Chassis Plate.

## LOWER CHASSIS PLATE



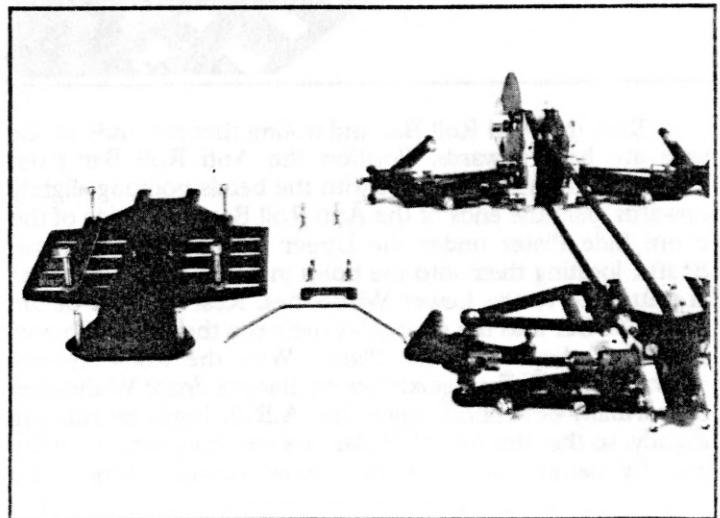
## PARTS REQUIRED

1	x	01/24	Chassis Plate - Lower
2	x	02/57	Post - Bellcrank
2	x	03/202	Nicad Tray Mouldings
2	x	03/208	Nicad Retaining Straps
2	x	06/24	Screw No2 x 1/4" Pan Head
4	x	06/31	Nut M3 Self Locking
4	x	06/33	Screw M3 x 30mm Countersunk Head
4	x	06/34	Nut M3 Thin
2	x	22/211	Screw M3 x 8mm Cheese Head



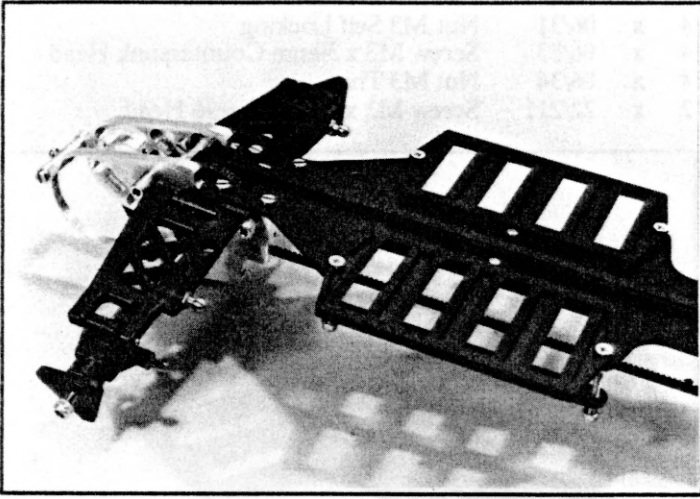
Clean up any machining burrs that may have been left around the edges of the Lower Chassis Plate and Nicad Retaining Straps with a fine file or sandpaper. Identify the front and back edges of the chassis, the back edge has a 22 x 17mm rectangle cut out of it. Fit a Bellcrank Post to each of the outer 3mm holes, that are 12mm from the front edge of the Lower Chassis. Using a M3 x 8mm Cheese Head Screw for each Post. The side that you have fitted the posts to, has now become the top of the Lower Chassis Plate. Fit the Nicad Tray Mouldings to the bottom of the chassis plate, with the long M3 x 30mm Countersunk Screws and M3 Thin nuts. Making sure that the small supporting tabs of the trays, are pointing towards the centre and are uppermost. Fit a Small No2 x 1/4" Pan Head Screw to each of the supporting tabs and into the Lower Chassis. Fit the Nicad Retaining Straps to the Long M3 Screws and a M3 Self Locking Nut to each screw ready for holding your Nicads in.

## ANTI ROLL BAR, FRONT & REAR SIDE PLATES, LOWER CHASSIS PLATE ASSY

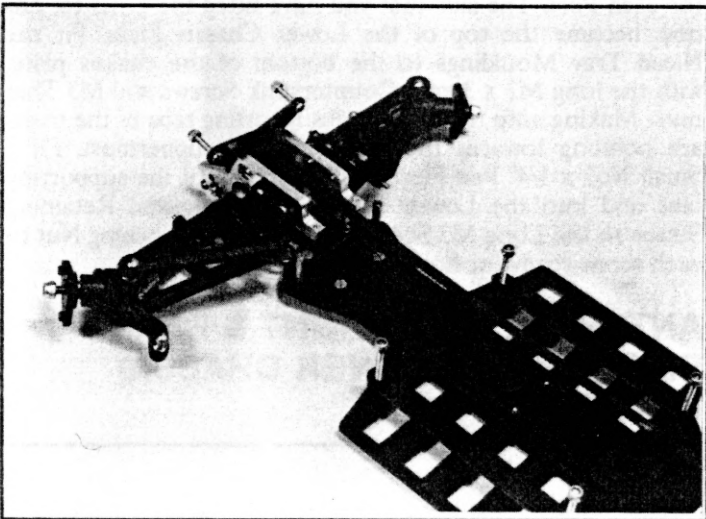


## PARTS REQUIRED

1	x	02/92	Anti Roll Bar
1	x	02/94	Retainer Plate - Anti Roll Bar
8	x	22/211	Screw M3 x 8mm Cheese Head
1	x		Lower Chassis Plate Assembly
1	x		Front & Rear Side Plates Assembly



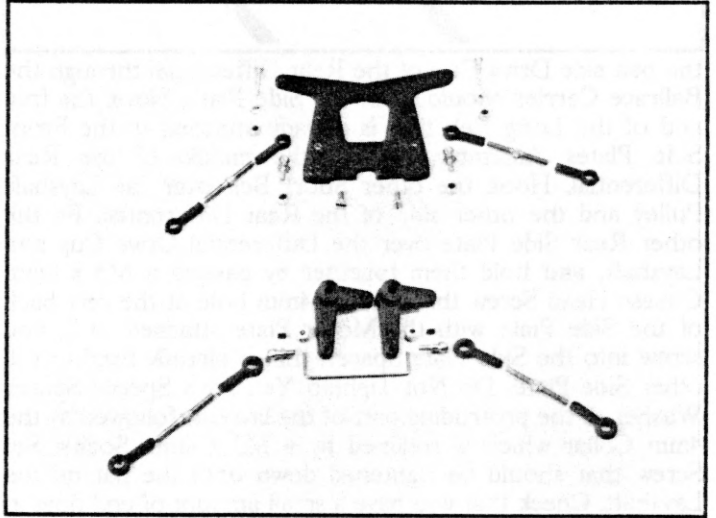
Loosen the two M3 x 8mm Cheese Head Screws that hold the Front Shocker Mounting Plate to the Front Side Plates. Turn the two Side Plate Assemblies with Belt, upside down taking care not to damage the long belt. Position the Lower Chassis Plate in the middle of the Long Belt and fix to the bottom of the Rear Side Plates with four M3 x 8mm Cheese Head Screws. Leave the screws approximately one turn loose. Turn the assembly back up the correct way, and fix the front of Lower Chassis Plate to the top of the lower legs of the Front Side Plates. Using two M3 x 8mm Cheese Head Screws and the two rear fixing holes, again leave the two screws about one turn loose.



Take the Anti Roll Bar and noting that the ends of the wire are bent upwards. Position the Anti Roll Bar from behind the Front Side Plates with the bends pointing slightly upwards, pass the ends of the Anti Roll Bar either side of the Front Side Plates under the Upper Wishbones and Drive Shafts, locating them into the holes in the A.R.B. Links that are attached to the Lower Wishbones. Rest the rear of the Anti Roll Bar into the groove left between the Lower Chassis Plate and the Front Side Plates. With the whole chassis assembly sitting on a flat surface so that the Front Wishbones are virtually horizontal, adjust the A.R.B. Links by rotating slightly, so that the Anti Roll Bar lays naturally central on the car. By natural we mean not under tension. When this

position is found, tighten the screws on the A.R.B. Links so they do not move. Fit two M3 x 8mm Cheese Head Screws to the A.R.B. Retainer Plate and then fit to the two holes at the very front of the Lower Chassis Plate and into the threaded holes in the Front Side Plates. As these holes are a little awkward to get to, please take great care not to put them in cross threaded. The eight screws fixing the Lower Chassis Plate to the Front and Rear Side Plates can now be evenly (each one a bit at a time in sequence) tightened down, to help ensure correct alignment of the Front and Rear Side Plates. The two screws fixing the Front Shocker Mounting Plate and the loose screw in the Rear Side Plate Spacer can now also be tightened.

## TRACKRODS, BELLCRANKS & REAR SHOCKER MOUNTING PLATE

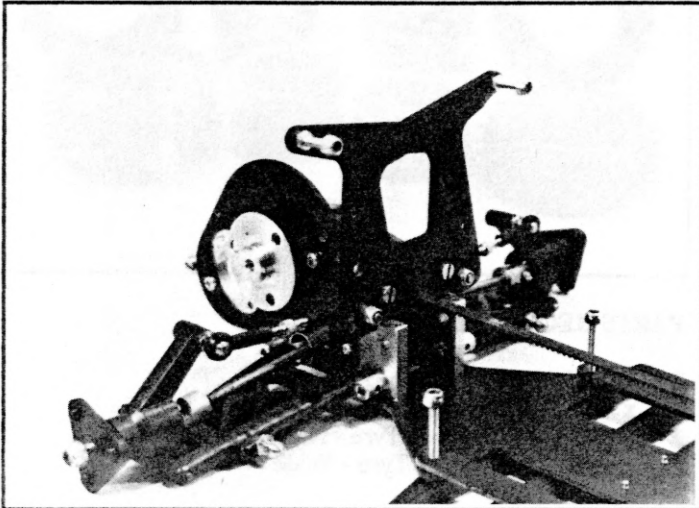


## PARTS REQUIRED

4	x	02/97part	Ball Joint Mouldings
4	x	02/31	Ball Ended Screw M3
2	x	02/55	Collar - Brass
4	x	02/63	Tie Rod - L.H. & R.H. Thread
4	x	02/66part	Ball Joint Mouldings
2	x	02/86	Bellcrank Moulding
1	x	02/88	Shocker Mounting Plate - Rear
1	x	02/95	Cross Link - Bellcranks
4	x	06/31	Nut M3 Self Locking
2	x	06/34	Nut M3 Thin
2	x	06/40	"E" Clip for 1/8" shaft - not shown
2	x	06/57	Screw M3 x 4mm Socket Set
2	x	22/211	Screw M3 x 8mm Cheese Head
2	x	22/361	Screw M3 x 20mm Pan Head

You have four Tie Rods, that have a Left Hand thread on one end and a Right Hand thread on the other, with a larger diameter knurled section or hexagon in the middle. Take two of them and screw the four Ball Joint Mouldings that came with the Rear Wishbones, onto each end. Not forgetting that on one end of each Tie Rod you have to screw in the opposite direction for the Left Hand Thread. Screw the Ball Joint Mouldings an even amount from both ends of the Tie Rod, until the distance between the centres of the holes in the Ball Joint Mouldings is approximately 51mm. Pop a Ball Ended Screw into one end of both the Tie Rod Assemblies you have just made. Check that the Ball Ended Screw can pivot freely in the Ball Joint Moulding and if necessary adjust by squeezing as before. In the lower two corners of the Rear Shocker Mounting Plate there are four 3mm holes arranged in a square. Fit the Ball Ended Screw that is attached to the Tie Rod Assemblies you have made. To the lower inner hole of each square of holes and retain

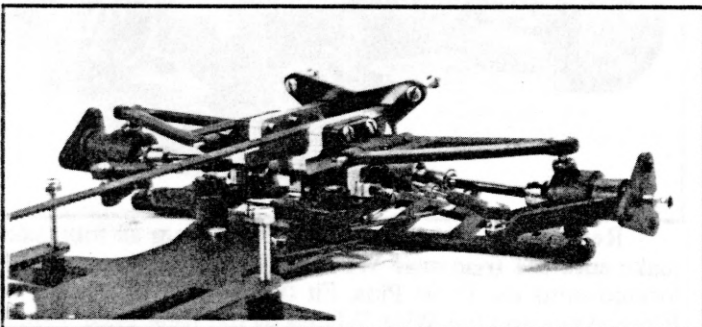
with M3 Self Locking Nuts. If fitted to the outer holes this would increase the Rate Of Change Of Camber, whereas moving to the upper holes will decrease the Rate Of Change Of Camber. You can experiment with this and find which settings most suit your track and style of driving. Fit a M3 x 20mm Pan Head Screw and M3 Thin Nut to the pair of holes one on each side at the very top of the Shocker Mounting Plate. So that the M3 nut and protruding screw is on the same face of the Plate as the M3 Self Locking Nuts of the Ball Ended Screws. Fit two M3 Self Locking Nuts a couple of turns onto the M3 x 20mm Screws ready to hold the Rear Shocker on.



Fit the Rear Shocker Plate to the Two threaded 3mm holes in the front vertical edges of the Rear Side Plates using two M3 x 8mm Cheese Head Screws. So that the Ball of the Ball Ended Screws are to the rear of the Shocker Mounting Plate. Pop the Ball Joint Moulding on the other end of the Tie Rods, onto the Ball Ended Screws in the top arm of the Rear Axle Blocks. Making sure that the Drive Shafts are located in the Differential Drive Cups first. Check the rear suspension moves freely and if necessary squeeze any stiff Ball Joint Mouldings as before.

Assemble the other two Tie Rods with the four Ball Joint Mouldings that came with the front wishbones, in the same way as you have just done with the rear Tie Rods, but this time make the distance between the centres of the holes in the Ball Joint Mouldings 56mm.

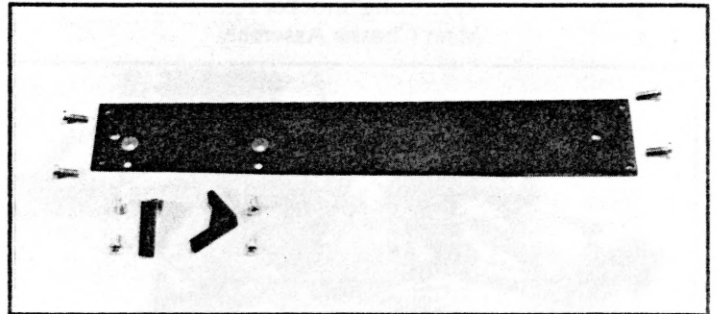
Find a Bellcrank Moulding and a Ball Ended Screw. With the long arm of the Bellcrank pointing towards you, and the short arm pointing to your right. Fit a Ball Ended Screw to the top of the long arm into the larger hole at the end of the arm. Because a standard length Ball Ended Screw is used through out the car, in this application it is necessary to file the excess length of thread until it is flush with the moulding. Repeat for the other Bellcrank Moulding and Ball Ended Screw.



Fit the Cross Link wire to the Bellcrank Mouldings using the other hole in the long arms, and retain using the Brass Collars and M3 x 4mm Socket Set Screw. The Cross Link should enter from the bottom of the Bellcrank

Mouldings so that the collars are on the top along with the ball of the Ball Ended Screw. Pop one end of each of the Tie Rod Assemblies you have just made, onto the Ball Ended Screws on the Bellcranks. Check that they rotate freely and squeeze as before if necessary. Remove the two Bellcrank Posts from the front of the Lower Chassis Plate, insert a post into a Bellcrank Moulding, refit the Post to the Lower Chassis, this time using thread locking compound. Repeat for the other Post and Bellcrank Moulding. The long Bellcrank arms should be pointing forwards and the short arms pointing to the left of the car (viewed as if you were sitting in the car). Fit a Small "E" Clip to the top of each Post. Pop the free ends of the Tie Rods onto the Ball Ended Screws, that are fitted to the steering arms of the Front Axle Blocks.

## UPPER CHASSIS PLATE & STEERING SERVO MOUNTING

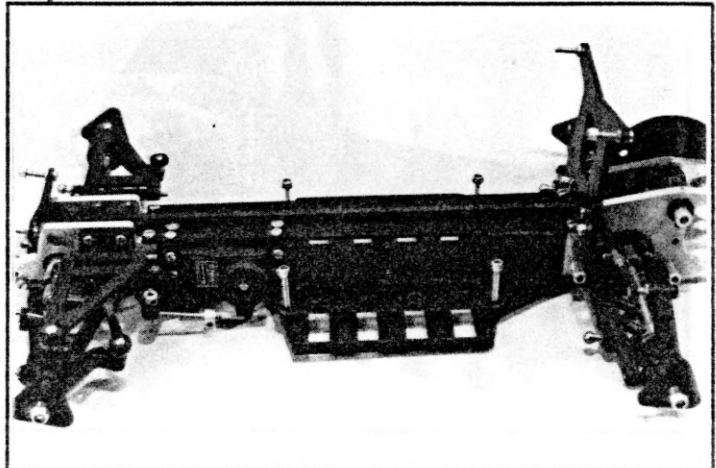


### PARTS REQUIRED

1	x	01/25	Upper Chassis Plate
2	x	02/89	Servo Mounting Brackets
2	x	06/25	Screw No4 x 5/16" Countersunk
2	x	06/38	Screw No4 x 1/4" Pan Head
4	x	22/211	Screw M3 x 8mm Cheese Head
1	x		Servo for Steering

Find the rectangular 31 x 205mm Upper Chassis Plate. Note the two countersunk 3mm holes on the top, 14 and 64mm from the front end of the Upper Chassis Plate. The countersunk holes and the two normal 3mm holes next to them are for use in fitting to the Servo Mounting Brackets. Fit the Servo Mounting Brackets to the Upper Chassis Plate, using a No4 x 5/16" Countersunk Screw and a No4 x 1/4" Pan Head Screw and the holes provided in each Servo Mounting Bracket and Upper Chassis Plate. The undrilled downward leg of the Servo Bracket should be virtually flush with the edge of the Upper Chassis Plate.

Position your servo between the Servo Mounting Brackets, and mark where you need to drill the holes to suit your servo. Drill the holes and mount the servo with the output disc to the rear.

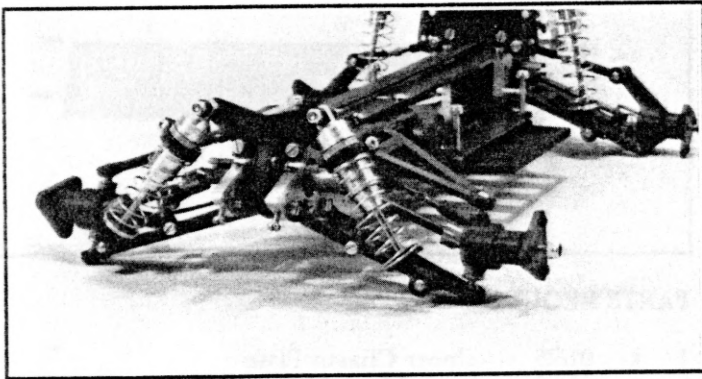


Place the Upper Chassis Plate with servo installed on it, into position on the car so that the top half of the long belt passes over the top of it and fasten it to the front and rear Side Plates using the four M3 x 8mm Cheese Head Screws provided. Now you need to make a wire link to go from your servo output disc to the Bellerank Moulding. The wire should be 16swg (1.6mm or 1/16" thick) and correctly lengthed, so that with servo arm pointing directly downwards, the Bellerank moulding input arm is at right angles to the chassis. The easy way to get the correct length is to use two pieces of wire and a collar to join the two as shown in the picture. We recommend the use of a servo top servo saver as opposed to a plain output disc on your servo.

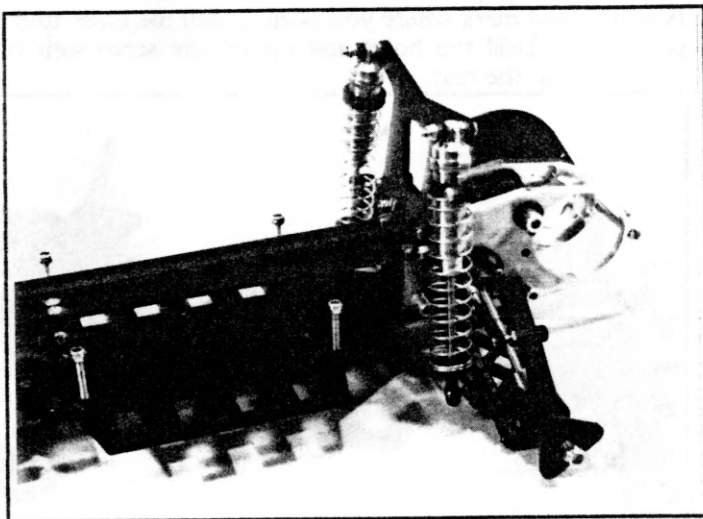
## SHOCK ABSORBER MOUNTING

### PARTS REQUIRED

2	x	Front Short Shocker Assemblies
2	x	Rear Long Shocker Assemblies
1	x	Main Chassis Assembly

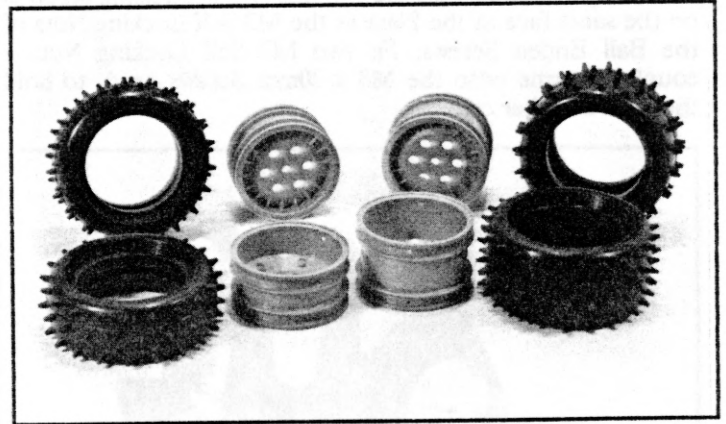


Check that you have adjusted both your Front Shockers to give the same amount of damping. There are two simple ways of doing this, the first is the simplest but least accurate, and that is. 1) With the shockers vertical, completely compress the shocker and check if the springs return at the same speed. This method is difficult to judge on light damping settings. The second method is 2) Remove the springs from the shockers, join the ball joint trunnions together with a nut and bolt or wire (solder). Again holding them vertically one hanging upside down under the other. Holding both shocker bodies, compress and open slowly, if they are set to give equal damping, the ball trunnions will stay in the centre of the two bodies, if one shocker is set lighter than the other, the trunnions will move towards that shocker body first. Adjust Shockers in small steps until they are evenly set. Repeat for the Rear Long Shockers.



After refitting the springs, fit the Short shockers to the Front Shocker Mounting Plate and Lower Front Wishbones and the Long Shockers to the Rear Shocker Mounting Plate and Lower Rear Wishbones. Do not tighten the M3 Self Locking Nut, only do up sufficiently to take out any end float in the screw mounting, but not so much as to create resistance to pivoting.

## WHEELS

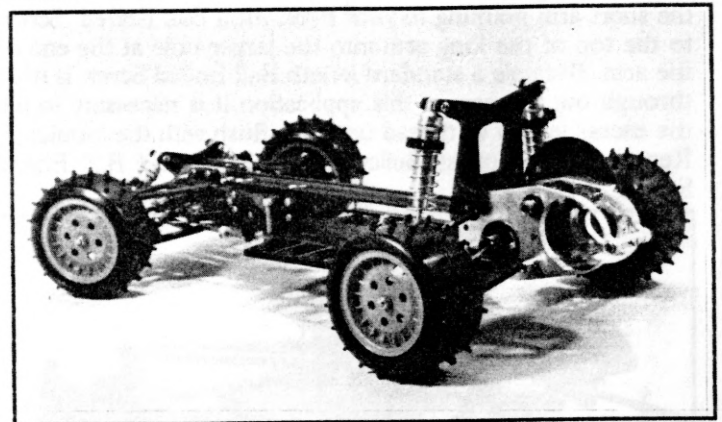


### PARTS REQUIRED

2	x	05/20	Front Hub - Narrow
2	x	05/21	Rear Hub - Wide
2	x	05/30	Front Tyre - Narrow
2	x	05/31	Rear Tyre - Wide

In order to reduce bounce as much as possible, it is a good idea to puncture the Tyres by cutting one small (approx 2mm) hole in each Tyre in between the central spikes. This allows the air to escape from the Tyre when landing from a jump and stops it acting like a bouncy ball. This is best done before fitting to the Hub, and a sharp knife usually produces a clearer hole than a drill.

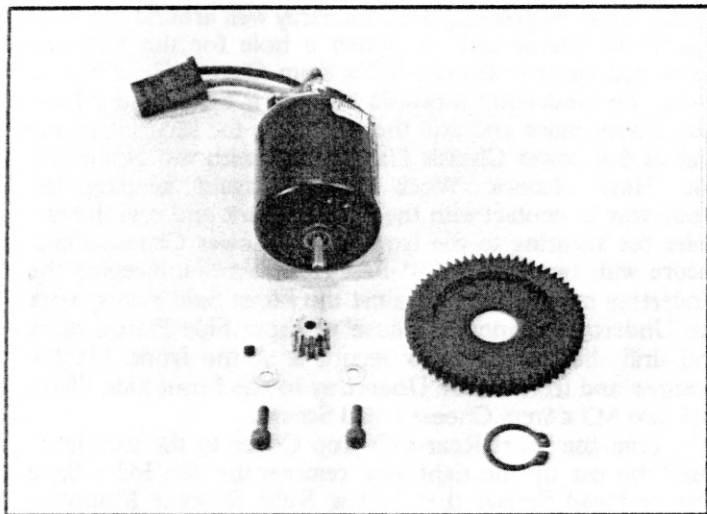
Fit the narrow Tires to the narrow Hubs and the wide Tires to the wide Hubs. Ensure that the 5mm wide Tyre Beads are seated properly into the 5mm wide Tyre Guides on the Hubs. When the Tires are fitted you should not be able to see the Tyre Beads at all, just the angled Tyre wall sitting concentrically around the Hub should be seen. Generally the Tires do not need gluing on, but for serious racing it is best to be safe, and run some Super Glue (Cyanoacrylate) in through the small holes provided in the Hubs.



Remove the M4 Self Locking Nuts from all four axles, make sure the triangular Wheel Driver Mouldings are fully located onto the Drive Pins. Fit the Narrow Wheels to the Front Axles and the Wide Wheels to the Rear Axle. Ensure the three Wheel Driver Moulding pips are aligned with three of the six holes in the Hubs and replace the M4 Self Locking

Nut. Do Not Over Tighten, the M4 Nuts only require doing up sufficiently to stabilise the Wheel against the Wheel Driver. Over Tightening could damage your Wheel Driver Mouldings.

## MOTOR & GEARS MOUNTING



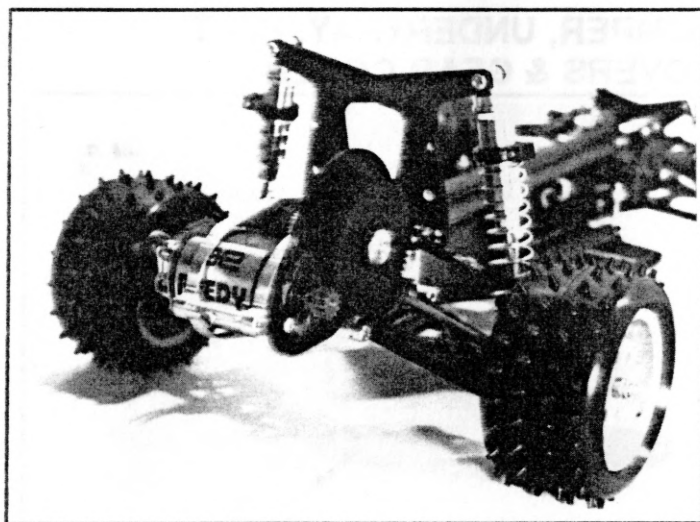
### PARTS REQUIRED

- |   |   |        |                                   |
|---|---|--------|-----------------------------------|
| 1 | x | 03/215 | Gear 48DP - 80 tooth              |
| 1 | x | 33/217 | Gear 48DP Motor Pinion - 21 tooth |
| 1 | x | 06/47  | Circlip 13mm                      |
| 2 | x | 06/51A | Washer M3                         |
| 1 | x | 06/57A | Screw M3 x 3mm Socket Set         |
| 2 | x | 22/311 | Screw M3 x 10mm Socket Cap Head   |
| 1 | x |        | Motor (540 Size)                  |

The kit is supplied with one set of 48DP gears. The new industry standard. 48DP gears offer greater efficiency than the old 32DP gears. Please note you can not mix a 32DP Motor Pinion with a 48DP Gear or vice versa. The gear ratio supplied with the kit is a middling gear ratio, for a Modified Motor. It is impossible for us to predict what will be the best Gear Ratio for you, because this is heavily dependant on what type and how good your Motor and batteries are, as well as your particular driving style and track conditions. But as a general rule of thumb, if the car has plenty of speed but will not last for a 5 minute heat, then you need to Increase the Gear Ratio (Less teeth on Motor Pinion). One tooth less on the Motor Pinion will gain you approximately 30 seconds. If the car lasts well over 5 minutes then you can Reduce the Gear Ratio (more teeth on Motor Pinion), giving you more speed during the 5 minutes. If the car does not appear to have much speed and also will not last 5 minutes. Then either you have a transmission problem, (I.E. Belts too tight, Ballrace seized or Transmission binding,) or your Batteries are not fully charged or faulty. or you have a problem with your Motor most commonly, sticking brushes. Speed Controllers can also cause problems in this area, and if suspected of being the cause of a problem should be returned to the manufacturer of the speed controller. A range of 48DP Gears and Motor Pinions are available for the Ace, please see price list for details.

Fit the large black moulded Gear to the Alloy Gear Carrier that you have already fitted to the car, aligning the three 4mm drive bosses with the three holes in the Alloy Gear Carrier and retain it there with the 13mm Circlip in the circlip groove provided in the alloy Gear Carrier.

Pass the shaft end of your Motor through the large hole in the Left Hand Rear Side Plate, and on through until the shaft end of the Motor Can butts up to the inside face of the Right Hand Rear Side Plate, with the shaft extending on

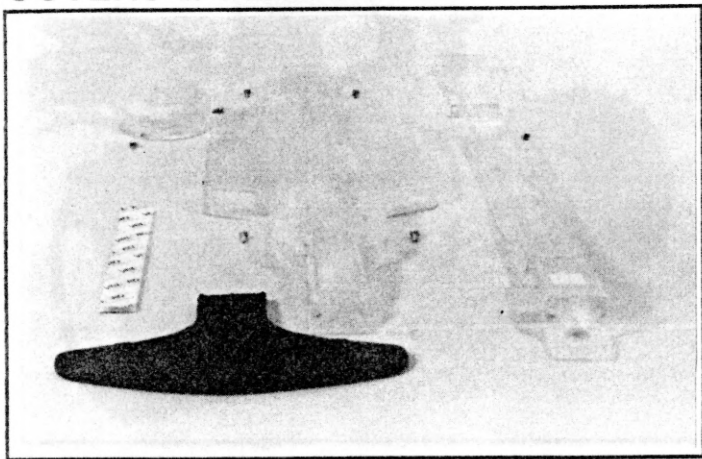


through the elongated hole in that Side Plate. Retain in position using the two M3 x 10mm Socket Cap Head Screws and M3 Washers, in the 3mm hole just below the elongated hole and the 3mm wide radial slot just above the elongated hole. Do not Tighten. Fit the M3 x 3mm Socket Set Screw a couple of turns into the Motor Pinion, and then fit the Motor pinion to the Motor Shaft, smaller diameter first. Line the Motor Pinion up with Moulded Gear and tighten the M3 x 3mm Socket Set Screw down onto the flat portion of the Motor Shaft. The Motor can now be pivoted on the fixed mounting screw so that the gears mesh, then the moving mounting screw can be tightened followed by the fixed mounting screw. Correct Gear Mesh Is Important! Too tight a gear mesh will result in a slow car, and possible damage to your Motor and Speed Controller due to overloading. Too loose a gear mesh will result in loosing teeth off the gears and eventual loss of drive. Please Note that when adjusting the Rear Belt Tension via the Eccentric Layshaft Ballrace Carriers, this will effect the Gear Mesh. Therefore the Motor Pinion should be taken out of mesh with the Moulded gear whilst the Belts are being adjusted then remeshed afterwards.

## 48DP GEAR RATIO CHART

RATIO CHART - ACE -48 DP					
-----					
FINAL DRIVE RATIO      2.17					
-----					
RING GEAR					
MOTOR	*	80.00	84.00	87.00	90.00
PINION	*	*****			
15.00	*	11.56	12.13	12.57	13.00
16.00	*	10.83	11.38	11.78	12.19
17.00	*	10.20	10.71	11.09	11.47
18.00	*	9.63	10.11	10.47	10.83
19.00	*	9.12	9.58	9.92	10.26
20.00	*	8.67	9.10	9.43	9.75
21.00	*	8.25	8.67	8.98	9.29
22.00	*	7.88	8.27	8.57	8.86
23.00	*	7.54	7.91	8.20	8.48
24.00	*	7.22	7.58	7.85	8.13
25.00	*	6.93	7.28	7.54	7.80
26.00	*	6.67	7.00	7.25	7.50

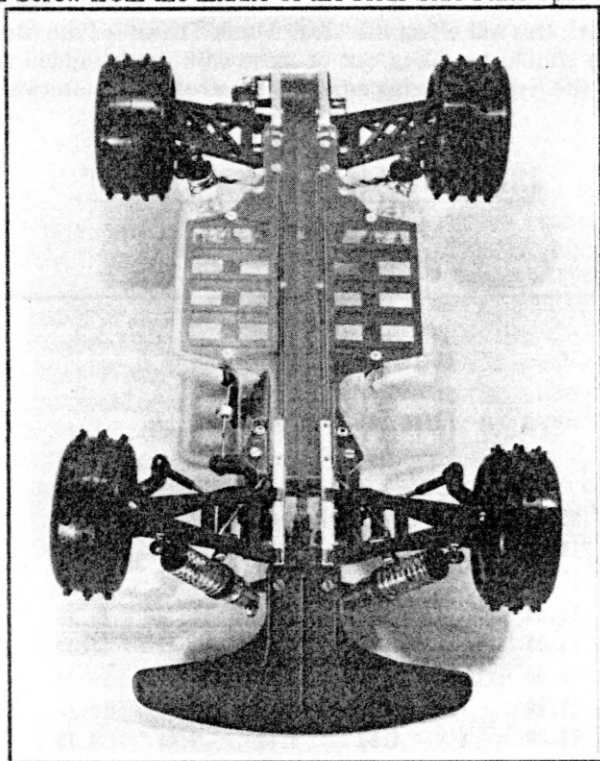
## BUMPER, UNDERTRAY, BELT COVERS & GEAR COVER



### PARTS REQUIRED

1	x	03/212	Gear Cover
1	x	03/213	Belt Top Cover - Rear
1	x	03/214	Belt Top Cover - Front
1	x	04/33	Velcro Tape (120 x 15mm Twin Strip)
1	x	04/34	Front Bumper
1	x	04/36	Undertray
7	x	06/38	Screw No4 x 1/4" Pan Head

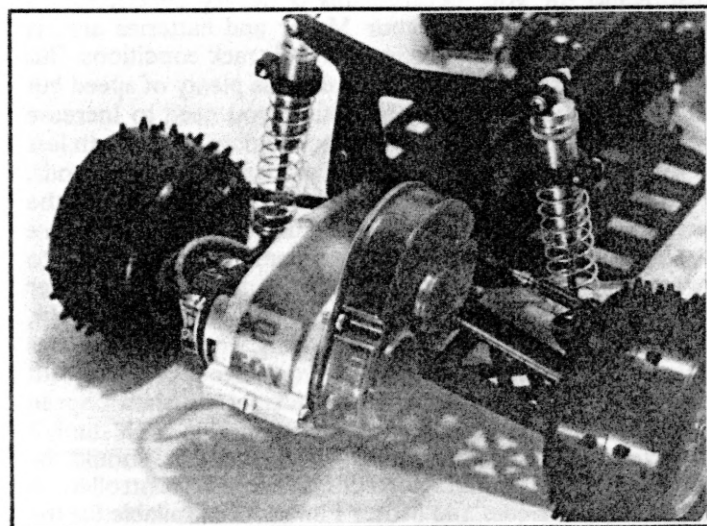
The Picture shows all the plastic covers and the bumper except the body shell, already trimmed and velcro attached to the appropriate places. Turn the car upside down and remove the two M3 x 8mm Cheese Head Bumper Mounting Screws from the front of the Front Side Plates, and the M3 x 8mm Screw from the middle of the Rear Side Plate Spacer.



Trim the Undertray to the trim lines with a sharp knife or cutters (Tin Snips), paying particular attention to the very small return edge, allowable around the Rear Side Plates. The Undertray is a close fit around the Rear Side Plates and is the first end that should be fitted. Offer the undertray to the bottom of the car (the two triangular cavities go to the rear of the Lower Chassis Plate). Check that the Undertray will not interfere with the full movement of the Lower

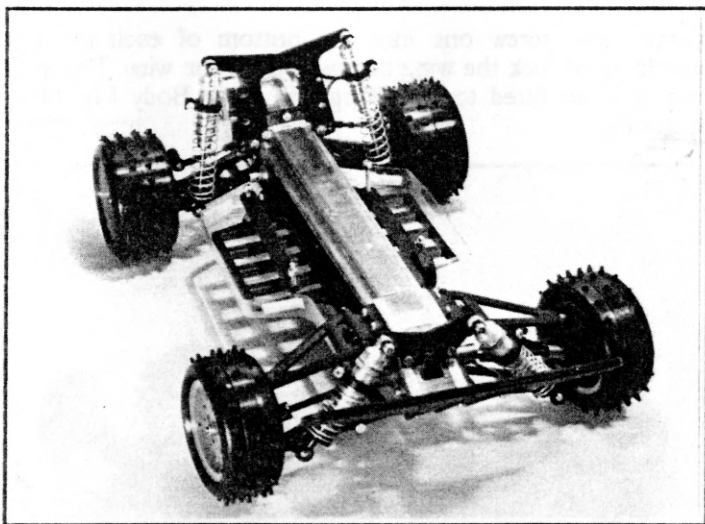
Wishbones, Steering Linkages or Anti Roll Bar. Trim more away if necessary. Note the positions of the seven mounting points that require 3mm holes drilling in the undertray. Two at the front that are also used for mounting the Bumper, one either side of the rear of the Front Side Plates, one in the corner of each triangular cavity to the rear of the Lower Chassis Plate, and one for the middle of the Rear Side Plate Spacer. Start by pressing the Undertray well around the Rear Side Plate Spacer drill or punch a hole for the retaining screw and secure with the M3 x 8mm Cheese Head Screw. Work the Undertray forwards keeping it tight on the Rear Side Plates, mark and drill the two holes for securing to the rear of the Lower Chassis Plate, secure with two No4 x 1/4" Pan Head Screws. Work forward again keeping the Undertray in contact with the chassis, mark and drill the two holes for securing to the front of the Lower Chassis Plate, secure with two No4 x 1/4" Pan Head Screws. Keeping the Undertray pushed firmly against the Front Side Plates, work the Undertray around the nose of these Side Plates, mark and drill the two holes to secure it at the front. Fix the Bumper and front of the Undertray to the Front Side Plates with two M3 x 8mm Cheese Head Screws.

Trim the short Rear Belt Top Cover to the trim lines. Turn the car up the right way, remove the two M3 x 8mm Cheese Head Screws that fix the Rear Shocker Mounting Plate to the Rear Side Plates. Offer the Rear Top Cover up to the Rear Side Plates. The front of the cover fits between the Rear Shocker Mounting Plate and the Rear Side Plates. Check that the Cover will not interfere with the Front Belt, Motor, or Motor Plate. Note where you have to drill two 3mm holes for fixing to the front of the Rear Side Plates, and one 3mm hole for fixing to the middle of the Rear Side Plate Spacer. You can also drill a couple of holes to allow you access to the Layshaft Eccentric Ballrace Carrier Locking Screws. Fit the Rear Belt Top Cover to the car, firstly using the two M3 x 8mm Cheese head Screws going through both the Rear Shocker Mounting Plate and the Top Cover into the front of the Rear Side Plates. Then fit a M3 x 8mm Cheese Head Screw through the rear of the Top Cover and the Undertray into the middle of the Rear Side Plate Spacer. Making sure that the cover is held hard down onto the Rear Side Plates.



Trim the Gear Cover to the trim lines drill 3mm holes for the two fixing screws. Fit to the Motor Plate using two No4 x 1/4" Pan Head Screws (these screws should extend out the other side of the motor plate and help keep the rear belt cover hard down against the side plate), again checking to make sure it does not interfere with the large gear or the Differential Drive Cup.

Trim the Front Belt Top Cover to the trim lines (the picture shows a hole cut in front cover to give clearance for

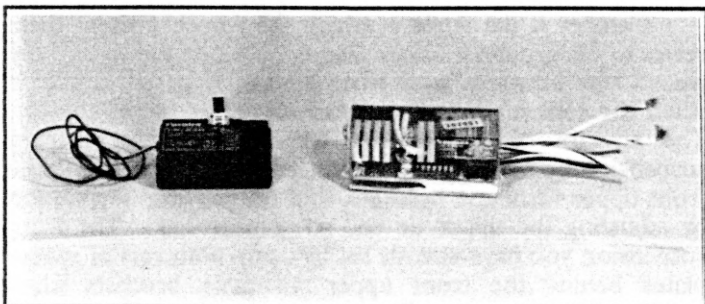


the front differential, this will not be necessary on the production version). Remove the two screws that fix the Front Shocker Mounting Plate to the Front Side Plates. Position the Front Belt Cover over the Upper Chassis Plate, Belt and Front Side Plates (behind the Front Shocker Mounting Plate). Note where you have to drill two 3mm holes for the Front Shocker Mounting Plate Screws and one 3mm hole to fix the rear of the cover to the Rear Shocker Mounting Plate. Drill the three 3mm holes, fix the cover firstly to the Front Side Plates behind the Front Shocker Mounting Plate using the two M3 x 8mm Cheese Head Shocker Mounting Plate Screws, and then with a No4 x 1/4" Pan Head Screw to the Rear Shocker Mounting Plate.

Cut up some small pads of Velcro Tape and stick the to the edge of the Undertray and the front of the Top Cover for the Front Belt as shown. These are to help seal the Body To the Undertray and also to hold the Body Shell down.

Warning !! Motor Sprays and Cleaning Solvents will damage the clear plastic Top Covers, Undertray, Gear Cover and Body Shell. Remove before use.

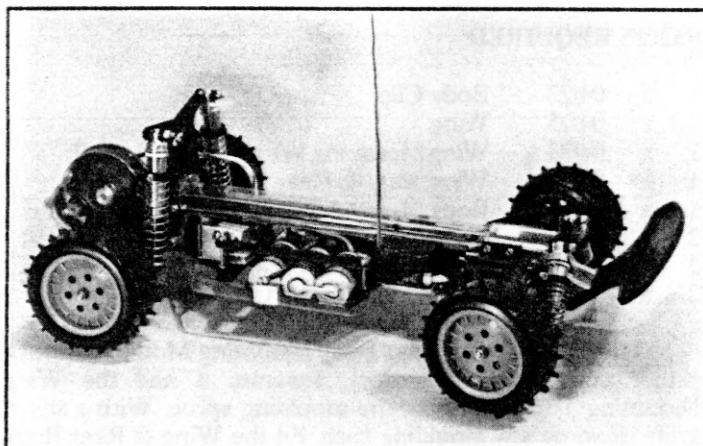
## RADIO RECEIVER, SPEED CONTROLLER & NICAD MOUNTING



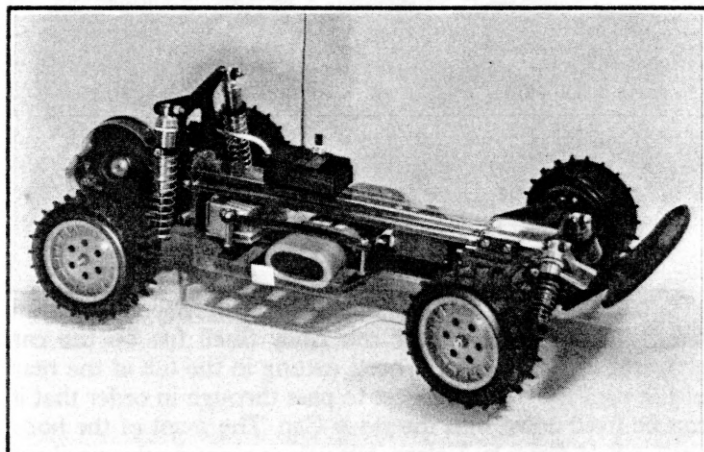
### PARTS REQUIRED

- |   |   |       |                  |
|---|---|-------|------------------|
| 1 | x | 03/71 | Aerial Tube      |
| 1 | x |       | Radio Receiver   |
| 1 | x |       | Speed Controller |

Shown in the pictures are several ways that you can fit your receiver, Speed Controller and Nicads. Either Stick or Saddle formation Nicads (Nickel Cadmium Rechargeable Batteries) can be fitted in the car. Because it is a rear motor car, it is best to have the Nicads mounted in the most forward position to balance the weight distribution in the car. The wires for Saddle Pack Nicads should pass under the Upper Chassis Plate. The Speed Controller should be fitted just behind the long rear nicad retaining screws, and in front

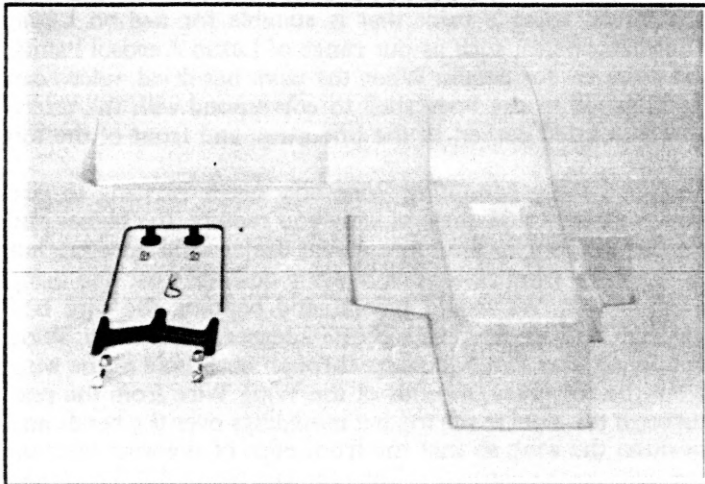


of the protruding Undertray fixing screws. If you have an Extra Large Speed Controller, file the protruding Undertray Fixing Screws flush to the Lower Chassis Plate, this will give you much more room. Fix the Speed Controller in place with a small piece of Velcro Tape. If you have a very Small Radio Receiver the best place to mount it, is to the back of the servo with Velcro tape. However if you have a Larger Radio Receiver then there is plenty of room to mount it on top of the Front Belt Cover with Velcro Tape. Alternatively for maximum protection of your Radio Receiver you can mount it between the Upper and Lower Chassis Plates behind the Servo and in front of the Speed Controller, but this can make it awkward to change Nicads.



The Aerial Wire of the Radio Receiver should be threaded through the Aerial Support tube provided, which should then be fixed to the Radio Receiver with insulating tape as shown in the pictures. From a Radio Interference point of view, it is best to keep the Radio Receiver and Aerial Wire as far away as possible from the Motor and Speed Controller.

## BODY & WING MOUNTING

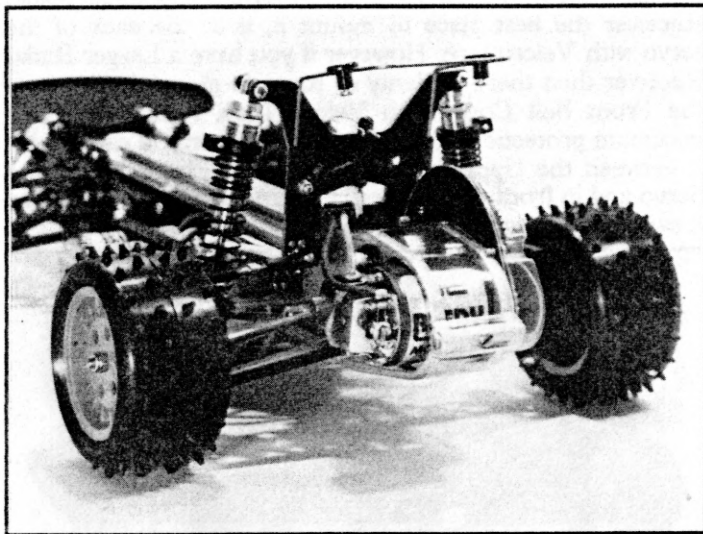




## PARTS REQUIRED

1	x	04/23	Body Clip
1	x	04/25	Wing
1	x	04/31	Wing Mounting Wire
1	x	04/32	Wing Mtg. & Rear Body Mtg. Mldg.
1	x	04/35	Body Shell - ACE
2	x	06/31	Nut M3 Self Locking
2	x	06/38	Screw No.4 x 1/4" Pan Head
2	x	22/303	Screw M3 x 12mm Cheese Head

Take the Wing & Rear Body Mounting Moulding (looks rather like a space invader), separate it and the Wing Mounting Top Hats from the moulding sprue. With a sharp knife clean up any moulding flash. Fit the Wing & Rear Body Mounting moulding to the rear of the Rear Shocker Mounting Plate, Using two M3 x 12mm screws, two M3 Self Locking Nuts and the outer 3mm holes half way up the Rear Shocker Mounting Plate.

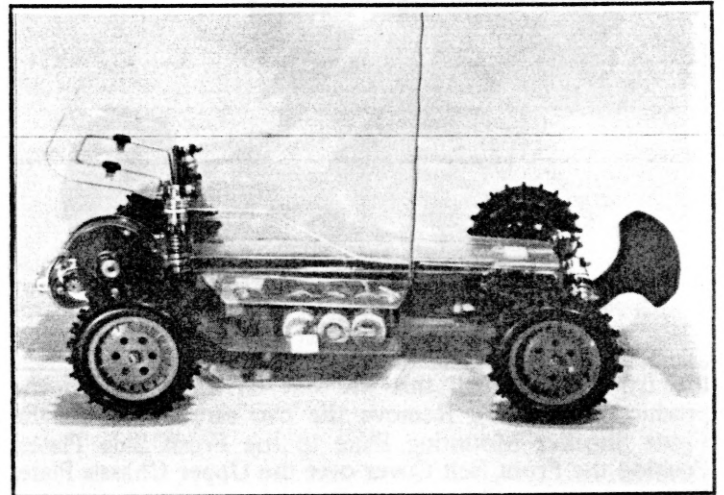


Cut out the Body Shell & Wing carefully to the trim lines, check to see whether the Body Shell fits on the car properly, a 7mm hole will need cutting in the tab at the rear of the roof for the Body Post to pass through in order that it can be fixed down with the Body Clip. The front of the body shell is held down by Velcro, but you can not do this until the body has been painted. Check that you have adequate clearance for the steering linkages. The Wing after it has been trimmed requires two 6mm holes cutting in it, approximately 30mm back from the front edge and 29mm either side of centre, these are for the wing mounting top hats to pass through and fix the wing to the wire.

Thoroughly clean the trimmed body shell and wing, with warm soapy water and dry. Mask and paint the body shell and wing (not forgetting the windows must be left clear) from the inside, using a paint that is suitable for use on Lexan (Polycarbonate), such as our range of Lexan Aerosol Paints, see price list for details. When the paint has dried, velcro can be attached to the body shell to correspond with the velcro that you fitted earlier, to the undertray and front of the top cover.

The Wing Mounting Wire now needs bending to give you the height and angle of wing you require, the higher and steeper the angle, the more stable the car will become, but also greater wind resistance, slowing down the car and using more power. We would recommend bending the wire half way up and at an angle of 100 degrees. Locate a Wing Mounting Top Hat Moulding through each hole in the wing from the top. Pass the ends of the Wing Wire from the rear through the slots in the top hat mouldings over the bends and position the wing so that the front edge of the wing lines up the bend in the wing wire. Take the two No4 x 1/4" Pan Head

Screws and screw one into the bottom of each top hat moulding to lock the wing in position on the wire. The wing can now be fitted to the Wing and Rear Body Mounting moulding.



## SET UP

### Ride Height

The lower the car is to the ground the more stable it becomes. On smoother circuits (such as grass) the car should be run lower than on more bumpy circuits. Initially set the ride height front and back to about 20 to 25mm ground clearance by adjusting the spring clamps on the shockers. It is important that the springs are adjusted the same amount on either side, other wise the car will pull to one side under acceleration. If you find when you run the car that it bounces or bounces around too much, provided the shockers are set correctly, it most probably means that you are set too low for the track conditions, and the ride height should be increased accordingly.

### Camber

Camber is the angle at which the wheels present themselves to the ground. Positive Camber is when the tops of the wheels lean outwards away from the car. Negative camber is when the tops of the wheels lean inwards towards the car. The amount of camber can be adjusted on the front suspension by putting different thickness of plate behind the front upper wishbone brackets, and on the rear suspension by adjusting the upper tie rod suspension links. The front suspension you have already set by using both sets of spacer plates behind the front upper wishbone brackets when building the car earlier. The rear suspension will need the camber checking to make sure that with full droop the wheels do not actually go into positive camber, and is even from side to side. I.E. with the wishbones pointing down as far as they will go (with shockers attached) the rear wheels are at 90 degrees to the ground, and as the wishbones are raised the tops of the wheels start to lean inwards.

### Steering

The front track rods should be set so that with the servo, servo links and bellcranks all at 90 degrees to each other, the front wheels should be pointing directly forwards at ride height. This means that with the front wheels on full droop you will have slight Toe Out, and with the suspension fully depressed you will get Toe In.

## Drive Shafts

Check that your drive shafts have been set sufficiently long so that they cannot come out of the differential drive cups over all suspension movements. But not so long as to interfere with the suspension movement. Lock drive shaft length with M3 x 4mm Socket set Screw and thread locking compound.

## Belt Tension

The belt system has been designed to allow you to run your belts very loose, the looser you can run your belts without them slipping the faster the car will go. The long front belt **must** be adjusted correctly before adjusting the rear belts. to adjust the front belt rotate the eccentric rear diff ballrace carrier mouldings evenly on both sides, there is a "O" mark on the mouldings which indicates the maximum point of offset in the moulding I.E. with the "O"s pointing forward you have the front belt set in its loosest setting and rotating the "O"s up/down will tighten the front belt. With the front belt adjusted the rear belts can be adjusted by rotating the eccentric ballrace carriers for the layshaft, again these have a couple of pips on them to help you turn them, and check that they are in even adjustment from side to side. Once the belt tensions have been set they can be locked in position by the self tapping screws for the front belt and by the M3 x 4mm socket set screw that can be got through the top edge of the rear side plates for the layshaft eccentric ballrace carriers.

## Tyres

On high grip surfaces such as grass you may wish to reduce the grip on the front by removing the outer circle of spikes from the front tyres.

## Notes

