

Stock
11.0
3.0 x 30°
8.60
7.50
7.40
0.2 RAD MAX.
3.01
3.0 DIA
3.905
CBOR

NOTE - U.
TO BE
WITHIN

11.00
Stock

Nc

SPAKE EDGE

4.99
4.97
DIA
3.8
3.7 DIA

16.1
14.30
0.5 x 30

0.8
0.7

DIA'S MARKED * TO BE
CONCENTRIC WITHIN
0.1 T.I.E.



racing products ltd.

2.00 DIA

G PROD L
TANG
RAFT L

DIFFERENTIAL

PACKS

1/10C SUPPLEMENTARY PARTS PACK 'C'

OR 1/12 SUPPLEMENTARY PARTS PACK C 2.W.D.

3/11 DIFFERENTIAL

6/10 BALLRACE PACK 2.W.D. OR 6/13 BALLRACE PACK 2.W.D.

6/11 SELF TAPPERS PACK 6/12 NUTS & BOLTS PACK

HELPFUL HINTS ON DIFFERENTIAL ASSEMBLY AND MAINTENANCE.

1. The 8BA x 1/4 screw (6/48) which fastens the half shafts together should be screwed fully into the long half shaft prior to assembly in order to check that there is no hardening scale in the hole. Immediately before final assembly of the differential, re-fit the screw into the half shaft with thread locking compound. Wipe off any excess compound and remove the screw. Now lightly grease the long half shaft where a) the large pulley fits and b) where the short half shaft fits over. The differential may now be assembled and the screw tightened. NOTE The long half shaft should be HAND HELD when tightening the screw in order to avoid over tightening.

2. Using grease lubricate all bearing and gear tooth (not the belt pulley) surfaces of the differential i.e. Small bevel gears to their pins and half shaft to large pulley. Use only a small amount of grease as it is important to prevent the belt and belt pulleys being "splashed" with grease as the differentials rotate.

3. If there is any moulding "flash" protruding from the back (large diameter) face of the small bevel gears then place the gear, large side down on a sheet of fine sandpaper and, using a circular motion, lightly sand the back until smooth.

4. If the differential action is "notchy" after assembly re-meshing the large bevel gears in a different position relative to the small ones may help. In any case don't worry, the diff will "smooth-up" after a couple of races.

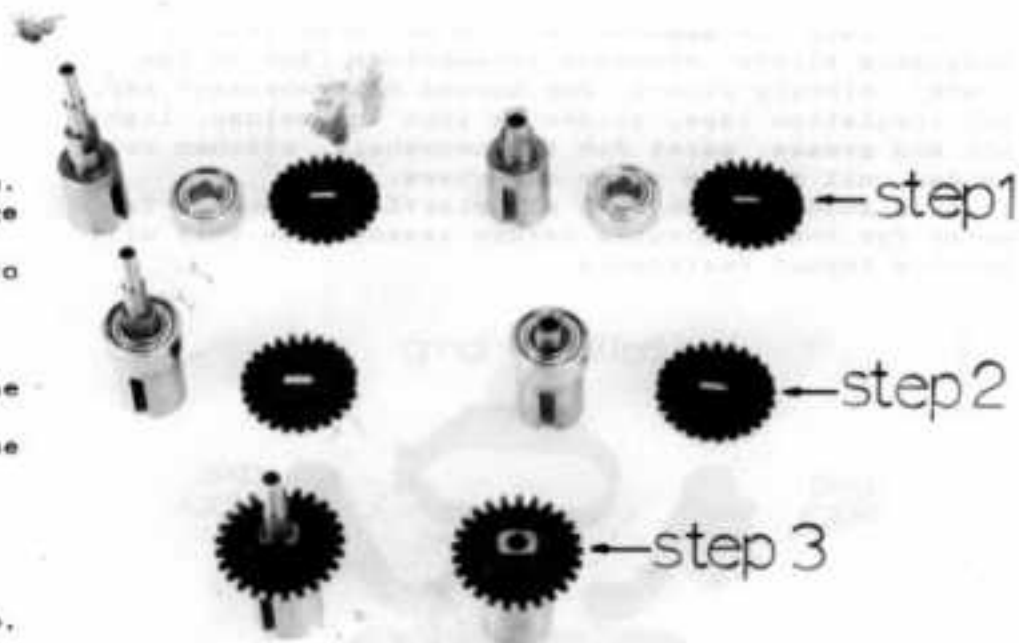
5. For identification purposes, the pins for the small bevel gears are slightly too large a diameter to fit in the slot in the half shafts. Open one of the "differential mouldings" packs (3/11) and remove the components from the runner taking care to trim off any moulding excess particularly where the gears are connected to the runner.

From the "supplementary parts C" pack (1/10C or 1/12) take three pins (6/36) 2.5mm diameter, 9.8mm long. Pass a pin through one of the small bevel gears and press the assembly into the differential pulley. Check that the bevel gear rotates freely. Repeat for the other two small bevel gears. If the small bevel gears do not rotate freely it may be that the back of the gear is not smooth or that the hole for the pin is slightly small. A light chamfer at each end of the hole should solve the problem.

Now take a "long half shaft" (3/22) and a "short half shaft" (3/23) from the "supplementary parts pack C" (1/10C or 1/12). Check that the large plastic bevel gears will fit onto the half shafts. From the "ballrace pack" (6/10 or 6/13) take two 6mm by 13mm ballraces (6/20) and fit them fully onto the two half shafts. Now fit the large plastic bevel gears to the half shafts so that the large diameter back of the gear fits against the ballrace.

Lightly chamfer the edge of both sides of the central hole in the large differential pulley. Push the long half shaft through the central hole in the large differential pulley and engage the teeth of the three small bevel gears with those of the large bevel gear. Check that the assembly turns freely. Now fit the short half shaft over the protruding end of the long half shaft and secure with a 8BA x 1/4" socket screw (6/48) taken from the "nuts and bolts pack" (6/12). This screw fits through the short half shaft and into the threaded hole in the end of the long half shaft. Check that the differential is free in operation.

The separate large pulley flange should now be fastened to the pulley with three no.2 x 1/4 pen head self tapping screws (6/24). Note that the chamfered edge of the flange should face towards the pulley. If you are building a 4 wheel drive car then repeat the procedure for the other differential.



spray with RP1



AXLE BLOCKS, AXLES & WISHBONES
PACKS

3/15 BATTERY CLAMP/AXLE BLOCK
 1/10A SUPPLEMENTARY PARTS PACK A
 1/10B SUPPLEMENTARY PARTS PACK B
 OR 1/13 SUPPLEMENTARY PARTS PACK R-2 WHEEL DRIVE
 6/10 BALLRACE PACK 4W.D. OR 6/13 BALLRACE PACK 2.W.D.

TIPS WHEN ASSEMBLING AXLE BLOCKS

- 1) Make sure that you keep the axle in line with the kingpin holes when threading the holes.
- 2) DO NOT use a 8mm tap to thread the kingpin holes as you will weaken the finished assembly.
- 3) The kingpin ball ended screws should be tightened until the flange is in contact and then at most a further 1/8 turn. Over-tightening will cause failure.
- 4) The axle should have about 0.25mm to 0.5mm end float when assembled.
- 5) Do not over-tighten the wheel nuts onto the wheel drivers as you will cause damage.

Take the two axle blocks and the three wheel drivers from each of the two "Battery Clamp and Axle Block Packs" (3/15) and remove any moulding "flash" with a sharp knife. Put the battery clamp to one side - you will need it later.

NOTE: You have been provided with six wheel driver mouldings, two are supplied as spares - you only need four to build the Mini Mustang.

ASSEMBLY INSTRUCTIONS

From the "supplementary parts pack A" (1/10A) remove the eight large kingpin ball ended screws (2/24). These may be identified by their larger diameter (8mm) thread. These kingpin ball ended screws are to be fitted into the cylindrical bosses at the top and bottom of each axle block. If you have an 8mm across flats box spanner or nut runner it is a simple matter to screw the kingpin ball ended screws directly into the axle blocks.

If you do not have a box spanner or if you have difficulty in fitting the ball ended screws you may wish to pre-thread the holes in the following number. Take an axle (2/26) from the supplementary parts pack B (1/10B) and a wishbone pivot pin (2/23) which is 3/32 (2.36mm) diameter and 47mm long from supplementary parts pack A (1/10A). Place the pin in the slot of the axle and using the pin as a tommy bar screw the axle into the kingpin hole in the axle block until the end of the axle just shows through the other side. This is probably the difficult part of the building sequence so please take your time.

Try to keep the axle in line with the hole during this operation, and when complete remove the excess plastic which has been produced at the ends of the hole. Repeat this step for all eight kingpin holes. The eight kingpin ball ended screws may now be fitted and tightened until the flange is touching the axle block.

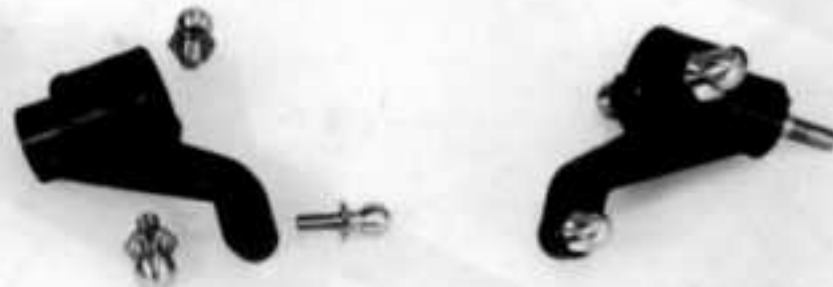
4 WHEELDRIVE

From the ballrace pack (6/10 or 6/13) take eight 5mm inside diameter x 10mm outside diameter ballraces. Note:- You should only have two ballraces left from this pack, they are for the layshaft and will be required later.

Fit a ballrace part way into the outside (small diameter) of the axle block, fit another ballrace to the axle and push all the way on. Now fit the axle/ballrace assembly through the large diameter side of the axle block, through the ballrace in the small side and push fully home. The outer ballrace may now be fully inserted and taking a drive pin (6/39) which is 2mm diameter and 11.8mm long, from the supplementary parts pack B (1/10B), fit it through the cross hole in the outside end of the axle. The pin will start from one side easily but may require pliers to push to its final position with an equal amount protruding either side of the axle.

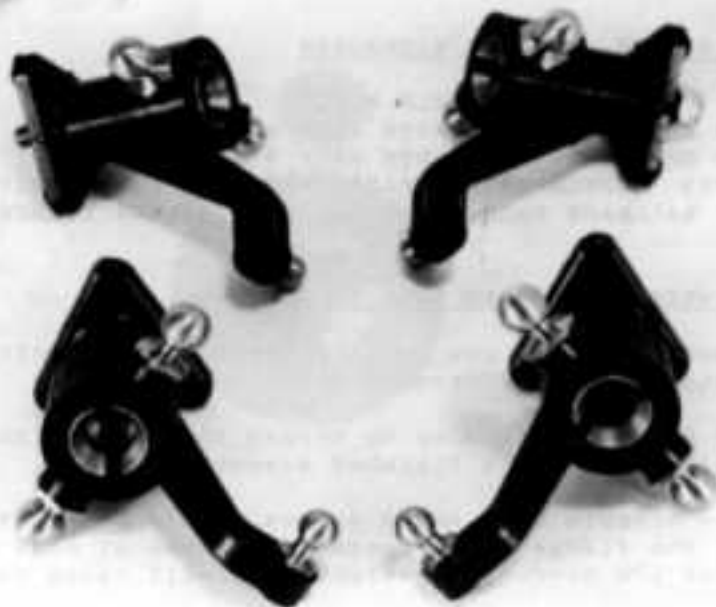
2 WHEELDRIVE

The 2 wheel drive front axles are slightly different and should be assembled as follows. Fit an 'E' clip to the groove in the end of an axle, then fit a ballrace to axle block outer (small) end and to the axle. Pass the threaded end of the axle through the inside of the axle block and the ballrace in the outside end. Secure the axle with a cross pin as in the 4 wheel drive axle block.



Now take four 16mm long ball ended crews (2/31) from the supplementary parts pack B (1/10B or 1/13) and screw one into the hole in the end of each steering arm.

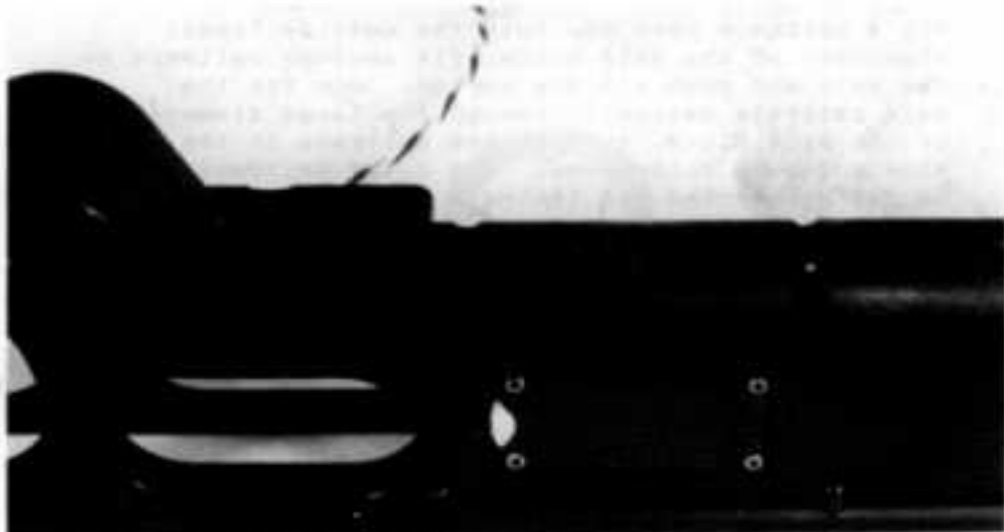
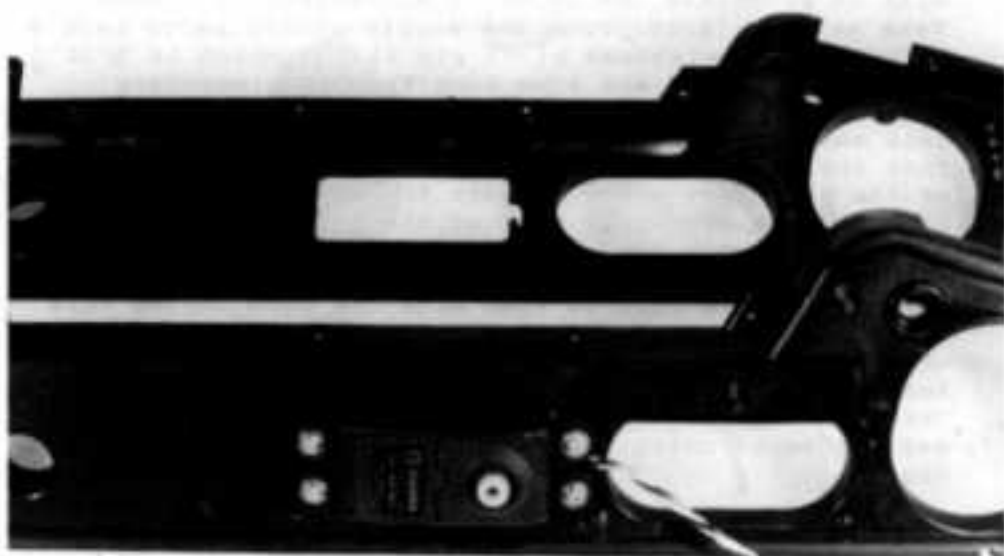
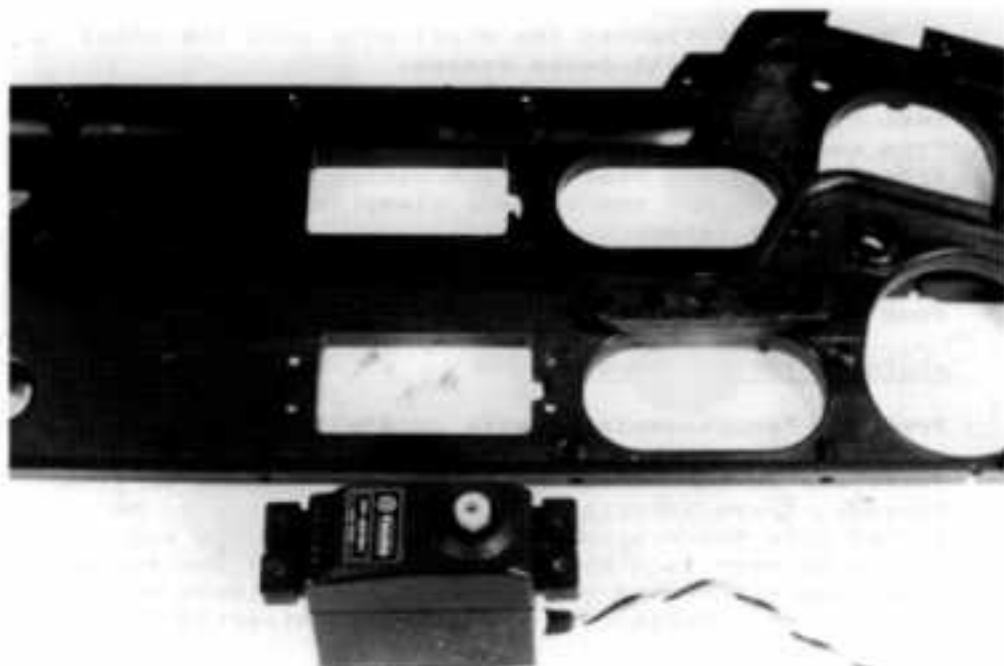
The triangular wheel drivers should now be fitted with the cross slot facing and lined up with the drive pin. When the wheel driver is fully home the drive pin is almost totally enclosed. If you cant push the driver fully on dont worry as it will go home when the wheel is fitted later. Now fit an M4 self locking nut (7mm across flats) to each axle to keep the assembly secure during the rest of the building process.



CHASSIS MOULDINGS & DRIVE PACKS

4/10 BUMPER & B'CRANK 1/11 CHASSIS MOULDINGS
1/10C SUPPLEMENTARY PARTS PACK C
OR 1/12 SUPPLEMENTARY PARTS PACK C 2.W.D.
6/11 SELF TAPPERS PACK

Before assembling the chassis mouldings it is a good idea to fit your steering servo to the left hand side chassis moulding. The left hand side moulding is the one which has the raised rectangular section just above the oval battery hole. Depending on the size of your servo it may be necessary to make additional cut out in the chassis mouldings (possibly both sides) but please make sure that your servo does not protrude more than 1mm above or 2mm lower than the moulded hole. If the servo lead comes from the bottom of the servo case it may be necessary to cut the right hand side chassis moulding to clear the wire. Use the screws provided with your radio equipment to secure the servo to the left hand side chassis moulding.



IDLER PULLEY/BRACKET ASSEMBLY

From the "bumper & bellcrank pack" (4/10) remove the 14mm diameter by 11.5mm long belt tensioner pulley and the two 2mm inside diameter "top hat" bushes. After removing any excess moulding "flash" put a little grease in the pulley, fit the bushes to the pulley and using the 2mm diameter by 20mm long pin and the belt adjuster carrier from the "supplementary parts pack C" (1/10C or 1/12) fit the pulley to the belt adjuster carrier.

Check that the pulley assembly rotates freely.

4 WHEELDRIVE

Fit a 6BA grub screw (6/29) to the 15 groove belt drive pulley and make sure that this screw is uppermost when the pulley is fitted.

Take the left hand chassis moulding (the side with the battery contact fitting moulded in) and install the front and rear differentials, the belt tensioner assembly, the main drive pulley (3/10) and the belt (3/30).

The photograph shows the correct way in which the belt should be routed around the various transmission components.

It is important that the belt tensioner assembly is located on the raised boss inside the chassis moulding.

2 WHEELDRIVE

Take the left hand chassis moulding and install a 20mm long, 2mm diameter pin into the small hole between the motor clearance hole and the battery hole. Fit a 6mm diameter by 11.2mm long plastic roller from the bumper and bellcrank pack onto this pin with a little light oil. Note: Check that this pulley is still free running after chassis assembly it may be necessary to adjust the length slightly to give 0.5mm (0.020in) end float.

Assemble the Idler pulley/adjuster carrier as detailed above. The differential should be installed together with the belt tensioner/bracket assembly and the main drive pulley. The photograph shows the correct route that the belt should follow round these items. Please check that the grub screw in the main pulley is uppermost. In the supplementary parts pack you will also find two red blanking discs, these should be fitted to block the holes in the chassis mouldings which would have been used for the front differential ballraces.

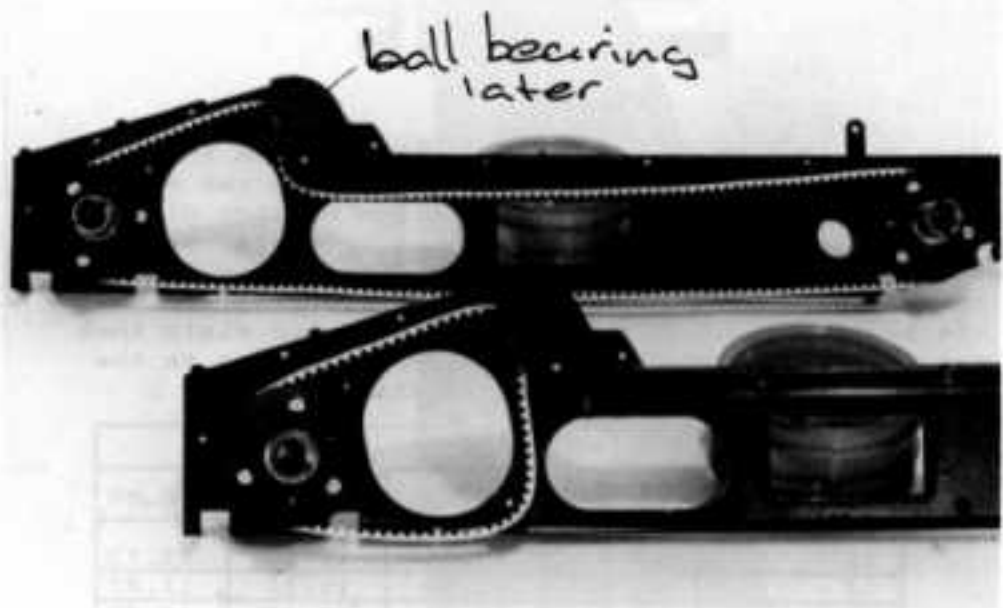
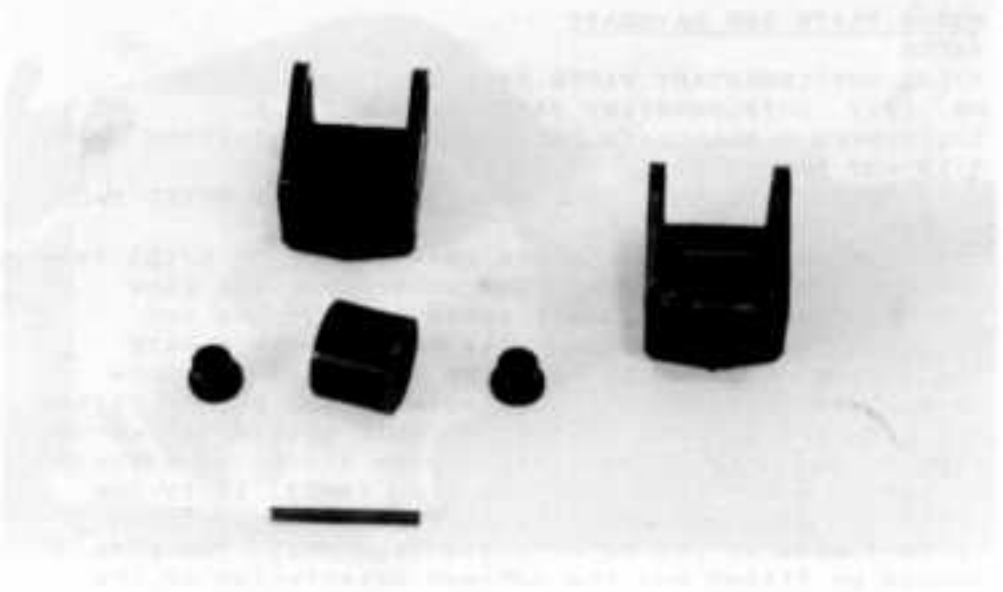
GENERAL

Do not worry if the main pulley appears to be very loose it cannot easily escape when the two chassis mouldings are fixed together. Taking care that the main pulley and the belt tensioner are correctly positioned install the right hand chassis moulding and secure with six No.2 x 1/4" self tapping screws. Do not over-tighten these screws or you will strip the chassis moulding.

If you do strip the self tapping screws it is easy to replace them with either 8BA nuts and bolts or 2mm nuts and bolts.

The fixing holes at the extreme front and rear of the chassis mouldings are intended for M2 by 10mm bolts and nuts. The bolts should be fitted from the same side as the self tapping screws and the nuts will then locate in the hexagonal holes in the other moulding.

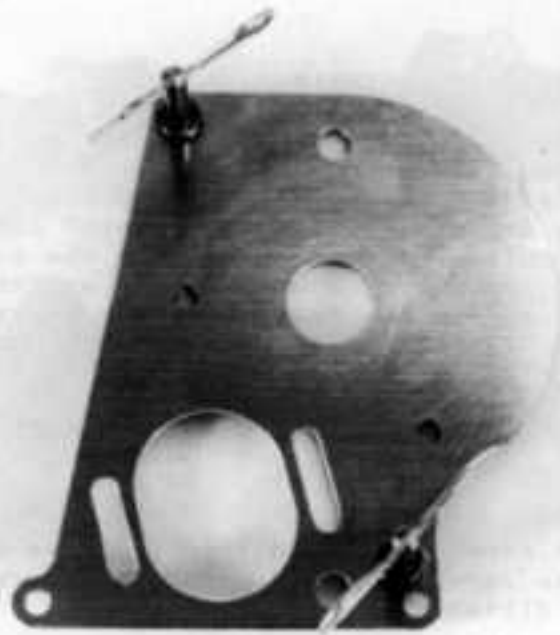
It is a good idea to stick pvc tape round the inside of the battery and motor holes in order to close off the gap between the chassis sides. This will keep the belt and differentials better protected against dust and dirt.



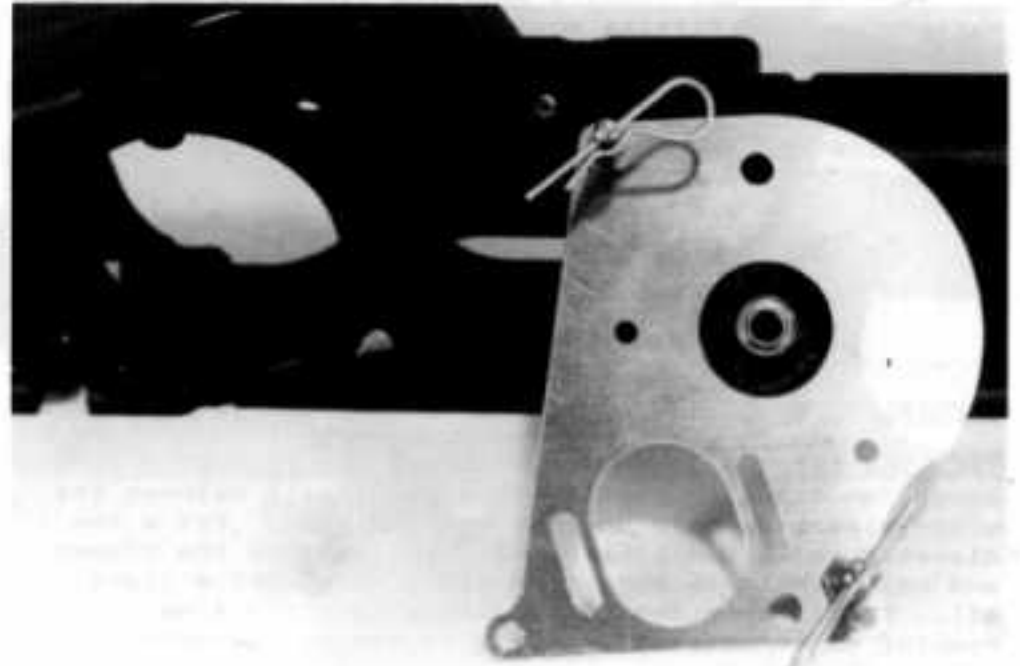
**MOTOR PLATE AND LAYSHAFT
PACKS**

- 1/10C SUPPLEMENTARY PARTS PACK C
- OR 1/12 SUPPLEMENTARY PARTS PACK C 2.W.D.
- 4/10BUMPER & BELLCRANK PACK 6/11 SELF TAPPERS PACK
- 6/12 NUT & BOLT PACK
- 3/13 GEARBOX PACK OR 3/14 SINGLE SPEED PACK

From the supplementary parts pack (1/10C OR 1/12) take the two 3mm diameter gear box cover mounting pins (03/76) these have a small cross hole in the end opposite the thread. You will need to fit a clip (04/23) to each pin in order to make sure that the cross hole is correctly aligned when the pin is fitted. The pins are secured with a 3mm thin nut (6/34) either side of the motor plate, these nuts should be adjusted so that the underneath of the clip (4/23) is 11.5mm above the motor plate. The photograph shows the correct side of the motor plate upon which the pins should be fitted and the correct orientation of the clips.



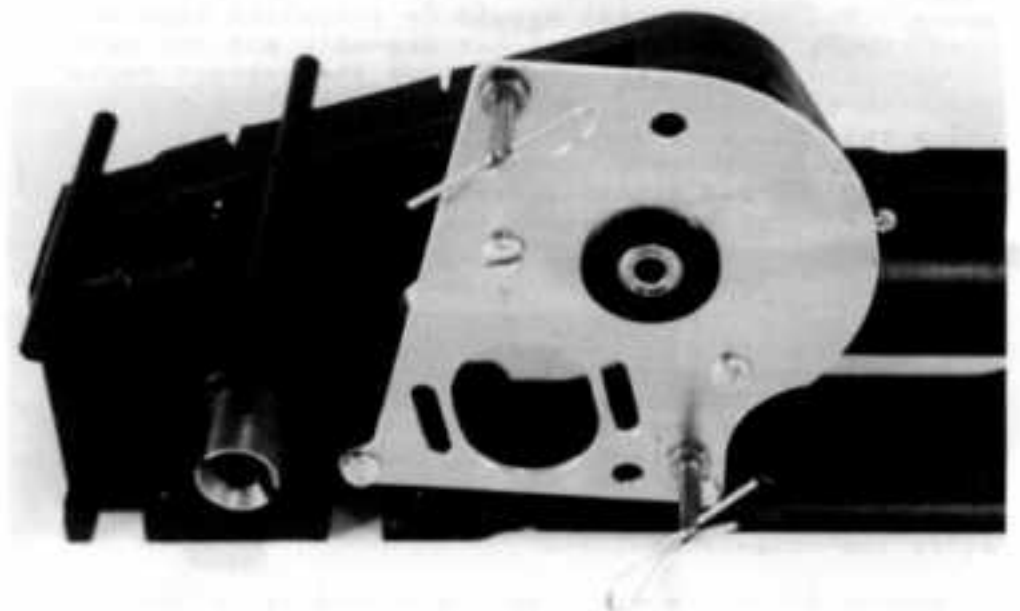
Take the 17mm diameter bearing housing from the bumper and bellcrank pack and install one of the two remaining ballraces (4mm inside diameter x 8mm outside diameter) then fit this assembly into the motor plate, check that you have the bearing in the same side of the plate as the gearbox cover mounting pins, see photograph. If the bearing housing is loose in the motor plate then apply a small quantity of cyanoacrylate glue to the assembly to guarantee a firm location.



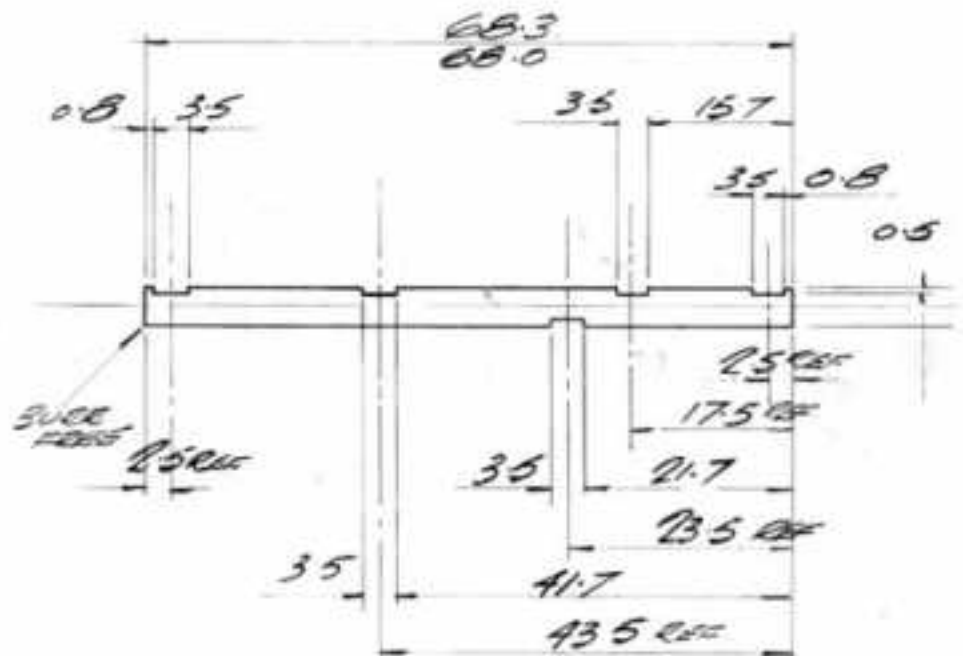
| MOTOR PINION TEETH | OVERALL RATIOS | | | |
|--------------------|----------------|-------|-------|-------|
| | 54.00 | 56.00 | 58.00 | 60.00 |
| 11 | 11.45 | 11.88 | 12.30 | 12.73 |
| 12 | 10.50 | 10.89 | 11.28 | 11.67 |
| 13 | 9.69 | 10.05 | 10.41 | 10.77 |
| 14 | 9.00 | 9.33 | 9.67 | 10.00 |
| 15 | 8.40 | 8.71 | 9.02 | 9.33 |
| 16 | 7.87 | 8.17 | 8.46 | 8.75 |
| 17 | 7.41 | 7.69 | 7.96 | 8.23 |
| 18 | 7.00 | 7.26 | 7.52 | 7.78 |
| 19 | 6.63 | 6.88 | 7.12 | 7.37 |
| 20 | 6.30 | 6.53 | 6.77 | 7.00 |
| 21 | 6.00 | 6.22 | 6.44 | 6.67 |
| 22 | 5.73 | 5.94 | 6.15 | 6.36 |

The motor plate assembly should now be fitted to the chassis mouldings assembly with four no.4 x 1/4" pan head screws as shown.

Fit a 4mm inside diameter by 8mm outside diameter ballrace to the left hand side chassis moulding (opposite the motor plate bearing).

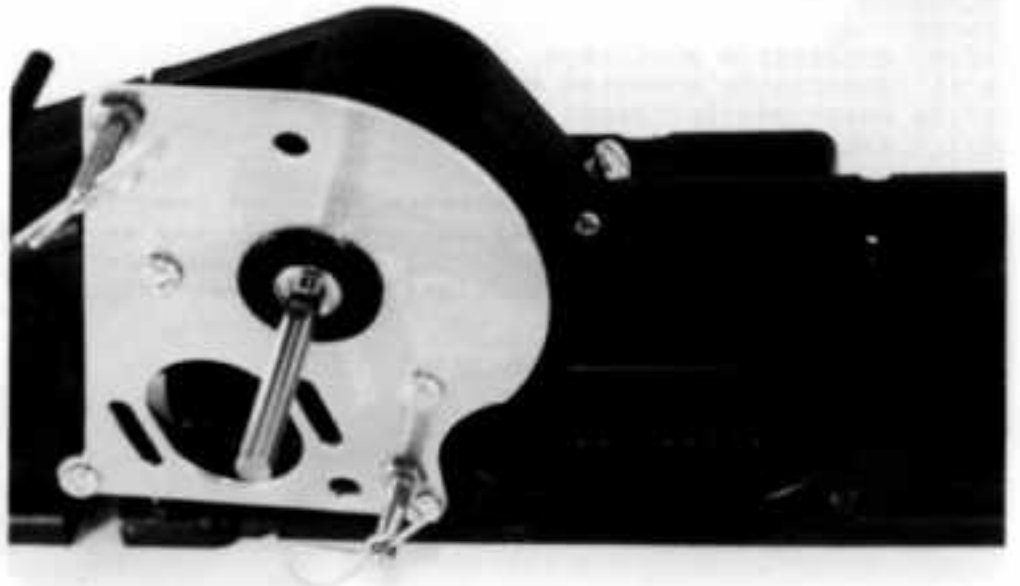


Take the layshaft (03/34) from the gearbox pack (3/13) or the single speed pack (3/14) and identify the right hand (drive) end, it has three flats within the first 26mm, one of which is on the other side of the shaft to all the others. The drawing shows the positions of all the location flats.



Holding the right hand end of the layshaft pass the other end through the motor plate bearing, the main drive pulley and the bearing in the left hand chassis moulding. With 28.5mm of the layshaft protruding from the motor plate bearing locate the pulley grub screw on the flat provided and tighten down with the pulley centrally located between the chassis sides.

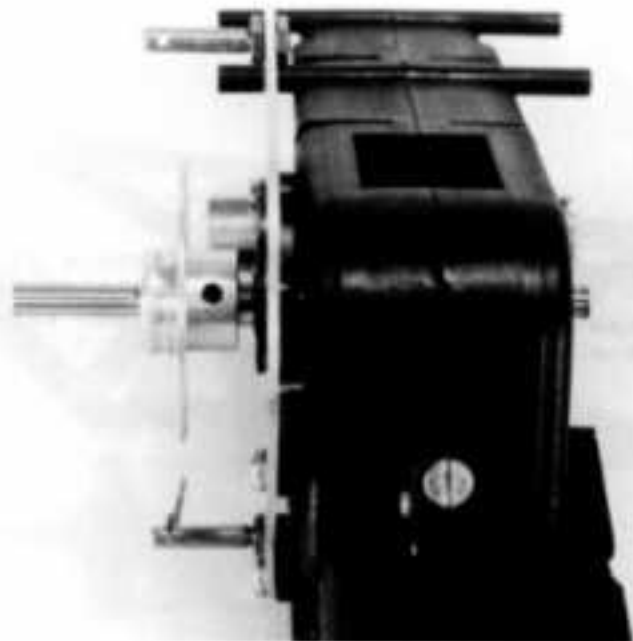
From the nuts and bolts pack (6/12) take a 3mm diameter by 16mm long bolt (cheese head) and screw it into the angled hole formed by the two chassis sides just in front of the layshaft. This screw is the belt tension adjuster and should be progressively tightened until the belt tension begins to cause detectable additional resistance when turning the layshaft by hand. Take care when first inserting this bolt that it correctly locates on the belt tensioner carrier.



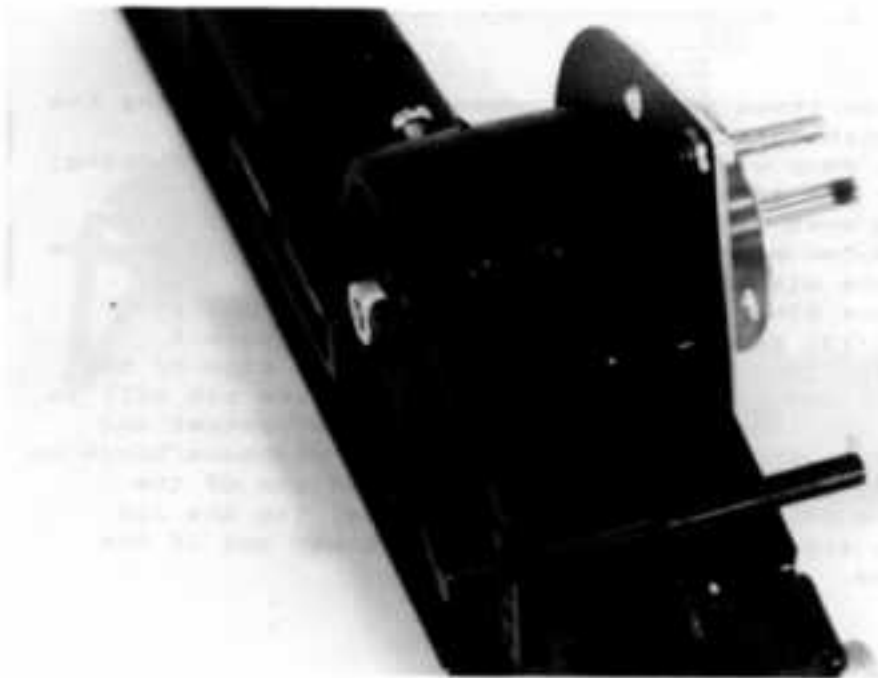
If your Mini Mustang has a two speed gearbox then please refer to the separate sheet for details of how to assemble, fit and adjust the unit.

LAYSHAFT INSTALLATION - SINGLE SPEED

Take the 1.8mm long spacer (3/73) from the single speed pack (3/14) and fit it to the motor plate end of the layshaft, the gear carrier (3/62) should now be fitted with the circlip groove facing away from the motor plate. When the gear carrier is touching the spacer and the main drive pulley (3/10) is central in the chassis mouldings (not touching either side), secure the gear carrier by means of a 6BA grub screw which should locate on the flat provided on the layshaft.



The 8mm outside diameter by 4mm inside diameter collar (3/37) may now be fitted to the other end of the layshaft and secured with a 6BA grub screw. Adjust this collar to allow about 0.2mm (0.010inches) side to side movement of the layshaft.



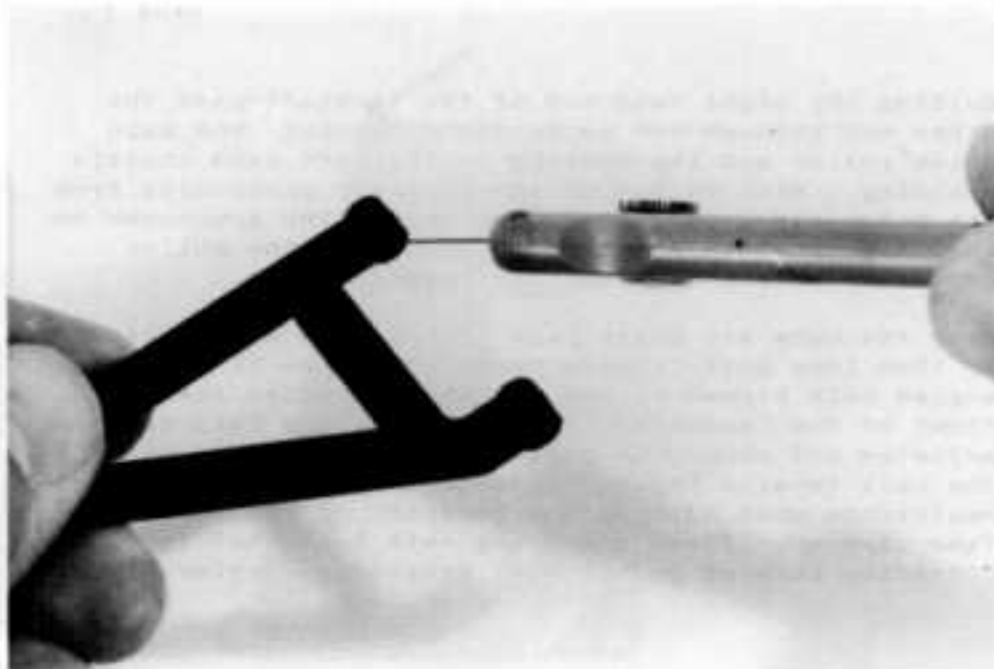
The plastic ring gear should now be taken from the single speed pack and checked for moulding flash. It is a good idea to lightly chamfer the edges of the central hole to allow easy installation. The hollow side of the gear should now be fitted to the gear carrier and the three locating pips on the gear engaged with their holes in the carrier. Use a large circlip (6/47) to secure the gear in place. Check that the circlip is correctly fitted in the groove in the gear carrier.



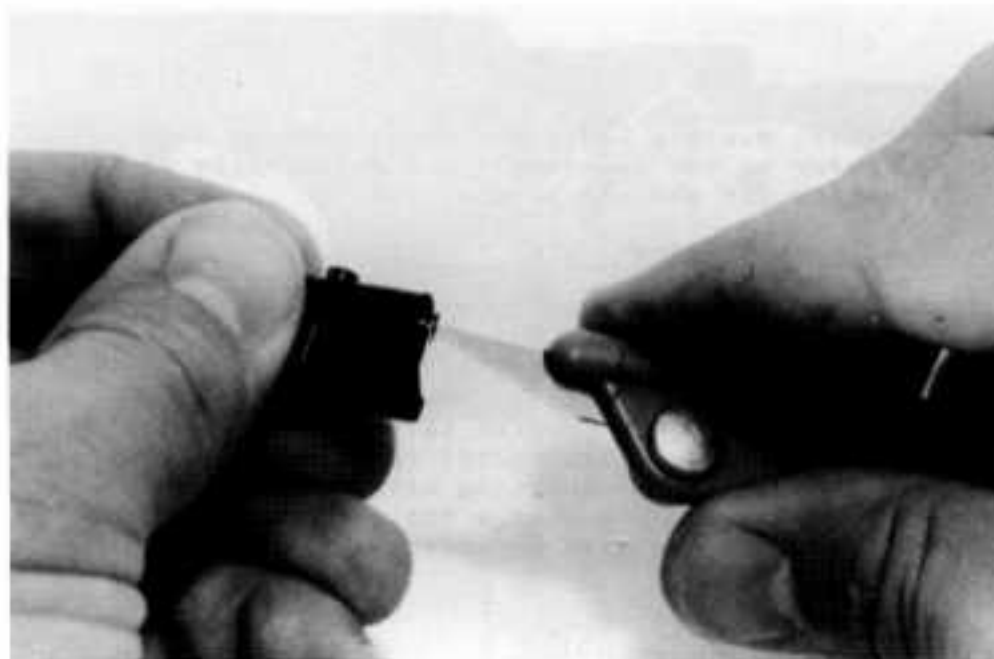
**WISHBONE
PACKS**

2/10 SUSPENSION MOULDINGS.
 2/11 SUSPENSION MOUNTING MOULDINGS.
 1/10A SUPPLEMENTARY PARTS PACK A.
 6/11 SELF TAPPERS PACK.

Take the four short upper wishbones from the two suspension mouldings packs (2/10) and remove any excess moulding flash. The inward facing ends of the holes for the pivot pins should be lightly chamfered using a very sharp modelling knife.



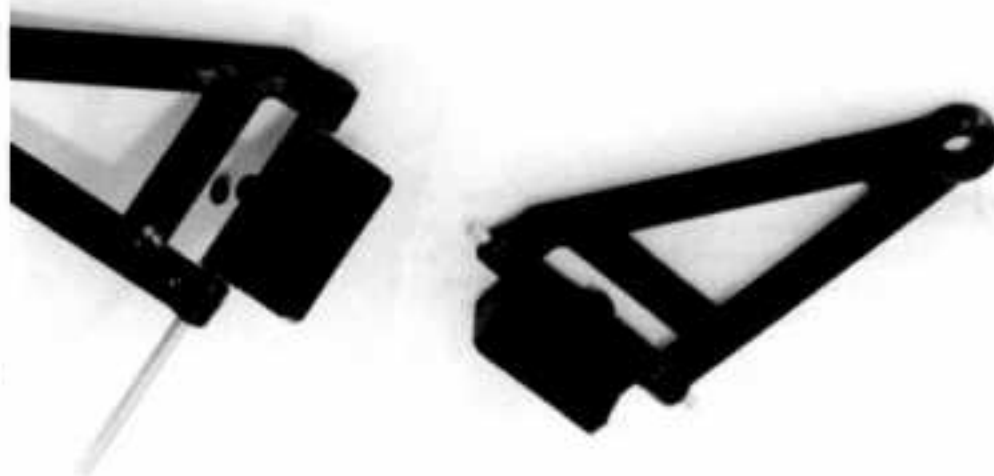
Now remove the four "L" shaped upper wishbone pivot brackets from the suspension mounting mouldings packs (2/11) and, again, remove any moulding flash especially from the bottom of the central cross hole.



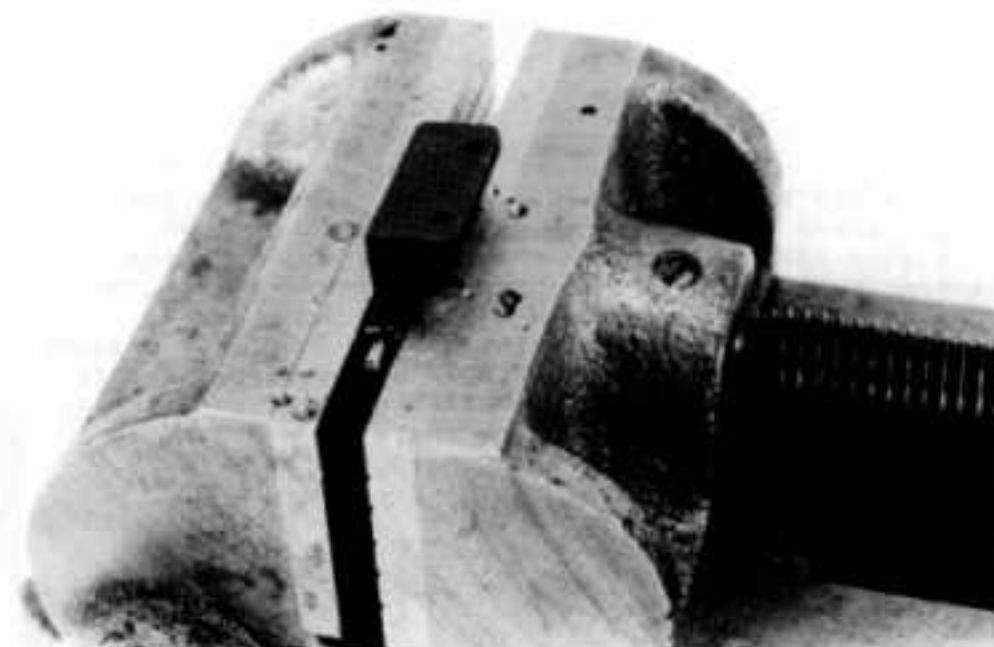
There are three things to remember when assembling the upper wishbones to their mounting brackets:

- 1) All four wishbones have the straight (non-sloping) edge at the front.
- 2) You must produce both left and right hand sets.
- 3) The two mounting holes in the pivot blocks must be above the wishbone.

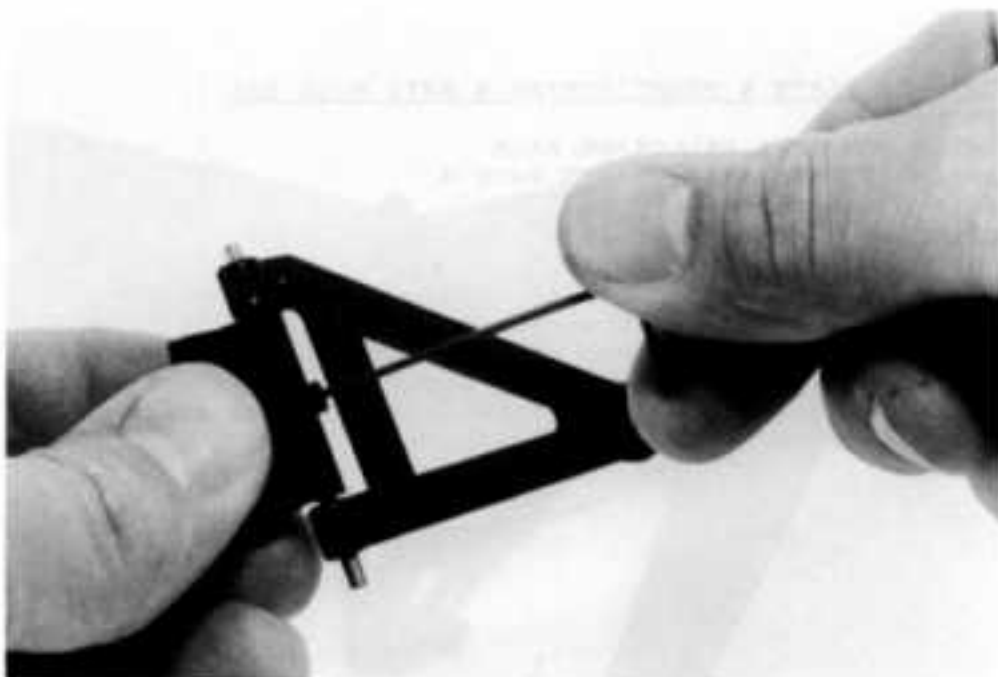
Take four 47mm long by 3/32 diameter wishbone pivot pins (2/23) from the supplementary parts pack A (1/10A). Insert a pivot pin through one side of the wishbone and into the mounting bracket the pin will go easily approximately half way in to the bracket and then meet firm resistance. Stand the wishbone/block on end and, after checking that the lower end of the wishbone is in line with the pin hole, tap the pin through the bracket and out of the lower end of the wishbone.



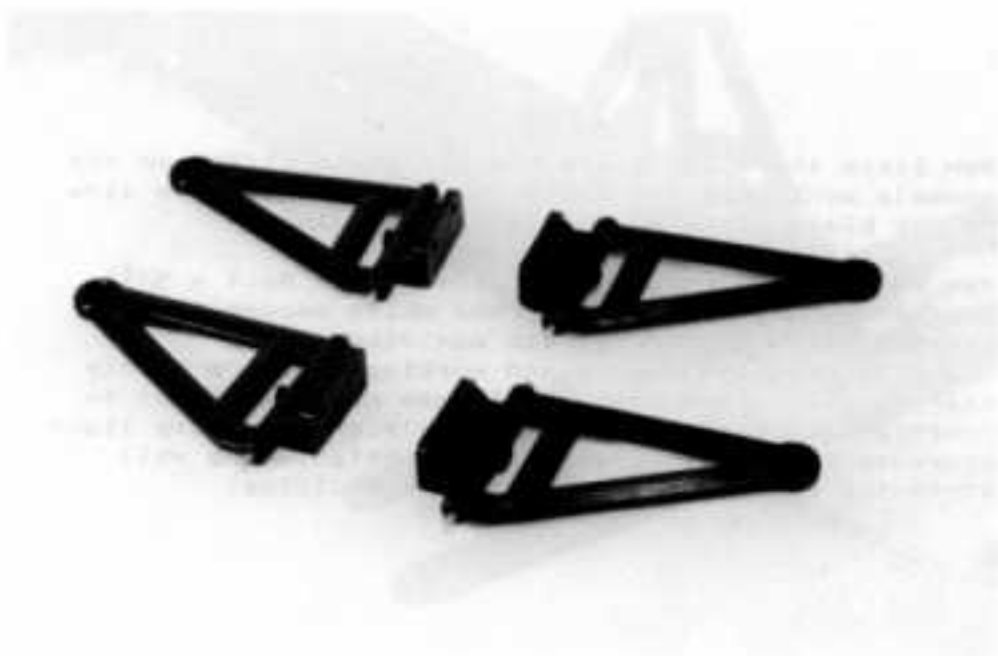
If the wishbone does not move freely on the pivot then gently squash the assembly in a vice, as shown, until the wishbone pivots under its own weight.



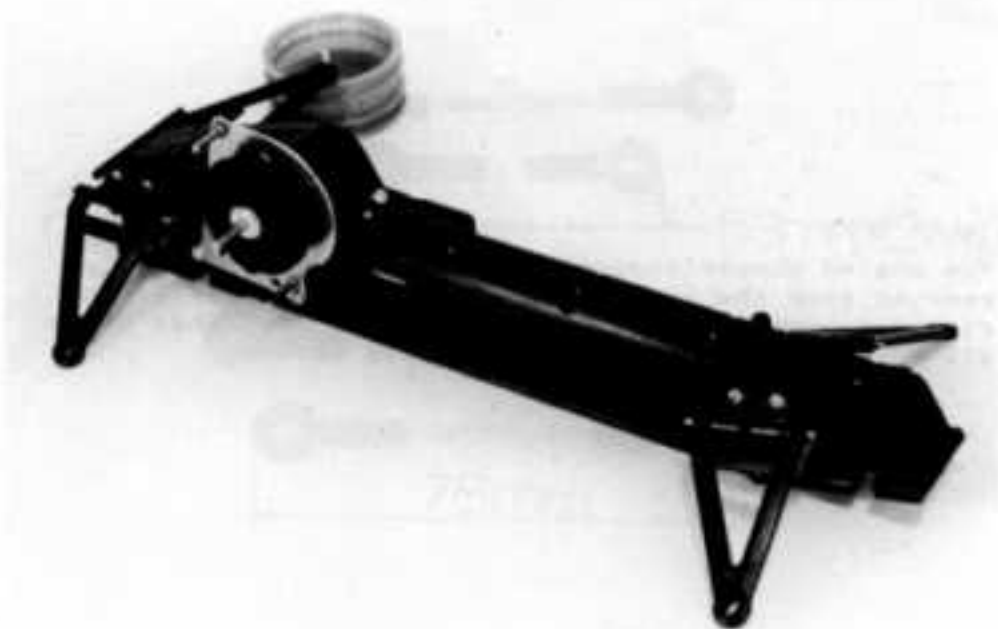
Secure the pivot pin by means of a 6BA grub screw as shown. Repeat for all four upper wishbones.



The photograph shows four upper wishbones assembled to their mounting brackets. You should make four assemblies which look the same as the photograph.

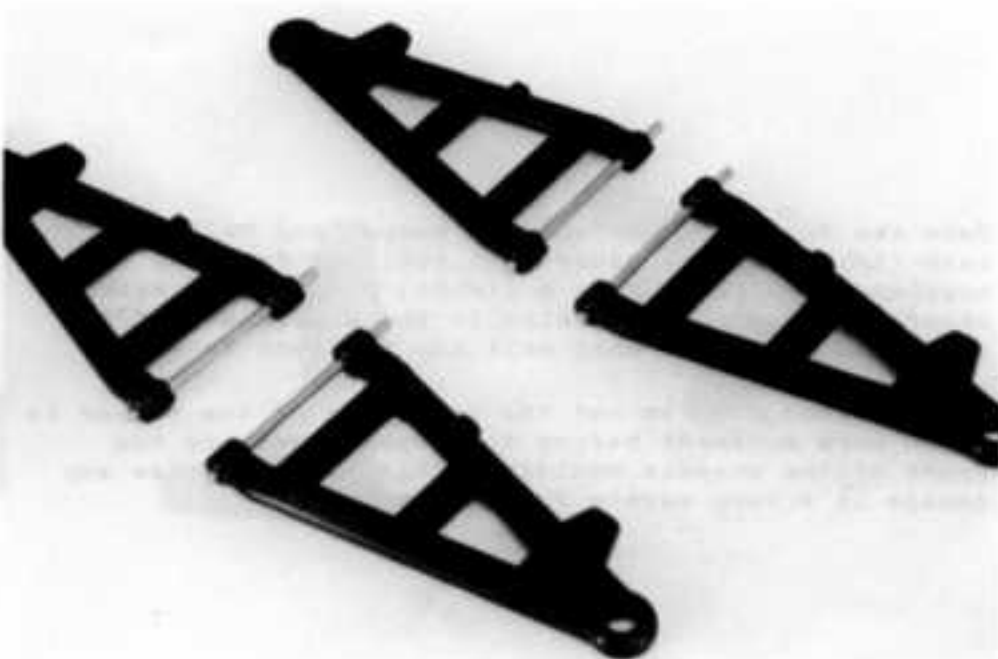
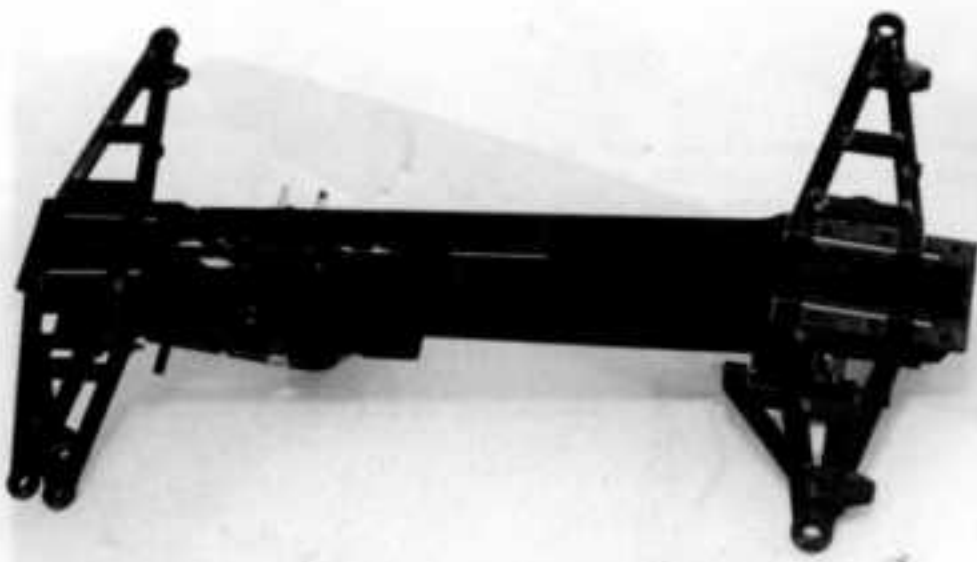


Fit the upper wishbone assemblies to the chassis mouldings using four lots of two No.4 by 3/8" screws.



Now take the four long lower wishbones from the suspension mouldings pack (2/10), de-flash then fit the pivot pins (2/23) as for the upper wishbone.

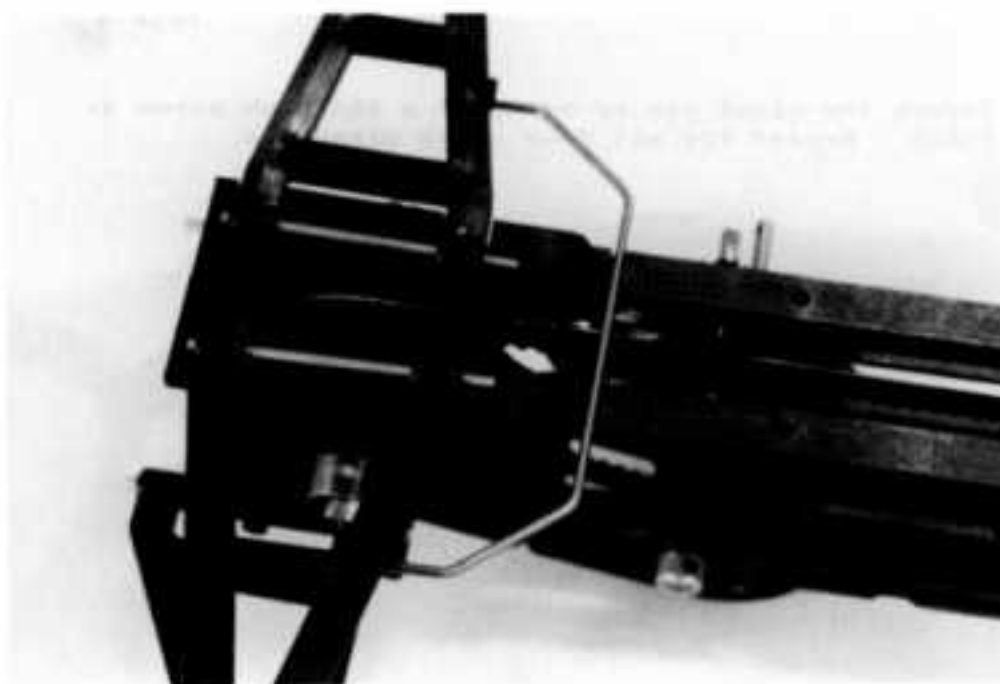
These assemblies now fit into the grooves in the underside of the chassis mouldings. Make sure that the projection on the outer end of the wishbone faces forward.



CHASSIS PLATE & FRONT BUMPER & ANTI ROLL BAR
PACKS

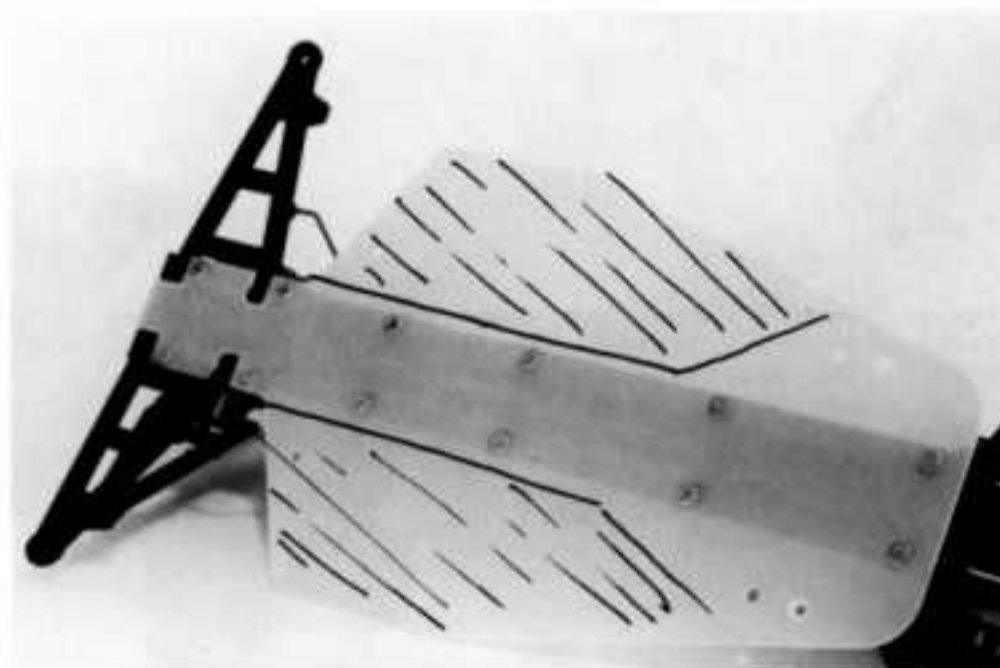
4/10 BUMPER & BELLCRANK PACK
 1/10A SUPPLEMENTARY PARTS PACK A
 6/11 SELF TAPPERS PACK
 2/10 SUSPENSION MOULDINGS

Place the chassis mouldings upside down on the work bench and, from the supplementary parts pack A (1/10A) take one of the two anti roll bars which are "U" shaped and made of 1.6mm diameter spring wire. Place the anti roll bar across the chassis mouldings in the groove just in front of the rear wishbones.

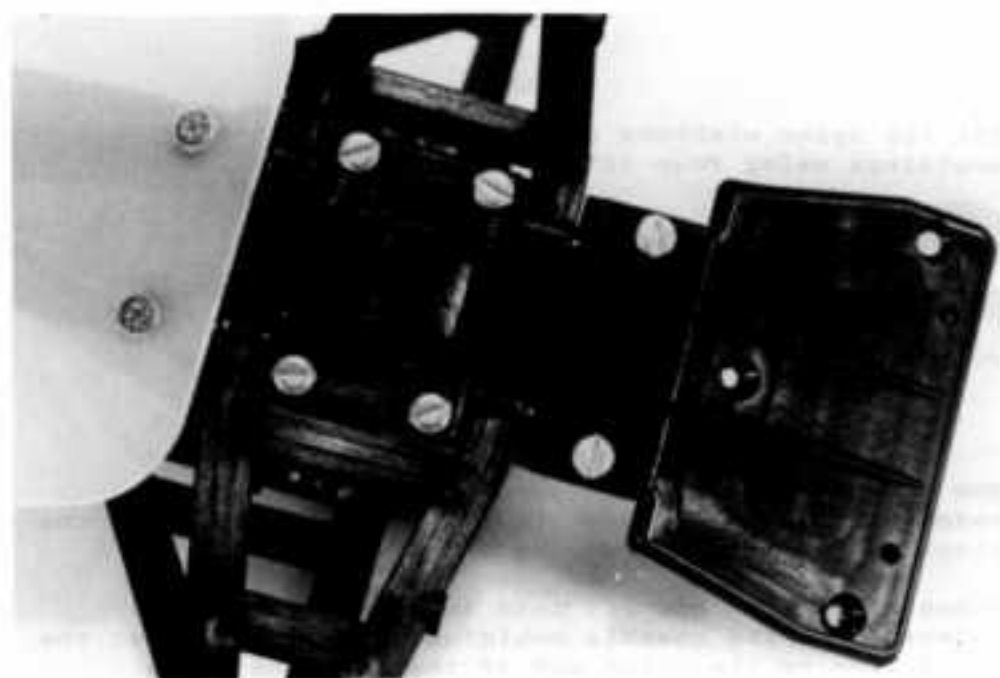


Now place the epoxy glass chassis plate (1/22) on the chassis mouldings and check that the countersunk side of the plate faces away from the mouldings.

Now fit, but do not tighten, the twelve No.4 x 5/16 countersunk self tapping screws which secure the chassis plate to the chassis mouldings. Starting from the centre and working outwards gently tighten all twelve screws. Please be careful not to overtighten these screws, they only require very light pressure to tighten properly. Overtightening will strip the screw out of the chassis moulding.

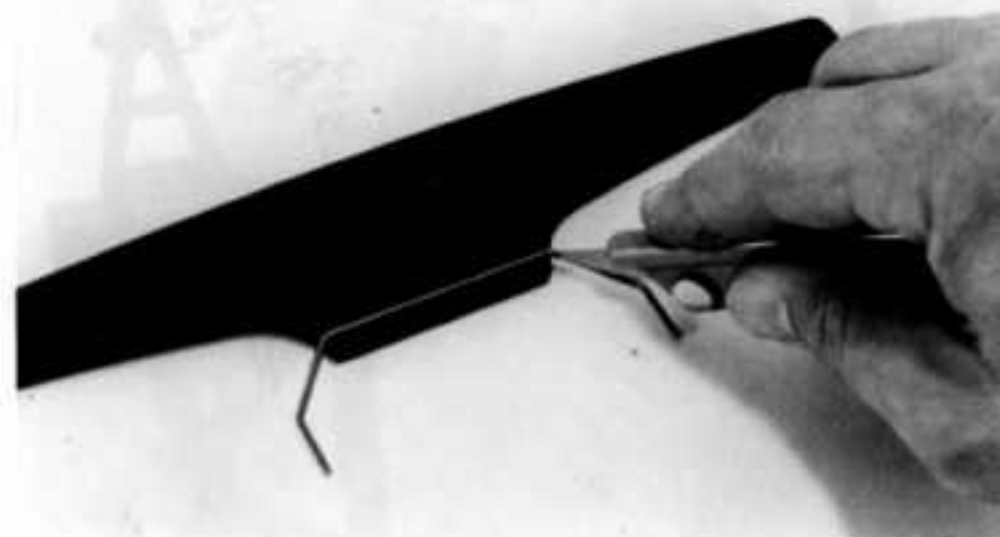


The angled bumper support moulding should now be removed from the bumper and bellcrank pack (4/10) and fitted to the underside of the chassis mouldings using six No.4 x 3/8 pan head self tapping screws.

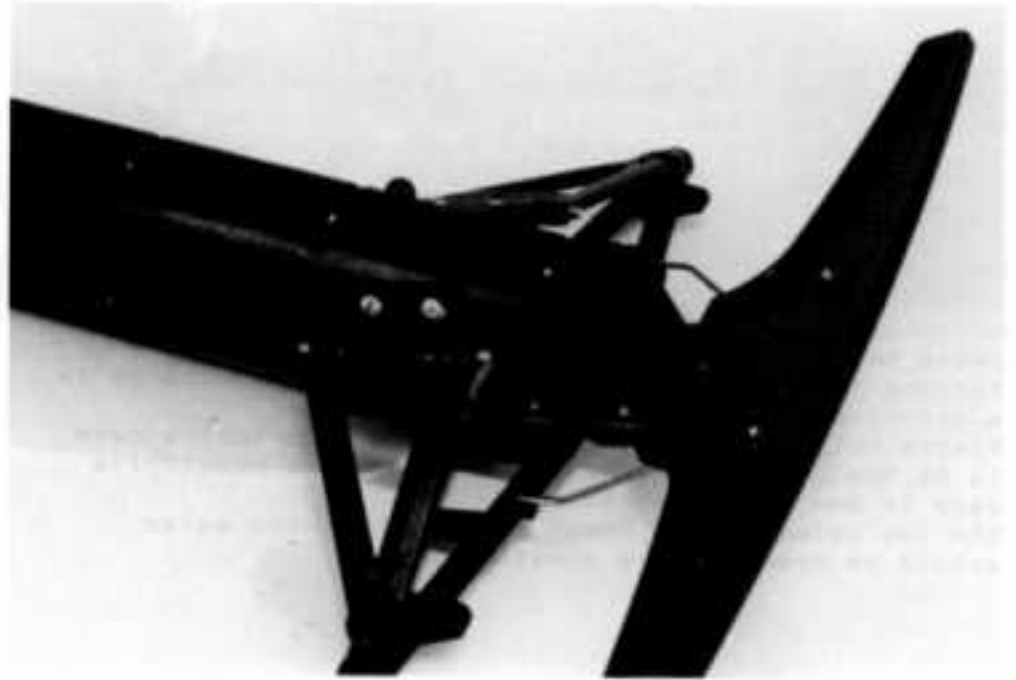


Take the front bumper from the bumper and bellcrank pack (4/10) and the other anti roll bar from the supplementary parts pack A (1/10A) and, if necessary chamfer the ends of the slot in the underneath of the bumper to allow the anti roll bar to pivot freely.

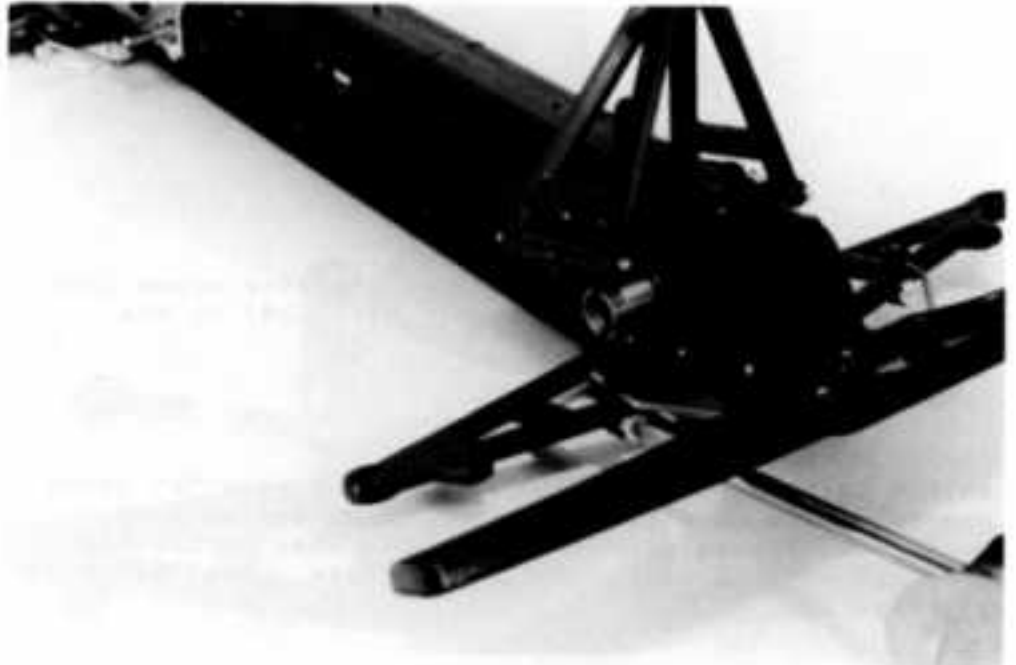
It is a good idea to cut the rear edge of the bumper to allow more movement before the bumper contacts the front of the chassis mouldings. This will minimise any damage in a very severe frontal impact.



The bumper/anti roll bar assembly should now be fitted to the bumper bracket by means of three No.4 x 5/16 countersunk self tapping screws.



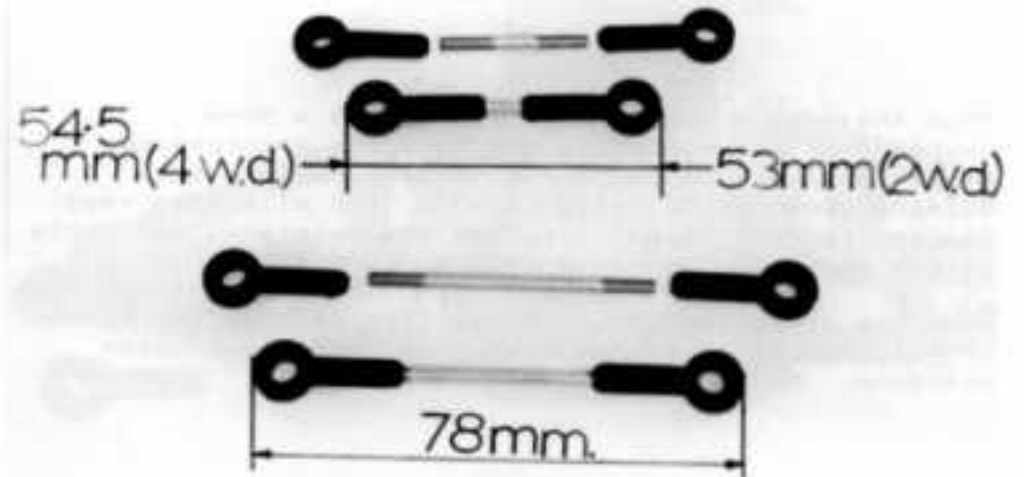
The remaining parts of the four suspension mouldings packs (2/10) should now be removed from the runner and de-flashed, you should have four drive shaft retainers, eight trackrod end mouldings and four anti roll bar link mouldings. Place the track rod ends and retainers to one side and fit the anti roll bar links to the wishbones using four No.4 x 3/8" self tapping screws taking care that the tapered holes in the links are fitted over the anti roll bars. Fully tighten the screws.



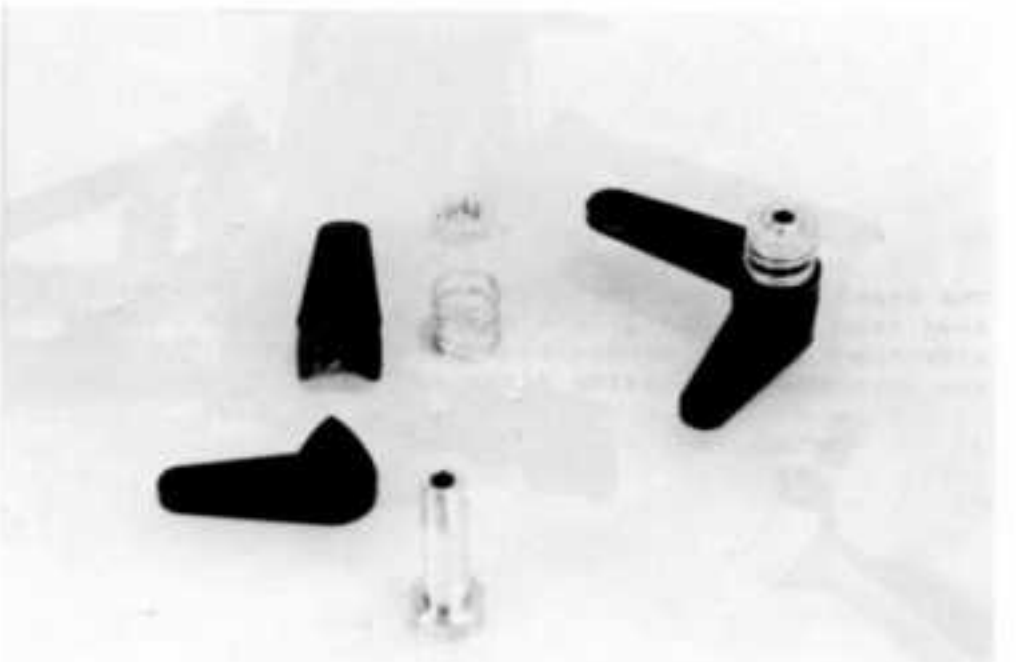
FRONT AND REAR TRACK RODS/STEERING LINKAGES/SERVO SAVER PACKS

- 1/10A SUPPLEMENTARY PARTS PACK A
- 1/10B SUPPLEMENTARY PARTS PACK B
- OR 1/13 SUPPLEMENTARY PARTS PACK B 2.W.D.
- 2/10 SUSPENSION MOULDINGS PACK
- 4/10 BUMPER AND BELLCRANK MOULDINGS PACK
- 6/12 NUTS AND BOLTS PACK

From the supplementary parts pack B (1/10B or 1/13) take the two short 3mm diameter rods with a thread at each end. These are the front track rods and should be fitted with a track rod moulding at each end. Screw the mouldings on to the track rod until the overall length of the assembly is 53mm for 2 wheeldrive cars or 54.5 for 4 wheeldrive cars. The long 3mm diameter rods with a thread at each end are the rear track rods and should be similarly fitted with track rod end mouldings but to produce an overall length of 78mm.



Remove the servo saver and idler arm mouldings from the bumper and bellcrank mouldings pack (4/10). The 24.5mm long by 5.6mm diameter headed, aluminium servo saver bush (2/56) and the 17mm long by 4mm diameter steel bellcrank post (2/57) should be taken from the supplementary parts pack B (1/10B or 1/13) along with the 10mm diameter aluminium servo saver adjuster ring (2/35) and the 10mm diameter by 10mm long servo saver spring (2/36). Assemble the servo saver as shown.

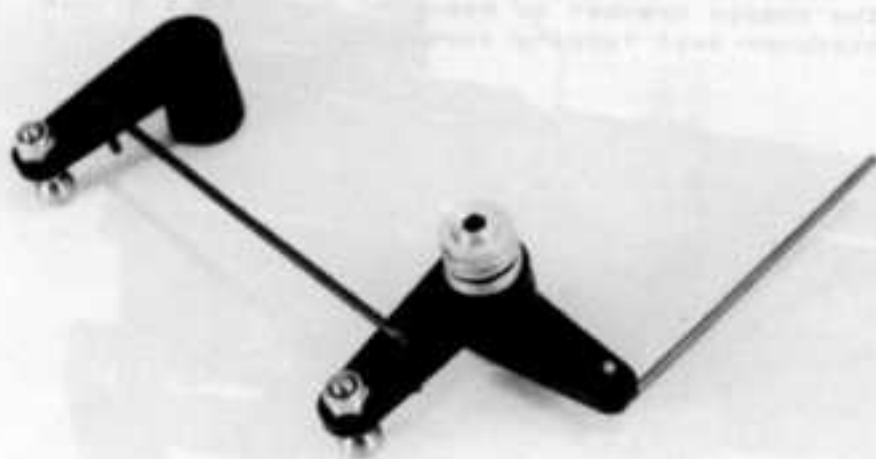


Take two 16mm long ball ended screws (2/31) from the supplementary parts pack B (1/10B or 1/13) and fit them to the underside of the servo saver and steering idler arm mouldings as shown, securing them with M3 self locking nuts from the nut & bolt pack (6/12).

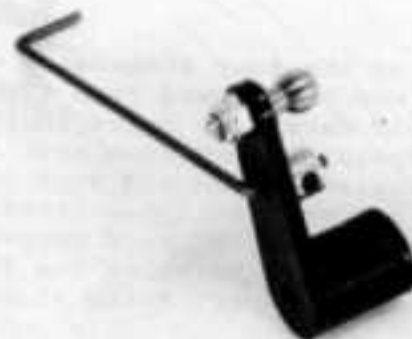
Make sure that the 1.6mm spring wire cross link fits into the smaller holes in the idler arm and servo saver mouldings. It may be necessary to slightly enlarge these holes either by drilling with 1.7mm drill or by forcing the cross link into the holes and moving it in a circular motion to stretch the plastic.

Please note that the cross link for 4 wheeldrive cars is 61.5mm centre to centre and that for 2 wheeldrive cars is 3mm longer at 64.5mm.

The two holes in the input arm of the servo saver should be treated in a similar manner.



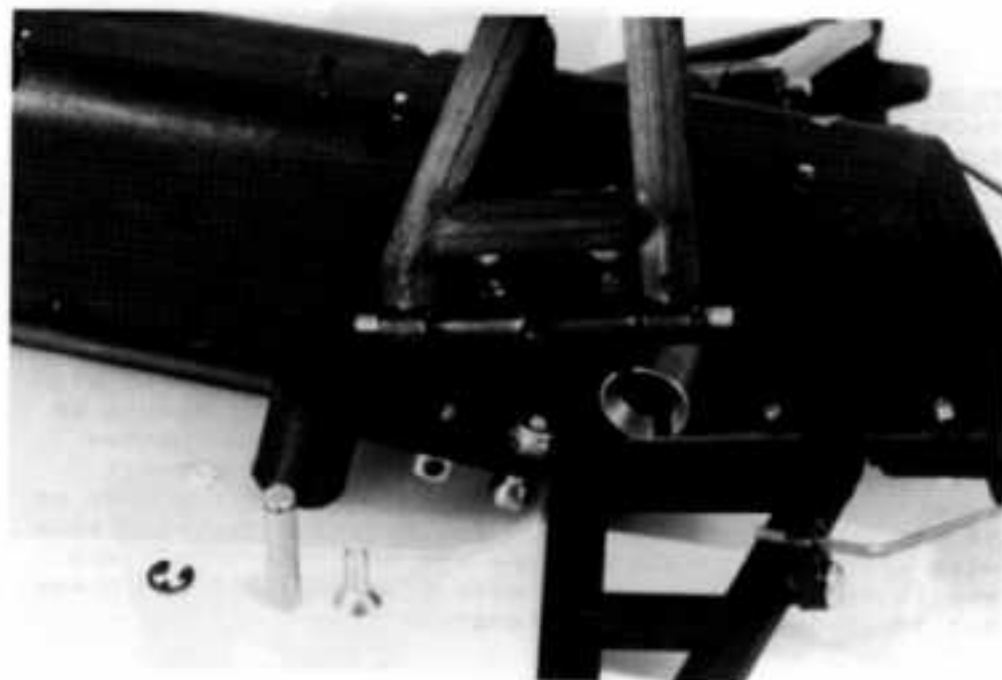
Fit the 1.6mm diameter spring wire steering cross link from the supplementary parts pack B (1/10B) to the steering idler arm as shown.



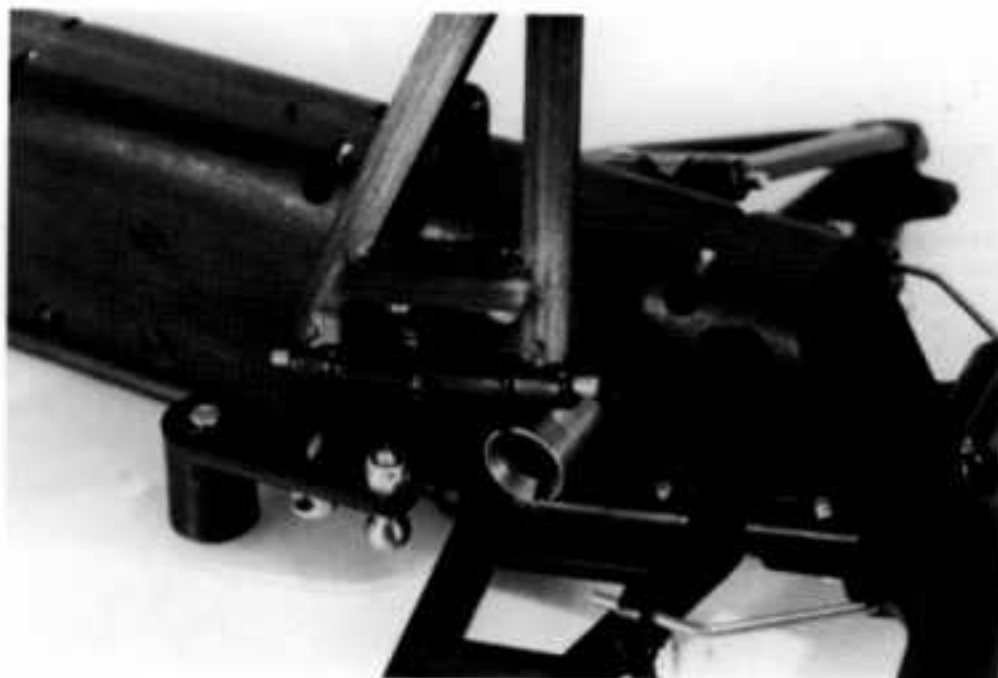
NOTE:- Later crosslinks and servo links have "z" bends and do not require fixing with a brass collar and grub screw. Please remember this note when completing the instructions on the following pages - Page 12; Page 13; Page 21.

From the nuts & bolts pack take the M3 x 30mm countersunk screw (6/33), the M3 x 8mm countersunk screw (6/32), an M3 thin nut (6/34), and the 6mm outside diameter "E" clip (6/40). You will also need 6BA grub screws (6/29) and from the supplementary parts pack B (1/10B), two brass collars (2/55).

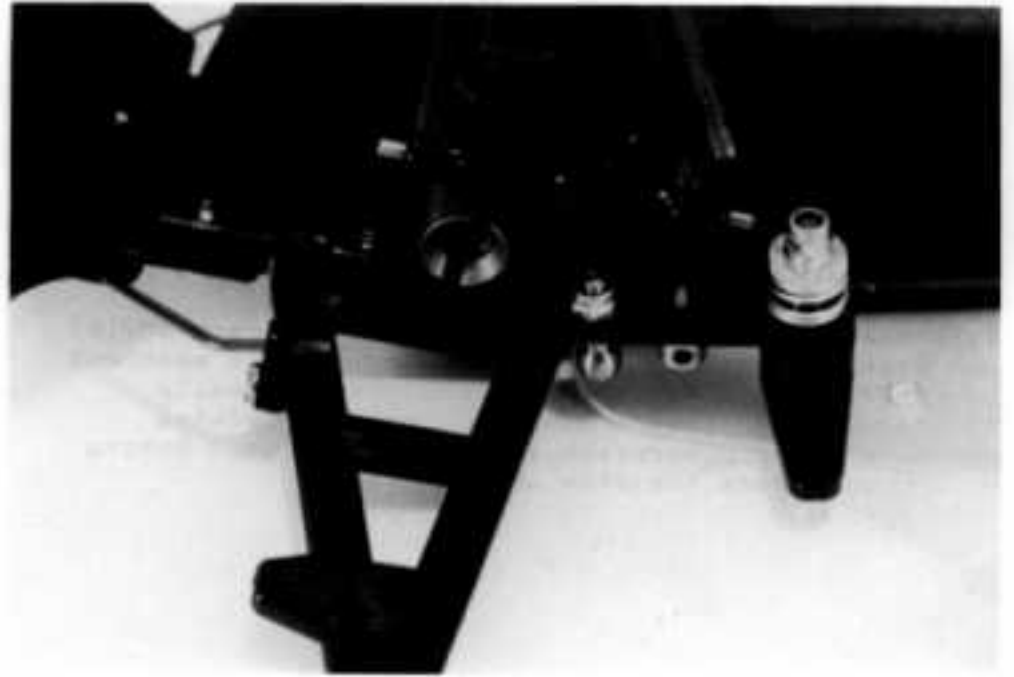
Pass the other end of the cross link through the hole in the chassis mouldings just below the front upper wishbone.



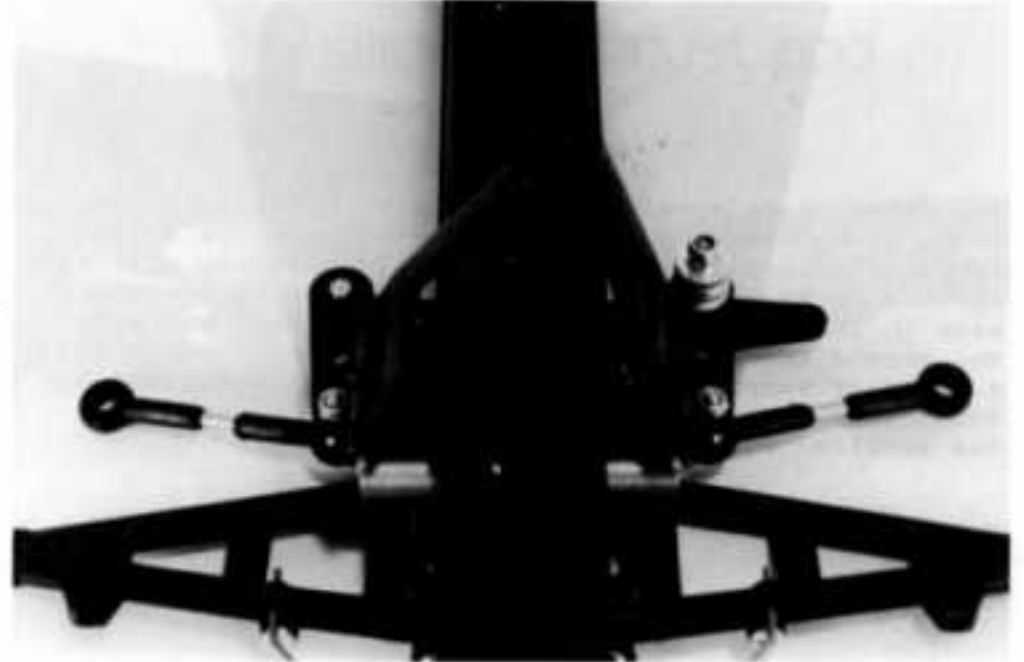
The steel bellcrank post (2/57) should now be passed down through the idler arm and secured to the chassis with the M3 x 8mm countersunk screw. Secure the idler arm with the 6mm outside diameter "E" clip.



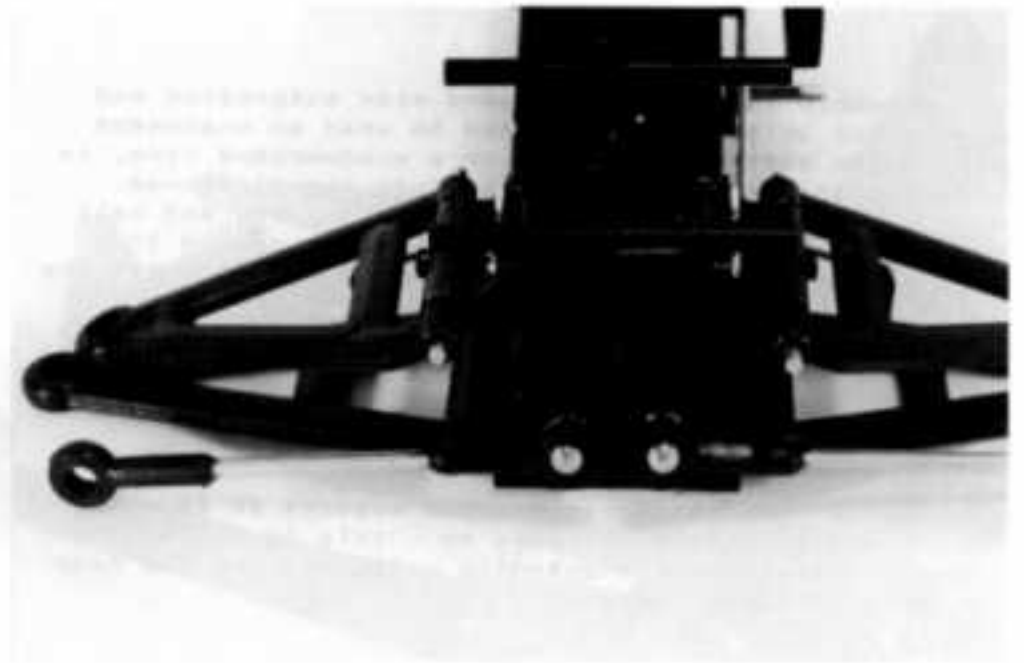
The servo saver should now be engaged with the cross link and the link fixed with a brass collar and 6BA grub screw at each end of the link. Pass the 3mm x 30mm countersunk bolt up through the chassis plate, through the M3 thin nut, and the servo saver. Tighten the M3 thin nut down to secure the bolt. Take an M3 self locking nut (6/31) from the nut and bolt pack (6/12) and use it to secure the servo saver onto the M3 x 30mm bolt. Note that the servo saver assembly should be free to pivot on this bolt but should have minimum up and down movement.



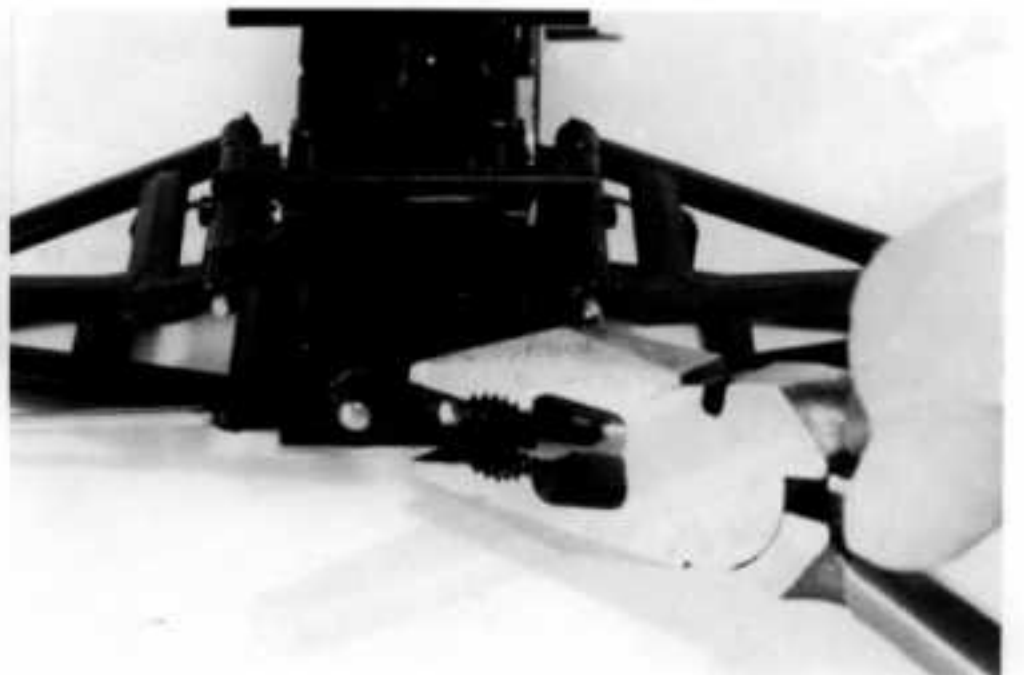
One of the short track rods should now be fitted to the servo saver and the other short track rod to the idler arm.



The rear track rods should now be fitted. Screw two 16mm long ball headed screws into the two lower holes in the back of the chassis moulding and then snap one end of a long track rod onto each ball.



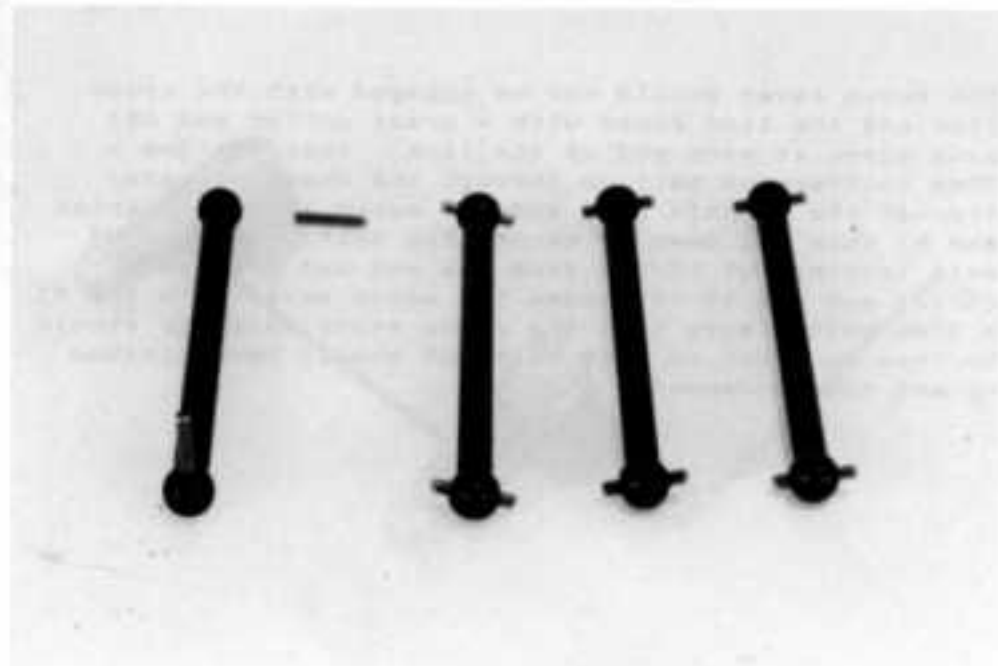
HINT:- If the plastic track rod ends are tight on their ball headed screws then nipping the plastic across its diameter with pliers will easily adjust the fit to give free movement with virtually no slop.



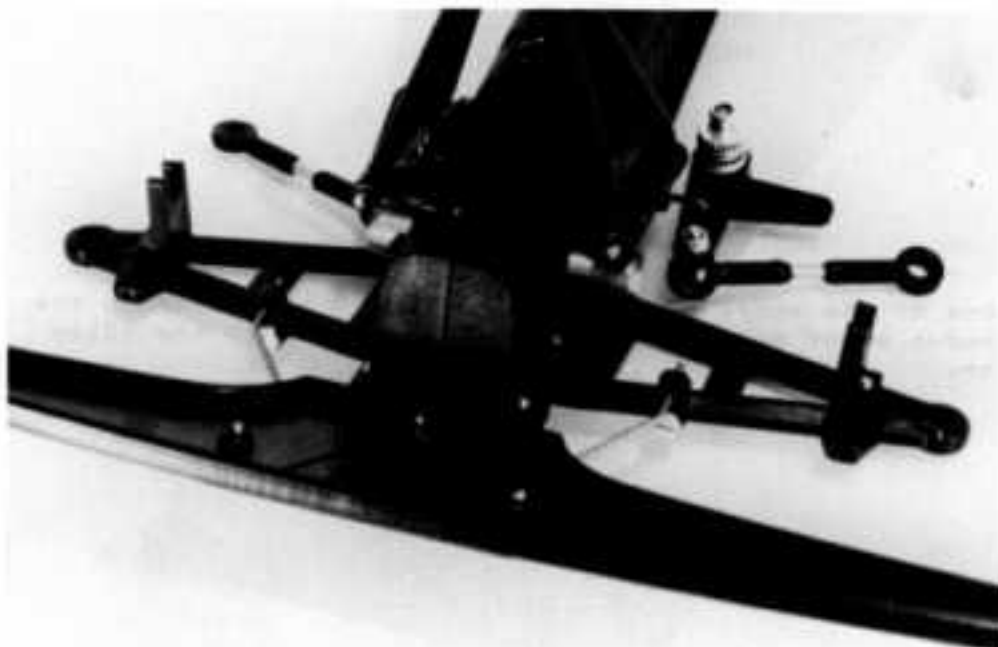
AXLE BLOCK & DRIVE SHAFT FITTING
PACK

2 x AXLE BLOCK ASSEMBLIES (PREVIOUSLY BUILT)
 1/10C SUPPLEMENTARY PARTS PACK C
 OR 1/12 SUPPLEMENTARY PARTS PACK C 2.W.D.
 6/12 NUTS & BOLTS PACK 3/16 DRIVE SHAFT & PINS
 2/10 SUSPENSION MOULDINGS 6/11 SELF TAPPERS PACK

Take the drive shafts and pins from their pack (3/16) and press a pin through the hole provided in each end of the drive shaft. The pin should be centrally located as shown and a small quantity of locking compound or cyanoacrylate glue should be used during assembly to lock the pins in position.

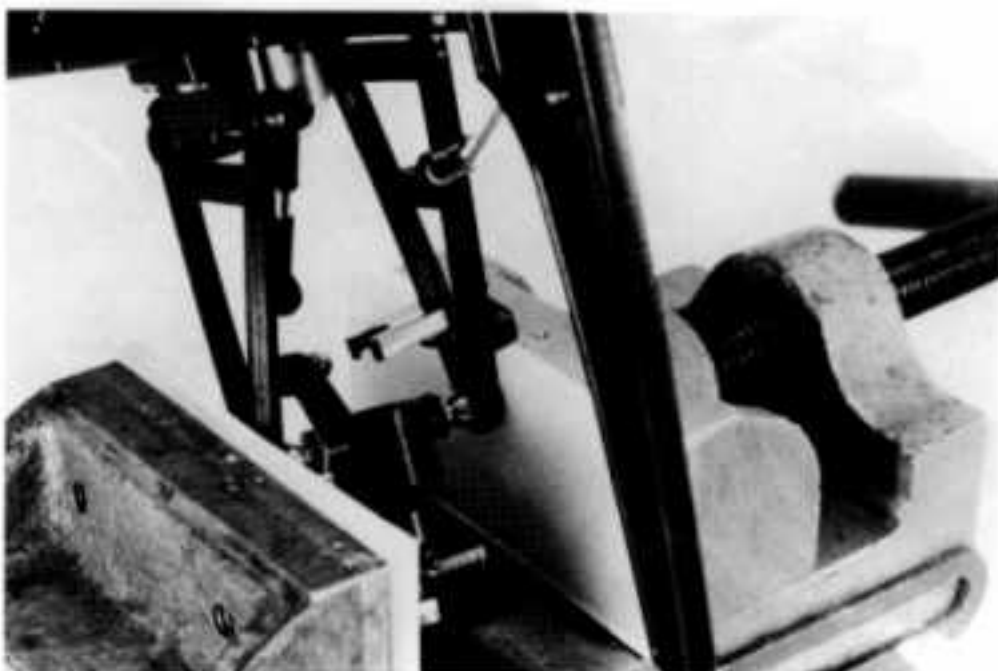


Two drive shaft retainers should now be fitted to the front lower wishbones only. DO not try to use drive shaft retainers on the rear suspension as they will not work. The retainers are from the suspension mouldings pack (2/10) and therefore you will have four but only two should be used - the others are spares. Using No.4 x 3/8 self tapping screws passing upwards through the front lower wishbones, fit the retainer brackets with the vertical part inboard of the fixing screw.



Now assemble the front left hand side suspension and axle block unit. You will need to use an engineers vice (with soft jaws fitted) or a woodworkers vice, in order to snap the kingpin balls into the wishbones. Make sure that when assembled, the track rod end ball will be facing downwards. Open the vice approx 53mm and, with the axle block kingpin balls aligned with the holes in the outer ends of the wishbones, place the wishbones/axle block in the vice as shown. Keeping the axle block kingpins at right angles to the vice jaws slowly tighten the vice onto the outer ends of the top and bottom wishbones and so push the balls into engagement in the wishbones.

Don't worry when the first kingpin engages as it will make a sharp click as it does so - this is quite normal. Simply keep tightening until you see and hear the other kingpin engage.

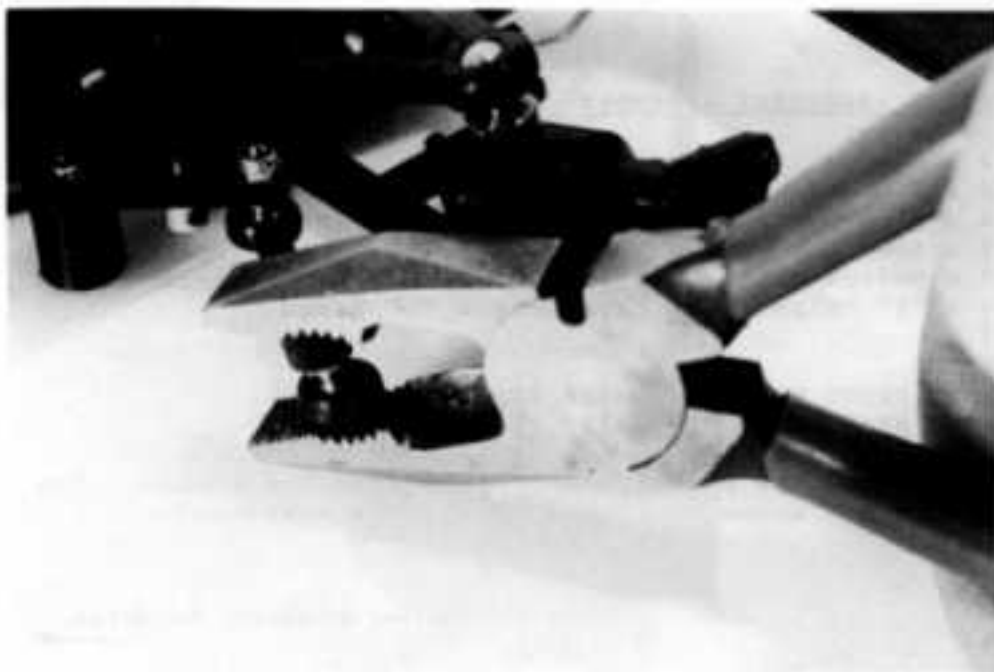


The steering and suspension movements should be free and not binding but if you do find that one kingpin is tight then lightly nip the round end of the wishbone in a vice (with the kingpin ball installed) and it will free up nicely.

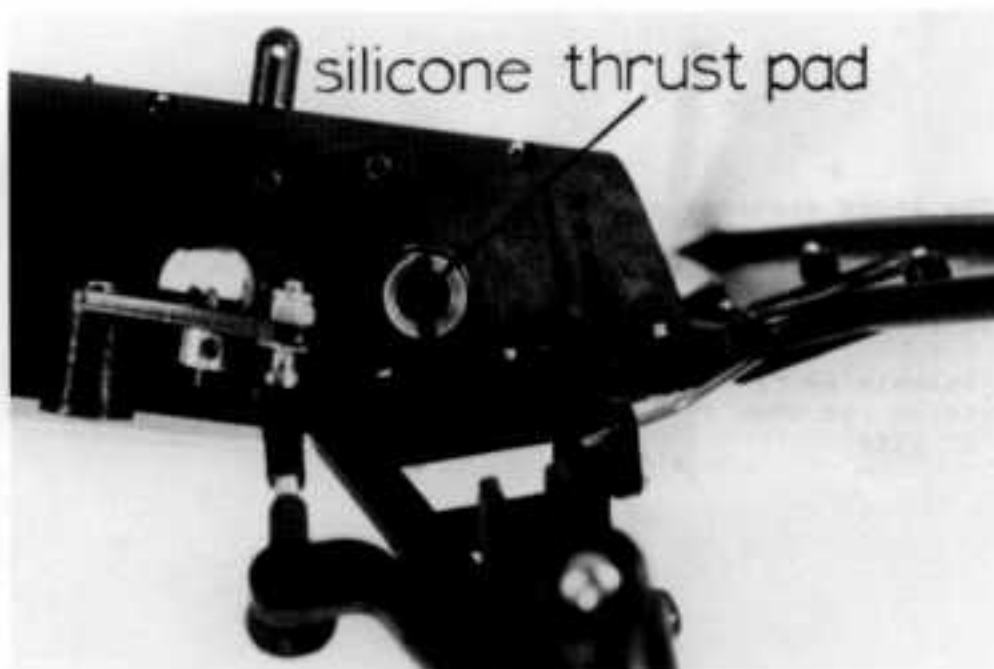
Repeat the above operation for all four suspension "corners".



Now connect the outer ends of the track rods to the track rod end balls, which are fitted in the steering arms. The moulding may be snapped into place with pliers as shown. Check that the suspension and steering movements are free and not binding.



From the supplementary parts pack C (1/10C OR 1/12) take the blue silicone tube and cut four pieces which are between 4mm and 5mm long (for 2 wheel drive only 2 pieces are required). These short pieces are used as thrust pads for the drive shafts and they will be fitted into the drive cups at each side of the differentials. NOT into the axle drive cups.



Now remove the upper wishbone pivot block from the chassis moulding and fit one of the silicone thrust pads to the differential drive cups.

Fit a drive shaft into the differential drive cup and the axle drive cup (and, at the front, the drive shaft retainer) taking care that the drive pins are properly aligned with the slots in the drive cups.



Now re-fit the upper wishbone pivot block to complete the assembly. Please check that the silicone thrust pad is still correctly fitted.

Repeat this step for the other driven axles.



SHOCK ABSORBERS ASSEMBLY**Contents:**

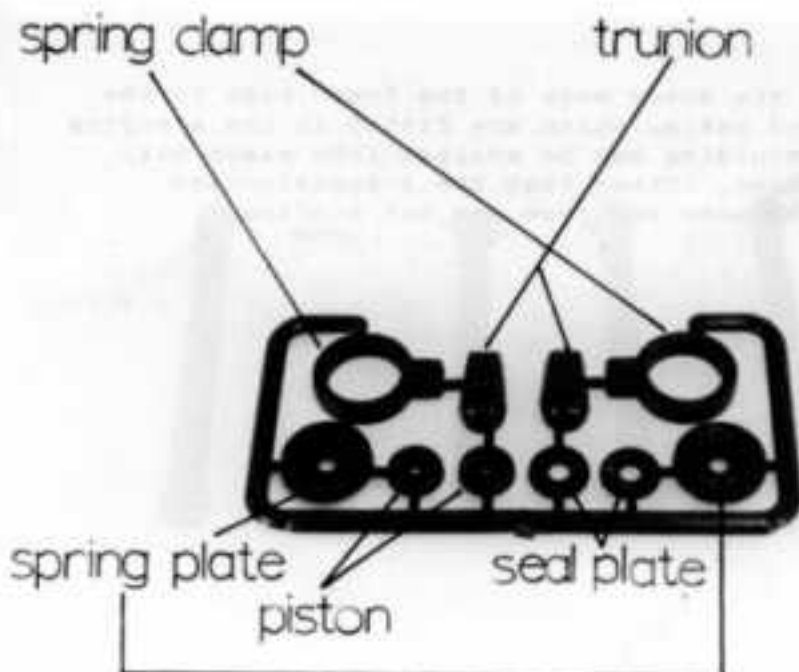
2 x Bodies 2 x Shafts.
 2 x End Cap 1 x Mouldings Set.
 4 x Pins 2 x Small Black "O" Rings
 4 x No.2x1/4 screws
 2 x Medium White "O" Rings
 4 x "E" Clips 2 x Large Black "O" Rings

PACKS

2/13 FRONT SHOCK ABSORBER (SHORT)
 2/14 REAR SHOCK ABSORBER (LONG)

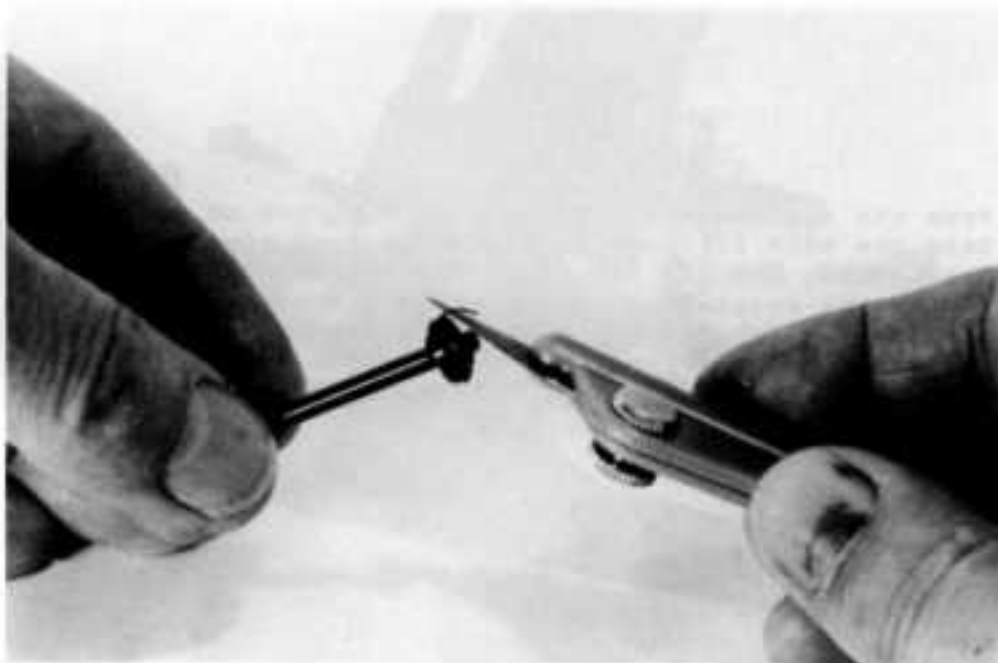
Remove all the plastic components from the runner. The photograph shows the names of all the components.

Shock Absorber Accessory Mouldings
 2/12. →



The shock absorber pistons (which have two small holes through them) should be very carefully de-flashed. It is a good idea to cut a very small chamfer on the outside edges of the piston. You may find this easier after the piston is fitted to the shaft.

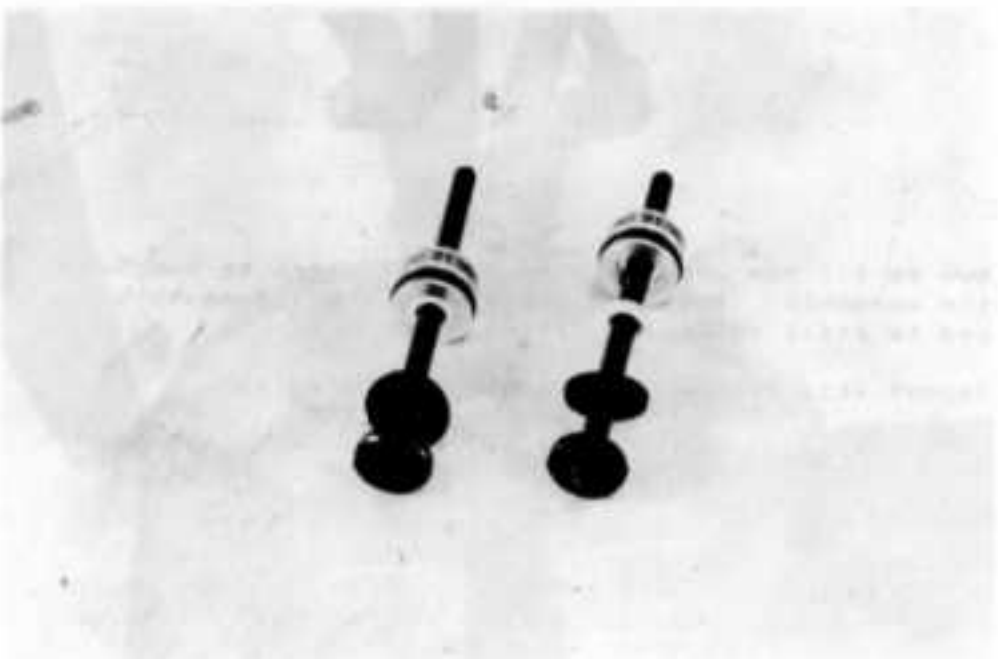
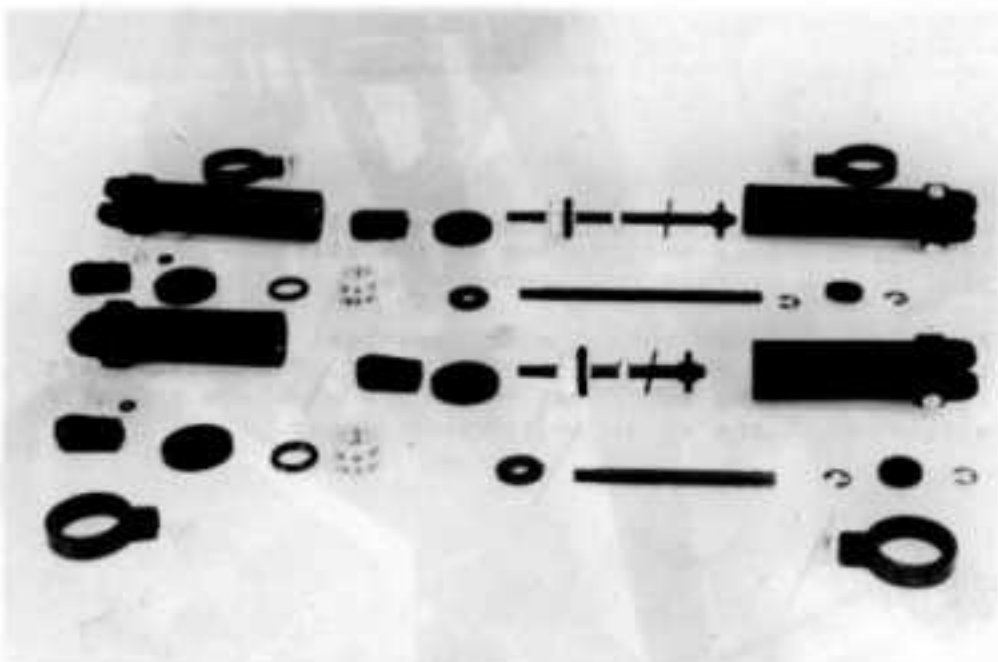
Assemble an "E" clip to one of the grooves on the piston rod then fit a piston and secure with a second "E" clip.



Take the aluminium end cap and install the large black "O" ring to the more shallow groove which is at the end which has a 6mm counter bore. This "O" ring makes a seal between the end cap and the shock absorber case.

Now fit a small black "O" ring to one of the No.2 x 1/4" screws, this should be fitted in the side of the large diameter upper end of the shock absorber body and acts as a bleed screw.

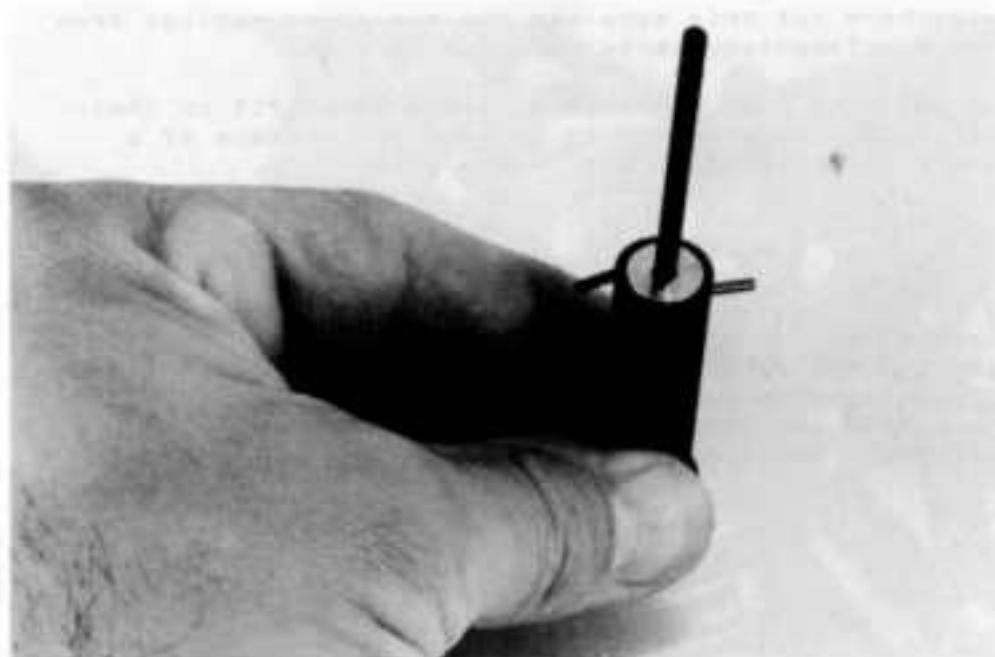
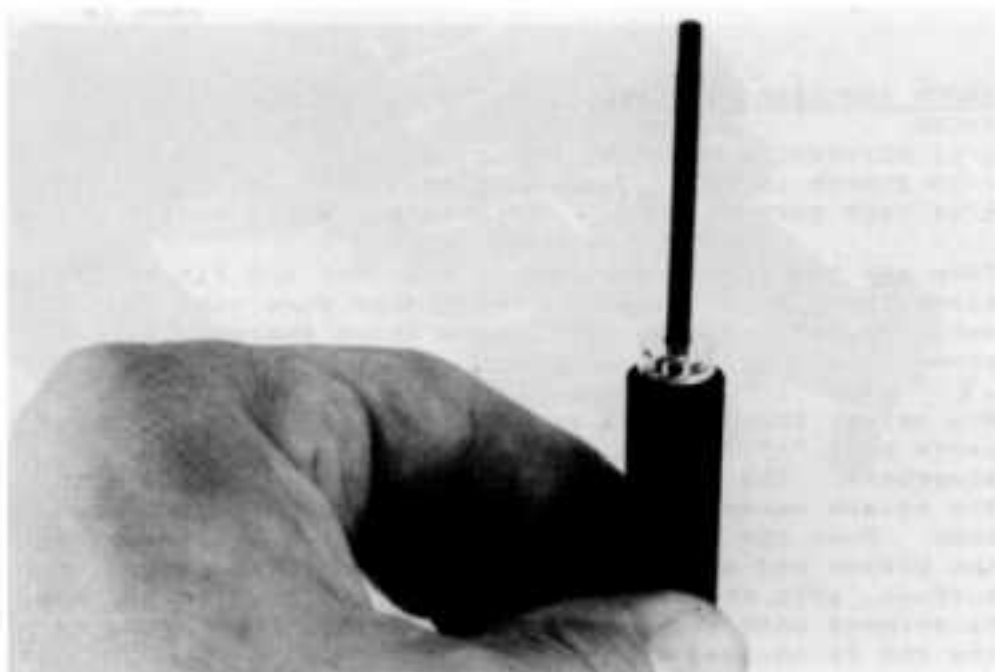
Take a plastic seal plate and place it on the long end of the shock absorber shaft and, after lubricating with oil, follow this with a white "O" ring (silicone). Now lubricate the 6mm diameter hole in the end cap and install the end cap on the shaft. Carefully push the white "O" ring into the 6mm hole in the end cap.



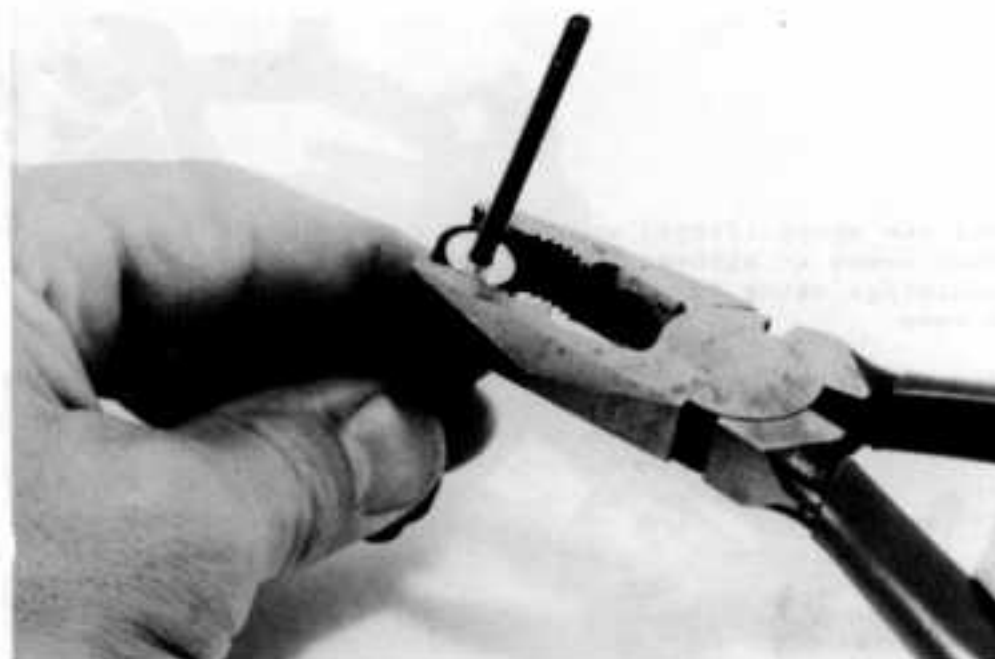
The following procedures will cause some oil to be spilled so you may wish to put paper or rag onto your workbench to protect it. You will also need some absorbent paper or rag for wiping your hands.

Holding the shock absorber body vertical, fill it with the oil which you have selected (see below) to a level 7.5mm below the top. There is a small shoulder inside the shock absorber body at this point.

Slowly insert the piston rod assembly (piston first) into the oil trying not to trap any air bubbles. The end cap should be pushed into the Shock absorber body until the black "O" ring has just entered the hole.



Now push the shaft as far into the shock absorber body as it will go. Oil will come out of the four holes in the side of the shock absorber body. The end cap may now be pushed all the way in, this will cause the piston rod to be pushed out as the oil is compressed. If you cannot get the end cap fully in the shock absorber body, it will be necessary to loosen the bleed screw one or two turns to allow some oil out. When the end cap is flush with the end of the shock absorber body fit two securing pins into the holes provided. Note:- It is easier to insert these pins one from each side.



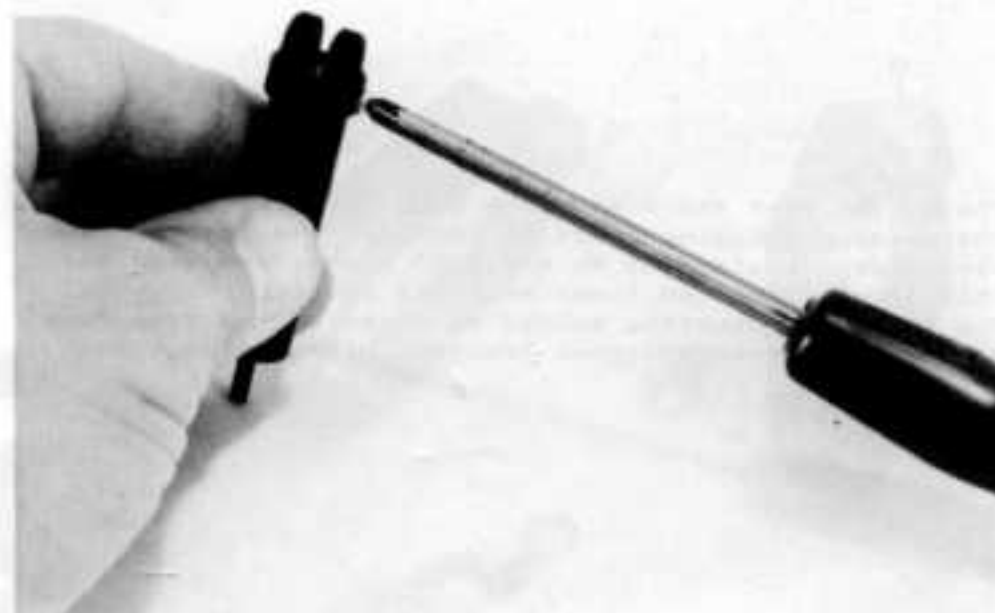
Now stand the shock absorber vertically with the bleed screw at the top, this will allow any remaining air to collect next to the bleed screw. After about five minutes you should loosen the bleed screw. (keeping the shock absorber vertical) and press the piston rod upwards fully in the shock absorber, some oil will be pushed out of the bleed screw. Now tighten the bleed screw.

Repeat these steps for all four shock absorbers. The hydraulic part of the shock absorber is now complete and you may proceed to fit the spring mechanism.

OIL

For smooth tracks or indoor use we recommend 3 in 1 light oil.
For average outdoor tracks SAE 10 oil is recommended.
For tracks requiring extra heavy damping use SAE 15 oil.

After a long period of use you may wish to renew the seals in your shock absorbers and a "first aid kit" is available, part no. 2/15 which includes the "O" rings, the end cap, and the end cap retainer pins.



SHOCK ABSORBER FITTING**PACKS**

2/11 SUSPENSION MOUNTING MOULDINGS.

4/10 BUMPER AND BELLCRANK MOULDINGS.

6/11 SELF TAPPERS PACK 6/12 NUTS & BOLTS PACK.

Take the two long (rear) shock absorber and fit spring clamps with No.2 x 1/4" screws. Make sure that you make one left and one right hand shock absorber as shown.

Now select the two long springs from the supplementary parts pack "A" (1/10A) and fit them over the shock absorbers. The spring plate should now be fitted with the square recess facing away from the shock absorber body. Push the spring plate and spring a little way up the piston rod and, taking care not to damage its surface, grip the rod with pliers. The trunion may now be screwed onto the piston rod until all the thread on the rod is covered by the trunion.

Repeat this operation for the two short (front) shock absorbers but this time use the two short springs from the supplementary parts pack "A" (1/10A)

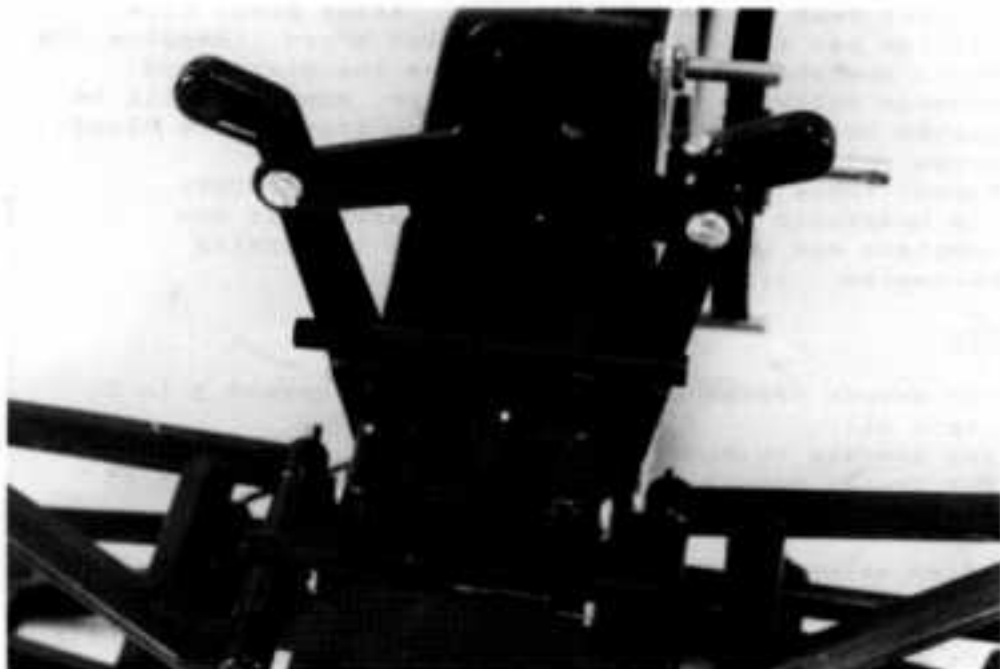
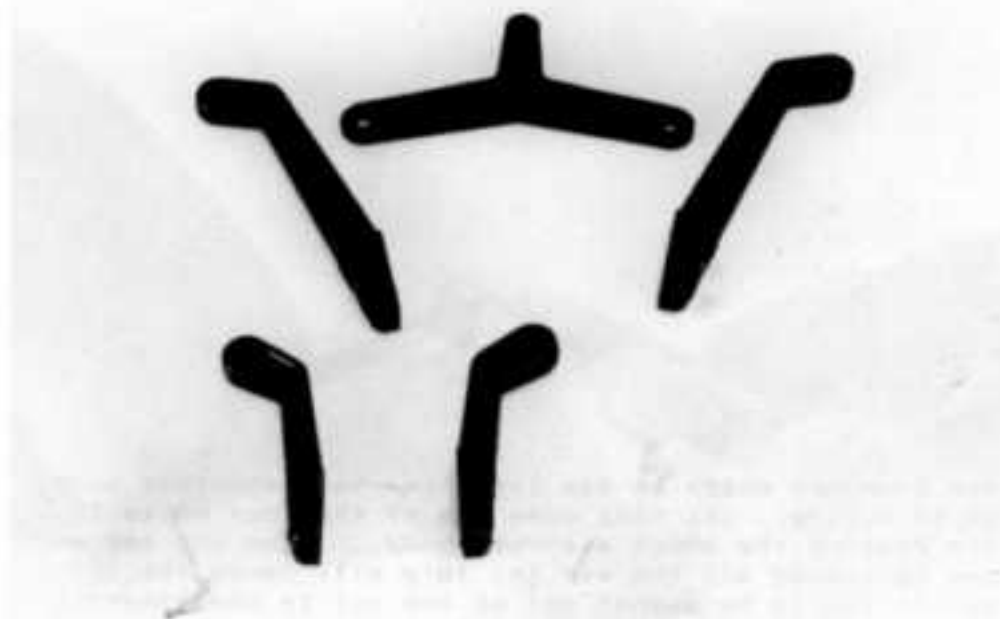
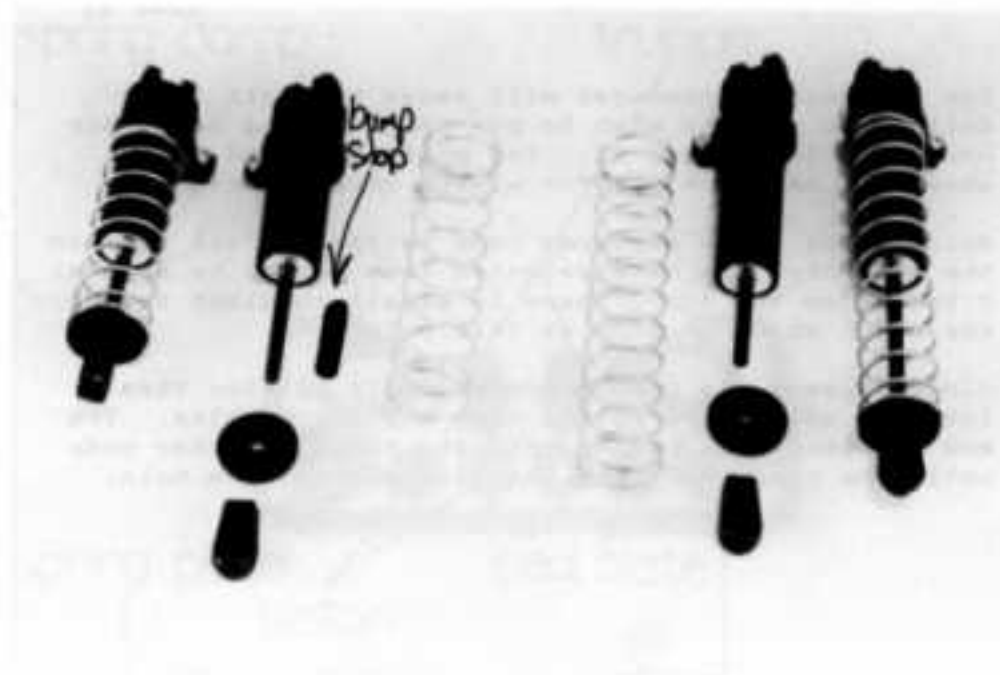
If you find that the springs are a loose fit on their spring plates they should be secured by means of a small quantity of 10 min. epoxy glue.

Remove the two short (front) shock absorber brackets and the two long (rear) shock absorber brackets from the suspension mounting mouldings pack (2/11) and the rear body mounting bracket from the Bumper and Bellcrank Mouldings pack (4/10)

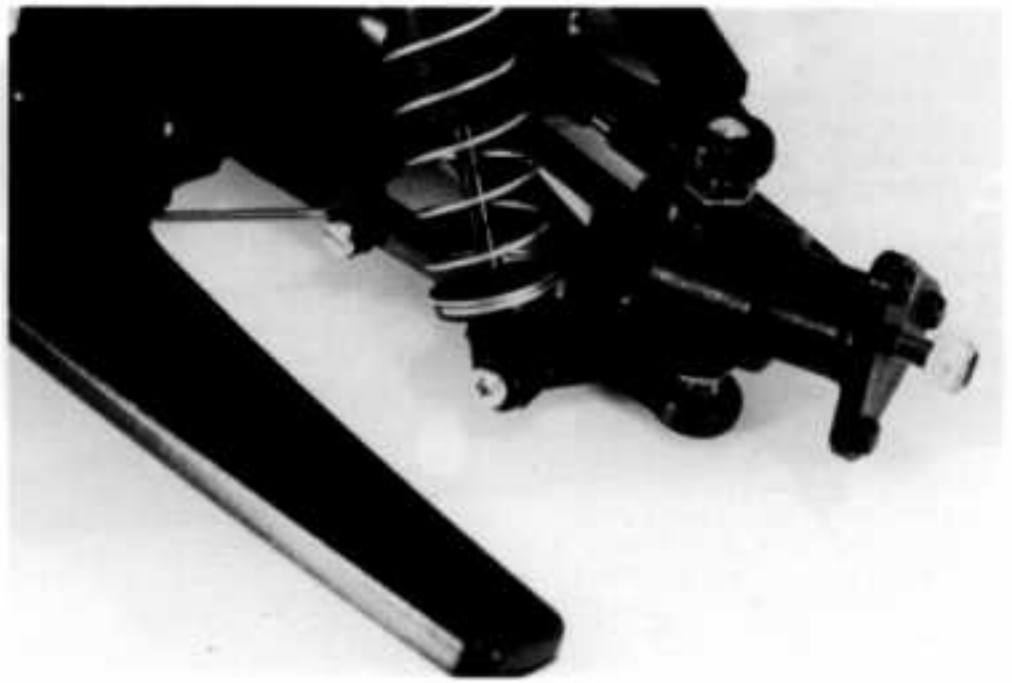
Fix the short (front) shock absorber brackets to the flat areas at either side of the front of the chassis mouldings using four No.4 x 1/4 inch self tapping screws.

You will see that the brackets may be fixed in two positions, upper and lower, as a starting point we suggest the upper position for the front brackets.

The longer rear shock absorber mounting brackets fix to the chassis mouldings just in front of the rear upper wishbones. Again four No.4 x 1/4" screws are used but this time select the lower mounting position. The rear body mounting should be fixed to the rear face of the rear shock absorber brackets with two No.4 x 1/4" screws.



Now fit the short shock absorbers to the front edge of the front lower wishbones using two no.4 x 1/2" self tapping screws. Please make sure that the screw is not so tight as to prevent the shock absorber trunion from rotating slightly.

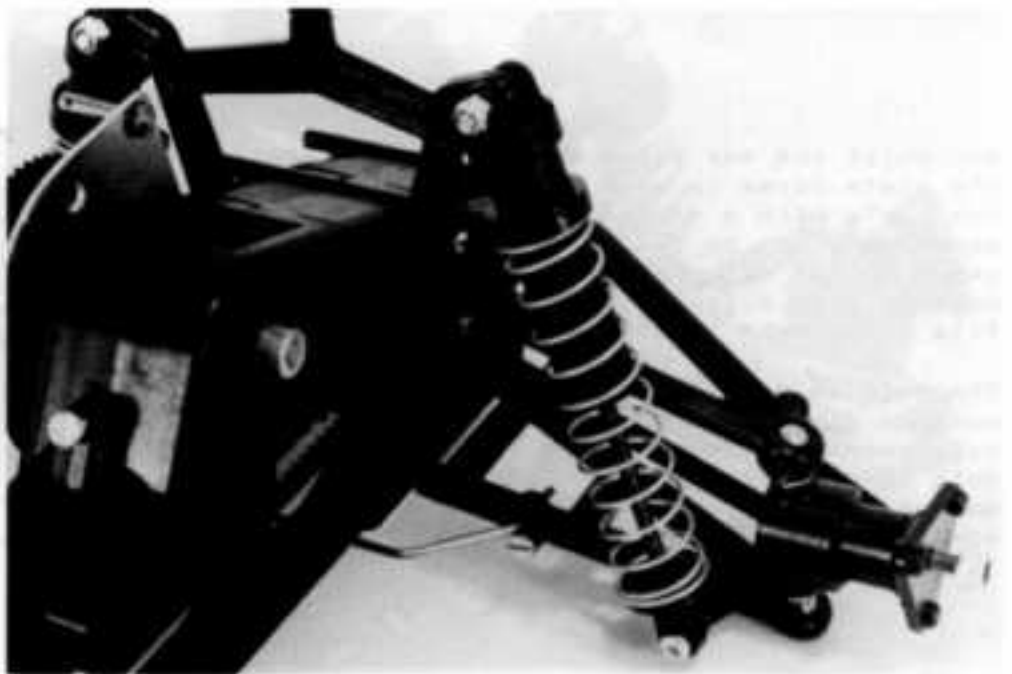


At the upper end the shock absorbers should be fixed to their brackets so that the spring clamp screw is inboard and facing forward. Fix the shock absorber with an M3 x 16mm bolt and M3 self locking nut.

Repeat the operation for the other front shock absorber.



The rear shock absorbers should be fitted in a similar manner except that, the spring plate clamp screws should be inboard and facing the back.



BATTERY CLAMPS AND CONNECTORS

PACKS

1/10A Supplementary Parts Pack "A"

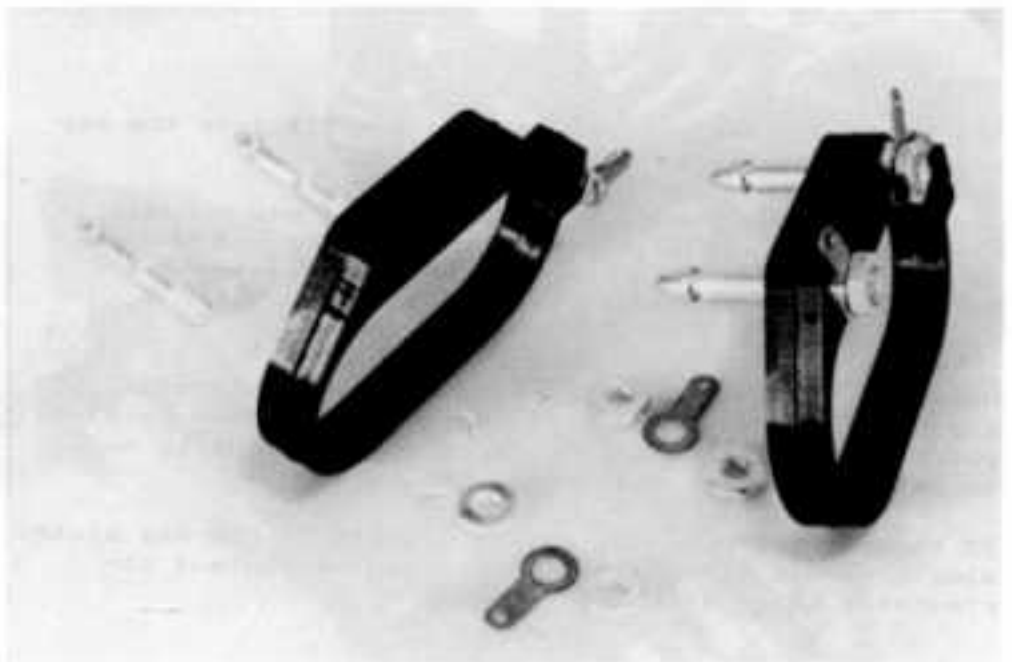
3/15 Battery Clamp/Axle block pack

6/11 Self Tappers Pack 6/12 Nuts & Bolts Pack

From the battery clamp/axle block pack (3/15) take the battery clamp moulding and fit a No.4 x 3/8" self tapping screw which acts as a pinch bolt. When the clamp is fitted to the car this pinch bolt should be to the rear.

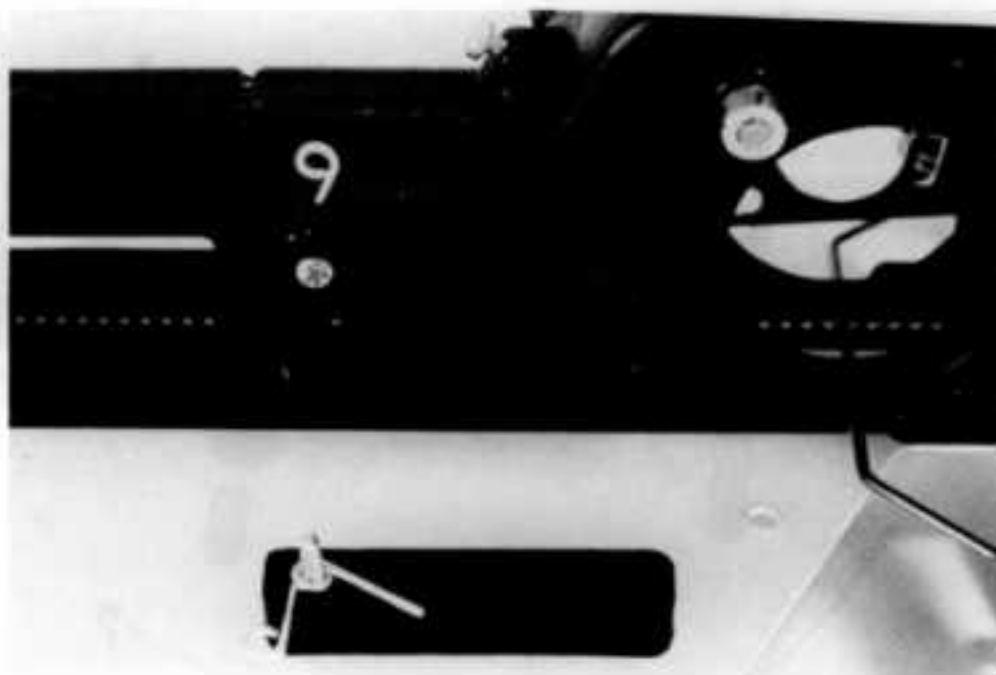
Fit the two silver plated, pointed, contact pins (3/66) to the clamp plate so that the pointed ends will face the centre of the car. Secure the pins with two silver plated M4 thin nuts from the nut and bolt pack (6/12) then fit two solder tags (from the same pack) followed by two more silver plated M4 thin nuts.

Repeat the above steps for the other battery clamp which is for your second nicad pack.

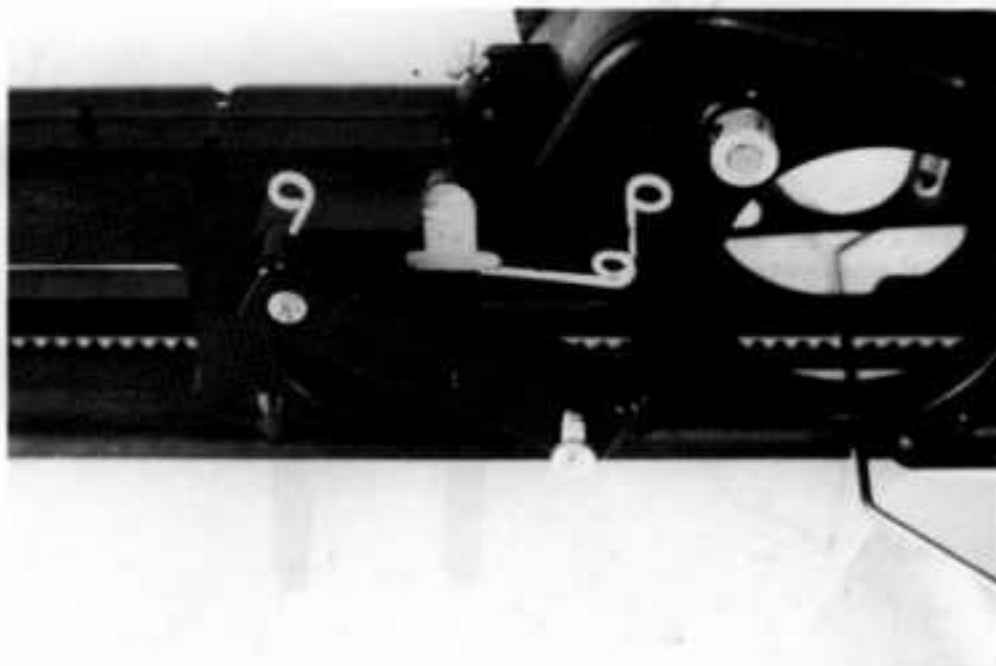


The black plastic key plate, and two silver plated contact springs should now be taken from supplementary parts pack "A" (1/10A). Two No. 4 x 1/2" screws should be taken from the self tappers pack (6/11).

Fit one of the springs into the recess provided in the key plate and pass a No. 4 x 1/2" self tapper through from the side marked with a + sign. This assembly should now be fitted to the left hand chassis moulding and the screw used to secure the key plate but not fully tight. The key plate should be able to twist downwards on the screw.

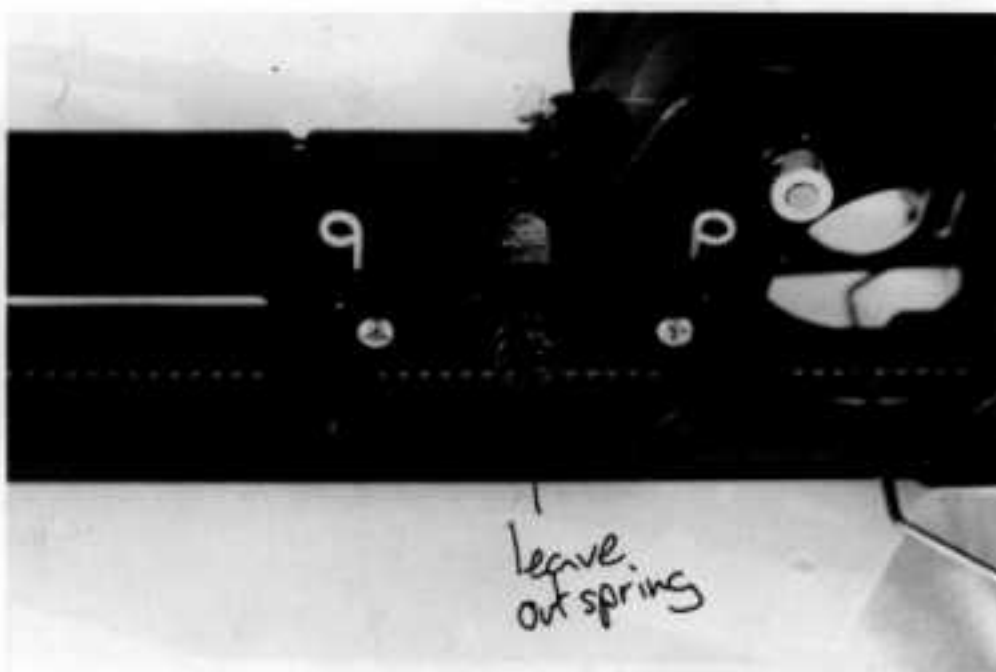


Now fit the release catch to the recess in the chassis side and the second contact spring.



Now twist the key plate anti-clockwise until the top of the plate lines up with the chassis moulding. Secure the plate with a second No. 4 x 1/2" screw. Both fixing screws may now be fully tightened. If the release catch "binds up" when these screws are tightened either unscrew them slightly or remove the catch and sand or file it to make it thinner, and then re-assemble.

The release spring, which is dark in colour, 8.4mm outside diameter and 8mm long, should be taken from the supplementary parts pack A (1/10A) and fitted into the hole in the outside of the key plate. Use a small amount of epoxy or cyanoacrylate glue to fix this spring.

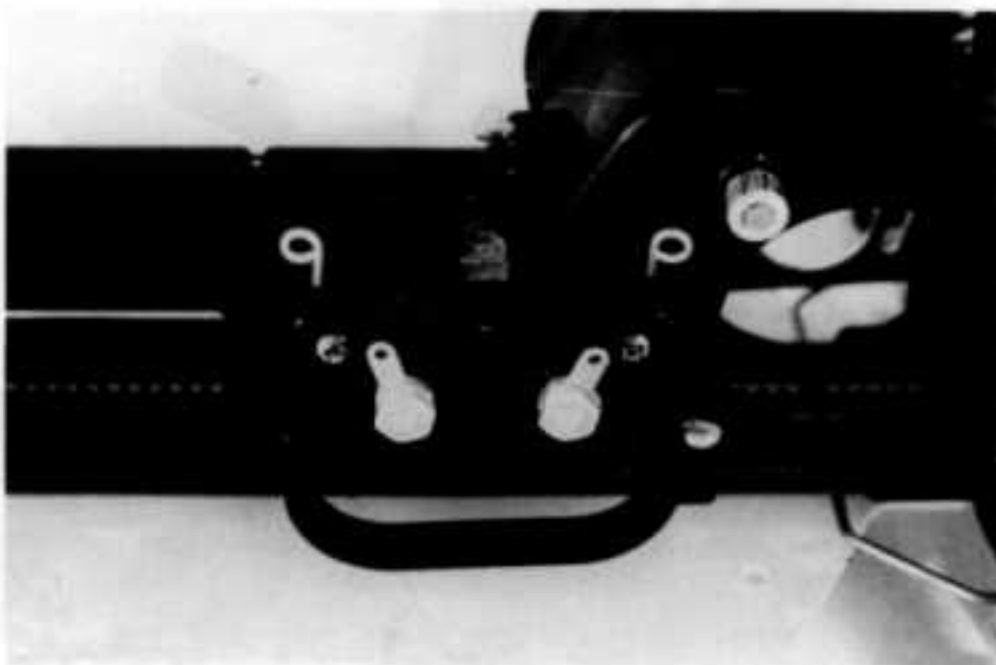


The battery clamp assembly should now fit into the key plate/contact spring assembly.

You will see on the outside face of the key plate that the front contact is marked with (+) Plus and the rear on with a (-) Minus sign these are the recommended battery polarity connections for both key plate and battery clamp.

When fitting your nicad pack into the battery clamp it may be necessary (depending on your particular pack) to put two or three layers of tape on the nicads in order to obtain a secure fitting of the clamp.

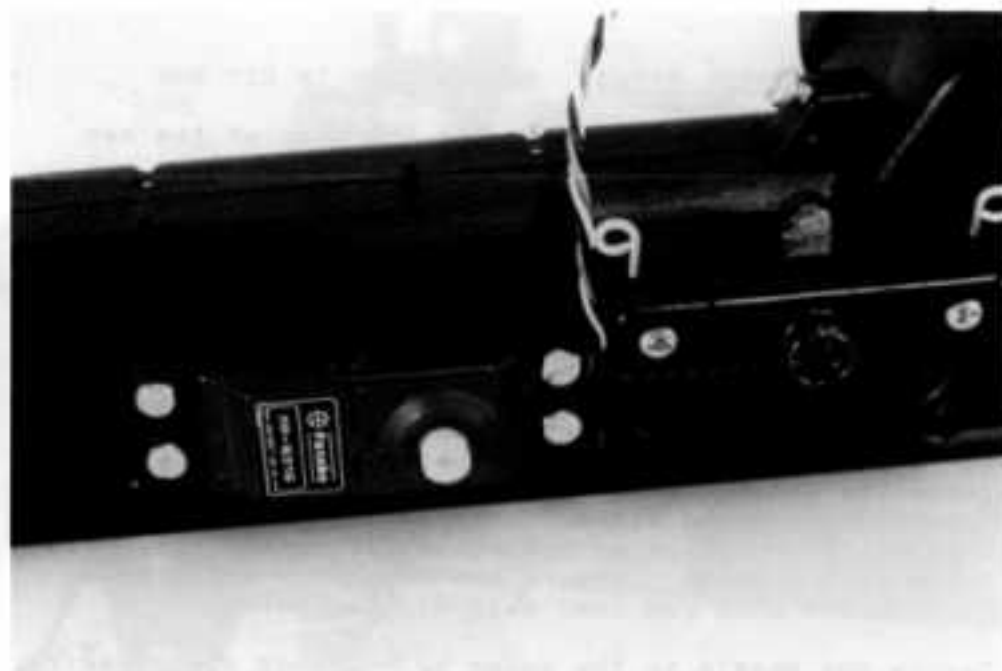
If the contact pins are a little stiff in the key plate simply remove the plate and enlarge the contact pin clearance holes slightly.



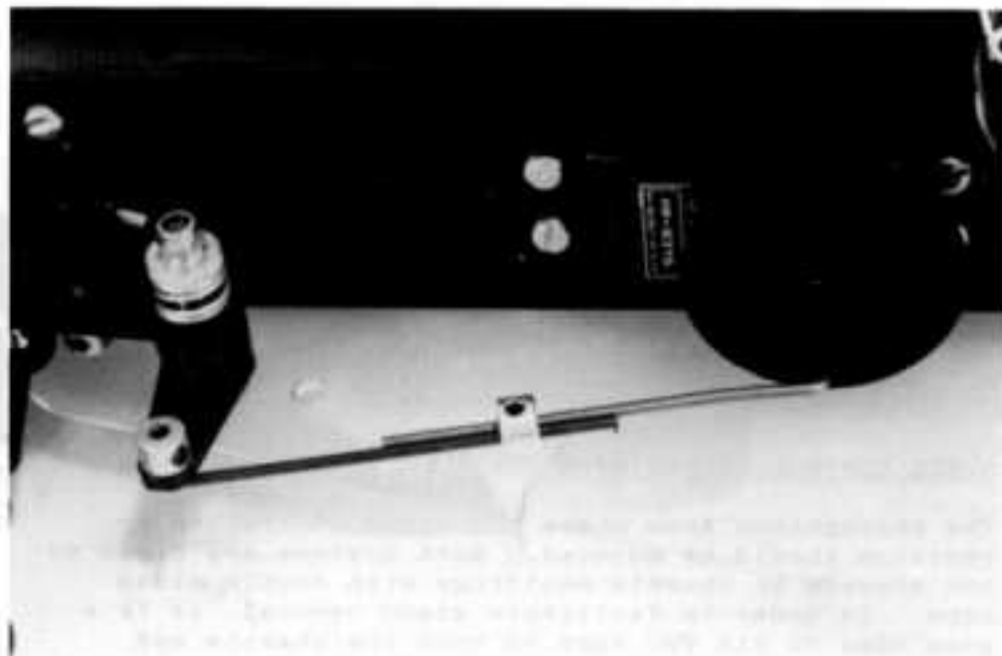
STEERING LINKAGE/RECEIVER MOUNTING
PACKS

1/10B SUPPLEMENTARY PARTS PACK B
OR 1/13 SUPPLEMENTARY PARTS PACK B 2.W.D.
6/12 NUTS AND BOLTS PACK

The steering servo should now be fitted to the previously prepared left hand chassis moulding.



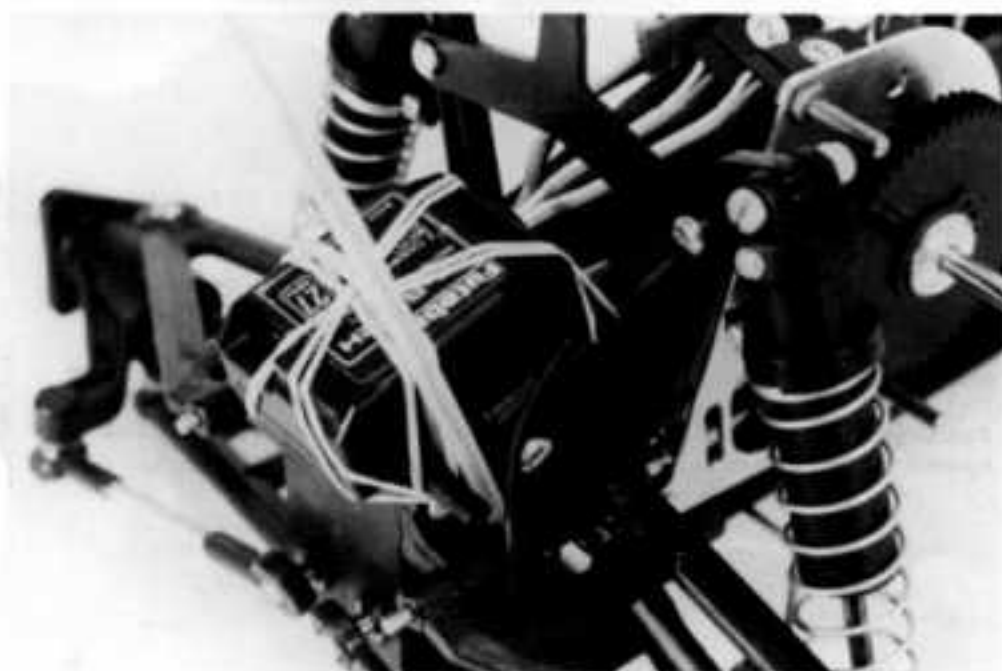
Fit one of the servo links to the servo and the other to the servo saver and secure them with two brass collars and 6BA grub screws. The two links should overlap in the centre and an aluminium collar (2/59) and 6BA grub screw is used to secure and adjust the linkage. All these collars are from supplementary parts pack B (1/10B or 1/13) and the grub screws are from the nut and bolt pack (6/12)



The receiver should be mounted on top of the chassis mouldings at the back and may be secured by means of the two rubber bands which were used to hold the chassis mouldings to their display board under the bodyshell.



If you are going to use an aerial tube to carry the receiver antenna you should drill an angled hole in one of the rear wishbone pivot blocks and install the tube as shown. Please take care that the aerial wire cannot become entangled in the drive cup or drive shaft.



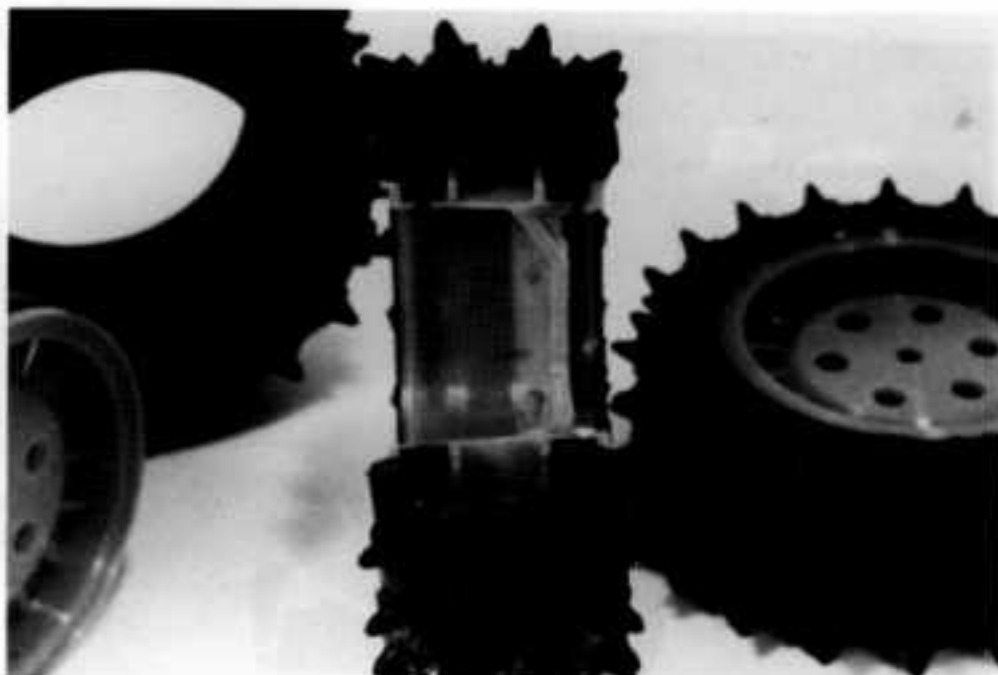
WHEELS AND TYRES PACKS BUBBLE PACK IN KIT BOX

The wider tyres and hubs are for the rear of the car and the narrower ones for the front. The bottom of the tyre sidewall locates in the outer grooves in wheel rim, as shown in the drawing.

Whilst it is not essential you may prefer to glue the tyres in position and four holes are provided in the wheel rims to allow you to apply cyanoacrylate (super) glue without removing the tyres.

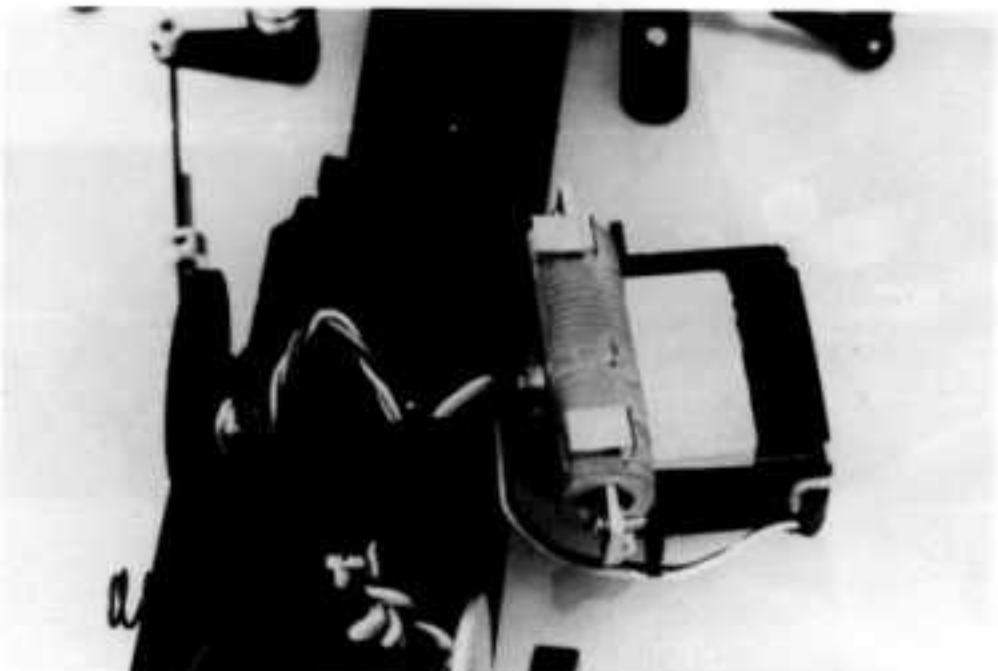
NOTE:- If you have a 2 wheel drive car the design of the front hubs is slightly different. Fit the 14mm wide "T" section ring inside the narrow front tyre. The inner rim and outer flange may now be placed inside the tyre from opposite sides. Locate the inner rim on the shoulder on the back of the outer flange and align the three fixing holes. Secure the assembly with three No.4 by 1/4 inch pan head self tapping screws.

Secure the wheels to the axles by means of the M4 self locking nuts. Do not overtighten these nuts as this will cause damage to both wheel and wheel driver.

SPEED CONTROLLER/RESISTOR

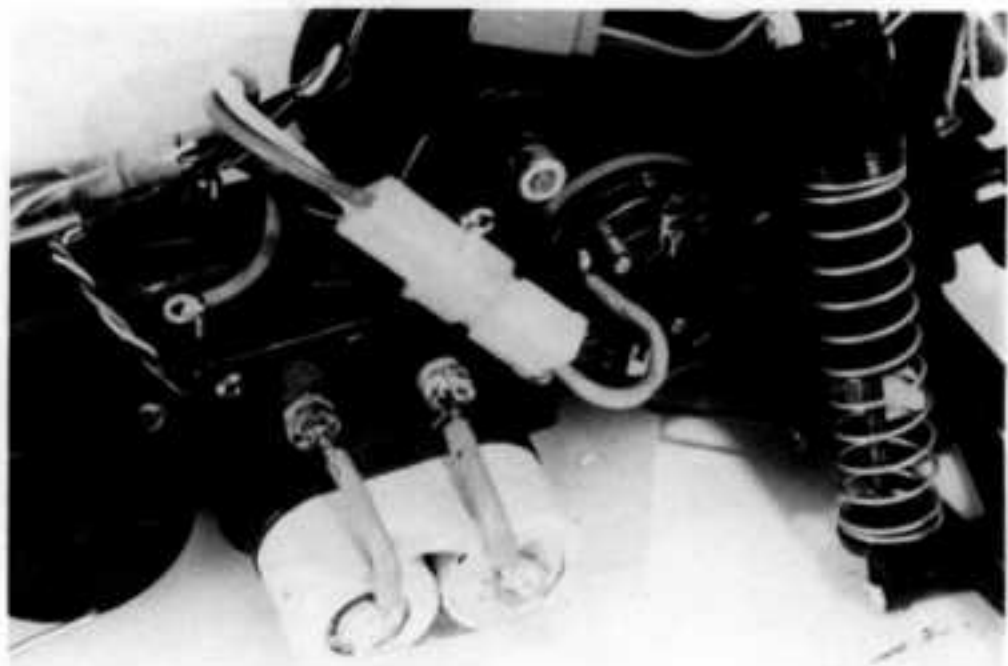
The photographs show where the speed controller or resistor should be mounted. Both systems are fixed to the chassis or chassis mouldings with double sided tape. In order to facilitate clean removal, it is a good idea to fix PVC tape to both the chassis and controller in the areas where double sided tape is to be used.

Solder the resistor/speed controller input leads directly to silver plated contact springs. The contact spring at the front should be used for the positive connection as shown on the key plate. If you find soldering a problem then a nut and bolt fixing may be employed. To remove the resistor/speed controller simply dismantle the key plate assembly.



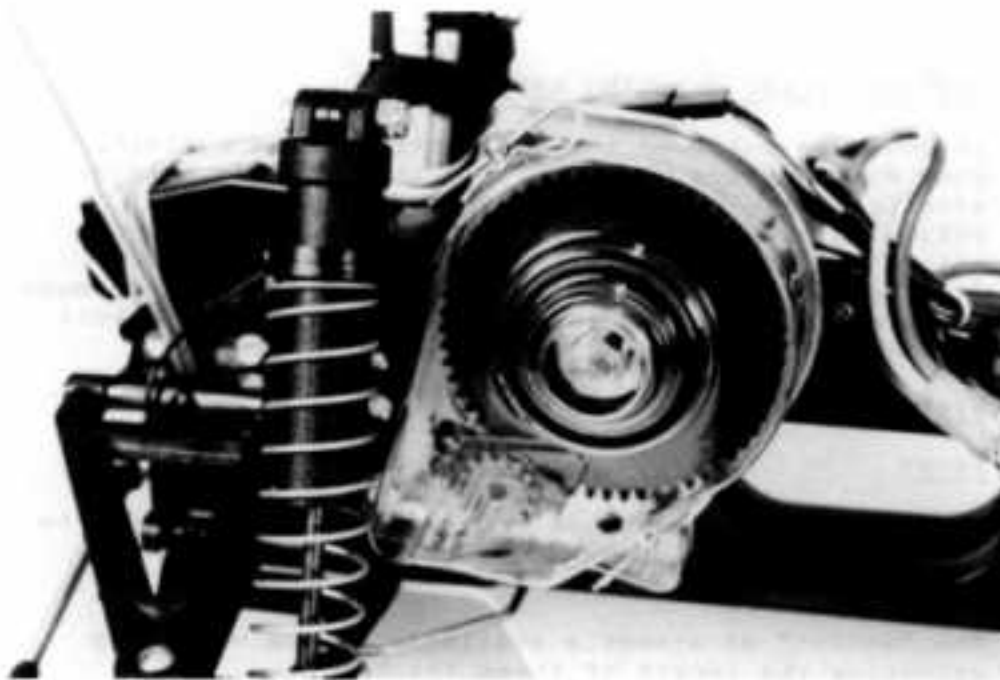
In order to allow simple motor change, a plug and socket arrangement is recommended between speed controller and motor.

Solder the battery wires directly to the tags on the battery clamp as shown but please remember that the terminal nearest the front of the car should be positive (+) and the rear-most one should be negative (-). This polarity will be correct if you have followed our markings on the key plate when fitting the speed controller.



GEARBOX COVER AND BODYSHELL

Trim the lexan gear cover so that only 1 to 2mm protrudes beyond the lower flange line and cut or drill two 3.5mm diameter holes for the mounting pins where indicated on the moulding.
The gear cover may be used with either single or two speed assemblies.
The bodyshell has a trim line marked to assist you and, using small tin snips or strong scissors, the shell should be cut as shown.



Painting lexan or polycarbonate bodyshells is best done using one of the paints, such as Hobbyknox or Parma, which are specially formulated for this material. Paint the bodyshell on the inside in order to allow the natural gloss of the lexan provide the finish and to protect the paint from damage in use. Please remember that some paints will attack the lexan and render it very brittle and that other paints may not adhere to the shell correctly and will fall off at the slightest provocation.



SETTING UP AND HANDLING ADJUSTMENTS.

If you have followed the instructions when building your Mini Mustang you will find that the car handles in a delightfully precise yet stable manner. The following are just some of the ways in which you can adjust the drive "feel" of the car to match your driving style and local track. Please remember to make adjustments ONE AT A TIME so that you know the result of each one.

STEERING GEOMETRYFRONT

The front track rods have been carefully positioned to minimise steering changes due to bump or roll, suspension deflection.

The "amount" of steering available may be varied by adjusting the length of these track rods.

As standard the front wheels will be pointing straight ahead, it is possible to increase steering by shortening the track rods slightly to make the front wheels "toe out". (The front edges of the wheels are further apart than the rear edges). On the other hand, if you make the front track rods slightly larger than standard the wheels will "toe-in" and this will increase stability (reduce steering sensitivity).

Do not make large adjustments to toe-in, toe-out - you will notice a difference with surprisingly small changes in track rod length.

REAR

The Mini Mustang is quite unusual in that you can adjust the toe-in, toe-out of the rear wheels as well as the front, and the effect is almost the same! Toe-in gives less steering. Toe-out gives more steering (especially when powering round corners).

It is also possible to make an even more unique adjustment to the rear "steering". By switching the rear axle blocks left to right, the track rod end ball is positioned above the steering arm. This produces Roll Induced Steering Effect or RISE. As the suspension is deflected in cornering the outside wheel will toe-out a little whilst the inside wheel will remain static or will toe-in a little. This movement causes the back of the car to turn, and the turn is additional to the steering effect from the front. The effect is that the harder you turn the more you turn. RISE is not an adjustment for the beginner but, in the right hands, can produce startlingly quick cornering.

CAMBER

"Camber angle" is the amount by which wheels (front or rear) lean in at the top (negative camber) or lean out at the top (positive camber). You will see that your Mini-Mustang has negative camber at both front and rear although more so at the rear.

By inserting plastic or metal "shims" between this upper wishbone pivot blocks and the chassis mouldings, it is possible to reduce this negative camber. As you reduce the negative camber so the tyres will have less grip. In this way you can encourage your car to slide more than normal and so alter the drive "feel".

ANTI ROLL BARS

By fitting harder (thicker) anti roll bars it is possible to reduce the grip of the tyres and, by fitting softer (thinner ones, you can increase grip).

FRONT

Harder anti roll bar - less steering.
Softer anti roll bar - more steering.

REAR

Harder anti roll bar - less grip more slide.
Softer anti roll bar - more grip less slide.

TYRES

There are many different tread patterns and tyre compounds available which will fit your Mini Mustang and so you can find the best grip on your particular track.

Any of the "Hot Shot" type tyres will fit the front and rear wheels of the 4 wheel drive Mini Mustang and, for the front of the 2 wheel drive version a range of Dynamite tyres is available.

SHOCK ABSORBERS

This is a very difficult area to give advice on as track conditions vary so much, but try to use the softest shock absorbers which give a good ride. The Mini Mustang shock absorbers are very good value for money and it is a good idea to keep two or three sets each with a different grade of oil. In this way you can very quickly and easily try different settings.

RIDE HEIGHT

There are two ways of adjusting the Mini Mustang ground clearance:- You can increase its spring tension by moving the adjuster ring up or down the shock absorber body OR you can move the shock absorber brackets into their alternative upper or lower positions. The first method will change the suspension "hardness" and the second will only change the ride height. Adjust the overall ride height to give good ride over your particular track as a general rule the smoother the track the lower the ride height, the rougher the track the higher the ride height. Ride height also affects steering if you have the front high and the back low, you have less steering and front low, back high produces more steering.

ACCESSORIES

The range of P B accessories for the Mini Mustang is growing all the time please watch our advertising for the latest details.

