

COUPE BUILD MANUAL

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## BUILD SEQUENCE

1. PREPARE CHASSIS, DEGREASE PRIME AND PAINT.
2. BUILD FRONT SUBFRAME ASSEMBLY AND FIT.
3. BUILD REAR SUBFRAME ASSEMBLY AND FIT.
4. ENGINE STEADY MOUNTING.
5. SPECIAL REAR SUSPENSION.
6. DASHBOARD SUPPORT AND STEERING COLUMN.
7. PEDAL ASSEMBLY AND MASTER CYLINDERS.
8. BRAKES.
9. CLUTCH.
10. FRONT MOUNTED RADIATOR AND PIPES.
11. ACCELERATOR PEDAL AND CABLE.
12. GEARCHANGE.
13. CHOKE CABLE.
14. PETROL TANK, FUEL PUMP, AND PIPE.
15. BATTERY AND BATTERY LEADS.
16. HEATER AND CABLE.
17. HANDBRAKE AND CABLES.
18. BODY SHELL TO CHASSIS.
19. BONNET TO CHASSIS.
20. DOORS TO CHASSIS.
21. ENGINE AND BOOT COVER.
22. REAR BUMPER.
23. FRONT BUMPER.
24. WIRING LOOM.
25. WIPER MOTOR AND ARM.
26. DASHBOARD AND INSTRUMENTS.
27. SOUNDPROOFING.
28. HEADLINING.
29. FRONT AND REAR SCREENS.
30. SEAT BELTS.
31. CARPETS.
32. SEATS.

## INTRODUCTION

The GTM coupe was first manufactured in 1968 following its launch at the 1967 Sports Car Show. Although there have been numerous changes to details on the car, the principle design layout has remained unchanged. Although the GTM has never been produced in great numbers, its twenty years of production have seen a steady development of the original concept into the current Coupe which incorporates 13" wheels and a fully gel-coated finished bodyshell. The technical details have also changed and improved with the development of the Mini and Metro and today's Coupe takes advantage of the better developments of these cars.

The GTM is a mid-engined 2-seater sports car designed to give outstanding performance and impeccable handling. It utilises a purpose-designed, extremely rigid and strong steel chassis. The body is moulded in glass fibre and carries no mechanical load. The mid-engined configuration is similar to that used by the majority of the world's famous (and highly expensive) sports car manufacturers.

The GTM utilises two mini front sub-frames with rubber suspension. The engine, gearbox, brakes, hubs, drive shafts and the majority of the suspension components come direct from a Mini, all other suspension components being supplied by GTM Cars Ltd. The constructor can thus complete his GTM at a very reasonable cost by using a second hand mini as a basis for his car.

## CHASSIS

The chassis is fabricated from 18-20 swg steel, to incorporate the floor pan, boxed sills and the central tunnel box section. It forms a very robust structure.

The fabrication is carried forward in order to locate the front sub-frame, and a 1" square tubular space frame extends beyond the rear bulk head to carry the rear sub-frame.

Welding is carried out by MIG for consistent quality and to avoid distortion. The chassis is fully jigged during manufacture to ensure a true and accurate assembly.

## BODY

The body is moulded in high quality glass reinforced plastic. It is extremely tough, non rusting and, being unstressed, is not subject to gel-coat star crazing as found on many cars using GRP body shells. The windscreen is laminated glass and the rear screen perspex.

## DOORS

The doors are double skinned glass fibre fitted with anti-burst locks, steel window frames, and steel strengtheners to avoid door drop, often found on glass fibre cars. The sliding windows are toughened glass.

### BONNET

The bonnet is again moulded in high quality glass reinforced plastic. It is hinged at the front to give access to the under bonnet space.

### BOOT

Completely separate boot compartment, situated behind the engine, offering 4 cu. ft. of easily accessible luggage space with separate locking boot cover.

### MAJOR STATISTICS

Wheelbase 84"	Overall Length 130"	Interior Length 55"
Track 50"	Ground Clearance 5"	Interior Width 49"
Overall Height 42"	Interior Height 37"	Weight (Road Trim) 12 cwt.

It has been the policy of GTM Cars Ltd. to reduce the non-Mini content of the Coupe to as few components as possible, thus enabling the customer to utilize as many of the standard Mini items as possible from his donor vehicle. However, there are still a number of items that have to be sourced from other vehicles. The following list covers all items required to complete the build of a GTM Coupe.

### Non-Mini Components

Dolomite Steering Column: Complete column assembly including cowling switches and keys. Wiring plugs directly into GTM loom.

There are two universal joints on the Dolomite column. Disregard the longer one connected to the column but use the smaller one (rubberised) to connect the column spline to the steering rack.

### Instruments:

Any instruments that will fit into the GTM supplied dashboard i.e. Smiths, Veglia etc. All separate instruments will fit (including Triumph Dolomite). Speedo will have to be recalibrated.

Radiator and Fan  
Front Indicators  
Headlamp Rims  
Wiper Arm  
Wiper Blade  
Steering Wheel  
Petrol Tank Cap

1750cc Allegro  
to suit customer requirements. (Morris 1100)  
8" chrome (MGB Roadster).  
Mini adjustable.  
17" blade.  
Boss to suit Dolomite column.  
MK II Escort.

### Mini Components

GTM Front: Subframe, pre face lift, twin bolt fixing.  
Front suspension complete.  
Front hubs and brakes, disc or drums (discs preferable).  
Mini steering rack, steering arms, and track rod ends.  
Brake light switch and banjo.  
Flexible brake hoses, (subframe to hubs).  
Battery and battery leads.  
Shock absorbers (standard Mini front).  
Pedal assembly.  
Accelerator pedal.  
Master cylinders to suit disc or drum.  
Fuse box.  
Mini headlight assembly including rear bowls.  
Side lights either in the headlight unit or separate units.  
Wiring from light unit to connect to GTM loom.  
Wiper motor and one gear box drive plus drive link.  
Screen washers.  
Radiator expansion tank.  
Side window catches (Mini Estate).  
Rear view mirror.  
Heater (preferably steel casing type).  
Handbrake (twin cable).  
Seat belts.

GTM Rear:

Subframe, pre face lift, twin bolt fixing.  
Suspension complete.  
Mini rear brake assembly and back plates (modified).  
Drive shafts to suit engine.  
Engine and gear box plus mountings and all  
accessories i.e. alternator  
distributor  
coil  
carburettor and inlet manifold.  
gear change (twin shaft) plus  
remote linkage  
gear stick and gear stick housing  
engine steady  
engine mounted heater switch  
flexible brake pipes (subframe  
to hubs)  
Allegro thermostat housing  
rear number plate light

## GLASSFIBRE

### TOOLS AND EQUIPMENT

#### FILES

To cut effectively, files should be of coarse metal-cutting type, and new. The life of a file used on glass fibre is very limited, and it should be discarded when it shows signs of becoming blunt.

#### DRILLS

Glass fibre must be considered as metal for the purpose of drilling. Only high speed steel twist drills should be used, with the lowest possible drilling speed (particularly with larger drill sizes). Drilling should always be done from the gel side, and the other side of the moulding backed up with a block of wood to limit the extent of tearing or cracking when the drill breaks through. A hole drilled from the opposite side will almost invariably damage the gel coat, even if backed up.

Drills used for drilling glass fibre should always be sharp, and ground to the same point angle as for cutting metals. In the case of drill sizes of 3/8" and above, the point angle of the drill can be reduced with some advantage. No lubricant is normally required, but if a drill does show signs of running hot, water can be used to cool it.

#### ABRASIVE PAPERS

Any "finish sanding" on GRP mouldings should always be done with wet and dry abrasive papers, used wet and frequently rinsed off to clean. Some authorities also recommend the addition of a little soap to the rinsing water to act as a lubricant.

For "rough" sanding 240 grit will be suitable. Progressively, finer grades down to 800 or even 1000 grit can be used for final smoothing. The surface can be further improved by buffing and polishing with metal polish, polishing compound or jeweller's rouge. A final overall finish can be given by wax polishing, provided this is acceptable to the application.

#### FINISHING EDGES

Although all edges are ready trimmed to size, we advise you to smooth them to neaten the moulds and reduce the risk of cuts from handling raw edges of glassfibre. This operation can be done with either production paper (dry) or wet and dry paper and simply requires rubbing around all the mould which have open edges. Take care not to scratch the finished gel-coat of the moulds with the production paper.

### FLATTENING SEAMS

The external seams caused by the joining of the mould i.e. rear of car to rear wheel arch, need to be removed with wet and dry paper. Start with 600 grit paper and work up to 1000 grit, smooth the seam until it is flat and then rub with "T" cut or rubbing compound to bring back the shine. A strip of masking tape run down either side of the seam will ensure that only the seam line is removed and reduce the area to be polished.



1. PREPARE CHASSIS, DEGREASE, PRIME AND PAINT.

If you have decided not to have the chassis stove enamelled, you have to prepare and treat the structure to protect it from rusting. It cannot be emphasised too greatly the importance of this stage in the building of your GTM. If the chassis is not adequately protected from the elements, it will start to show signs of corrosion within a few years. If time and care is taken at this stage, the chassis will last much longer than any production car.

The chassis is normally supplied in the bare steel form, still retaining its protective coating of engineers oil. The first stage is to remove all grease and oil from all surfaces. This is done with clean, dry absorbant cloths. If the oil is difficult to remove, a standard solvent (i.e. white spirit) will help.

The structure is then ready for painting. Everyone has their own particular views on how to protect steel, whether it be red lead or Hammerite.

Our own suggested system involves spraying the chassis with an etch-primer which will key into the bare steel. Once this has been applied, a second coat of primer filler will build up a good base before a final top coat of the desired colour.

The chassis is manufactured from sheet steel. Where these sheets are joined, a layer of Auto Seam Sealer is advised. This is normally applied from a tube with the aid of a sealing gun and should be pushed into all the joints on the chassis to stop water seeping into the joint. A further layer of top coat paint can be applied on top of the sealer if required.

Finally the base of the chassis should be undersealed for maximum protection.

## FRONT SUB-FRAME ASSEMBLY

The assembly procedure for the front sub-frame is identical to a standard Mini. The following section covers the suspension and steering in detail, if there is any doubt regarding the procedure, we recommend reference to a 'HAYNES' manual.

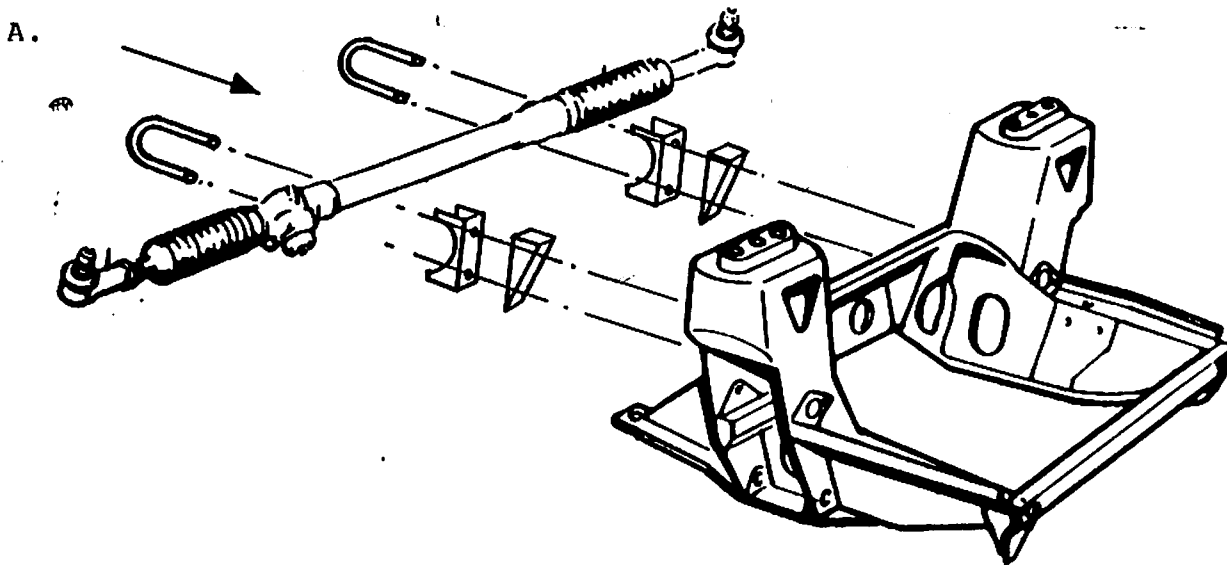
The assembly stops where the constant velocity joint in the front hub connects to the drive shaft, the remains of the constant velocity joint within the front hub are removed by braking the ball housing (a sharp blow with a hammer will suffice, eye protection will be required).

## STEERING RACK

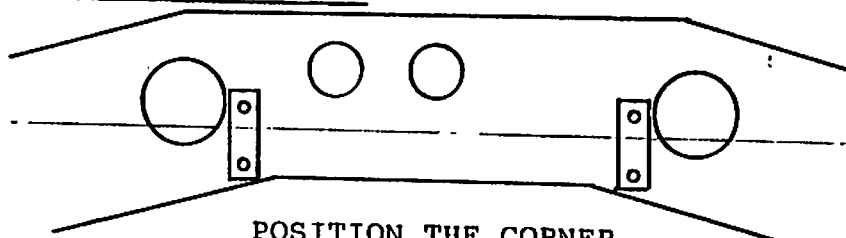
The steering rack is standard Mini and locates onto the Mini front sub-frame as opposed to the body shell on the original Mini. This enables the front sub-frame to be fitted and removed as a complete unit.

The position of the mounting brackets and assembly procedure are shown diagram , some of the rack casing has to be removed to allow the rack clamps to fit properly. This is done with a file.

The rack is then assembled to the sub-frame but left loose and should be tightened when the column is fitted and the rack is centralised.



VIEW OF SUB-FRAME FROM POSITION 'A'



POSITION THE CORNER  
OF THE BRACKET AGAINST  
THE EDGE OF THE SUB-  
FRAME.

LINE UP BRACKET WITH  
THE EDGE OF THE HOLE.

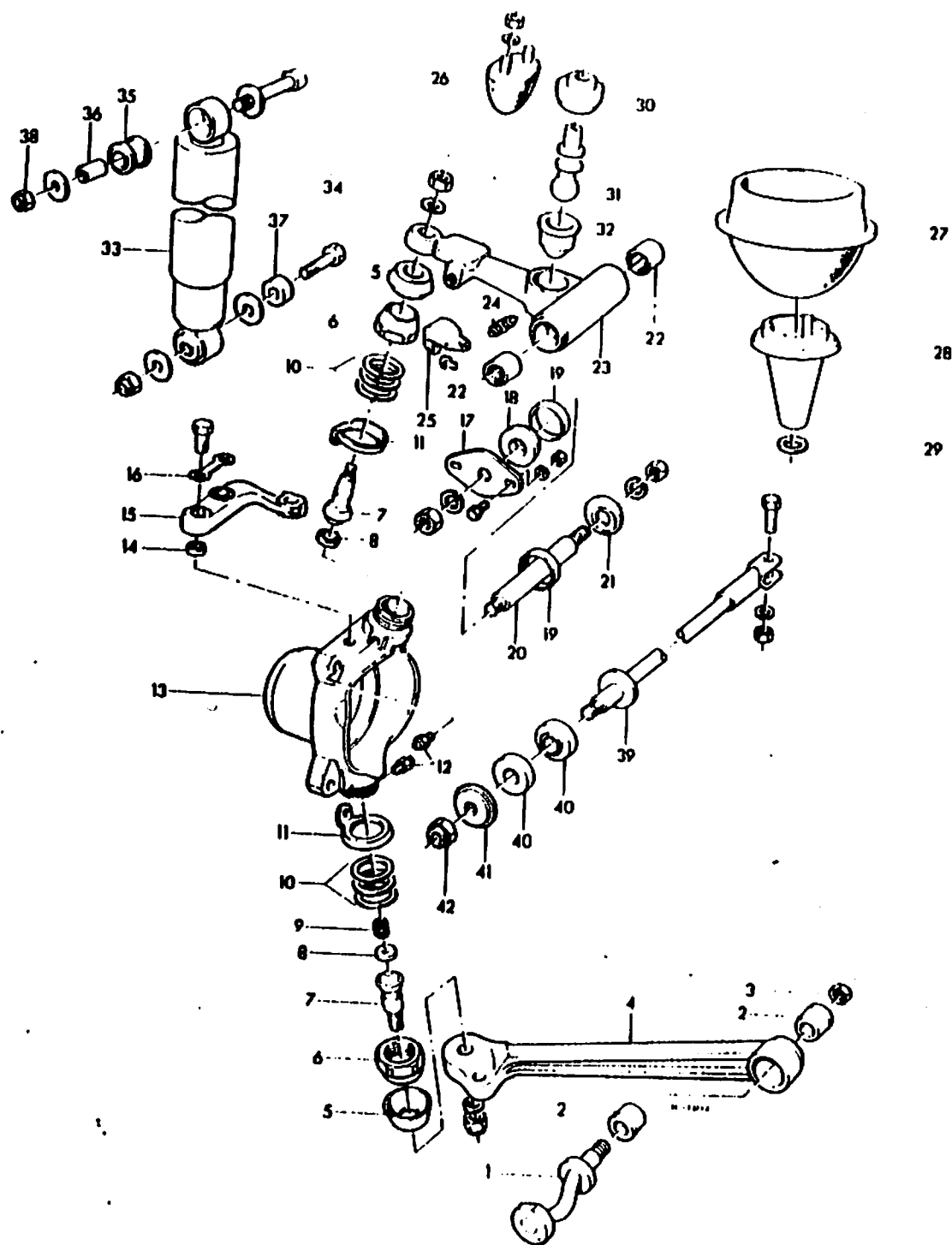


Fig. 11.1 Exploded view of the front suspension - rubber cone spring type (Sec 1)

- |                        |                           |                          |                   |
|------------------------|---------------------------|--------------------------|-------------------|
| 1 Lower arm pivot pin  | 12 Grease nipple          | 23 Upper suspension arm  | 33 Shock absorber |
| 2 Bushes               | 13 Swivel hub             | 24 Grease nipple         | 34 Upper mounting |
| 3 Locknut              | 14 Ring dowel             | 25 Rebound buffer        | 35 Upper bush     |
| 4 Lower suspension arm | 15 Steering arm           | 26 Bump buffer           | 36 Sleeve         |
| 5 Dust cover           | 16 Lockwasher             | 27 Rubber cone spring    | 37 Distance piece |
| 6 Ball-pin retainer    | 17 Retaining plate        | 28 Cone strut            | 38 Locknut        |
| 7 Ball-pin             | 18 Thrust collar          | 29 Spacer (where fitted) | 39 Tie-bar        |
| 8 Ball-seat            | 19 Sealing rings          | 30 Dust cover            | 40 Tie-bar bushes |
| 9 Spring               | 20 Upper arm pivot shaft  | 31 Knuckle               | 41 Cup washer     |
| 10 Shims               | 21 Thrust washer          | 32 Ball socket           | 42 Locknut        |
| 11 Lockwasher          | 22 Needle roller bearings |                          |                   |

## Suspension and steering

### 1 General description

The front and rear suspension assemblies and associated components are mounted on subframes which are bolted to the underside of the bodyshell. The subframes are of welded all-steel construction, the front subframe also providing mounting points for the engine/transmission assembly.

The front suspension on all Mini models is of the independent type, each side consisting of a lower wishbone and single upper link. The lower wishbone is supported in rubber bushes at its inner end, while the inner end of the upper link pivots on two caged needle roller bearings. The outer ends of the two suspension arms are bolted to the tapered shanks of the upper and lower swivel hub balljoints. Fore-and-aft movement of each front suspension assembly is controlled by a tie-bar bolted at one end to the lower wishbone and mounted at the other end, via rubber bushes, to the subframe. The swivel hub contains tapered roller or ball bearings which support the outer ends of the driveshafts, and also provides mounting points for the drum brake backplate or disc brake calipers. Suspension and steering movement of the swivel hub is catered for by adjustable upper and lower balljoints.

While all Mini models share the same suspension component layout, two different types of springing and damping have been employed. All models are now equipped with dry suspension, whereby a rubber cone spring and telescopic shock absorber are fitted to the suspension assembly at each wheel. Early Clubman and 1275G1

The steering gear is of the conventional rack-and-pinion type and is secured by a U-bolt at each end of the rack housing.

Tie-rods from each end of the steering gear housing operate the steering arms, via both exposed and rubber gaiter enclosed balljoints. The upper splined end of the helically toothed pinion protrudes from the rack housing and engages with the splined end of the steering column. The pinion spline is grooved and the steering column is held to the pinion by a clamp bolt which partially rests in the pinion groove.

### 3 Suspension and steering components - inspection for wear

#### Steering

1 First check for wear in the steering tie-rod outer balljoints. Turn the steering to left or right lock sufficiently to allow the joints to be observed. Now have an assistant turn the steering wheel back and forth slightly. If there is any side movement in the balljoint it must be renewed. Similarly place your hand over the rubber gaiter at the end of the rack housing and feel for any excess free play of the inner balljoint. If the condition of this joint is suspect, a further investigation should be carried out with the gaiter removed. If necessary, adjust as described in Section 30.

#### Front suspension

2 To inspect the front suspension, jack up the front of the car and support it on axle stands.  
3 Grasp the roadwheel at the 12 o'clock and 6 o'clock positions and try to rock it. If any movement is felt it is likely to be in one or more of the following areas:

#### Wheel bearings

4 Continue rocking the wheel while your assistant depresses the footbrake. If the movement disappears or becomes less severe, then the wheel bearings in the swivel hub are at fault. If the movement felt at the roadwheel is greater than 0.25 in (6.3 mm), the bearings should be renewed.

#### Swivel hub balljoints

5 Wear of the swivel hub balljoints is fairly common on Minis and will be quite obvious on inspection because the whole swivel hub will appear to move in relation to the suspension arms as the wheel is rocked. If this is the case, the balljoints should be adjusted, or if badly worn, renewed as described in Section 8.

#### Suspension arm mountings

6 Check for wear of the lower arm inner mounting bushes where the arm is bolted to the subframe. If the bushes are worn, the arm will appear to move in and out as the wheel is rocked.

7 The upper arm inner roller bearings cannot be inspected without partially dismantling the suspension because the rubber cone spring or displacer unit holds the arm in tension and any wear will not be evident. It can be removed for closer inspection if required as described in Section 9; however, wear of the upper arm and its bearings is uncommon.

8 With the brakes still firmly applied, try to rotate the wheel back and forth. If any movement is now felt, examine the tie-bar between the lower suspension arm and subframe for wear or deterioration of the rubber bushes.

### 4 Front swivel hub - removal and refitting

1 Remove the wheel trim and slacken the roadwheel retaining nuts.  
2 Extract the split pin and then undo and remove the driveshaft retaining nut and thrust collar (photo).

3 Working under the wheel arch, undo and remove the single retaining screw and lift out the upper suspension arm rebound rubber. Insert a solid packing piece of approximately the same thickness in its place.

4 Jack up the front of the car and support it on axle stands placed under the subframe. Remove the front roadwheel.

5 On disc brake models, undo and remove the brake caliper retaining bolts. Lift off the caliper complete with brake pads, and tie it out of the way from a convenient place under the wheel arch. On models fitted with drum brakes, clamp the flexible brake hose with a proprietary brake hose clamp or a self-gripping wrench with its jaws suitably protected. Now slacken the brake hose union, at the wheel cylinder by half a turn.

6 Undo and remove the steering tie-rod outer balljoint retaining nut and then separate the taper of the balljoint shank from the steering arm, using a universal balljoint separator (photo). If a separator is not available, refit the retaining nut two turns and then firmly strike the end of the steering arm with a few sharp blows, using a medium hammer. When the shock has freed the taper, remove the retaining nut and lift off the balljoint.

7 Next undo and remove the nuts securing the upper and lower swivel hub balljoints to the suspension arms (photo), and release the balljoint shank tapers from the suspension arms, using the procedure described in the previous paragraph.

8 Carefully lift the swivel hub assembly off the two suspension arms. At the same time, tap the centre of the driveshaft, using a soft-faced mallet, until the driveshaft can be withdrawn from the rear of the swivel hub assembly.

9 On disc brake models, withdraw the swivel hub assembly and then lift off the driving flange and disc. On models fitted with drum brakes, support the flexible brake hose to avoid stretching it and then rotate the complete swivel hub assembly anti-clockwise to unscrew it from the hose (photo). The hub can now be lifted away and the end of the brake hose protected to prevent dirt ingress. Take care not to lose the copper sealing washer from the end of the hose as the hose is removed.

10 Refitting the swivel hub assembly is the reverse sequence to removal, bearing in mind the following points:

- (a) Ensure that the flexible brake hose is not twisted when refitting the swivel hub to models equipped with drum brakes, and bleed the hydraulic system at the appropriate wheel on completion of the reassembly
- (b) Tighten all retaining nuts and bolts to the specified torque
- (c) Finally, tighten the driveshaft retaining nut when the vehicle has been lowered to the ground (photo)

### 5 Front hub bearings - removal and refitting

#### Drum brake models

1 Remove the swivel hub assembly from the car as described in the previous Section.

2 With the assembly on the bench, slacken the brake adjusters, remove the two brake drum retaining screws and lift off the drum. If it is tight, tap it gently using a soft-faced mallet.

3 Arrange two robust wooden blocks approximately 10 in (250 mm) high, on the bench, far enough apart for the drive flange to lie freely between them, with the brake shoes resting on the top of the blocks. Using a tube or drift of suitable diameter, tap the drive flange out of the hub. It is likely that the inner race of the outer bearing together with the oil seal and the outer bearing distance piece will come away with the flange. If this happens, carefully remove these items from the flange with the aid of a puller.

4 Now undo and remove the four bolts securing the brake backplate to the swivel hub and lift off the backplate with brake shoes still in position.

### Disc brake models

19 Remove the swivel hub assembly from the car as described in the previous Section.

20 With the assembly on the bench, lift off the tapered collar (fitted to certain Cooper S models) from the front of the outer bearing and then prise out the two oil seals using a screwdriver. Now lift out the inner bearing spacer, the two taper roller bearings and the distance piece.

21 Using a suitable drift, tap out the two bearing outer races from each side of the hub.

22 Thoroughly clean the bearings and swivel hub in petrol or paraffin and dry with a lint-free rag. Remove any burrs or score marks from the hub bore with a fine file or scraper.

23 Carefully examine the bearing outer races, the rollers and roller cages for pitting, scoring, or cracks, and if at all suspect renew the bearings. It will also be necessary to renew the oil seals as they will have been damaged during removal.

24 Begin reassembly by refitting the bearing outer races to the hub, with their smaller diameter toward the hub centre. Press the outer races into the hub using a tube of suitable diameter and a vice, or very carefully tap them into place using a brass drift. Ensure that the race does not tip slightly and bind as it is being installed. If this happens, the outer race will crack so take great care to keep it square. The outer race must seat firmly against the shoulder in the centre of the hub when fitted.

25 Pack the two roller bearings with a high melting-point grease and position them in their outer races with the distance piece in between.

26 Install the two new oil seals with their sealing lips inwards and use a tube of suitable diameter to tap them fully home. Note that there is a spacer fitted behind the inner oil seal and that the inner seal also has a second lip on its inner circumference.

27 Position the tapered collar over the outer bearing (where fitted), and refit the swivel hub assembly to the car as described in the previous Section. When refitting the swivel hub, ensure that the water shield on the driveshaft is packed with grease around its sealing face and positioned 0.25 in (6.35 mm) from the end of the shaft.

### 6 Front swivel hub balljoints - removal and refitting

1 Remove the swivel hub assembly from the car as described in Section 4 and mount it firmly in a vice, with the balljoint requiring attention uppermost.

2 Remove the rubber dust cover, tap back the lockwasher, and using a large socket or box spanner, undo and remove the domed retaining nut.

3 Lift off the ball-pin, ball-pin seat, and if working on the lower balljoint assembly, the ball-pin seat tension spring.

4 Lift off the shims located over the lockwasher and then remove the grease nipple and lift away the lockwasher.

5 Clean all the components thoroughly and then carefully inspect the ball-pin, ball-pin seat and domed nut for pitting, score marks or corrosion.

6 If the components are worn, a balljoint repair kit, consisting of new ball-pin, ball-pin seat, spring, shims, lockwasher and retaining nut should be obtained from your local dealer. If the old parts are in a satisfactory condition they may be re-used and any slackness that may have been previously felt in the joint can be taken up by adjustment of the shim sizes.

7 Before final reassembly of the balljoint, it is necessary to determine the correct number and size of shims required to provide a snug fit of the ball-pin with the domed retaining nut fully tightened. This is done in the following way.

8 Place the lockwasher in position and refit the grease nipple. Now place all the available shims over the lockwasher and then refit the ball-pin seat, the ball-pin and domed retaining nut. Assemble all the parts without grease at this stage, and if working on the lower balljoint do not fit the ball-pin seat tension spring.

9 Fully tighten the retaining nut and then check the movement of the ball-pin. With all the available shims fitted, it should be quite slack with considerable up-and-down movement.

10 Using a trial and error process, remove the retaining nut, take out a shim and then refit the nut and recheck the movement of the ball pin. Continue doing this until it is possible to move the ball-pin in all directions, without binding, but with slight resistance to movement being felt.

11 Dismantle the joint again, lubricate all the parts with general purpose grease and finally reassemble the joint. If working on the lower assembly, the ball-pin seat tension spring should now be fitted (photos).

12 Tighten the retaining nut fully, check that the ball-pin still moves freely with only slight resistance, and if satisfactory bend up the lockwasher to secure the retaining nut (photos).

13 Refit the rubber dust cover to the ball-joint (photo) and then refit the swivel hub to the car as described in Section 4.

### 7 Front lower suspension arm - removal and refitting

1 Remove the wheel trim and slacken the roadwheel retaining nuts.

2 Working under the wheel arch, undo and remove the single retaining screw and lift out the upper suspension arm rebound rubber. Insert a solid packing piece of approximately the same thickness in its place.

3 Jack up the front of the car and support it on axle stands placed under the subframe. Remove the front roadwheel.

4 Undo and remove the nut and washer securing the swivel hub balljoint to the lower suspension arm. Release the taper of the balljoint shank using a universal balljoint separator. Alternatively refit the nut two turns to protect the threads, and then firmly strike the end of the suspension arm, using a few sharp blows from a medium hammer until the taper is released. Now remove the retaining nut.

5 Move the lower suspension arm downwards to disengage the balljoint shank.

6 Next undo and remove the nut and bolt securing the tie-bar to the suspension arm and then move the tie-bar sideways out of the way.

7 Undo and remove the nut and washer from the rear of the pivot bolt securing the lower suspension arm to the subframe (photo).

8 Lever the pivot bolt forward and off the subframe and then lift out the lower suspension arm.

9 Lift the rubber bushes off the suspension arm and inspect them carefully for swelling, cracks or deterioration of the rubber. Also inspect the pivot bolt for wear or damage. Renew any worn components.

10 Refitting the lower suspension arm is the reverse sequence to removal, bearing in mind the following points:

- (a) Ensure that the flat of the pivot bolt head locates under the tab on the subframe
- (b) Do not fully tighten the pivot bolt retaining nut until the car has been lowered to the ground
- (c) Ensure that all nuts and bolts are tightened to the specified torque.

### 8 Front suspension tie-bar - removal and refitting

1 Remove the wheel trim, slacken the roadwheel retaining nuts, jack up the front of the car and support it on axle stands placed under the subframe. Remove the roadwheel.

2 Undo and remove the locknut securing the front end of the tie-bar to the subframe (photo). Now lift off the thrust washer and the rubber thrust bush.

3 Undo and remove the bolt, nut and spring washer securing the other end of the tie-bar to the lower suspension arm. Disengage the tie-bar from the suspension arm and subframe and then lift it off the car. Slide the remaining rubber thrust bush off the tie-bar end.

4 Carefully inspect the tie-bar thrust bushes for swelling, compression damage or deterioration of the rubber and check the tie-bar for straightness and elongation of the mounting bolt holes. Also check the securing bolt for wear of its shank. If any of the components are defective a new tie-bar kit should be obtained from your local dealer.

5 Refitting the tie-bar is the straightforward reverse of the removal sequence.

### 9 Front upper suspension arm - removal and refitting

*If working on cars equipped with rubber cone suspension, special tool 18G5748 will be required to compress the rubber cone.*

1 Remove the wheel trim, slacken the roadwheel retaining nuts and jack up the front of the car. Place axle stands under the subframe and then remove the roadwheel.

2 Undo and remove the nut and spring washer securing the swivel hub balljoint to the upper suspension arm.

3 Using a universal balljoint separator, release the taper of the balljoint shank from the upper suspension arm. Alternatively, refit the nut two turns to protect the threads and then sharply strike the end of the suspension arm using a medium hammer until the taper is released. Now remove the nut and disengage the balljoint shank from the arm.

4 The procedure now varies slightly depending upon whether Hydrolastic or rubber cone suspension is fitted.

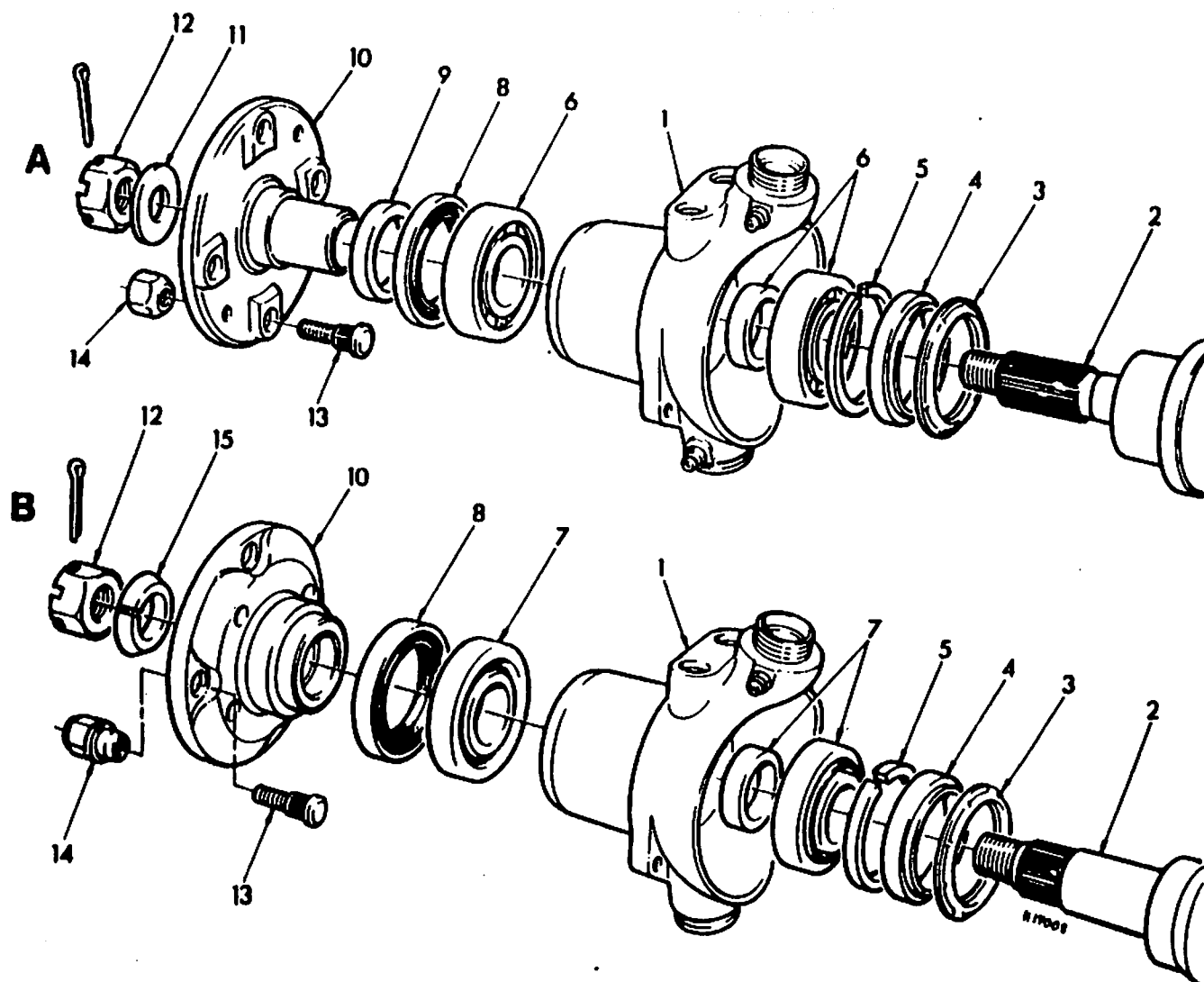
- 1 Swivel hub
- 2 Driveshaft
- 3 Water shield
- 4 Inner oil seal
- 5 Oil seal spacer

#### A Drum brake models

- 6 Ball bearing and spacer set
- 7 Taper roller bearing and spacer set

#### B Disc brake models

- 8 Outer oil seal
- 9 Distance ring
- 10 Driving flange
- 11 Thrust washer
- 12 Castorated hub nut
- 13 Wheel stud
- 14 Wheel nut
- 15 Thrust washer



5 Clean away any surplus grease from the centre of the hub between the bearings, and then prise out the two oil seals using a screwdriver. Note that there is a spacer fitted between the rear oil seal and the bearing outer race.

6 Using a tube or drift of suitable diameter tap out the bearing inner races away from the centre of the hub. Take care not to lose the balls which will be dislodged as the inner races are released, and recover the spacer fitted between the two bearings.

7 Firmly support the swivel hub in a vice and drift out the two bearing outer races from each side of the hub.

8 Clean the bearings and swivel hub thoroughly in petrol or paraffin and dry with a lint-free rag. Remove any burrs or score marks from the hub bore with a fine file or scraper.

9 Examine carefully the bearing inner and outer races, the balls and ball cage for pitting, scoring or cracks, and if at all suspect renew the bearings. It will also be necessary to renew the oil seals as they will have been damaged during removal.

10 If the old bearings are in a satisfactory condition and are to be re-used, reassemble the balls to the ball cage, place it in the outer race and then press the inner race into position.

11 Before refitting the bearings to the hub, pack them thoroughly with a high melting-point grease. Do not fill the space between the bearings in the swivel hub with grease.

12 Place one of the bearings in position on the hub with the word **THRUST** or the markings stamped on the outer race facing toward the centre of the hub. Note: Certain later models are fitted with bearings having lengthened inner races which butt against each other. On these assemblies the bearing spacer is omitted and the bearings are fitted with the identification markings facing away from the centre of the hub. Using a tube of suitable diameter or a drift, press the outer race into the hub between the vice jaws or very carefully tap it into position. Ensure that the outer race does not tip slightly and bind as it is being fitted. If this happens, the outer race will crack so take great care to keep it square. Ensure that the bearing seats firmly against the

shoulder in the centre of the hub when fitted.

13 Now place the bearing spacer in position and repeat the previous paragraph for the second bearing.

14 Tap a new oil seal into place over the outer bearing using a block of wood to keep it square. Note that both oil seals are fitted with their sealing lips inwards and that the inner seal has a second lip on its inner circumference.

15 Refit the split spacer against the inner bearing and tap in the inner oil seal using a tube of suitable diameter.

16 Refit the brake backplate to the swivel hub and secure with the four retaining bolts, tightened to the specified torque.

17 Place the distance piece over the driving flange with the chamfer towards the flange. With the inner race of the inner bearing suitably supported, tap the driving flange into the bearings. Ensure that the flange enters the distance piece between the two bearings squarely, otherwise the bearing inner race will be dislodged with possible damage to the oil seal.

18 The brake drum and its retaining screws can now be refitted and the complete swivel hub assembly refitted to the car as described in the previous Section. When refitting the hub assembly, ensure that the water shield on the driveshaft is packed with grease around its sealing face and positioned 0.25 in (6.35 mm) from the end of the shaft.

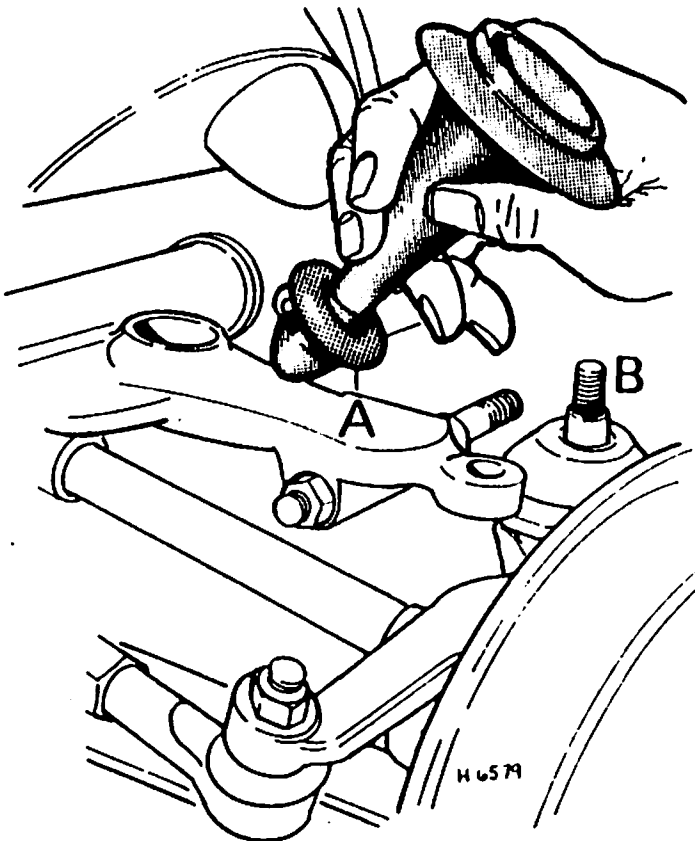
### Rubber cone suspension models

10 Undo and remove the nut and flat washer securing the shock absorber to the upper suspension arm. Now move the shock absorber sideways until it is clear of the mounting stud.

11 Working in the engine compartment, undo and remove the two bolts (or nuts) securing the subframe tower to the bulkhead crossmember. Lift off the locking plate and then refit the bolts (or nuts). On later models undo and remove the large hexagon-headed plug that is used instead of the two bolts or nuts (photo).

12 It is now necessary to compress the rubber cone spring using service tool 18G574B as follows. Position the body of the tool over the two subframe tower retaining bolts (or nuts) and turn the tool centre screw, nine complete turns, to engage the threads in the rubber cone. Now turn the ratchet handle of the tool until it contacts the tool body. Hold the centre screw and turn the ratchet handle clockwise until all tension is removed from the strut which interconnects the rubber cone and the upper suspension arm.

13 Undo and remove the single retaining screw and lift out the upper suspension arm rebound rubber.



Suspension strut removal - rubber cone spring suspension (Sec 9)

14 Lift up the rubber dust cover around the knuckle joint located at the base of the spring strut.

15 Withdraw the ball end of the knuckle joint from its seat in the upper arm and then lift out the spring strut assembly from the rubber cone. If it is tight, prise it out using a screwdriver.

16 Undo and remove the nut and spring washer from each end of the upper arm pivot shaft.

17 Undo and remove the two nuts, bolts and spring washers securing the pivot shaft thrust collar retaining plate, thrust collar and seal and then withdraw the pivot shaft forward and out of the upper suspension arm.

18 Now take out the rear thrust collar and seal and then manipulate the upper arm out of the subframe.

19 With the upper arm removed, inspect the pivot shaft and the needle roller bearings for wear, and if necessary renew them. The needle roller bearings can be removed from the upper arm by tapping them out of each side using a long thin drift inserted through the other side. Press in new bearings using a vice, or drift them in using a tube of suitable diameter or a shouldered mandrel. Ensure that the marked ends of the bearings face outwards.

20 Also carefully inspect the ball end of the knuckle joint and its plastic cup seat in the upper arm. If the ball end is corroded, worn or pitted or if the plastic cup seat is cracked or worn, renew the joint. The plastic cup seat can be removed by prising out with a screwdriver. The new knuckle joint will be supplied fully assembled and the plastic cup seat can be fitted to the arm with the joint in this condition. The rubber dust cover and ball end will then have to be removed to allow

refitment of the upper arm.

21 Refitting the upper suspension arm is the reverse sequence to removal bearing in mind the following points:

- Lubricate all the parts with general purpose grease during reassembly.
- If the original knuckle joint is being refitted, pack the cup seat with Dextragrease Super GP available from BL dealers.
- Ensure that the dust cover is correctly located over the knuckle joint cup, when refitting, otherwise dirt and road grit will enter the joint.
- Ensure that all nuts and bolts are tightened to the specified torque.

### 10 Front suspension rubber cone spring - removal and refitting

1 Begin by removing the front upper suspension arm as described in the previous Section.

2 The service tool 18G574B that is used to compress the rubber cone must now be released by turning the ratchet anti-clockwise until all tension in the rubber cone is released.

3 Now unscrew the service tool and withdraw the rubber cone from its location in the subframe.

4 Refitting is the reverse sequence to removal.

### 12 Front shock absorber (rubber cone suspension models) - removal and refitting

1 Remove the wheel trim, slacken the roadwheel retaining nuts and jack up the front of the car. Place axle stands under the subframe and remove the roadwheel.

2 Undo and remove the shock absorber upper and lower retaining nut and washers and lift off the shock absorber (photos).

3 Examine the shock absorber for leaks or damage of the outer casing. Hold the shock absorber upright and fully compress and extend it six times. Now slowly extend and compress it again. If 'dead' areas are apparent, if there is free travel when changing direction, or if the unit is damaged or leaking, it must be renewed.

4 Refitting is the reverse sequence to removal. Hold the shock absorber in an upright position and fully compress and extend it six times to expel any air before fitting.

### 13 Steering tie-rod outer balljoint - removal and refitting

**Note:** If any side movement is present in the outer balljoint, it will be necessary to renew the complete joint as it cannot be dismantled or repaired.

- 1 Withdraw the wheel arm, slacken the roadwheel retaining nuts and jack up the front of the car. Position axle stands under the subframe and remove the roadwheel.
- 2 Slacken the locknut on the steering tie-rod a quarter of a turn.
- 3 Undo and remove the balljoint shank locknut and separate the taper of the shank using a universal balljoint separator. Alternatively, refit the nut two turns and sharply strike the end of the steering arm with a medium hammer. When the taper is released, remove the nut and lift the balljoint off the steering arm.
- 4 Hold the steering tie-rod with a self-gripping wrench and unscrew the balljoint from the tie-rod.
- 5 Refitting is the reverse sequence to removal. It will be necessary to have the front wheel alignment reset by your local dealer on completion of this operation.

### 14 Steering rack rubber gaiter - removal and refitting

**Note:** Should the rubber gaiters at each end of the steering rack become damaged, split or show any other signs of deterioration, they must be renewed immediately, otherwise the lubricant will be lost from the rack unit, and water and road grit will enter the assembly, causing rapid internal wear.

- 1 Begin by removing the steering tie-rod outer balljoint as described in the previous Section.
- 2 Mark the position of the locknut on the tie-rod so that it can be refitted in the same place and then unscrew it from the tie-rod.
- 3 Place a suitable container beneath the rubber gaiter to catch any oil that may spill from the rack (early models only).
- 4 Now undo and remove the two retaining clips or cut off the wire clips and then slide the gaiter off the rack housing and tie-rod.
- 5 Refitting the rubber gaiter is the reverse sequence to removal. With the gaiter in position refill the rack with the appropriate lubricant as described in Section 31 before refitting the retaining clips or wire.

### 15 Rack-and-pinion steering gear - dismantling and reassembly

**Note:** It is not possible to make any adjustments to the rack-and-pinion steering gear unless it is removed from the car. With it removed, it is as well to dismantle and examine the whole unit before making any adjustments. This will save having to remove the unit again later because of initial non-detection of wear. If wear is very bad it is advisable to fit an exchange reconditioned unit. It must be pointed out that dismantling and reassembly of the steering gear is rather involved and may be beyond the scope of the average DIY enthusiast. Read through the complete Section first to familiarise yourself with the procedure and ensure that the necessary tools and equipment are available before proceeding.

- 1 Mark the position of the locknuts on the tie-rods so that the toe-out is approximately correct on reassembly.
- 2 Slacken the locknuts and, gripping the tie-rods firmly with a self-gripping wrench, unscrew the tie-rod balljoints. Now unscrew the locknuts also.
- 3 If the steering gear is fitted with black rubber gaiters, it will be filled with oil. If it is fitted with transparent rubber gaiters it will be filled with grease. If working on the oil-filled type ensure that a container is available before proceeding further.
- 4 Unscrew the clips or cut the wires that secure the rubber gaiters to the rack housing and tie-rods. Carefully remove the gaiters, and on oil-filled types, drain the oil from the housing.
- 5 On inspection it will be seen that the ball housing at the inner end of each tie-rod is secured to the rack by a locking collar. The locking collar is then peened into a groove in the ball housing on early models, or retained by a grooved pin on later types.
- 6 On early models punch or prise up the peening and then unlock the ball housing and collar using 8L special tool No 18G1278. Alternatively, use two small Stillson wrenches, but take care not to damage the housing and collar faces.
- 7 On later models, it is first necessary to drill out the grooved pin. To do this use a 0.156 in (3.97 mm) drill, and drill to a depth of 1.6 in (4 mm). Now unlock the ball housing and collar using the procedure described in the previous paragraph.
- 8 Unscrew the ball housing and then lift off the tie-rod, ball seat and spring from the end of the rack. The locking collar can now be removed.

9 Repeat this procedure for the other tie-rod, noting that if these components are to be re-used they must be refitted to the same side of the rack from which they were removed.

10 At the base of the pinion housing, undo and remove the two rack damper cover bolts and spring washers. Lift off the damper cover together with its shims, and then withdraw the thrust spring, yoke, and O-ring seal from the rack housing.

11 Undo and remove the two bolts and lift off the pinion end cover together with its gasket and shims.

12 Carefully push out the pinion and lower bearing.

13 Withdraw the rack from the pinion end of the housing. **Note:** If the rack is withdrawn from the plain end of the housing the rack teeth will damage the support bush.

14 Extract the pinion upper bearing from the rack housing, followed by the oil seal.

15 From the plain end of the rack housing, undo and remove the small retaining screw and then withdraw the rack support bush. **Note:** On some models a rivet is used instead of a screw and this must be carefully drilled out.

16 Thoroughly clean all the parts with paraffin. Carefully inspect the teeth on the rack and the pinion for chipping, roughness, uneven wear, hollows, or fractures. Renew both components if either is badly worn.

17 Carefully inspect the component parts of the inner balljoints for wear or ridging, and renew as necessary.

18 The outer tie-rod joints cannot be dismantled, and if worn must be renewed as a complete assembly. Examine the component parts of the damper and renew any that show signs of wear. Pay particular attention to the oil seals; as a precautionary measure it is always best to renew them.

19 The rubber gaiters are particularly prone to damage and it is advisable to renew them as a matter of course.

20 Begin reassembly by refitting the rack support bush to the plain end of the rack housing. If the original bush is being refitted, align the screw holes in the bush and rack housing.

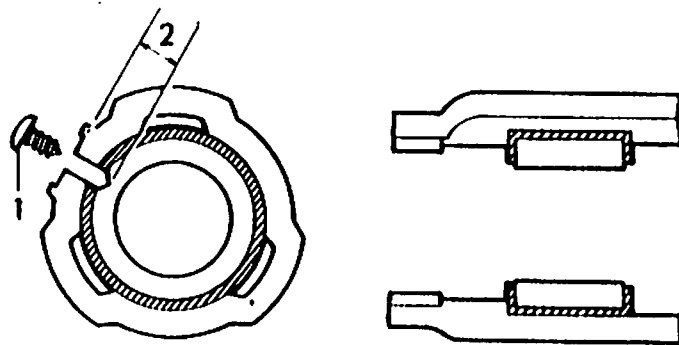
21 If a new rack support bush is being fitted, drill a 0.109 in (2.7 mm) hole, into the bush, through the retaining screw hole, to a depth of 0.142 in (10.5 mm).

22 Apply jointing compound to the threads of the support bush retaining screw. Refit and tighten the screw, then check that the bush bore has not distorted. Make sure that the screw does not break right through the bush into the bore.

23 Lubricate the upper pinion bearing and fit it into place in the housing. Use the pinion to push the bearing fully into position.

24 Insert the rack into the housing from the pinion end and then refit the pinion, splined end first.

25 Lubricate the lower pinion bearing and place it in position on the lower end of the pinion shaft.



Refitting the rack support bush

1 Retaining screw 2 Drill to a depth of 0.142 in (10.5 mm)

26 Refit the preload shims, using additional shims if necessary, until the shim pack stands proud of the pinion housing.

27 Refit the end cover and retaining bolts and tighten the bolts lightly and evenly until all pinion endfloat is taken up.

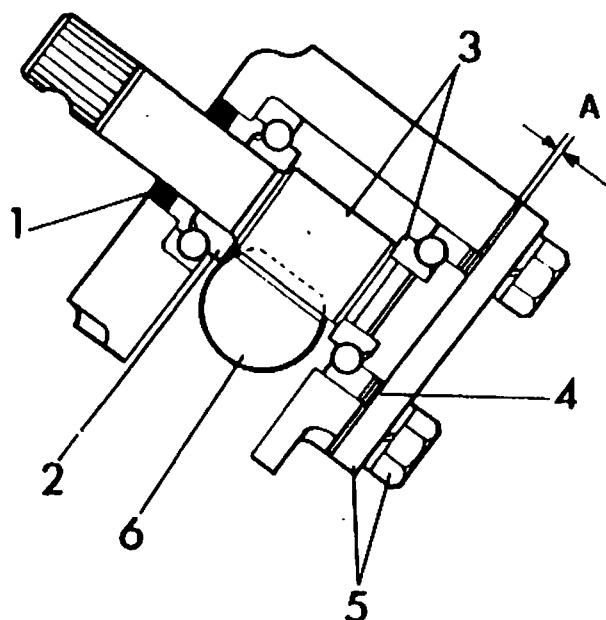
28 Using feeler gauges, measure the gap between the end cover and the pinion housing. Now take off the end cover and remove the appropriate number of shims until a gap of 0.011 to 0.013 in (0.28 to 0.33 mm) still remains.

29 With the correct shims in position, refit the end cover using a new gasket, and with the bolt threads lightly coated in jointing compound, tighten them fully.

30 Place a new oil seal over the pinion and insert it into the housing. The seal must be fitted with the seal lips toward the pinion bearing and with its top face flush with the end of the housing.



- 31 Lubricate the rack damper yoke and slide it into the housing. Refit the cover plate and retaining bolts, but do not fit the spring at this stage.
- 32 Tighten the cover plate bolts evenly until the rack is lightly clamped by the yoke. Turn the pinion two or three turns in either direction and check that the rack is not binding in any position. If necessary, slacken the cover plate bolts slightly to achieve this.
- 33 Take a feeler gauge measurement of the gap between the damper cover plate and the housing and then remove the cover plate.
- 34 Fit a new O-ring seal to the damper yoke and place the spring in position. Add shims equal to the gap measured between the cover plate and housing plus 0.002 to 0.005 in (0.05 to 0.13 mm). Refit the cover plate and tighten down the bolts. Turn the pinion through 180° in each direction from the centre and make sure there is no tightness or binding.
- 35 Screw one of the tie-rod ball housing locking collars onto the rack as far as it will go. If the original components are being re-used, make sure that the collar is being refitted to the end of the rack from which it was removed.
- 36 Lubricate the thrust spring and ball seat and then locate them in the end of the rack. Lubricate the tie-rod balljoint and the ball housing and refit these components.
- 37 Tighten the ball housing until the tie-rod ball is clamped and will not move without binding.
- 38 Now slacken the ball housing slightly (approximately  $\frac{1}{4}$  of a turn) until the tie-rod is just free to move. *Note: The tie-rod will still feel stiff to move because of the tension of the thrust spring, but there should be no trace of binding or endfloat.*
- 39 Hold the ball housing in this position and screw the locking collar into contact with it. Tighten the locking collar using the same procedure used for removal, making sure that the position of the ball



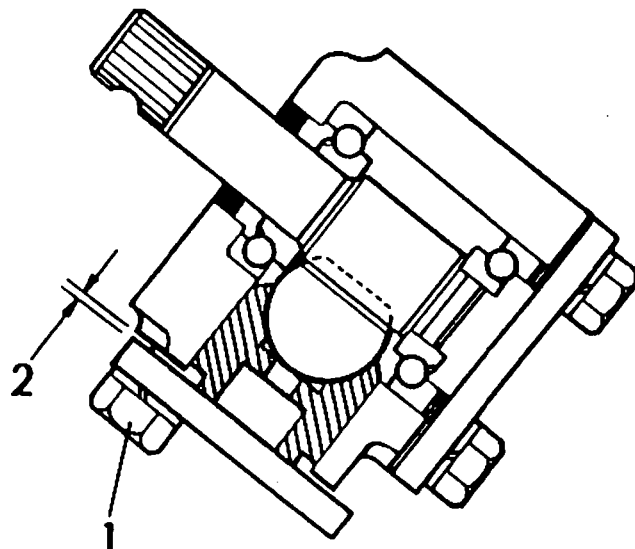
Reassembly of the pinion housing

- |                            |                                |
|----------------------------|--------------------------------|
| 1 Oil seal                 | 5 End cover and retaining bolt |
| 2 Upper pinion bearing     | 6 Rack                         |
| 3 Pinion and lower bearing | A - 0.011 to 0.013 in          |
| 4 Preload shims            | (0.28 to 0.33 mm)              |

housing does not alter.

- 40 If working on early type racks, peen the edge of the locking collar into the groove of the ball housing using a small punch.
- 41 On later type racks, protect the rack housing from swarf and drill a 0.156 in (3.97 mm) diameter hole, 0.312 in (8.0 mm) deep, between the locking collar and ball housing. The hole must be drilled on the side facing away from the rack teeth and at least 90° away from any previous hole. *Note: The rack may be drilled a maximum of three times only. With the hole drilled, drive in a new grooved pin and retain it by peening over the edge of the hole.*
- 42 Repeat the above procedure for the other tie-rod and ball housing.
- 43 Refit the rubber gaiter and retaining clips or wire to the plain end of the rack assembly.
- 44 Stand the assembly upright and fill it through the pinion end of the housing with the correct quantity and type of lubricant as shown in the Specifications.

- 45 Refit the remaining rubber gaiter and its retaining clips or wire.
- 46 If the original tie-rods have been refitted, screw on the tie-rod outer balljoint locknuts to the positions marked during dismantling. Now screw on the balljoints and tighten the locknuts.
- 47 If new tie-rods have been fitted, screw on the locknuts and then screw on the balljoints, by an equal amount each side, until the dimension between their centres is as shown in the Specifications. Tighten the locknuts.
- 48 The steering gear can now be refitted to the car as described in Section 28. It will be necessary to have the front wheel alignment checked and reset as described in Section 32 after refitting.



Reassembly of the rack damper

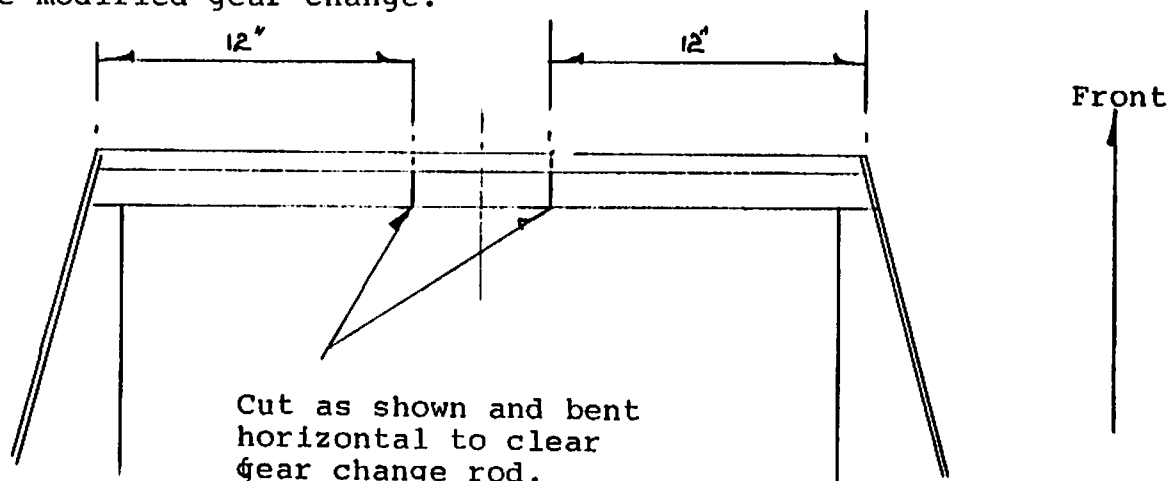
- 1 Damper cover plate retaining bolts
- 2 Measured gap plus 0.002 to 0.005 in (0.05 to 0.13 mm) - see text

## 16 Rack-and-pinion steering gear - lubrication

- 1 The steering gear is filled with lubricant during manufacture and then sealed. Additional lubricant will only be required in service if a leak develops, either from the rubber gaiters or from any of the joints, or if the steering gear has been dismantled.
- 2 The steering gear fitted to early models, identified by black rubber gaiters, is filled with oil. The equipment fitted to later models, identified by transparent rubber gaiters is filled with grease. The grade and quantity of lubricant for both types is given in the Specifications.
- 3 Should it be necessary to refill the rack, proceed as follows.
- 4 Jack up the driver's side of the car, suitably support it on stands, and remove the front roadwheel.
- 5 Centralise the steering gear so that the wheels are in the straight-ahead position.
- 6 Slacken the retaining clips or remove the wire securing the rubber gaiter to the rack housing and tie-rod. Slide the rubber gaiter down the tie-rod sufficiently to provide access.
- 7 Using an oil can or grease gun filled with the specified grade and quantity of lubricant, fill the rack housing.
- 8 Refit the rubber gaiter and secure it with the retaining clips or soft iron wire.
- 9 Turn the steering from lock to lock to distribute the lubricant, refit the roadwheel and lower the car to the ground.

## REAR SUB-FRAME ASSEMBLY

The rear subframe used on the GTM is a front subframe from a Mini. It uses the four bolt fixing (4 x 3/8" UNF) pre face lift Mini subframe. It is used in the GTM with only the small modification shown below to give sufficient clearance for the modified gear change.



### View from top of sub-frame

The subframe assembly is the same as that used on a standard Mini apart from the fitting of special tie rods and mounting plates as shown on drawing S109 (to lock up the rear end to stop it steering yet still allow adjustments at rear toe-in) and the fitting of modified Mini rear back plates S106 (to facilitate a separate mechanical handbrake).

The sub assembly complete with engine, gearbox, drive shafts, brakes etc. should be built up prior to fitting to the central tub.

The specific parts required for this sub assembly are detailed below:

#### a. Engine/gearbox unit

The GTM will take any "mini" type engine/gearbox unit but should the unit come from another vehicle other than a Mini (i.e. Metro, 1100 etc.) the engine mountings must be changed to standard Mini mountings prior to fitting to the Mini subframe. Only the relatively modern rod change gear box can be used on the GTM.

#### b. Hub assemblies

The hub assemblies used on the GTM must be from a Mini with drum brakes on the front wheels (i.e. disc brake hub assemblies cannot be used).

#### c. Brake drums

The brake drums used on the rear of the GTM must be the drums off a front of a Mini.

d. Brake back plates

The back plates used are Mini rear back plates modified as shown on drawing S106.

e. Brake shoes, cylinder springs etc.

The brake shoes, cylinder springs etc. must come from the rear of a Mini (i.e. front brake shoes cannot be used).

f. Drive shafts

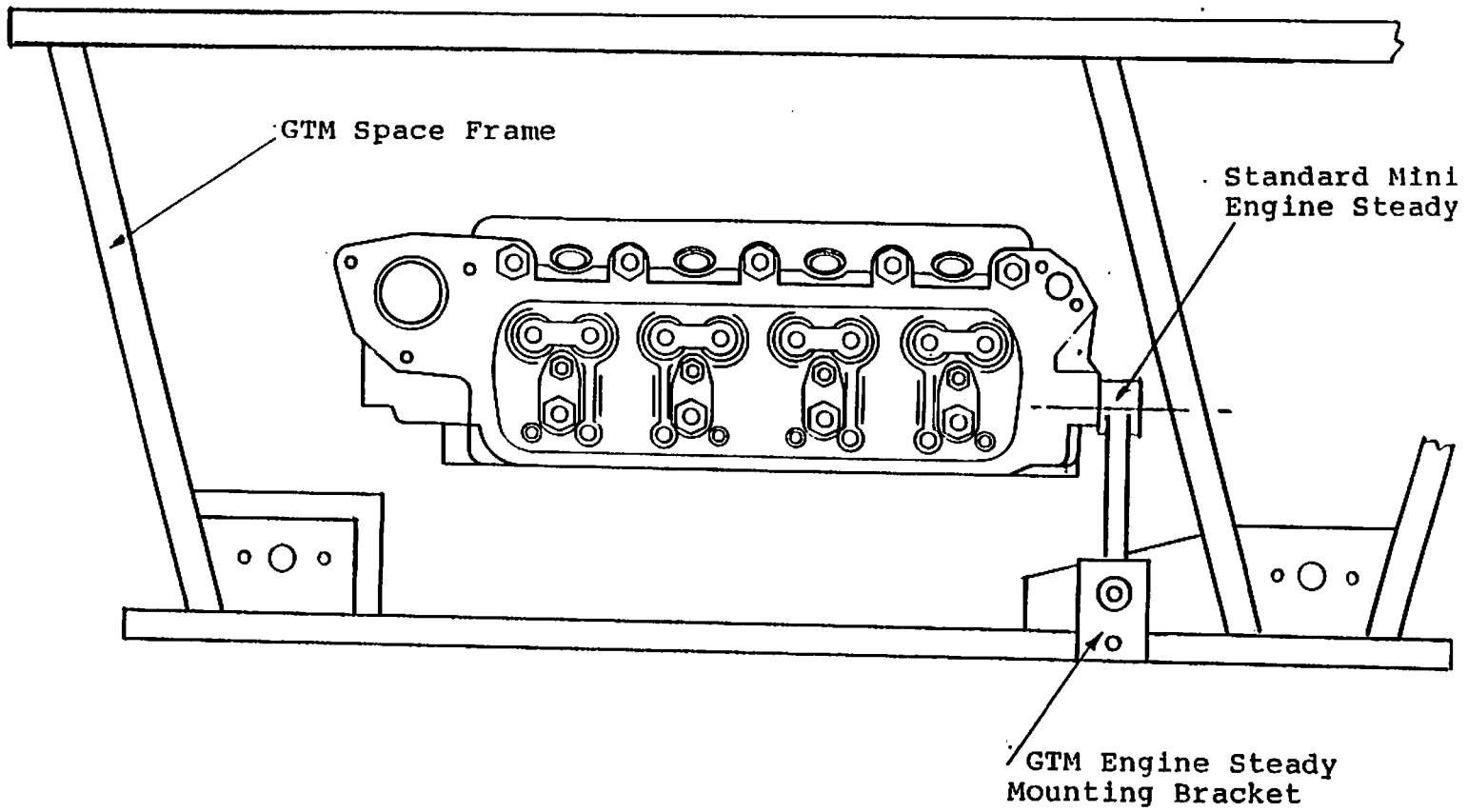
The drive shafts used must be from a drum braked Mini with suitable spines to fit the universal joint, pot joint arrangement on the engine being used.

Suggested assembly sequence

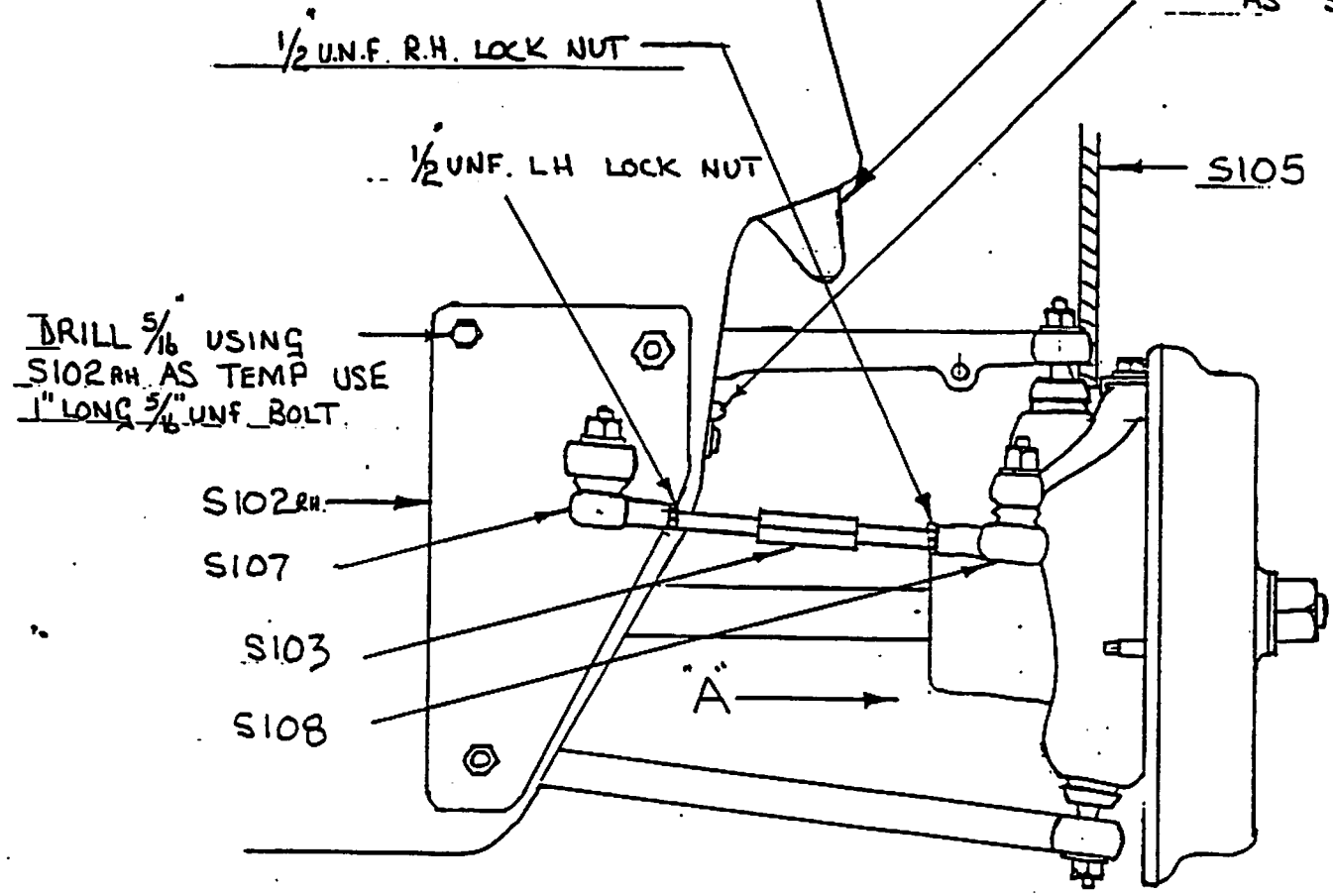
1. Clean subframe and check for rot/broken welds.
2. Modify front cross member as shown on drawing previously.
3. Paint subframe (Hammerite type paint has proved satisfactory).
4. Possa only - fit shock absorber mounting brackets as described in chapter on front subframe.
5. Assemble front suspension arms top and bottom (refer to Hynes manual) with rubber springs and aluminium cones etc. Remember to fit the GTM suspension adjusters in place of the aluminium cones at this stage, should you chose to use them (highly recommended). It is important, if the car is to ride satisfactorily to use as new as rubber springs as possible as the rubber tends to age/workharden and this will result in a poor bumpy ride.
6. Attach the two special GTM inner track rod end location plates S102RH and S102LH to the subframe as shown on drawing S109. Use the plate as a template to drill the 5/16" D. hole.
7. Fit the hub assemblies to the suspension arms minus back plates, drums, steering arms etc. Pay particular attention to the condition at the top and bottom swivels. If in doubt replace with new ones. The wheel bearings must also be examined and replaced if worn.
8. Fit steering arms complete with GTM handbrake location brackets S104RH and S104LH as shown on drawing S109.
9. Fit tie-bars S103 complete with track rod ends between steering arms and GTM brackets attached to subframe. At this stage, make sure that there is full and sufficient adjustment available on the tie-rods and that the hexagon section of the tie-bars is in the middle of the track-rod ends. Tighten all nuts and bolts and check the assembly is "sound" by attempting to move the hub assemblies as if steering a car. It is best to set the suspension or the normal ride height (i.e. between the bump rubbers) before undertaking the above check.

10. Fit the modified rear back plates S106 to the hub assemblies as shown in drawing S109 and secure with a 3 x 5/16" UNF bolts and washers.
  11. Fit rear brake shoes, cylinders etc. to the back plates. It is advisable to fit the latest type of handbrake scissors EAU 5728/9 as these have a far greater leverage and have more efficiency than the older ones.
  12. The rest of the rear hub assemblies can now be completed as a standard drum braked Mini car. (refer to Hynes).
- NB It is extremely important that the standard bump rubbers are used to prevent over travel of the suspension and possible damage to the track rod ends.
13. The engine/gearbox drive shafts etc. can now be fitted to the subframe subassembly as in a standard Mini (refer to Hynes).
  14. The assembly is now ready to be fitted to the tub.

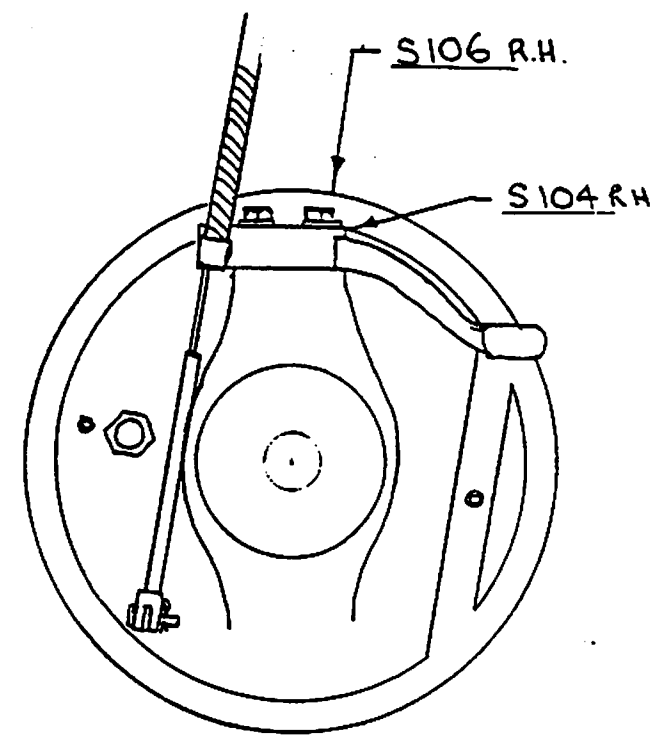
## ENGINE STEADY MOUNTING



IT IS VERY IMPORTANT THAT THE  
STANDARD BUMP RUBBERS ARE USED  
AS SHOWN



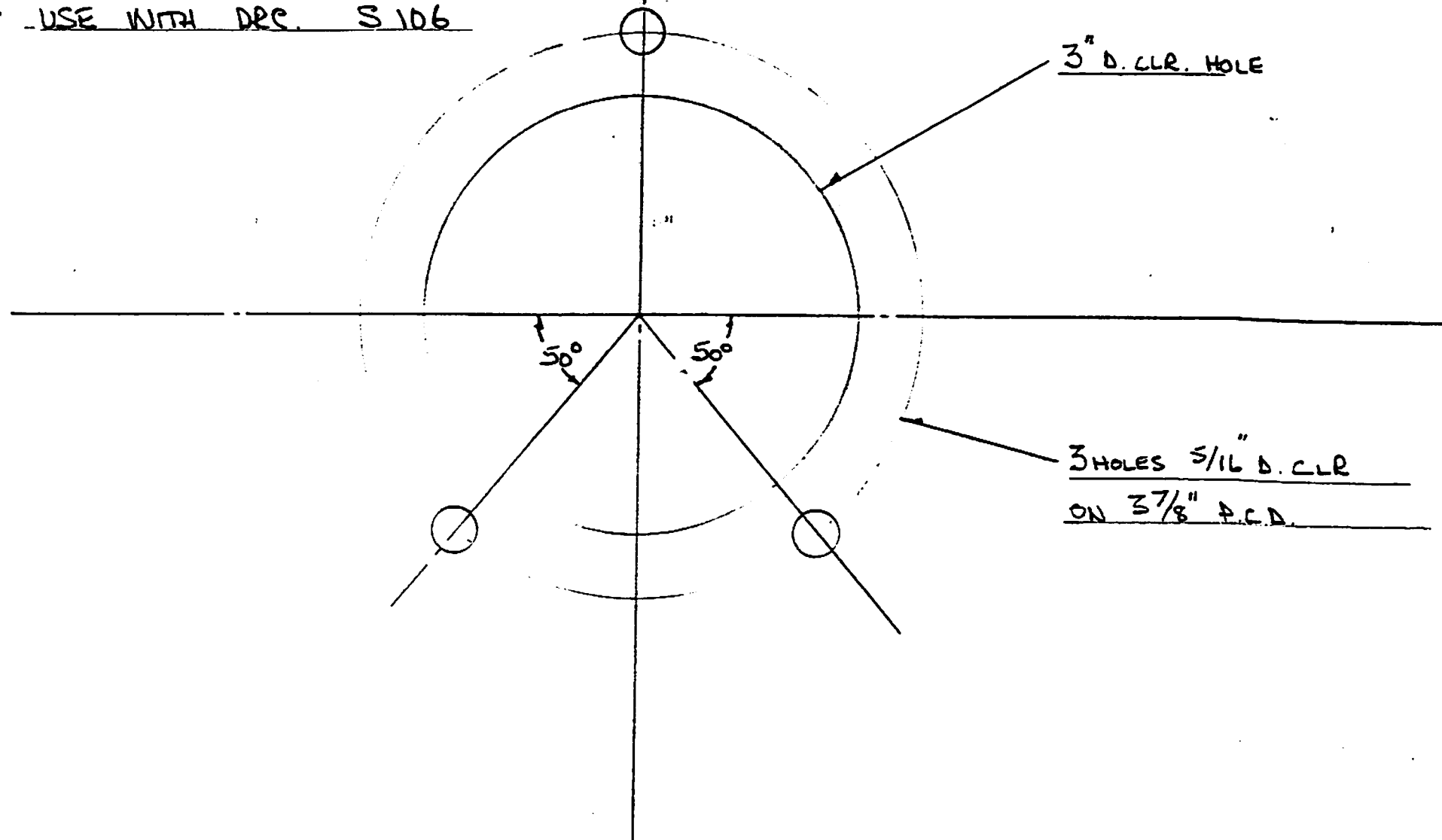
REAR VIEW BACK RIGHT HAND CORNER



VIEW A

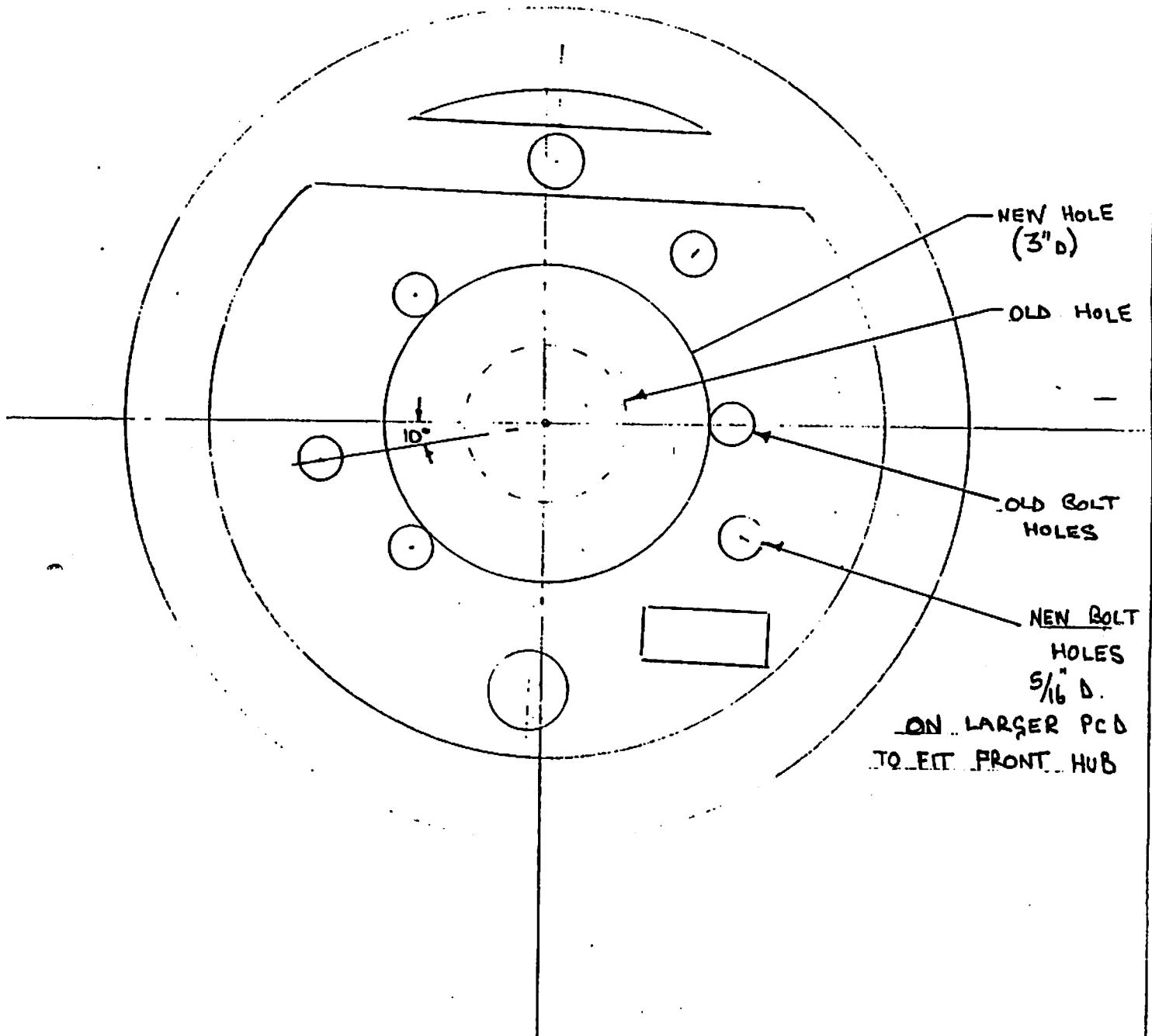
TEMP. FOR MODS TO REAR  
BACK PLATES TO FIT FRONT  
HUB ASS.

... USE WITH DRC. S106



24/3/69  
S106/b

MODS TO REAR BRAKE PLATES  
 RH SHWN LH. MIRROR IMAGE



14-10-85  
 G.T.M

S 106



### DASHBOARD SUPPORT & STEERING COLUMN

Once the dashboard support bracket has been secured in the position shown on the following diagrams, the steering column can be mounted to the brackets and lined up correctly with the hole in the chassis to accommodate the steering rack pinion. The column and the steering rack are joined together with the smaller of the two universal joints found at the base of the standard Triumph Dolomite steering column. (The longer universal joint at the base of the column is disregarded).

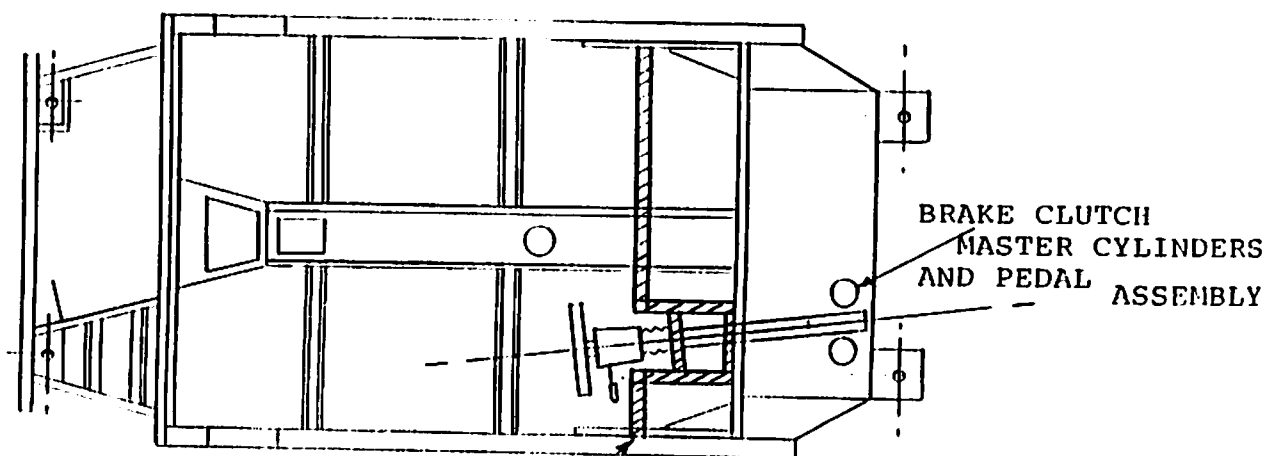
The standard adjuster assembly found on the Triumph Dolomite column is transferred complete and mounted to the cross member on the dashboard support bracket thus enabling complete for-aft, up-down adjustment of the column.

The binnacle on the Dolomite column is also transferred complete and the dashboard moulding is shaped to take this pod. All the electrics for this binnacle are used without alteration and the plug in the GTM wiring loom accepts the plug from the column.

\* Ensure the keys are obtained with the column.

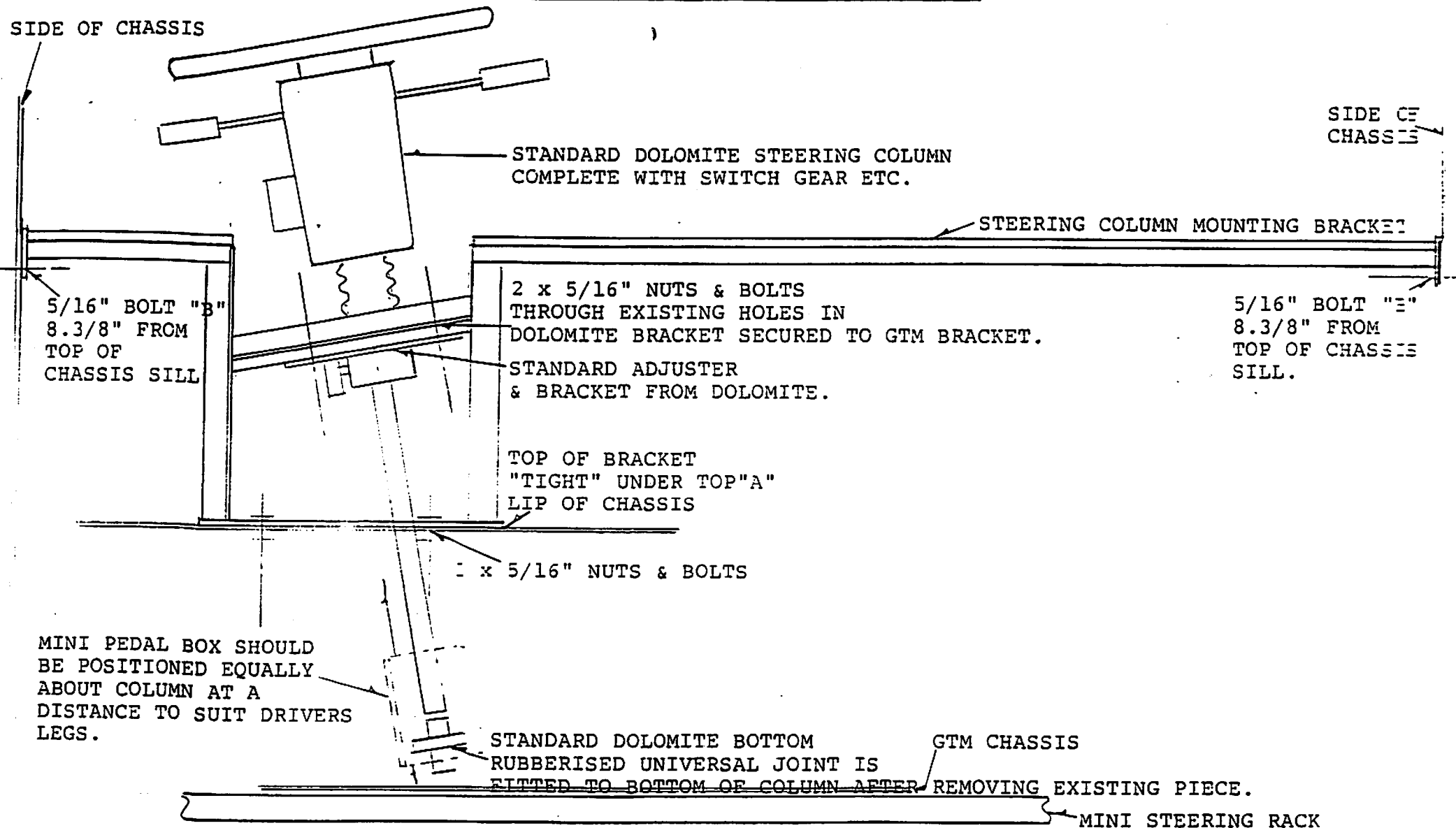
### PEDAL ASSEMBLY & MASTER CYLINDERS

Once the steering column is in position, the pedal box and master cylinders can be set in the relevant position. The brake and clutch pedal straddle the steering column line and can be moved forward or back depending on the length of the drivers legs. Once the position has been determined the pedal assembly, complete with shortened brake and clutch pedals can be secured by drilling through the front chassis panel, and securing the pedal assembly by fixing the master cylinders on the chassis panel above the pedal box. There is also a fixing point on the front edge of the pedal box which can be secured to the chassis for extra rigidity.



POSITION OF STEERING COLUMN & SUPPORT BRACKET.

# GTM COUPE STEERING COLUMN MOUNTING



N.B. WHEN FITTING BRACKET TO CHASSIS, START WITH HOLES "A" AND THEN DRILL HOLES "B" AT THE HEIGHT INDICATED.

VIEW FROM TOP OF CAR WITH BODY AND DASHBOARD REMOVED.

## BRAKE & CLUTCH SYSTEM

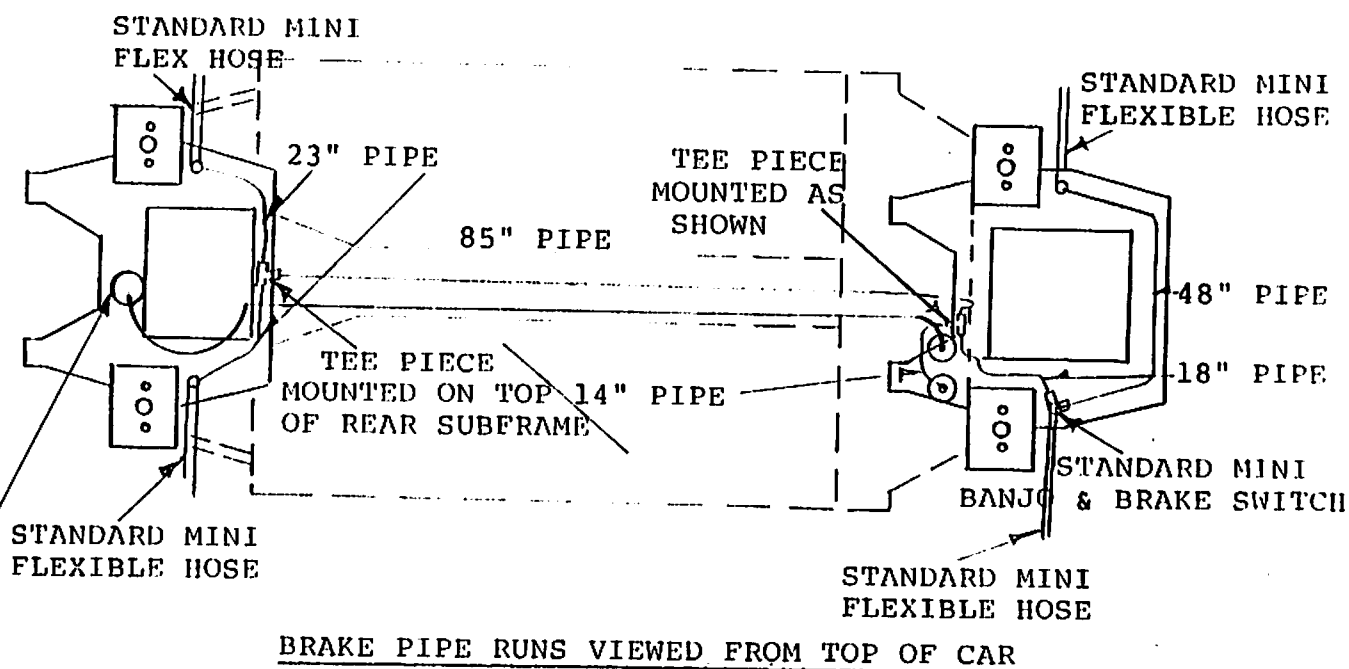
### Hydraulic System

The brake system on the GTM uses standard parts obtainable from the Mini. It is possible to use both disc or drum brakes at the front but only drum brakes at the rear as a separate mechanical hand brake is required to meet the construction and use regulations. The better system use the disc brakes at the front (preferably the larger 1275 GT type). When using disc brakes the Mini disc brake master cylinder must be used. No pressure compensating valve is required in the system.

The GTM uses the standard Mini front flexible pipes at the front and rear mounted through the standard holes in the Mini front subframe. If disc brakes are used then the front flexible pipes must be from a disc braked Mini.

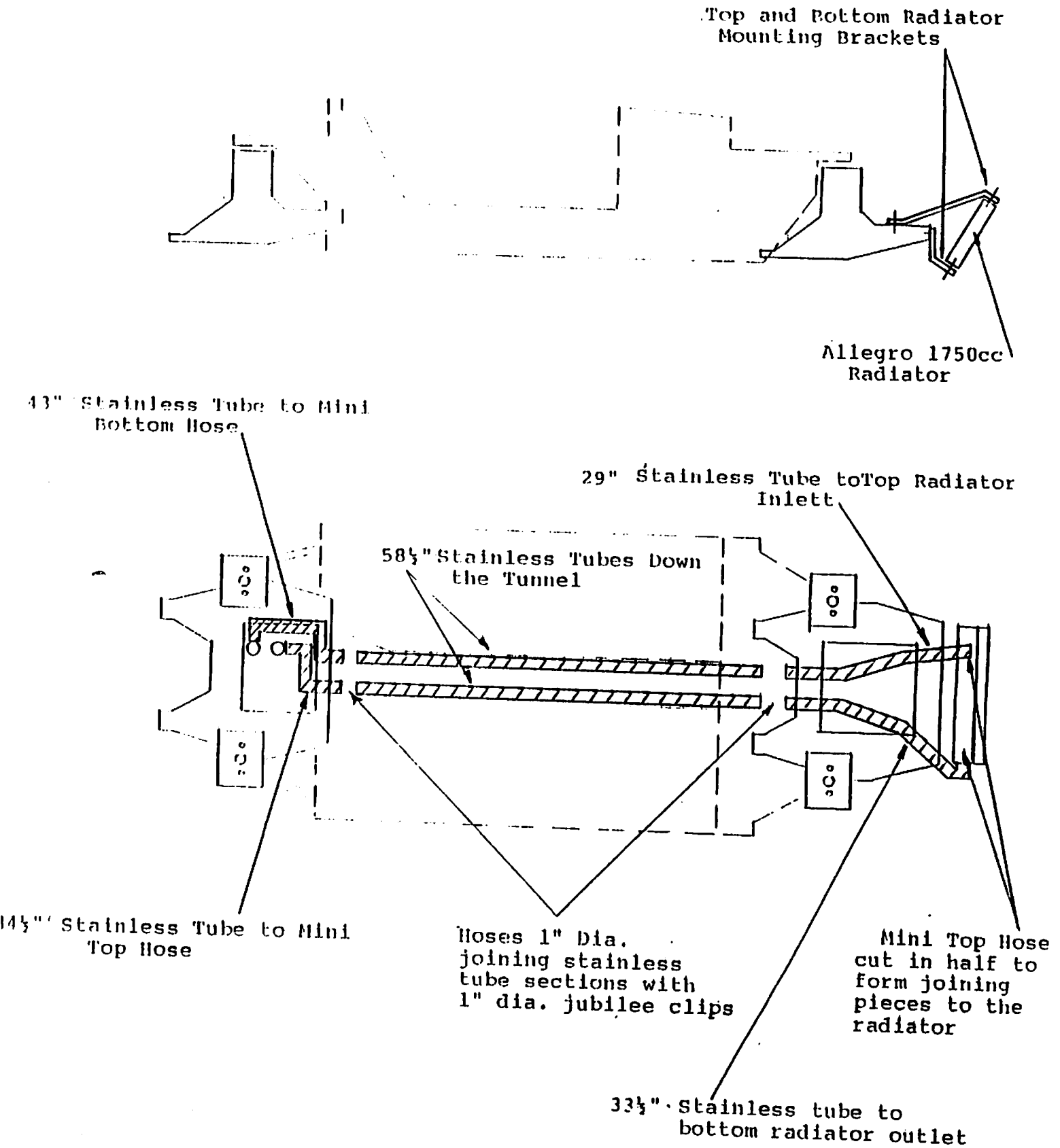
Where the front drivers side flexible pipe attaches to the front subframe, the standard Mini banjo and stop light electrical switch is fitted. The diagram below indicates the general configuration of the brake pipe runs. The secure attachment of these pipes and fittings to the chassis and subframe is extremely important if vibration and rattles are to be avoided.

Once the system is completely "piped" and filled with hydraulic fluid, considerable pressure should be applied to the brake pedal to check for leaks.

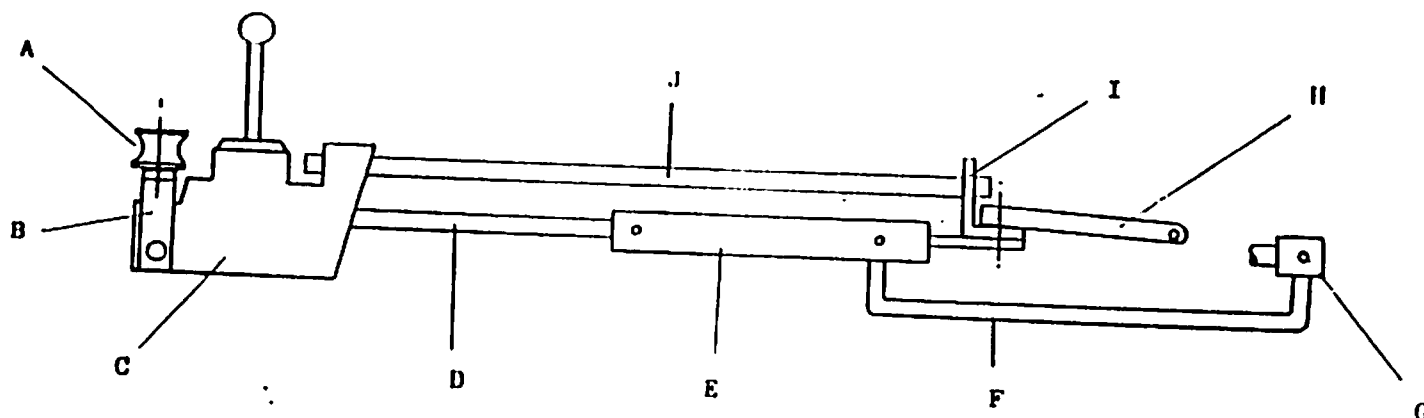


The clutch pipe supplied in the kit is a black  $\frac{1}{2}$ " dia. flexible type 118" long. Attached to each end with brass unequal connectors is a 4" steel tube and standard male connector which locates in the master cylinder and slave cylinder.

# FRONT MOUNTED RADIATOR AND PIPES



## COUPE GEAR CHANGE LINKAGE



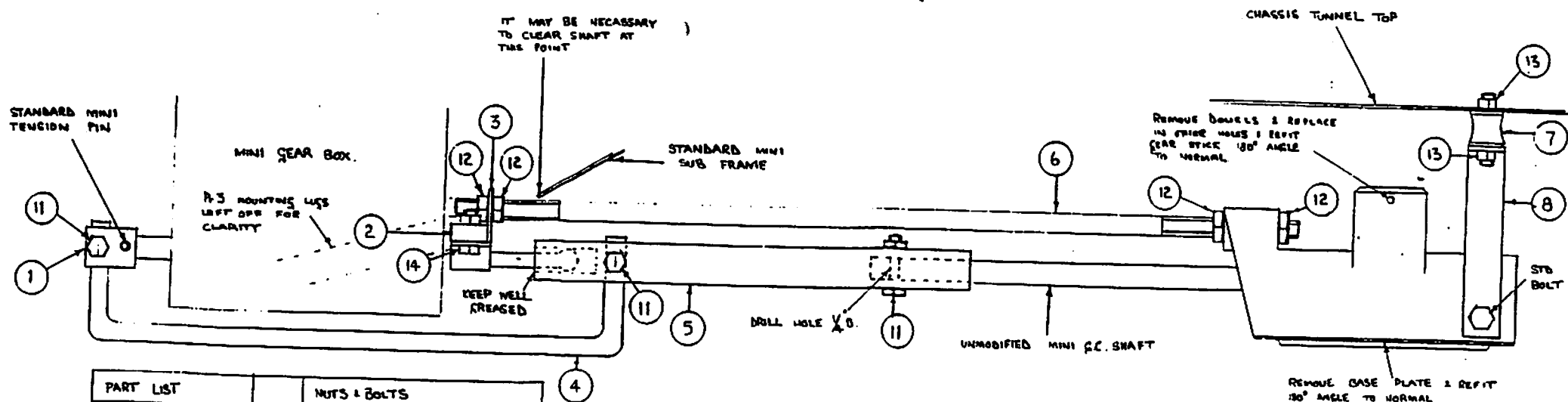
- A Exhaust Bobbins
- B Housing Support Brackets
- C Gear Lever Housing (standard Mini)
- D Main shaft (standard Mini)
- E Main shaft extension
- F Drop Bar
- G Main shaft Collet
- H Engine Steady
- I Pivot Assembly
- J Tension Bar

The COUPE kit includes all the parts necessary to convert a Twin Shaft Mini Gear Change, to enable the engine to be positioned behind the driver. Older type gear boxes cannot be used in the Coupe.

To convert your gear change proceed as follows:

- a. Disconnect the twin shafts from the engine.
- b. Remove the top shaft from the gear change housing and discard.
- c. Remove joining collets from main shaft and discard.
- d. Remove existing housing support bracket and discard.
- e. The gear change housing on the COUPE is turned through 180° and it is therefore necessary to turn the bottom plate through 180° to make the reverse stop work correctly.
- f. The pins which prevent the gear change lever from rotating require reversing. They are a push fit in the housing casting.
- g. The reversing light switch has to be repositioned on the opposite face, 180° from the original position. This requires the casting to be drilled and taped appropriately.
- h. Open up the hole in the end of the main shaft to 1/4" dia.
- i. Fit new tension shaft to housing with the nuts provided and adjust until the nut is flush with the end of the shaft, as diagram page.

- j. Fit main shaft extension to main shaft with  $\frac{1}{4}$ " bolt provided.
- k. Fit pivot assembly to main shaft extension and tension bar. Tighten nuts.
- l. At this point, it is advisable to mount the housing in a vice and make sure that the gear change lever can be moved freely in all directions.
- m. Working from the rear of the car and before the engine is fitted, push the housing up the tunnel.
- n. Working through the hole cut in the side of the tunnel, fit the housing support brackets complete with exhaust bobbins, on to the gear change, using the nut and bolt provided. Tighten finger tight.
- o. After the engine has been fitted to the car, fit the engine steady to the engine using the existing nuts and bolts. It should not be possible to mount the bracket in an incorrect position.
- p. Bolt the pivot assembly to this bracket with the 5/16" nuts and bolts provided.
- q. Bolt the two exhaust bobbins to the roof of the tunnel through the existing holes, to suspend the gear change mechanism within the tunnel.
- r. Fit gear lever, and working with an assistant, ensure that the main shaft extension moves freely on the pivot assembly, and does not bind on the reduced part of the shaft. It may be necessary to bend this part to make it line up with the main shaft extension.
- s. Fit the new main shaft collet to the engine with the standard slotted pin.
- t. Fit drop bar, ensuring that it places no loading on either the main shaft extension, or the input shaft to the gear box. This is achieved by adjusting the 90° bend at either end of the drop bar.
- u. With the gear box in neutral (the drop bar will move freely from side to side) adjust the two lock bolts on the tension bar/pivot assembly to achieve a vertical position of the gear lever. Tighten securely. The gear change should now work correctly.

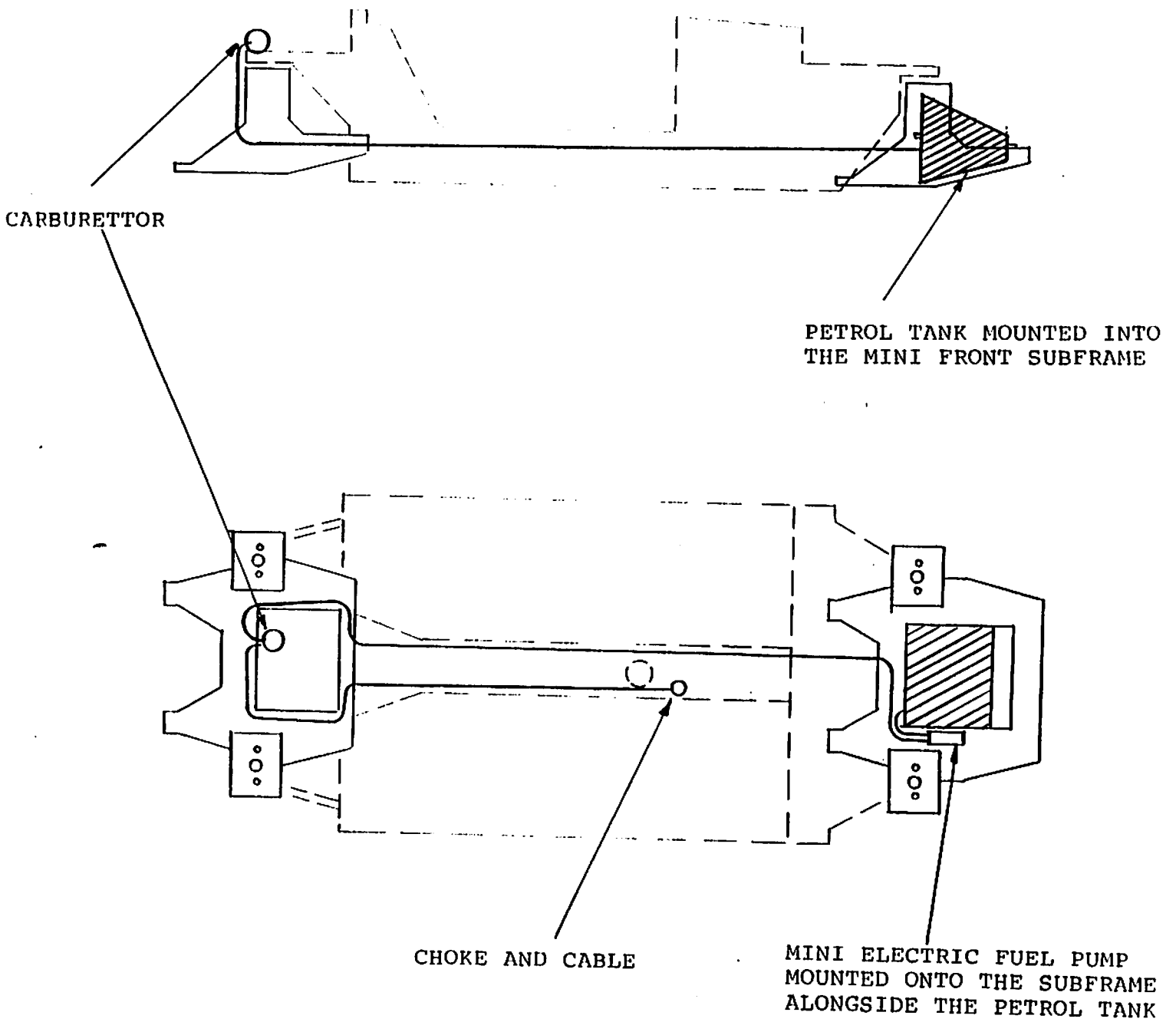


PART LIST			NUTS & BOLTS	
Pt	CIM	Qty	Pt	DISCRIPTION
NO	P CODE		NO	
1	NC 1001	1	11	1/4" UNF. 1 1/2" L. BOLT. REF. W. G.W. 3
2	NC 1008	1	12	1/2" UNF. LOCK NUT 4
3	NC 1006	1	13	3/16" UNF. NUT W. G.W. 4
4	NC 1003	1	14	3/16" UNF. 1 1/2" BOLT. NUT. W. G.W. 2
5	NC 1002	1	15	
6	NC 1009	1	16	
7	GRX 1251	2	17	
8	NC 1007	2	18	
			19	

155. 19-12-83

GEAR CHANGE  
GENERAL ASS.  
ROD CHANGE  
D23 NP 191283.

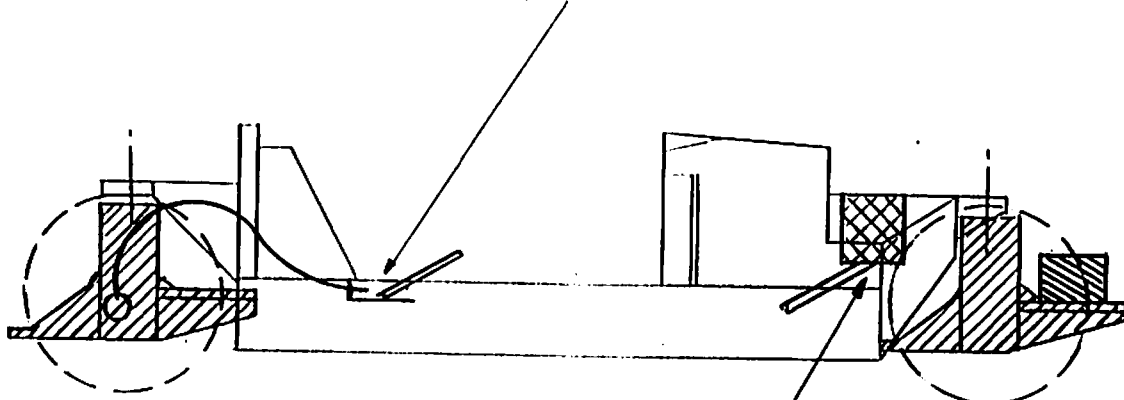
CHOKE CABLE, PETROL TANK, FUEL PUMP & PIPE





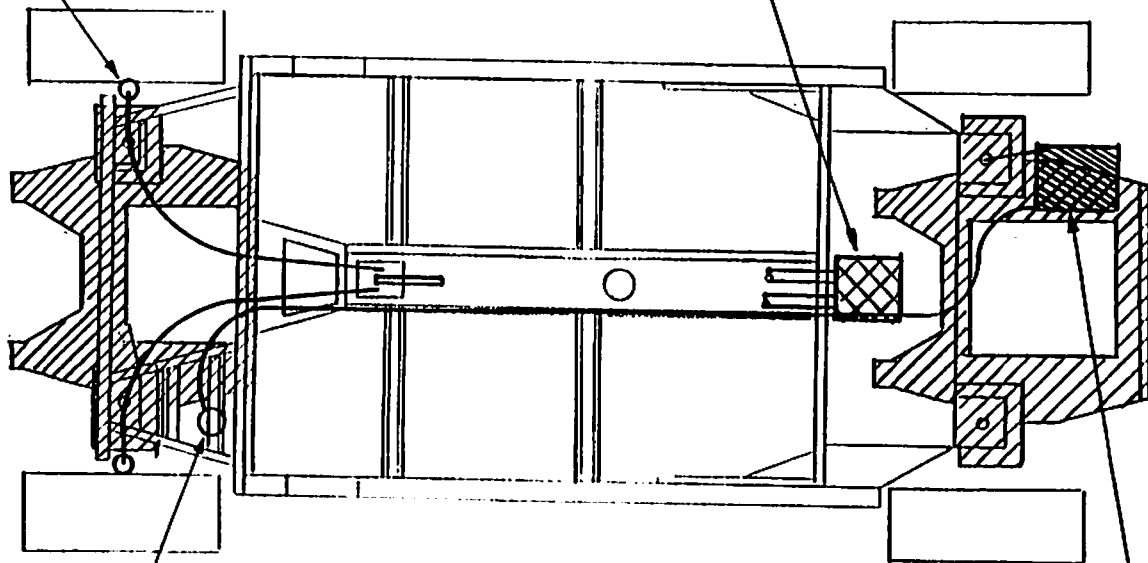
BATTERY AND BATTERY LEADS, HEATER, HANDBRAKE AND CABLES

STANDARD MINI HANDBRAKE MECHANISM



SPECIAL GTM CABLES LINKED TO THE HANDBRAKE BRACKETS MOUNTED TO THE REAR HUBS

MINI HEATER SUSPENDED FROM THE FRONT BULKHEAD ABOVE THE TUNNEL. THE INLET AND OUTLET PIPES ARE FED INTO THE TUNNEL AND BACK TO THE ENGINE TO THE FEED AND RETURN HOSES.



SOLINOID

POSITION FOR MOUNTING THE BATTERY AT THE FRONT OF THE GTM. THE EARTH LEAD IS CONNECTED TO THE FRONT SUBFRAME, AND THE POSITIVE LEAD IS FED DOWN THROUGH THE TUNNEL TO THE SOLINOID AT THE REAR.

## BODY - CHASSIS ASSEMBLY

### BUILD SEQUENCE

1. Main Body Section to Chassis
2. Rear Wheel Arch
3. Passenger Compartment Blanking Panel
4. Laminate Complete Rear Section
5. Hang Doors
6. Fit Bonnet and Trim
7. Secure Front Body Section.

Before starting the above procedure it is wise to remove all excess flash on the moulds (i.e. where the moulds have been joined) and smooth all the edges of the individual mouldings with either a file or coarse production paper (P80 grit).

### 1 & 2 MAIN BODY SECTION TO CHASSIS AND REAR WHEEL ARCH

Stand the main body section on its rear flat area so it is pointing vertically in the air, it is useful to put something on the floor i.e. cardboard to eliminate scratching the 'gel coat'.

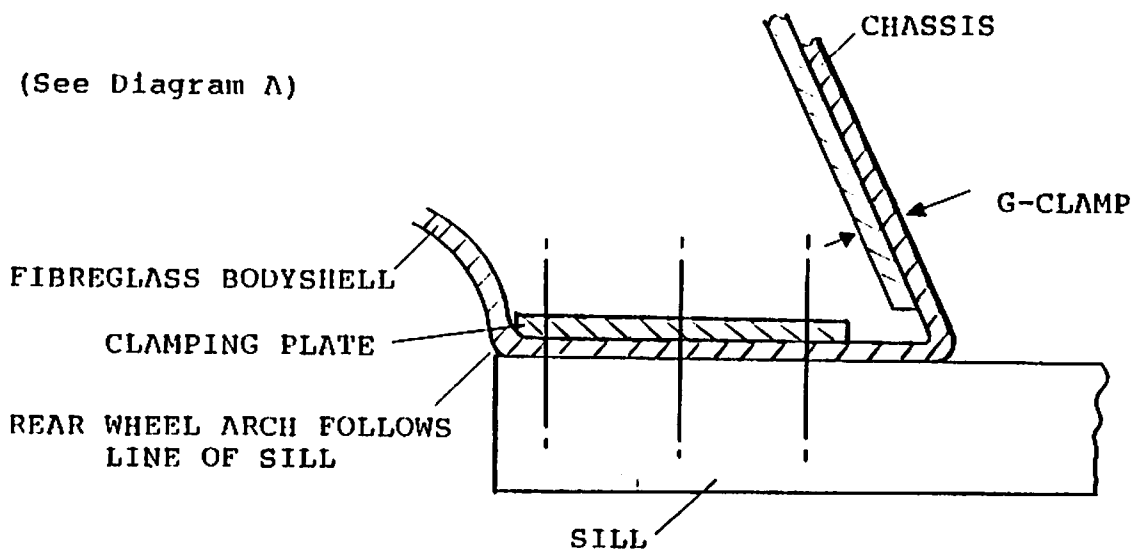
There will be three rectangles marked on the moulding on the flat section that sits on each sill, these require drilling, the size of the hole is not critical but around  $\frac{1}{2}$ " diameter will suffice.

Place the rear wheel arch in the main body section whilst it's sitting in this position, don't worry too much about the precise fit as long as the wheel arch fits inside the body section. With the help of an assistant take the body section and rear wheel arch together and lift it over the chassis springing the body section in front of the rear wheels out and over the triangular sections on the chassis, the holes drilled in the body section should line up with the holes in the sills of the chassis.

It is normal to spring the body section back to meet the triangular plates at the rear of the sill. This operation is done by ensuring the front edge of the body section (bottom of the windscreen) is sitting over the metal section of the chassis both at the front and down each side to the screen pillars, secure this in place with something heavy.

Use a "G" clamp to force the section at the base rear of the door aperture back until it sits flush against the triangular plate on the chassis.

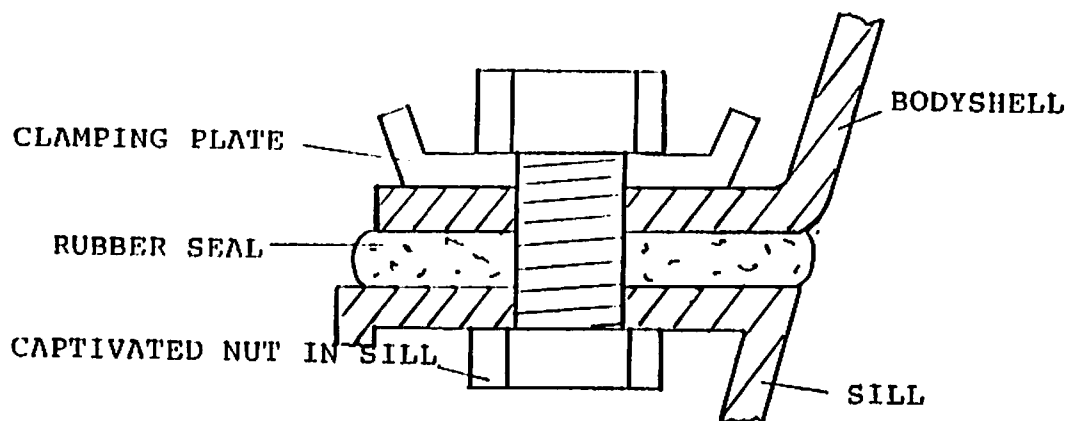
(See Diagram A)



Take the clamping plates provided in the miscellaneous pack and place them over the holes in the sill sandwiching the glass-fibre between the plate and the sill, insert the bolts provided and screw them into the captivated nuts in the sill section.

It is wise at this point to clamp the plates down tight and remove the 'G' clamps to ensure everything is fitting correctly.

\*The rear wheel arch should be following the line of the sill as in diagram 'A', the body should be flush with the sill so the side of the car follows the same line as the sill (Diagram 'B').



The inner rear wheel arch should be checked at this stage to ensure its fit, if there are any points causing tension on the body where the two meet a small amount of fibre glass should be removed from the wheel arch until the fit is good.

It is normal to fit the body section and rear wheel arch a number of times to ensure a good fit, when you are sure the fit is correct, loosen the bolts holding the body section to the sill and raise each side by approximately  $\frac{1}{4}$ " leaving the bolts in position, spread a flexible/waterproof material i.e. windscreen sealant or something similar between the fibreglass and the top section of the sill, force the body section back with 'G' clamps as before and bolt the clamping plates down firm securing the body to the chassis. (see Diagram 'B').

The rear wheel arch should be positioned so the two vertical flat sections are flush against the metal plates on either side of the engine compartment and so that the rear section is square to the chassis. Use pop rivets to secure this in position three down each side of the engine compartment and four along the rear edge where the wheel arch sits inside the main body mould.

### 3. PASSENGER COMPARTMENT BLANKING PANEL

This moulding is identified by the two triangular sections sticking up at each end, it is a long moulding the width of the car and about 10" deep. This is positioned from the inside of the car and fills the aperture between the base of the rear screen and the top of the metal rear bulkhead of the chassis, secure this in place with five pop rivets along the width of the rear bulkhead.

As this section is laminated to the metal and to the moulding around the rear window area it is advisable to rub the surface inside the passenger compartment with P80 grit paper to give the fibreglass a good key.

### 4. LAMINATE COMPLETE REAR SECTION

\*A final check before progressing with this operation is to stand at the rear of the car and ensure the horizontal line at the rear of the boot moulding lines up with the horizontal lines on the chassis members, if the two do not closely line up the body is secured to the chassis out of line.

Fibreglassing is a simple but messy operation, the requirements for this particular operation are:-

- 1½ oz Fibreglass Matt
- Resin
- Hardener
- 2" Brush
- Acetone (for cleaning brush)
- Mixing Pots approx. 2 pints.

Cut the fibreglass matt into 6" x 4" pieces, this makes handling them much easier, mix 1 pint of resin with approximately 10% hardener and start by wetting out a small area of the moulding to be joined, start in the cavity at the rear of the clamping plates and work around over the wheel arch to the base of the boot section, doing a small area at a time, laying the matt pieces over the join of the two mouldings and thoroughly soaking with Resin. Leave for a few minutes for the resin to soak into the matt and then stipple the area flat with the brush.

This operation should be duplicated on the other wheel arch, and finally a long strip of matt should be glassed into place along the base of the boot where the mouldings meet.

A mix of this solution should last for about 30 minutes before hardening, but warm weather will accelerate the cure time.

The blanking panel in the passenger compartment should also be glassed into position ensuring a good seal all around to ensure no fumes are allowed through from the engine into the passenger compartment.

If any excess matt is required to be trimmed it is best to do this at a point midway between starting to go off and being completely cured at this stage i.e. (1½ hours after mixing) the additional matt can be removed easily with a Stanley knife.

## 5. HANG DOORS

The doors are supplied with the metal frame already fixed, and an internal metal frame is pre-bonded onto the inner door cavity to support the hinges.

Start by fixing the hinges onto the door, the strengthening frames have slots already cut, these should be cleared fully for adjustment of the hinge.

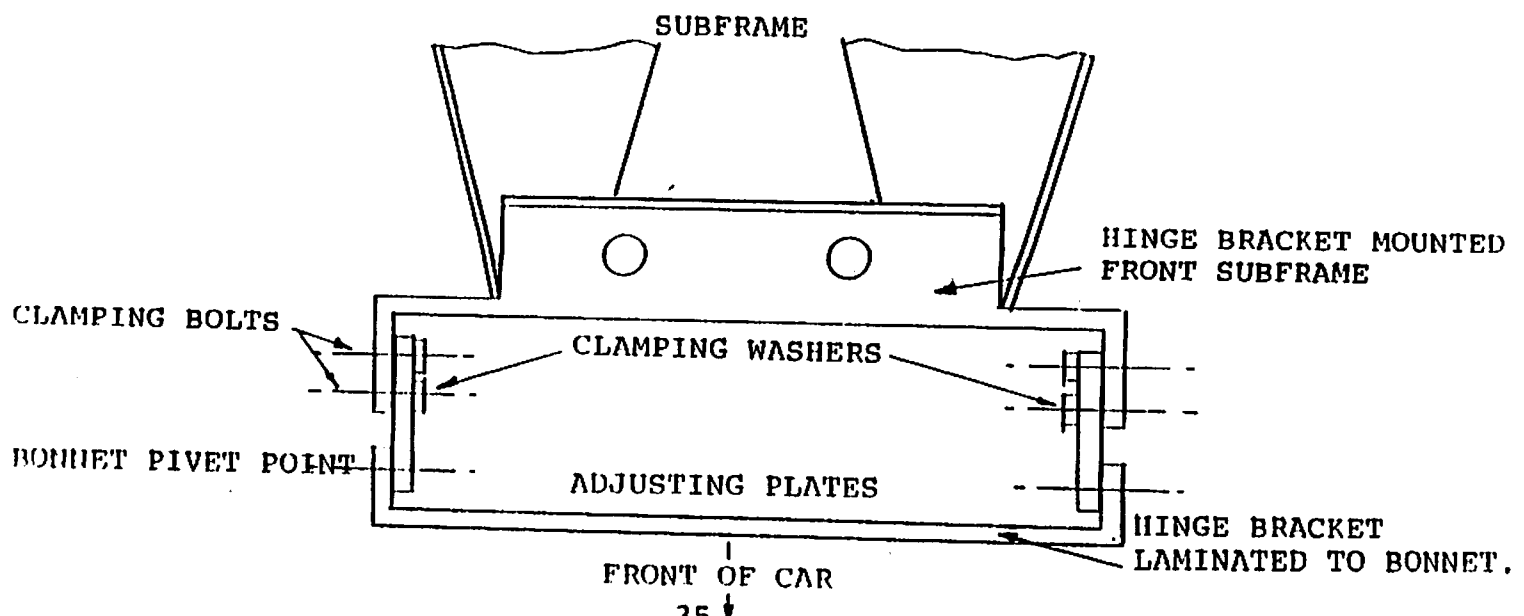
Place a packing piece 1/8" thick on the top edge of the sill, and place the door on top leaving a 1/8" gap at the rear face of the door where it meets the main bodyshell.

The flat face of the hinge should butt up against the hinge mounting plate on the chassis, mark the elongated slots in the hinge through to the chassis and drill a ¼" diameter hole in the centre of the slot. This will enable you to hang the doors but also allow you to move the doors forward and back.

The other two holes in the hinge should not be drilled through until the glass and doors have been completely assembled as the door will drop with the additional weight.

## 6. FIT BONNET AND TRIM

Assemble the bonnet mounting bracket to the front sub-frame with the items supplied in the kit, properly assembled the bonnet should be fully adjustable up, down, forward and backwards.



The bonnet should be positioned on the chassis with the wheel arches of the moulding coming round to join the front edge of the sill and the flat section on the side/bottom face of the moulding should sit flush and parallel on the top edge of both sills, to enable you to position this correctly the rear edge of the moulding has to be trimmed to allow the bonnet to drop down onto the sill.

IT IS ADVISABLE TO TRIM A SMALL QUANTITY AT A TIME AS AN ACCURATE FIT ALONG THIS FACE IS ESSENTIAL.

The front edge of the doors give the line at the rear side of the bonnet and a  $\frac{1}{8}$ " -  $\frac{3}{16}$ " gap should be left between the two moulds.

It is very important to line the bonnet up parallel to the chassis, if this is not done correctly one side of the bonnet at the point where it meets the door will "bellow" out and the other side will be too tight, to correct this the side which "bellows" should be brought back further which in turn brings the wheel arch back onto the sill, this is standard with all 13" wheels GTM the wheel arch on the drivers side is  $\frac{1}{8}$ " further back on the sill than the passenger side.

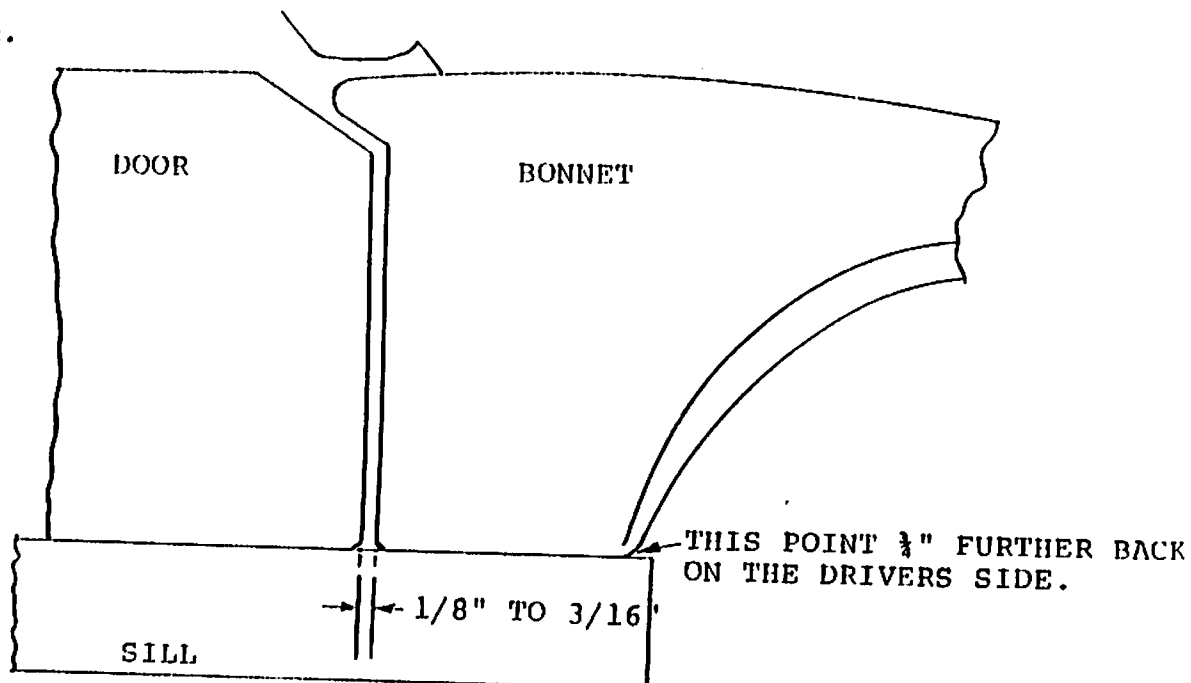
The rear edge of the bonnet should be trimmed and smoothed allowing a gap between the screen aperture and the bonnet of  $\frac{1}{8}$ " to  $\frac{1}{4}$ ".

#### 7. SECURE FRONT BODY SECTION

Now the doors and bonnet are fitted the front section of the body can be adjusted and secured.

The most important part of this operation is the location of the base of the window screen pillar as it is still unfixed it can be moved up and down. The correct position should be halfway between the door mould and the bonnet mould when the bonnet is closed flush.

See Diagram.



When this is positioned correctly a pop rivet should be used to secure the position on both sides.

The strengthening screen pillar bars should now be fitted, this is done by removing the doors and feeding the bars up into the cavity inside the screen pillar, the bottom vertical section should run parallel with the front edge of the hinge mounting plate and should be clamped and welded to it, ensuring the bar inside the car is flush against the moulding and does not stick out into the car.

The pillars should then be glassed into position covering the bar and overlapping both sides onto the inner surface of the moulds, it is also advisable to run a strip of glass fibre around the point where the moulding meets the chassis on the inside of the front bulkhead.

#### 8. FIT LOCKS AND HANDLES TO DOORS

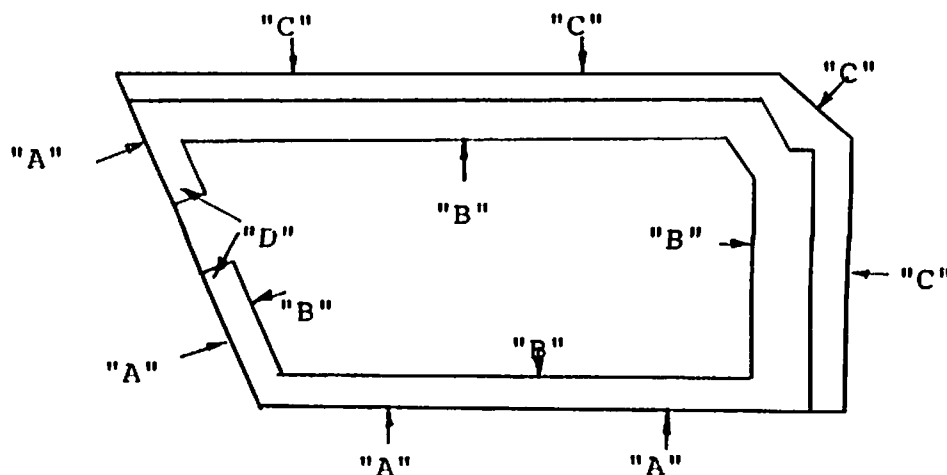
L.H. and R.H. doors are built identically and, therefore, only the R.H. (Drivers) door assembly will be described.

##### Build Sequence

1. Trim door mouldings (inner and outer)
2. Prepare outer mouldings for latch
3. Prepare handles and latch for assembly
4. Fit latch and handles to door shell and inner panel
5. Fit operating rods and clips
6. Fit door hinges to door shell
7. Fit inner panel to outer shell

#### 1. TRIM DOOR MOULDINGS (INNER AND OUTER)

Brake off and clean up the flash indicated on the drawings below by "A". Use a rough file and production paper (80 grit).



Clean up the inner flange "B" removing all unevenness with a rough file and finish with production paper.

Very carefully remove the light flash and the edges "C".  
Use only production paper 120 grit.

It may be necessary to flat the surfaces marked "D" on the inner flanges. Use a rough file and finish with production paper. Make the flange "D" the same height as the surrounding flange.

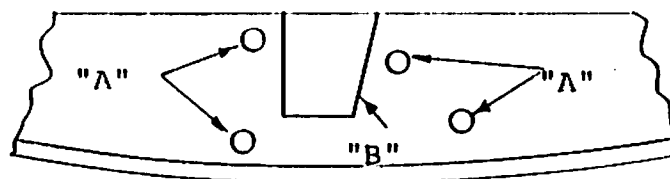
Clean up the hole in the outer shell for the outer handle using the handle as a gauge. Make sure the handle fits without binding.

Clean up the hole in the inner panel so the inner handle will fit in from the rear at the panel.

Clear up the edge of the inner panel.

## 2. PREPARE OUTER SHELL FOR LATCH

The outer shells are marked as shown below:-



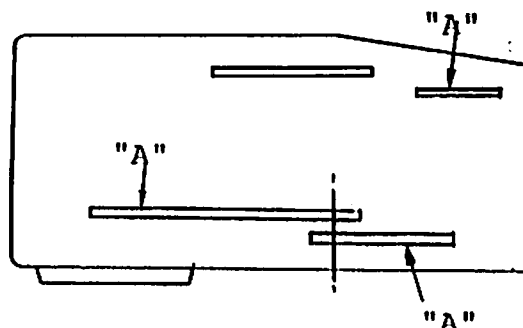
Drill holes "A" using a 1/8" drill. Make sure you drill on the centre of the holes marked on the shell. Countersink the holes to suit the 1 1/4" long 1/4" U.N.F. screws provided. Finally drill 1/4" diameter.

Cut out and file the slot marked "B" using a Junior hacksaw and rough file. Finish with production paper.

## 3. PREPARE HANDLES AND LATCH FOR ASSEMBLY

### Latch

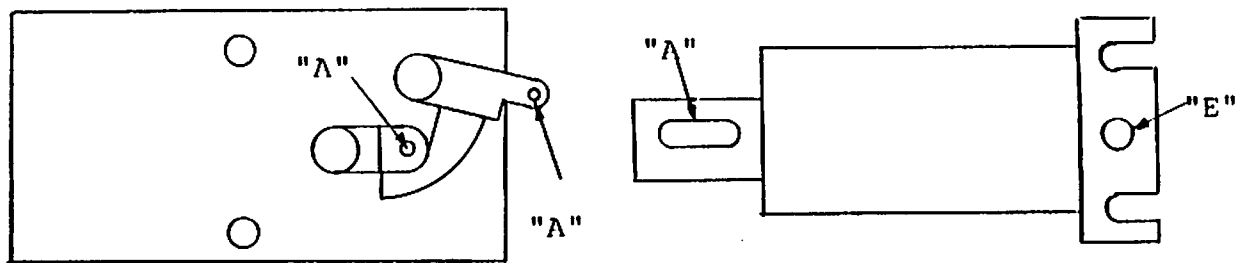
Open up the holes shown "A" below using a 7/32" drill.





### Outer Handle

Open up the holes marked "A" shown below using a 7/32" drill.



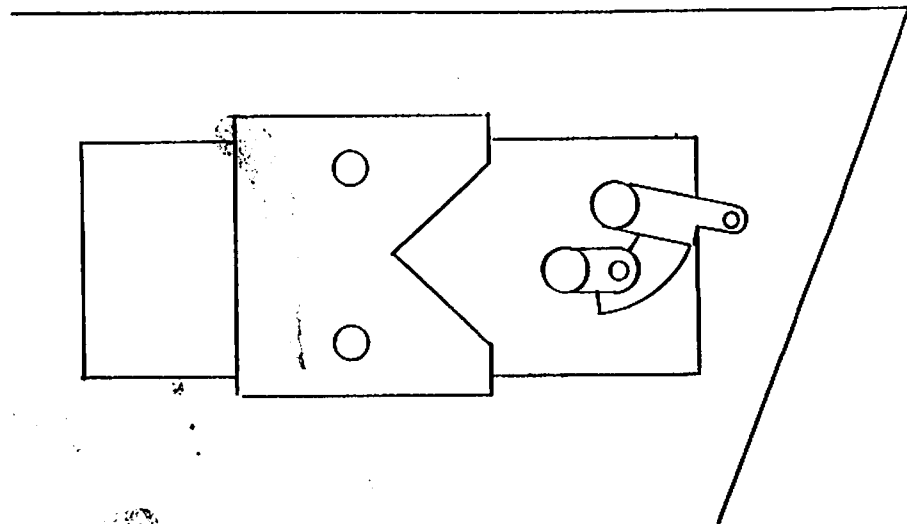
### Inner Handle

Open up the slot "A" and hole "B" to  $\frac{1}{4}$ " diameter.

#### 4. FIT LATCH AND HANDLES TO DOOR SHELL AND INNER PANEL

### Outer Handle

The outer handle is attached using the bracket provided and 2 x 5mm nuts and shakeproof washers as shown in the diagram below. Be careful not to overtighten the nuts as this may distort the outer shell.

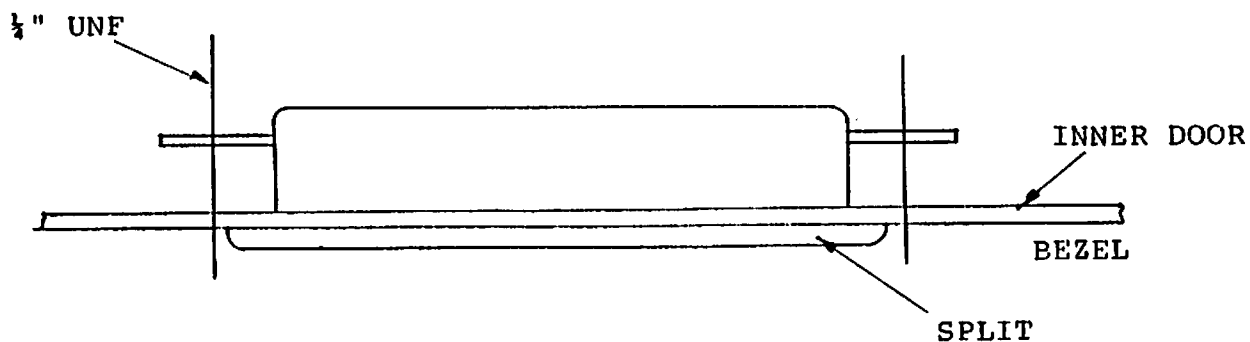


### Latch

Fit the latch to the door shells using the 4 x  $1\frac{1}{4}$ " long  $\frac{1}{4}$ " U.N.F. screws, nuts, washers and spring washers provided.

## Inner Handles

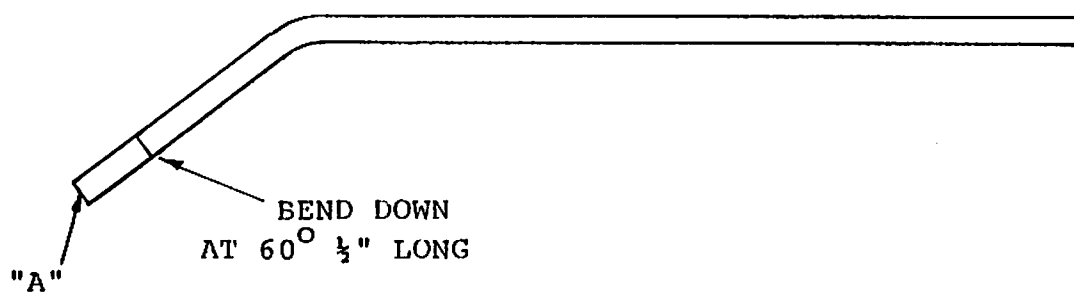
Fit the inner handles to the inner panels as shown below, with the operating rod facing the latch end, using 2 x  $\frac{1}{4}$ " U.N.F. x 1" bolts and nuts provided.



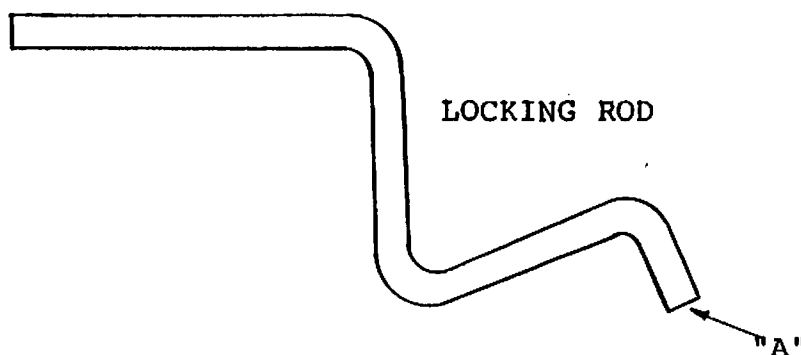
## 5. FIT OPERATING RODS AND CLIPS

Bend and cut the two smaller rods provided as shown below.

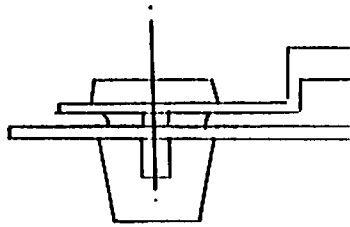
### OPENING ROD



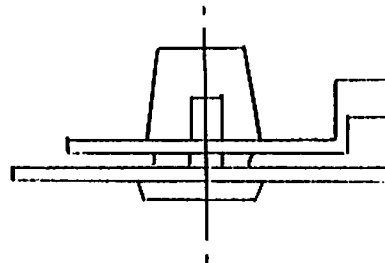
### FULL SIZE



Fit the retaining clips to the operative levers at the latch and the outside handle by inserting the plastic moulding from the top as shown in the diagram below.



The retaining clip fitted to the slotted operating lever on the latch should be fitted as shown below.



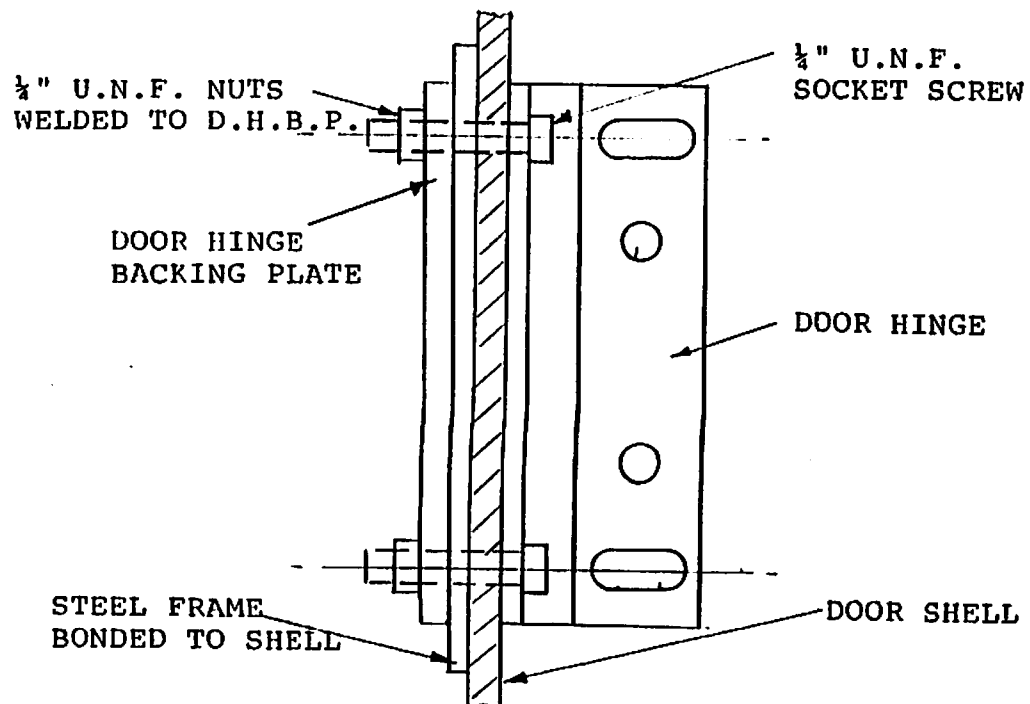
Fit the striker to the latch.

Fit end "A" of the locking rod into the locking lever on the latch. (The lever nearest the outer shell of the door). Position the other end of the rod over the lever on the outer handle. Mark the rod where a bend is required to take the rod through the hole in the lever. Remove rod, bend and cut rod  $\frac{3}{8}$ " from bend.

Re-fit rod to clips in both levers, check operation.

Similarly fit the "A" end of the operating rod in the operating lever at the latch and repeat as above.

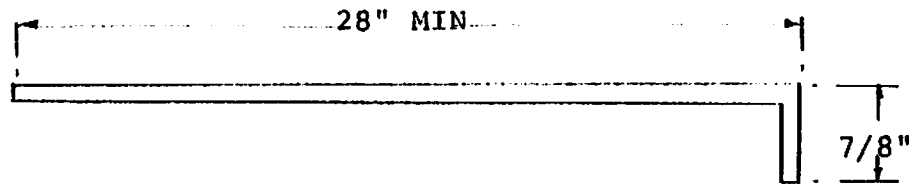
6. Fit door hinges to door shell, as shown below.



7. Fit inner panel to outer shell.

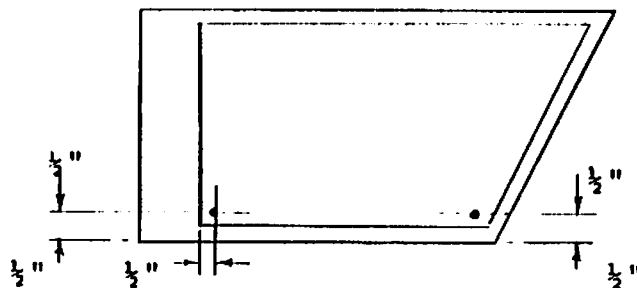
NOTE:- The locking rod is only fitted to the passenger door.

Bend the operating and locking rods as shown below:-

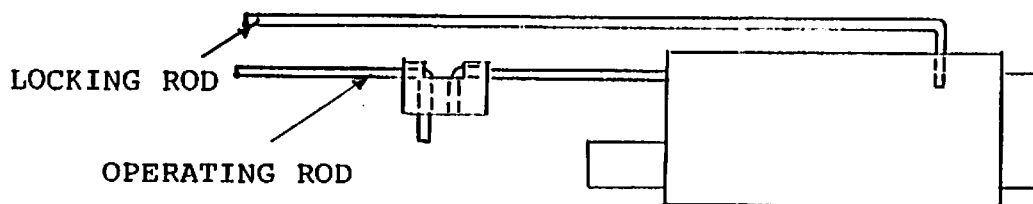


Place the inner panel over the outer shell and clear the area around the latch so that the inner panel fits flush to the inner flange at the outer shell.

Place the inner panel over the outer shell and drill 2 number 1/8" location holes in the portion shown below:-



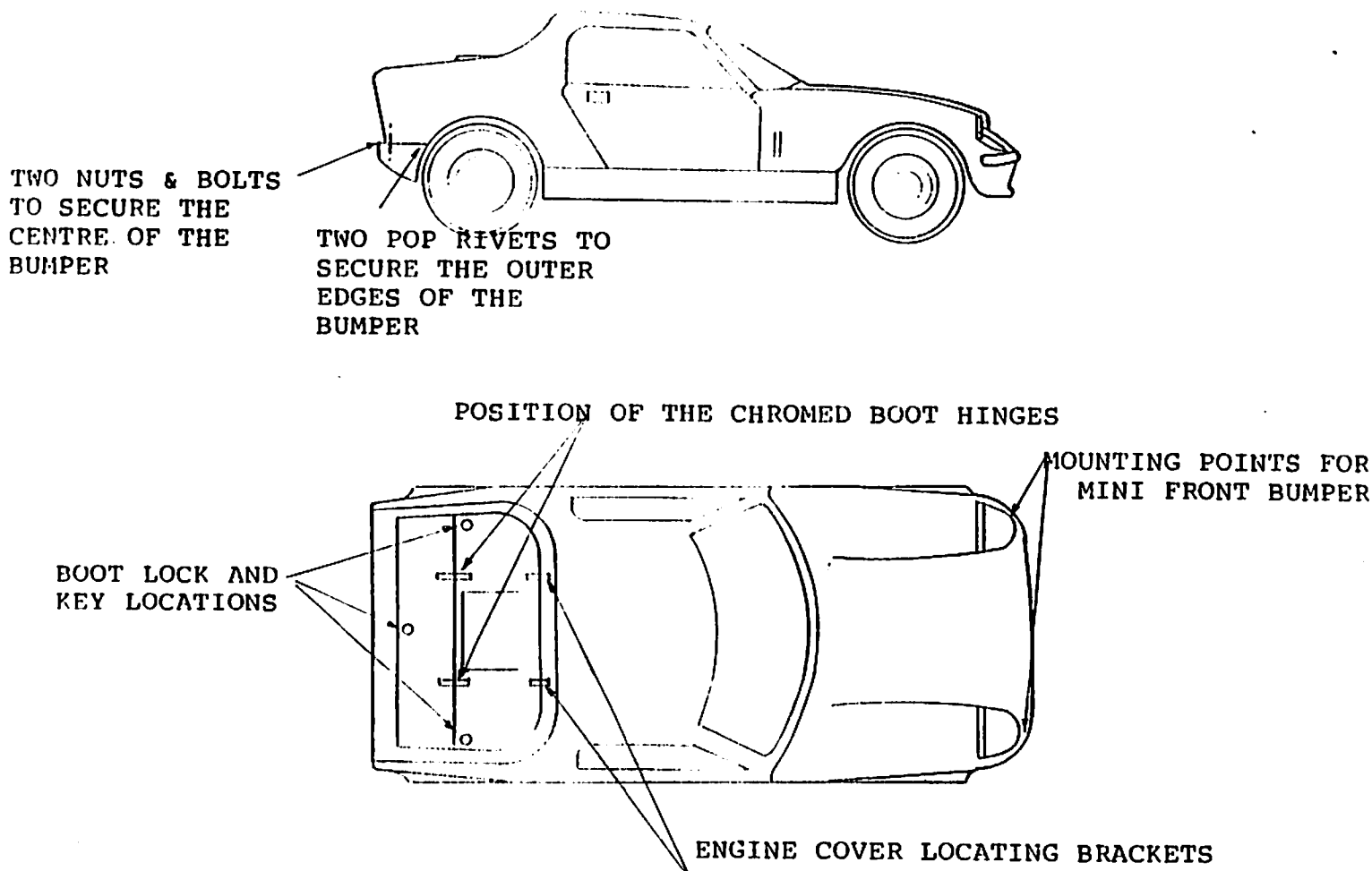
Fit the 2 rods (1 R.H.) into the inner door handle as shown below:-



Replace the inner panel over the outer shell and use 2 pop rivets to locate. Lifting edge "A" and looking in direction "A" mark rods. Remove bend and fit clips. Check operation of doors. Secure inner panel to outer shell using 10 No. 1/8" diameter, 1/2" long aluminium pop rivets.

The doors are now ready to fit to the car.

## ENGINE & BOOT COVER, REAR BUMPER, FRONT BUMPER



### ENGINE AND BOOT COVER

These two moulds are fastened together with the two chromed hinges supplied in the kit and are positioned as shown on the drawing.

Three locks and keys are also provided in the kit and these are also located as shown on the drawing.

Two engine cover mounting brackets (supplied) are laminated to the underside of the engine cover in the positions shown, this enables the engine and boot lid assembly to be lifted off in one piece.

### REAR BUMPER

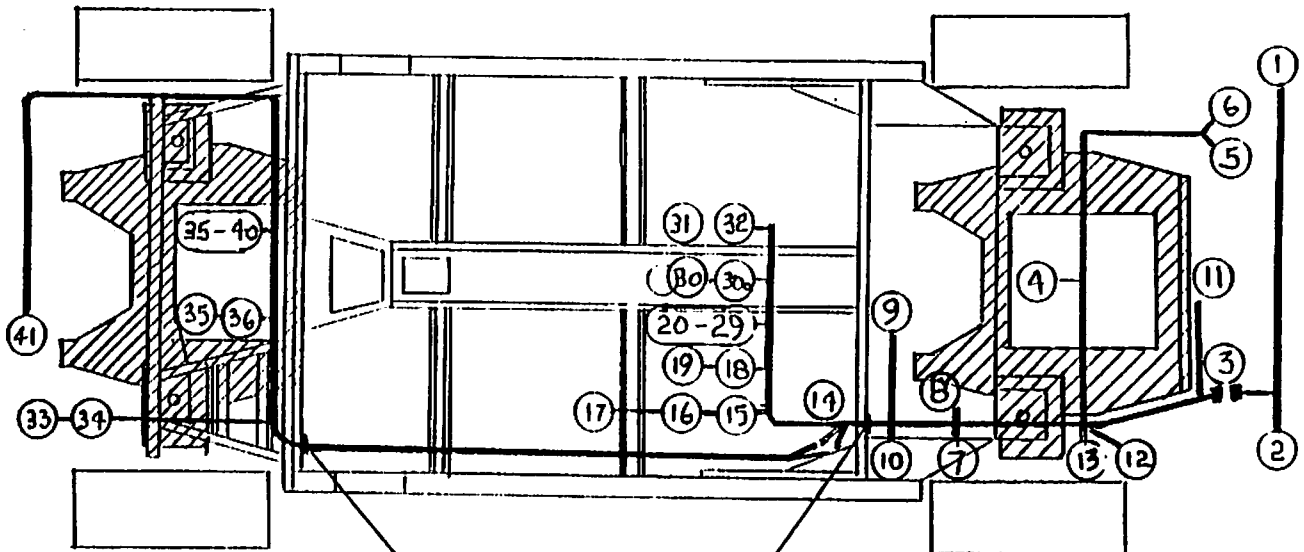
The rear bumper moulding is attached to the main body shell by two nuts and bolts which are passed through the two mouldings from the inside of the boot area. This is done once the bumper has been pushed flush up to the main body shell.

The two outer corners of the bumper where they meet the wheel arch are pop-riveted from inside the boot area to secure them.

### FRONT BUMPER

The front bumper is a standard Mini bumper, chromed or matt black (Mini City) and is drilled through the bonnet at the two outer mounting joints. The centre one is not used as it interferes with the bonnet mounting bracket.

## Fitting of Coupe Wiring Harness



1½" grometts fitted where harness  
goes through front and rear bulkheads.

1. L/H Front Headlamp/side/indicator	GR UW UR R B
2. R/H " " " "	GW UW UR R B
3. Plug - H/Lamp Harness to Main Harness	
4. Petrol Tank	GB B
5. Fan	G BG
6. Thermo (Rad) Switch	BG B
7. Earthing Point	B (X5)
8. F/Box	W G P N
9. Wiper Motor	
10. Washer	LGB B
11. Horn	P PB
12. Brake Light Switch	G GP
13. Fuel Pump	W B
14. Plugs - Main Harness to Rear Harness	
15. Hazard Warning Light Switch (All come out in one place)	GW GR LGN LGN GK
16. Rear Fog Light Switch	R RB
17. Heater Fan Switch	G GY
18. Flasher Relay	G LGN
19. Hazard Warning Relay	N GK

### DASH:

20. High Beam Warning Light	UW *
21. Oil	W WP
22. Ignition " "	W NY
23. R/H Indicator " "	GW *
24. L/H Indicator " "	GR *
25. Tacho	WR G
26. Fuel Gauge	G GB
27. Temperature Gauge	G GU
28. Panel Light Feed	R
29. Earthing for Instruments	B
30. Heater GY * 30A. Cooling Fan Override Switch	G BG
31. Steering Column - 3 Plugs	
32. Radio	WK *

\* Need Earth's

### (TAIL HARNESS)

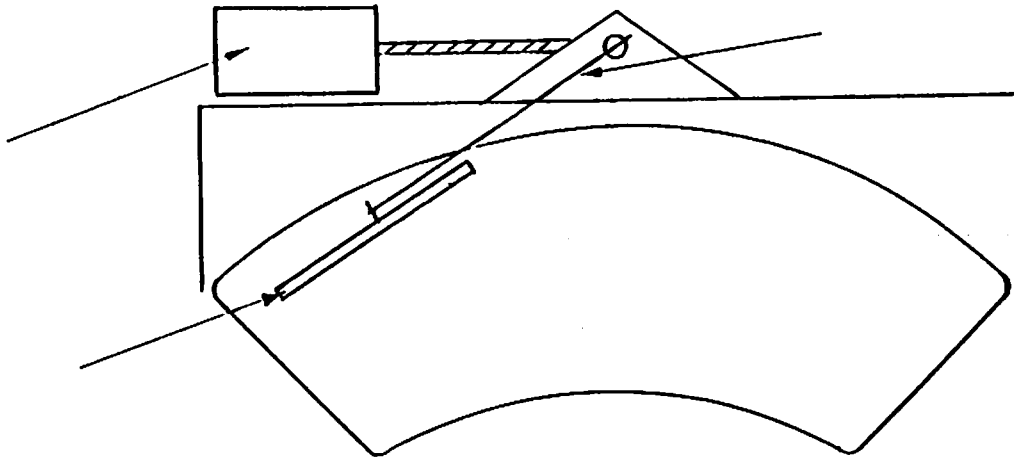
33. Earthing Point	B (X2)
34. Solenoid	N WR B N
35. Coil	W WB
36. Oil Sender	WP
37. Alt	N NY
38. Temperature Sender	GU
39. Distributor	WB
40. Reversing Light Switch	G GN
41. Tail & No. Plate Lights	RB R GW GR
	GP GN B

### CABLE COLOUR CODE

B = Black	G = Green	K = Pink	LG = Light Green
N = Brown	O = Orange	P = Purple	R = Red
U = Blue	W = White	Y = Yellow	S = Slate

### WIPER MOTOR AND ARM

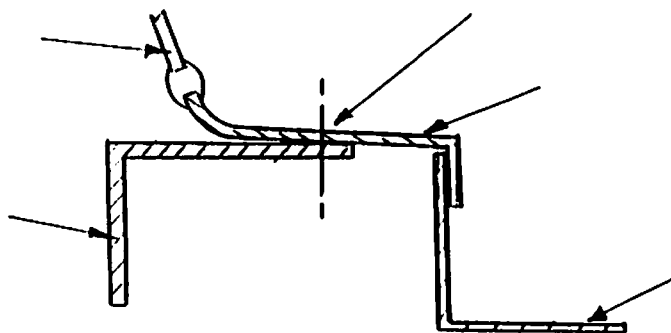
A single wiper system is fitted on the GTM utilizing the standard Mini wiper motor, preferably the twin speed version. The wiper motor location bracket is fitted onto the chassis as shown.



### DASHBOARD AND INSTRUMENTS

The dashboard mould supplied in the kit has been moulded with a leather cloth finish as standard. It can be covered with genuine leather or leathercloth if required. The facia will accommodate any make of instrument, Smiths, Veglia etc. and these are best positioned by cutting out circles of paper the size of the instruments required and selecting the position to suit. Scribe and cut over the holes and secure the instruments.

The dashboard is secured to the mounting bracket with pop-rivets along the base of the dash, these are drilled through into the 1" x 1" section tubing. The top is mounted at the base of the screen by securing the top of the dash moulding to the base of the screen moulding.



### SOUNDPROOFING

There is sufficient soundproofing in the kit to cover the entire internal area of the chassis. The most important section to soundproof is obviously the bulkhead between the engine and the cockpit, the floor, sills, side panels and foot wells also need covering. These areas should be covered by making paper templates of the section required, cutting out to shape, and sticking to the chassis with upholstery glue

## HEADLINING

The headlining supplied in the trim pack has been marked out with templates and should be trimmed out to these sizes.

If a sunroof is being fitted to the GTM the headlining is easier to fit as the sunroof pulls the headlining up to the roof. If a sunroof is not fitted, it is advisable to secure a bar across the centre of the car to which you can attach the headlining to give plenty of headroom. If this is not done, 2" of internal headroom will be lost.

All the headlining pieces are fitted before fitting the screens. This enables you to secure the headlining material around the screen apertures loosely and when the rubber screen surrounds are fitted it will tighten up the material.

The main roof section is fitted first and this is done by centralising the material between the front and back of the car and side to side. This is best done by securing the material with standard household pegs. Once the material has been centralised, the edges can be glued to secure them. Any excess should be trimmed off with a stanley knife.

The front screen pillars are then glued in position. These can be backed up with  $\frac{1}{4}$ " foam rubber if required.

The two rear side sections are then fitted and due to the change in shape of the rear window aperture, these pieces are the most difficult to position. If all the creases cannot be removed from these sections the screen rubber will tighten the material when the rear screen is fitted.

## SEAT BELTS

The GTM chassis has been designed to take standard Mini/Metro seat belts. Captivated nuts are welded to the chassis in the floor and back bulk head to take standard seat belt mounting bolts.

If inertia reel seat belts are to be fitted, the best position for the reel is low down on the rear bulkhead through into the bottom crossmember of the engine spaceframe.

## CARPETS

The carpets supplied in the trim pack are all cut and trimmed to size, and the shape of the individual pieces should indicate which section goes where. It is best to glue the carpet pieces down directly on to the soundproofing pieces.

The sizes of the carpets have been designed to fit over soundproofing. If soundproofing is not used, the carpets will be short.



## FRONT AND REAR SCREENS

By far the best way to fit screens is to employ a professional glass fitter to do the job. The replacement windscreen companies will normally do the job quickly and efficiently, but be careful of the cost as they normally fit free if they are supplying the screen. As you supply the screens for them to fit, make sure you agree a cost for the job before starting.

It is best to remove all sharp edges from the glass fibre screen apertures before starting as the sharp edges can cut the rubber sealing sections!

## SEATS

GTM seats are specially designed to give maximum headroom for taller drivers. The sides are lowered to make it easier to get in and out and the rake of the seat angle is greater than normal. The runners are also mounted directly to the base of the seat. This gives about 3" extra headroom over standard seats.

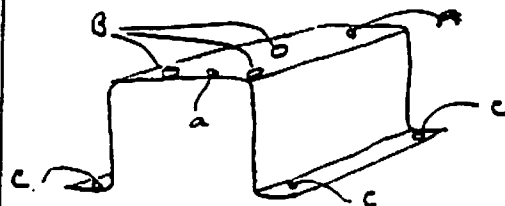
Normal aftermarket seats can be used in the Coupe but will reduce the headroom within the car.

# DISCRIPTION

WIPER MOTOR MOUNTING BRK.

## IDENTIFICATION.

16 S.W.G. MILD STEEL  
6" x 2" x 4" AS SHOWN.

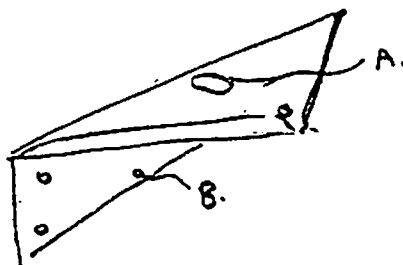


## LOCATION ON CAR

THE STANDARD MINI WIPER MOTOR IS MOUNTED ON THE TOP OF THE BRK THROUGH HOLES A & B. THIS BRK IS THEN MOUNTED ON TOP OF THE BULK HEAD USING SELF TAPPING SCREWS THROUGH HOLES C.

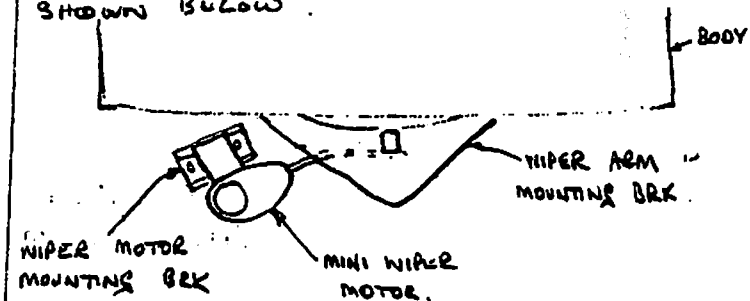
WIPER ARM MOUNTING BRK.

16 SWG TRIANGLE IN MILD STEEL  
12" x 4" x 2 3/4" AS SHOWN.



THE STANDARD MINI WIPER GEAR BOX IS FIXED THROUGH HOLE "A" AS ON MINI USING ANGLED RUBBER SLEEVE TO CREATE CORRECT ANGLE OF BLADE TO SCREEN.

USE 18" BLADE ON 1100 ARM. THE BRKT. IS "POP" RIVETED UNDER SMALL LIP AT CENTER OF BODY AS SHOWN BELOW.



# IDENTIFICATION

ENGINE COVER MOUNTING BRKTS.

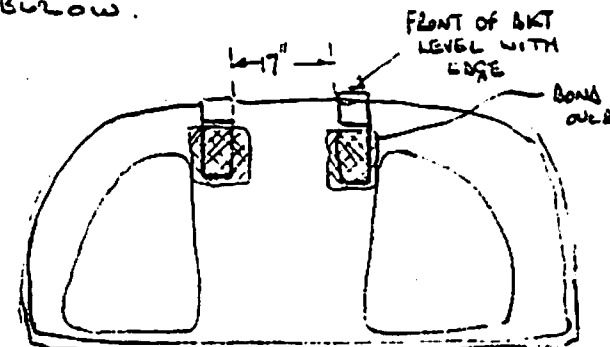
## IDENTIFICATION

1/8" MILD STEEL 1" x 5 3/4" WITH TWO  
BLINDS 2 OFF AS SHOWN BELOW

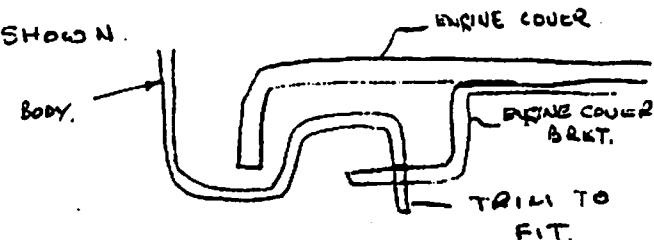


## LOCATION ON CAR

FITTED UNDER ENGINE COVER TO  
PREVENT FRONT LIFTING. ATTACHED  
USING SMALL AMOUNT OF GLASS  
FIBRE POSITIONED AS SHOWN  
BELOW.



NOTE. LOWER OF REAR LIP OF  
BODY MOUNTED IS TRIMMED AS  
SHOWN.

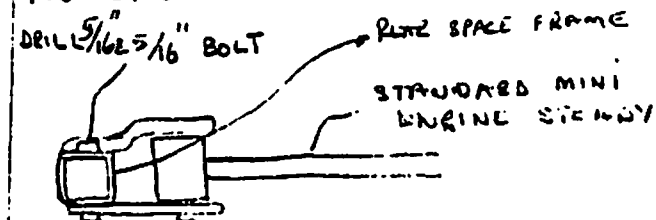


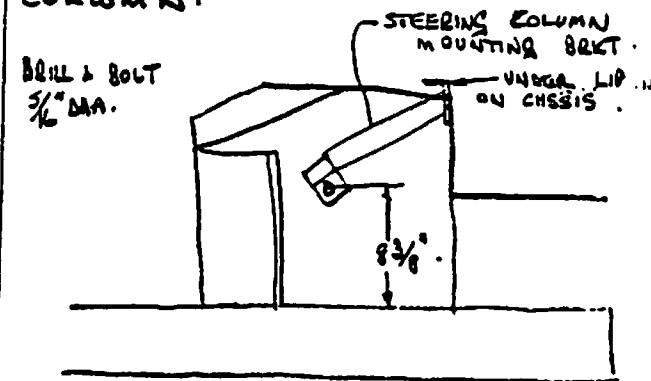
ENGINE STEADY TOP PLATE

18. S W G MILD STEEL 2" x 2"  
AS SHOWN BELOW



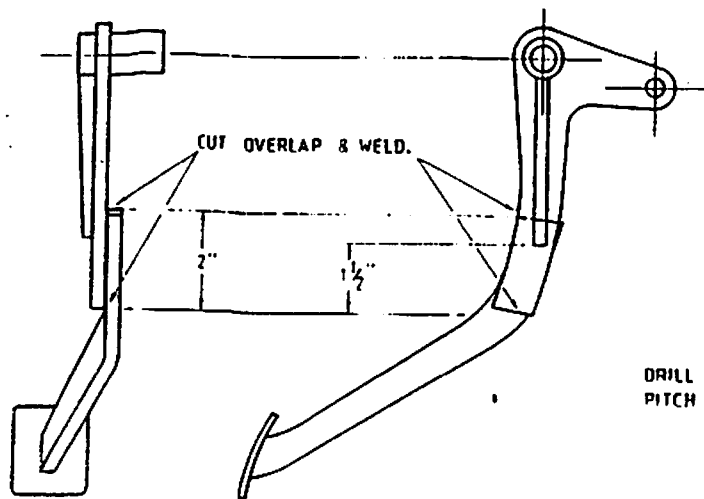
FITTED OVER 1" SQ. REAR CHASSIS  
SPACE FRAME TO FORM TOP SUPPORT  
FOR TOP ENGINE STEADY STANDARD  
MINI ENG STEADY USED AND LOCATED  
AS SHOWN.



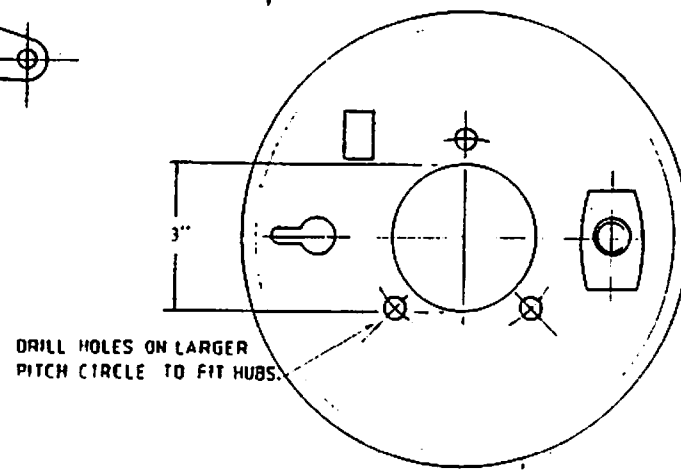
DISCRIPTION	IDENTIFICATION	LOCATION ON CAR.
BODY CHASSIS CLAMPING PLATES & BOLTS.	16 SW.S. MILD STEEL $9 \times 13\frac{1}{8}$ " 2 OFF. AS SHOWN ON PAGE 2 OF THE CONSTRUCTION MANUAL.	AS SHOWN ON PAGE 2 OF THE CONSTRUCTION MANUAL.
BONNET BUFFERS	2 OFF. 2" DIA RUBBERS 1" THICK	USED BETWEEN THE BODY AND THE BONNET TO PREVENT MOVEMENT
STEERING RACK MOUNTING BRK.	2 OFF ALUMINIUM BLOCK. $\frac{1}{2} \times \frac{1}{2} \times 2\frac{1}{2}$ " AS SHOWN ON THE BACK PAGE OF CONSTRUCTION MANUAL. "ALTERNATIVE RACK MOUNT."	AS SHOWN ON BACK PAGE OF CONSTRUCTION MANUAL "ALTERNATIVE RACK MOUNT"
STEERING COLUMN MOUNTING BRKT.	MAINLY 1" SQ. MILD STEEL TUBE 49" LONG WITH $9 \times 11$ " FRAME TO SIDE.	BOLTED TO CHSSIS FRAME AS SHOWN BELOW AND USED TO MOUNT TRIUMPH DONOMITE STEERING COLUMN. 

SIDE VIEW OF CHASSIS.

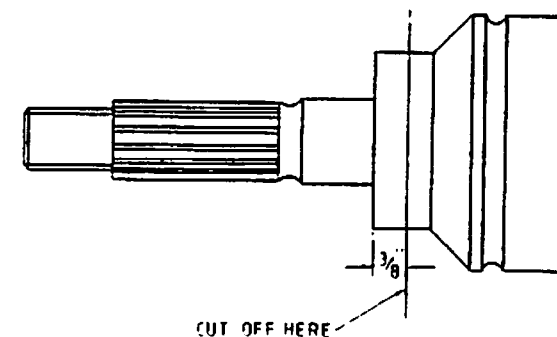
MODIFIED BRAKE & CLUTCH PEDALS.



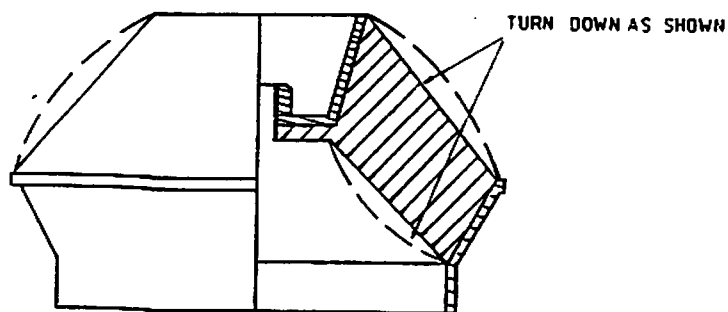
MODIFIED BACKPLATE.



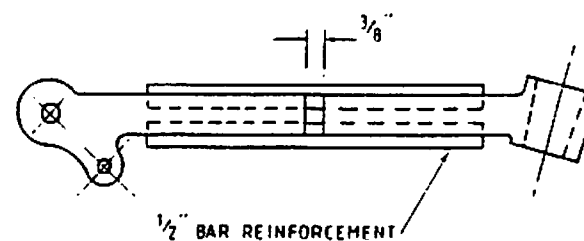
MODIFIED DRIVE SHAFT.



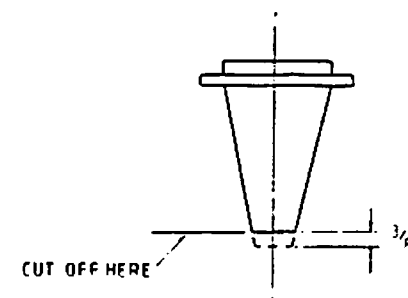
MODIFIED FRONT SUSPENSION RUBBERS.



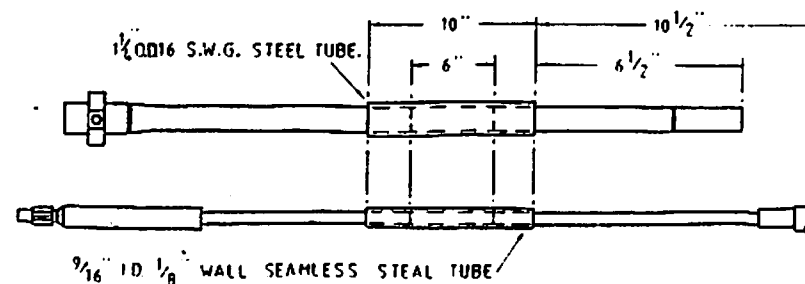
MODIFIED FRONT WHISHBONE.



MODIFIED FRONT SUSPENSION CONE.



MODIFIED STEERING COLUMN INNER & OUTER.



G.T.M. ENGINEERING.

MODIFIED MINI PARTS

NOT TO SCALE. 3 FEB. 1981

## MINI COMPONENTS

### GTM FRONT:

Subframe, pre face lift, twin bolt fixing.  
Front suspension complete.  
Front hubs and brakes, disc or drums (discs preferable).  
Mini steering rack, steering arms, and track rod ends.  
Brake light switch and banjo,  
Flexible brake hoses, (subframe to hubs).  
Battery and battery leads.  
Shock absorbers (standard Mini front).  
Pedal assembly.  
Accelerator pedal.  
Master cylinders to suit disc or drum.  
Fuse box.  
Mini headlight assembly including rear bowls.  
Side lights either in the headlight unit or separate units.  
Wiring from light unit to connect to GTM loom.  
Wiper motor and one gear box drive plus drive link.  
Screen washers.  
Radiator expansion tank.  
Side window catches (Mini Estate).  
Rear view mirror.  
Heater (preferably steel casing type).  
Handbrake (twin cable).  
Seat belts.

### GTM REAR

Subframe, pre face lift, twin bolt fixing.  
Suspension complete.  
Mini rear brake assembly and back plates (modified).  
Drive shafts to suit engine.  
Engine and gear box plus mountings and all accessories i.e. alternator  
distributor  
coil  
carburettor and inlet manifold.  
gear change (twin shaft) plus  
remote linkage  
gear stick and gear stick housing  
engine steady  
engine mounted heater switch  
flexible brake pipes (subframe  
to hubs)  
Allegro thermostat housing.  
rear number plate light

NON MINI COMPONENTS

DOLOMITE STEERING COLUMN: Complete column assembly including cowling switches and keys. Wiring plugs directly into GTM loom.

There are two universal joints on the Dolomite column. Disregard the longer one connected to the column but use the smaller one (rubberised) to connect the column spline to the steering rack.

INSTRUMENTS:

Any instruments that will fit into the GTM supplied dashboard i.e. Smiths, Veglia etc. All separate instruments will fit (including Triumph Dolomite). Speedo will have to be recalibrated.

Radiator and Fan  
Front Indicators  
Headlamp Rims  
Wiper Arm  
Wiper Blade  
Steering Wheel  
Petrol Tank Cap

1750cc Allegro.  
to suit customer requirements (Morris 1100).  
8" chrome (MGB Roadster).  
Mini adjustable.  
17" blade.  
Boss to suit Dolomite column.  
MK III Escort.

## **SECTION 13**

### **COMPLETION AND CHECKING**

#### **(1) TRACKING UP**

Once the suspension has settled, the vehicle will need tracking up carefully.

##### **(a) TOE-IN**

Ideally this should be done with alignment equipment as it is fairly critical.

The toe-in on the wheels should be 1/8" (3 mm) front and rear, i.e. each wheel should point in by 1/16" (1.5 mm).

##### **(b) CAMBER**

The camber should be ½ to 1½ degrees negative.

N.B. Ensure that all nuts and bolts as mentioned on page 14 and 15 under the fitting of the rear bottom wishbones are properly secured prior to using the vehicle.

#### **(2) GENERAL**

Ensure that all wires, pipes and connections are properly secured.

#### **(3) RIDE HEIGHT**

From the bottom of the chassis to the level ground there should be 4" to 5" (100 mm to 125 mm) ground clearance at the front and 5" to 5.5" (125 mm to 140 mm) at the rear.

#### **(4) TYRE PRESSURES**

These will need to be experimented with to suit driving styles but 20 p.s.i. (1.4 kg/cm<sup>2</sup>) at the front and 28 p.s.i. (1.96/cm<sup>2</sup>) at the rear are the recommended starting points.



