5TH CATEGORY - HISTORIC RACING

GROUP Nc

APPROVED VEHICLE SPECIFICATION

This form details the approved specifications of individual vehicle models in the 5th Category Historic car group. To be issued with an Historic Log Book, cars need to comply with these specifications, the physical appearance shown in the illustrations, the general historic rules and the specific regulations relative to the subject vehicle Group, as detailed in the current CAMS Manual of Motor Sport.

Make of Car: **FORD** **Model:** **ESCORT TWIN-CAM**

Period of Original Manufacture: 1970 - 1973

CAMS Historic Group: Nc

Date of Issue of this Document: **27 May 2004**

This form was issued without alteration or erasure.

SECTION 1 - CHASSIS

1.1 CHASSIS FRAME

Description: Unitary construction with body **Period of Manufacture:** 1970-73

Manufacturer: Ford Australia
Chassis no. from: Typical prefix CK49xxxxxxx
Chassis no. location: Top of RH suspension tower
Material: Steel
Comments: Assembled in Australia from CKD parts mainly of European origin with some local components

1.2 FRONT SUSPENSION

Description: Independent by McPherson Strut
Spring medium: Helical coil
Damper Type: Telescopic incorporated in strut **Adjustable:** No
Anti-sway bar: Integral with front suspension **Adjustable:** No
Suspension adjustable: Toe-in only **Method:** By tie-rod ends
Comments: Adjustable strut top mounts and dampers permitted. Spring platform location may be change; adjustable spring platforms are permitted.

1.3 REAR SUSPENSION

Description: Live rear axle
Spring medium: Semi-eliptic leaf springs
Damper type: Telescopic **Adjustable:** No
Anti-sway bar: Not fitted **Adjustable:**
Suspension adjustable: No **Method:**
Comments: Additional lateral and longitudinal linkages permitted; adjustable dampers permitted. Rear damper original upper mountings must be used; 'turrett' style upper mountings (where modification to body floor pan is necessary) are NOT permitted.

1.4 STEERING

Type: Rack and pinion **Make:** Cam Gears or Burman

Comments:

1.5 BRAKES

	Front	Rear
Type:	Disc	Drum
Dimensions:	244mm x 12.7mm	229mm x 45.5mm
Material of drum/disc	Cast iron	Cast iron
No. cylinders/pots per wheel:	2	1
Actuation:	Hydraulic	Hydraulic
Caliper: Make, Material, Type:	Girling cast steel 2-pot	

Master cylinder make: Girling **Type:** Single cylinder

Adjustable bias: No

Servo Fitted: Yes
Comments: Use of twin master cylinders with adjustable bias permitted. Modifications limited to pedal box (body shell may not be modified) and bias adjustment may not be operable by driver when in driving position. Servo may be removed.

SECTION 2 - ENGINE

2.1 ENGINE

Make:	Lotus/Ford		
Model:	Twin-cam		
No. cylinders:	4	**Configuration:**	In line
Cylinder Block-material:	Cast iron	**Two/Four Stroke:**	Yes
Bore - Original:	82.5mm	**Max. allowed:**	84mm
Stroke - original:	72.75mm	**Max. allowed:**	72.75mm
Capacity - original:	1558cc	**Max. allowed:**	1613cc
Cooling method:	Water cooled		
Identifying marks:	681F-6105-A or 701M-6105-A with 'L' at motor mount boss		
Comments:			

2.2 CYLINDER HEAD

Make:	Lotus Ford				
No. of valves/cylinder-	2	**Inlet:**	1	**Exhaust:**	1
No. of ports total:	8	**Inlet:**	4	**Exhaust:**	4
No. of camshafts:	2	**Location:**	Cyl Head	**Drive:**	Roller Chain
Valve actuation:	Direct from camshaft via buckets				
Spark plugs/cylinder:	1				
Identifying marks:	A26E311 & WM9403 adjacent to gasket face but visible on assembled engine				
Comments:					

2.3 LUBRICATION

Method(Wet/Dry Sump):	Wet sump	**Oil tank location:**	N/A
Dry sump pump type:	N/A	**Location:**	N/A
Oil cooler standard:	Yes	**Location:**	Radiator support
Comments:			

2.4 IGNITION SYSTEM

Type:
Make:
Comments:

2.5 FUEL SYSTEM

Carburettor: Make:	2 x Weber 40DCOE	**Model & Number:**	
Fuel injection Make:		**Type:**	
Supercharged(Yes/No):		**Type**	
Comments:	Other carburettors permitted as per Group Nc Regulations Article 4		

SECTION 3 - TRANSMISSION

3.1 CLUTCH

Make: Ford **Type:** **Diameter:** Diaphragm
No. of Plates: One
Actuation: Hydraulic
Comments:

3.2 TRANSMISSION

Type: Manual synchromesh **Model:** 2000-E

Make: Ford

No. forward speeds: 4 **Gearbox location:** Behind engine
Gearchange type and location: Remote change in extension housing
Case material: Cast iron with separate cast iron bell housing **Identifying marks:**

Comments:

3.3 FINAL DRIVE

Make: Ford **Model:** 'English' banjo type

F/R/All Wheel Drive Rear
Ratios: 3.7:1 standard other ratios permitted
Differential: Free; torque biasing (LSD) permitted

Comments: Australian made Borg Warner integral carrier rear axle (ex late Escort Mk 1) not permitted

3.4 TRANSMISSION SHAFTS (EXPOSED)

Number: 1 **Location:** Gearbox to rear axle
Description: Single piece tubular steel with Hardy Spicer type U/J's
Comments:

3.5 WHEELS & TYRES

Wheel type - Original: Conventional disc **Material - Original:** Steel

Allowed: Alternative period style **Allowed:** Aluminium alloy
Fixture method: Studs and nuts **No. studs:** 4

	FRONT	REAR
Wheel dia. & rim width -		
Original:	13 x 5.5	13 x 5.5.
Allowed :	13 x 7	13 x 7
Tyre Section -		
Original:	165 x 13	165 x 13
Allowed :	215 x 13	215 x 13
Aspect ratio - minimum:	60%	60%

Comments:

SECTION 4 - GENERAL

4.1 FUEL SYSTEM

Tank Location: RH corner of boot **Capacity:** 40 Lt
Fuel pump, type and location: Mechanical, on engine **Make:** Ford
Comments:

4.2 ELECTRICAL SYSTEM

Voltage: 12 **Generator/Alternator fitted:** Either fitted
Battery Location: LH corner of boot
Comments:

4.3 BODYWORK

Type: Unitary construction saloon **Material:** Steel
No. of seats: 4 **No. doors:** 2
Comments:

4.4 DIMENSIONS

Track - Front: 1270 mm **Rear:** 1295mm
Wheelbase: 2413mm **Overall length:** 3980mm
Dry weight: 825 Kg
Comments:

4.5 SAFETY EQUIPMENT : Refer applicable Group Regulations

FORD ESCORT MK I & TWIN-CAM - SOME HISTORICAL NOTES

Whilst introduced to the European market in 1968, it was not until 1970 that the car appeared on the Australian market. Ford Australia decided to assemble the car from CKD ('Completely Knocked Down') components. In this process all individual parts which are produced by expensive tooling (such as all body sheet metal parts) are imported as individual parts and fabrication of the body is carried out locally using these parts. Engine and other power train components are imported assembled. Local content is enhanced by the use of locally manufactured components (Lucas Australia provided the complete electrical system in this case) including paint, fabric for upholstery and trim, tyres and wheels, radiator etc. By about 1974 the Escort was using a local Borg-Warner rear axle assembly, and the 2-litre gearbox had replaced the earlier 1300 transmission. It should be noted that such specification changes ,made later than 31 December 1972, do not qualify under Historic Group Nc regulations.

It is worth noting that in the U.K. the 'standard' model Escorts used common round headlights, whilst only the 'de luxe' models featured the oval headlight. Ford Australia made the decision to standardise on the more-attractive oval lights - ironically at the expense of good lighting!

The decision to include the Escort Twin-Cam in the range in Australia was made by the late Keith Horner, Director of Marketing of Ford Australia. Horner was a motor sport enthusiast - I had first met him in the mid-1950's when we were running Vanguards in trials and he was head of Standard/AMI, and later I drove for AMI in the first Armstrong 500 in 1960. Horner left AMI following their financial crisis of the 1962 credit squeeze, and then joined Ford. He admitted to deciding on the marketing of some 750 Twin-Cams in Australia - a decision that 'backfired' on him. Ford found 750 cars was too large a number for the market to accept, and the solution to the surplus cars was to allocate them to field staff. Horner was then subject to a rash of complaints from staff that the cars were not reliable and were constantly inhibiting staff in their daily duties! To be fair on the car, this claim reflected on the Ford Dealer service structure - brought up on 'iron' engines it was short on the skills related to aluminium cylinder heads, and particularly one using shims to adjust valve clearances! Ultimately Ford renounced the Twin-Cam as a model - Dealer Service declining to service the Twin-Cam engine and Parts & Accessory Department terminating the supply of engine parts. Organisations such as Jeff Hughes Racing at Chatham (Melbourne) quickly took over supply of engine parts.

Ford Australia certified the production of Twin-Cams commenced on 1 April 1970 and 200 units (to meet CAMS requirements of the time) had been produced as of August 1970. Subsequently they certified production had risen to 500 units by 1971. I believe it is worth noting that in all the 'authoritative' writings of U.K. origin about the Twin-Cam and the number manufactured etc. there has never been any mention that some 750 cars were built in Australia. It seems the Brit. Escort freaks are ignorant of this fact.

It should be noted that except for one or two isolated examples (eg the first Stillwell Escort Twin-Cam which was prepared by Alan Mann Racing and was imported to Australia) the numerous Twin-Cams raced in Australia in the period were Australian assembled cars, and it is appropriate therefore that our Historic Group Nc Specification Sheet is based on the contents of the Homologation Papers lodged by Ford Australia with CAMS in August 1970. Certainly such specifications must apply to 'specification' Twin-Cams being presented for Group Nc racing.

A further twist of the Twin-Cam history in Australia is that in August 1971 (with the introduction of the 1971 body - refer 'Body Coding & Identification' section below) Ford changed the name of the car to Escort GT1600. It appears this was an attempt to overcome the unfavourable attitude insurance companies had developed towards the Twin-Cam! This change was reflected in the appearance of "GT 1600" in contrasting colour decal (gold on red or bronze cars, black on white or yellow cars) on the boot and on each front guard above the metal badge on which "ESCORT" replaced the previous "TWIN-CAM". Interestingly there have been cases where the word "ESCORT" has been a 'metal-cal' which when peeled off revealed the words "Twin-Cam"!!

BODY CODING AND IDENTIFICATION

Initially the model coding relating to the Escort range was as follows:-

11012	Standard Sedan -2 Door
11016	Super Sedan - 2 Door
11018	GT 1300 Sedan (1300cc) - 2 Door
11019	Twin-Cam - 2 Door
11036	Super Sedan - 4 Door

The first two numerals ("11") refer to the Escort range and the last two relate to the particular model. The mid figure ("0") identifies the 'Body Model' year - "0" relates to 1970. Note that this does NOT relate to the YEAR OF MANUFACTURE of the car. The "0" body was the original form of the Escort body which featured decorative mouldings only on the gutters. The "1" body (1971) saw the gutter mouldings abandoned and decorative strips in the form of a large "C" around both side windows, plus decorative strips in the boot area. Note that reversing lights fitted to 'other' model Escorts were not fitted to the Twin-Cam because the gearbox fitted to the Twin-Cam had no provision for a reversing light switch! Reiterating, the 'Body Model' figure does not relate to the production date of the car - in the case of the Twin-Cam the 11019 bodies were used in production up until August 1971; the 11119 bodies were incorporated into production late in August 1971with the change of name to GT1600. The subsequent body identification was 11219 introduced in 1972 and was used only on a small number of GT1600's prior to production ceasing - and featured high-back seats to meet ADR requirements. These seats were derived from the Cortina, and were rigidly mounted to the floor with the hinged squab providing access to the rear seats. The seats they replaced were the rather flimsy tube-steel framed units which were not rigidly mounted to the floor and tilted forward as a unit to provide access to the rear seats.

The body coding detailed above will appear on the compliance plate, together with the date of manufacture - 8/71 meaning August 1971. Ford appear to have been rather sloppy in naming the car - I have noted compliance plates carrying "ESCORT T/C" whilst others (on Twin-Cams) have carried "ESCORT SEDAN". The positive identification of a genuine Twin-Cam body is provided by body serial number prefix which is

CK49K (1970) CK49L (1971) CK49M (1972)

Twin-Cam Engine Code is "H" and Transmission Code "X".

Whilst a rather trivial matter, it is worth recording a further difference in body decor between 'Twin-Cam' and 'GT1600' versions. The early cars carried a pair of lines (one about 6mm wide, the other about 3mm and separated about 3mm) from headlight to tail light along the ridge formed at the 'waist' of the body. Colour was contrasting - gold on red cars for example. On the GT1600 version this decoration was replaced by a single contrasting line (about 6mm wide) running the length of the car just below window level and adjacent to the ridge along the upper edge of front and rear mudguards.

Another curious feature is the so-called 'crank handle hole' provided in the Escort body! In the case of the Twin-Cam it is seen as useless because of the offset engine. However it is useless on all Escorts as not only is there no provision for a crank handle on the engine, but the radiator core obstructs any possibility of inserting a crank handle! At some late stage of production of the Escort MK I the hole disappeared, but strangely replacement front panels still available in the U.K. have the hole.

UNIQUE FEATURES OF A GENUINE TWIN-CAM BODY SHELL

There are a number of features enabling one to identify a genuine Twin-Cam body shell from the other shells from the Escort range. These are summarized as follows:

1. The Twin-Cam front mudguards have much more prominent 'flares' whilst the 'wheel cutouts' are larger to accommodate the 13" wheels. One difference compensates for the other difference to a degree; the surface measurement from the body join with the bonnet to the highest point of the wheel arch is 37cm for the T/C, 39cm for others. Of course the Twin-Cam has two 'bumperettes' whereas all other Escort model have a single piece front bumper bar.

2. The battery platform on the left side inner guard on 'other' Escorts is absent on the Twin-Cam - the battery is mounted on a rack in the left rear mudguard, where the spare wheel is located on 'other' Escorts.

3. The top closing panel of the radiator support panel on the Escort has a rounded shape adjacent to the radiator top tank. This would foul the larger radiator (as fitted to MkI & MkII Cortina) used in the Twin-Cam and the panel has been crudely cut away (by oxy torch) in production. The gap remaining is filled with a narrow steel panel (Ford P/No. 3026E 70 001K67 A) held on by self-tappers. Also, the radiator support panel on the right side has two 25mm holes to accommodate the lines to the oil cooler, which is mounted on the front side of the panel, to the left of the water radiator.

4. The Twin-Cam uses an engine steady arm (pressed steel) attached to the top two bell-housing to engine bolts with the other end secured by rubber mounting attached to the vertical bulkhead panel on the passenger side. This panel has a reinforcement plate about 100mm x 100mm spot-welded to it and a 10mm hole to receive the stud of the mounting. The later 1972 versions of the GT1600 do NOT have this steady.

5. Because the Twin-Cam has hydraulic clutch operation and does not use the integral booster/master cylinder for the brakes, several fittings on the bulkhead (drivers side) of 'other' Escorts are not present on the Twin-Cam . The Twin-Cam does have a small mounting platform for the cylindrical (divided) brake fluid reservoir with two hoses passing through the bulkhead to supply fluid to the two reservoirless master cylinders in the pedal box which is unique to the Twin-Cam . On the Twin-Cam the speedo and throttle cables pass through the bulkhead higher up compared with the 'other' Escorts. These features are shown on Appendix A.

6. The Twin-Cam and the GT1300 both have the more extensive instrument panel - fitted with speedo, tacho and 4 small instruments. Not only does the 'soft' dash panel covering have a larger 'binacle'to suit, but the basic steel dash panel of the bodyshell differs. Remember Group Nc requires original instruments to be in the car, and the Twin-Cam had an 8,000 rpm tacho. ,and 140 MPH speedo. The GT 1300 had 7,000 rpm and 110 MPH instruments respectively.

7. On the rear underbody near the rear spring front mounts, the Twin-Cam bodyshell has the two mounts for the rear axle trailing links, unique to the Twin-Cam.

8. The Twin-Cam is fitted with a large stone-deflector panel bolted to the underside of the boot floor and intended to prevent stones thrown up by the wheels from damaging the valance panel below the rear bumper. The deflector is illustrated in the Attachment.

9. In the Twin-Cam the gearshift hole in the transmission tunnel is some 2" further rearwards - to accommodate the different gearbox used. The gearbox mounting location also differs, and there are reinforcing plates at both locations on the Twin-Cam not present on other model Escorts. Some 'hand-working' of the floor pan in the vicinity of the drivers left foot will be noted - to clear the bulge on the Twin-Cam bell-housing which has the starter motor on the drivers side.

The provision of the above quite extensive detail of a genuine Twin-Cam body is intended to aid Eligibility Officers in assessing whether or not a body is a genuine Twin-Cam. Given that we accept 'Specification' cars (ie a nominal Twin-Cam built up using an Escort 1300 bodyshell) the intention is to provide Eligibility Officers with the ability to determine whether a candidate car is 'genuine' or 'specification'. In the case of the latter, provided the major body features of a Twin-Cam are present (bumperettes, front guards, instruments, battery in boot, trailing links and stone deflector) the car should be seen as acceptable, assuming mechanical components are in order.

UNIQUE MECHANICAL FEATURES OF A GENUINE TWIN-CAM

The Twin-Cam incorporates a substantial number of mechanical component differences compared with 'other' Escorts. The major ones are well known, but others are less obvious and a full list is as follows:-

1. The Ford/Lotus engine is angled/offset to the left - to accommodate the 2 x 40DCOE Weber carbs . The offset is achieved by different length steel brackets to which the rubber motor mounts (the heavy duty cylindrical type used on Capri & Escort Mk.II) are attached.

2 The gearbox is the 2000E type (refer Attachment) taken from the Cortina MkII GT. The bell housing has the starter motor on the driver's side (opposite to other Escorts) whilst the clutch slave cylinder is on the left.

3. The Mc.Pherson struts, sway bar , and disc brakes are all more substantial - otherwise found on the Capri V6, - and to clear the starter motor (on right hand side in the Twin-Cam) the steering rack is the 'long stem' type.

4. The pedal box is unique to the Twin-Cam , carrying two reservoirless master cylinders (one for clutch, the other for brakes) supplied with fluid by two rubber hoses passing through the firewall from the dual reservoir mounted in the engine compartment (refer comments under 'body' above).

5. The Twin-Cam has a single line hydraulic brake system with an in-line booster mounted where the battery is located in 'other' Escorts - the latter have an integrated booster/tandem master cylinder arrangement providing a split system.

6. All Australian Twin-Cams had a single piece tailshaft whereas 'other' Escorts had either single piece or 'split' tailshafts with a (troublesome) intermediate bearing. I cannot advise in respect of Twin-Cams of UK origin.

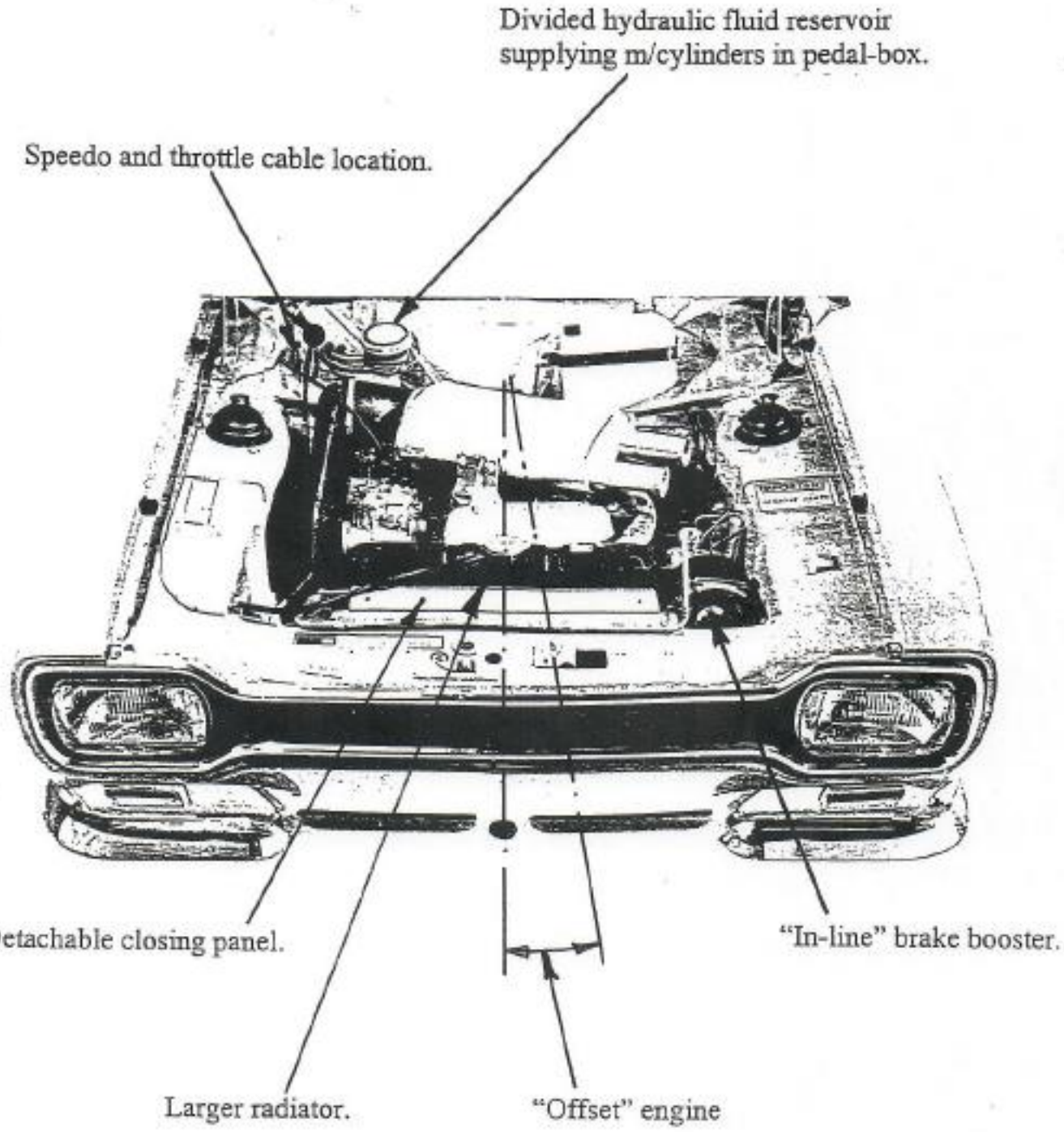
7. As mentioned earlier, the Twin-Cam was fitted with the 2000E gearbox (also found in the Mk II Cortina GT) which has a separate cast iron bell-housing, and the extension housing also of cast iron contains both the output shaft and the remote gearshift linkage in the single housing. Reverse is next to top gear. 'Other' Escorts have an integral bell-housing and gearbox casing of cast iron, with an aluminium output housing in which the output shaft and gearshift linkage are accommodated in separate housings of the single casting. Reverse is next to first gear and the gearshift features a nylon threaded member screwed into the aluminium which is of poor durability and gives frequent problems in service. The two gearboxes are illustrated in the Attachment.

8. Both 'other' and Twin-Cam Escorts use the "English" banjo type rear axle, but in the case of the Twin-Cam two trailing links are provided. Later production (from around 1974) 'other' Escorts were fitted with Australian Borg-Warner rear axles of the 'integral' type.

9. Note that prior to 1974 all Mk I Escorts including the Twin-Cam had the upper mounting of the rear shock absorbers in the form of a pressed steel 'U' bracket about 2 feet long bolted to the floor pan.. Late model Mk I Escorts had rear shock absorber upper mountings on the floor pan with upper bushes, washers and nuts visible in the boot – this arrangement as well as 'Turreted' upper rear shock absorber mountings (as found on some Mk II Escorts) are not eligible as they post-date the Group Nc termination date of 31 December 1972.

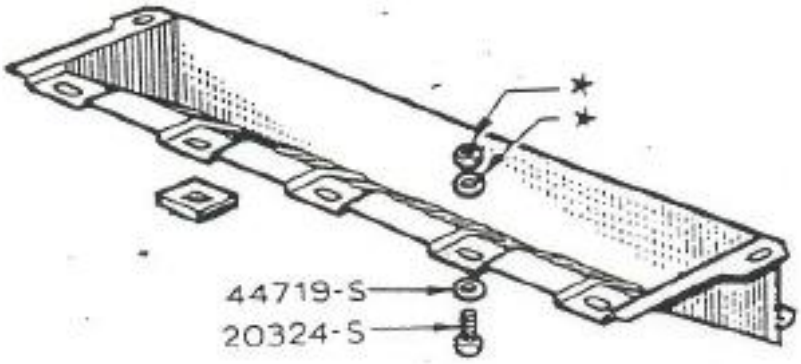
Graham Hoinville
July 2001..

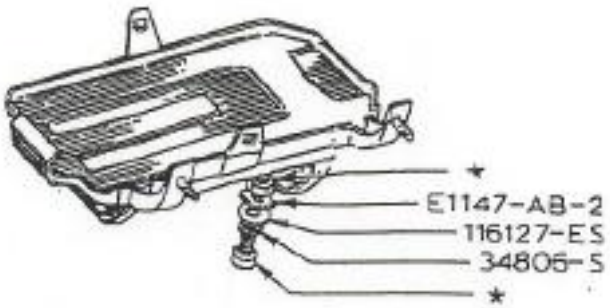
UNDERBONNET FEATURES OF ESCORT TWIN-CAM



APPENDIX B

ESCORT TWIN-CAM UNIQUE BODY COMPONENTS



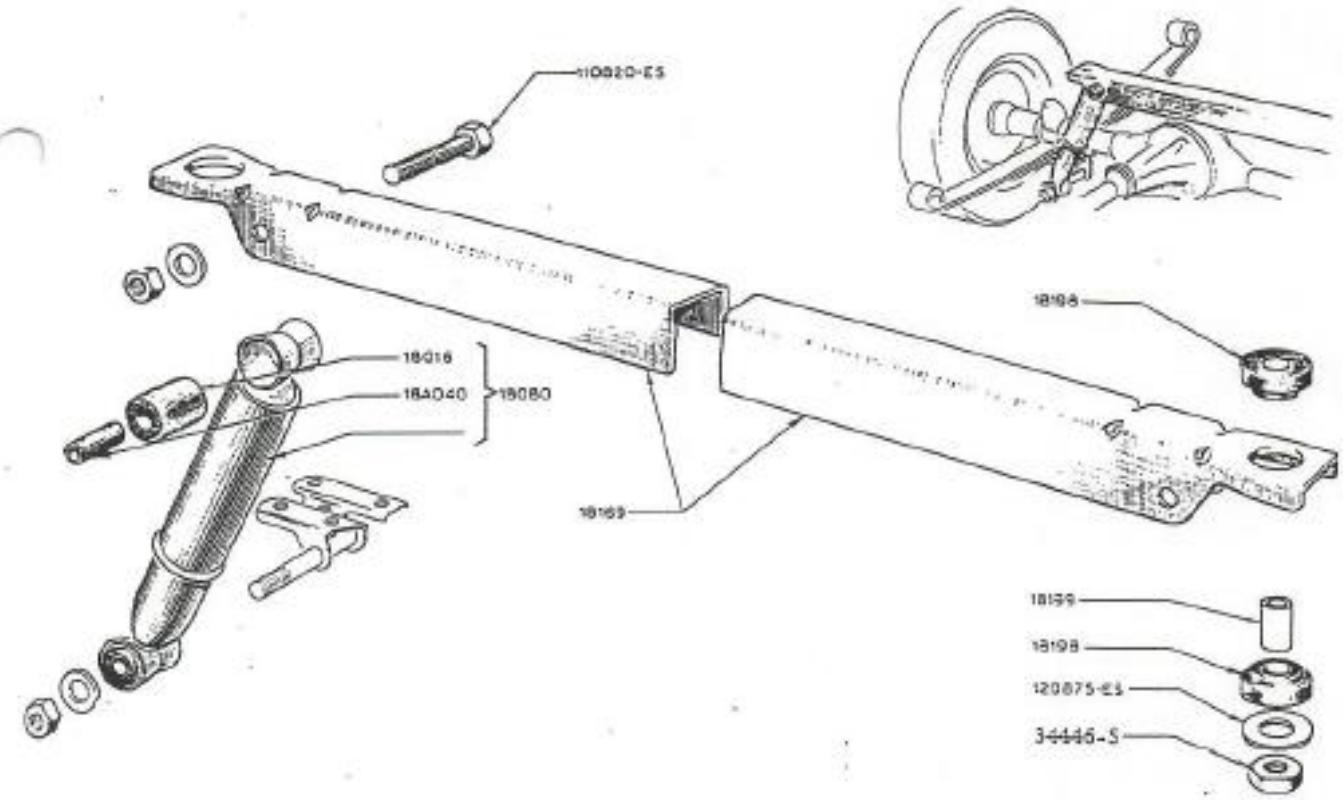


Battery carrier (mounted in left boot well).

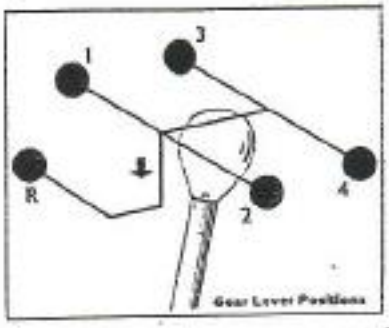
Stone deflector tray (mounted under boot floor).

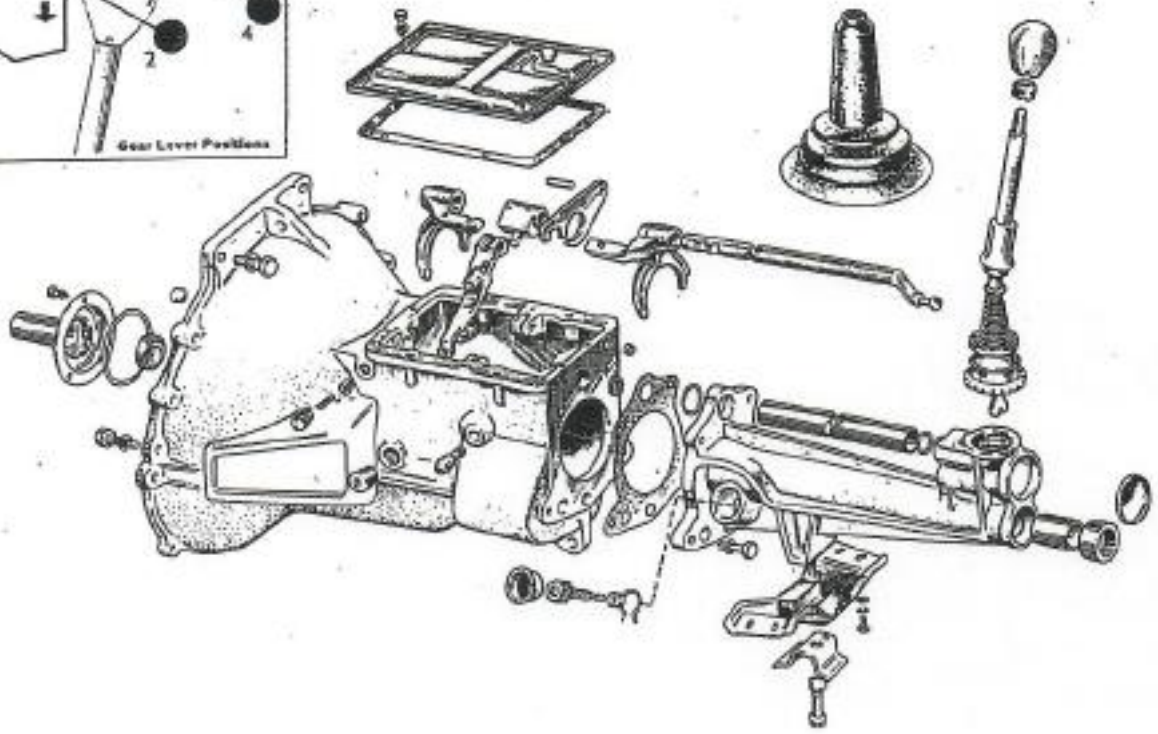
DETAIL OF REAR SHOCK ABSORBER MOUNTING

ALL GROUP Nc Mk.I ESCORTS INCLUDING TWIN-CAM

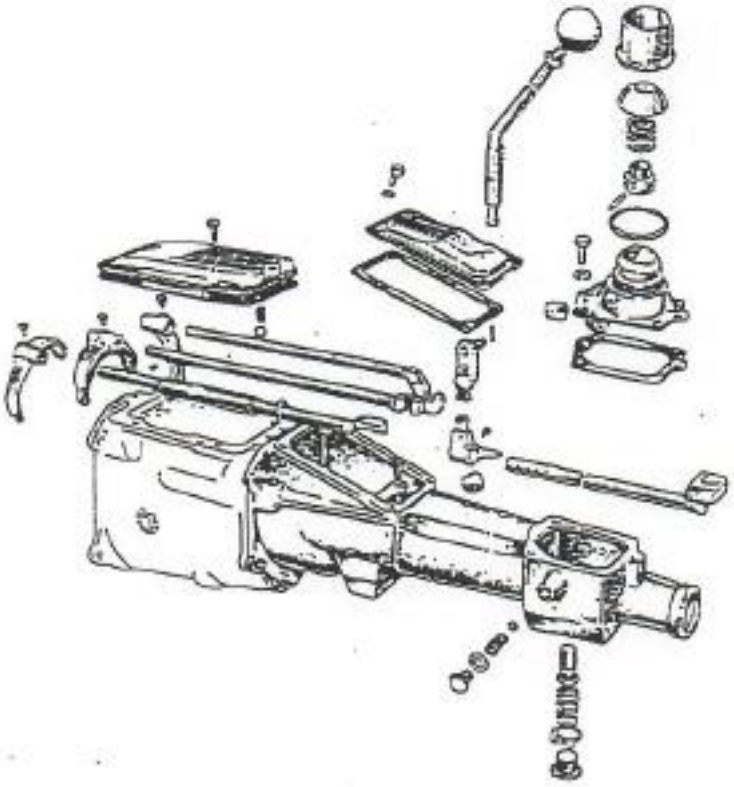


APPENDIX C





ESCORT MK I Gearbox - note integral bell-housing and case of cast iron. Extension housing is aluminium with gearshift which gives trouble in service.



ESCORT T/C Gearbox - bell-housing is separate and both case and extension housing are cast iron.

EXAMPLES OF FORD AUSTRALIA ESCORT TWIN-CAM I/D PLATES

May 1971 production plate which uses "Escort Sed." to describe car. "CK49L" identifies Twin-Cam body shell with "Model 11019" confirming same but "0" indicates 1970 body style having decorative strips only on roof gutters ; no decorative strips around side windows.

August 1971 production plate which uses "Escort T/C" to describe car. "CK49L" identifies Twin-Cam body shell - "Model 11119" relates to 1971 body style in which no gutter strip decoration was fitted but side windows were decorated by strips in the shape of a large "C".