

ASSEMBLY MANUAL FOR DUTTON REEF Donor:-
Fiesta 1600 Zetec S petrol Mk 7/8
Fiesta S1600 petrol Mk 7/8
Fiesta 1600 Metal petrol Mk 7/8

This manual - Aug 24 2018 - takes precedent over all earlier dated editions. Do not download until you have the kit in front of you as we continually upgrade the manual.

TOOLS REQUIRED



Usual garage tools inc hand tools, jack, 4 axle stands, drill, files, measuring tape, 300 ml mastic dispenser, 3/16" rivet gun, 15 ft piece of string, Haynes Fiesta manual 2008 to 2011 #4907 (or equiv)



You must use proper wire crimping tools NOTE 1/2" wide jaws to crimp wire and outer cover

If there is anything that does not make sense please advise, we are always interested in any comments that might improve the build-up for the benefit of other builders (and us!)

It is recommended that you fill in the following and keep this manual with the completed Reef, it will help with obtaining parts at a later date

DUTTON REEF CHASSIS # DUTTON2X4REEF _ _ _ _ _

FORD FIESTA CHASSIS # (17 digit): -

FIESTA REGISTRATION #: -

FIESTA REGISTRATION YEAR: -

**ITEMS THAT ARE SUPPLIED LOOSE (i.e. not pre-attached to the hull/deck)
ARE HIGHLIGHTED IN GREEN**

Nomenclature: -

A post 1st upright post (windscreen)

B post 2nd upright post (behind driver)

C post 3rd upright post (behind rear seat)

LHS = Left as viewed from sitting in car

RHS = Right as viewed from sitting in car

LHD = Left hand drive

RHD = Right hand drive

PS = passenger side

DS = drivers side

Wet side is any part of car that is contactable with water

Dry side is any part of car that does not come into contact with water

ss = stainless steel

Dia = diameter

= Ford part number

i/d = inside diameter

o/d = outside diameter

IVA = Individual Vehicle Approval

ffm = full and free movement

GRP = Glassfibre Reinforced Plastic (FRP in some countries)

F = front

R = rear

m = male

f = female

Nylock = self locking nut

SVA = Single Vehicle Approval (now obsolete)

Washer = normal outside dia (2 x i/d)

Penny washer = oversize outside dia (3.5 x i/d)

MS = mild steel

1" (inch) = 25.4mm

1ft = 300mm

8.8 standard bolt
10.9 medium bolt
12.9 high tensile bolt
hyd = hydraulic
cyl = cylinder
hex set = hexagonal headed fully threaded screw
bolt = fastener with solid shaft and short thread
Button head = domed head with Allen socket
damper = what is incorrectly referred to as a “shock absorber”

READ THIS BEFORE BUILD-UP

To comply with IVA these instructions should be followed precisely

ALL pipes/hoses/wire/cables etc. must be supported minimum every 12”
(300mm)

ALL wiring must be covered by plastic conduit

All cam locks (bonnet/sundeck) are super glued to GRP, if removed they must be re-glued to avoid rotating - do not over tighten

All Non ss parts (suspension etc) fitted to wet side must be properly cleaned, all loose rust removed and painted with zinc phosphate, marine undercoat and black marine top coat (Apart from braking surfaces)

When applying **mastic**, degrease all surfaces and surround bolt holes with a bead of approx ¼” (5mm) dia

A full list of nuts & bolts/hose clips/wire etc is supplied with the kit

All bare steel components inside the car need painting (pedal box etc)

EVERY HOLE THRU THE HULL MUST BE SEALED WITH MASTIC

NEVER USE A SELF TAPPING SCREW UNDER THE WATER LINE THAT BREAKS THRU THE HULL (it could eventually fall out) SIMILARLY ALL NUTS/BOLTS ON THE HULL THAT ARE UNDER THE WATER LINE MUST BE SELF LOCKING

WORK THAT CAN BE COMPLETED BEFORE YOU HAVE THE KIT

It is very important that you check EVERYTHING on the Fiesta works before stripping it down otherwise if you build up the Reef and something does not work later you will not know whether its a Ford fault or you have assembled something incorrectly

To check your wiring modifications are correct it is advised that you complete the following on the Fiesta BEFORE you start to strip the Fiesta

Remove front cross member complete with rad and fan

WIRING SPECS

Wire supplied is referred to by the number of copper strands (x) and colour and is rated as: -

Strands	Amp	Typical use (see Haynes manual)
(14)	8	All lighting and most other systems
(28)	17	Rear earth
(44)	27	Main earth/charging circuit
(65)		

Colours: -

B	black (earth)
Br	brown
Bl	blue
R	red
Y	yellow
P	purple
W	white
G	green
O	orange
Gy	grey

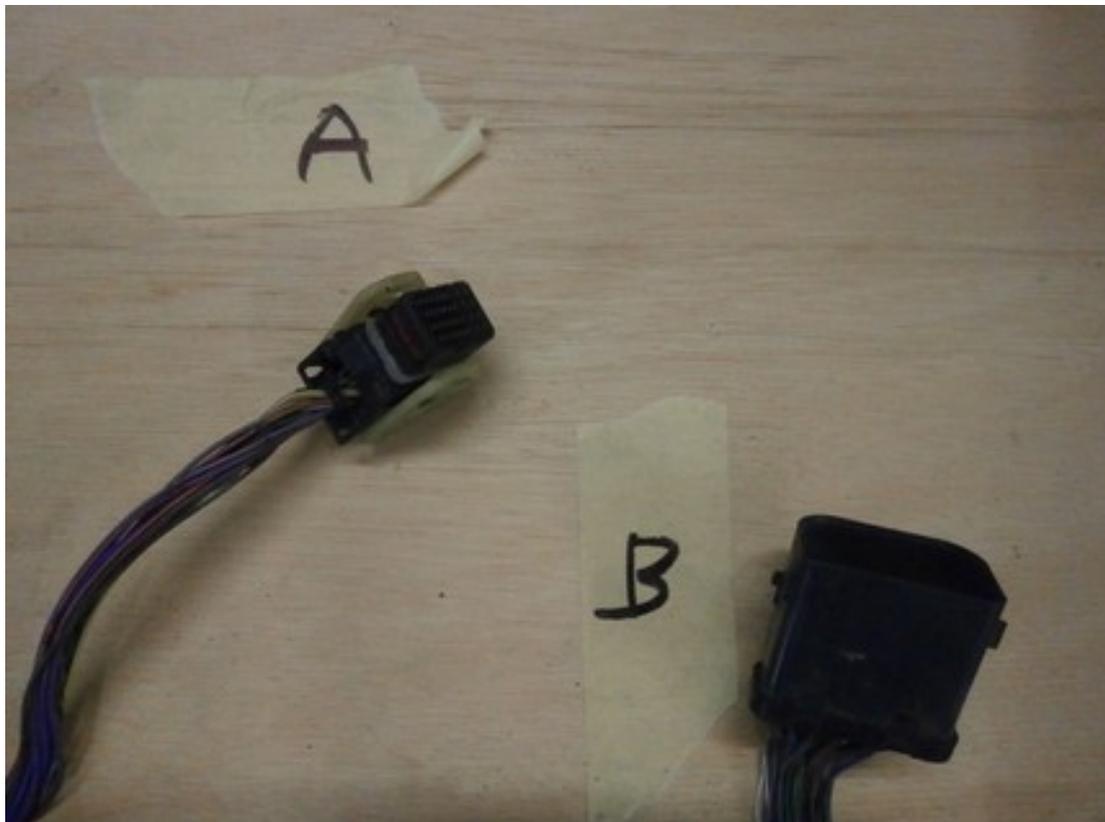
All Dutton wiring unless otherwise stated is (14)

EXTENDING MAIN LOOM

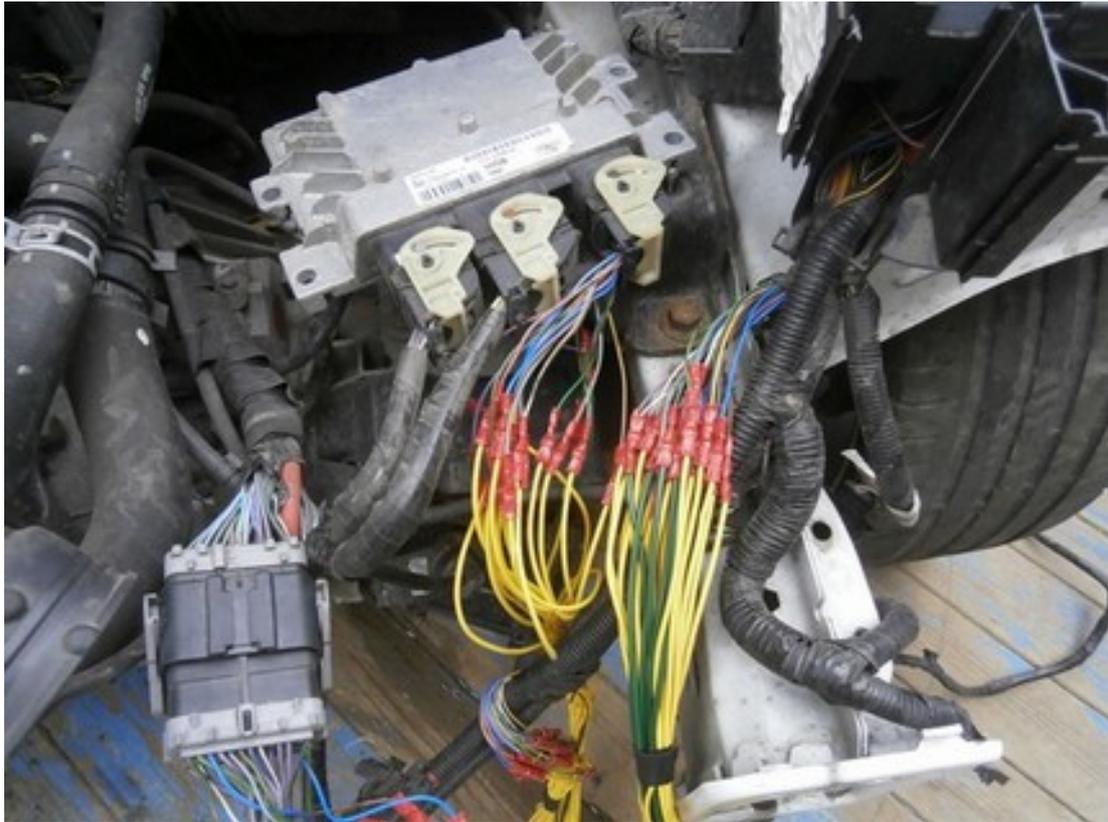
Remove battery and mounting plate, air filter, aluminium ECU and entire front cross member with rad/fan attached



grind off security plate (arrowed) to release left plug A from ECU. Disguard steel plate

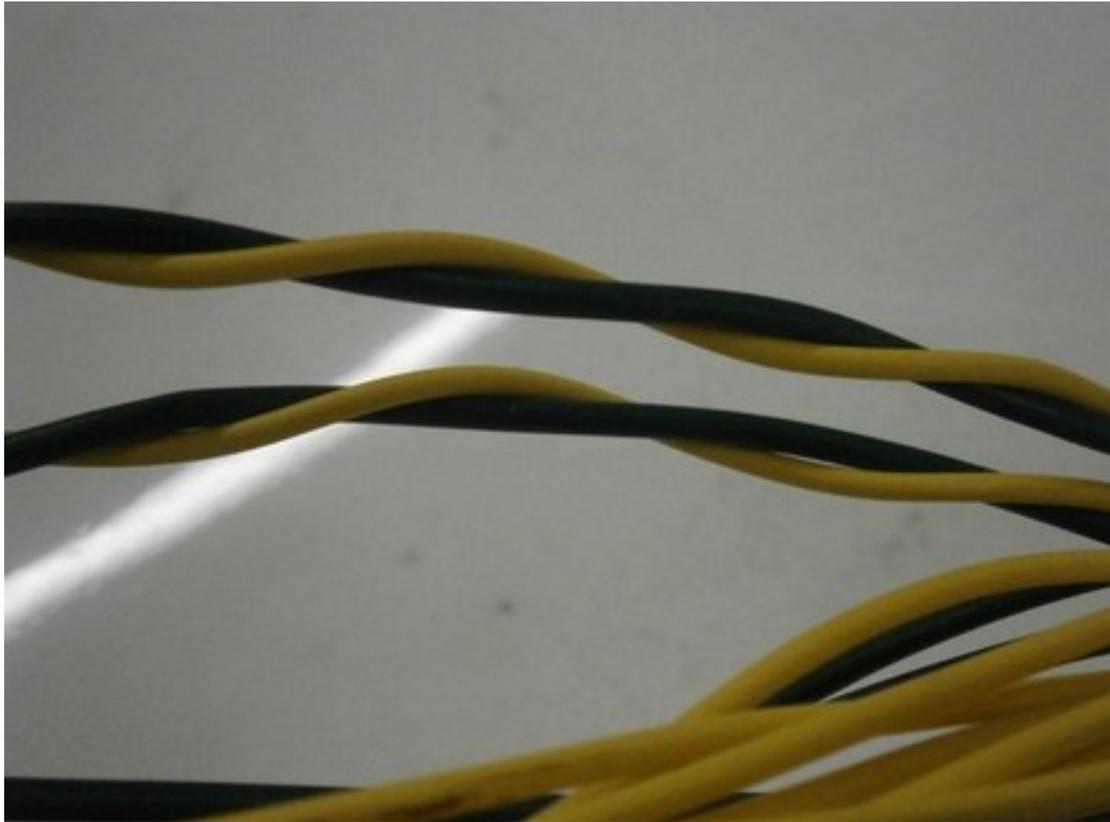


unplug B from engine loom.

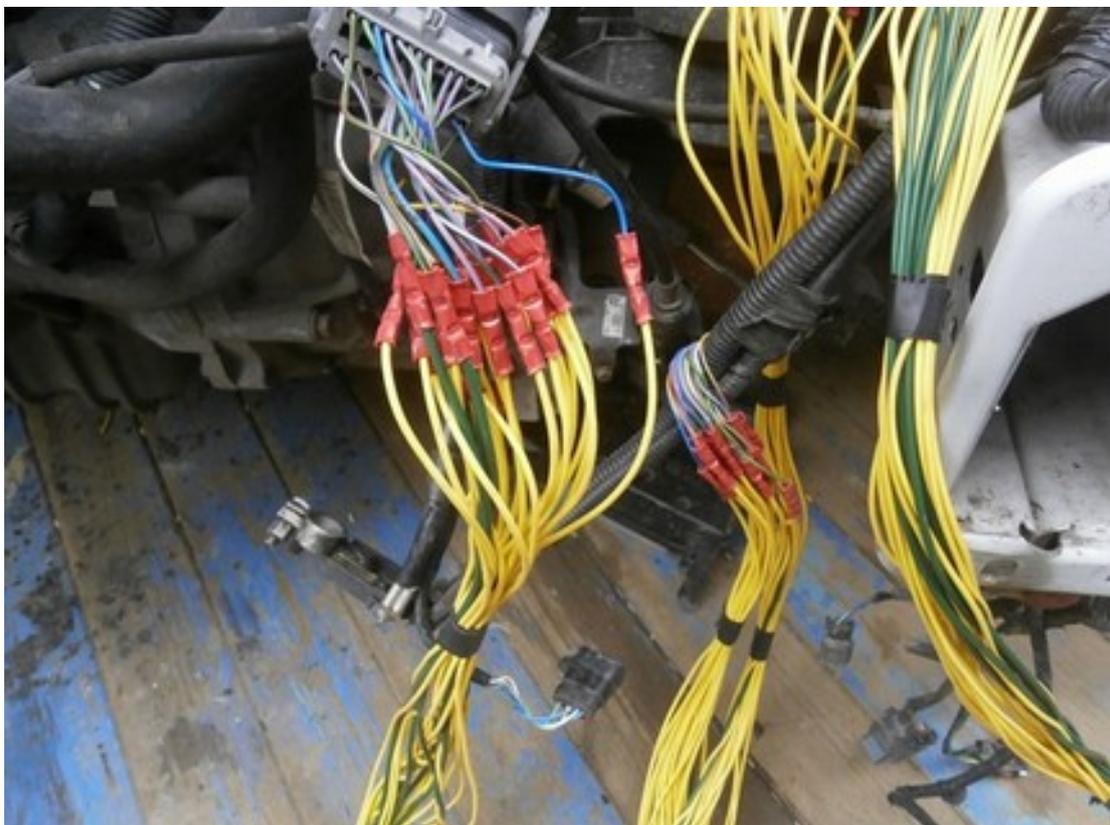


NOTE photos show butt connectors used to extend main loom, these may eventually fail. Connections **MUST** be soldered and sealed with **heatshrink**

Both these looms have to be extended 15 ft (4.7m) use 4 rolls yellow (14) wire for thin and 1 roll green (28) for thicker to match Ford wire sizes, extend ONE WIRE at a time (as some colours are duplicated, on no account mix them up). It is imperative that there is a good electrical and strong mechanical connection so these **MUST** be soldered, on no account use butt connectors



On both plugs on some Fiesta there may be pairs of wires that are twisted together, your wires will have to be twisted to match. So that any pair of twisted wires don't get mixed up use the (28) green wire as one of the pair



General view of finished extensions



General view of finished extensions

TEST ONE

Run engine and check everything still works. If there is an electrical problem do not proceed until its sorted

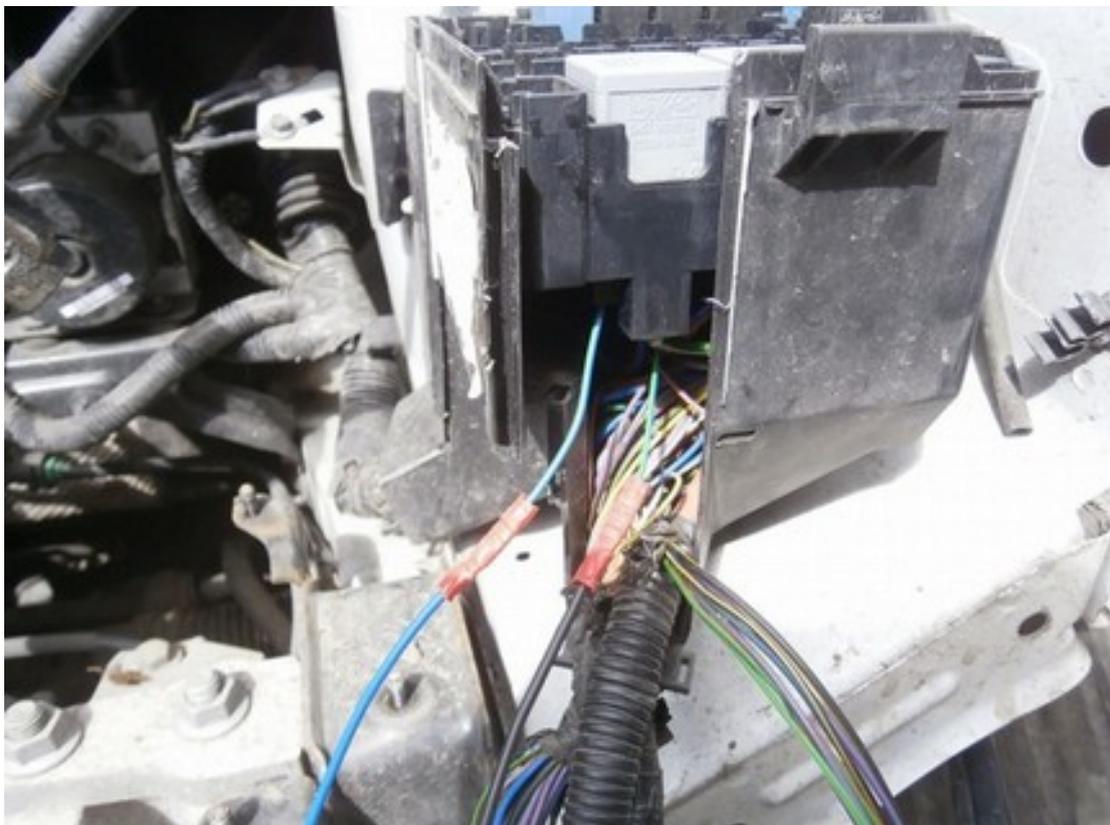
Tape loose wires every 12" (300mm) then insert each loom into **5m 25mm split conduit** then tape both conduit together

NOTE it is OK to use butt connectors on remaining wiring

RAD FAN RELAY



Locate rad fan relay R1 retrieve both thin wires from underside.



Extend both feed wires 3 ft G/Bl with (14) B and Bl/G with (14) Bl and tear off plastic flap

On relay #1 locate both thin G/Bl add (14) B 20" and (14) Bl 80"

TEST TWO

Temporarily re-fit battery in Fiesta, switch on ignition and connect these 2 wires direct to battery to check fan works and rotates in correct direction, B to earth

HEADLAMP LOOM

locate left headlamp loom, this needs to be “unpacked” so it reaches new headlamp position.



Original loom



Remove conduit and cut insulating tape to “release” more from the main loom then refit conduit.

DEACTIVATE BONNET OPEN LAMP

Locate switch by left side bonnet catch and join B to Bl/O

TEST THREE

Open bonnet and check bonnet open lamp on dash centre screen does not light

DEACTIVATE TAILGATE OPEN LAMP

Locate tailgate plug on main loom

Join Y/O to Bl/O

Extend 3rd brake lamp wires

B/P to (14) B 72”

Bl/Gy to (14) Bl 72”

Seal open end of plug with mastic

TEST FOUR

Open tailgate and check tailgate open lamp on dash centre screen does not light

REAR SEAT BASE



Rear seat base has to be shortened along moulded recess in foam, peel back fabric to expose foam



Cut off both outer and inner wire





Timber base

Using sharp craft knife cut back foam as showed being careful not to cut thru fabric. Keep foam for future use

Tuck in both corners and re-tie to front of seat using original cords



Final seat (the rear edge is hidden under seat backs when fitted)

PAINT FIESTA SUSPENSION

All external steel parts must be thoroughly cleaned/degreased and painted in marine zinc phosphate primer, undercoat and black top coat before fitting

That concludes all work prior to receiving the kit

THE FIESTA STRIP DOWN

Remove parts in order best suited to you bearing in mind your available space and who is there to help you. We suggest you photo/sketch any items that you might forget how to re-assemble. Always remove items with as many parts attached as it saves time with the build-up.

A few important points:-

1/ before disconnecting battery:-

- a) park wipers in park position
- b) electric windows 1/3 way up
- c) there is a special bolt hidden by door on right side of dashboard pillar
- d) there is a hidden nut in front of heater holding dashboard onto centre of steel bulkhead

2/ road wheels straight ahead and remove steer wheel and black steer wiring ring (air bag/horn called a "squid") tape up ring and on NO ACCOUNT

let it rotate

3/These are common parts that customers forget to remove (if you have the space it's better to keep all the remains of the Fiesta until the build-up is finished) :-

- a) tailgate and both door rubbers
- b) bulbs from rear lamps
- c) both number plate lamps

GEL COLOURS

All our standard pigments are Scott Bader

yellow BS10E53
dark admiralty grey no #
black RAL 9005
white BS 00E55
light admiralty grey BS 00A01
mid blue no #

THE BUILD-UP

REMOVE THE FOLLOWING FROM YOUR REEF: -

DOORS leave hinge on deck and note any spacers fitted

BONNET

REAR SUN DECK

FLOOR

PAINT

we recommend painting the engine bay in grey

FRONT & REAR WISHBONES



All 4 ss mounting plates are factory fitted. Bolt wishbones using **12mm button head and bolts**

Fit **12mm thick ss penny washers** (2 for each wishbone) between rubber bushes and GRP hull and on GRP inside of hull (2 for each wishbone) NOTE:-
a) on assembly the washer on right to be slid up to GRP hull
b) to fit accurately into GRP recess inside hull some of the washers on the inside of vertical bolt are trimmed down to suit (minimum as possible)

STEERING RACK

Rack is factory fitted and sealed and requires no attention

ENGINE & GEARBOX



Loosely fit top RHS engine insulator



Your returned gearbox will have factory **lower insulator** and factory modified bracket pre fitted.

Remove lower cross brace (across jet unit).

Engine and gearbox have to be fitted together before the jet drive bracket is fitted





lay LHS engine mount on GRP. Do not fit bolts



Loosely bolt up RHS engine insulator



fit timber spacer to set east/west position of engine



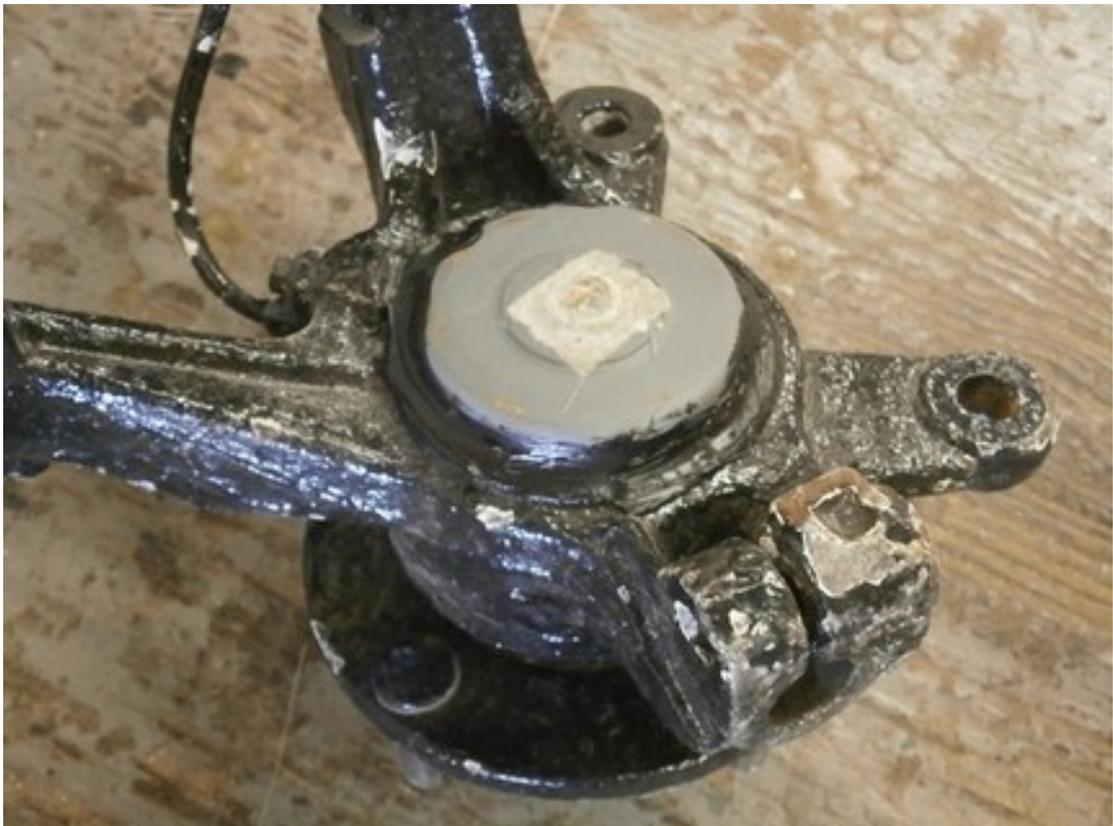
Adjust RHS top engine mount to suit engine position, drill and bolt **top support strap** you must fit M8 washers into extra large Ford hole in engine mount as shown then penny washer + nylock. So that bolt grips the Ford part make sure M8 washers are lower than the black plate

Check engine stays in correct east/west position when timber spacer is removed

Drill and bolt LHD engine mount

FRONT STRUTS

Pack with grease and fully assemble using factory shortened strut, rear spring and your factory machined stub axle, check that lower end of spring locates into recess on strut



Tap **GRP hub cup** into back of hub and seal with mastic, there are 2 different sizes 75mm and 67mm we have supplied the size you quoted, if wrong please advise and we will post off the other size

Road spring with ss lug goes on RHS with lug facing dead forward, trim off ends of white plastic around strut to allow spring to fit

Check that lower end of spring locates into recess on strut

Locate top strut support into hull and bolt up

locate strut onto wishbone and bolt up using original Ford pinch bolt

couple up steering arms note ball joints are handed L and R

REAR STRUTS

Pack with grease and fully assemble using factory shortened strut, check that lower end of spring locates into recess on strut

Locate top strut support into hull and bolt up

Do not attach to wishbone or control rods yet

REAR BRAKES



Bolt adaptor plate to hub using 12.9 bolt and nylock nut

Fit disc then bolt modified Focus calliper to adaptor plate with flexi hose tapping uppermost

Feed Focus brake cable thru hole precut in hull and couple up to calliper

MORSE CABLE

When connected to top of RH strut check for ffm, trim back GRP if it fouls





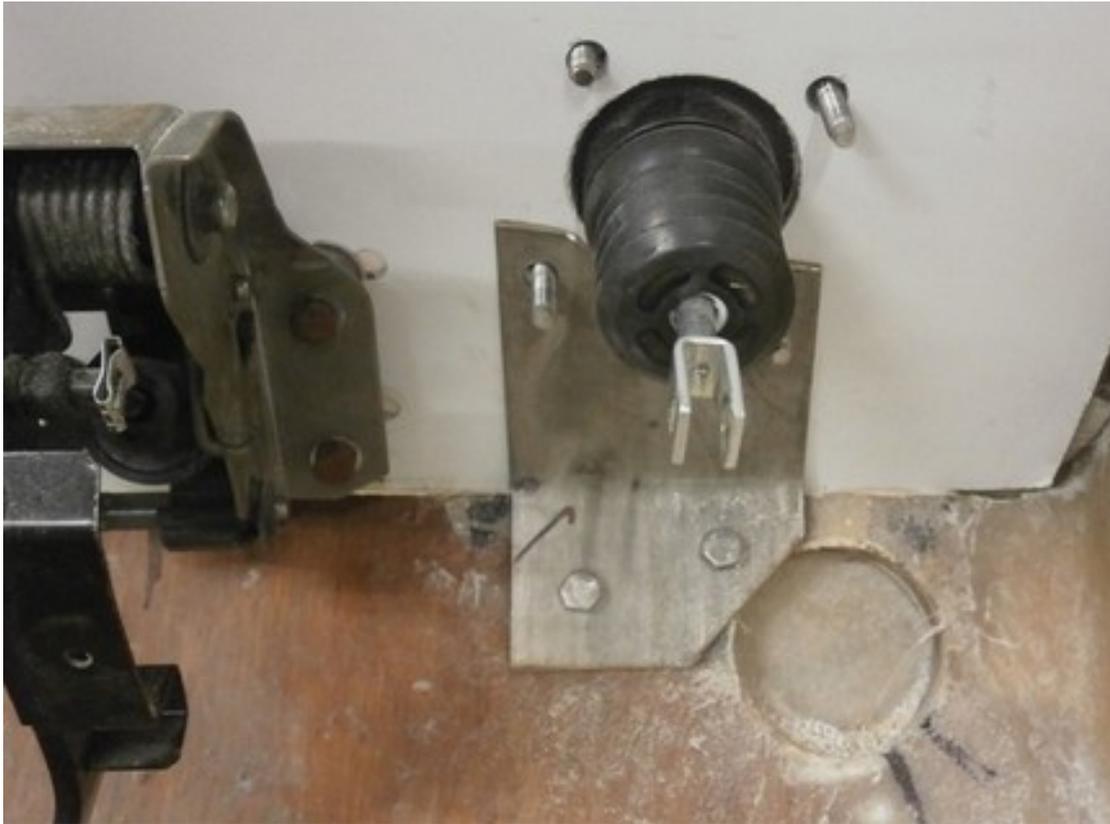
mastic fabric splash panel, also mastic where Morse enters and leaves the GRP pedal panel

Clean area and locate splash panel over Morse cable hole

WIPERS

Assemble complete unit thru attachment holes pre-drilled in the deck

PEDAL BOX

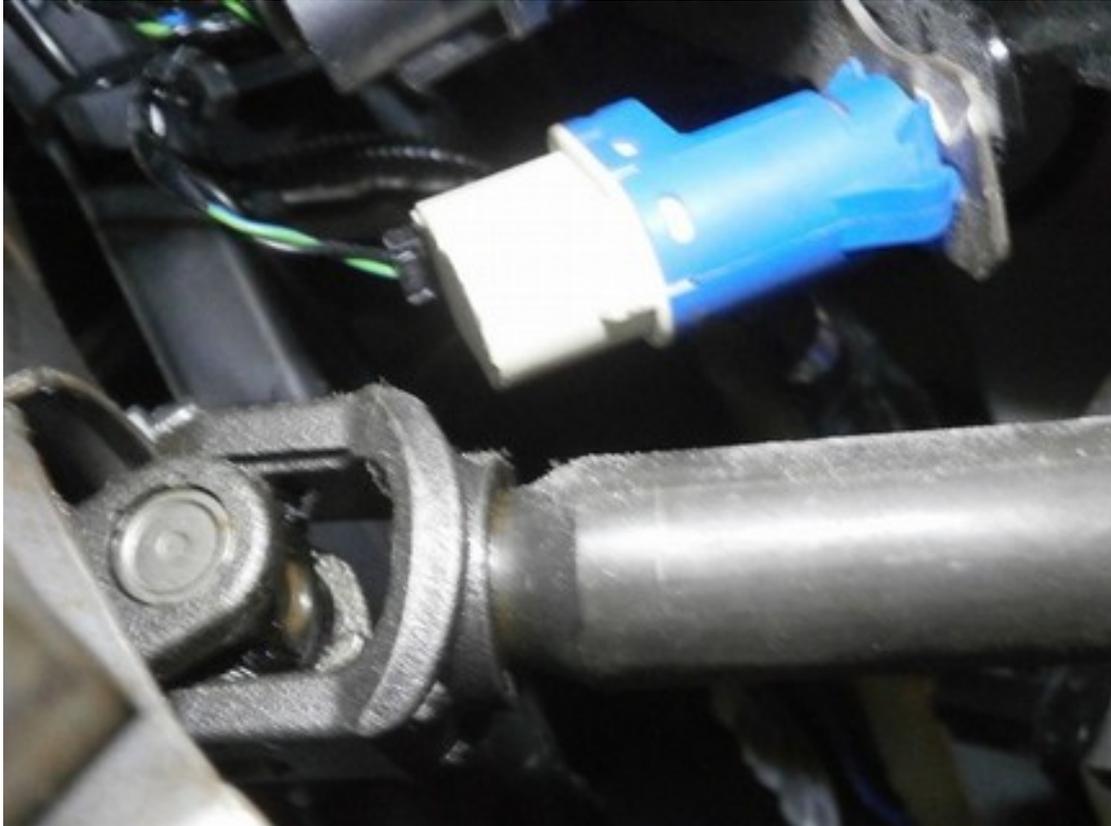


Bolt clutch pedal to GRP panel, use spacers/washers to pack out the left bolt hole. Fit lower ss pedal bracket as shown, fit servo and bolt up pedal assembly. When permanently fitted check when accelerator pedal is pushed fully forward that there is a 3/8" gap between pedal and timber bulkhead, this gap can be adjusted by adding washers to lower attachment bolt



Bolt ss top pedal support plate to top mounting on pedal box and the ss Morse cable bracket

BRAKE PEDAL SWITCHES



After dashboard and steering column have been fitted check there is a 1/4" gap between switch and column. Bend steel plate to suit

DASHBOARD

The passenger air bag has to be fired, because of health and safety crap we have to advise employing an accredited air bag firing person to do this. When we fire one we extend the wiring 10 ft, place dash facing up, put a blanket over the dash, stand back and plug it into a battery and it goes bang



Remove remains of fired air bag and flex metal cover until it breaks off



Cut off air conditioning pipes and part black plastic heater. Make sure you don't accidentally cut water pipes



Drill 3 off 10mm dia top of dashboard as shown 1/2" back from front edge of grey plastic. Remove felt from front edge. Photographed without pre-fitted screen for clarity



Bolt dash side plates, leave finger tight

MAIN WIRING FRONT



Bolt battery box to GRP and fit battery

Fit both extended main loom inside **split conduit**. Fit thru large hole cut in LHS GRP and lay along top of inner LHS sill to engine bay



Bolt main fuse box to GRP and **ss plates** and feed loom with large grommet thru GRP pedal panel. Check that headlamp fits and that headlamp loom reaches the lamp



Fit 2" P clip as shown to clear brake pipes and tank GRP



Fit 2nd fuse box on side of timber. Not fitted to all Fiestas

DASH WIRING



Attach lower fuse box as shown

Unplug both blue plugs on control assembly (top box) and cut back plastic tape so there is enough cable to re-plug to control box with wires in front of the box

Bolt box to GRP pedal panel. **MUST** be in UP position (as marked on box)



Fit wiper loom thru large grommet. Couple up wiper/clutch/brake pedal wiring.



bolt centre of loom in plastic shroud to GRP panel



Bolt 2 socket to turret

DASHBOARD



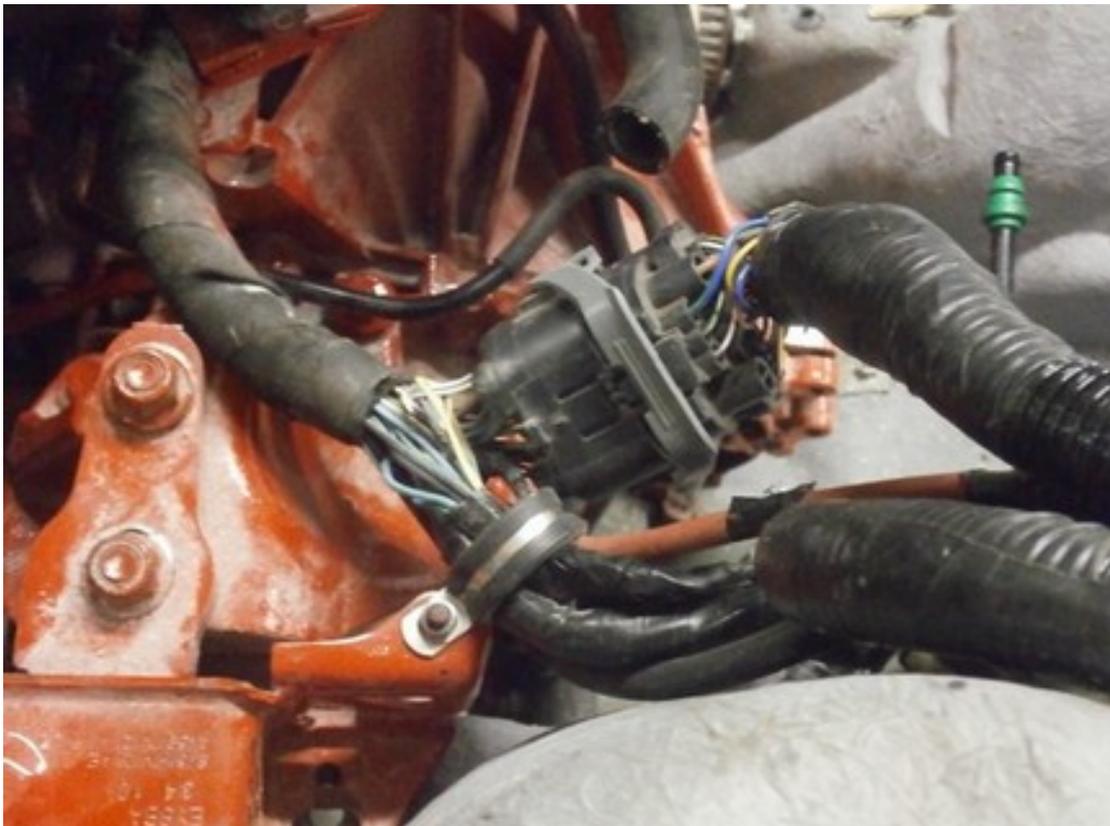
Slide dash onto lower base of windscreen with side brackets inside inner sills and bolt 3 M8 x 30 button head 2 x penny washer + nylock thru top 3 drilled holes



Drill thru inner sill, use inspection lamp to shine thru bracket to show position of holes

Tighten all bolts

MAIN WIRING REAR



Bolt ECU to LHS turret and couple up to 2 extended loom from front. 2 X P clip. Make sure everything is lower than top of turret



bolt long red starter cable to Ford cable, cover joint with plastic conduit (top pic)

Bolt long black starter cable to a top bellhousing bolt



Both these cables go forward thru timber support plate, red cable to battery, bolt AFTER main fuse



Black cable to steel dashboard cross member. On same dashboard side bolt add short black cable to master earth bolt on timber. At same time cut small terminal off Ford body to engine earth and fit neg battery terminal, bolt large end to master earth bolt

The master earth bolt can be used to jump start as its not easy to get to neg on battery

CENTRE EARTHS



Locate earths near both doors and earth the dash board



Locate earth near LHS rear and earth the engine

FAN WIRING

Cut off fan plug from main loom leave with 4" G/W and 20" B/G tails

Add (65) 200" R wire to G/W from loom to fan plug.

Attach B/G from plug to engine earth

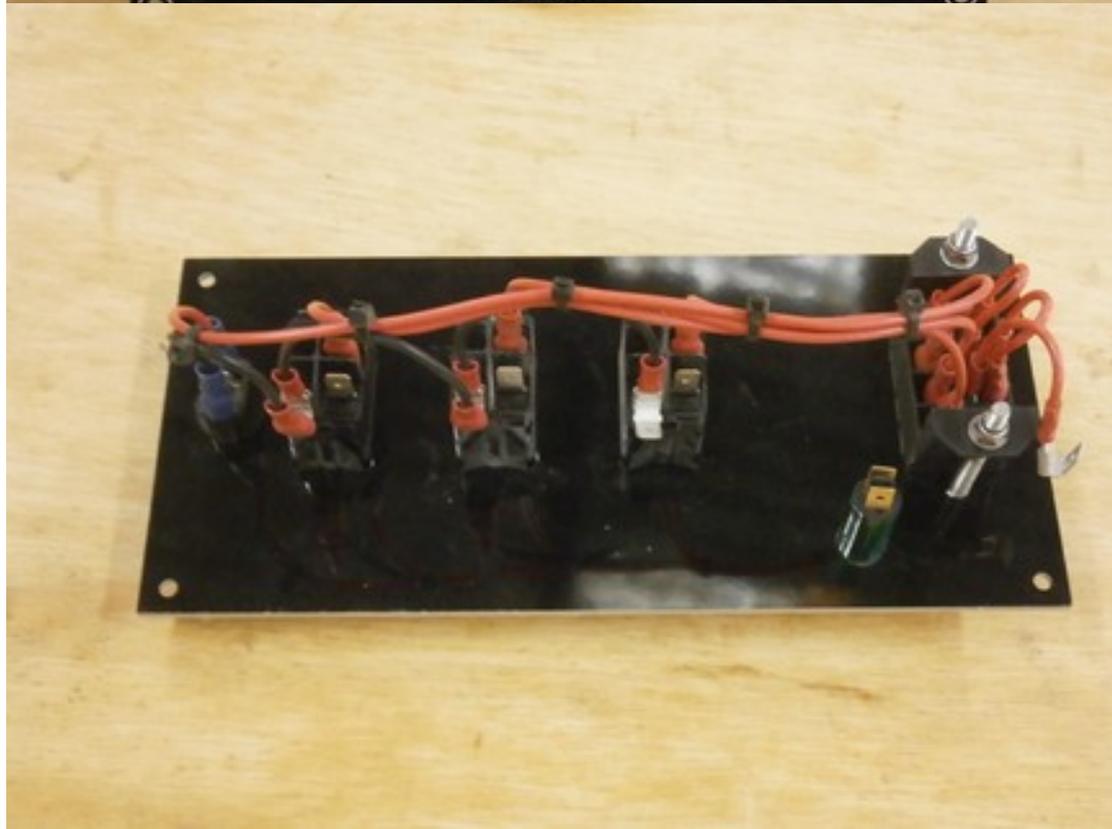
Add twin wire 160" from both fan plug wires to green lamp on engraved panel

FAN RELAY

locate B wire already added to relay and bolt to earth master switch

Locate Bl wire already added to relay and T joint to P/G on ignition switch, leave original wire connected to loom

ENGRAVED DUTTON DASH PANEL



Supplied pre assembled as in photos (white switch for white and light Admiralty grey cars and black for all others)

Wire as per diagrams at back of manual



Drill 5mm thru steel under dash. Bolt GRP panel parallel to back edge of dash and 3/8" from grey bezel M6 button head + nuts

INT LAMP + NAV LAMP



Cut off all original retaining clips from int lamp, drill 2 off 5mm holes.

1 3/4" and 3/8" from edge,

Add (14) 12" Bl from nav switch on engraved panel to SPARE fuse use 3A fuse

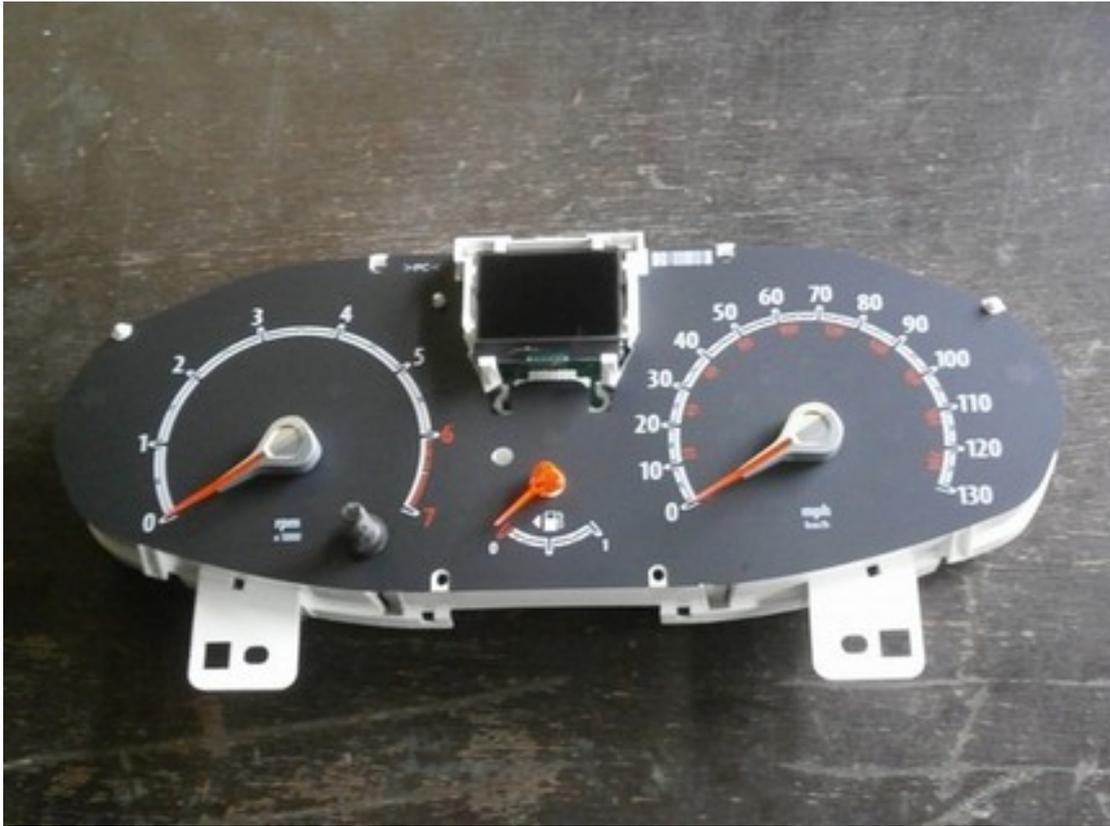
Add (14) 70" Bl from nav switch on engraved panel up LHS A post to centre of screen top to nav lamp

add (14) 12" B from nav lamp earth to int lamp loom B/Y

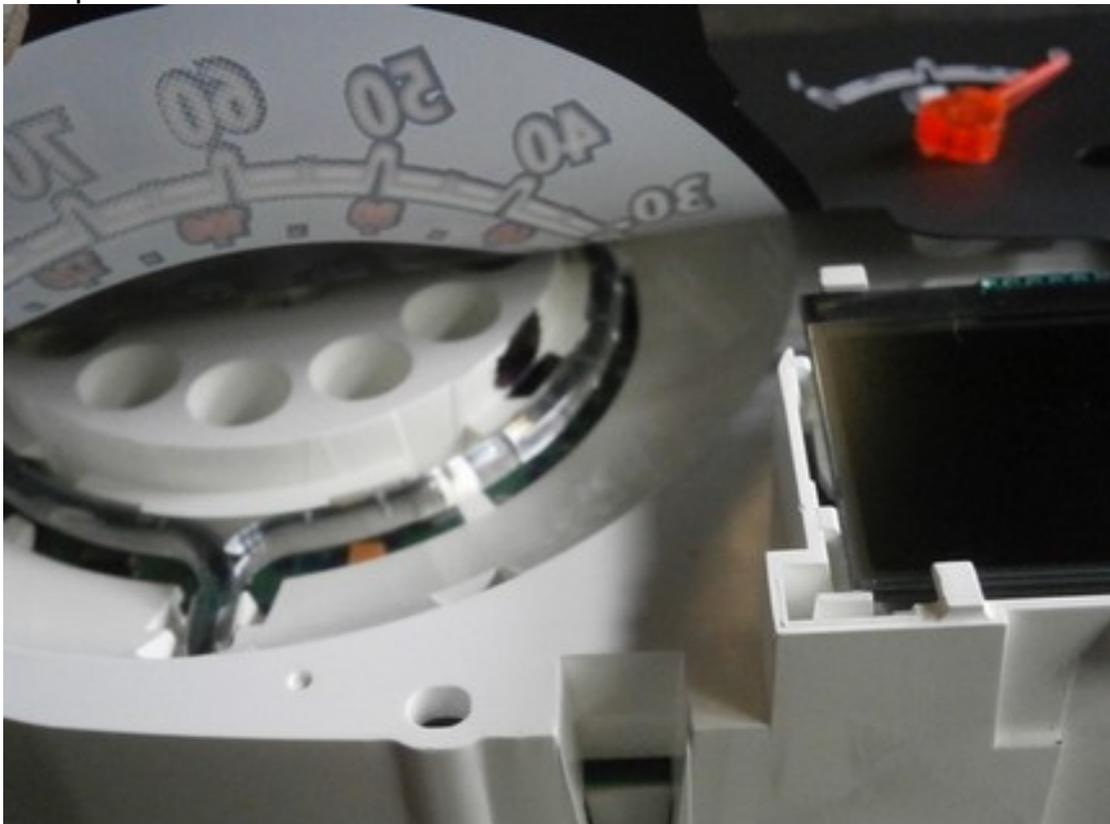
attach to screen top with 2 self tapper

INSTRUMENT CLUSTER

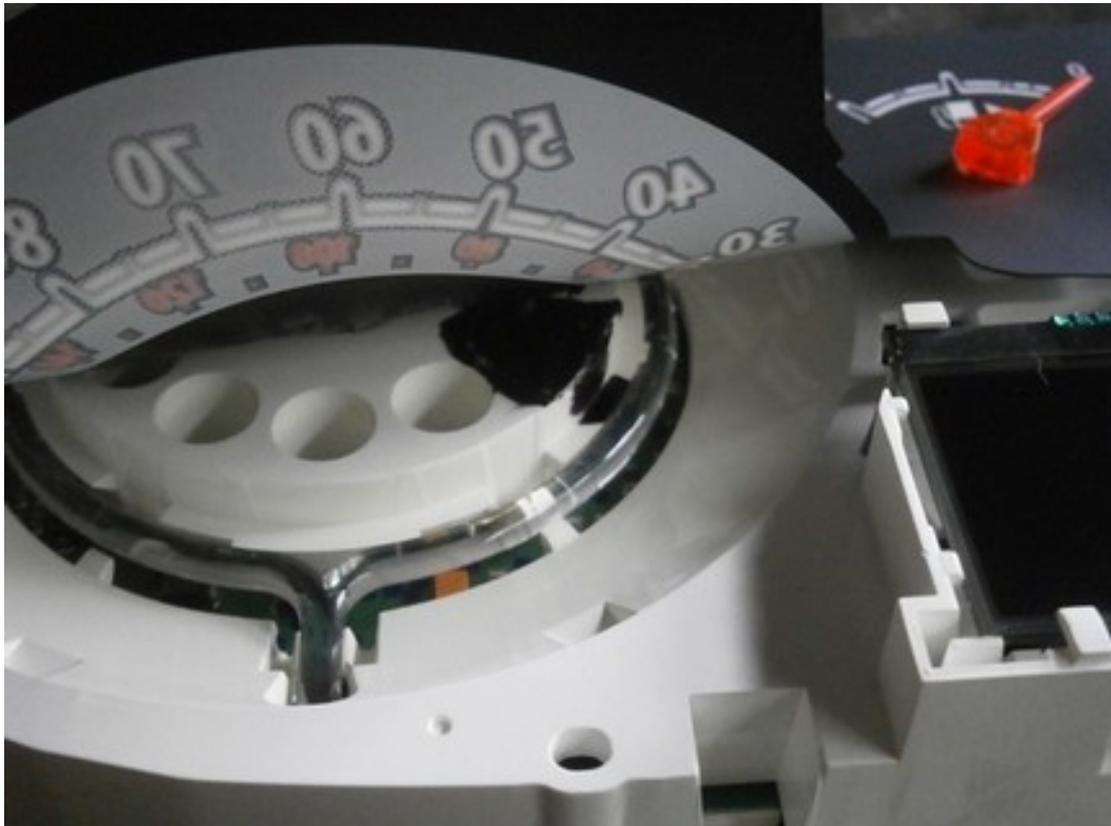
The air bag lamp MUST be de-activated



Unclip both black outer shrouds



Carefully peel back printed plastic, shine light thru to locate lamp. Make sure you do not bend the speedo needle. Mark off air bag lamp. Lamp is usually closest to 30 mph marker



Re-check you have correct lamp and fill recess with mastic. Re-assemble unit

FUEL TANK WIRING

Cut off Ford tank plug near engine (leave 4" tail) and extend 4 wires (14) any colours 130" (use remains of yellow from main loom extensions) and connect to tails left on main loom

SERVO



Cut engine end of plastic hose



Cut servo end of plastic hose. Fit one way valve using 2" rubber hose and clips. Check major diameter is towards engine



Couple up to engine thru GRP

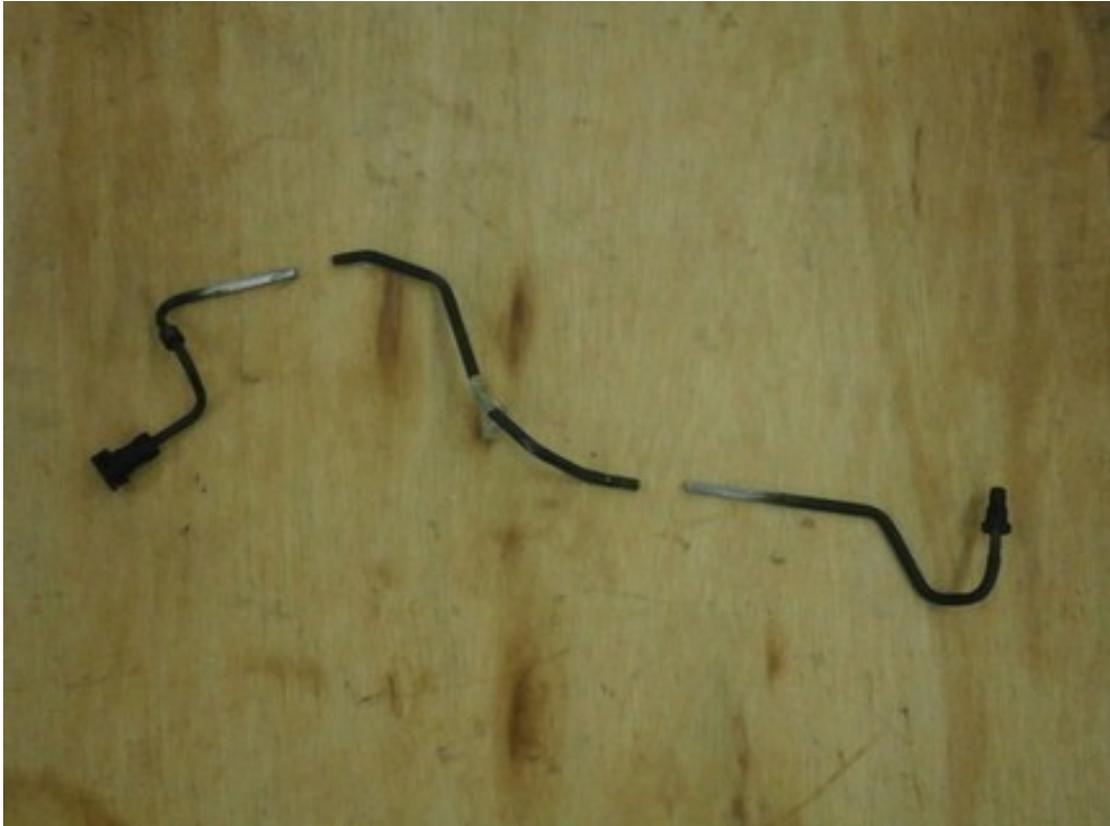
CLUTCH



Remove plastic hyd hose from engine. Heat up master cyl end in boiling water (do not use direct heat) and reform 1st bend to straight, bend over straight and hold under cold water to set shape whilst still hot. Fit this end to gearbox check that the re-bend is sufficient so the hose does not rub on any metal parts



Push thru hole in GRP rad panel



Cut steel hyd clutch hose as shown, trim off protective plastic and attach **1/4" compression joint** at each end. Clip male end into plastic hose and female end into master cyl



Feed 1/4" dia x 95" copper pipe thru both timber bulkheads and couple up to compression joints

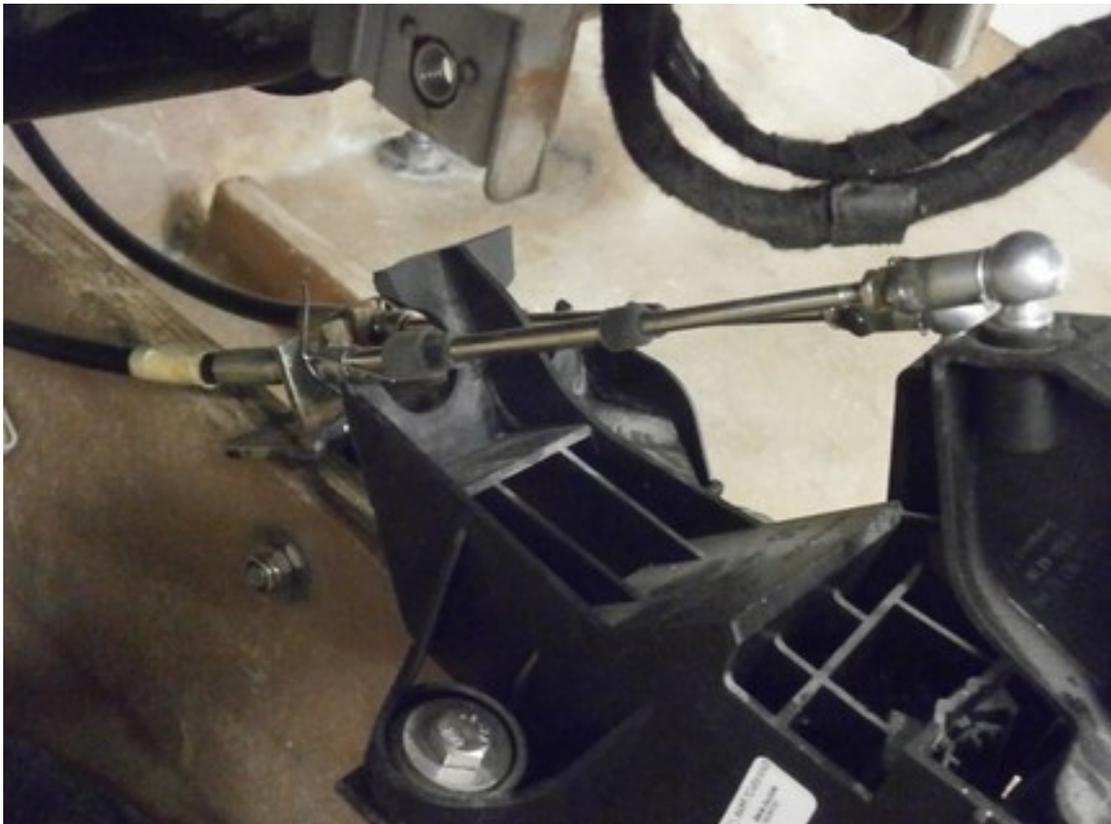


UNDER FLOOR CLIPS



Use 5 white Fiesta under floor pipe clips and drill 5mm thru original attachment and 5 screw to side on timber every 12". Brake clips uppermost and top of clip 1" below top edge

GEAR LINKAGE LEVER



Bolt to pre-fitted steel centre bracket

Mark off one of the 15ft Morse cables with tape at both ends

fit 15ft Morse cables from gear lever thru inner sill to engine bay.

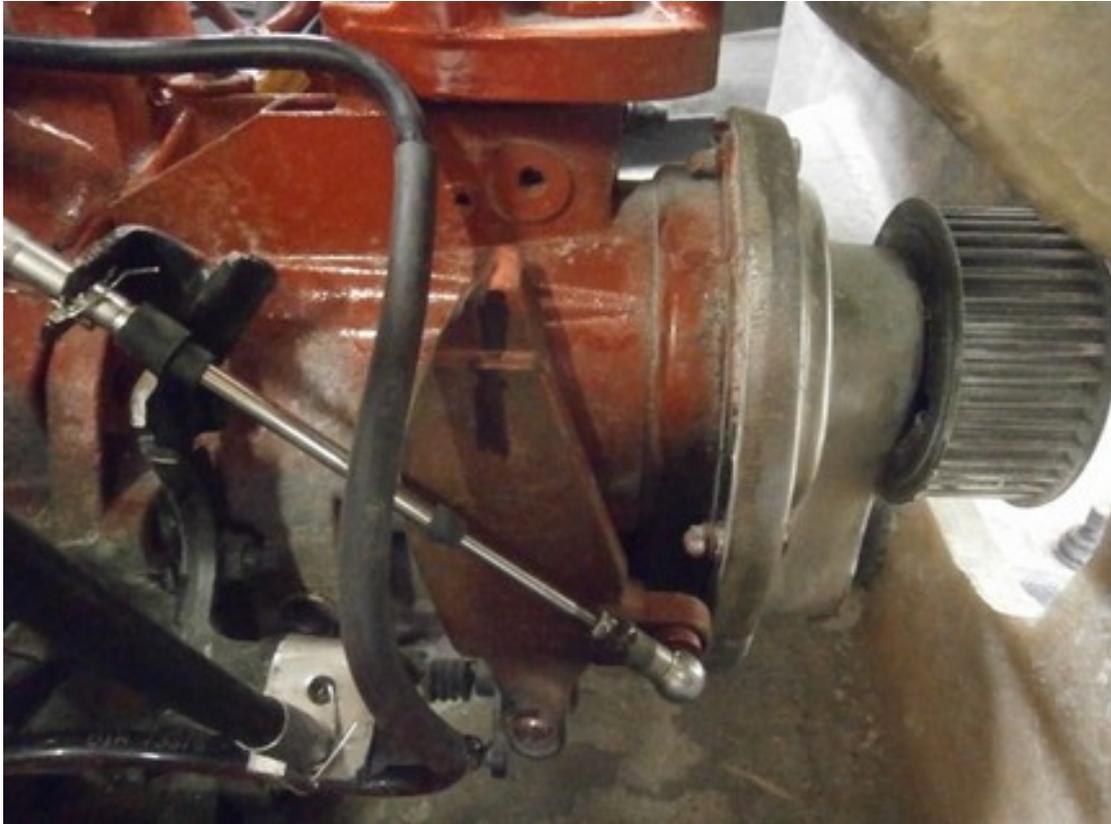
Fit marked cable to left side

Screw on ball joints approx half way on threaded cable both ends on both cables



fit retaining clip on both ball joints on lever end. Tie cables to gear lever assembly using **ss wire**, lower bend in wire fits thru hole in metal retaining plate, pull tight and then bend both ends of wire 180deg around each other

GEAR LINKAGE GEARBOX



Move cast iron selector into middle position

Feed both Morse cables from inner sill thru timber bulkhead, attach marked cable to top mounting and tie up, push cable onto ball joint on large cast iron selector. fit retaining clip on ball joint



Adjust threaded ball joints on marked cable so that in neutral the gear lever is 6 1/2" from centre of heater knob



Select 3rd gear on lever

Attach Morse outer cable to lower mount and tie up

adjust Morse cable ball joint so it slips over ball without it moving. Fit retaining clip

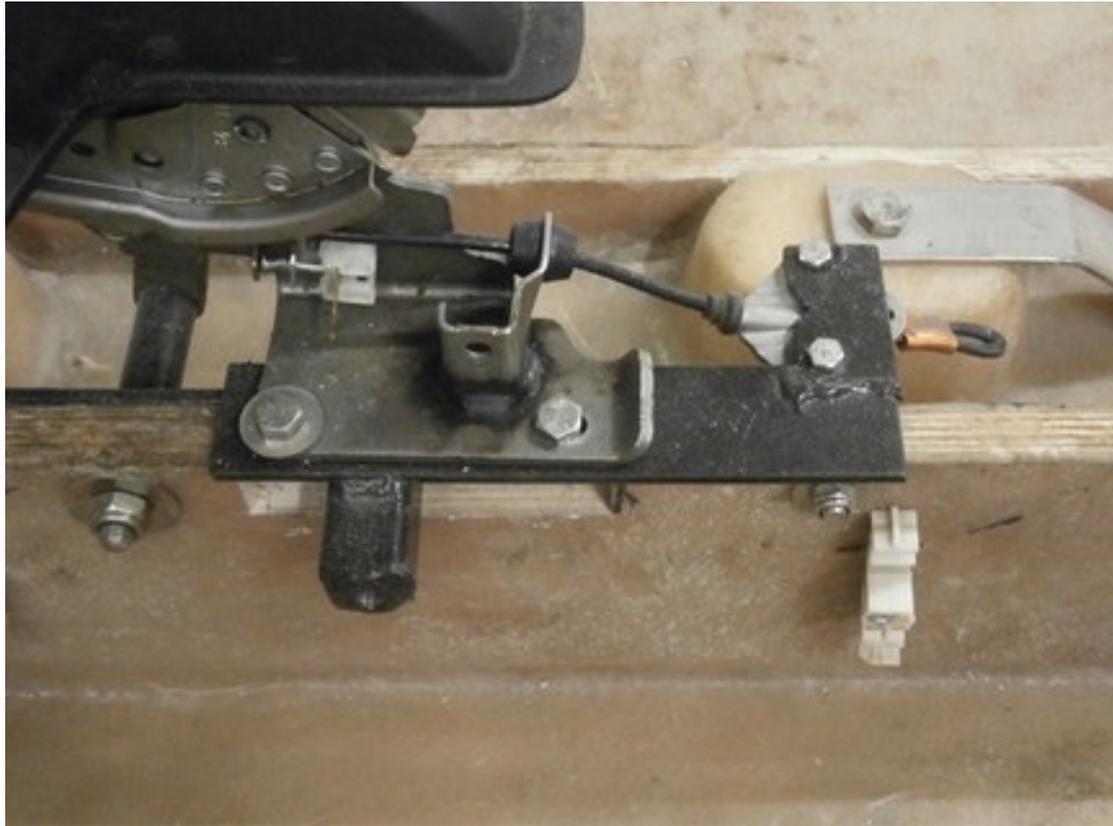
Check all gears can be selected, it is not always possible to engage reverse without engine running

Tighten lock nuts on all 4 ball joints

HAND BRAKE



Bend lower support plate so it is flush with bracket tube, insert 10M bolt



Bolt to pre-fitted bracket **M8 hex set** and **M10 bolt + nut + penny washer**
attach cable slide **M6 hex set + nylock**

REAR SEAT BELTS

EVERY SEAT BELT BOLT MUST BE STAMPED 10.9



You can only use bolts stamped 10.9 **DO NOT** mix up with seat bolts. Photo shows left bolt stamped 10.9, centre bolt stamped 10.9 and right SEAT bolt marked 010 (more curved button head and **NOT** 10.9 grade)



bolt outer lower belt. Bolt reel use large dome head bolt (reels are not

handed) cut off 1/4" from tail so bolt does not cut into timber



Bolt top belt in correct sequence :- penny washer, sleeve, washer, 10.9 bolt



Fit double buckle to RHS. Do not fit single buckle to LHS until seat back is being fitted

FRONT SEAT BELT

EVERY SEAT BELT BOLT MUST BE STAMPED 10.9



Cut off 1/4" off top Ford bolt to 1 3/4" fit top belt, bolt up top mount
check that tail of bolt does not damage outer surface of GRP



Clip ford belt slide into rear mount, bend front so it is level with GRP.
Assemble :- 10.9 bolt, washer, slide, 6 washer, 4" square ss plate and bolt thru GRP into seat belt reel, check the belt lines up with top mounting (reel will be slightly tilting forward)

4" ss plate must be horizontal/vertical

The fabric must slide and not be trapped

Front reels are handed, fit with black foam forward

ABS

If replacing ABS unit it must have same #



numbers refer to pipe positions

BRAKE LINES



General view of fuel and brake lines thru timber rear bulkhead

f = female 3/16" dia

m = male 3/16" dia

LM = large male 3/16" dia

XM = large male 5/16" dia

rear master cyl to ABS (4) 32" XM/XM

front master cyl to ABS (1) 30" XM/XM

front Left to ABS (2) 15" LM/f

front right to ABS (3) 44" m/f

rear left to ABS (6) 145" LM/f mark both ends

rear right to ABS (5) 150" m/f

clip lines to white ford plastic clips on timber

(numbers) refer to pipe positions on ABS



FUEL LINES

Both copper 5/16" dia X 135" lines are same length, mark both ends on one line.

On no account cut off small flange off any ends



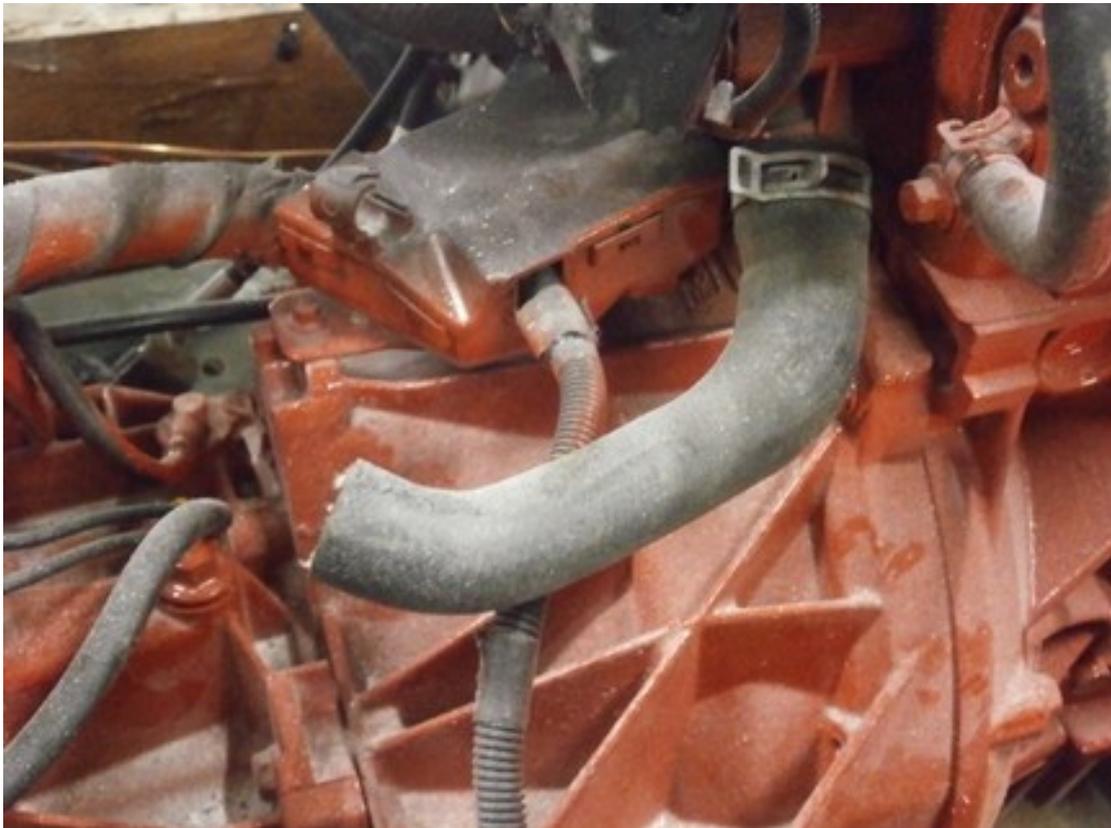
P clip to GRP with 2" tails facing forward. Inner fuel line (marked) is main line, outer is return



You must use marine grade **rubber fuel hose** marked ISO 7840. No other grade is acceptable. Fuel lines go under the throttle body

Fill these 3 grommets with mastic

HEATER HOSES



Cut top heater hose



Using Ford plastic connector feed 33" 3/4" I/d rubber hose thru forward grommet in GRP and attach to outer aluminium pipe



Couple up engine water/oil heat exchanger to inner aluminium pipe using original rubber hose



Cut remaining part of top hose and joint to heater plastic socket, clip into lower pipe on heater



cut other hose that was original fitted to heater, disguard short part



Attached 90 deg end of long hose to top heater pipe, couple up to aluminium pipes

ENGINE WATER HOSE



cut lower hose and insert 8" X 1 1/8" aluminium pipe



cut top hose

FRONT LAMPS



cut off forward location hole



cut off end and side of lamp, this is the first thing to break in any accident



Cut off gussets to make underside flat



fit lamp above GRP measure 1 1/4" from edge of grab handle to rear end of clear plastic and self tap into deck.



Self tap forward mount

Do not seal sides until all wiring is checked

Fit Ford plug into headlamp

REAR LAMP WIRING

Colours: -

B black (earth)
 Br brown
 Bl blue
 R red
 Y yellow
 P purple
 W white
 G green
 O orange
 Gy grey

Use (14) for additional lamp wiring

LEFT		RIGHT	
Ford loom	rear lamp	Ford loom	rear lamp
Bl/Gy	Bl	Bl/Gy	Bl
Bl	W	Bl	W
B/P	B	B/Bl	B add another B to # lamp

Gy/R
P/G

Y
R
G

G/R
W/R
G

Y
R add another R to # lamp
G add another G to LH lamp

3rd BRAKE LAMP



Locate 2 wires already added to tailgate wiring socket and P clip to underside of deck to centre of car

FUEL TANK



Remove clamp, cut ss filler pipe and breather



note orientation of bracket and that it clamps on the smaller dia

Bolt filler pipe to deck using ford 2 part clamp, rotate pipe until the breather pipe is rearward and touching underside of deck

cut 2" off long end of breather hose and clip cut end to filler pipe

cut 1 1/4" off both ends of filler hose and fit longer tail to tank



drop tank into GRP tank surround and lay on timber side panels, you may have to trim timber to suit GRP. Lay tank assembly slightly to the right then slide across inserting filler hose into filler neck