

# “ANSALDO A.1 BALILLA”



## BUILD LOG

Aviatic

# Introduction

Firstly, thank you for buying this Aviattic kit!

Much love and attention was lavished on its creation and we very much look forward to seeing customers getting the best from the parts and enjoying the process...

Having tried numerous approaches to a build guide or a set of instructions it seemed a modeller's approach to the various challenges best suited this kit. This guide is an edited and enhanced version of Ron's original prototype build log (hence the poor quality of some of the photos) and is to be read in conjunction with the kit's booklet, photo cards and website galleries. Our sincere thanks to Dave Hooper for his considerable efforts in presenting this guide.

There will be links posted on the website ([www.aviattic.co.uk](http://www.aviattic.co.uk)) to other modeller's builds as they appear on the various modelling forums etc. Between those sources and careful examination of each stage and the parts concerned you should gain a good understanding of this wonderful little aeroplane and its construction before you start.

With the recent advances in resin quality (and we have used the best) we hope you will not find the build too much different from regular plastic, though some "resin rules" still apply...

## PLEASE NOTE THE FOLLOWING...

- 1) Only remove the parts from their casting blocks when you are ready to use them. Store them carefully, away from heat and light.
- 2) Any warpage of parts that may have occurred in storage can be rectified by immersion in very hot water and leaving on a flat surface to dry.
- 3) Wash all parts thoroughly in soapy water, or better still, household de-greaser or alcohol.
- 4) Resin dust is harmful if inhaled. Wear suitable particle mask or respirator when cutting, scraping or sanding parts.
- 5) For best results prime all parts before paint or decal application. In the case of decals a gloss surface, polished and dust free is essential.

## TOOLS AND EQUIPMENT

You will notice a variety of drill bits are required, these should be part of your tool collection and are a great help in any modelling project.

A selection of razor saws, wet and dry paper, needle files, etc.

Cyano glues of various drying times, white or "PVA" glue, two-part epoxy may be a preference and "[Gorilla](#)" glue has proved excellent for attaching photo-etch over the varnish-sealed decals.

A PE folding tool will be an essential aid to obtaining a clean fold on the photo etch parts.

As Ron explains in his notes, you may want to add soldering to your skill set. It certainly creates a better bond and shouldn't take long to master on some scrap P/E...

## GOOD LUCK!

Our little multi-media "Balilla" has been designed to look and feel like a wood, plywood, metal and linen biplane of 1918. The fine parts and extensive photo-etched parts, such as rigging attachment points and internal details, reach new levels of achievement in a WW1 kit and we hope to produce more kits in the future, promoting interest in this fascinating period of aviation history.

Please enjoy your modelling and let us see the results!

## AVIATTIC DIGITAL AND PRINTED DECALS

If are not familiar with "Aviattic" digitally printed decals and you wish to use the wood grain, linen and camouflage supplied, please read the instructions provided. The various shapes need to be cut *exactly* to the indicated outlines as they do not trim well whilst wet.

Apply ONLY to gloss prepared surfaces.

The Pheon Models designed markings decals are applied in the traditional way, warm water should be sufficient to make them conform, decal solvents are not recommended.

# Contents

## Section 1: Building the SPA 220 HP

- [Step 1: Engine block](#)
- [Step 2: Cylinders](#)
- [Step 3: Rear engine detail and camshaft](#)
- [Step 4: Springs and rockers](#)
- [Step 5: Manifold assembly](#)
- [Step 6: Magnetos and ignition wiring](#)
- [Step 7: Turbo Pipe](#)
- [Step 8: Spark plug wiring](#)
- [Step 9: Carburettor](#)
- [Step 10: Exhausts](#)
- [Step 11: Intakes](#)
- [Step 12: Pipes](#)

## Section 2: Fuselage interior

- [Step 1: Fuselage basics](#)
- [Step 2: Forward bulkhead](#)
- [Step 3: Fuel tank](#)
- [Step 4: Aileron control unit](#)
- [Step 5: Rudder bar and floor](#)
- [Step 6: Control stick](#)
- [Step 7: Optional control bar detail](#)
- [Step 8: Interior assembly](#)
- [Step 9: firewall and engine bearers](#)
- [Step 10: Fuel Mixture Selector Quadrant](#)
- [Step 11: Radiator Shutter Quadrant](#)
- [Step 12: Instrument panel](#)
- [Step 13: Ignition switch](#)
- [Step 14: Cabane struts](#)
- [Step 15: Cleaning the rear cowling](#)
- [Step 16: Front cabane struts](#)
- [Step 17: Gun mount bar](#)
- [Step 18: Installation of cockpit assemblies](#)
- [Step 19: Optional aileron control rod assembly](#)
- [Step 20: Seat installation](#)

## Section 3: Fuselage exterior, machine gun and engine installation

- [Step 1: Windscreen](#)
- [Step 2: Turtle deck detailing](#)
- [Step 3: Tail](#)
- [Step 4: Turtle deck and tail assembly](#)
- [Step 5: Empty shell drop box](#)
- [Step 6: Engine installation](#)
- [Step 7: Machine gun installation](#)
- [Step 8: Optional cowling trims](#)
- [Step 9: Optional Synchronization System](#)
- [Step 10: Rear cowling](#)

## Step 11: Radiator shutters

## Step 12: Radiator and Front Cowlings

## Step 13: Oil tank

## Section 4: Landing gear

## Step 1: Basic strut assembly

## Step 2: Axle

## Step 3: Fitting to the fuselage

## Section 5: Fuselage detail

## Step 1: Rear fuselage detail

## Step 2: Actuator slot detail

## Step 3: Air vents

## Step 4: Forward fuselage detail

## Step 5: Underside engine covers

## Step 6: Fuel tank detail

## Step 7: Hatches

## Step 8: Engine air intake

## Step 9: Rudder and Elevators

## Step 10: Tail struts

## Section 6: Upper and lower wings

## Step 1: Lower wings

## Step 2: Lower wing installation

## Step 3: Cabane strut rigging brackets

## Step 4: Interplane struts

## Step 5: Interplane strut rigging brackets

## Step 6: Upper Wing detail

## Step 7: Actuator slots

## Step 8: Cowling and Lower wing rigging points

## Step 9: Fuel lines

## Step 10: Upper wing assembly

## Step 11: Actuator rod

## Step 12: Fuel lines and windscreen

## Section 7: Final details

## Step 1: Tail details

## Step 2: Wheels

## Step 3: Tail skid

## Step 4: Propeller

## Appendix

## Jigs

## Instrument panel layout

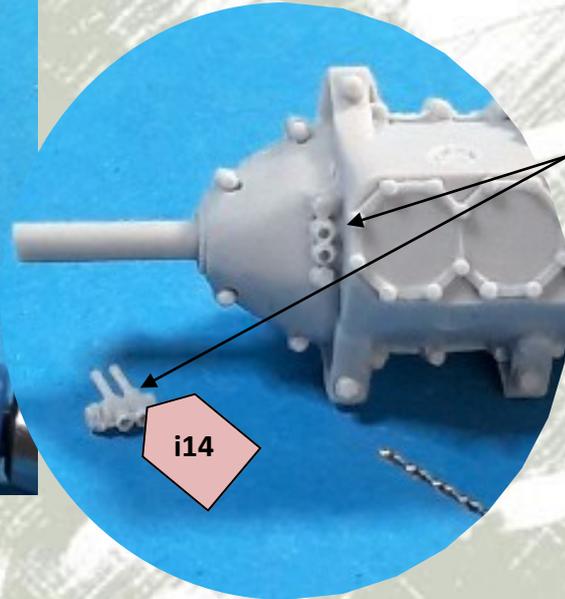
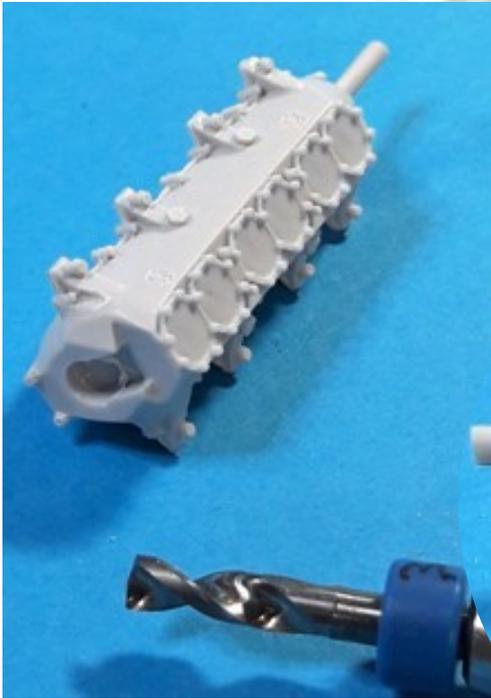
## Section 1

# BUILDING THE SPA 220 HP

Note: All the parts required to build the engine are provided in a separate bag with exception of a few which are on the casting block marked 'i'.

### Step 1. (Engine block)

Clean the engine block and drill out the back of the engine with 3.5 mm drill bit to later fit part 26D. Clean up the slot to accept part 26D thoroughly!

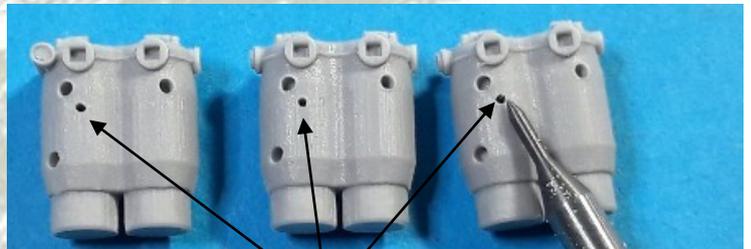
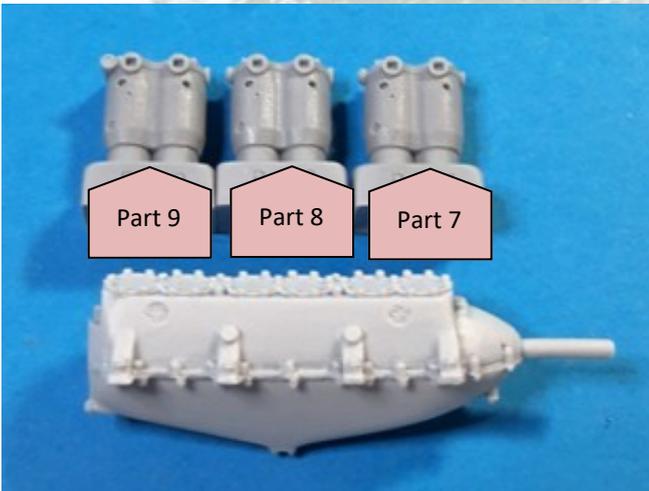


Drill out two holes in front of the engine to fit part i14. Also using a 0.55 drill bit, drill out i14.

Glue part i14 in place so that is protruding by 3.6mm

### Step 2. (Cylinders)

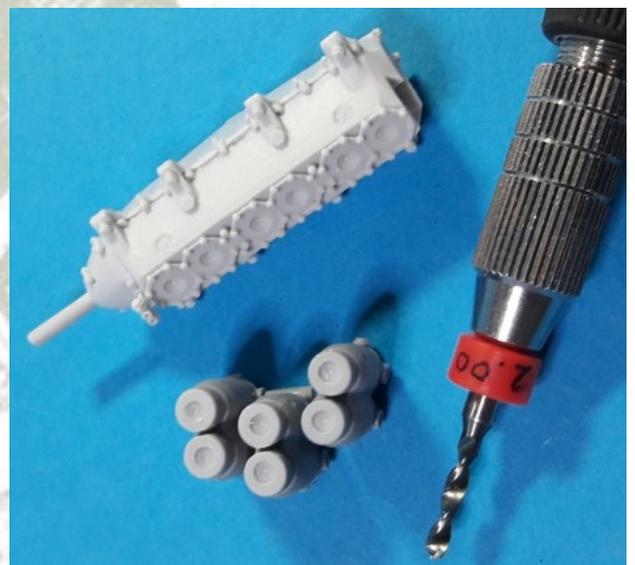
Clean up parts 7,8,9



Mounting holes for PE parts 22 / 23 on both sides of parts 7, 8 & 9 should be drilled with a 0.5mm drill bit.

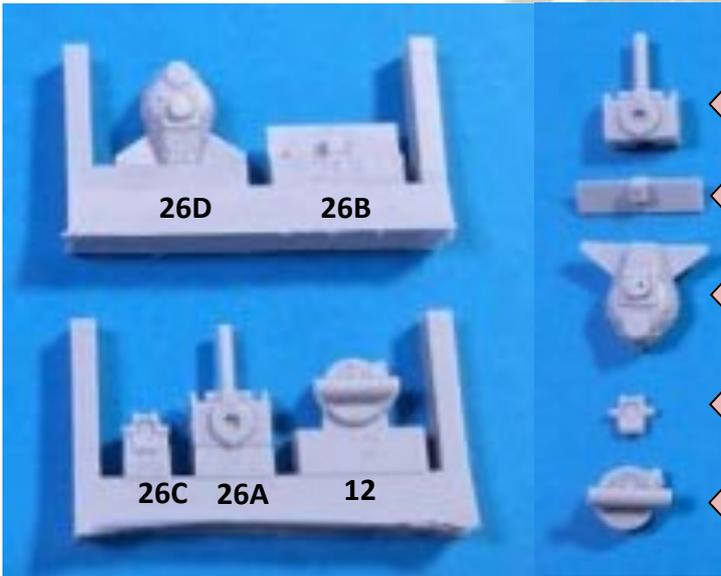
Note that the slots are cut out on the bottom of the cylinder's. To ensure a good fit of the parts drill shallow holes of 2mm in parts 7,8,9 and engine block.

Use a 2 part epoxy or CA glue to fit the cylinders in to position.

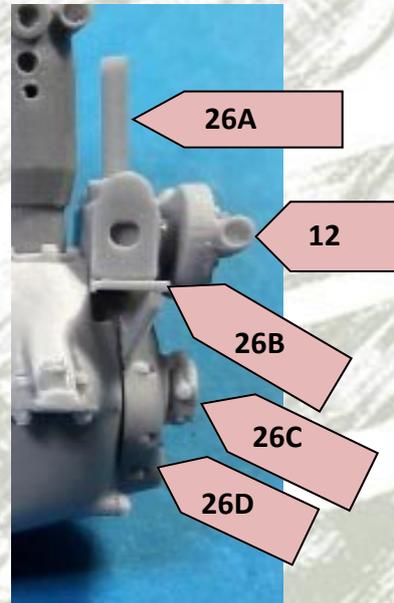


## Step 3. (Rear engine detail and Camshaft)

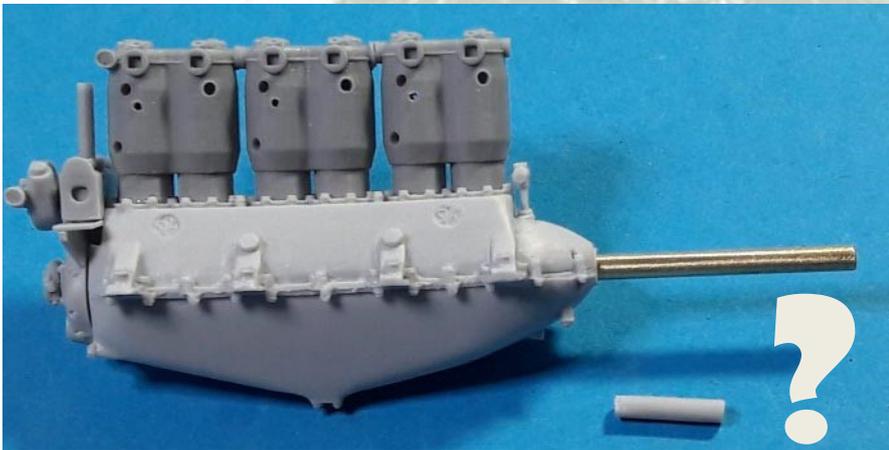
Clean up parts 12, 26A, 26B, 26C, 26D. They are glued in the positions shown below (for additional information refer to the booklet and website galleries). Glue these on the engine with CA or epoxy glue.



- 26A
- 26B
- 26D
- 26C
- 12

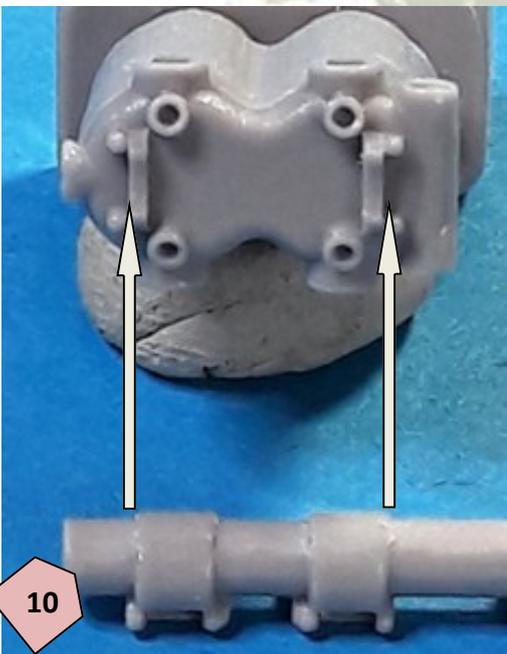
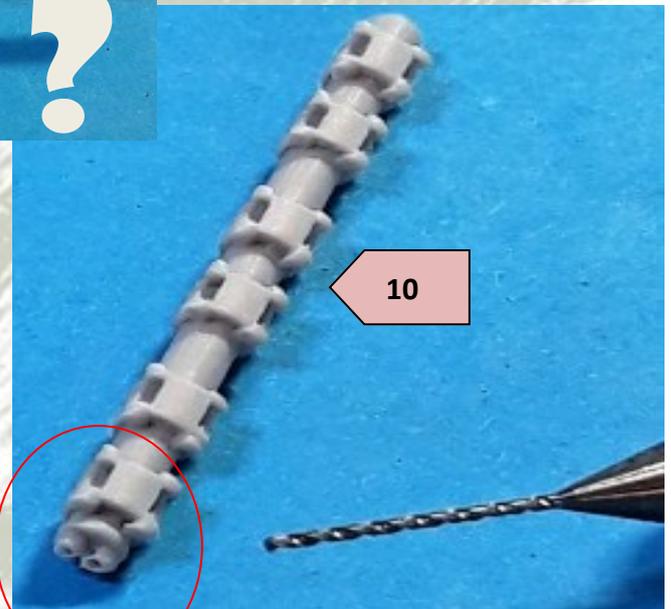


You have the option to remove the propeller shaft of and replace it with 2mm brass rod . Leave it longer than needed so you can hold it for painting later!



Next, drill out 2 holes in the front of the camshaft part 10 using a 0.55mm drill bit to later fit pipes of lead/copper.

Clean up the camshaft part.

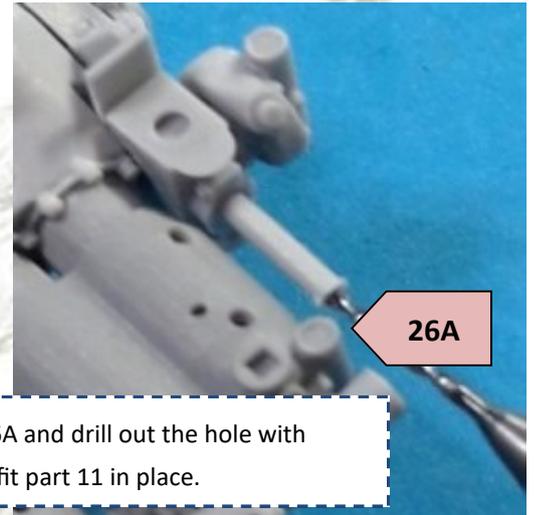


Glue part 10 on to the cylinder heads ensuring that the outside edges of part 10 align to the outside of the cylinder head part (as shown left)

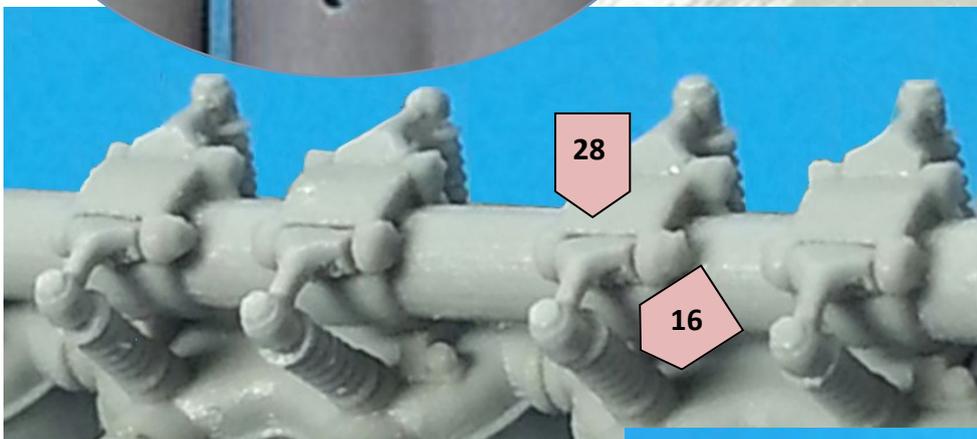
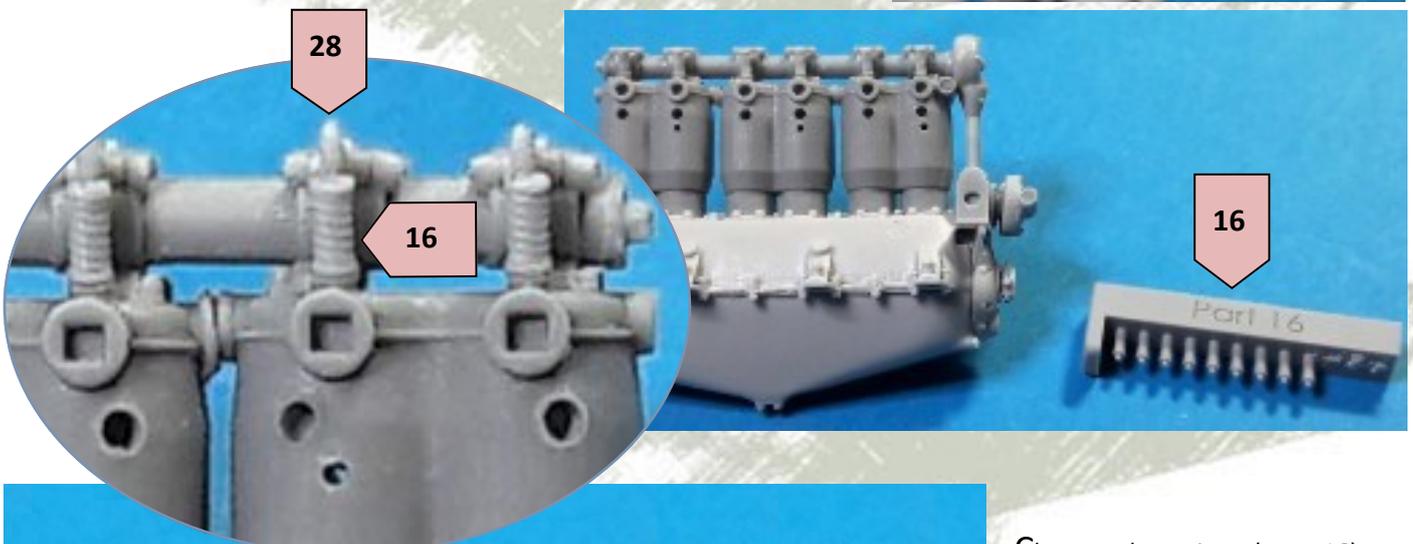
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## Step 4. (Springs and rockers)

Drill out part 11 with a 2mm drill bit and then remove and clean the part.



Next, trim part 26A and drill out the hole with 0.9mm drill bit to fit part 11 in place.



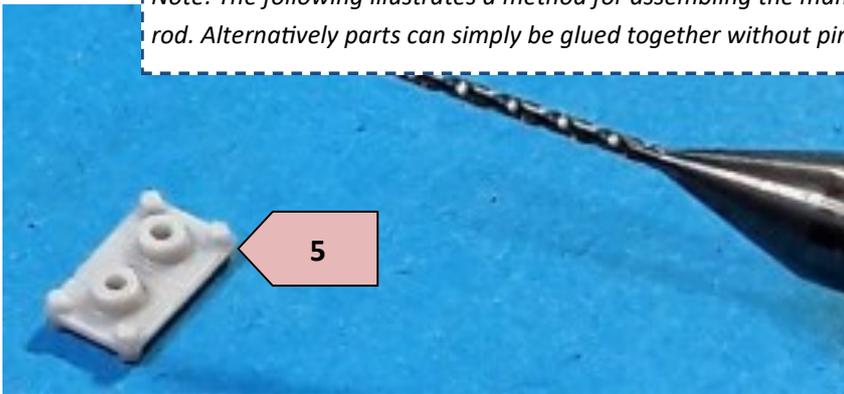
Clean up the springs, (parts 16), then glue all springs in place with CA glue. Then clean fit the rocker arms (parts 28) making sure they are in the middle of the camshaft slot and that the end rests on the top of each spring as pictured left

At this stage your engine should look something like this (pictured below)



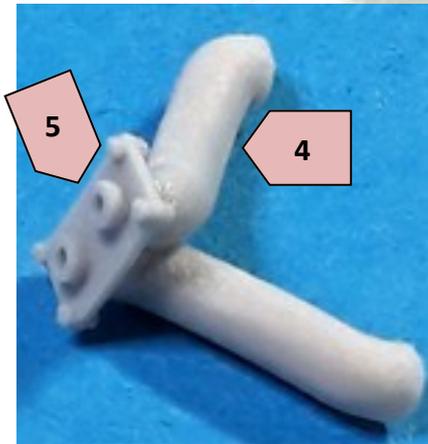
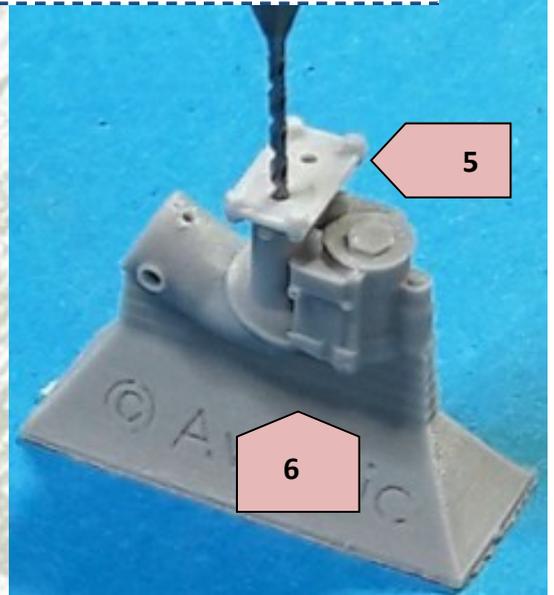
## Step 5. (Manifold assembly)

Note: The following illustrates a method for assembling the manifold by pinning the parts with brass rod. Alternatively parts can simply be glued together without pinning

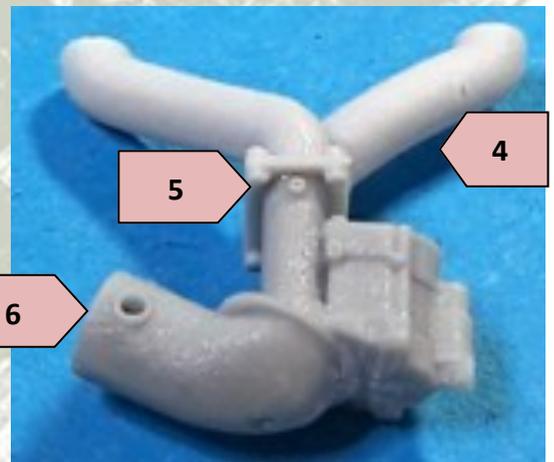


Clean up the part 5 and open up the two centre holes using a 0.5mm drill bit.

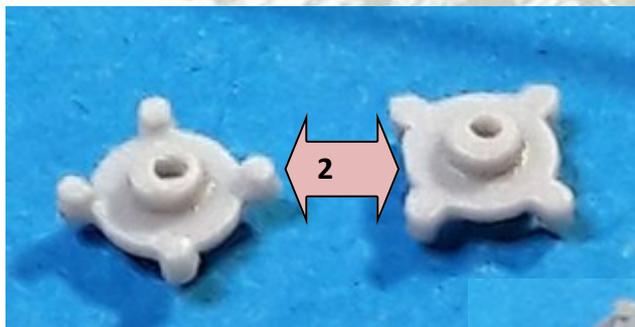
Then dry fit part 5 on to part 6 leaving it on the casting block for now. Drill a 0.5mm hole in part 6 through .



Glue part 5 on to part 4. Drill through the holes in part 5 in part 4 deep enough to accept brass rod. Glue 0.5mm brass rod in to these holes.

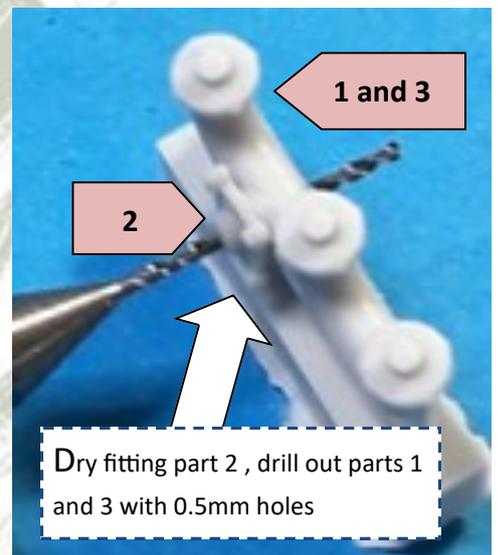
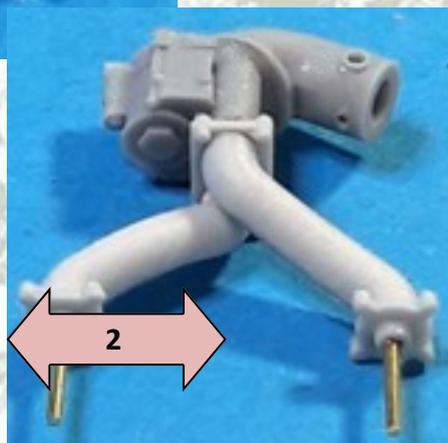


Next glue the parts together as in the picture on the right. You can clean up part 6 now.



Clean up the part 2 (2 pieces) and open up the centre hole using a 0.5mm drill bit

Carry out the same procedure for pinning the part 2 pieces to the ends of the part 4. Do not glue yet! (right)



Dry fitting part 2 , drill out parts 1 and 3 with 0.5mm holes

## Step 5 (Continued)

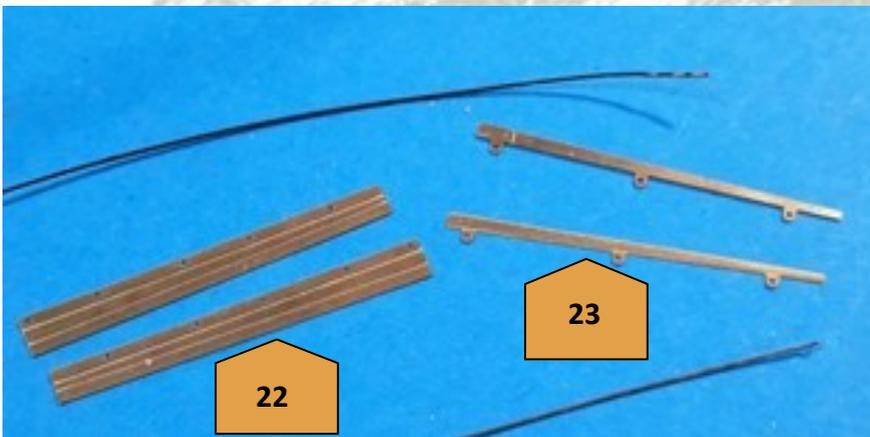
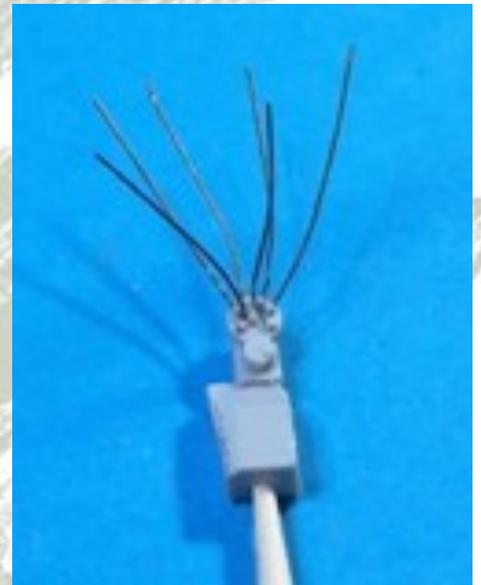


To aid in the final assembly of the manifold either use the engine as a jig or construct a jig from plasticard or wood. A jig is included in the [appendix](#) section at the rear of this build log.

To use the jig drill six 0.8mm holes in the positions defined and assemble the manifold as illustrated right

## Step 6. (Magnetos and ignition wiring)

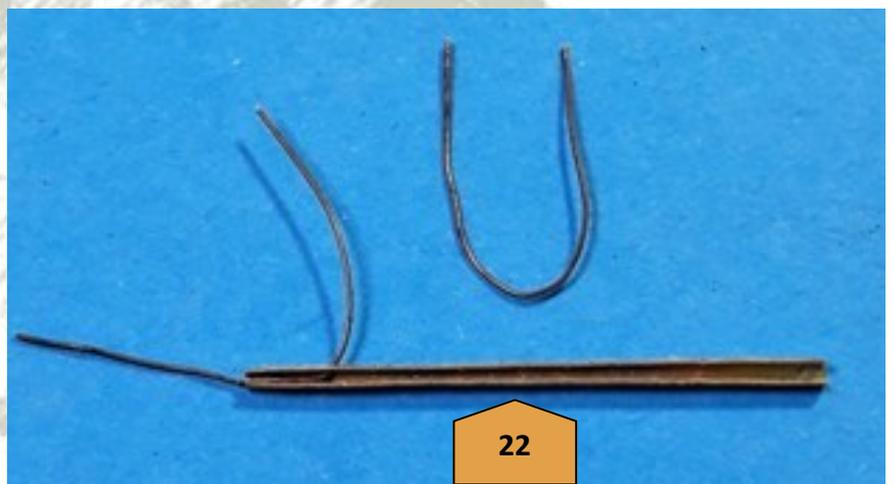
Drill six holes of 0.3mm into the two magnetos corresponding to each connection point and glue 0.3mm lead wire into the holes representing ignition wires. Note: This best done while the part is still on the casting block



Remove the ignition wire sheath parts from the photo etch fret (parts 22 and 23). Anneal these parts as well as a length of 0.3mm copper wire before assembling.

Then bend both sides of part 22 inside as pictured right.

Bend the copper wire in U shapes and feed the first one through the first hole. The second wire loop is fed through the next two holes and so on...until you have 6 separate wires. Use CA glue or soldering to hold in place.

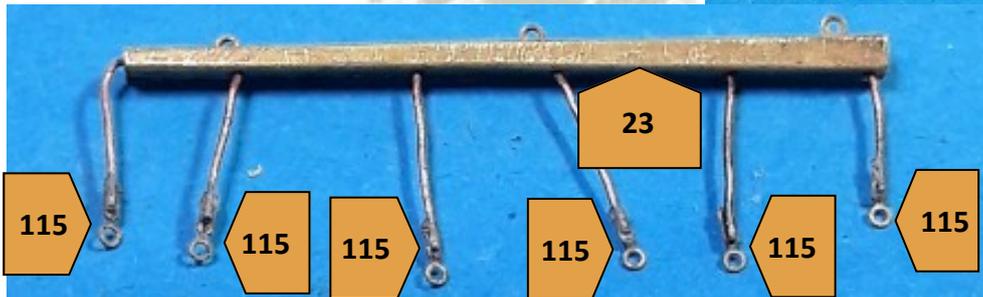


## Step 6 (Continued)

Once all the wires are fitted it should look something like the picture on the right.

Then glue or solder part 23 on the open back edges of part 22.

Test fit each Ignition wire tube to the engine assembly and carefully trim each wire to the required length so that the wire loosely fits the corresponding spark plug position. Glue or solder part 115 to the wires as shown below.

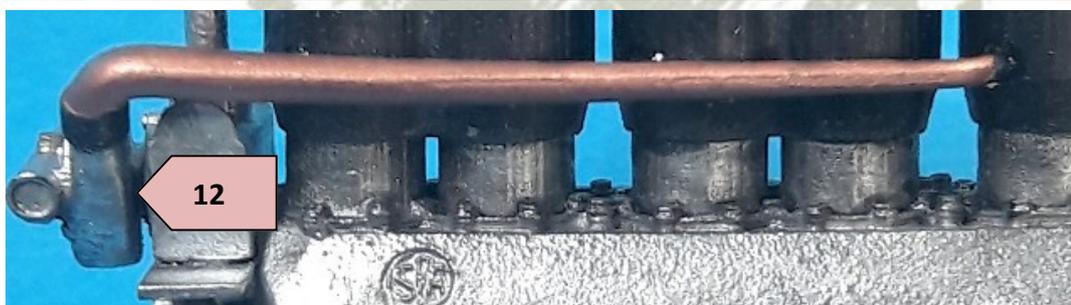


## Step 7. (Turbo Pipe)

Paint the spark plugs with an iron colour and brass.



Glue in place the spark plugs on both sides.



Then glue the turbo pipe in place which fits in to three holes near the base of the cylinder on the starboard side of the engine. The thicker end of the turbo pipe should fit into part 12 (above).

Glue the two magneto / ignition assemblies in place as pictured right



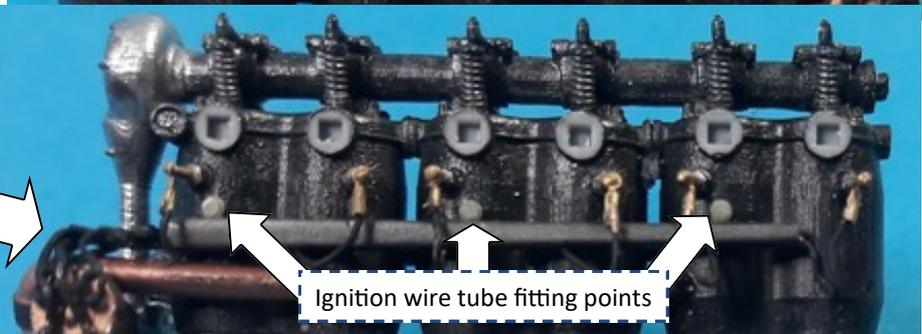
## Step 8. (wiring)

Attach the assembled Ignition wire sheath to each side of the engine cylinders using brass rod or similar to pin the tube into the three holes pre-drilled into the cylinders just below the spark plugs on each side of the engine.

Fit each spark plug connector (part 115) to the corresponding spark plug as pictured right.

Twist and glue the six ends of wire fitted in to each magneto in to the wide open end of the corresponding ignition wire tube.

Ignition wire tube fitting points



## Step 9. (Carburettor)

Glue the carburettor assembly in place.

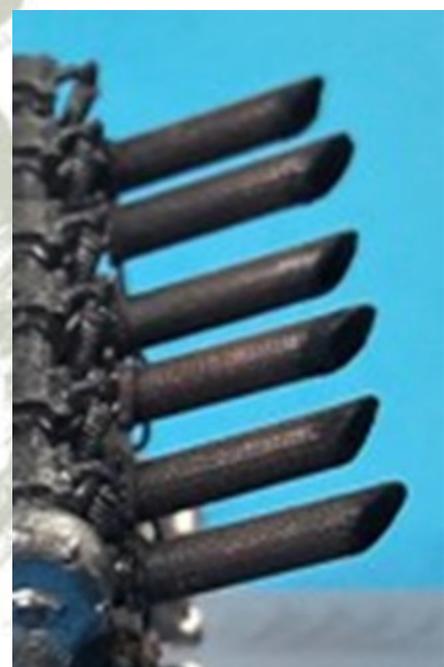


## Step 10. (Exhausts)

Do not cut off exhausts at an angle - cut them off straight and drill out with a 1.4mm drill bit , then trim and sand to marked angle.

*Tip: To do this I made a jig of brass rod but styrene also works. Drill a hole of about 9 - 10mm depth with a 1.4mm drill bit. then drill out 5mm with a 2.00 mm drill bit.*

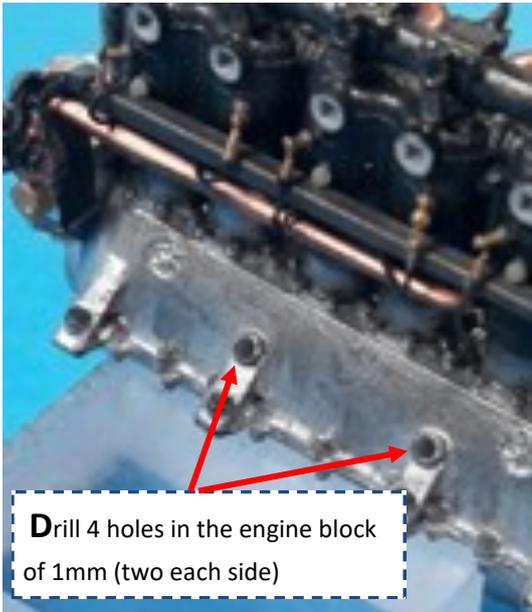
Glue the exhaust parts in place on to the engine.



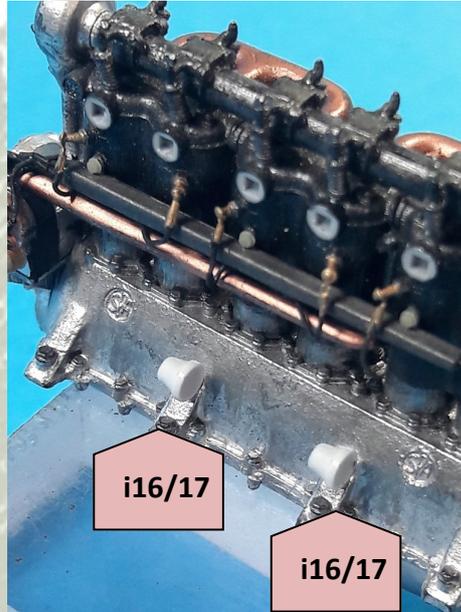
## Step 11. (Intakes)

Clean up resin parts i16 and i17 and glue in to the drilled out holes . Check reference photos for directions part i17 fits on to the manifold side of the engine.

*Note; Ansaldo and Breda engines had different arrangements for what we believe were cooling intakes. Also, some engines only had intakes on the exhaust side of the engine.*



Drill 4 holes in the engine block of 1mm (two each side)

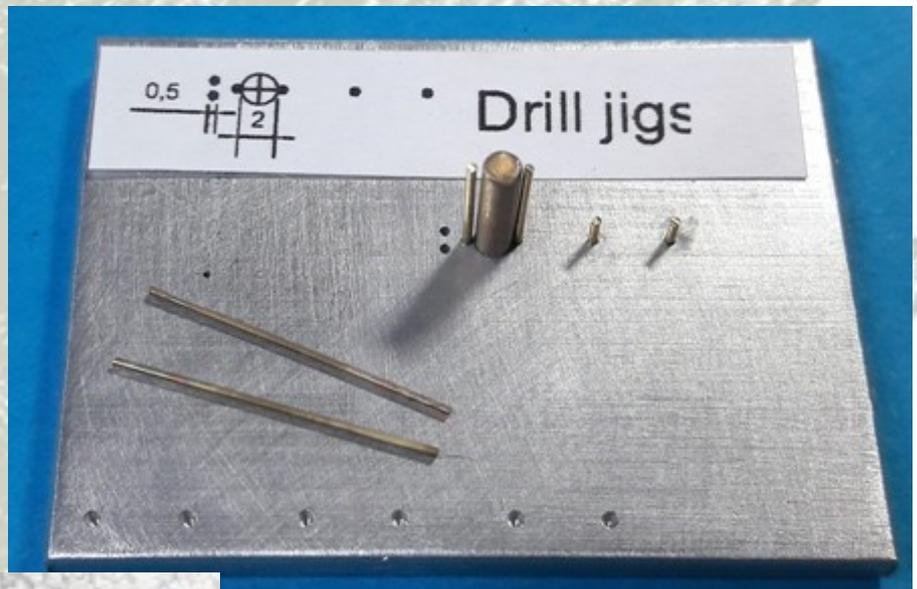


## Step 12. (Pipes)

To bend the front copper pipes use the jig supplied in the [appendix](#) section of these instructions, I used an aluminium plate as a basis for the jig but wood or plastic card is also an option.

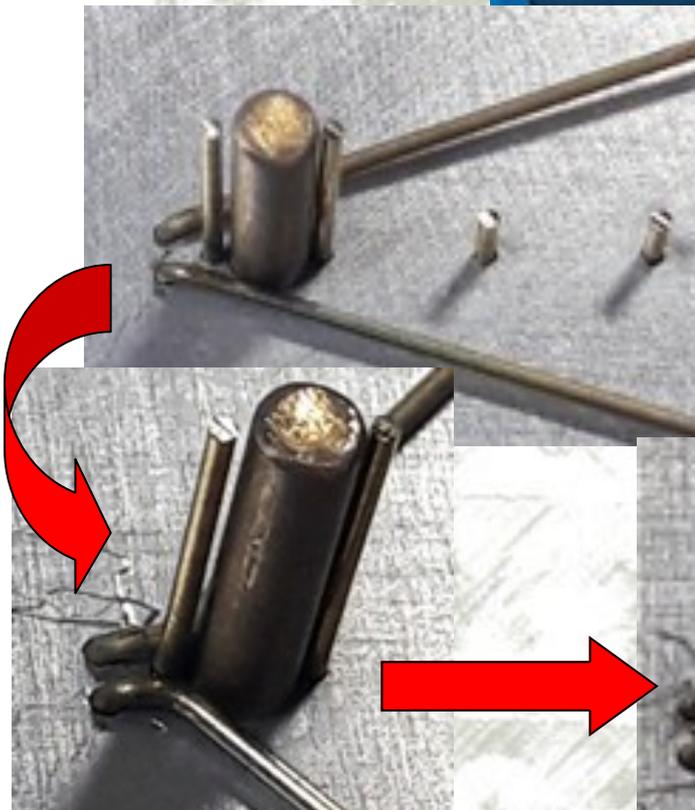
Drill holes according to the supplied template and glue in brass rod of 0.5mm and 2mm.

Either used the supplied copper wire or cut off 2 pieces of brass rod of 30mm length 0.5mm diameter and anneal the rods.

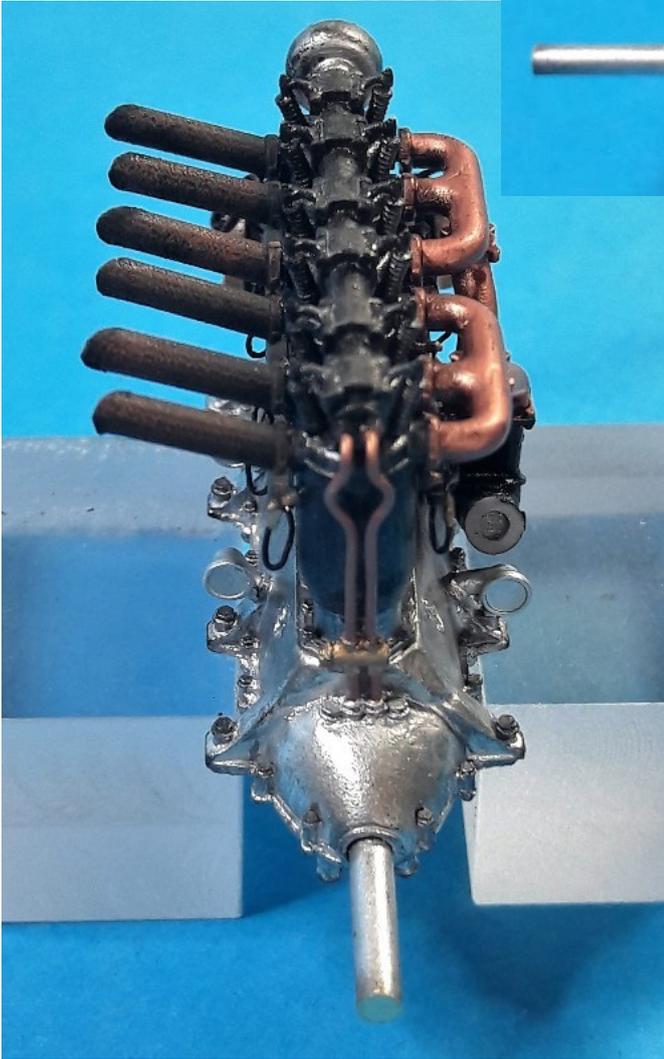


Place the rods in the jig and bend them flat to the surface. Use pliers to bend the wire around the 2mm brass rod until the shape is complete.

The picture below should be what the end result looks like. Glue in place on to the engine between the front of the camshaft and part i14. Paint copper, or if using copper wire leave unpainted.



The finished engine should look something like this.....



# Section 2

## FUSELAGE INTERIOR

### Step 1. (Fuselage basics)

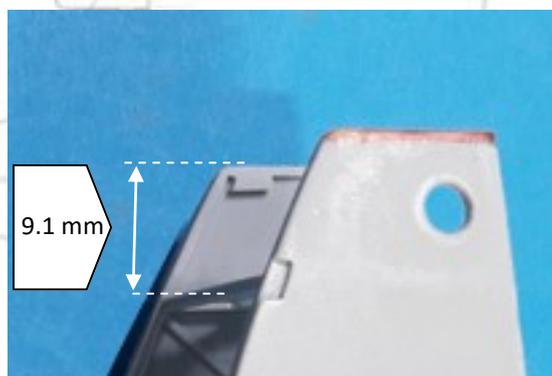
Clean up the fuselage and sand away any imperfections so it is completely smooth.



Drill hole out to 3.9mm

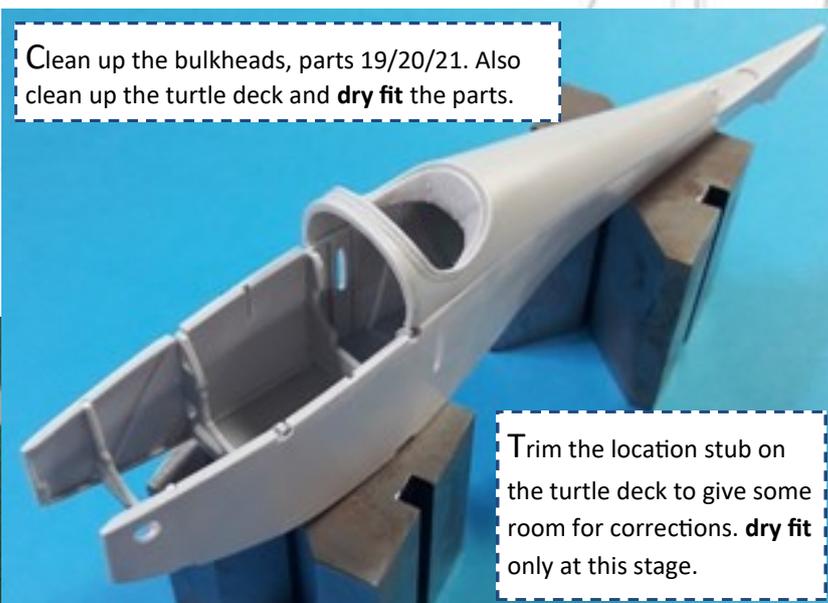
Drill 1.0mm holes both sides

Trim slot to a width of 1mm and extending downwards to a length of 9mm to later fit PE part 19/35, both sides



Cut fuselage to a length of 9.1 mm from the first frame removing the casting block if applicable (see left)

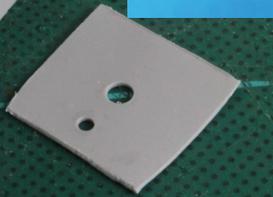
Clean up the bulkheads, parts 19/20/21. Also clean up the turtle deck and **dry fit** the parts.



Trim the location stub on the turtle deck to give some room for corrections. **dry fit** only at this stage.

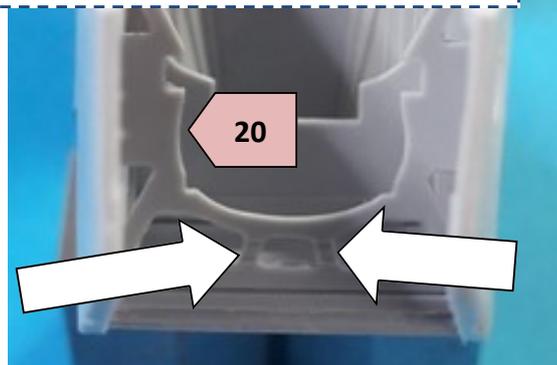


**Optional :** There are two methods of fitting the fuel tank (see Section 2: Step 3). The more accurate method requires the removal of a section of fuselage underside between the rear engine bulkhead and the forward cockpit bulkhead (moulded in to the fuselage). This section can be removed with a scalpel. If possible keep the removed piece of fuselage underside for later use.



*Modelers Tip: Paint all interior wood parts before final fitting of bulkheads. [Suitable wood grain decals are available from Aviaticc.](#)*

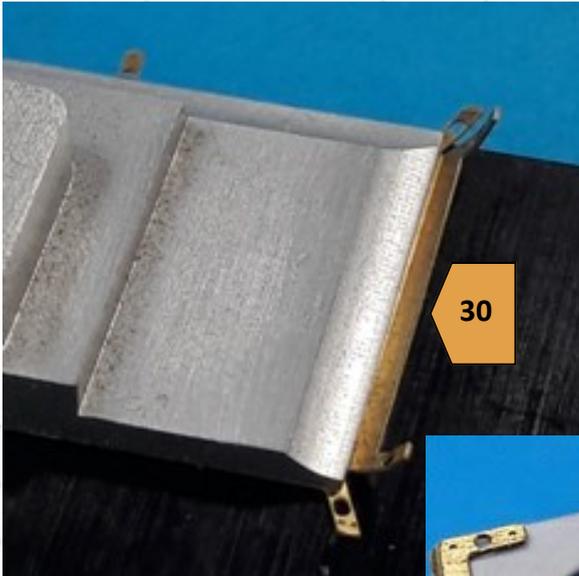
Ensure sure the indentations at the bottom of part 20 are facing forwards as indicated below



When happy with the fit of all the parts, glue in the bulkheads, parts 19 and 20 using CA glue to fix in place making sure there is no interference in the fit in the slots. Do not glue the turtle deck yet!

## Step 2. (Forward bulkhead)

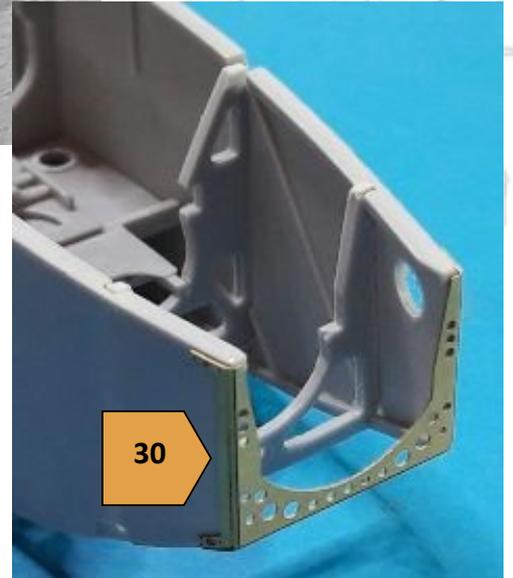
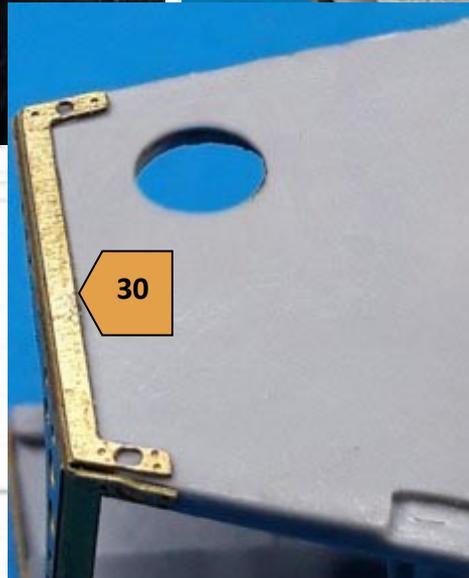
Remove the moulded detail marked in red in the picture on the right and thin the inside fuselage walls to 0.3 mm in this area.



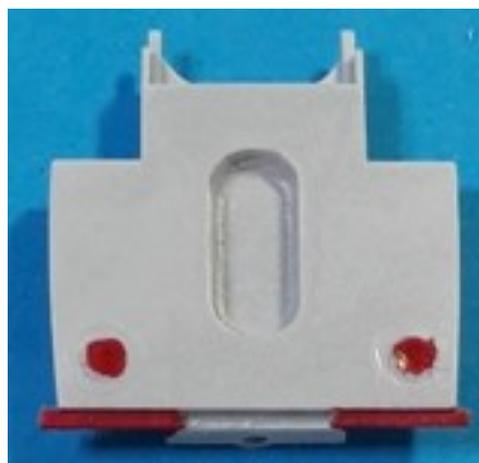
Cut away PE part 30 and bend to shape using a right angled edge tool as an aid.

*Modelers tip: The joints can be soldered together for extra strength.*

Glue PE part 30 in position at the front of the fuselage. You may need to gently bend the two fuselage sidewall edges inward to fit the PE part.



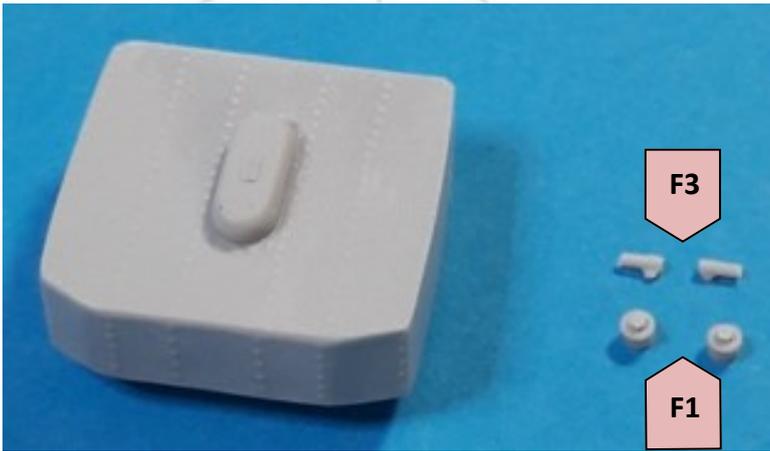
## Step 3. (Fuel tank).



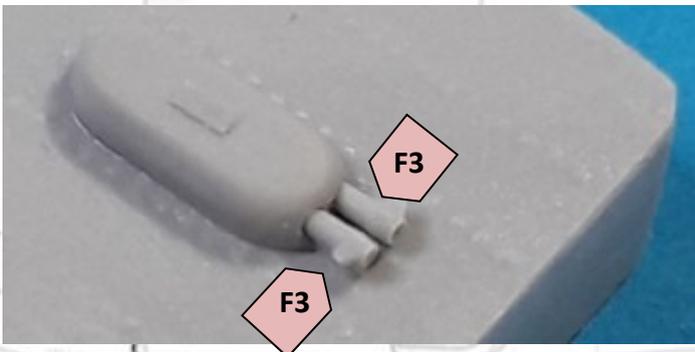
Remove the casting block from the cockpit floor with a fine razor saw. Cut off the red areas shown in the picture on the left and drill out the holes if necessary .

*Note: There is an option to sand away the detail of the flange and use PE part 11 instead*

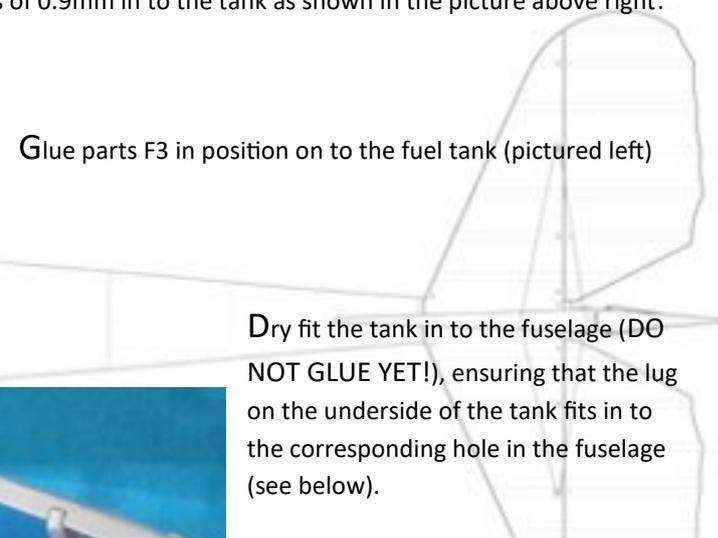
## Step 3. (continued).



Clean up the fuel tank as well as parts F1 and F3. Drill two holes of 0.9mm in to the tank as shown in the picture above right.

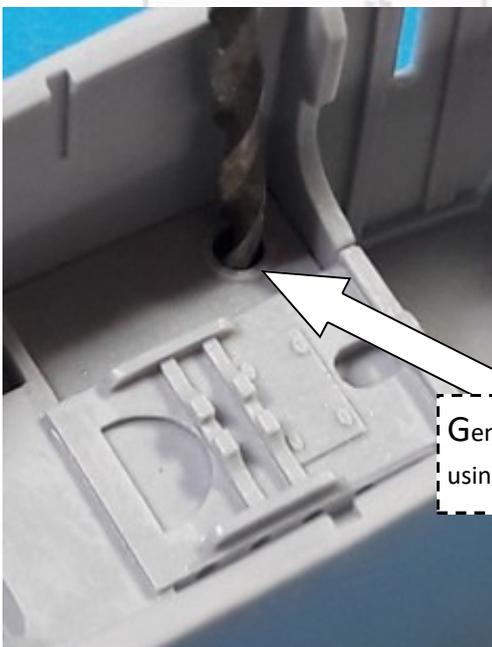


Glue parts F3 in position on to the fuel tank (pictured left)



Dry fit the tank in to the fuselage (DO NOT GLUE YET!), ensuring that the lug on the underside of the tank fits in to the corresponding hole in the fuselage (see below).

If building the option with the accurate fuel tank assembly (See Section 2: Step 1) place the fuselage on a flat surface and slot the fuel tank in to position using the flat surface to hold the tank in position.



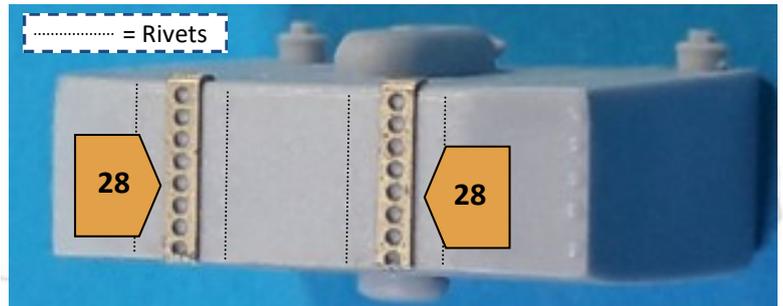
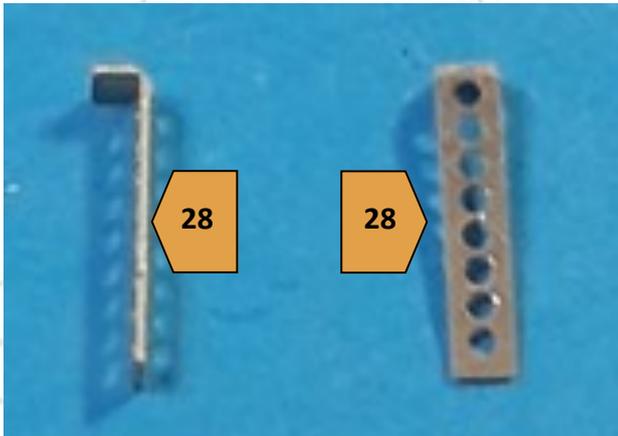
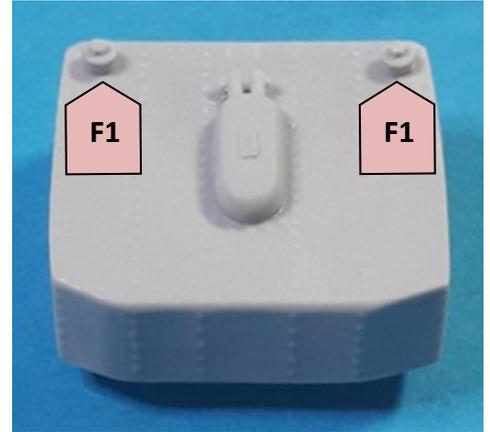
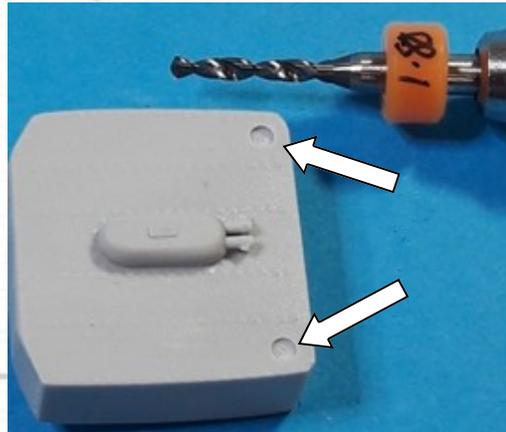
Dry fit the cockpit floor on top of the fuel tank.



Gently spot drill the fuel tank using a 2.4mm drill bit using the two holes in the cockpit floor as guides

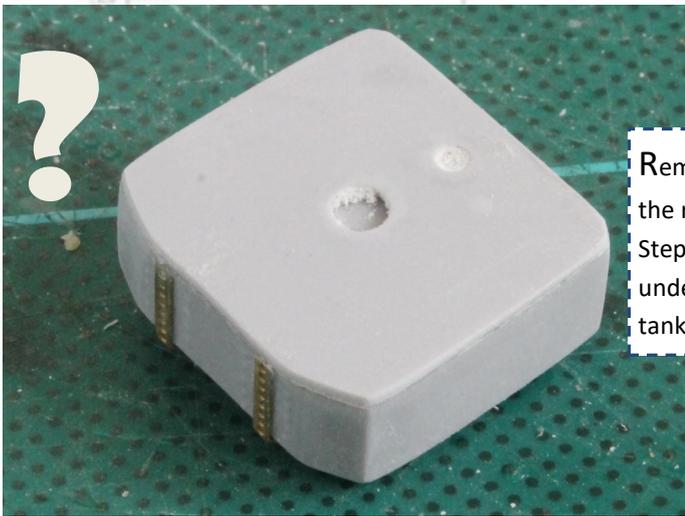
Step 3 (Continued).

Remove the flooring and tank from the fuselage and drill two 1.8mm holes with a depth of approx. 0.5mm at the positions that were previously spot drilled. Glue in parts F1 in to these holes



Now remove PE parts 28 from the PE fret and bend in to shape (above left). Then glue them on to the tank so that they fit in-between the central rows of rivets on each side.

The fuel tank can now be painted and glued in to position UNLESS opting for the accurate fuel tank assembly (as below):



Optional: If the intention is to build the accurate fuel tank assembly option:

Remove the lug from the underside of the fuel tank. Either glue the retained piece of removed fuselage underside (see Section 2: Step 1) or glue a piece of plasticard of a similar substance to the underside of the fuel tank and trim flush to the edge of the fuel tank (see left).

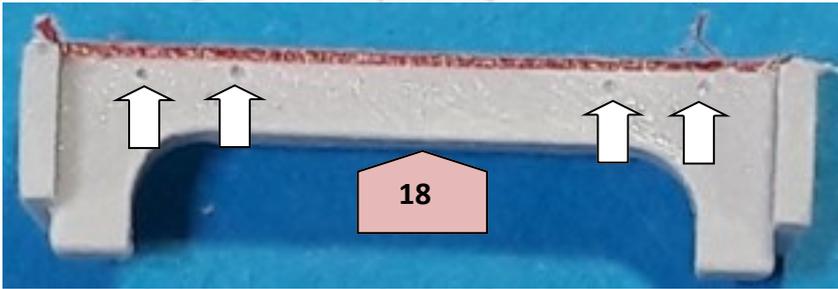
Glue PE fuel tank underside on to the underside of the fuel tank as illustrated right.

Set the fuel tank aside. Do not glue in to the fuselage yet!



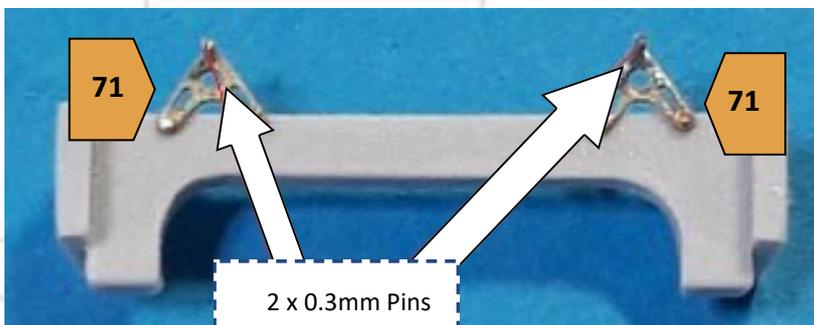
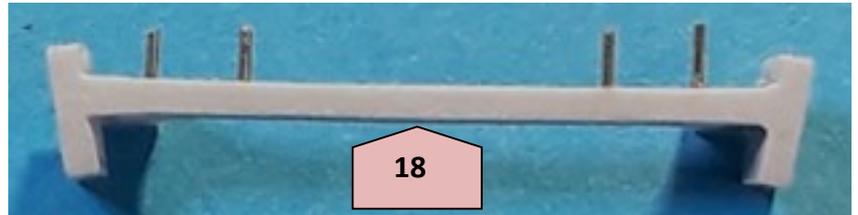
## Step 4 (Aileron control unit ).

Note: This unit will not be seen as it sits under the seat and this step can therefore be treated as optional.



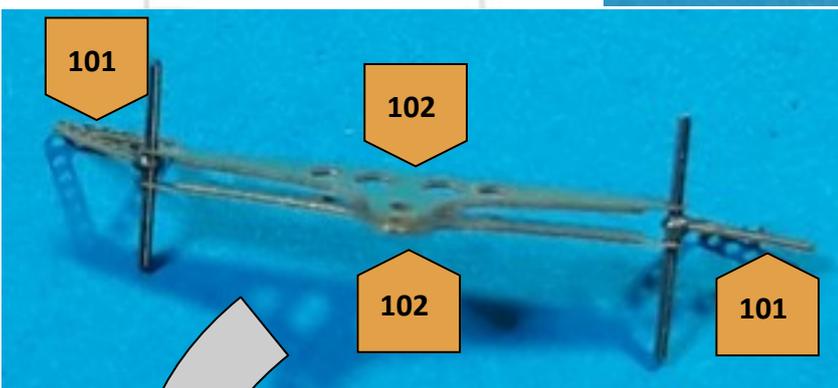
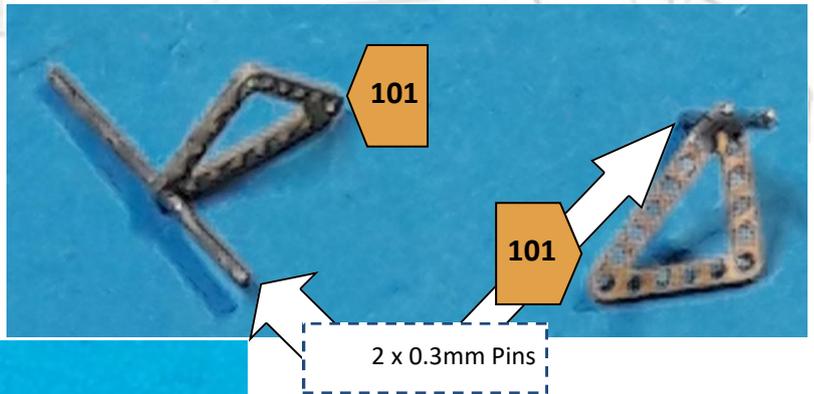
Cut away part 18 from its casting block and drill 4 holes of 0.3mm as pictured left.

Glue 4 pins of 0.3mm brass in to the holes that you have just drilled.

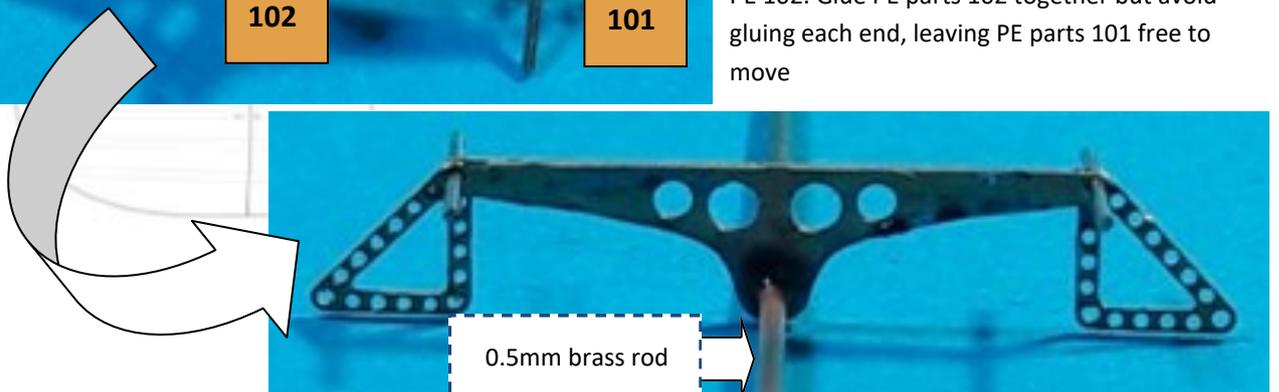


Glue or solder two 0.3mm 4mm long pins in to the ends of PE parts 71. Then glue the two PE parts 71 in place on to the four brass pins fitted above. Trim the ends of these four brass pins so that they are flush with PE parts 71.

Glue or solder two 0.3mm pins that are 5mm in length in to the top edge of PE part 101.

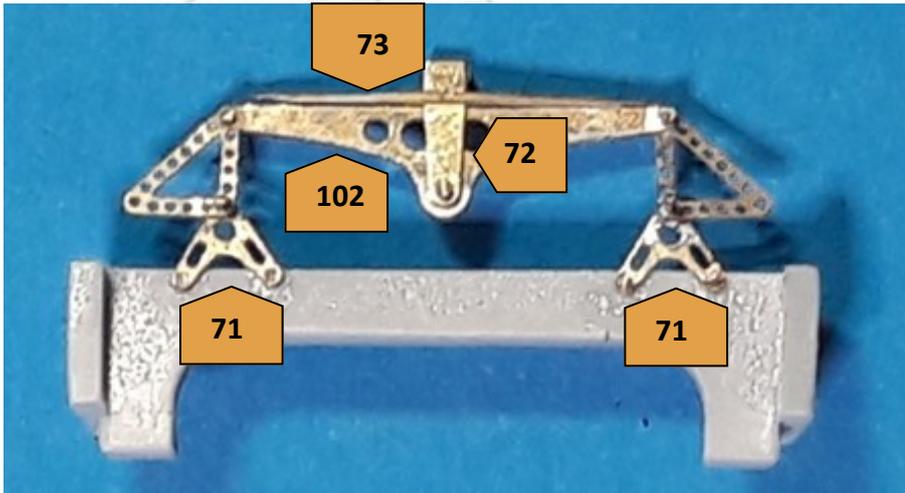


Sandwich PE parts 101 between and at each end of PE parts 102 so that the 5mm brass rods fitted to PE parts 101 (as described above) are threaded through the holes at each end of parts PE 102. Glue PE parts 102 together but avoid gluing each end, leaving PE parts 101 free to move.



Glue or solder 0.5mm brass rod in to the center of PE part 102 shown in picture above.

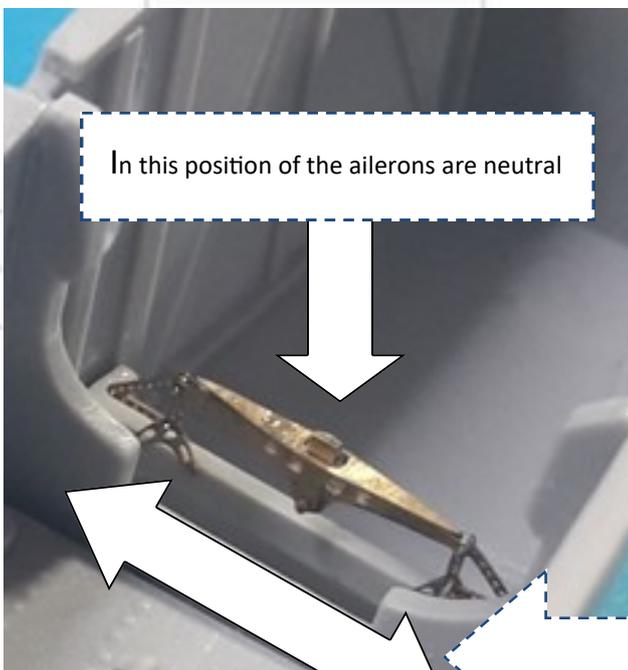
## Step 4 (Continued).



Glue PE parts 72 each side of PE parts 102 so that the hole in PE parts 72 fits over the 0.5mm brass rod fitted above. The slot PE part 73 over the ends of PE part 72 as pictured left.

Fit the aileron control bar assembly to assembly detailed at the beginning of step 4 via the pins in PE parts 71.

Do not glue yet!

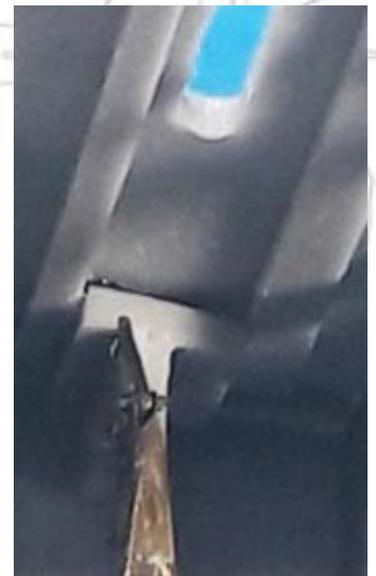


Glue or solder the aileron control bar to required position dependent on aileron positions (See left and below).

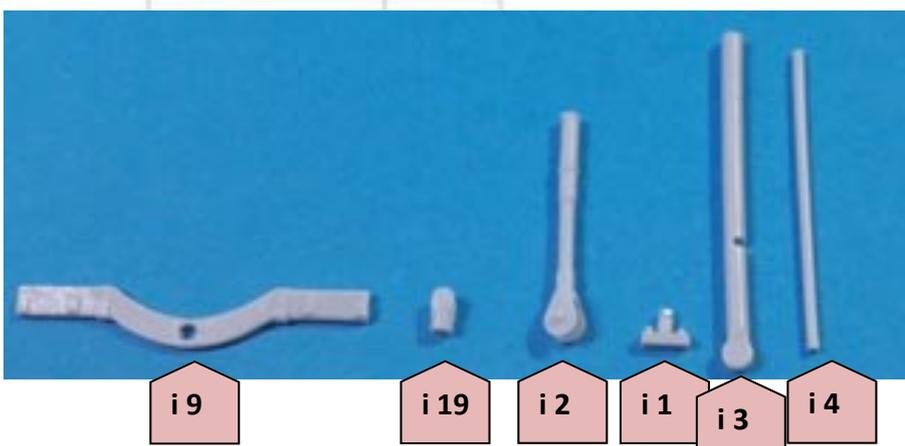
*Note; In most period photographs of the A1, ailerons appear to be in a neutral position when the aircraft is stationary.*

When the assembly is complete paint it and glue in to the slot on the fuselage ensuring that the assembly sits at the base of the slot as pictured right.

If PE part 71 is pointing upwards to the right of the picture and the left is down that means the ailerons are from the pilots view, left side down and right side up. The opposite would be true if the aileron control bar points towards the left.



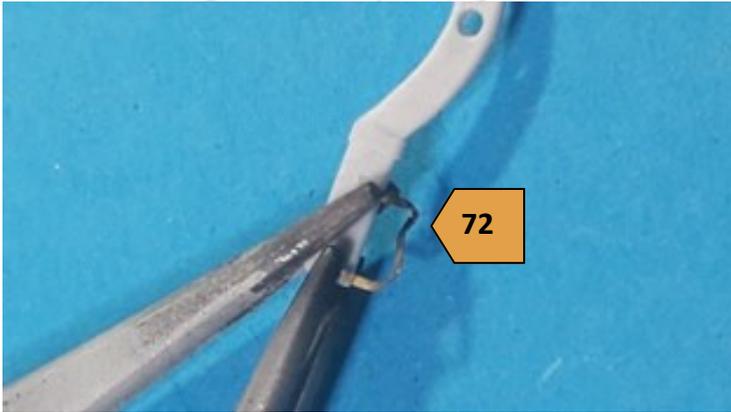
## Step 5 (Rudder bar and floor).



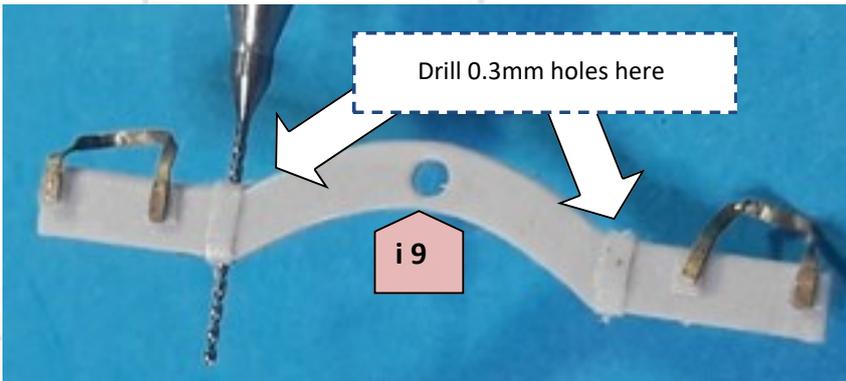
Clean up all of these parts which can all be found on block "i".

We suggest replacing part i4 with brass rod, 22mm x 0.8mm.

## Step 5 (Continued).

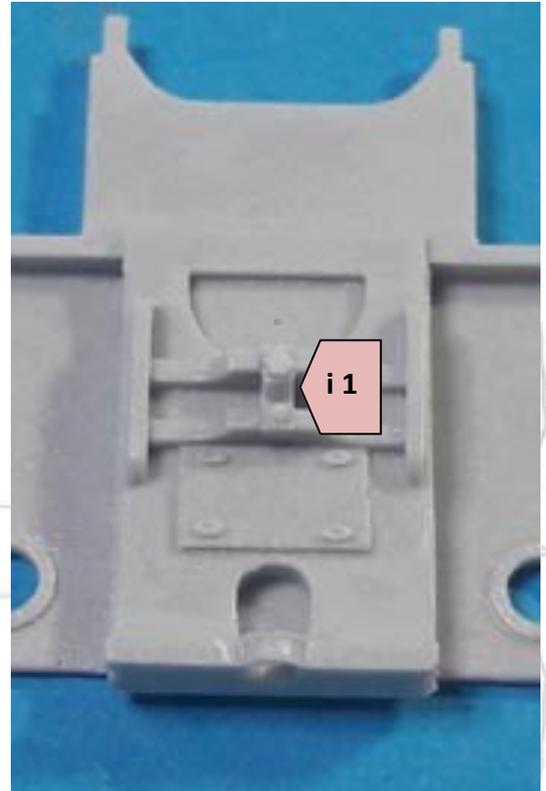


Anneal PE part 63 and bend to shape using tweezers then glue in place on to each end of part i9.



Drill two 0.3mm holes through Part i9 for control wire as pictured above

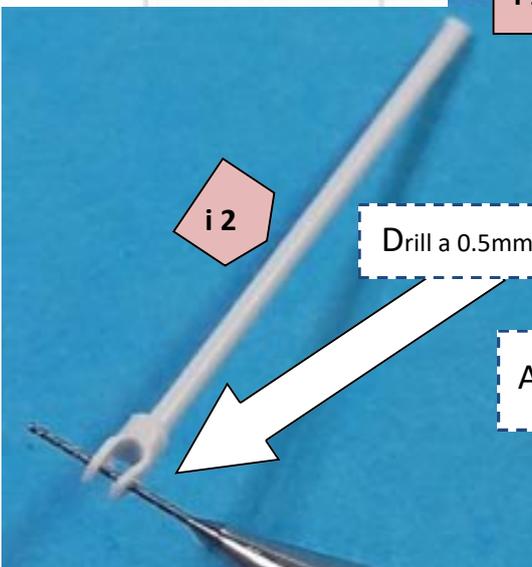
Glue part i1 in place on to the cockpit floor ensuring that the inverted 'T' sits flush with the edge of the slots.



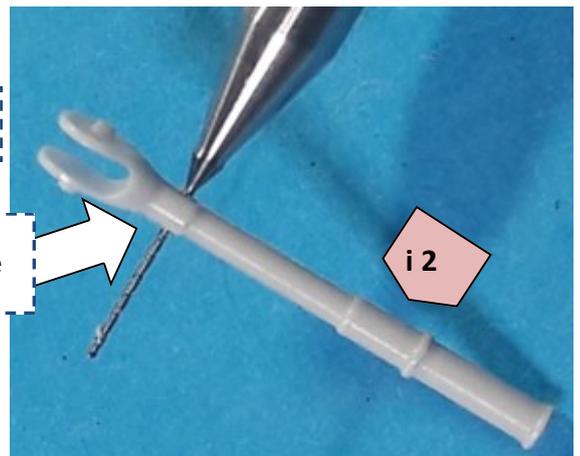
## Step 6 (Control Stick).

The modeller has a choice of either gluing in all of the parts or with very careful drilling, leaving an 'articulated' assembly

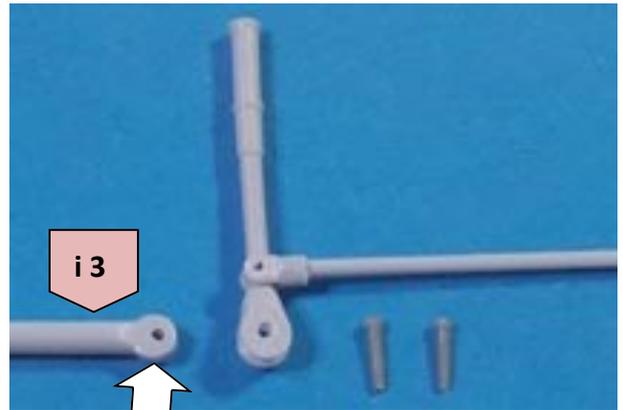
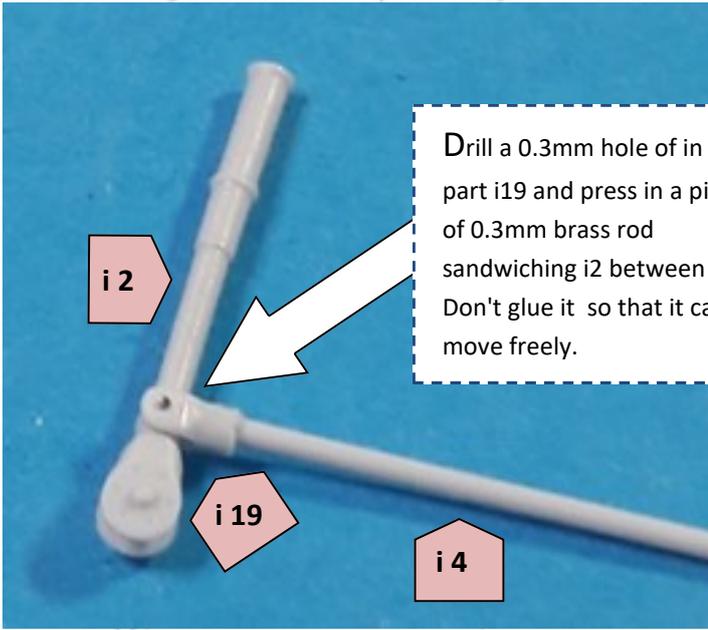
Drill a hole of 0.8mm in to the end of part i19. Glue in part i4 or a 0.8mm brass rod replacement 22mm in length.



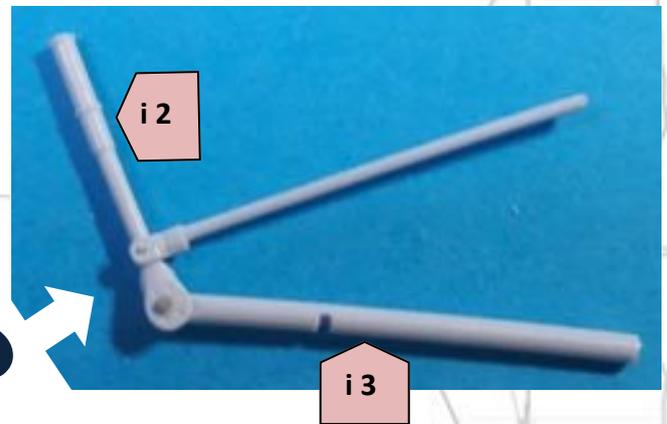
Also Drill a 0.3mm hole here



## Step 6 (continued).



Drill a 0.5mm hole in the end of part i3.



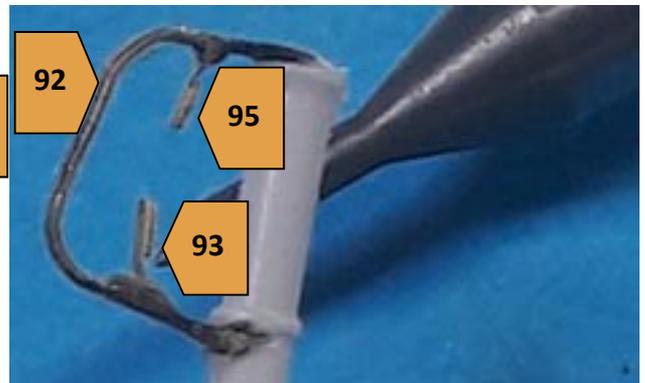
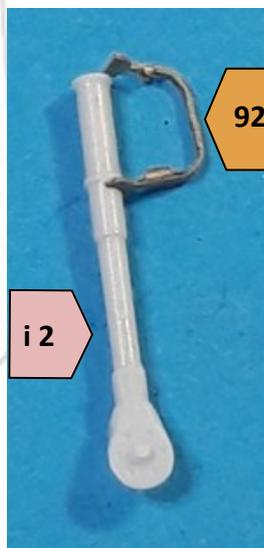
Pin part i3 to the end of part i2 with two 0.5mm resin hex nuts or with brass rod as pictured right.



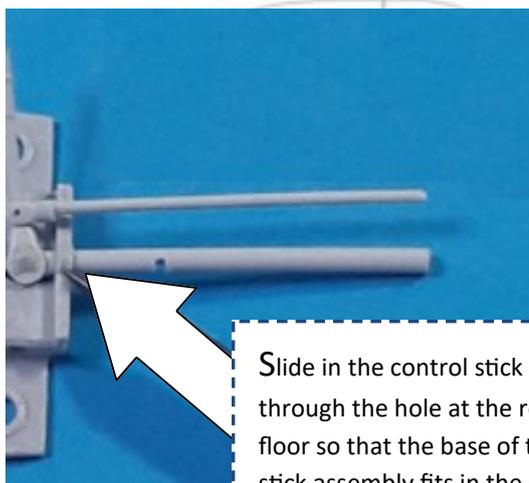
Or the parts can be all be glued as illustrated on the left.



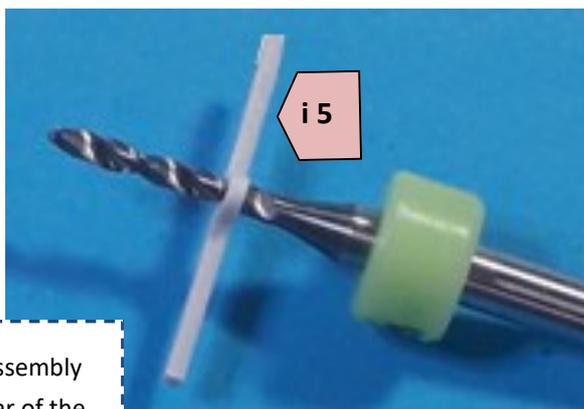
Cut away PE parts 92, 93 and 95.



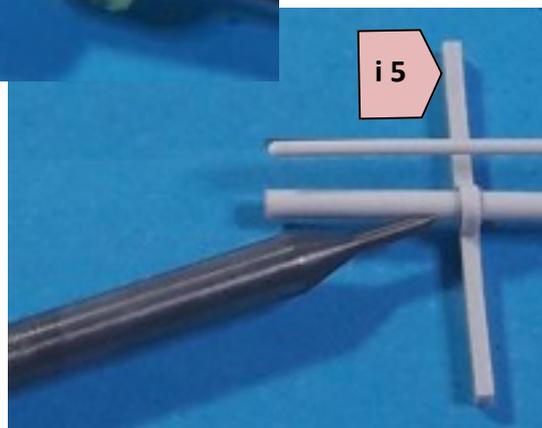
Glue PE part 92 in to part i2 as in middle picture cutting a 0.2 slot half way through the stick to accept PE part 92. Fit PE parts 93 and 95 to PE part 92 as illustrated above.



Slide in the control stick assembly through the hole at the rear of the floor so that the base of the control stick assembly fits in the recess in the floor.



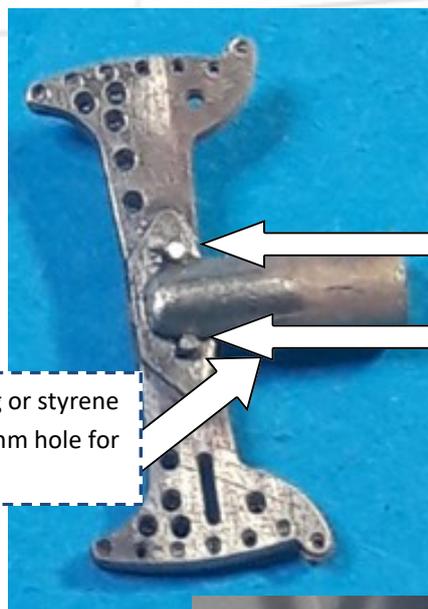
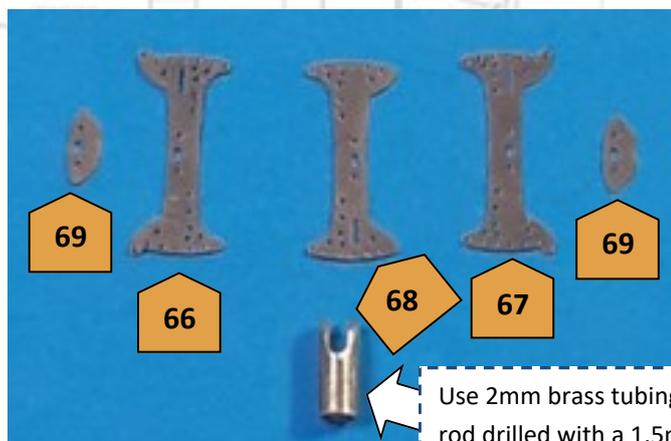
Drill out the hole in the centre of part i5 using a 1.6mm drill bit



Slide part i5 on to the end of the control stick assembly. Do not glue.

### Step 7 (Optional control bar detail).

Note: This part will sit under the seat and as such will not be visible.



0.3mm brass pins

Use 2mm brass tubing or styrene rod drilled with a 1.5mm hole for the joint.

Sandwich part PE part 68 between PE parts 66 and 67 using 0.3mm brass pins through the holes each side of the centre hole for alignment. Glue PE parts 66 each side of this assembly.

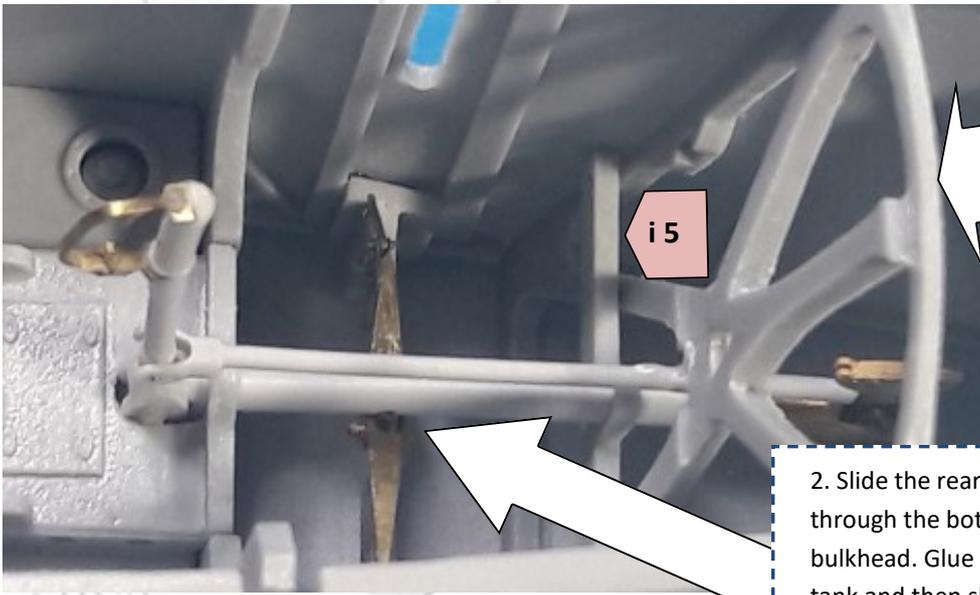
Slot and glue the assembly on to the end of the control stick assembly



Modellers tip: At this stage paint the floor, rudder and control stick assemblies

## Step 8 (interior assembly)

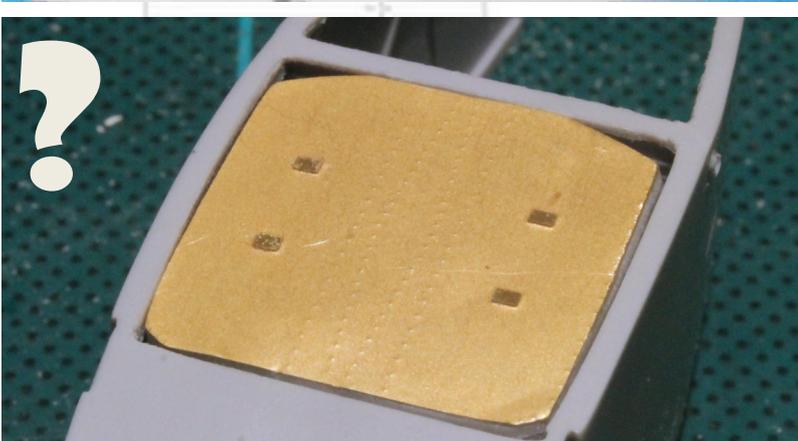
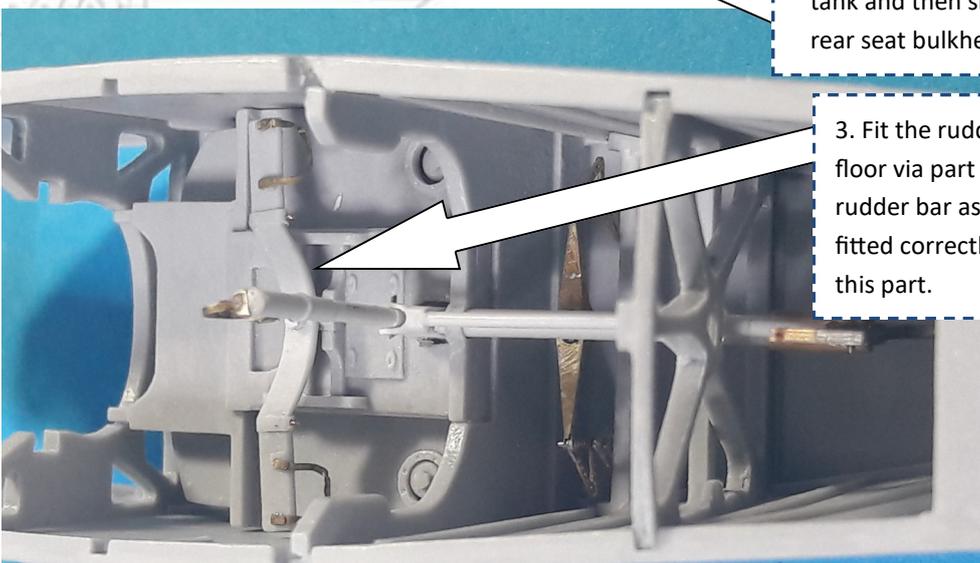
This section details the process for fitting the rear seat bulkhead, floor, control stick assembly and rudder bar in to the fuselage. Fit the parts and assemblies in the suggested order.



1. Slot and glue the rear (seat) bulkhead in to the fuselage ensuring that the notches for the seat base on the bulkhead are facing forwards

2. Slide the rear section of the control stick assembly through the bottom opening of the rear (seat) bulkhead. Glue the floor in to position above the fuel tank and then slide part i 5 across and glue to the rear seat bulkhead.

3. Fit the rudder bar assembly firmly on to the floor via part i 1 (see [step 5](#)) ensuring that the rudder bar assembly clips firmly in to part i 5. If fitted correctly there should be no need to glue this part.



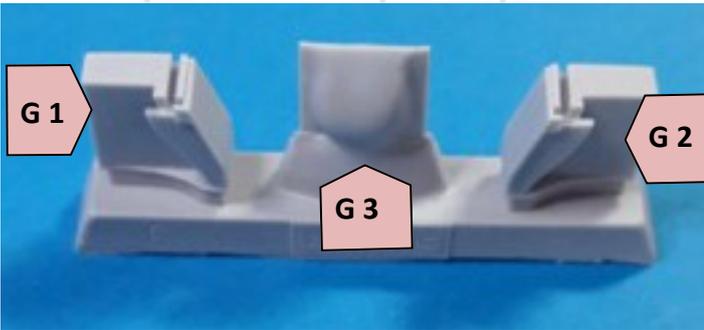
Optional: If opting for the accurate fuel tank assembly (See [Section 2: Steps 1 and 3](#)); slot the fuel tank in to the open underside of the fuselage and glue to the underside of the cockpit floor.



The assembly should end up looking something like this

Modellers tip; At this stage rudder control wires can be fitted to the rudder bar via the eyelet holes drilled out in [Step 5](#). These can be pulled taught and fitted to the rear of the cockpit.

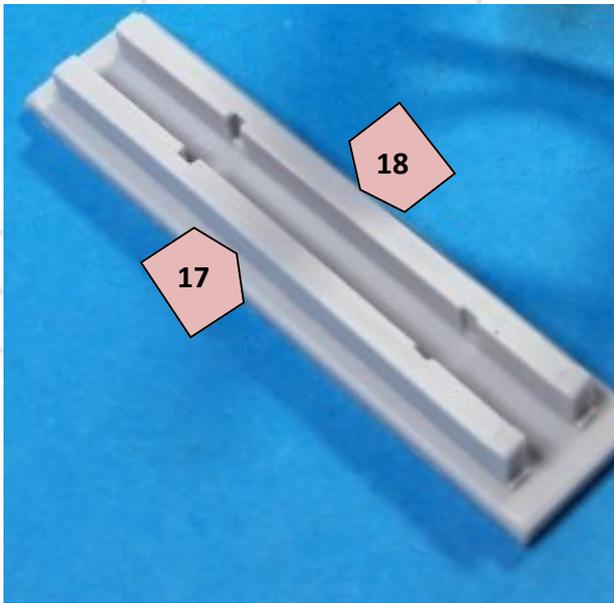
### Step 9 (Firewall and engine bearers)



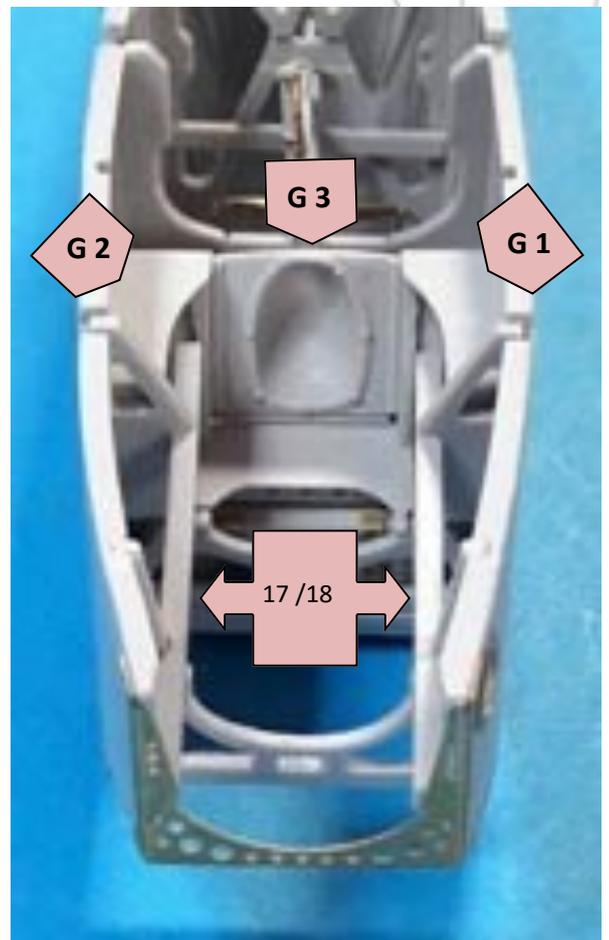
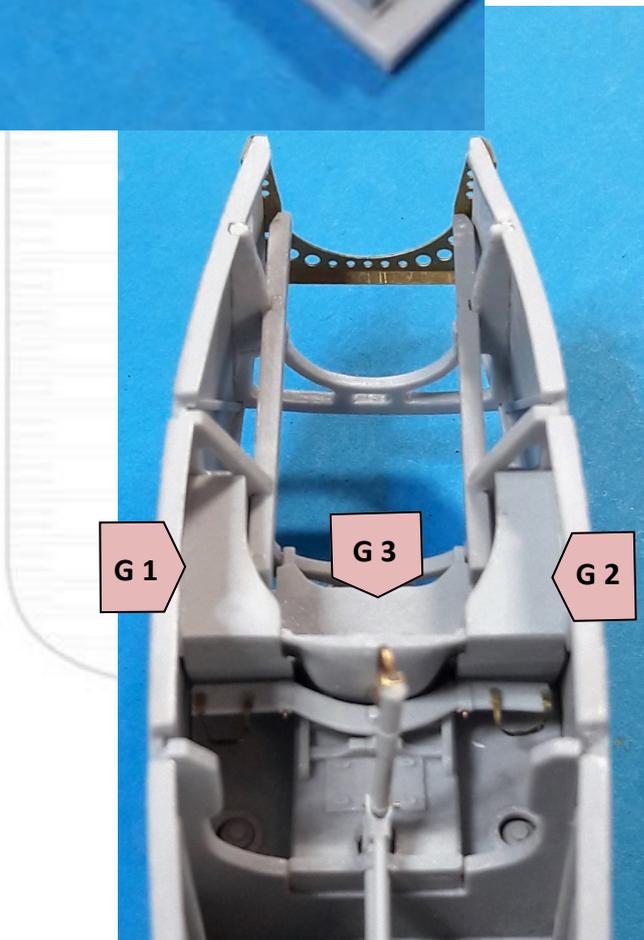
Clean up parts G 1 G2 and G3, removing the areas marked out in red on parts G 1 and G2 pictured on the right



Remove the engine bearers, Part 17 and 18 from their casting block and clean up

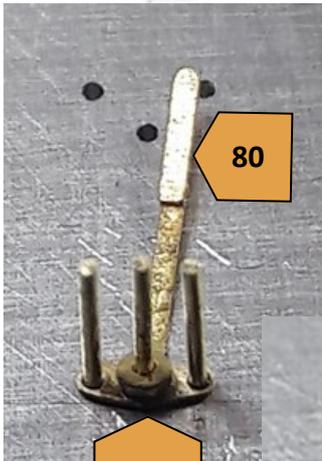


Cement all parts in to the fuselage as pictured below. The larger notch on the bearers needs to be to the rear.



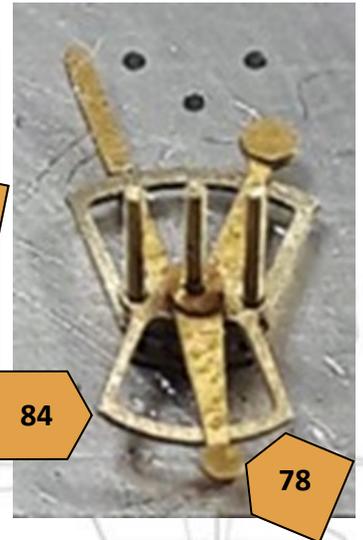
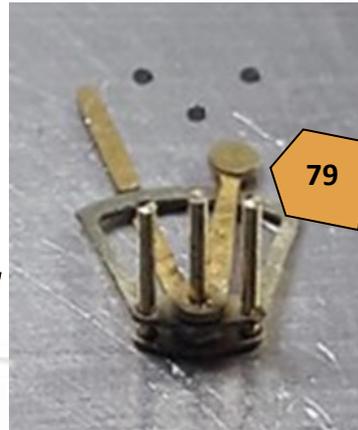
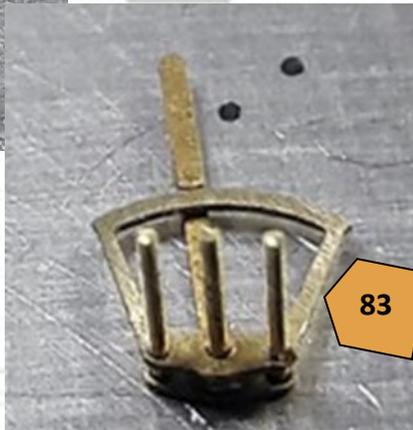
## Step 10

### (Fuel Mixture Selector Quadrant)



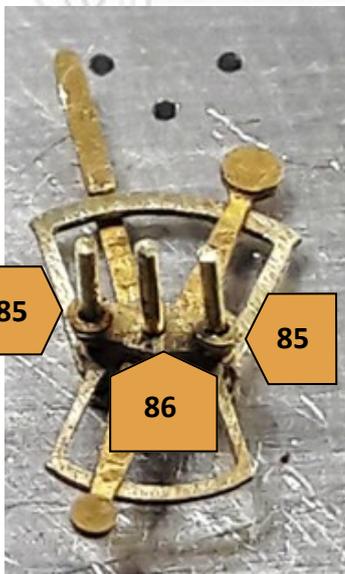
Drill 3 holes of 0.35mm to a depth of 1.5mm in to a block of wood, balsa or aluminum using PE part 83 as a template. Cut 3 x 0.3mm pins to a length of approx. 10mm placing one in to each of the holes.

Fuel mixture selector PE parts are stacked on to these pins. Begin with PE part 86 followed by PE part 80



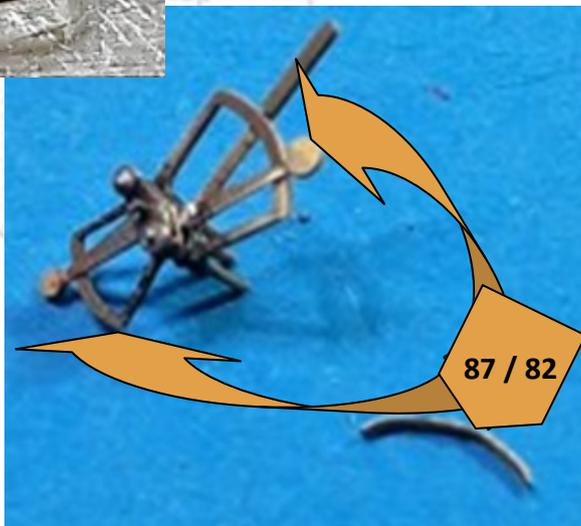
Continue by adding PE part 83 and then PE part 79

Next add PE part 84 and then PE part 78 as above



Finally add PE part 86 and fit two of PE parts 85, one to each of the outer pins giving you the complete assembly of the quadrant looking like the picture on the left.

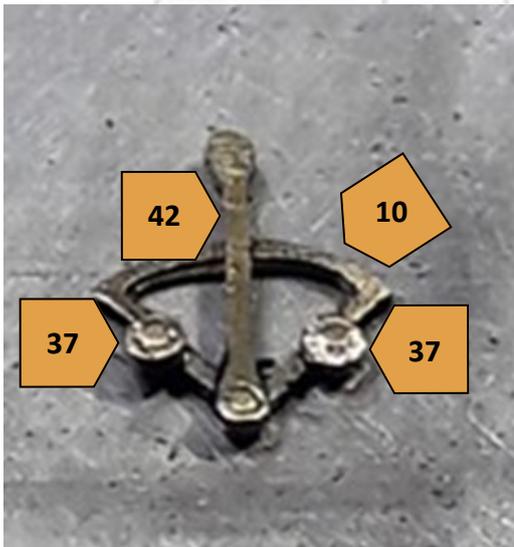
Glue or solder the assembly together. Trim the three brass pins and install the assembly on to the bracket; PE part 104 after folding the sides of the part to a 90° angle.



Glue PE parts 87 and 82 to the top of the arc on both PE parts 83 and 84.

*Modellers tip: Add a drop of PVA glue to these handles to give them a more rounded appearance.*

## Step 11 (Radiator Shutter Quadrant)



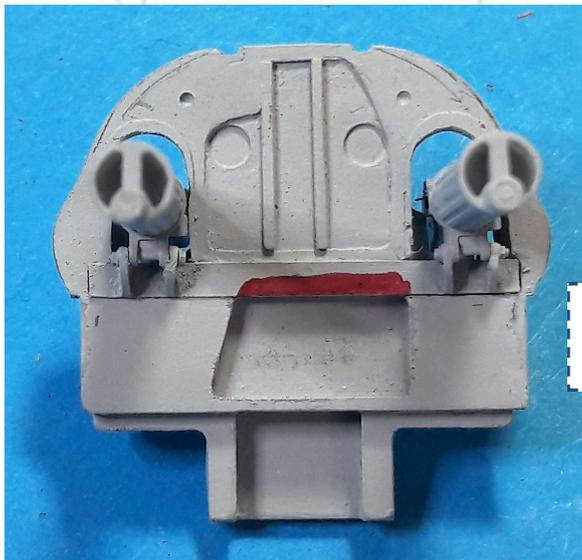
Use the same process as detailed for the fuel selector quadrant. Use PE part 10 as a temple for the wooden or aluminium jig.

First place PE part 10 on to three 0.3mm pins. Place PE part 42 on to the middle pin and then PE parts 37, one each on to the two outer pins. Glue or solder the parts together. Use white glue to accentuate the handle.

## Step 12 (Instrument Panel)

Remove the instrument panel from its casting block and clean up, removing all areas marked in red in the picture on the right.

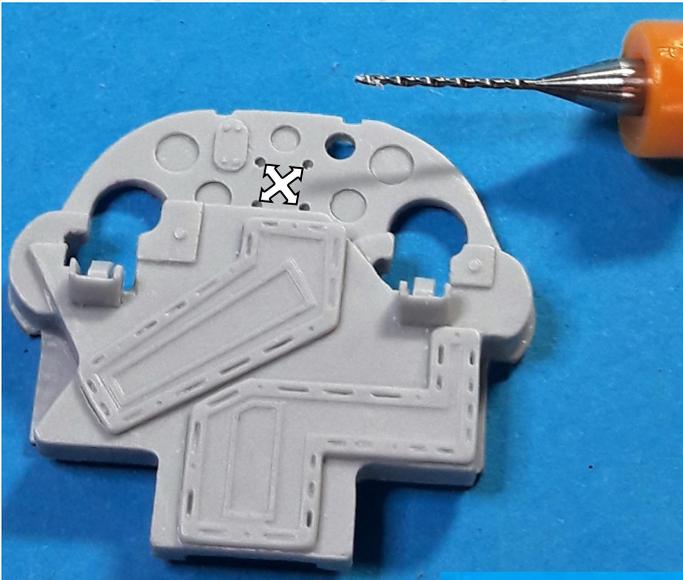
Part 14 and the machine guns can be dry fitted at this stage. It is suggested that the area marked in red below is removed from part 14 and the area of the instrument panel it fits to, which will make the installation of the engine a little easier.



Drill out this hole using a 1.6mm drill bit .

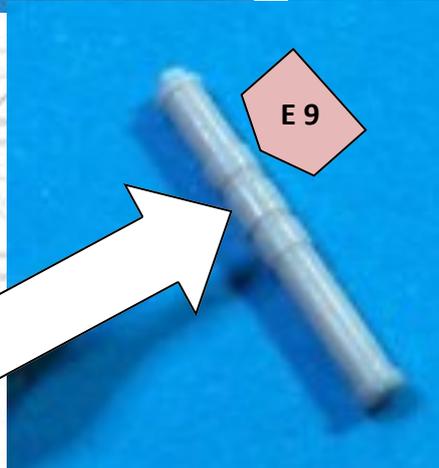


## Step 12 (Continued)



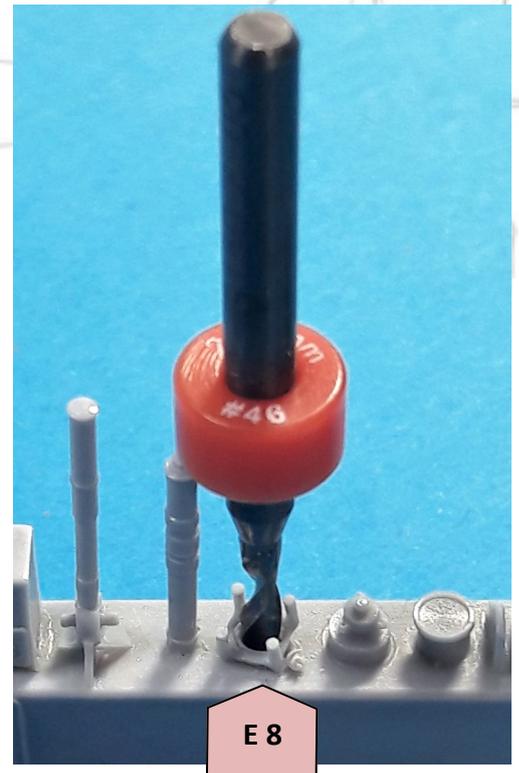
Drill out the 4 holes in the center of the dashboard with a 0.6mm drill bit.

Remove E9 from its casting block and drill 0.5mm diameter holes in both ends.



The centre band marks the position that part E9 fits to the instrument panel

Using a 2.5mm drill bit gently drill through the centre of part E8 while the part is still on its casting block. The part should come away from the block once completely drilled through.



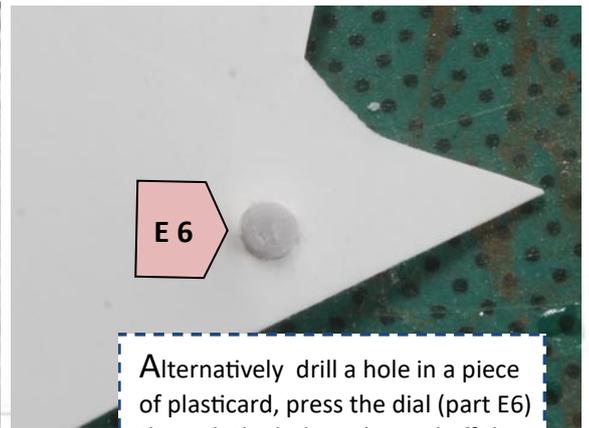
Use a small drop of slow drying CA glue to glue part E8 in to position.

## Step 12 (Continued)

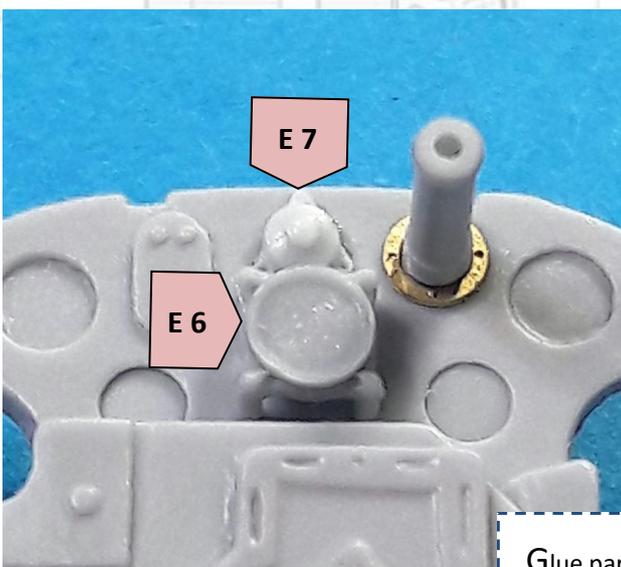


Glue part E9 in position through the hole in the instrument panel. The longer end should point towards the pilot. Slide PE part 4 down the shaft of part E9 and glue to the instrument panel

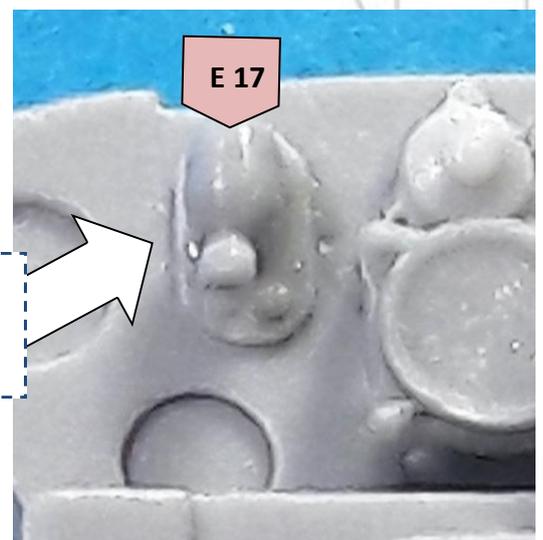
Remove part E6 from its casting block and round off the back side of the instrument which can be made easier by using a jig with a 2.9mm hole drilled to a depth of 1.5mm.



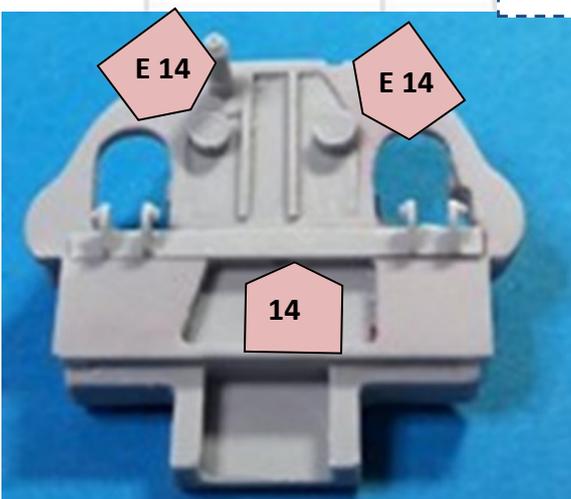
Alternatively drill a hole in a piece of plasticard, press the dial (part E6) through the hole and round off the exposed rear side of the dial



Glue part E6 in to the middle of part E8 (see previous page). Also fit part E7 and glue in place as pictured left.

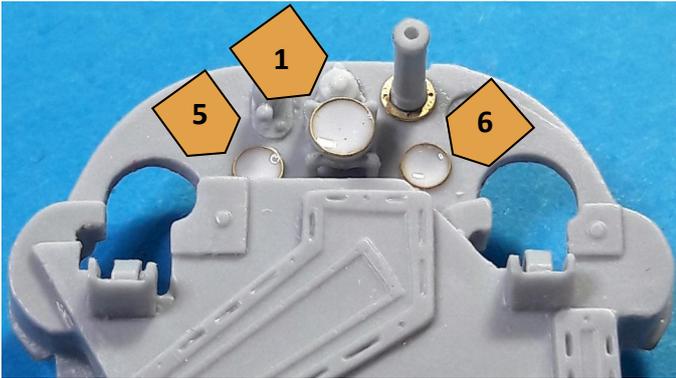


Glue part E17 in to position on the instrument panel here



On the other side of the instrument panel glue the gun bracket (part 14) in to the slot on the panel and also fit and glue the two parts E 14 as pictured left

## Step 12 (Continued)



Using a blob of thinned PVA glue, placed on top of the instrument decals, glue the bezels PE parts 1, 5 & 6 in place. The larger PE part 1 being the central bezel. Once the PVA glue dries it should have a clear glassy appearance.

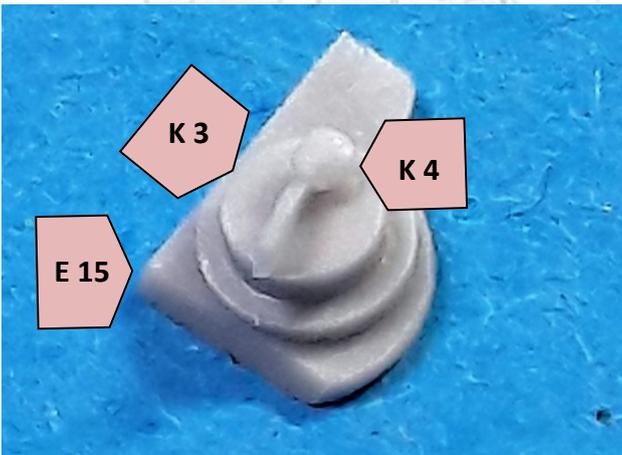
At this stage the instrument panels should be painted and instrument decals applied (see [appendix](#) for instrument panel layout).



Then glue in PE parts 2 and 3 as illustrated above. On top of these glue parts E14 (2 pieces).

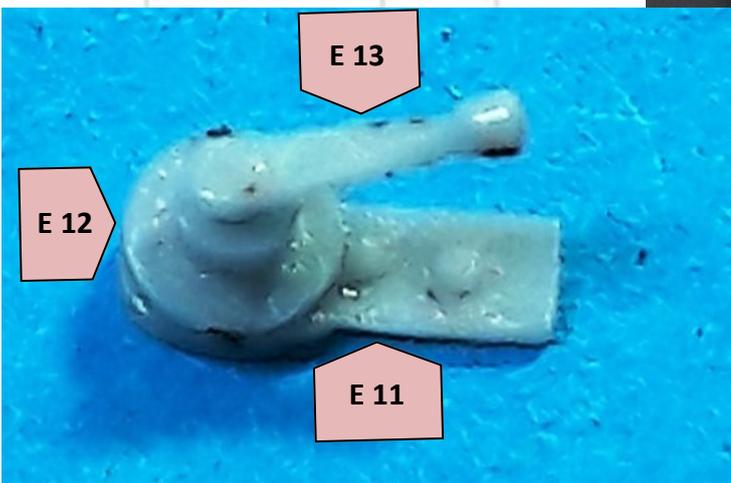
## Step 13 (Ignition switch)

*Note: our parts replace Taurus castings on the fret*



Assemble parts E15, K3 and K4 as illustrated in the picture on the left.

Glue the assembly in to position on the inside of the fuselage as in the picture on the right



Assemble parts E11, E12 and E13 as pictured left.

## Step 13 (Continued)

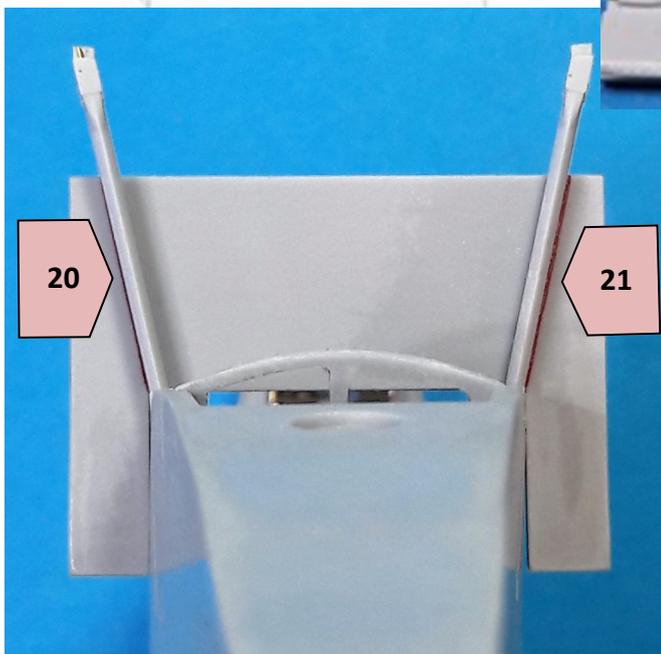
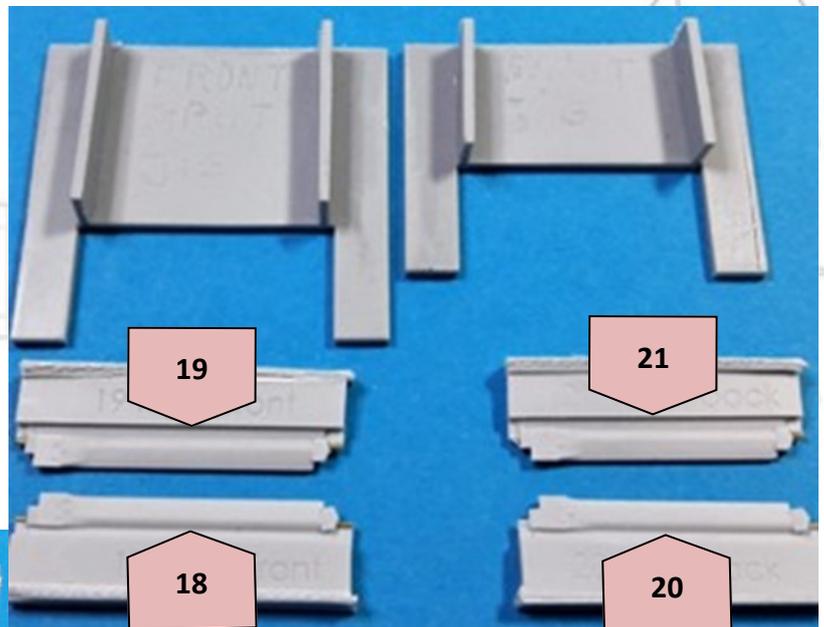


Glue the assembly in to position on the inside of the fuselage as in the picture on the left

## Step 14 (Cabane Struts)

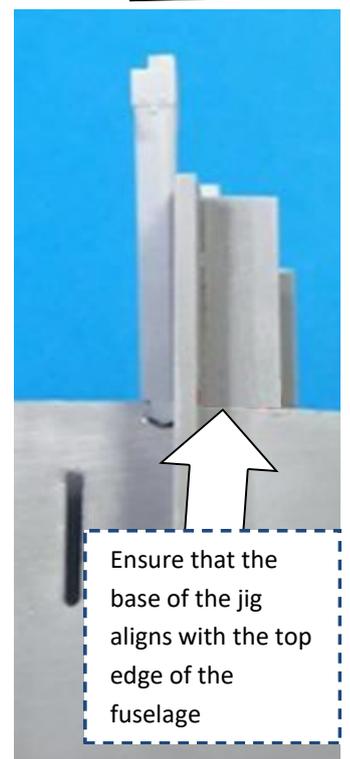
Clean up strut jigs and cabane (Inner) strut parts 18, 19, 20 and 21. Make sure you keep the sprue with the part so they don't get mixed up and glued in the wrong position! Any excess strut strengthening rod should be removed.

*Modellers tip: Use a sharpie or ink wash to highlight the inscribed lines on the jigs so that they are easier to see during strut assembly.*



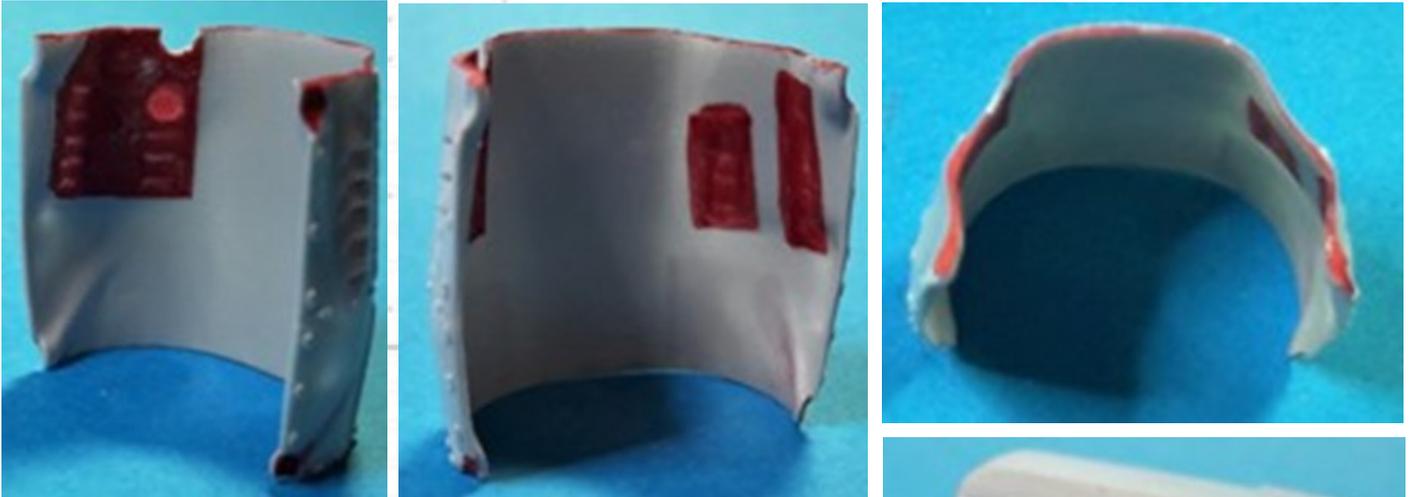
To fit the rear cabane struts, slot the rear strut jig in to position over the fuselage just in front of the rear strut attachment positions as pictured right.

The strut casting blocks are labelled with their intended position. Left and right indicate the pilots left and right.

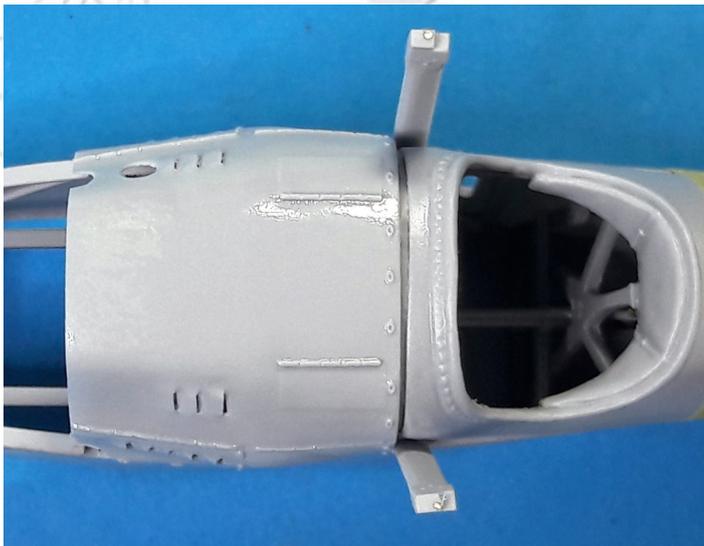


Glue the two rear cabane (inner) struts into position using the jig to set the angle of the struts as pictured above and right. Use a small drop of CA glue to secure in place. Then use a mix of CA glue and talcum powder to fill in the gaps.

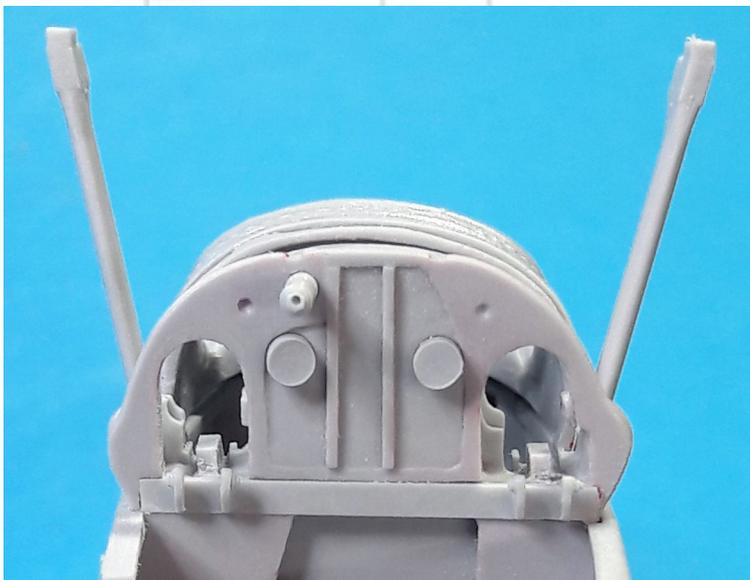
## Step 15 (Cleaning the cowling and general trimming of parts)



Clean up the cowling and thin the areas marked in red in the four pictures above and right. Sand vented areas from the inside of the cowling to open up the vents.

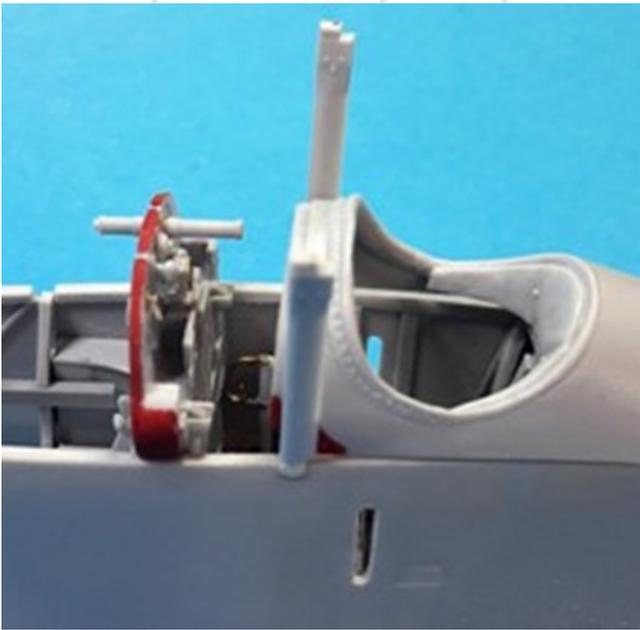


The cowling should fit between the struts when thinned and cleaned up.



The instrument panel should dry fit so that it fits flush with the fuselage as pictured left

## Step 15 (continued)

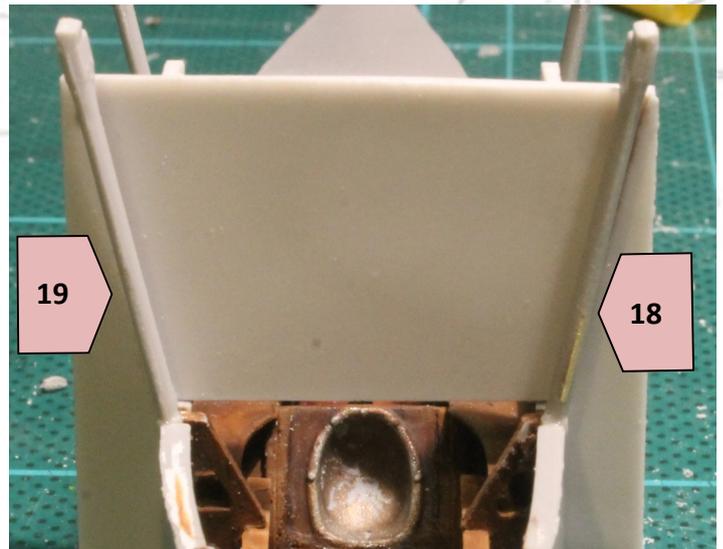


At this stage it is suggested that the turtle deck is dry fitted and trimmed to fit between the struts (filler can be used later to make the seam tidier)

The edges of the instrument panel can also be trimmed at this stage so that it fits inside the cowling. Don't trim the instrument panel if cowling is intended to be left off to show the internal cockpit details.

## Step 16 (Front cabane struts)

Glue in the front cabane struts, parts 18 and 19 using the front strut jig to set up angles correctly as detailed in [step 14](#). The front jig should sit behind the front strut positions



## Step 17 (Gun mount bar)

Anneal PE part 58 and bend it into shape so that it fits PE part 57. Glue or solder the two PE parts 57 and PE part 58. Sand the assembly smooth once the glue or solder has cured.

*Modelers tip: If gluing, initially glue the parts together using PVA and then run thin CA along the bonded edges of each part.*

Alternatively use part i 10.



If not already done, all interior parts should be painted before proceeding !

## Step 18 (Installation of cockpit assemblies)



Glue the fuel mixture selector quadrant (see [step 10](#)) to the inside port side of the fuselage as pictured left.



Glue the radiator shutter quadrant (see [step 11](#)) to the inside starboard side of the fuselage as illustrated right.



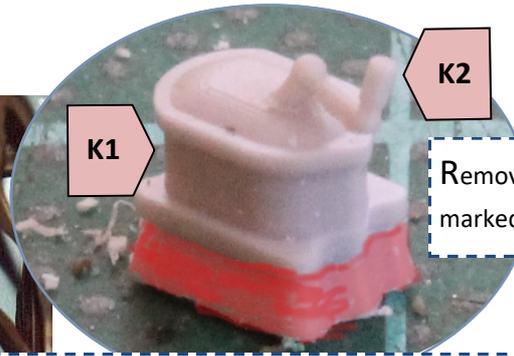
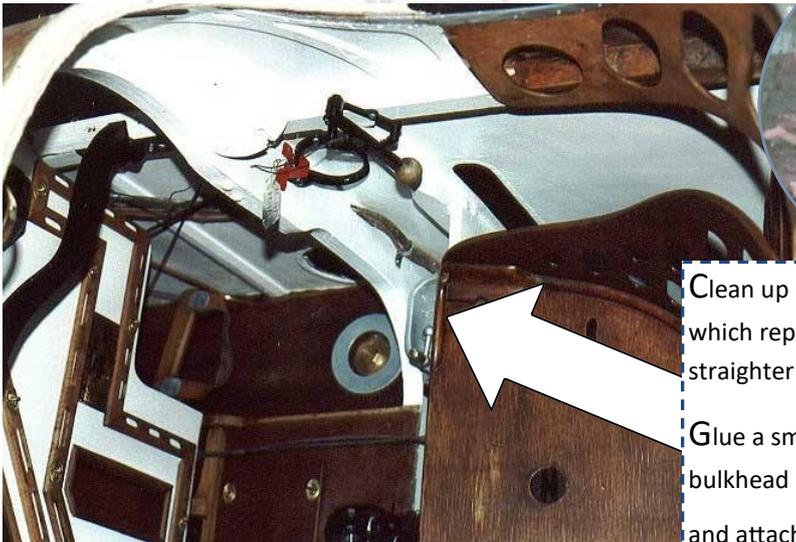
Install the instrument panel by sliding it in to the slots in the fuselage.

*Modellers tip; Before gluing in the instrument panel check that the engine can be installed once the instrument panel is fixed. Information on [installing the engine](#) can be found later in this build log.*

Glue the gun mount bar to the fuselage. The gun mount bar should bridge between the port and starboard fuselage edges and be positioned directly in front of the instrument panel.



## Step 18 (continued)



Clean up and assemble the Magneto; Parts K 1 and K 2 which replace the Taurus parts. Note: Part K2 should sit straighter than photographed above

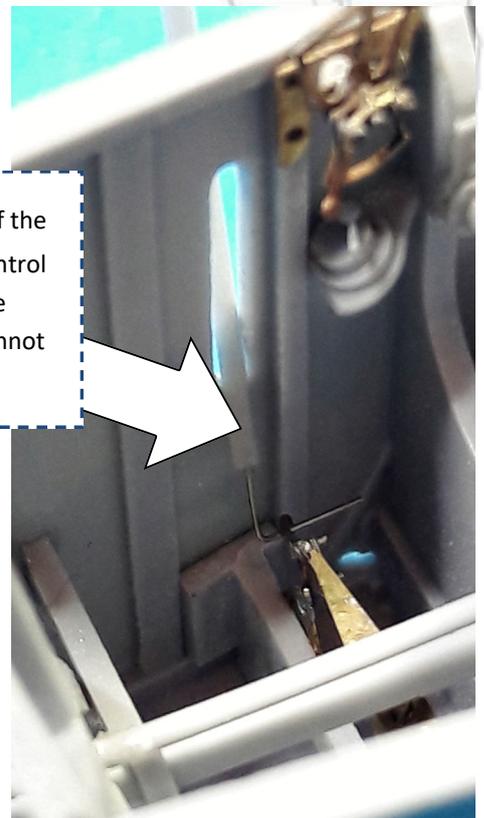
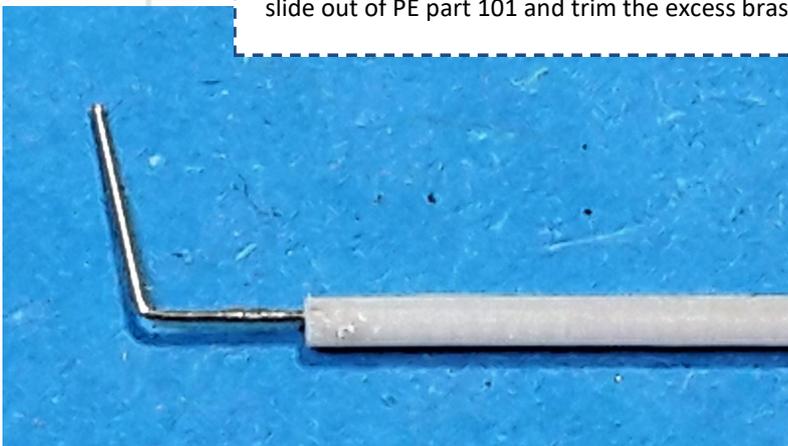
Glue a small "shelf" of scrap plastic card to the moulded bulkhead in front and under the seat position. and attach magneto in position.

## Step 19 (Optional aileron control rod assembly)

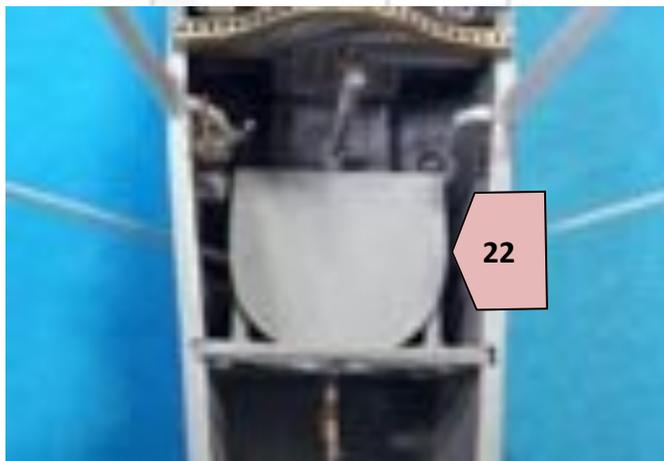
This step provides instructions on fitting the aileron control rods to the aileron control unit (see [step 4](#)). This option allows exact fitting to the aileron control unit. Optionally control bars can be slotted in to the general area (which will not be visible) later in the build.

Drill a 0.3mm hole in to end of each aileron control rod and glue in a piece of 0.3mm brass or steel rod which has been bent to a 90 angle as illustrated below.

Slide each aileron control rod through the slot in each side of the fuselage and slide the brass or steel rod on the end of the control rod through the hole in the unused corner of PE part 101 (see [step 4](#)). Glue or lock off the brass / steel rod end so that it cannot slide out of PE part 101 and trim the excess brass / steel rod.



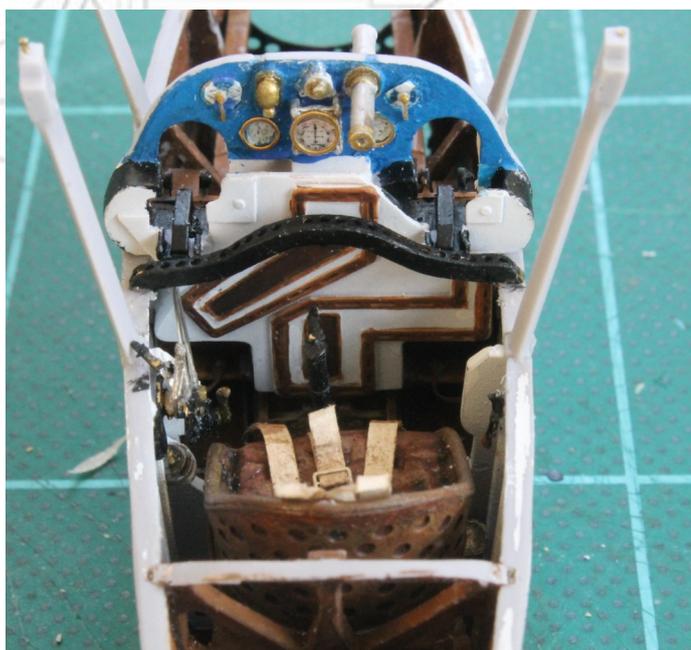
## Step 20 (Seat installation)



Glue the seat base, part 22 in to the rear bulkhead. The seat base needs to be set to a 90° angle against the bulkhead (not the fuselage frames), otherwise the seat will appear to be too far forward once the turtle deck is fitted.

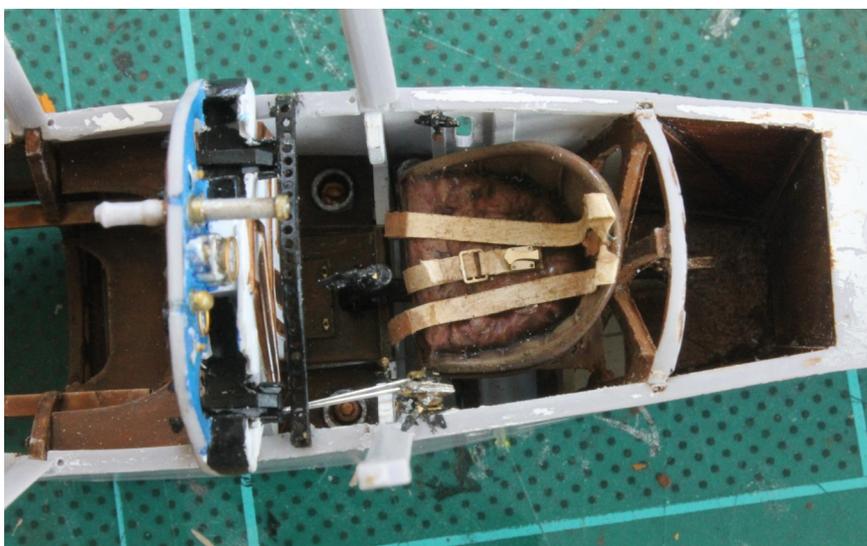
*Modellers Note: If you haven't done so already now is the time to paint the seat and fit the seatbelts. Instructions for fitting the seatbelts are supplied within the seatbelt packaging.*

Glue the painted seat in to position on top of the seat base.



Once completed your cockpit should look something like this.

Note; this particular example is painted as the Italian (blue and white) presentation versions. The regular finish was varnished birch plywood.



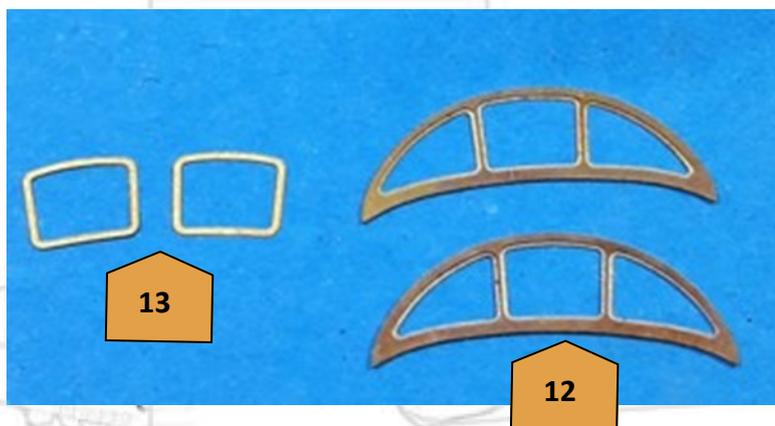
## Section 3

## FUSELAGE EXTERIOR, MACHINE GUN AND ENGINE INSTALLATION

## Step 1. (Windscreen)

This step is fun to do for those who wish to practice soldering techniques. Alternatively the parts can be glued together

*General soldering tips. Make sure your part is as clean and if possible a little sanding will help the join. Use flux to steer the solder where you want it to go. The use of solder paste is also recommended which is basically ground solder mixed with flux. Make sure your part is hot enough to let the solder flow. I have my iron set on 290 degrees and am using low temp solder (tin).*



Remove PE part 12 (2 pieces) and 13 (2 pieces) from the PE fret and anneal part 12 (both pieces). Use a suitably size tubular object to roll around PE part 12 on a soft surface (eg; mouse mat) as pictured right.



Optional (if soldering): Coat the inside of the windscreen of one part with flux, and use a low temperature solder to tin the part.

Use flux again on the part that is not tinned yet and sandwich the two parts together making sure the parts are clamped together well when you heat up the part using a soldering iron.

Alternatively glue the two rolled PE parts 12 together. Sandwich the supplied acetate between the two PE parts 12 if desired.



## Step 1. (continued)



Repeat the process with part 13 which is fitted to and central framing of both sides of the windscreen assembly.



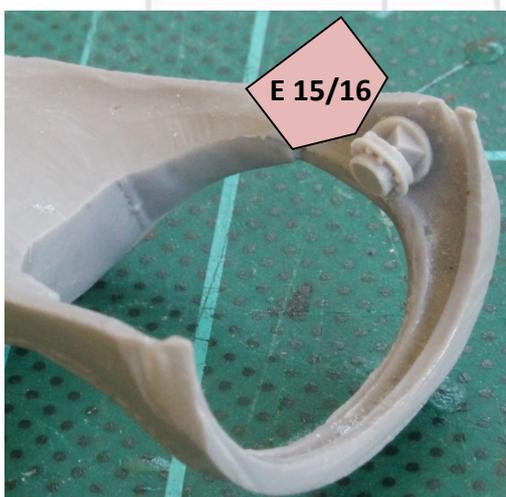
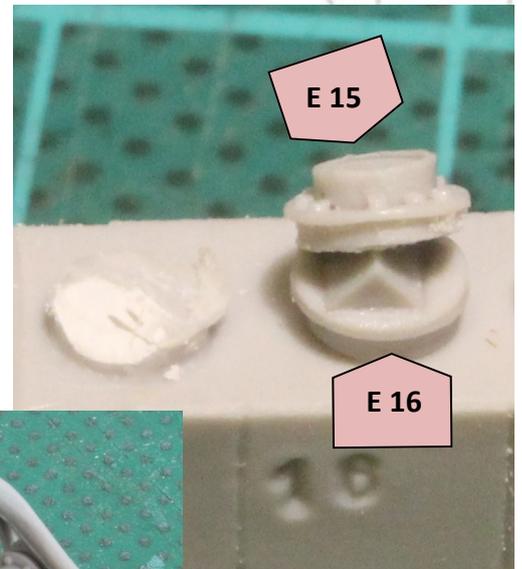
Check the fit of the windscreen to the fuselage but do not glue yet. For the glass use Crystal Clear (or similar) or sandwich acetate between PE parts 12 during the [first part of this step](#) (only applicable if cementing).

## Step 2. (Turtle deck detailing)

Remove part E 15 from its casting block and glue to the narrower sloping edge of part E16 while still on its casting block as pictured right.

Remove the assembly of E15 /16 from the casting block and glue in to the turtle deck so that it sits in the front corner of the starboard side of the turtle deck with the dial thermometer facing the pilot.

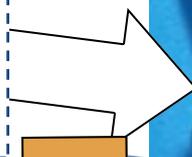
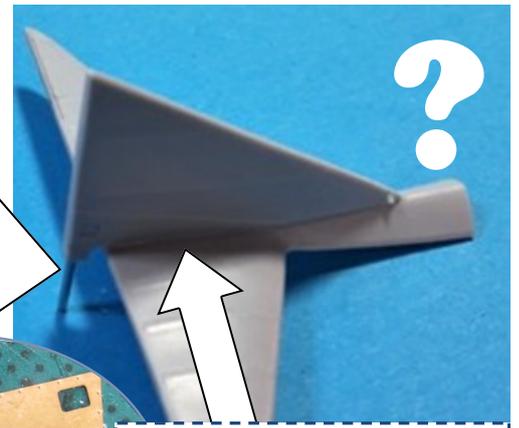
Paint, add the dial decal and seal with thinned down PVA or 'Future'.



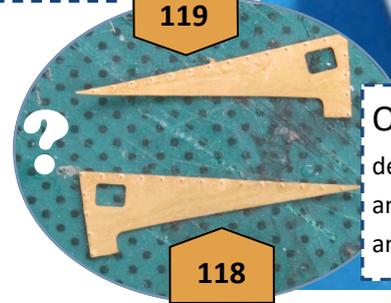
## Step 3. (Tail)

Clean up the tail part.

Optional: If on dry fitting the tail and turtle deck to the fuselage you have a slight over hang of the tail at the rear of the fuselage, drill a 1mm hole at the end of the part and glue in a brass/stainless steel rod as shown in this picture.



119



Optionally the metal plate fitting detail on the fin can be removed and replaced with PE parts 118 and 119.

Trim the sides of the locating plug so that there is more room for corrections.



## Step 4. (Turtle deck and tail assembly)

Glue the turtle deck in to position , so that the front edge of the part aligns with the front edges of the rear cabane struts.

Clamp and glue the tail section into position.



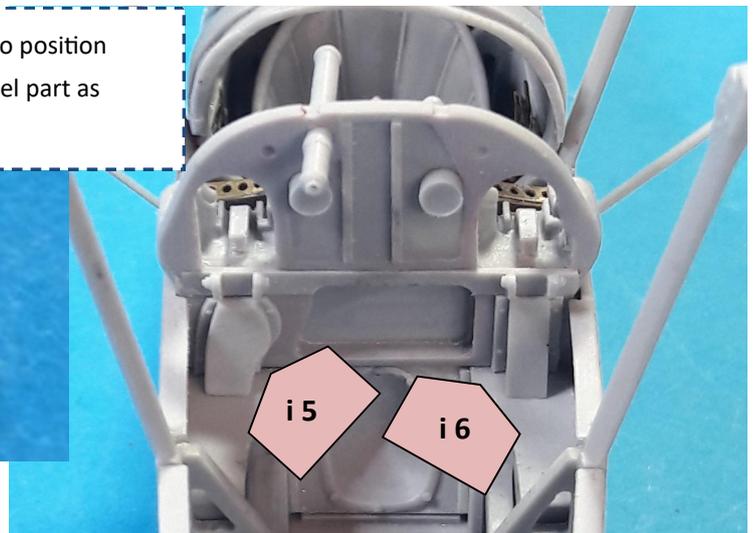
## Step 5. (Empty shell drop box)

Clean up parts i5 and i6 and glue them in to position against the rear side of the instrument panel part as pictured right



i5

i6

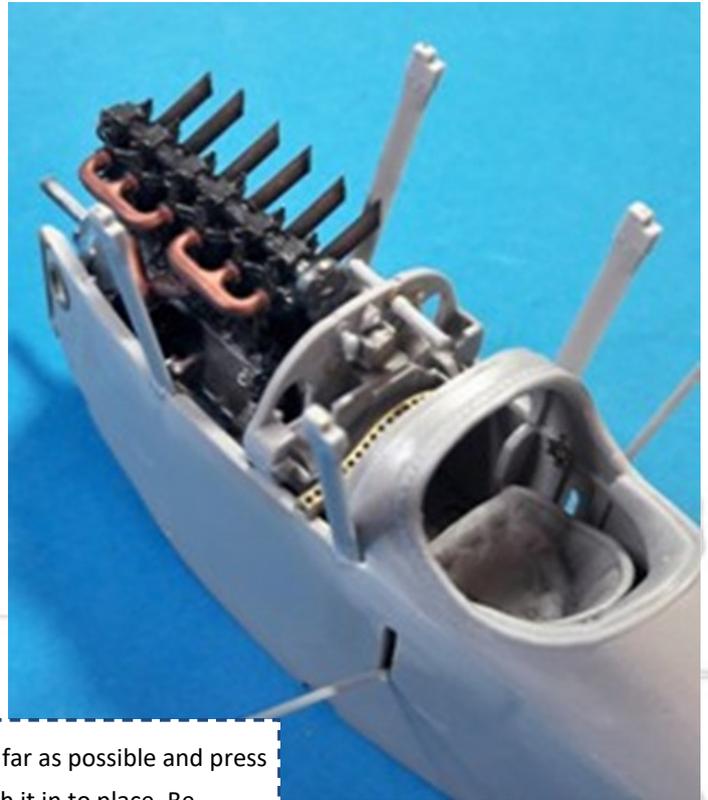
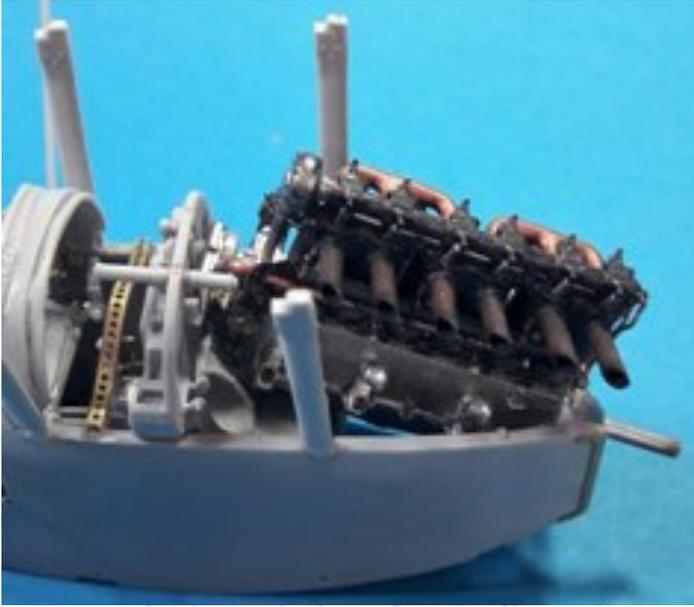


i5

i6

## Step 6. (Engine installation)

To fit completed engine ([see section 1](#)) into the front of the fuselage begin by positioning the engine as pictured below so that the front of the engine sits on the engine bearers.



Now slide the engine to the front as far as possible and press on the back side of the engine to push it in to place. Be gentle and look carefully where parts are touching. When in position glue in place from the underside of the fuselage.

## Step 7. (Machine gun installation)

Clean up the Vickers (Italian/British) machine guns.

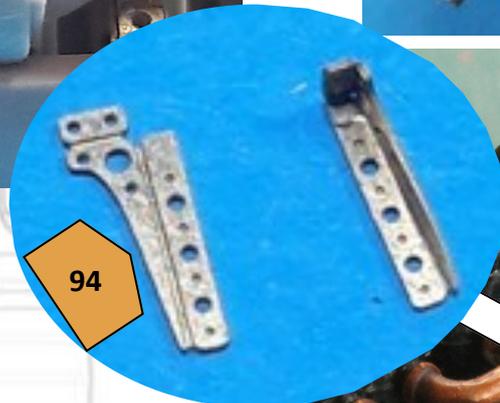
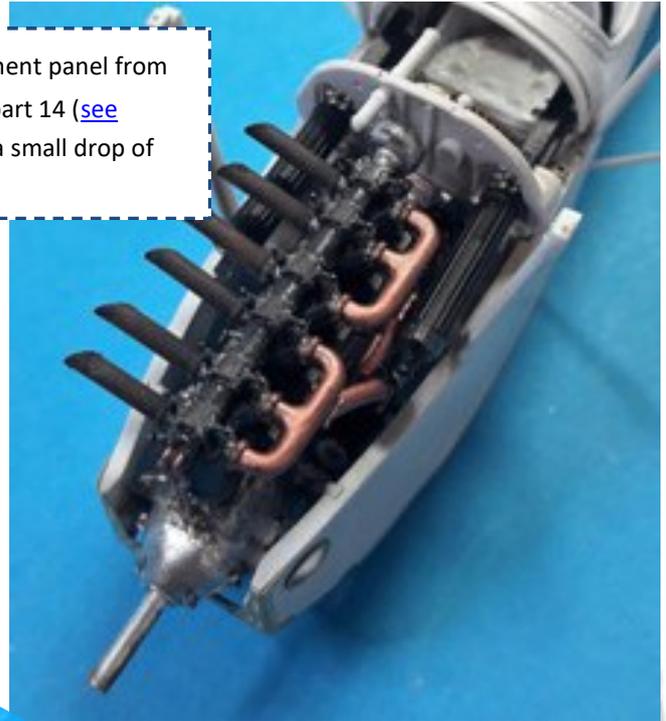
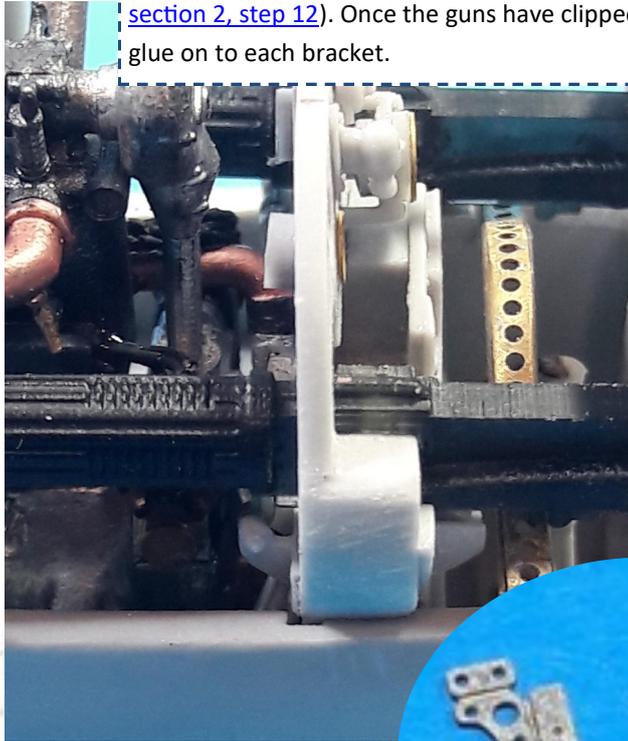
If desired, shape the optional PE flash muzzles (PE part 91) and glue to the front edge of the gun jacket.

**Note: if installing the front cowlings do not fit the PE flash muzzles (PE part 91)**

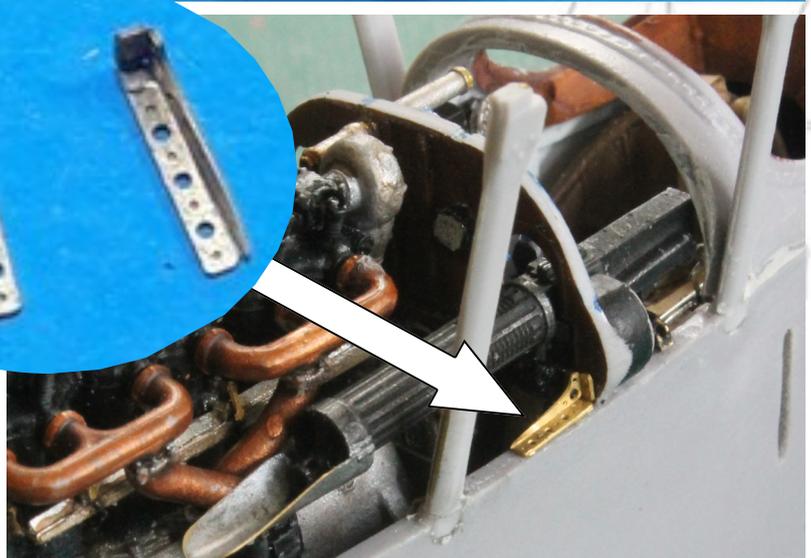


## Step 7. (continued)

Install the machine guns through the slots in the instrument panel from the engine side, clipping the guns in to the brackets on part 14 (see [section 2, step 12](#)). Once the guns have clipped in, spot a small drop of glue on to each bracket.



Fold PE part 94 and glue in place to the edge seam of the fuselage so that the part butts up against the rear side of the instrument panel part.



## Step 8. (Optional cowling trims )

The cowling can be fitted as one piece or divided in to three separate parts.

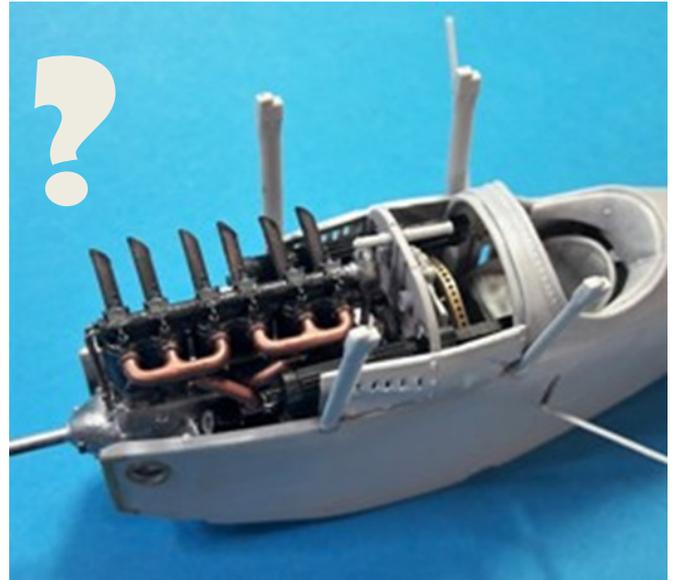
If opting to divide into three parts carefully cut the cowling along the hinge on both sides so that you have three separate parts. Test fit and sand edges to improve fit if necessary.



## Step 8. (Continued - Optional)

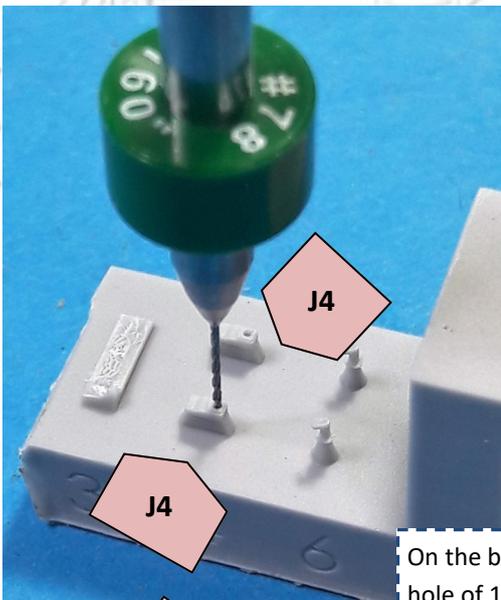
Fit the sides of the cut of cowlings in place on to the fuselage.

**Note:** if fitting the cowling in one piece do not fit at this stage of the build.

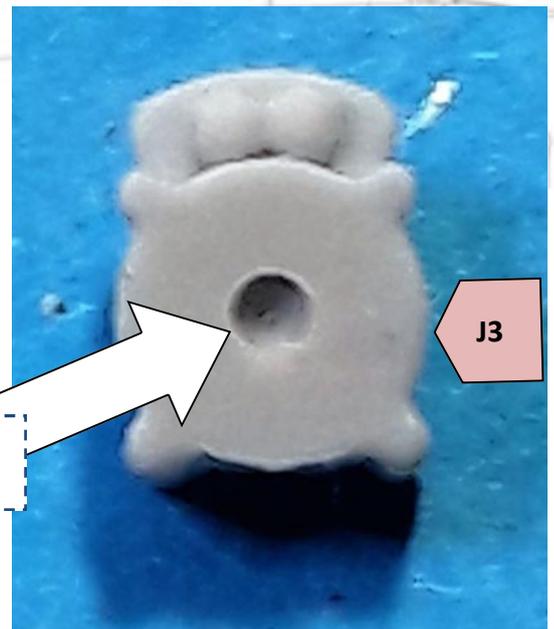


## Step 9. (Optional Synchronization System)

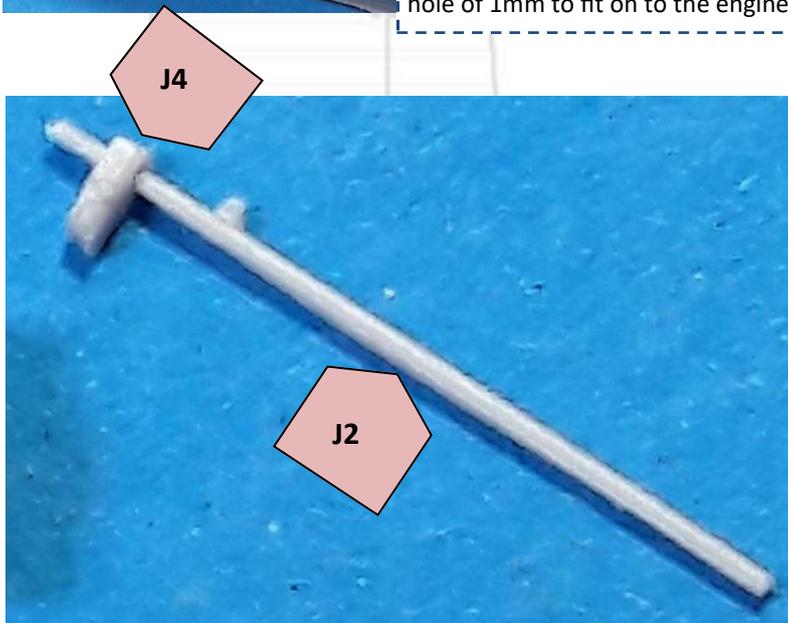
**Note:** The synchronisation unit will not be seen unless the rear cowling is to be left open. This step can therefore be treated as optional.



Using a 0.4mm drill bit, drill holes in parts J4 as pictured left.

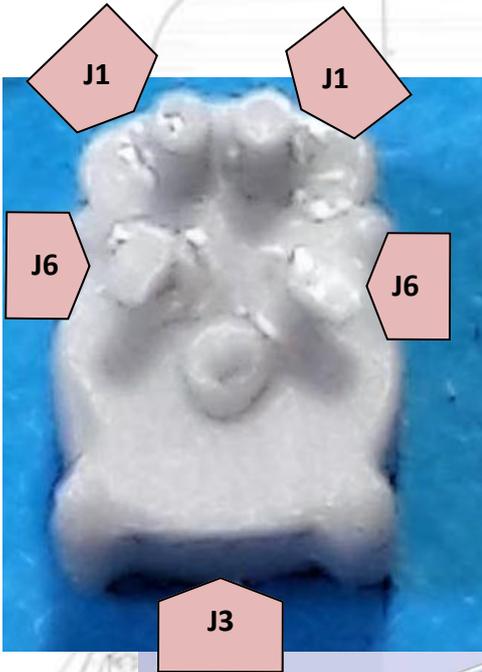


On the back of part J3 also drill a shallow hole of 1mm to fit on to the engine



Carefully clean up the two rods, parts J2 and slide part J4 on the end of each rod as pictured left.

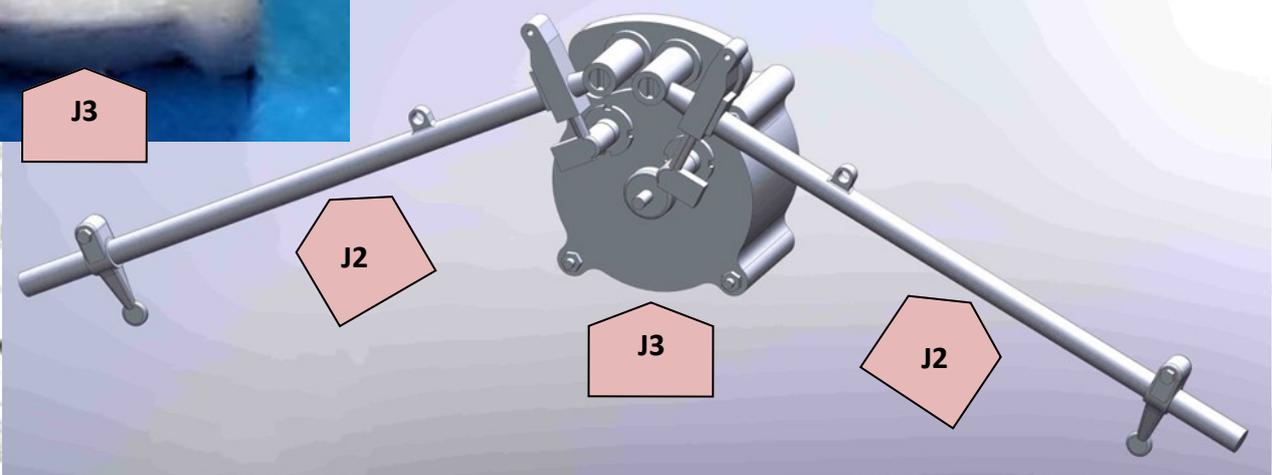
## Step 9. (continued)



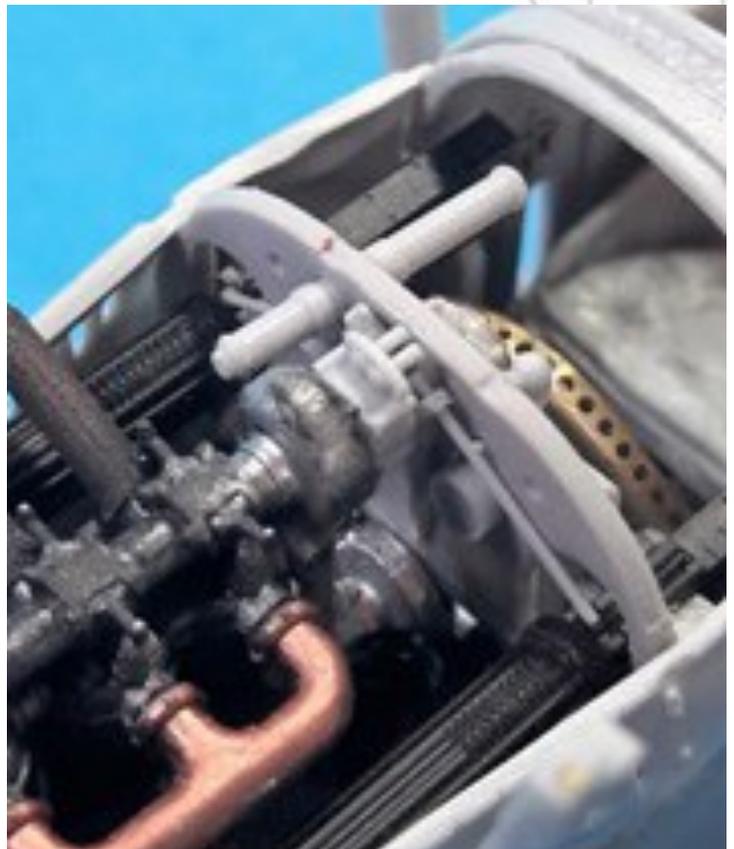
Drill out the four holes on the front plate of part J3 with a 0.9mm drill bit.

Glue parts J1 and J6 in to these holes as pictured left.

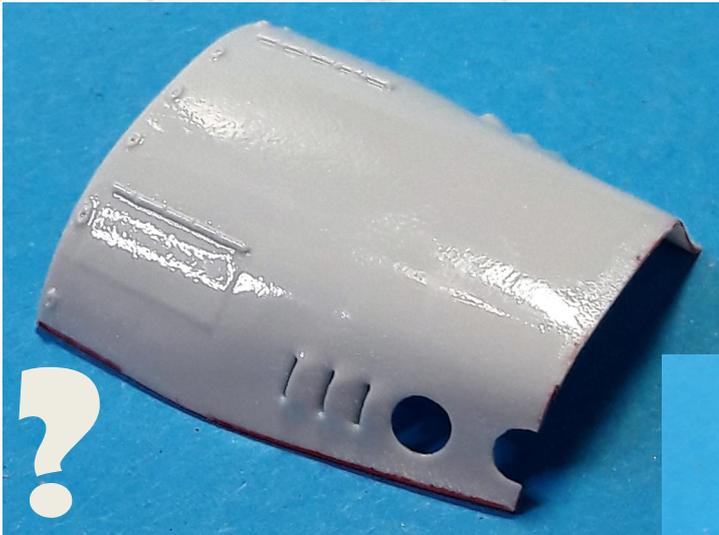
Assemble the synchronisation system as illustrated below.



Fit the synchronisation between the instrument panel and engine as illustrated on the right. The rods should rest on the Vickers guns.



## Step 10 (Rear Cowling)



If the rear cowling has previously been divided into 3 pieces (see [step 8](#)); Carefully trim the rear cowling to fit, working on one side at a time. Ensure that the rear exhaust holes line up with the pipes of the engine. These may require slight enlargement to fit correctly.

If fitting the rear cowling as one piece test fit and trim as above.



Once happy with the fit, glue the rear cowling in to position

## Step 11 (Radiator shutters)

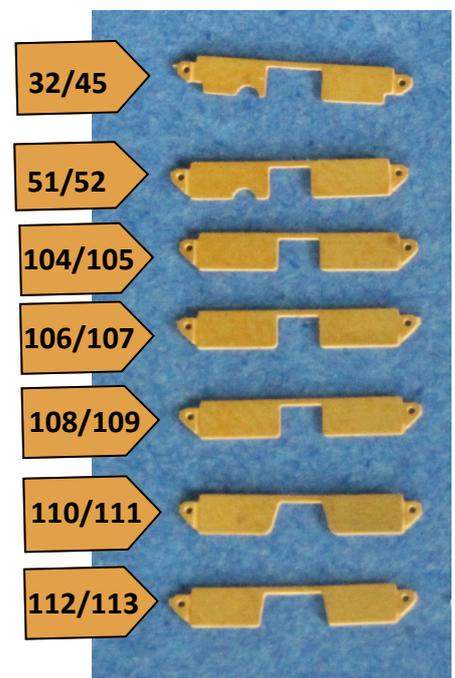
**Note:** If the cowlings are intended to be completely closed up, the radiator shutters will not be seen and as such are optional.



Remove PE parts 46 from the small replacement PE fret\* and fold to a 90 degree angle.

Using the "Radiator drill template" create a jig from wood, plastic or aluminum drilling four holes into the jig as marked on the template (See [appendix](#) section of this build log for jig).

Push 0.3mm brass rod into the holes and glue or solder PE parts 46 onto the brass pins as pictured left



Remove each of the shutters from the small replacement PE fret and keep them organized in the same order as positioned on the fret.

\* Note: (Later productions of the PE fret will not need a correction fret)

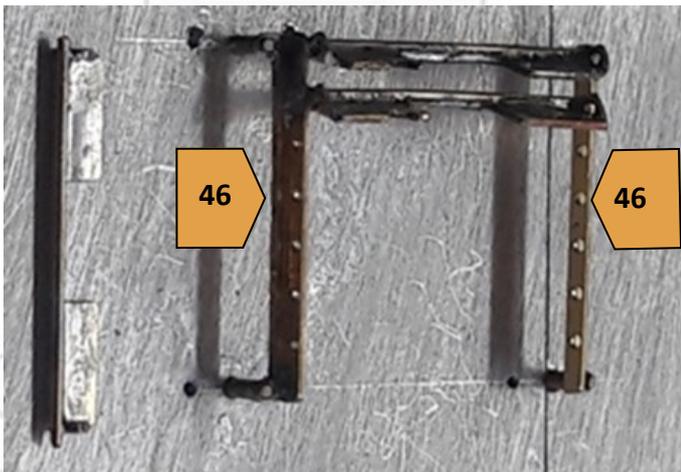
## Step 11 (Continued)

Fold the side edges of each shutter to a 90 degree angle inwards.

As an option you can glue or solder a 0.3 brass rod along the top edge of each shutter. The brass rod should be 9.6mm long and be positioned so that it protrudes from each end of the shutter.

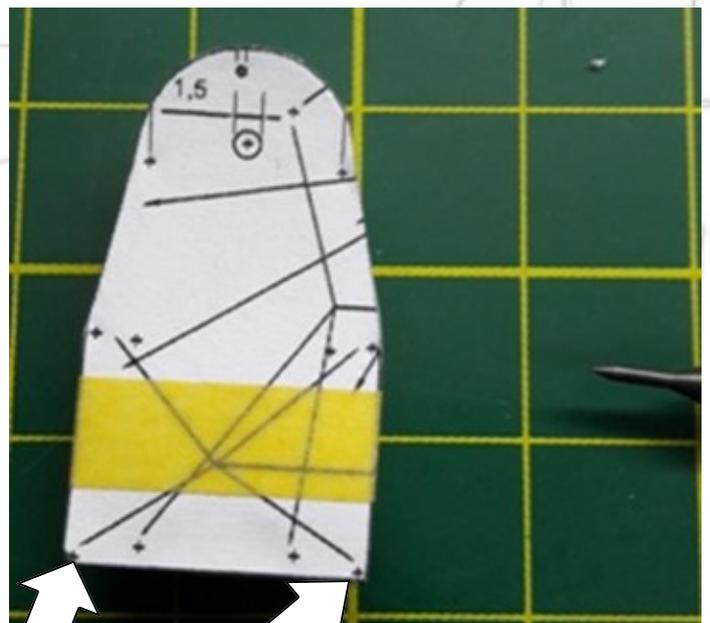


Position all seven shutters between the two PE parts 46 and glue or solder them in place ensuring that they are all set to the same angle as pictured left. Reference pictures in the booklet and on the [Aviaticc website](http://www.aviaticc.com) clarify the assembly appearance



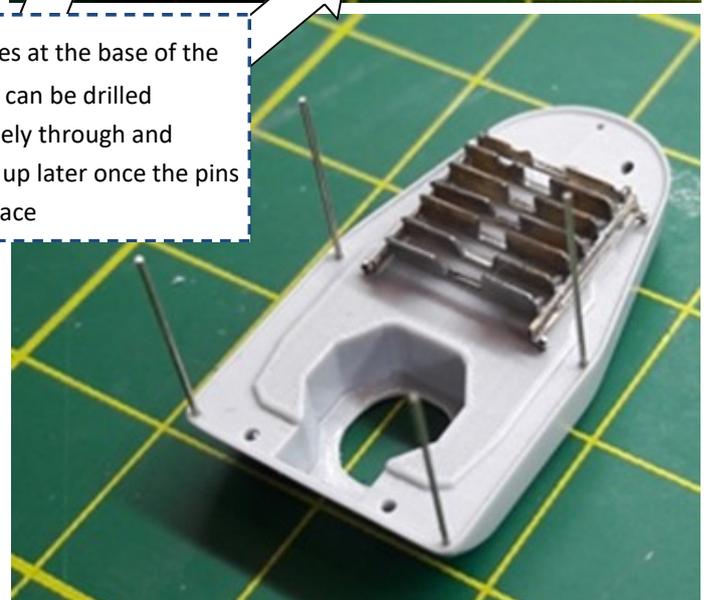
Clean up the radiator part and use the drill jig (see the appendix of this build log) to drill all of the holes into the radiator using the drill size suggested on the jig.

Glue the shutter assembly on to the radiator as illustrated below

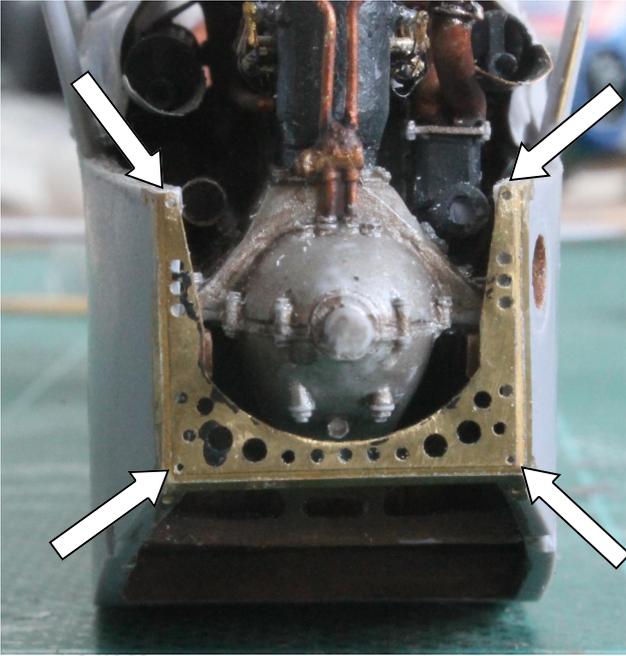


The holes at the base of the radiator can be drilled completely through and cleaned up later once the pins are in place

Glue 0.3mm pins into the 4 corners of the radiator as pictured right. Leave them longer than required to make handling easier during painting. Again referring to reference pictures extra detail can be added using scrap material.

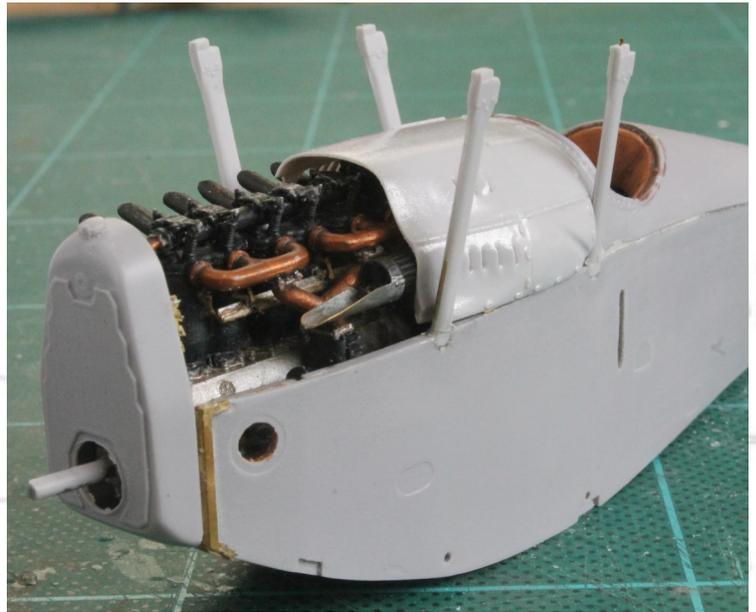


## Step 12 (Radiator and Front Cowlings)



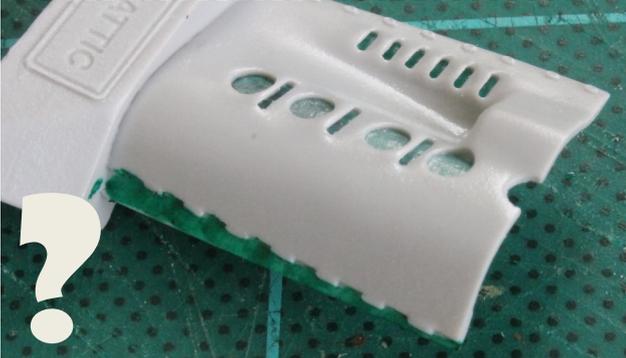
Drill out the holes in the four corners of the forward PE bulkhead (PE part 30) with a 0.35mm drill bit as indicated in the picture on the left. The holes should be deep enough to accept the four pins fitted to the radiator at the end of the previous step.

Glue the radiator assembly into position by sliding the four 0.3mm pins fitted to the radiator at the end of step 11 into the holes illustrated in the picture above.



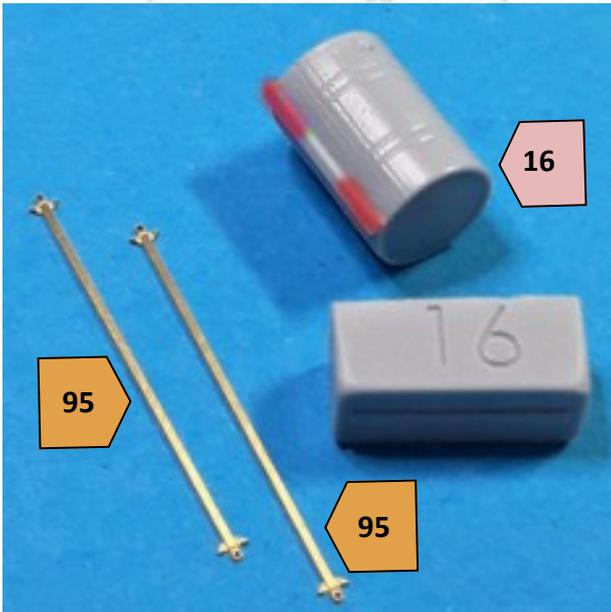
Begin trimming the front cowlings (if required in your build). Dry fit but do not glue in position yet!

Trim and sand away the areas marked in green on both front panels to open up the exhaust holes, vents, and gun openings. Carefully trim around the hinges (below)



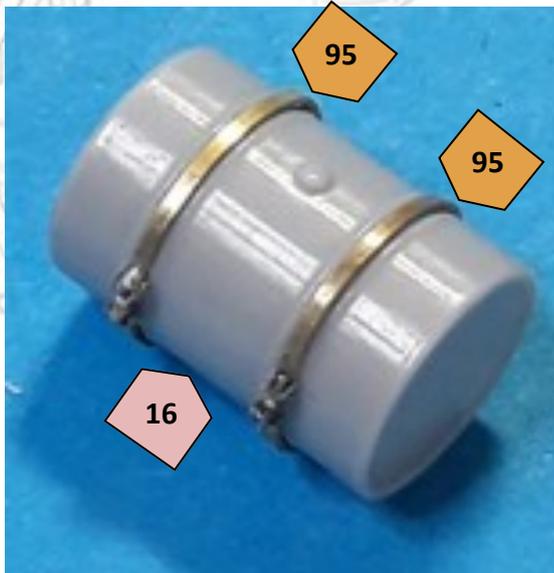
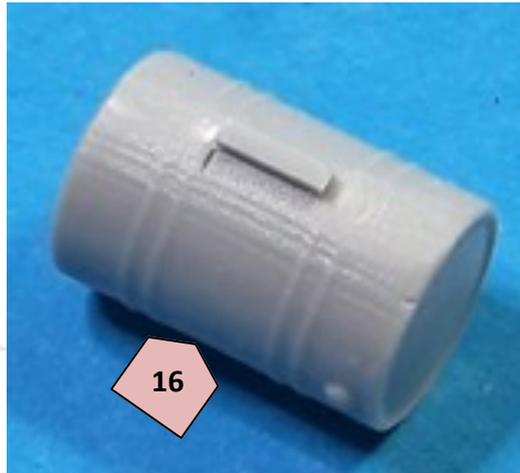
## Step 13 (Oil Tank)

Note: If building straight from 'the box' the oil tank will not be seen. If cutting the fuselage base and installing the fuel tank in a more realistic fashion, the oil tank will be visible.



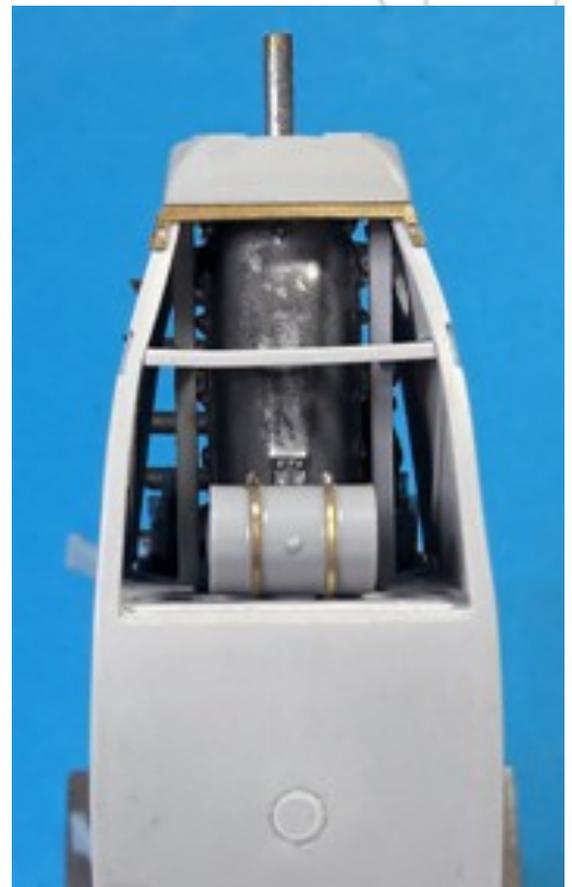
Clean up the oil tank (part 16) and remove PE parts 95 from the PE fret.

Trim and shape the strip of resin on the oil tank (part 16) to fit slot in bulkhead as illustrated below



Anneal the brass straps (PE 95) and roll to shape so that they fit around the tank. Secure with two brass pins.

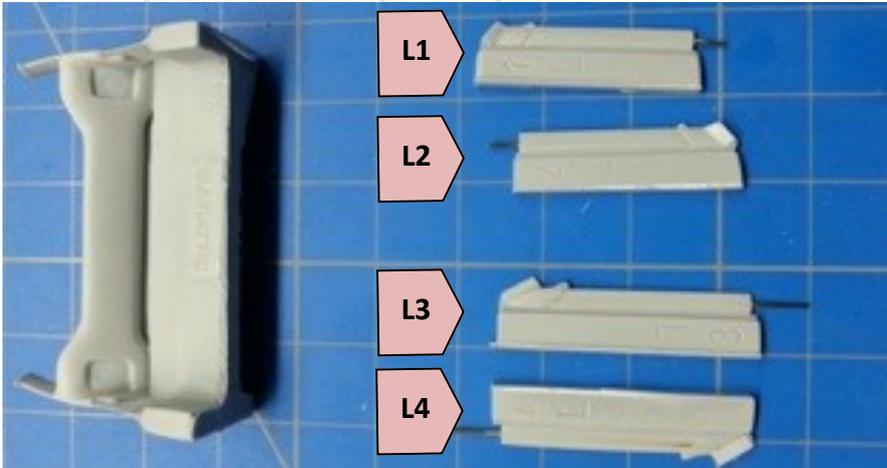
Glue the assembled oil tank in place so that the slot on the oil tank fits into the slot on the bulkhead.



## Section 4

### LANDING GEAR

#### Step 1 (Basic strut assembly)



Clean up the axle aerofoil and landing gear struts (Parts L1, L2, L3 and L4), making sure that you keep the casting blocks with the struts, or mark them for reference, so that they don't get mixed up.



Drill 0.55mm drills in the positions indicated right on both sides of the axle aerofoil to accept the landing gear struts.

*Modellers tip: Use a scribe to remove the struts from their casting block.*



Optional (if not using PE eyelets (see next page): Drill 0.3mm holes in the positions shown above on both sides of the axle aerofoil to accept retaining wire later on.

## Step 1 (continued)

Optionally, PE eyelets can be fitted using the process below:



Fold each PE part 44 (four in total) as illustrated above and right.



Then glue or solder the eyelet section of the part. Bend it to shape using a strip of styrene, wood or brass of approximately 0.6 thick and press the part so it looks like the bottom example in the picture on the left.



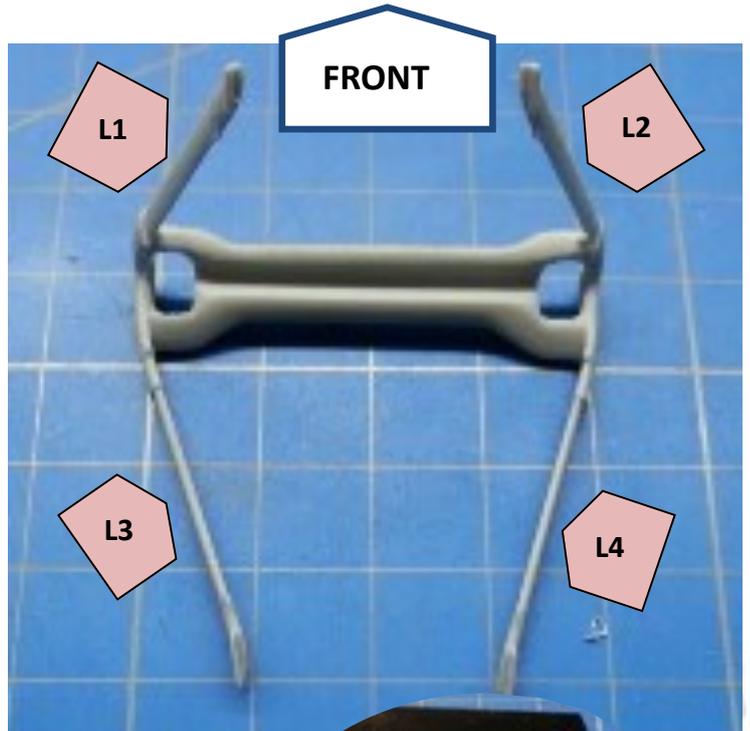
Remove the resin moulded eyelet detail and glue the assembled PE eyelets to each side of the axle aerofoil as pictured above. Check reference photos.

Glue part L4 in the rear right position on the axle aerofoil as pictured left using epoxy or CA. Ensure that the strut is positioned so that it follows the line of the attachment point on the axle aerofoil.

## Step 1 (continued)

Glue the remaining three struts to the axle aerofoil as illustrated right

## Step 2 (Axle)

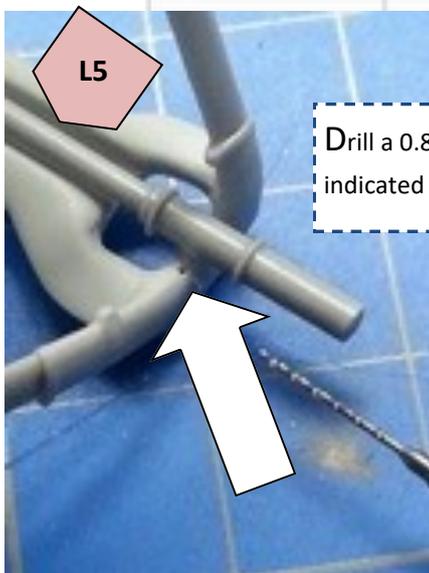


Remove the axle (part L5) from its casting block and clean the part up. Ensure that you remove any excess steel rod protruding from each end of the axle.

*Note; if intending to use the [spoked wheel](#) option, strip the resin away to expose the steel rod on each end of the axle.*



Excess steel rod from the axle ends can be removed using a hardened saw (as above) or alternatively the ends can be filed down until they are flush with the resin shell.



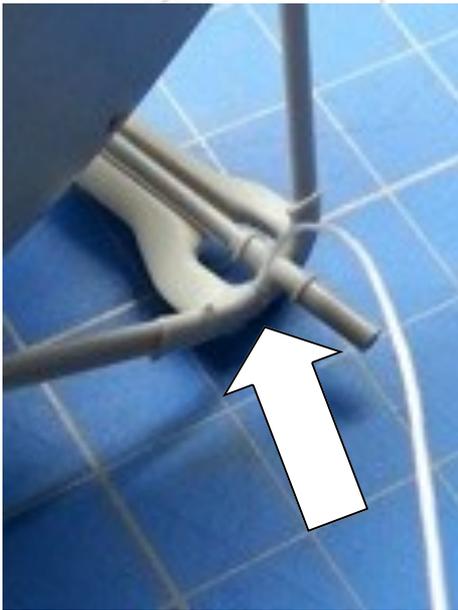
Glue the axle (part L5) to the axle aerofoil as illustrated left.

Drill a 0.8mm diameter hole in the position indicated left on both sides of the axle aerofoil.



Dip a length of thread into thinned PVA glue and allow to dry for 10 minutes.

## Step 2 (continued)



Glue the end of the thread into the 0.8mm hole and begin winding the thread around the axle and axle aerofoil as pictured below to make the bungee cord.



The completed bungee cord should end up looking like the picture on the left. Once you are happy with the appearance of your bungee cord, glue the end down in an unobtrusive position and trim away any unused thread.

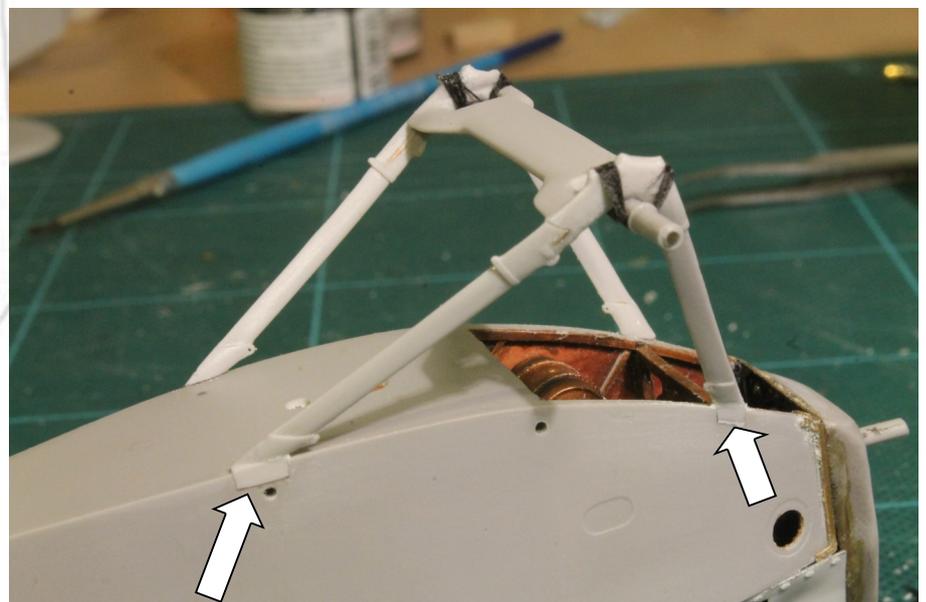
Repeat the process on the opposite side of the axle.

## Step 3 (Fitting to the fuselage)

Glue the landing gear assembly to the fuselage via the four inserts (two of which are indicated on the photo on the right) on the underside edge of the fuselage.

Once the landing gear is in place, fill in any gaps and sand flush with the fuselage.

*Modellers tip: Cement one strut position at a time, ensuring that the shape of the lug on the end of each strut matches the shape and position of the insert on the fuselage.*

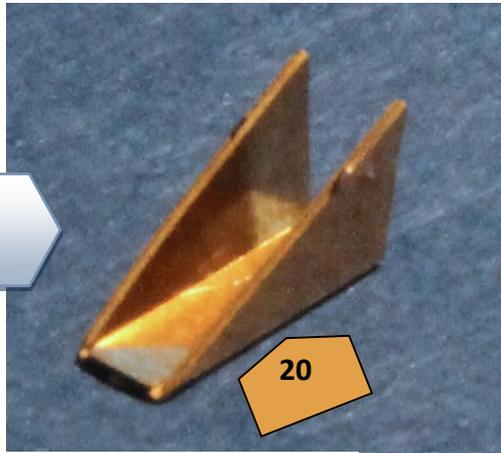
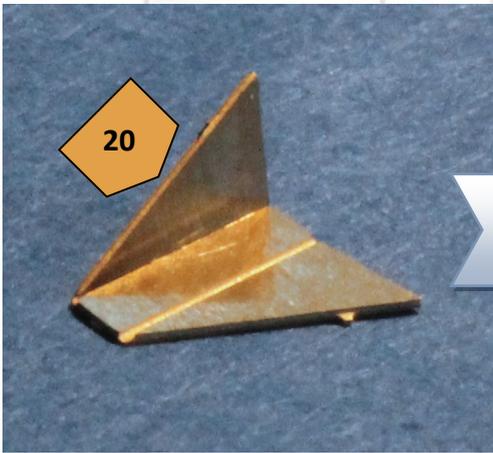


## Section 5

### FUSELAGE DETAIL

#### Step 1 (Rear fuselage detail)

**Note: If using kit woodgrain decals apply now to a gloss white surface and add PE once sealed and varnished. We suggest using 'Gorilla Glue' to cement the PE to the varnished and sealed woodgrains.**

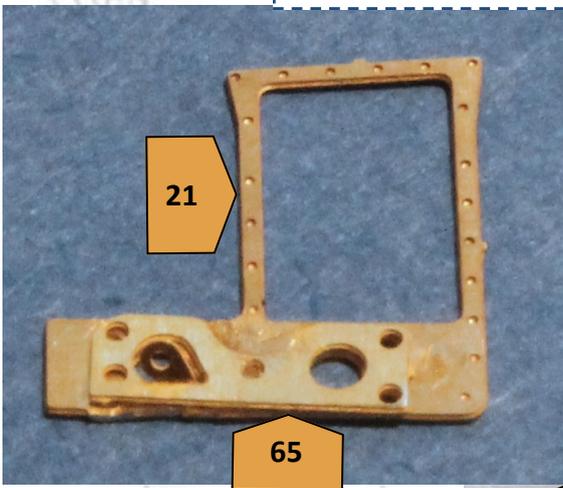
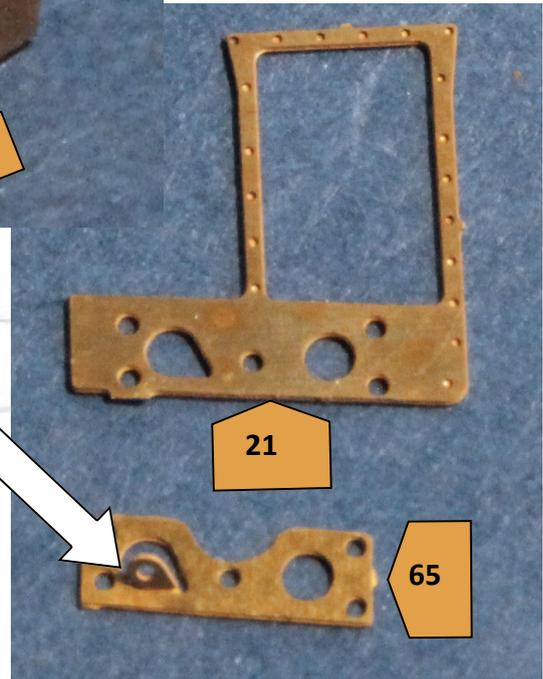


Bend PE part 20 to shape as shown left. The scored lines should be on the inside.

Remove PE parts 21 (2 pieces) from the main PE fret.

Remove PE parts 65 (2 pieces) from the small correction PE fret\* (if included).

Fold out the strut bracket on PE part 65 (2 pieces) as illustrated right.



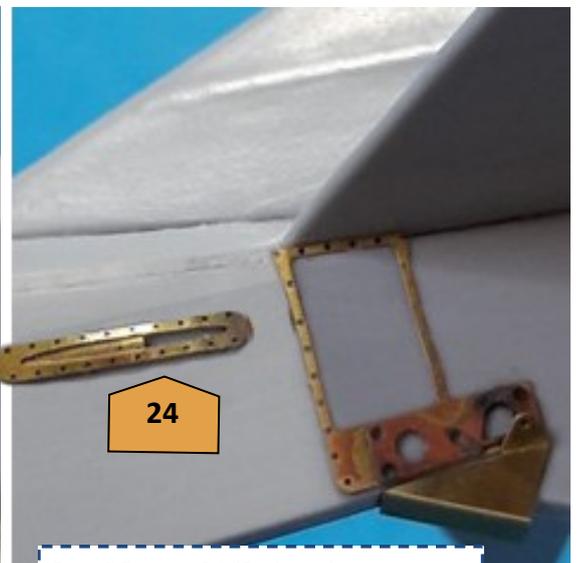
Glue or solder PE part 65 to PE part 21 as pictured right. Repeat for the second pair of PE parts (21 and 65) so that you end up with two PE assemblies that are mirror opposites to each other.

Glue PE part 20 into position on to the tail skid fin on the underside of the fuselage (right)

Then glue the PE parts 21 / 65 assembly on to each side of the fuselage as illustrated right.

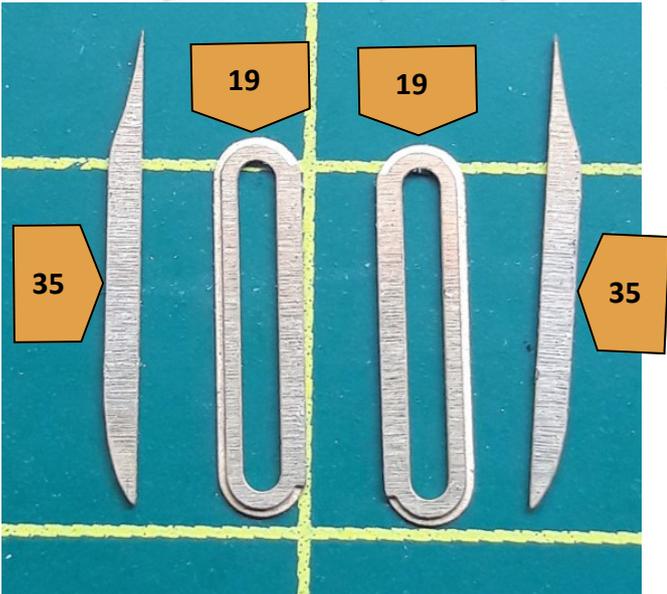
See reference pictures the booklet for positioning.

**\* Note: (Later productions of the PE fret will not need a correction fret)**



Glue PE parts 24 (2 pieces) to each side of the fuselage as pictured above.

## Step 2 (Actuator slot detail)

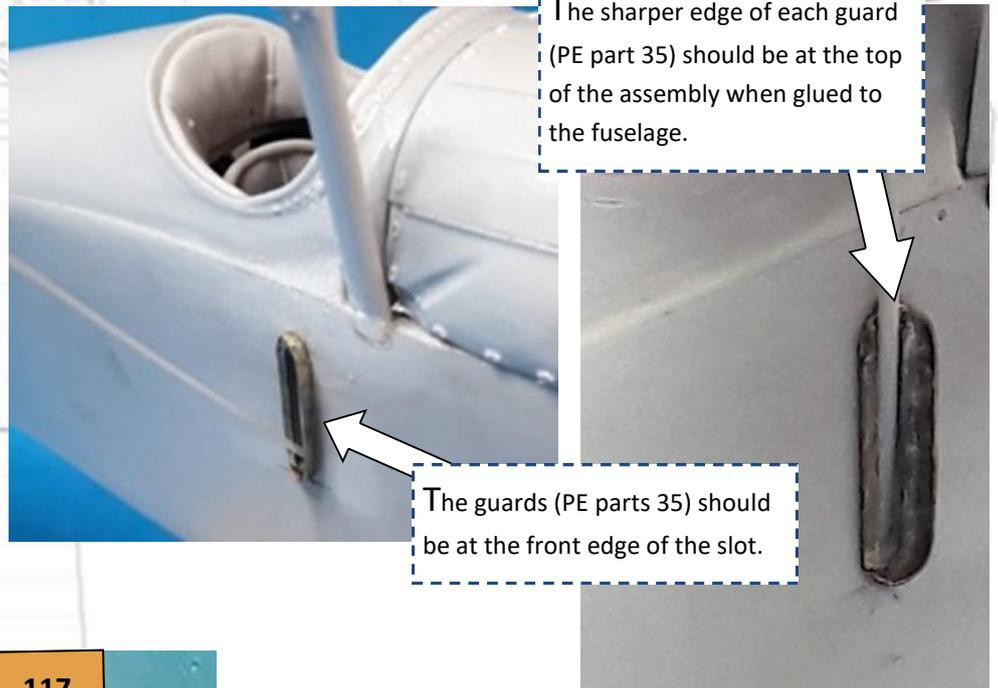


Remove the actuator slot surround (PE parts 19) and windshield (PE parts 35), two pieces each from the PE fret.

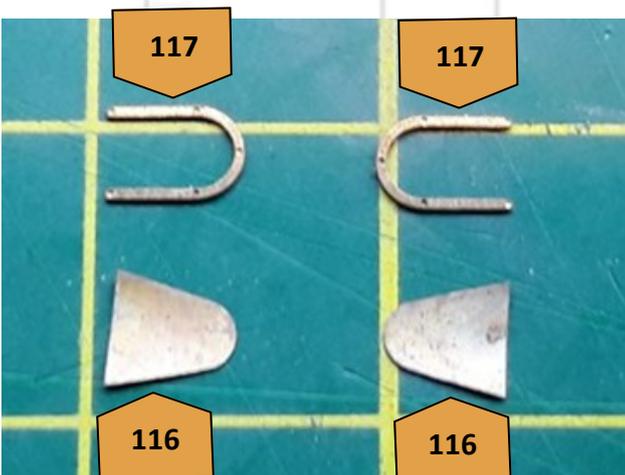


Anneal PE parts 35 and bend both ends of these parts to fit the edge of PE part 19. Once happy with the shape of PE part 35 glue or solder to the grooved edge of PE part 19 so that the two assemblies are mirror opposites to each other as illustrated in the picture on the right.

Glue the actuator slot detail assemblies to the fuselage so that they fit around the actuator slot cut outs. The guards (PE parts 35) should both at the front edge of the slot. The sharper edge of each guard (PE part 35) should be at the top of the assembly when glued to the fuselage.



## Step 3 (Air vents)



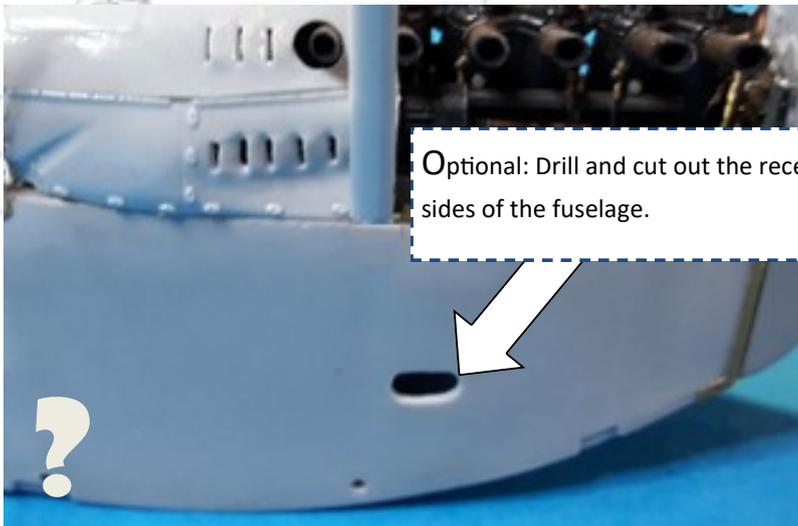
Remove PE parts 116 and 117 (two parts each) from PE fret and clean up..

## Step 3 (continued)



Anneal PE parts 116 (2 pieces) and roll into shape using a suitably sized drill or rod as illustrated left.

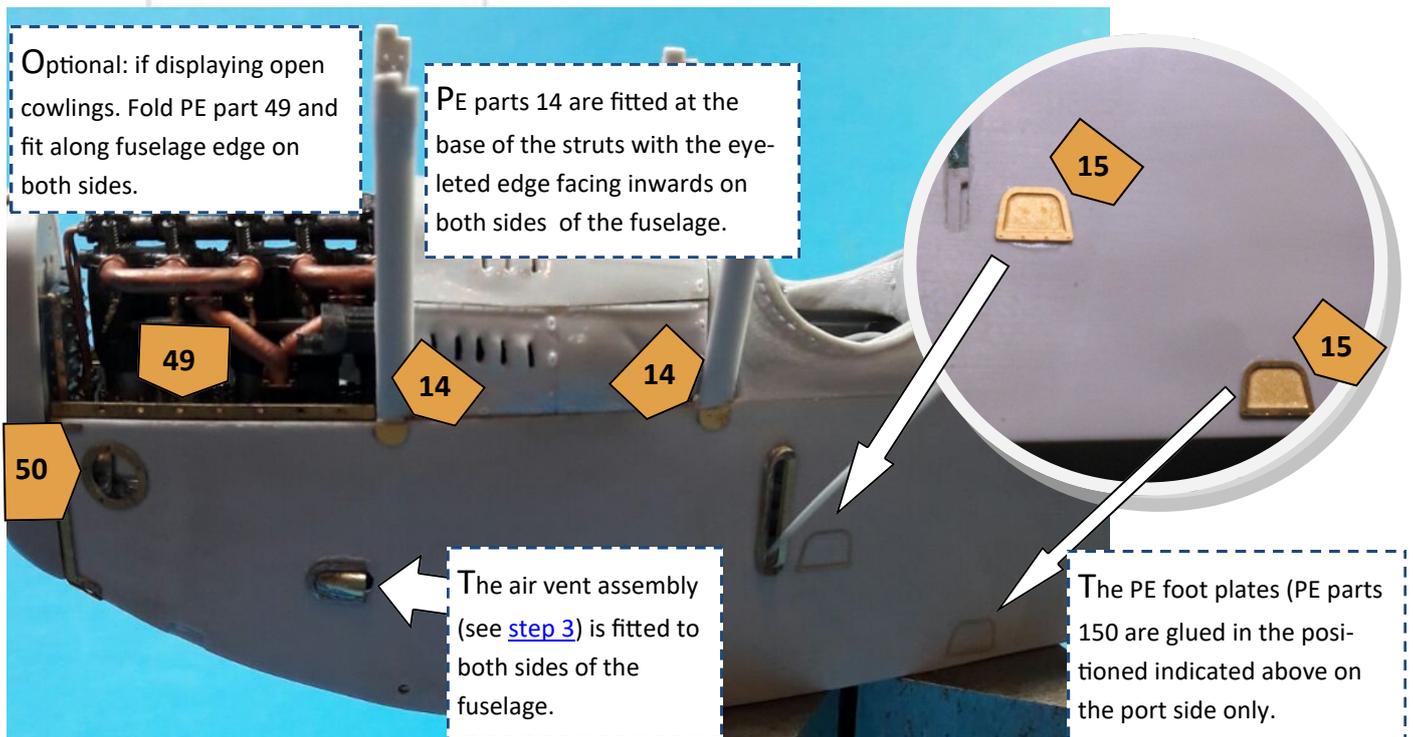
Glue or solder PE parts 116 to PE parts 117 as pictured below.



Optional: Drill and cut out the recessed vents on both sides of the fuselage.

## Step 4 (Forward fuselage detail)

Glue PE parts and assemblies as detailed in the picture below.



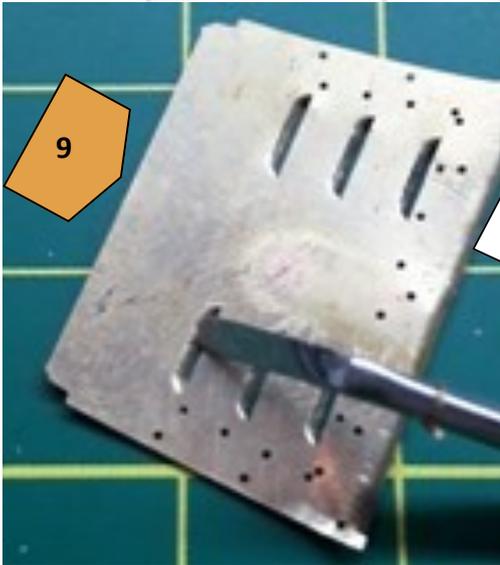
Optional: if displaying open cowlings. Fold PE part 49 and fit along fuselage edge on both sides.

PE parts 14 are fitted at the base of the struts with the eye-letted edge facing inwards on both sides of the fuselage.

The air vent assembly (see [step 3](#)) is fitted to both sides of the fuselage.

The PE foot plates (PE parts 150) are glued in the position indicated above on the port side only.

## Step 5 (Underside engine covers)

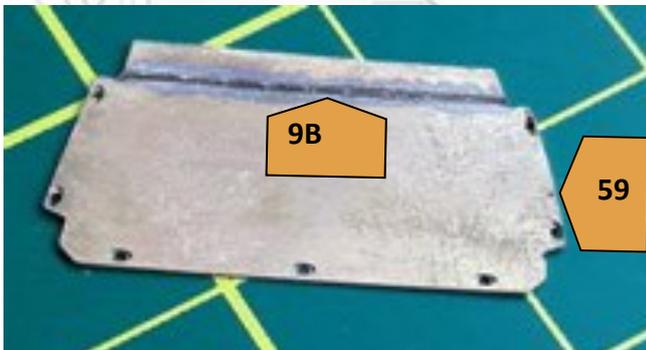


Anneal PE part 9. Using a small flat headed screwdriver or similar tool, carefully press each of the louvres out from the inside on a soft cutting mat.

Fold the rear edge of PE part 9 inwards along the scored line.

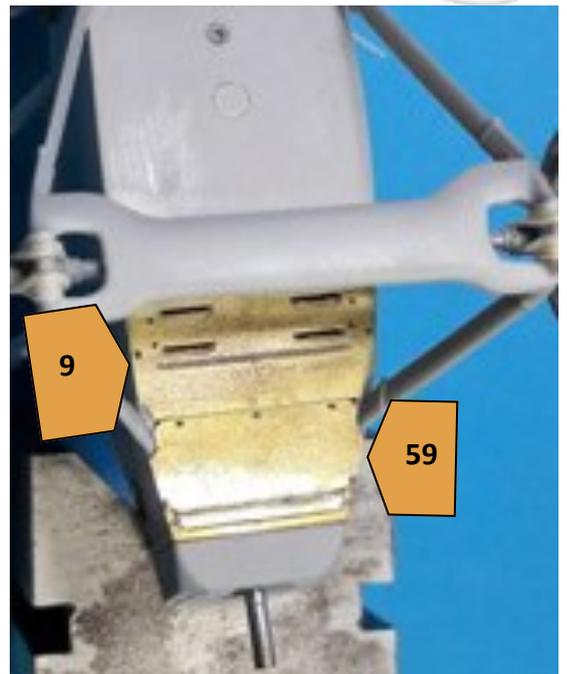


Glue or solder PE part 9B to PE part 9 as illustrated right.



Clean up PE part 59 and glue PE part 9B to the etched line as shown left

Glue PE parts 59 and 9 to the underside of the fuselage so that PE part 59 sits between the front (PE) bulkhead and the forward landing gear struts, while PE part 9 butts up against PE part 59 as pictured right.

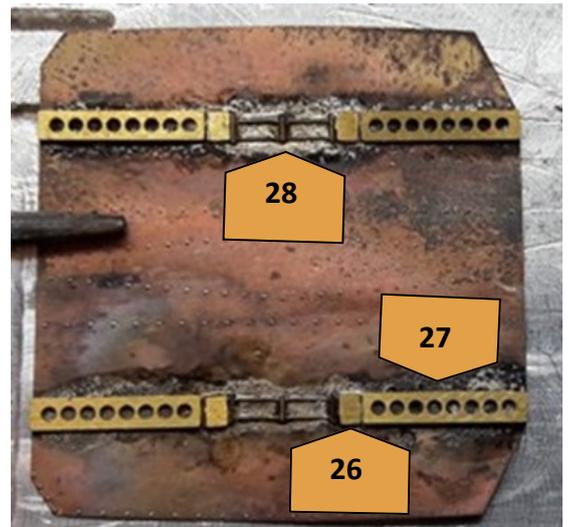


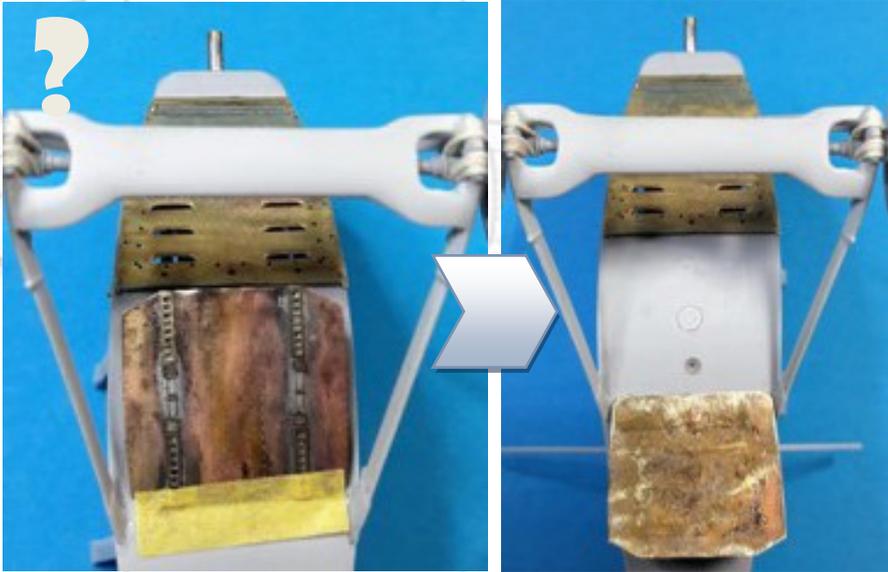
## Step 6 (Fuel tank detail)

Note: If following the accurate fuel tank assembly method then the PE fuel tank underside part described below should already be assembled to the fuel tank and fitted in to the fuselage (see [Section 2, steps 3 and 8](#)). The detailing process is the same as described below.

Prepare PE parts 26, (4 pieces) 27 (4 pieces) and 28 (2 pieces).

Glue or solder the straps and catches, PE parts 26 (4 pieces) 27 (4 pieces) and 28 (2 pieces) to the PE fuel tank underside pieces as illustrated right.

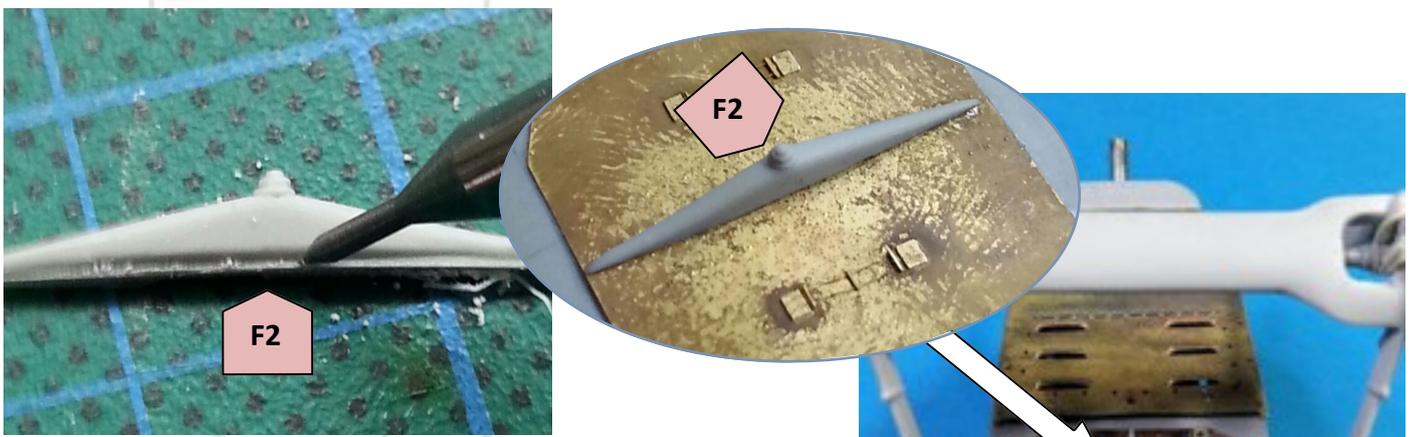




**Note: the following is only applicable if you are following the "simple" fuel tank assembly method.**

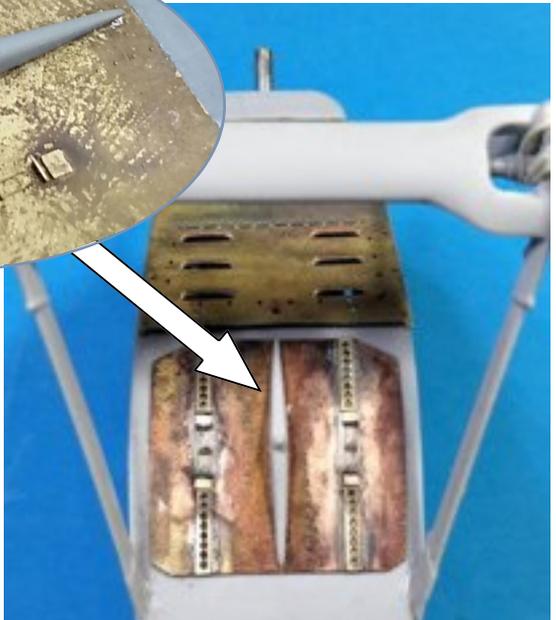
Cement the assembled PE fuel tank underside piece to the underside of the fuselage. Consult the reference book for exact position.

To glue this part using CA, position the PE part with a piece of tape so that the PE fuel tank underside assembly is in the correct position. Apply thin CA glue the underside of the PE part and press down. Apply extra thin CA to edges if required.



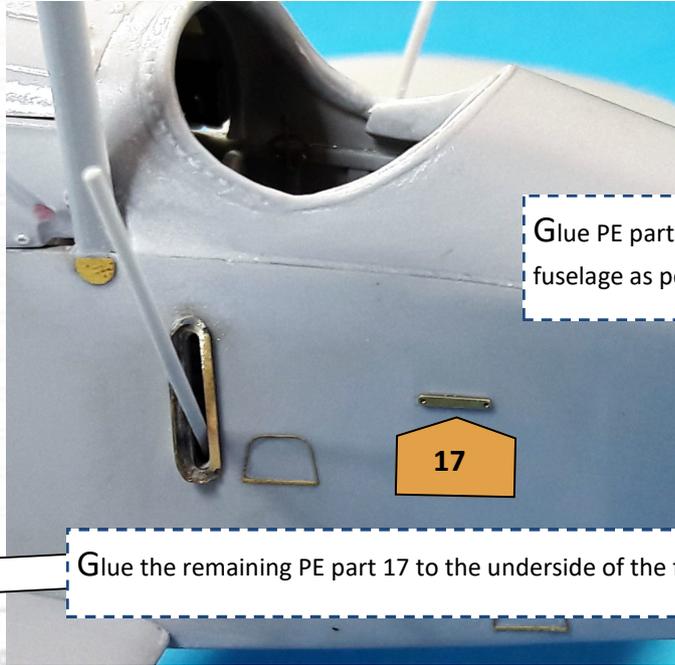
Remove part F2 from its casting block and take care to completely trim away the underside of the part.

Glue part F2 to the underside of the fuel tank (for both simple or realistic fuel tank assembly methods) as pictured above centre and right.



## Step 7 (hatches)

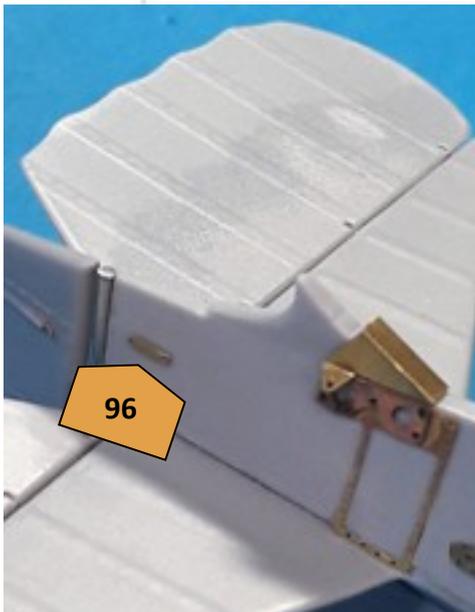
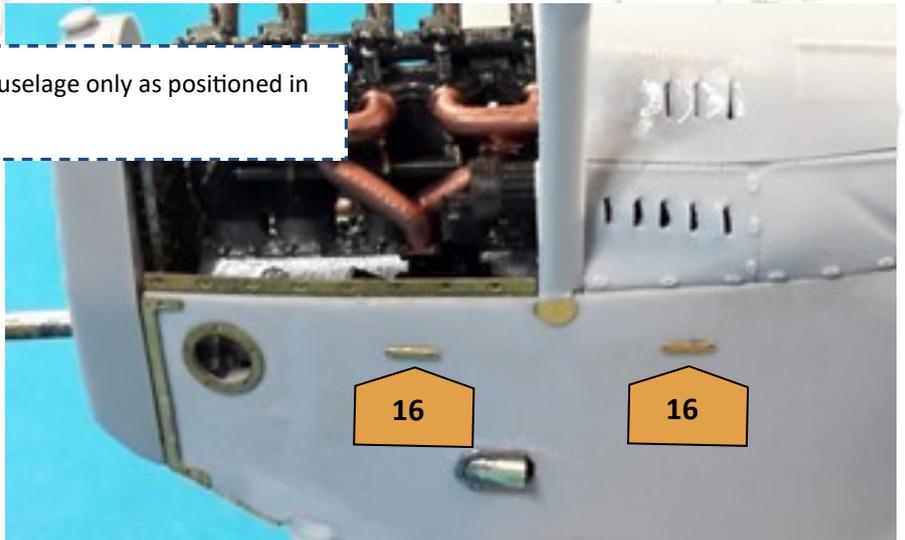
Note: As with all the fuselage fittings the hatches should be fitted after the wood grain decals have been added and sealed. The hatches described below fit over and in the centre of the circular wood access panels on the wood grain decals.



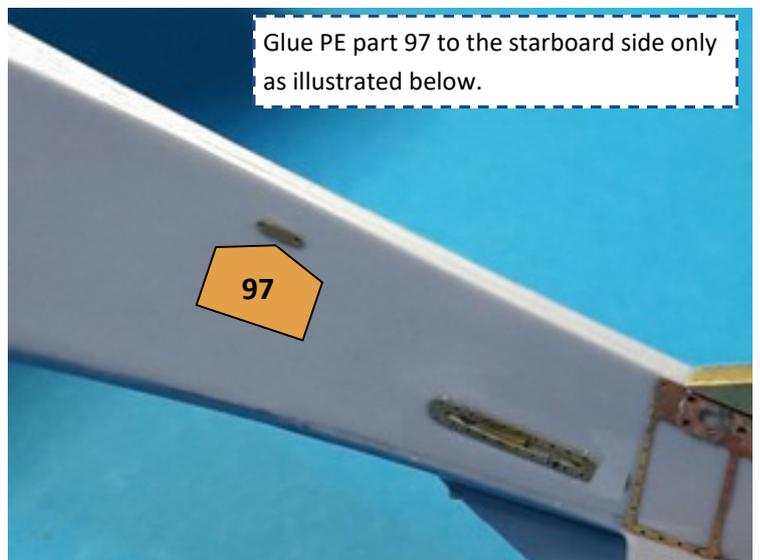
Glue PE part 17 (2 pieces) to each side of the fuselage as positioned in this picture.

Glue the remaining PE part 17 to the underside of the fuselage as positioned in this picture.

Glue PE parts 16 for the port side of the fuselage only as positioned in the photo on the right.



Glue PE part 96 to the port side of the fuselage only in the position illustrated in this picture. Note that there is not a circular panel in this area on the wood grain decals. One can be made from the spare wood grain decal.

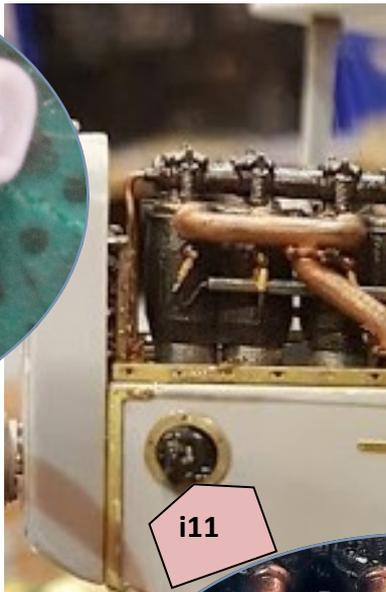


Glue PE part 97 to the starboard side only as illustrated below.

## Step 8 (Engine air intake)



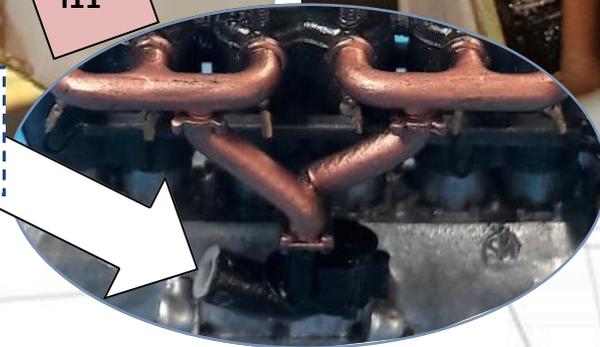
i11



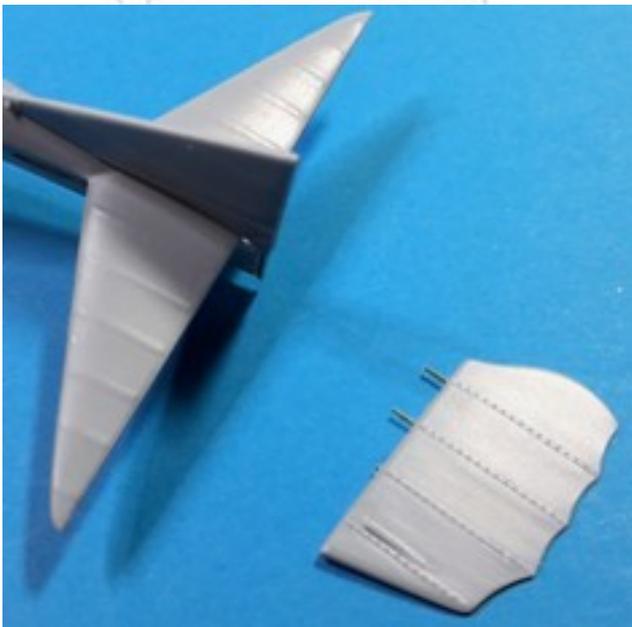
Clean up the engine air intake (part i11). Fit this part through the hole at the front of the port side of the fuselage .

Locate and glue the lug on the end of part i11 into the recess at the base of the engine manifold.

The forward cowlings can now be permanently glued in position if required (see [section 4, step 12](#))

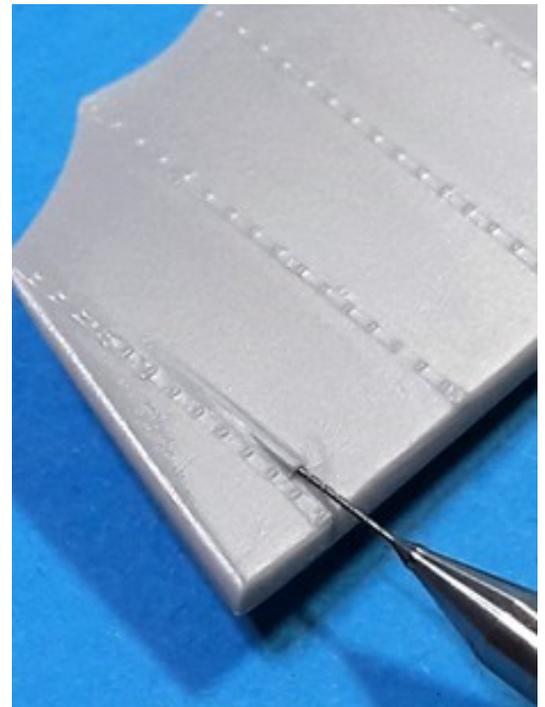


## Step 9 (Rudder and Elevators)



Test fit the rudder up against the fin and mark two corresponding positions on both the rudder and fin.

Drill out 0.5mm holes in these positions and fit 0.5mm brass rod in both positions on the rudder to act as reinforcement pins.



Drill 0.3mm holes into the control cable connection point on each side of the rudder to accept cables.

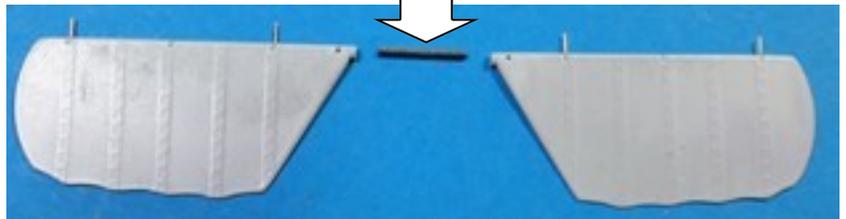
## Step 9 (continued)



Slot the rudder on to the fin via the brass rod pins and cement in position.

Pin the elevators using the same method as for the rudder (see below)

Cut a 10mm length of 1mm rod to connect the elevators together

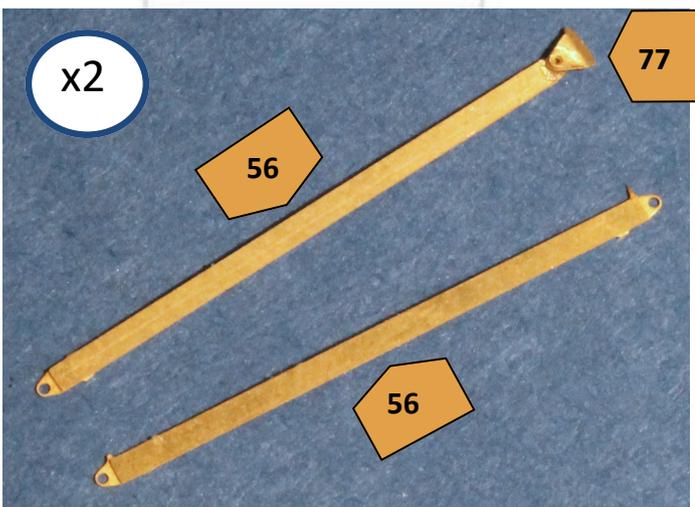


Gently dry fit the 1mm rod into the end of one of the elevators. Slide this rod through the opening at the base of the fin and slot the elevator on to the tail via the pins (do not glue at this stage).

Take the second elevator and slide on to the 1mm rod. Slot this elevator on to the tail and glue both elevators in to position when you are happy with the fit.



## Step 10 (Tail struts)



Fold PE part 77 and glue it to one end of one of the PE tail strut pieces (PE part 56).

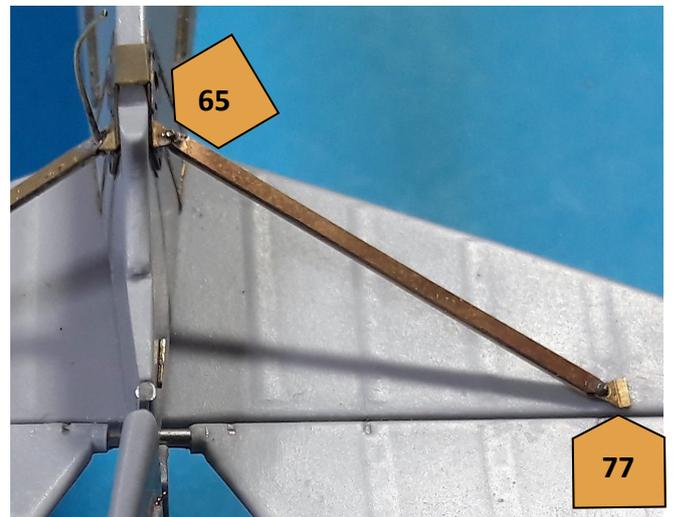
Glue or solder a second PE tail strut piece (PE part 56) to the first strut so that PE part 77 is sandwiched between the two halves of the strut.

Repeat to make the second strut.

Slot the strut assembly on to the folded out bracket on PE part 65 (see [section 5, step 1](#)). Glue or pin into position.

Glue the folded edge of PE part 77 into position on to the tail as illustrated right.

Repeat the above process for the second tail strut.

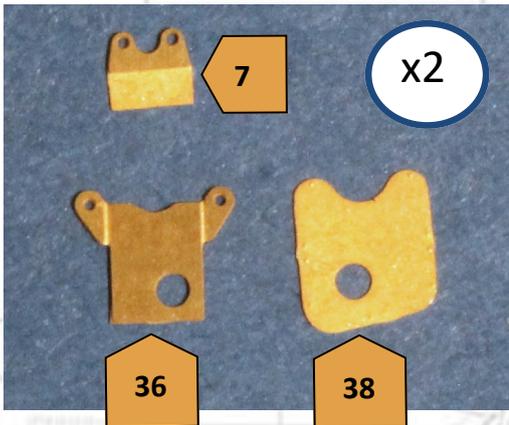


# Section 6

## UPPER AND LOWER WINGS

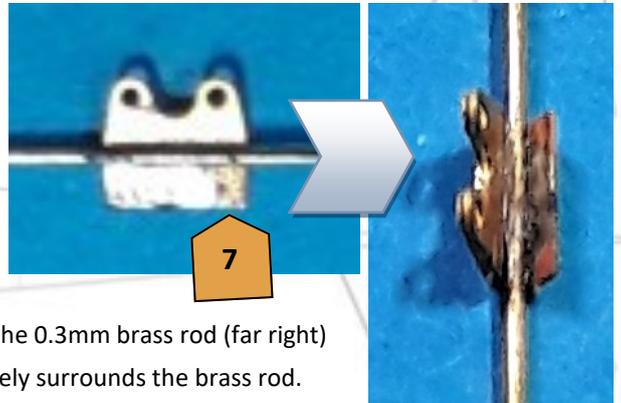
### Step 1 (Lower wings)

Clean up the lower wings and add the fabric decals on to a gloss white finish referring to the reference book for placement information. Once the decals have been applied, seal and varnish the wings.



Clean up the forward wing joint bracket PE parts 7, 36 and 38 (2 of each part).

Glue or solder a length of 0.3mm brass rod to PE part 7 as pictured right.



Carefully fold the end of PE part 7 around the 0.3mm brass rod (far right) until the etched end of the PE part completely surrounds the brass rod.



Trim one end of the 0.3mm brass rod so that it extends from PE part 7 by approximately 1mm.

Slide PE part 36 along the length of the long end of the 0.3mm brass rod and fold the fitted end to a 90° angle.

Begin to fold the opposite edge of PE part 36 so that the brass rod fits through PE part 36. Continue to fold so that this edge is at a 90° angle to the base. PE part 7 should move freely.

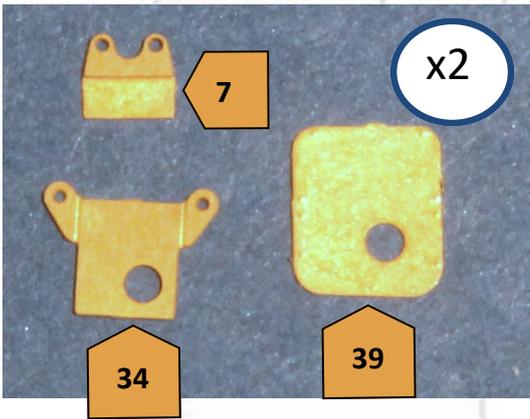
Trim the long end of the brass rod and sand flush as illustrated below.



Glue or solder PE part 38 to the base of PE part 36 (as above) taking care that PE part 7 continues to move freely.

Repeat the process ensuring that the two forward bracket assemblies are a mirror image of each other.

## Step 1 (Continued)



Follow the same process as detailed on the [previous page](#) for the assembly of the rear wing joint brackets using PE parts 7, 34 and 39 (2 of each)

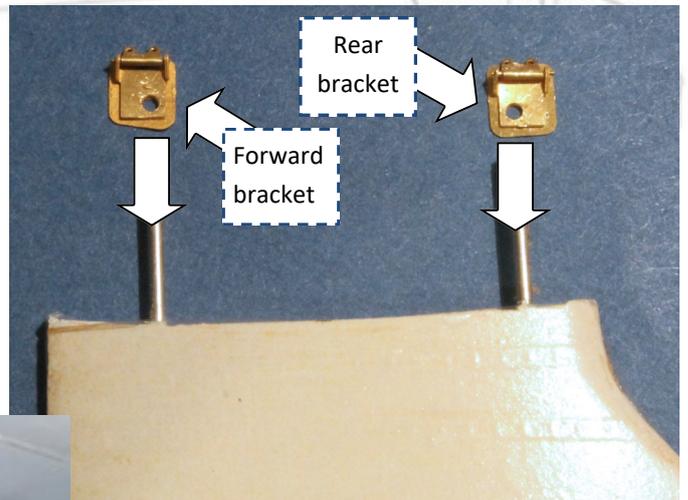


You should end up with four bracket assemblies as illustrated right. If required add turnbuckles of your choice (not included in the kit).

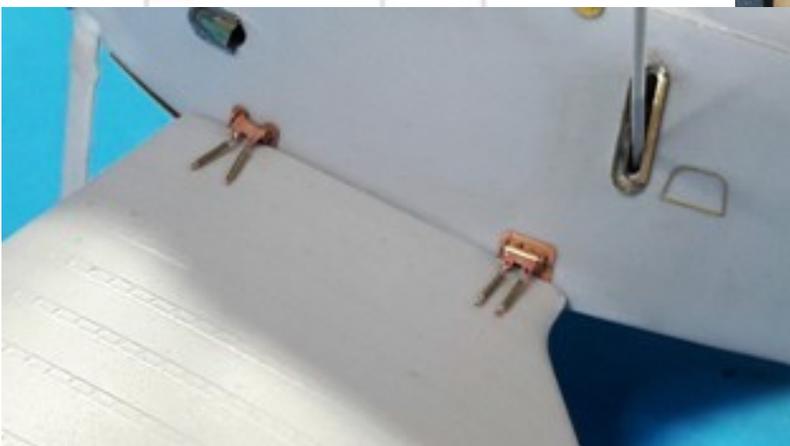
## Step 2 (Lower wing installation)

The lower wings slot in to the corresponding holes in the fuselage via the two steel rods. Dry fit and if necessary open out the holes in the fuselage.

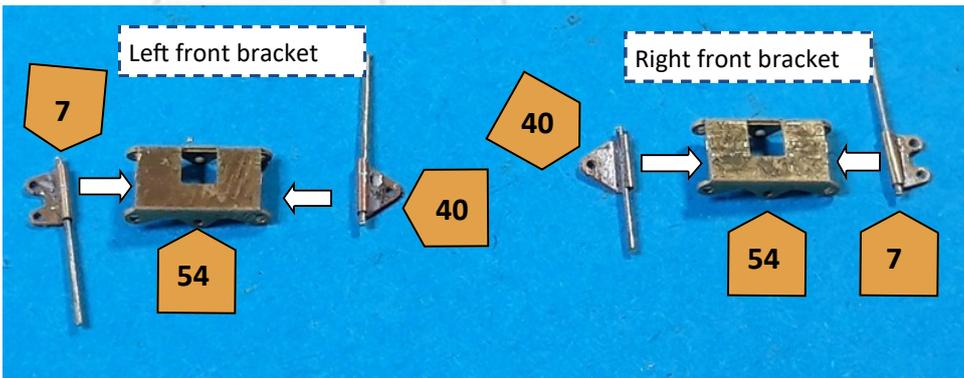
Slide the bracket assemblies on to the steel rods at the end of each wing as positioned in the picture on the right.



Slide the steel rods into position on to the fuselage and glue the steel rods and brackets permanently in place once happy with the fit.



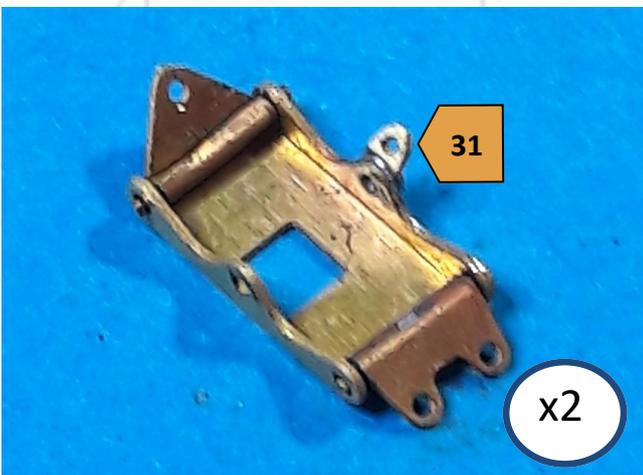
### Step 3 (Cabane strut rigging brackets )



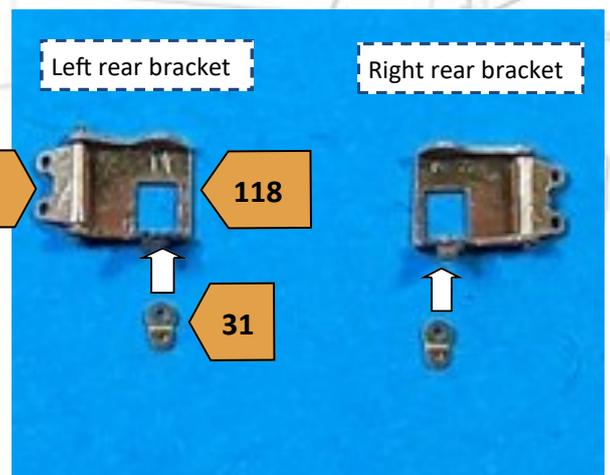
Following the same method as described in [step 1](#) assemble the forward cabane strut rigging brackets as illustrated left.

Begin by gluing or soldering 0.3mm brass rod to PE parts 7 and 40. Roll the end of the PE parts around the brass rod as described in [step 1](#).

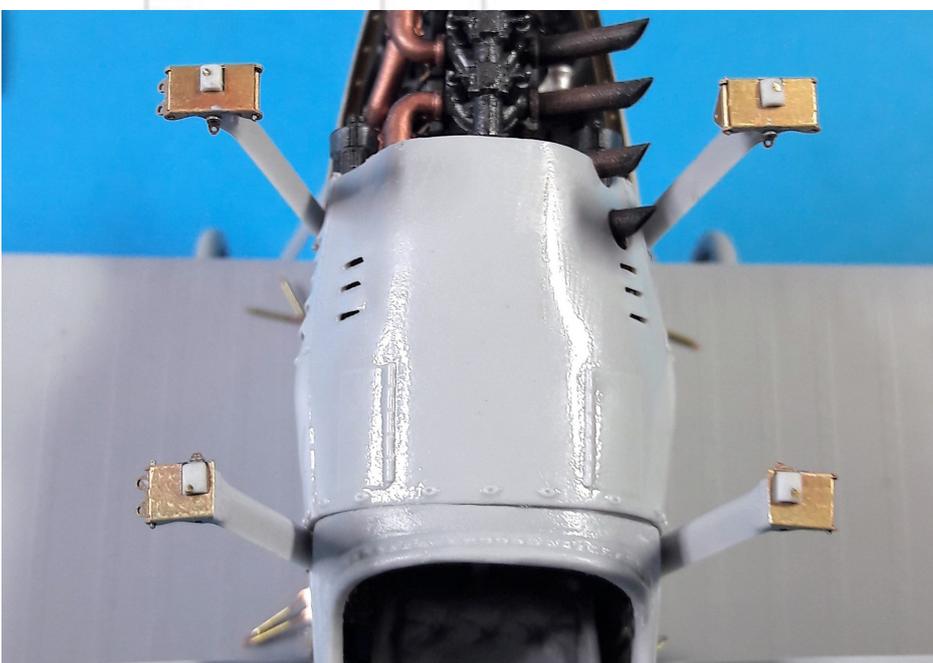
Fold each edge of PE parts 54 fitting the two assemblies (PE parts 7 and 40) into each end so that they are able to move freely. The photo above shows the parts laid out as they should be assembled and eventually fitted to the forward cabane struts.



Fold the bracing eyelets (PE parts 31) to a 45° angle and glue or solder to both forward cabane rigging brackets as illustrated left.



Assemble the rear cabane rigging brackets using the same method as the forward brackets as pictured right. As with the forward brackets the hinged PE parts 7 should move freely.

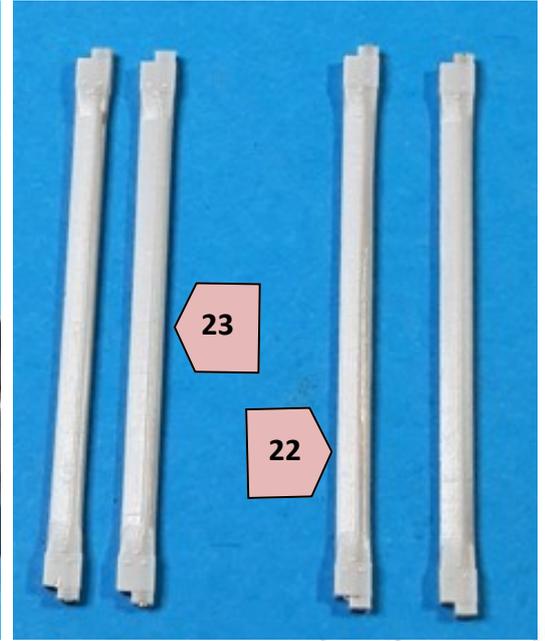
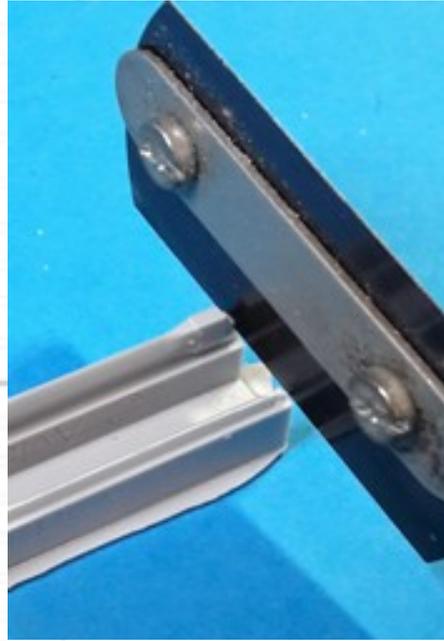


Test fit the assembled cabane rigging brackets as illustrated left. **Do not Glue!**

At this stage you can test the fit of the upper wing.

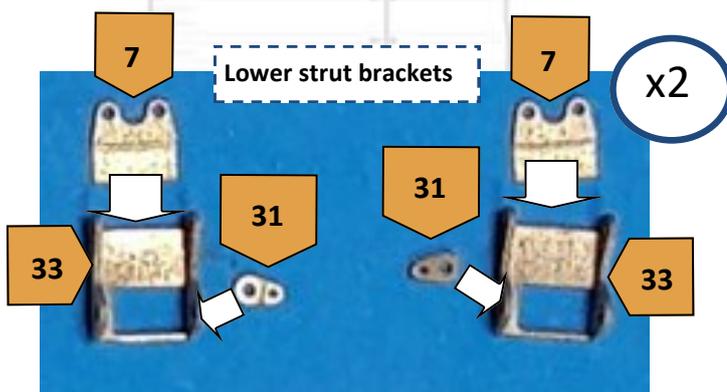
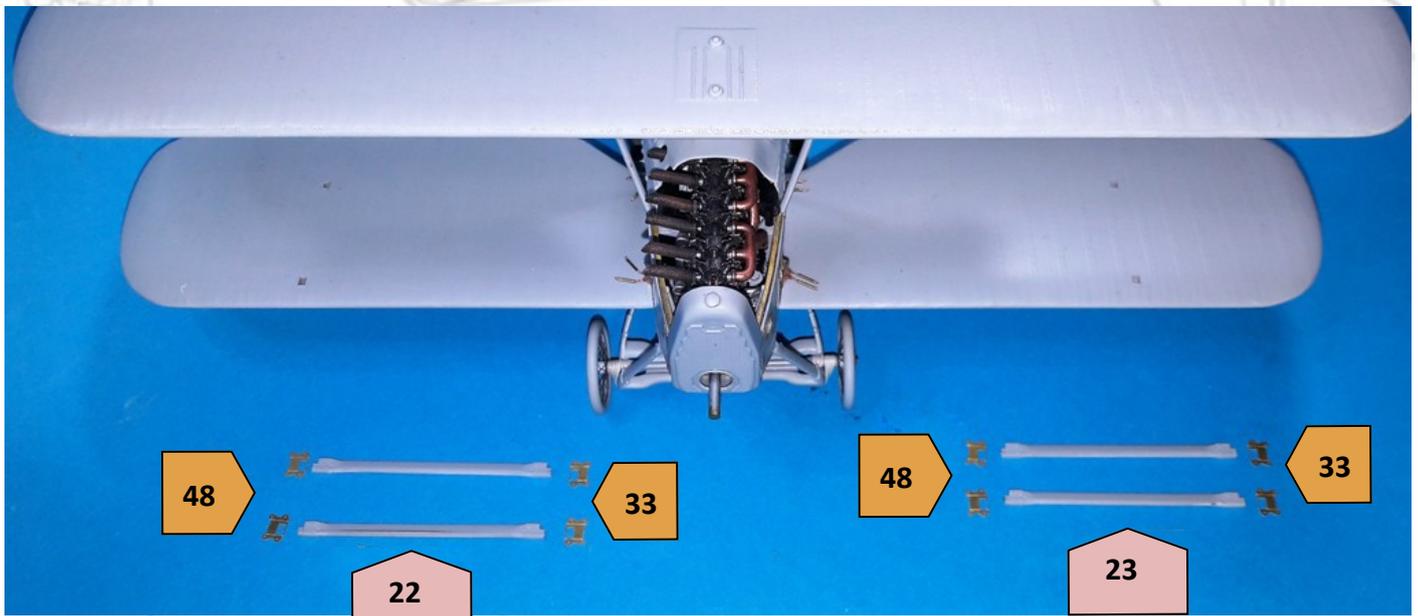
## Step 4 (Interplane struts)

Clean up the interplane struts (parts 22 and 23—two of each) and trim the stainless steel rod flush to the edge of the resin. The longer pair of struts are part 22.



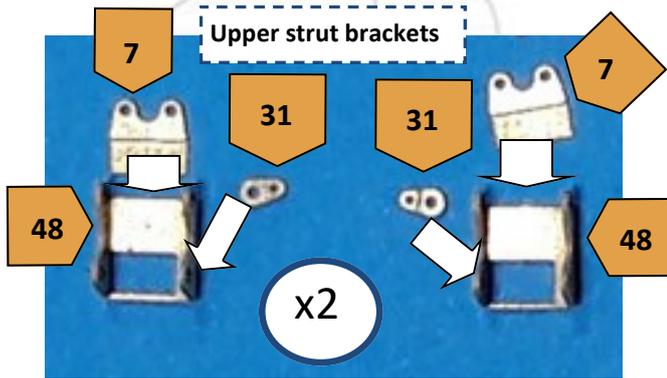
## Step 5 (Interplane strut rigging brackets)

The strut and bracket layout is as illustrated below. The struts on the left wing are longer because the wing is shorter, this is due to the compensation for the engine rotation. Be careful not to mix parts up during this process—if necessary use post it notes with number parts written on them to keep track of the parts.



Assemble the four lower wing rigging brackets as in previous steps using PE parts 33, 7 and 31. As in previous steps hinged PE parts 7 should be moveable. The small rigging eyelets, (PE parts 31) should be positioned so that two pairs are a mirror image of each other as left

## Step 5 (continued)



Construct the upper wing rigging brackets using the same process as the lower wing rigging brackets with PE parts 48, 7 and 31. Again, position PE parts 31 so that you end up with two pairs of brackets that are a mirror image to each other.



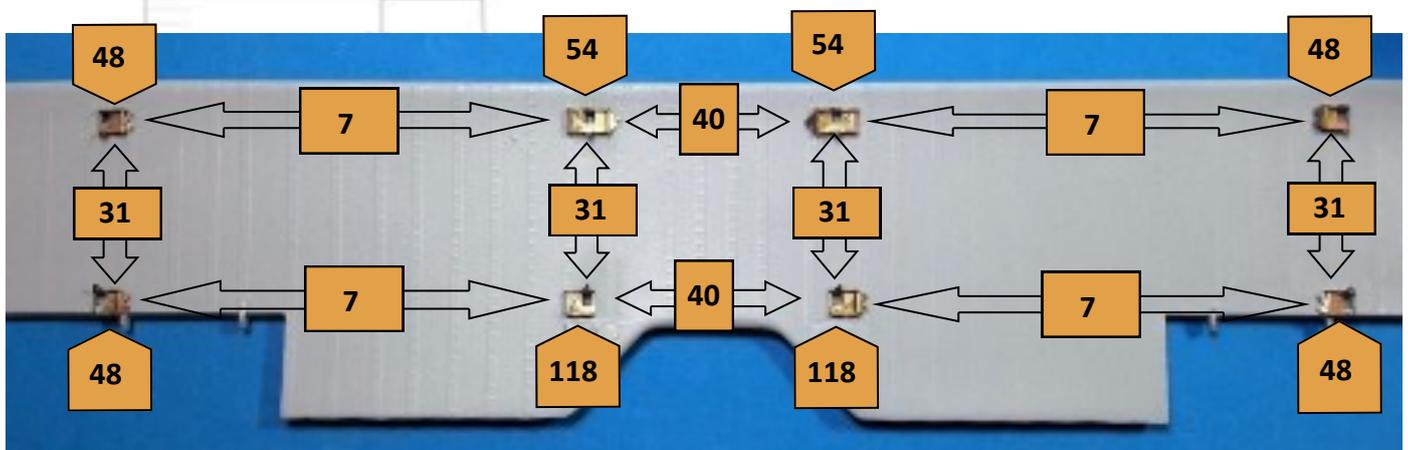
Completed lower and upper wing rigging brackets should look something like the picture on the right.



Dry fit the rigging brackets to the four struts. The small rigging eyelets, PE parts 31 should be on the trailing edge side (sharp edged side) of the strut for the front struts and the leading edge side (rounded edged side) for the rear struts.

## Step 6 (Upper Wing detail)

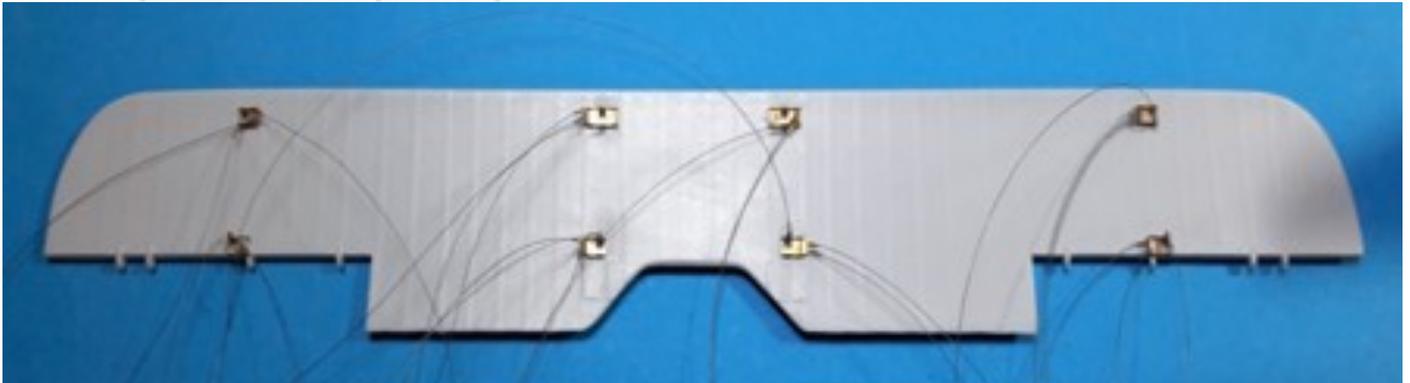
Clean up the upper wing and add the fabric decals on to a gloss white finish referring to the reference book for placement information. Once the decals have been applied, seal and varnish the wing.



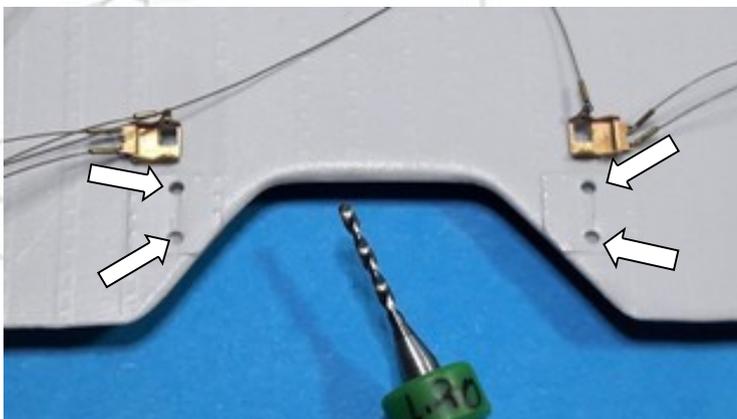
Glue all of the upper wing brackets into position on to the top wing ensuring that the small rigging eyelets (PE parts 31) face each other. The image above shows the bracket fitting PE numbers (PE parts 48, 54 and 118) and also the direction that the moveable (PE parts 7 and 40) and fixed (PE parts 31) rigging eyelets should face.

## Step 6 (continued)

Add all rigging wires to the upper wing except the two single wires between the front cabane struts using a rigging material of your choice.



## Step 7 (Actuator slots)

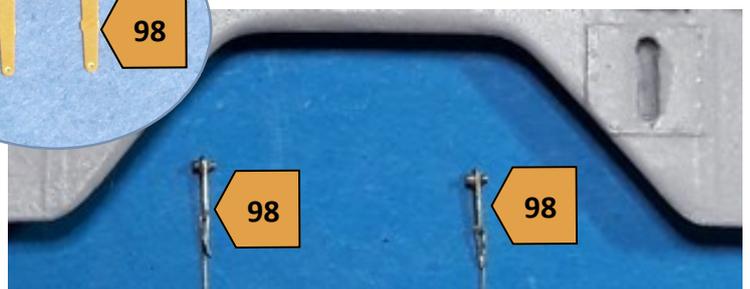
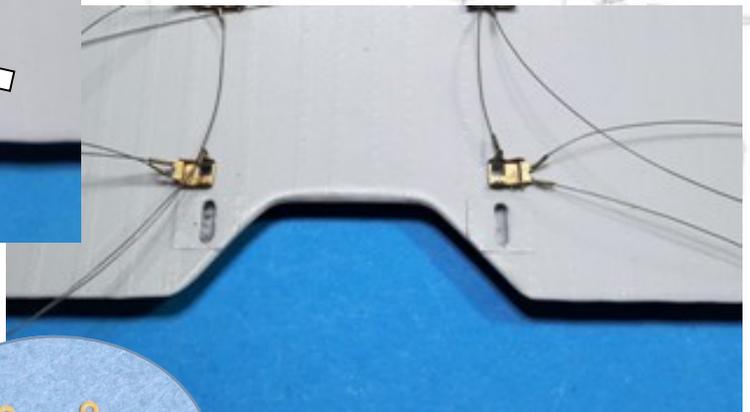
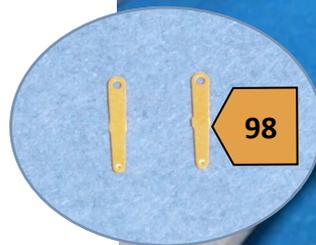


Partially drill out each end of each actuator slot using a 1.2mm drill bit as pictured left.

Use a dremel or file to cut a slot between the two drilled holes as illustrated right.

Glue or solder 0.5mm brass rod through the large hole in one end of each actuator lever (PE part 98—2 pieces) and trim to the width of the actuator slot (as detailed above).

Thread a length of 0.2mm wire through the small hole at the narrow end of the actuator lever (PE part 98). Twist and fix with a drop of glue to create an eyelet. This should be done to both PE parts 98.

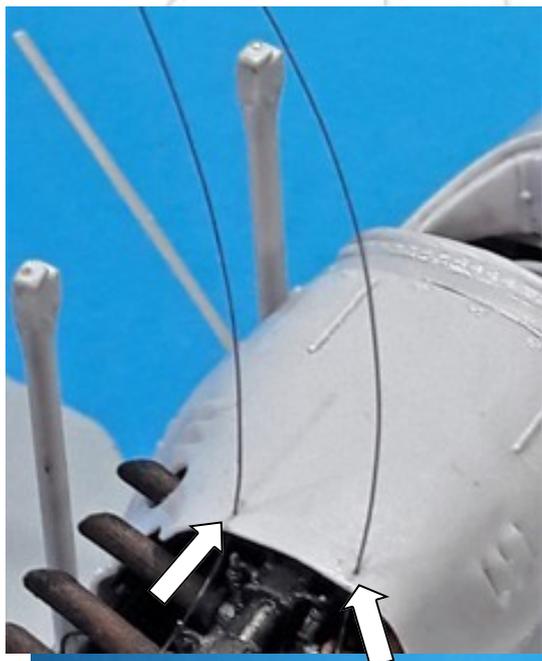


Glue the actuator lever assembly in to position taking into consideration the aileron positioning: one down and one up, or in the middle if neutral (consult references).

Then glue on the cover plates (PE part 118—2 pieces) as pictured left.

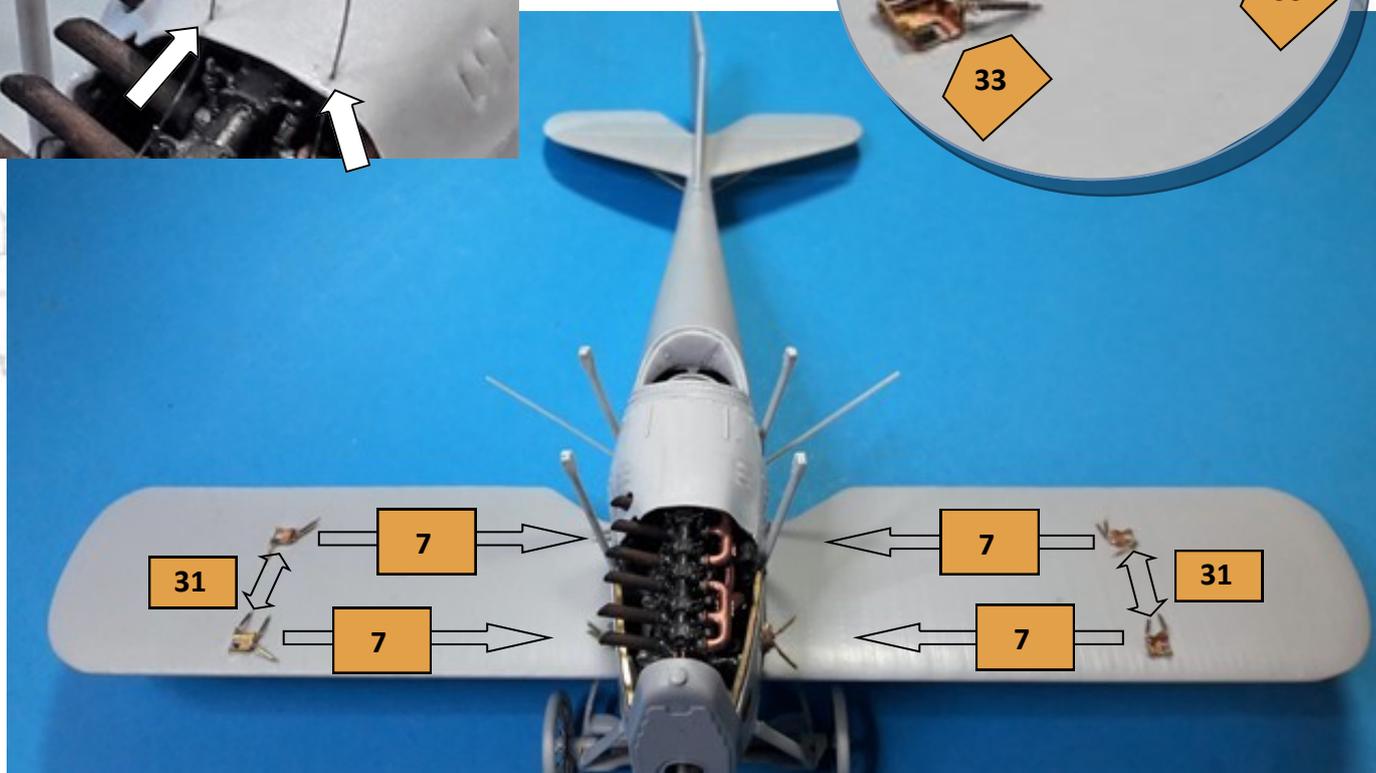
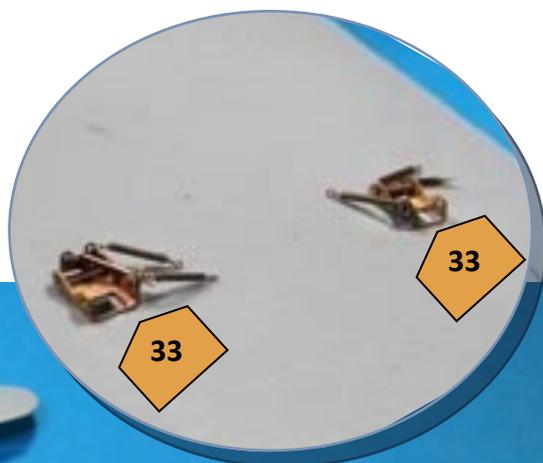
**Note:** that there are two different parts both labelled 118 on the PE fret. Only one of these relate to the actuator.

## Step 8 (Cowling and Lower wing rigging points)



Drill two 0.2mm holes, 8mm apart at the front edge of the rear cowling as pictured left. Thread a length of rigging material of your choice through each hole and knot from the underside. Pull tight (so that the knot is caught at the base of the hole, glue in to position and trim away the excess rigging material under the cowling.

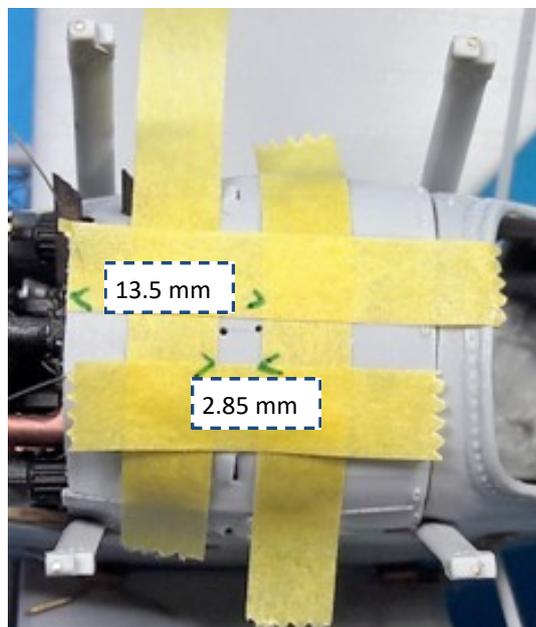
Attach turnbuckles of your choice to the lower wing rigging bracket assemblies ([see section 6, step 5](#))



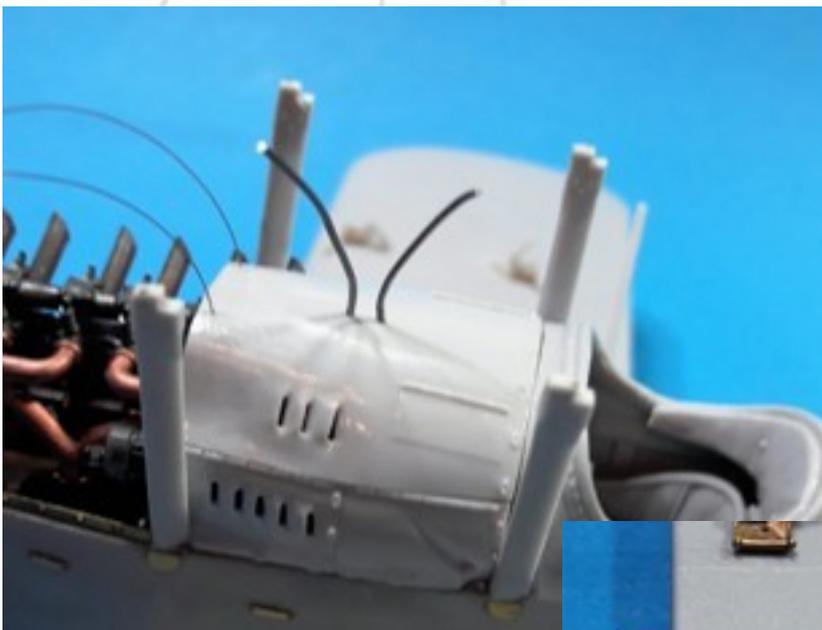
Glue the lower wing bracket assemblies (based around PE parts 33) to the lower wings. The image above shows the direction that the moveable eyelets (PE parts 7) and fixed (PE parts 31) rigging eyelets should face.

## Step 9 (Fuel lines)

Drill two 0.6mm holes into the centre of the of the rear cowling 2.85mm apart from each other, with the rear hole 13.5mm from the front edge of the rear cowling (as illustrated right)



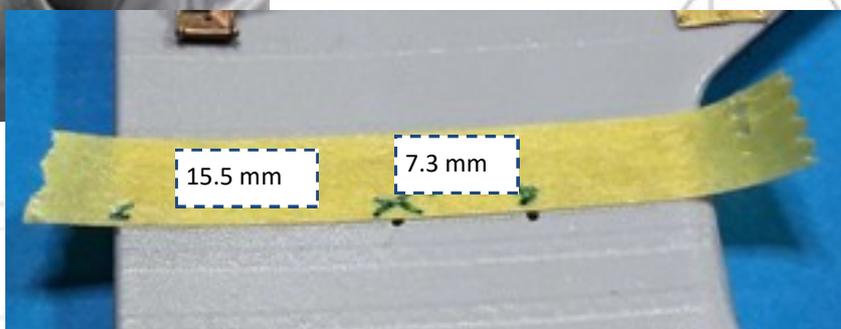
## Step 9 (Continued)



Slide two 0.6mm lead or brass wires into position as pictured left.

*Note: some reference photographs show the fuel lines as being covered but these appear to have been removed after a while in service. As there is no documentation on this we have left it to be the modellers choice to fashion something if required.*

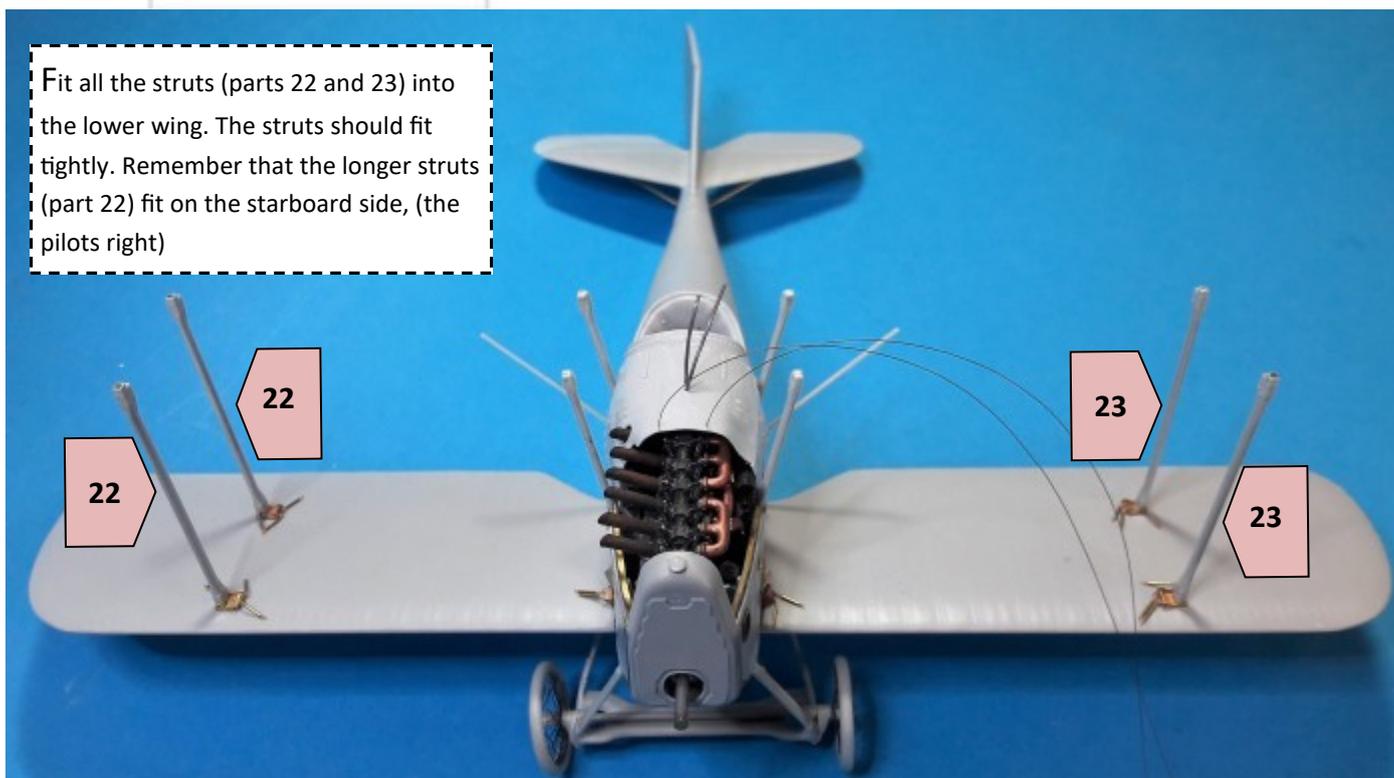
Drill a pair of 0.7mm holes into the underside centre of the top wing, 7.3mm apart with a distance of 15.5mm between the leading edge of the wing and the first hole as illustrated right. (the larger hole size is to allow easier fitting of the fuel lines after assembly)



## Step 10 (Upper wing assembly)

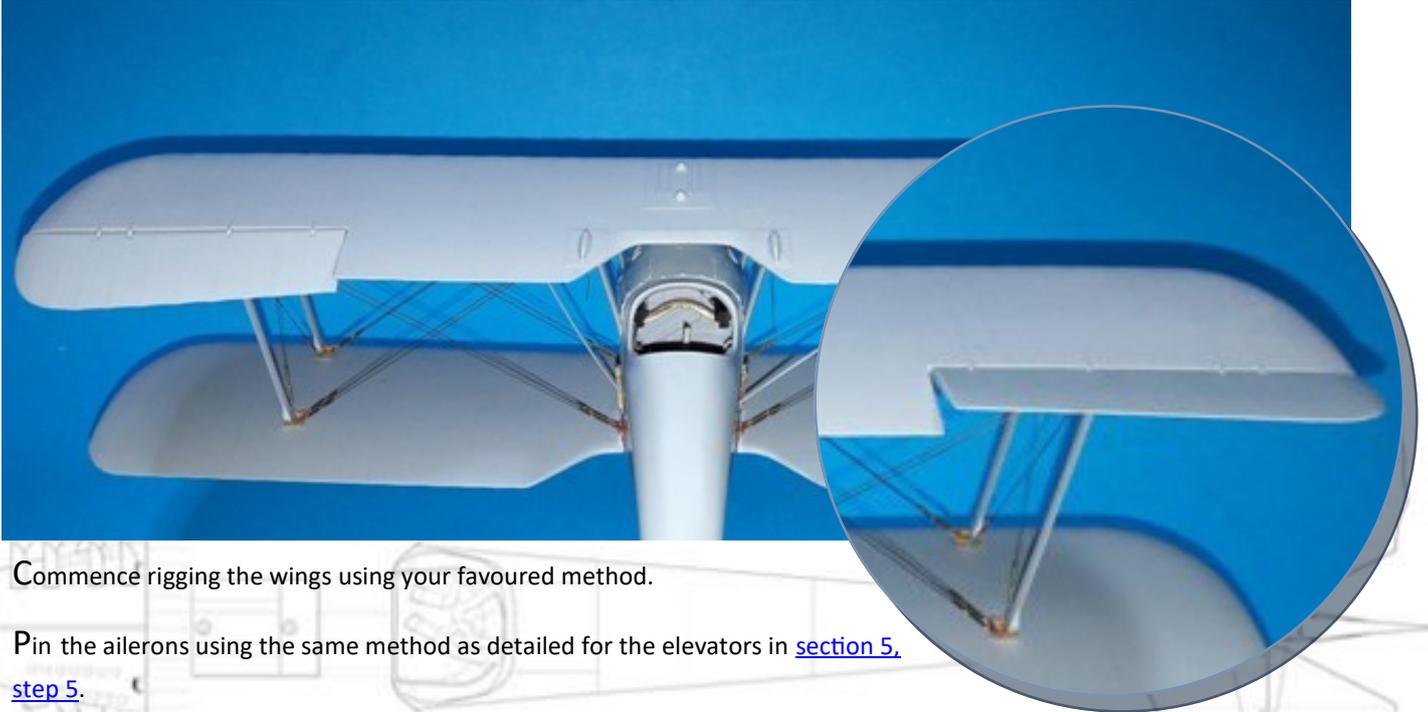
**Before beginning this step ensure that all struts fit in the holes on the upper and lower wings**

Fit all the struts (parts 22 and 23) into the lower wing. The struts should fit tightly. Remember that the longer struts (part 22) fit on the starboard side, (the pilots right)



## Step 10 (Continued)

Lay the upper wing on to a flat surface, lower side facing upwards. Hold the assembled airframe assembly upside down and lower on to the top wing ensuring that whole wing is aligned and that rigging wires don't become tangled or caught. Once happy with the position glue in place using thin CA glue.



Commence rigging the wings using your favoured method.

Pin the ailerons using the same method as detailed for the elevators in [section 5, step 5](#).

Glue the ailerons into position so that they are aligned in the same position as already determined in previous steps by the position of the aileron control unit and actuator rod lever ([section 2, step 4](#) and [section 6, step 7](#)).

## Step 11 (Actuator rod)

This step mainly details the simple method of installation of the actuator rod, if not already fitted to the aileron control unit as in [Section 2, step 19](#). Parts that refer to the more "realistic method" of installation are highlighted in **Blue**



Remove the actuator rods from their casting block and clean up.



Reduce the length of the actuator rods to approximately 40 mm and drill a hole into the top end to accept your prepared eyelet attachment (See [section 6, step 7](#)) so that the actuator rods hang freely.

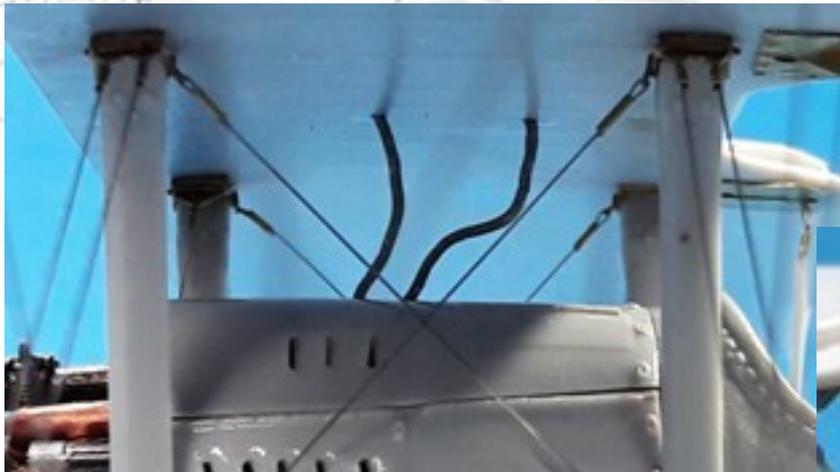
If following the realistic method of actuator rod installation ([Section 2, Step 19](#)), Trim the actuator rod to fit the eyelet attachment and install as above. Once completed move on to [Step 12](#).

## Step 11 (Continued)

Carefully slide the actuator rods into the actuator slots on each side of the fuselage. The rods may need further adjustment by trimming the end to enable them to fit in to the slot without undue pressure being applied to the parts.

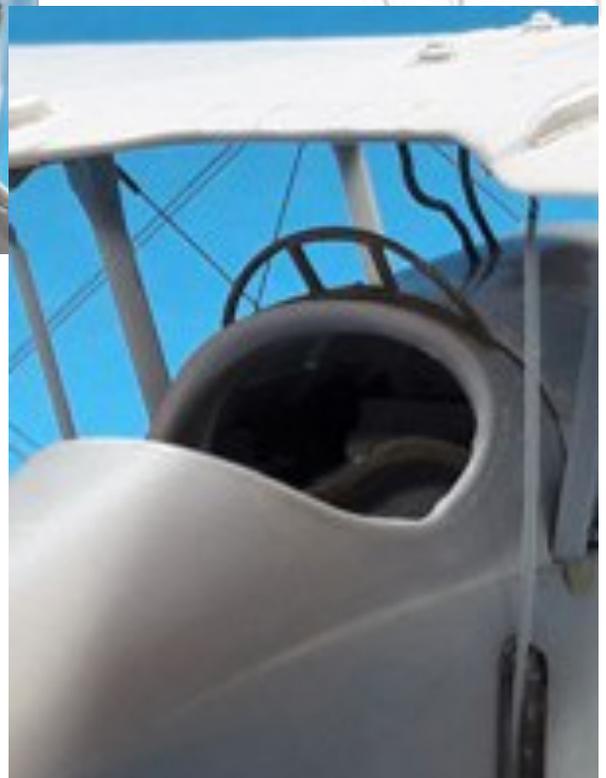


## Step 12 (Fuel lines and windscreen)



Shape the fuel lines as pictured left and glue into the pre-prepared holes in the upper wing.

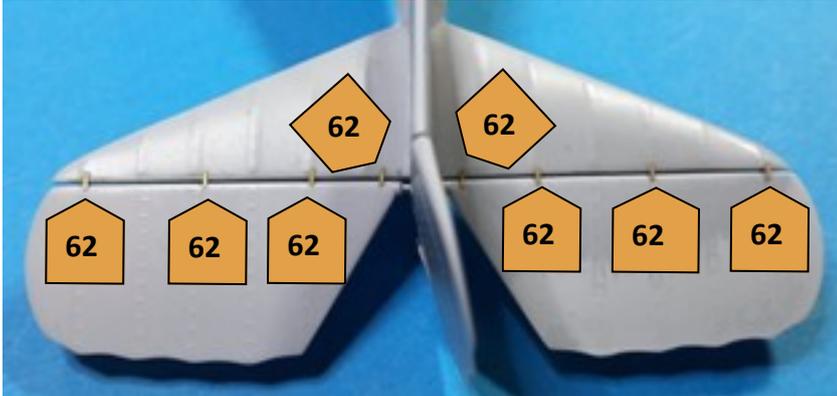
Glue the windscreen in place using a PVA glue. Do not use CA!



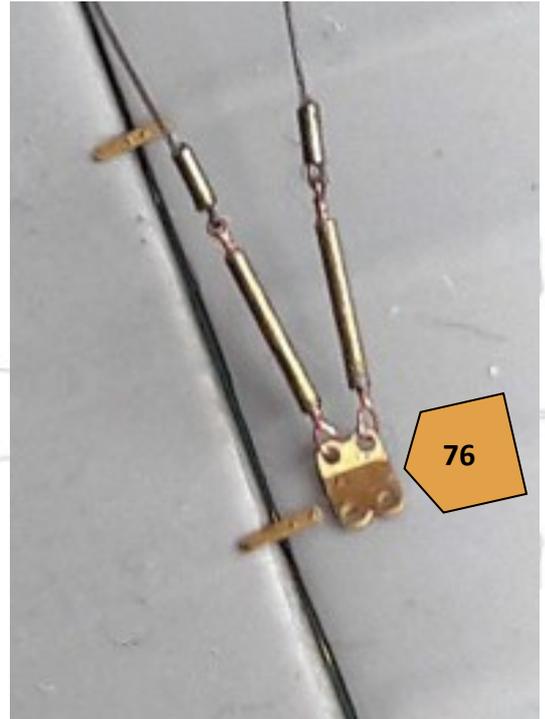
## Section 7

### FINAL DETAILS

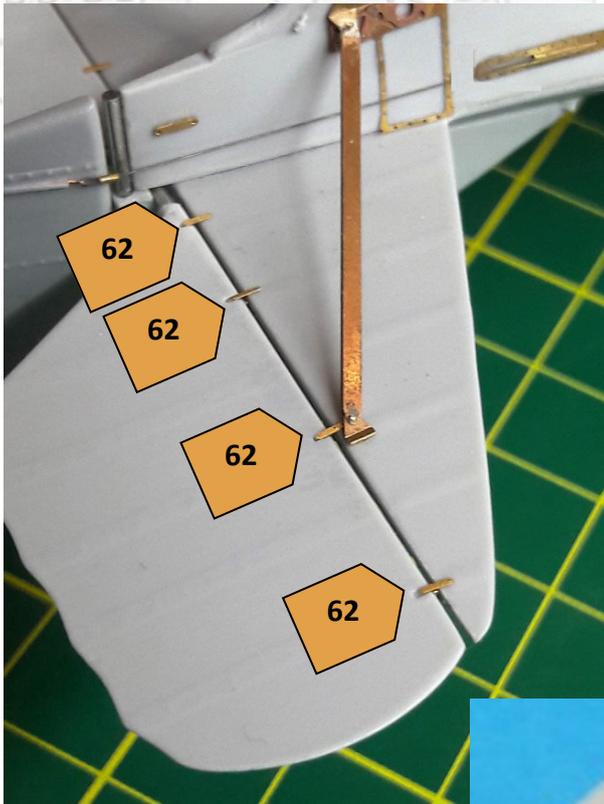
#### Step 1 (Tail details)



Glue the upperside elevator hinges (PE parts 62 — 8 pieces) to the edge of the upperside elevators and tailplane in the positions shown on the left.



Fold the rigging plates (PE part 76 - 2 pieces) and glue to the upper side edge of each tailplane in line with the third PE hinge outwards from the fuselage (second from the outer edge). Add turnbuckles of your choice.



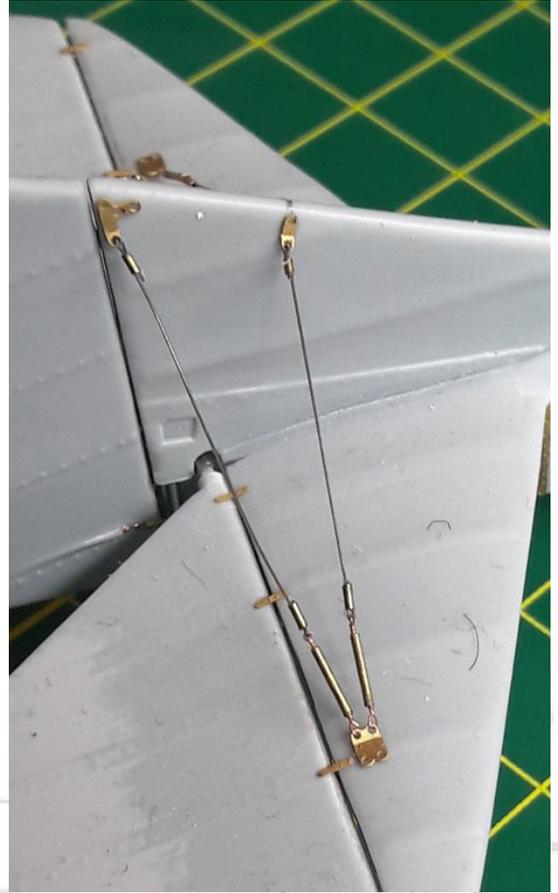
Glue the underside elevator hinges (PE 62—8 pieces) to the edge of the underside of the elevator and tailplane in the positions pictured on the left.

Fold the fin rigging plates, PE part 60 and PE part 61 (2 pieces each) and glue to the edge of the fin as pictured below and on the following page.



## Step 1 (continued)

Rig the tail section using rigging material and method of your choice.

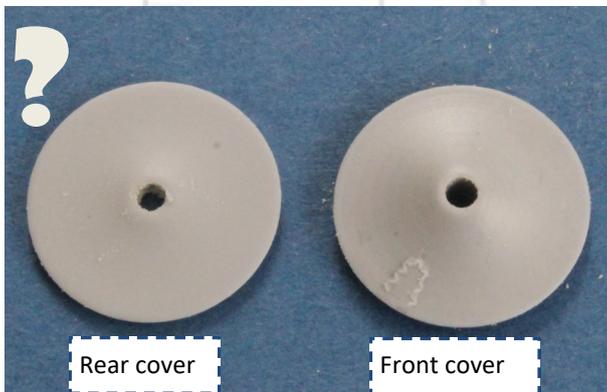


## Step 2 (Wheels)



Clean up the resin tyres, removing the thin centre film before removing the pieces from their casting block.

## Step 2a (Covered wheel option)



Pair up front and rear cover parts. You should have two of each as pictured left.

Clean up the underside of each cover piece so that they fit to each side of the tyre without impeding each other.



## Step 2a (continued)



Glue the rear cover piece centrally to one side of the tyre.



Glue the front cover centrally to the other side of the tyre as pictured right.

Repeat the process for the second wheel

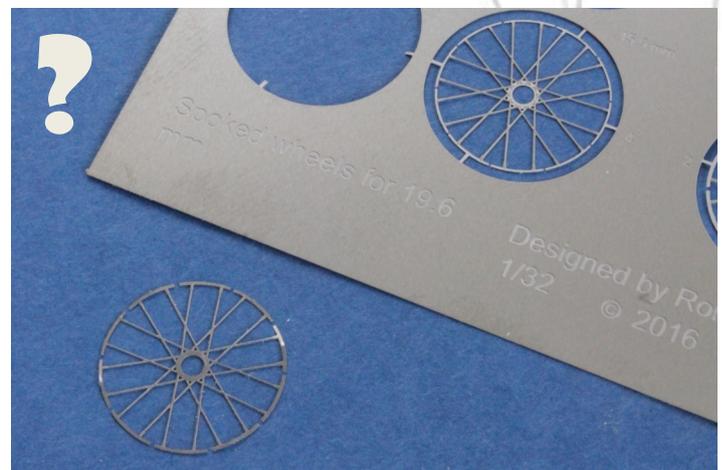
Glue the completed covered wheels into position on to each end of the axle.

## Step 2b (Spoked wheel option)



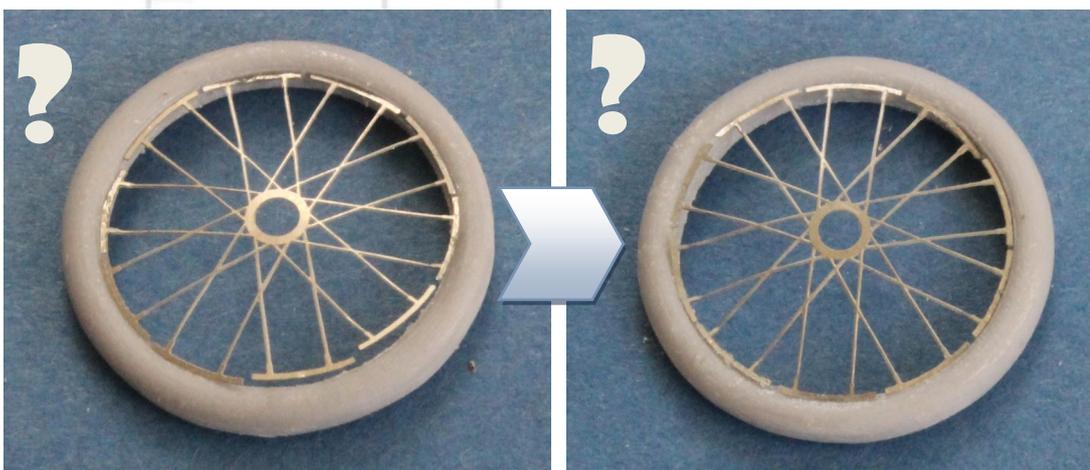
Drill completely through each spindle using a drill bit slightly larger than the stripped ends of the axle (see section 4, step 2).

If necessary trim the length of each spindle to approximately 3.5mm



Carefully cut the a pair of spokes from the separate spoked wheel PE fret.

Beginning in one area, carefully glue the PE spokes to the inside edge of the tyre. Gradually work your way around the tyre until the PE spoke is bonded all the way around the tyre.



The centre of the PE spoke should naturally push outwards as the outer rim is fitted to the tyre. Don't worry if this looks untidy at this stage.

## Step 2b (continued)

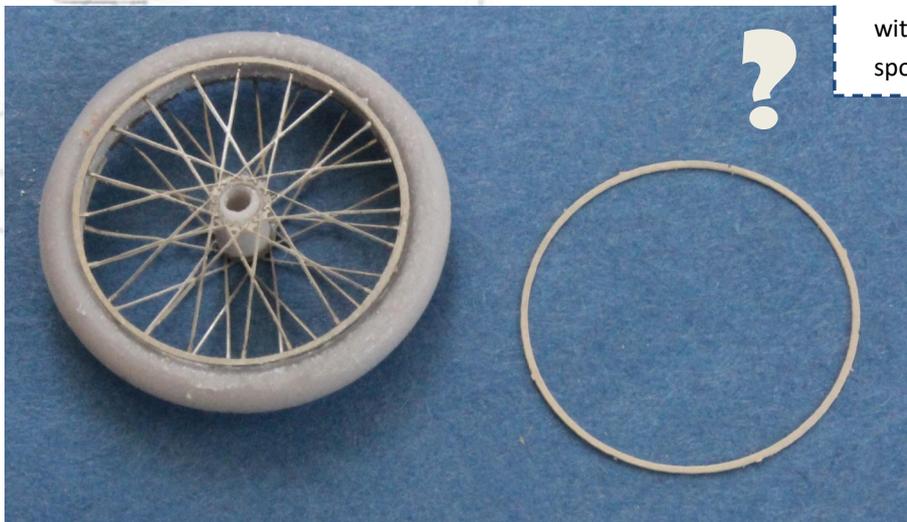


Turn your assembly over and glue the spindle to the inside centre of the PE Spokes.



Glue the centre of a second PE spoked part to the edge of the spindle as illustrated right.

Note: Try to align the second PE spoke part so that the ends of each spoke on each side align with each other, but the direction of each spoke is different on one side to the other.



Glue the rimmed edge of the second PE part to the tyre. As with the opposite side piece, glue a section at a time, gradually working your way around the rim until complete.

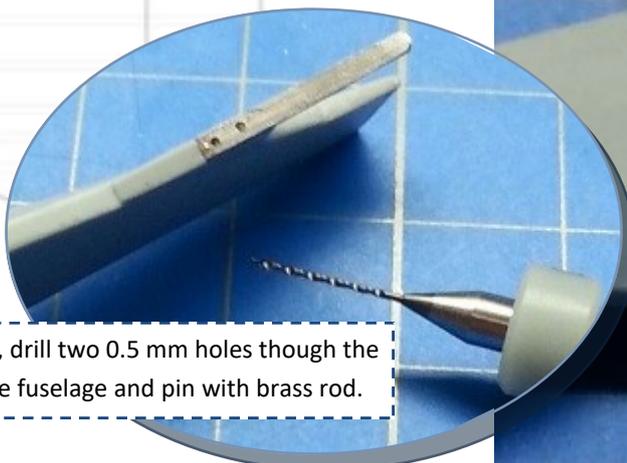
Glue the PE rim parts over each side of the spoked assembly as pictured left.

Repeat the process with the second wheel.

Glue the completed spoked wheels into position on to each end of the axle.

## Step 3 (Tail skid)

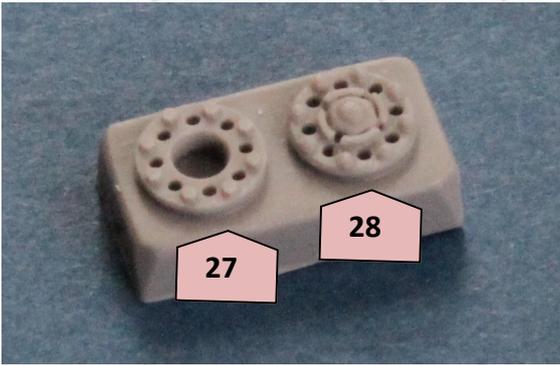
Add the white metal tail skid after all painting and finishing is completed to prevent damage.



For added strength, drill two 0.5 mm holes through the tail skid and into the fuselage and pin with brass rod.



## Step 4 (Propeller)



Remove the propeller boss parts (27 and 28) from their casting block and clean them up. Part 27 is the rear boss and part 28 is the front boss.

Clean up the propeller and glue the rear boss (part 27) into position as pictured below.



27

Turn the propeller over and glue the front boss (part 28) into position.



28

Glue the assembled propeller on to the end of the propeller shaft (trimming the propeller shaft if required). Position the propeller to your personal taste.



## Your model should now be completed!

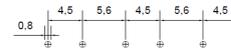
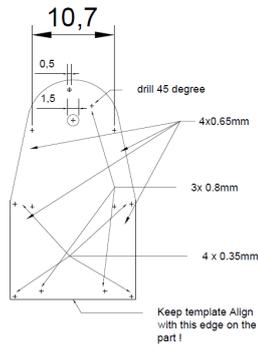


## Appendix

### JIGS

Right: Jigs for:

- The radiator ([Section 3, step 11](#))
- Engine manifold assembly ([Section 1, Step 5](#))
- Forward engine pipes ([Section 1, Step 12](#))

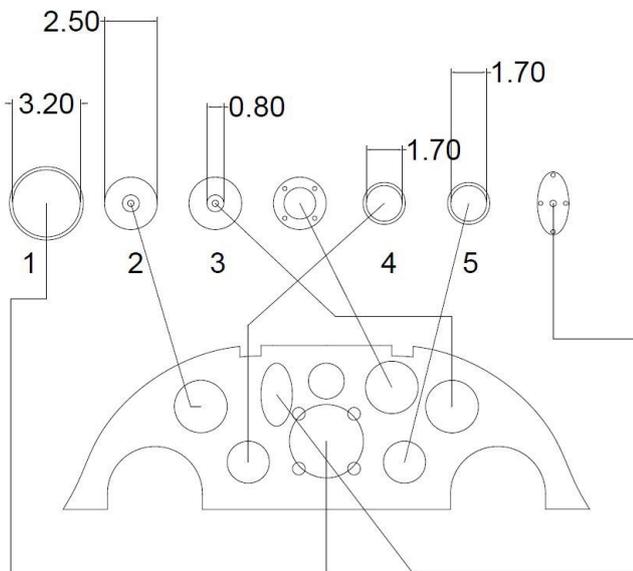


Drill jig  
Radiator rod  
option



\* \* Drill jig engine  
pipe

## INSTRUMENT PANEL LAYOUT



1. Tachometer
2. Fuel tank selector
3. Fuel tank selector
4. Gasoline meter
5. Fuel Gauge
6. Thermometer



## CREDITS.....

**Build log** by Ron Kootje with additional photos by Dave Hooper

**Text** by Dave Hooper, Ron Kootje and Richard Andrews

**Layout** by Dave Hooper