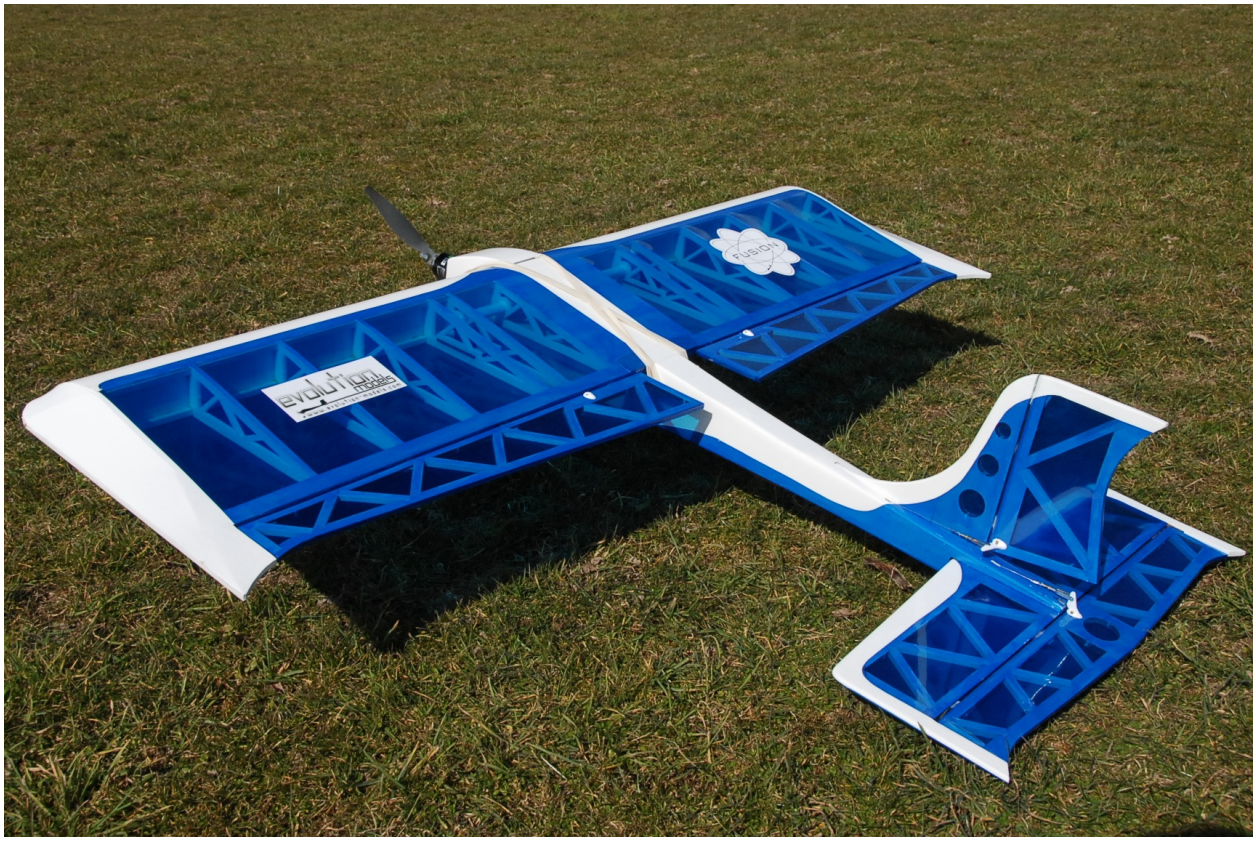
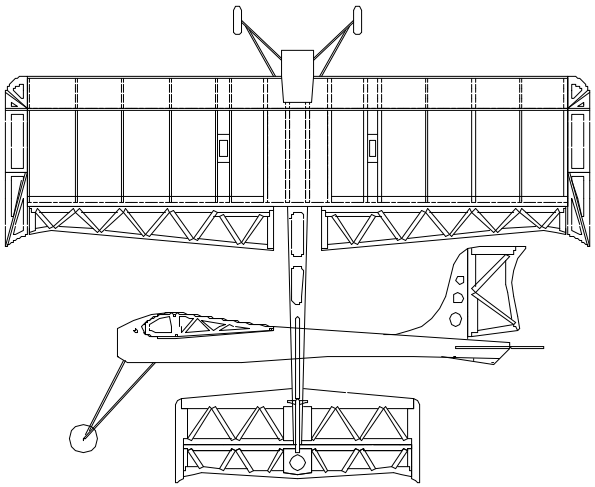


Glow and Electric Instruction Manual

FEATURES

- Precision Laser Cut Parts
- Lightweight Strong Airframe
- Excellent Low Speed Stability
- Comprehensive Instruction Manual
- High Quality Balsa Ply and Depron parts
- Excellent Precise Handling Characteristics
- High Quality Comprehensive Hardware Pack



Introduction

The New Fusion has takes those comments made by our customers and develops them into the Fusion package. These comments along with hours of testing and development we have improved the strength, durability and overall performance of the model. For those who owned the original Fusion you will note the changes, some of them are only minor, such as the length of Tail moment and others like the battery hatch provide a better all round model. We listen to our customers to improve our products, so if you have anything you wish to share please let us know.

The Evolution Fusion has been designed predominantly for the Fun Fly enthusiast and the club flyer. The Fusion will loop on the spot, roll in the blink of an eye and inspire confidence as it remains rock solid and stable. This model that has been designed to be highly manoeuvrable, but also to be attractive with style and flair.

The laser cut parts simply slot together to provide a lightweight structure without compromising strength. The Fusion is simple and satisfying to build for the amateur and experienced builder.

Each kit contains a comprehensive hardware pack that includes the fuel tank (glow version), metal clevises, closed loop systems, hinges, hatch latch, and horns to name but a few.

The Evolution Fusion has been designed to meet the needs of the Fun Fly competition pilot in an attractive package. We hope that you have as much fun building and flying it as we have had developing it!

Building Recommendations

Check all parts from the box to ensure that they are present, if not then please contact us at the e-mail address at the back of the instructions. We do from time to time make mistakes!!

Ensure that you use a completely flat base on which to build the model, this should be large enough the build the wing 50” (1270mm) x 16” (400mm) as a minimum.

Read through the instructions before starting to build, understand each step before applying glue.

The glue detailed in the instructions is for a guide only, this is what we used for the prototypes, it is at the builder discretion which glue is used, but ensure that it is suitable for the intended purpose. **Always** read the application instructions to ensure you achieve a strong joint. Depron is a foam material; Standard Cyano will attack and melt it, **always** use foam safe glue or wood glue. **Always** read the safety instructions supplied with the glue.

Take your time building the model, build a straight and strong model, this will ensure the model will fly well!

Enjoy. Building **is** part of aero modelling!

This radio-controlled model is **not** a toy. It can cause serious injury to the operator, public and property if misused or abused. Ensure that you read all the instructions supplied with this kit and instructions provided with the engine and radio control system or any other components purchased separately carefully. Also, make sure that any parts bought separately are suitable for their application.

The kit contains small and potentially sharp parts, keep away from children.

Additional Materials Required	**Recommended Tools**
Standard Thin or Medium Cyano Aliphatic White Wood Glue Epoxy Resin Tinned Copper Wire (For Undercarriage) Solder Heat Shrink Covering Material Engine Mount Radio Gear	Modelling Knife Razor Plane Set Square Shaping Paper Shaping Block Blow Torch Drill Drill Bits Building Board – Completely flat 1300 x 400mm Min Bradawl

Fusion Part List
Wood Pack

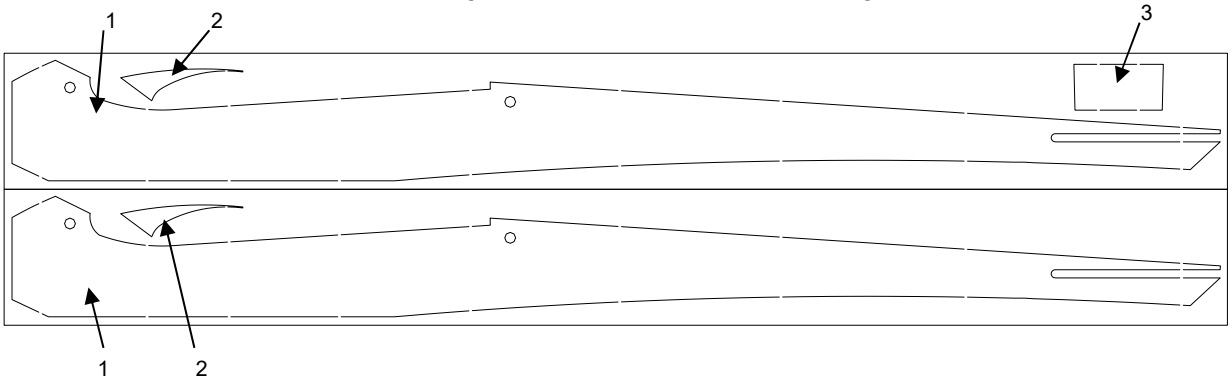
Description	Sheet Size		Quantity
	Metric	Imperial	
Webbing Sheet	1.5 x 100 x 915mm	1/16 x 4 x 36”	1
Leading and Trailing Edge Sheet	1.5 x 100 x 1220mm	1/16 x 4 x 48”	2
Leading Edge	6 x 25 x 1220mm	¼ x 1 x 48”	1
Wing Spars and Trailing Edge Spar	6 x 6 x 1220mm	¼ x ¼ x 48”	3
Wing Centre Section Sheet	1.5 x 75 x 915mm	1/16 x 3 x 36”	1
Fuselage Bottom and Front Deck Sheet	3 x 75 x 915mm	1/8 x 3 x 36”	1
Rib Capping Strips	1.5 x 6 x 915mm	1/16 x ¼ x 36”	6
Aileron/Rudder/Elevator/Tail Plane Strip	9.5 x 6 x 915mm	3/8 x ¼ x 36”	3
Fuselage Triangular Fillet	9.5 x 9.5 x 915mm	3/8 x 3/8 x 36”	4

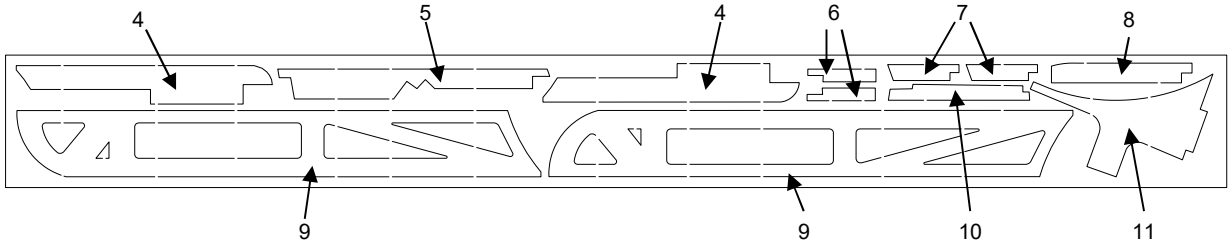
Hardware Pack

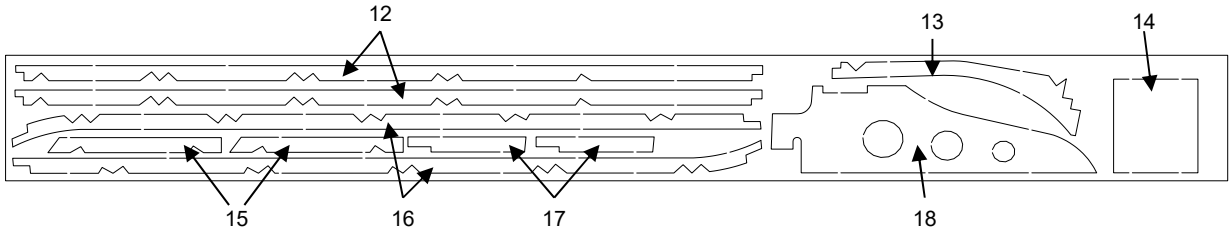
Description	Quantity
Metal Clevis (M2)	6
Metal Control Rod (M2)	2
Snap links	2
Control Horns	6
Single Saddle Clamp 10 swg	4
Hatch Latch	1
Closed Loop Kit	1
Mylar	1
Servo Mount Spruce 6 x 6 x 25mm (¼ x ¼ x 1”)	2
Wing Dowels 8 x 90 and 8 x110mm	2

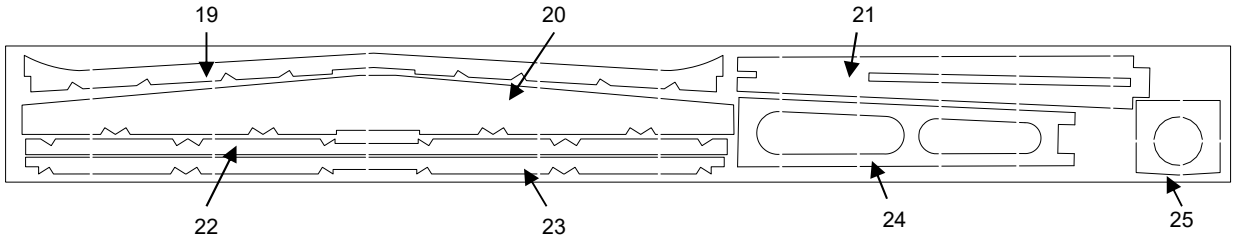
Fusion Part List
Laser Cut Sheets

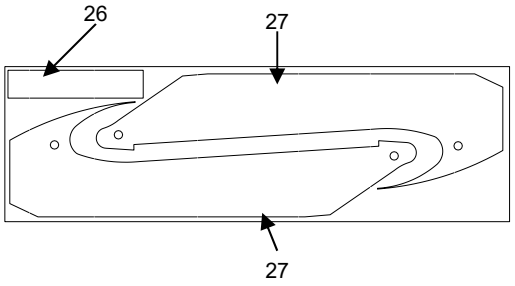
Due to the balsa supply issues some parts may be relocated on sheets, please make sure you locate each part carefully













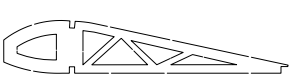
W1 x 4



W2 x 2



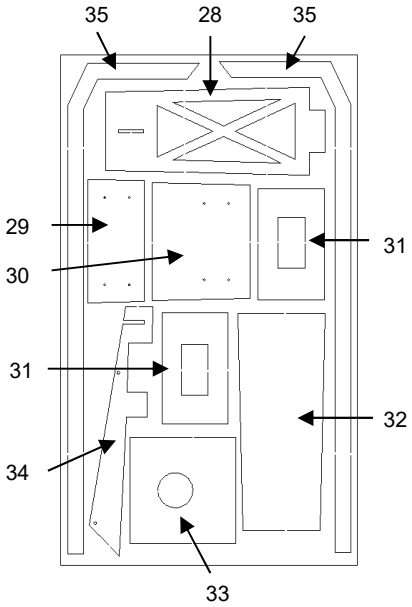
W3 x 2



W4 x 6



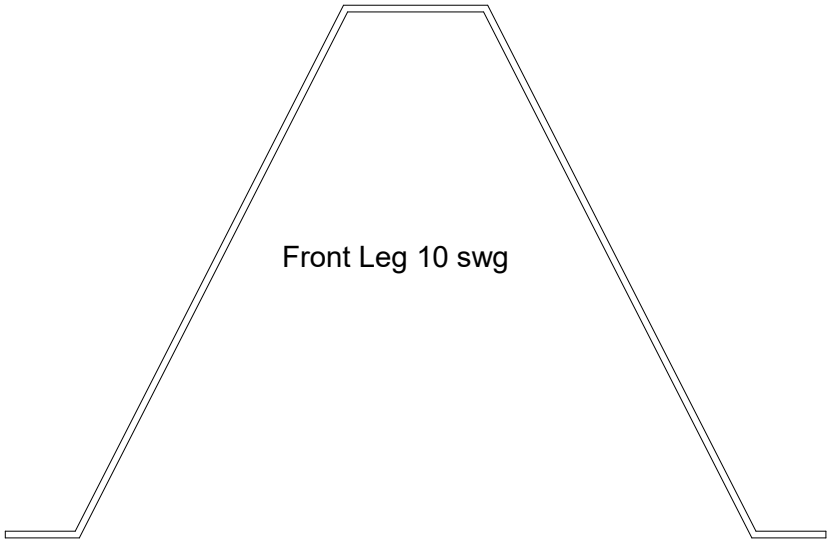
W5 x 2



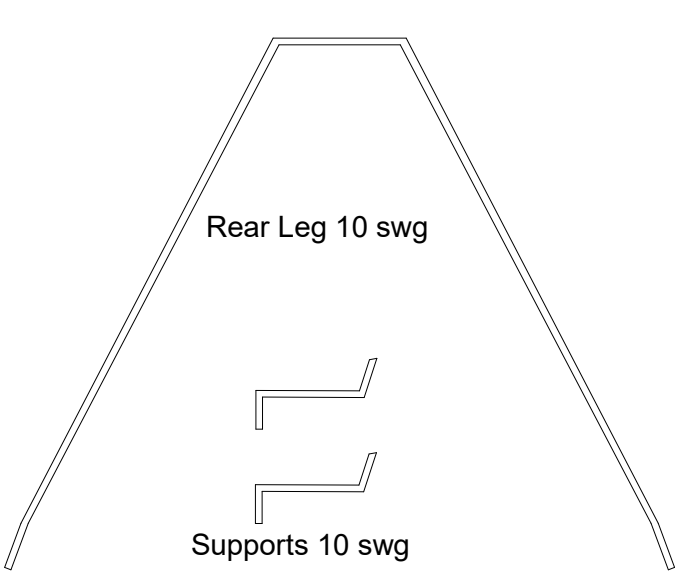
Part No.	Description	Sheet Material
1	Left and Right Fuselage Sides (2)	3mm (1/8”) Balsa
2	Left and Right Fuselage Sides Top (2)	3mm (1/8”) Balsa
3	UC centre spacer Plate	3mm (1/8”) Balsa
4	Tail Plane Tips (2)	6mm (1/4) Balsa
5	Rudder Leading Edge	6mm (1/4) Balsa
6	Elevator Tips (2)	6mm (1/4) Balsa
7	Aileron Outer Tips (2)	6mm (1/4) Balsa
8	Rudder Top Frame	6mm (1/4) Balsa
9	Wing tips (2)	6mm (1/4) Balsa
10	Rudder Bottom Frame	6mm (1/4) Balsa
11	Fin Front Section	6mm (1/4) Balsa
12	Aileron Leading Edge (2)	6mm (1/4) Balsa
13	Rudder trailing Edge	6mm (1/4) Balsa
14	Tail Plane Centre Section	6mm (1/4) Balsa
15	Aileron Horn Supports (2)	6mm (1/4) Balsa
16	Aileron Trailing Edge (2)	6mm (1/4) Balsa
17	Aileron Inner Tips (2)	6mm (1/4) Balsa
18	Fin Main Section	6mm (1/4) Balsa
19	Elevator trailing Edge	6mm (1/4) Balsa
20	Tail Plane Leading Edge	6mm (1/4) Balsa
21	Top Rear Deck (Back Section)	6mm (1/4) Balsa
22	Tail Plane Trailing Edge	6mm (1/4) Balsa
23	Elevator Leading Edge	6mm (1/4) Balsa
24	Top Rear Deck (Front Section)	6mm (1/4) Balsa
25	Elevator Centre Section	6mm (1/4) Balsa
26	Wing Band Support	1mm (1/32) Ply
27	Fuselage Doublers (2)	1mm (1/32) Ply
28	Hatch Floor	3mm (1/8) Ply
29	U/C Front Mount	3mm (1/8) Ply
30	U/C Rear Mount	3mm (1/8) Ply
31	Wing Aileron Servo Mounts (2)	3mm (1/8) Ply
32	F2 – Servo Tray	3mm (1/8) Ply
33	F1 - Firewall	3mm (1/8) Ply
34	Tail Skid	3mm (1/8) Ply
35	Fuselage Reinforcement Runners	3mm (1/8) Ply
W1	Centre Section Ribs	6mm (1/4) Depron
W2	Servo Mounting Rib	6mm (1/4) Depron
W3	Servo Mounting Rib	6mm (1/4) Depron
W4	Main Rib	6mm (1/4) Depron
W5	Wing Tip Rib	6mm (1/4) Depron

Fusion Parts List

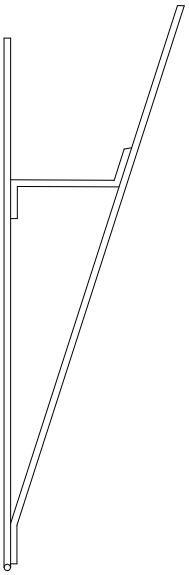
Piano Wire U/C



Front Leg 10 swg



Rear Leg 10 swg



Supports 10 swg



Tail Skid 16 swg

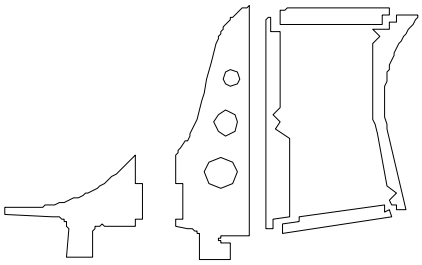
Description	Quantity
Undercarriage Front Leg	1
Undercarriage Rear Leg	1
Undercarriage Support	2
Tail Skid	1

Building Instructions

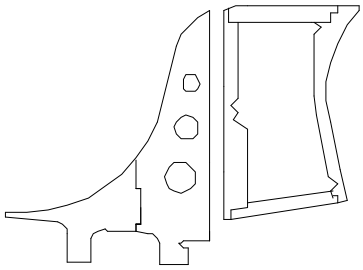
The laser is set to the minimum setting to minimise any 'V' cut in the balsa, please check and run a knife through any areas that require releasing and the tabs that hold the part in the sheet.

Fin and Rudder

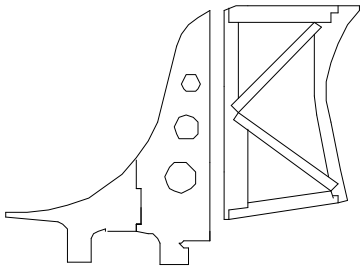
Take the three parts that form the Fin and Rudder (Parts 5, 8, 10, 11, 13 and 18), trial fit before gluing together using Cyano or white wood glue, ensure that the Fin leading edge and Fin top are at 90°. With the supplied strip of 6 x 9.5mm (1/4" x 3/8") cut to length to form the centre ribbing pieces. Mark a centre line on the Rudder leading edge and chamfer to a 45° angle with a razor Plane.



Place the parts on a bench like so



Glue together



Add the two ribbing pieces

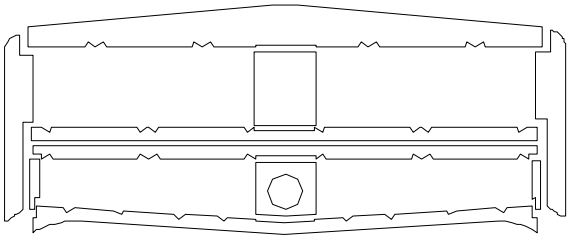
With a sharp knife cut the slots for two hinges 10mm (3/8") from the top and bottom. This gap should be parallel for the full length of the Rudder. Cut 10mm (3/8") strips from the supplied Mylar hinge material and insert into the hinge slots; 50% in the Rudder and 50% into the Fin. Ensure that you get at least 45° free movement either way. **Do not** glue the hinges in at this stage! Cover both parts with your chosen covering first.

Shaping all parts to a smooth Finish and round off the leading edge of the Fin ready for covering. !!! **Warning**. Ensure that you are wearing an appropriate mask for shaping balsa and are in a well-ventilated area. We recommend shaping in free air (outside).!!!

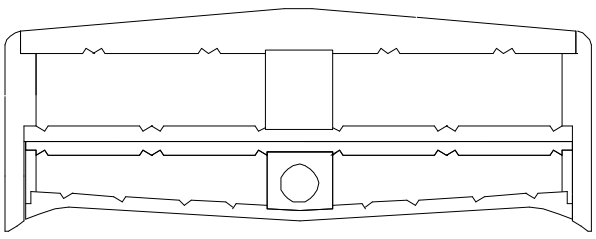
Tail Plane and Elevator

Take the five pre-cut parts (Parts 4(2), 6(2), 14, 19, 20, 22, 23 and 25) which form the Tail Plane and Elevator, trial fit, ensure the tips are at 90° to the leading and trailing edge before gluing with Cyano or white wood glue. With the supplied strip of 6 x 9.5mm (1/4" x 3/8") cut to length to form the eight ribbing pieces, glue in place with Cyano or white wood glue. Do not glue the Elevator to the Tail Plane; theses should be 2 separate pieces!

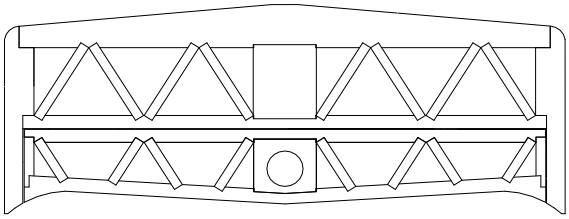
With a pencil mark the centre line of the leading edge of the Elevator and chamfer to a 45° angle with a razor Plane ready to receive the hinges.



Tail Plane parts laid out



Glue Tail Plane and Elevator parts separately.



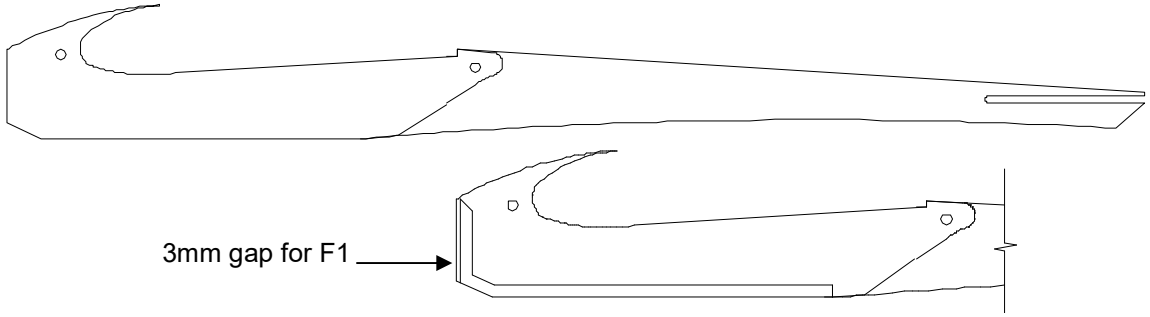
Rib pieces inserted

With a sharp knife cut the slots for four hinges 10mm in from either end and evenly spaced, ensure that the Elevator sits centrally on the Tail Plane. Cut 3/8" (10mm) strips from the supplied Mylar hinge material and insert into the hinge slots, 50% in the Elevator and 50% into the Tail Plane. Ensure that you get at least 45° free movement either way. **Do not** glue the hinges in at this stage! Cover both parts with your chosen covering first.

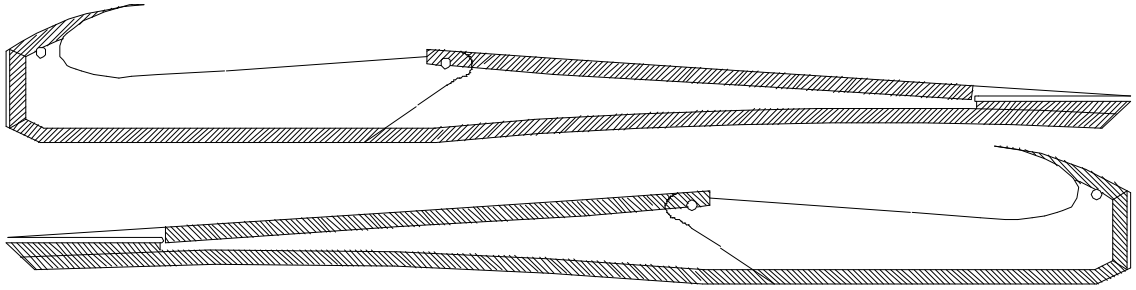
Shaping all parts to a smooth Finish and round off the leading edge of the Tail Plane ready for covering. !!! **Warning**. Ensure that you are wearing an appropriate mask for shaping balsa and are in a well-ventilated area. We recommend shaping in free air (outside).!!!

Fuselage

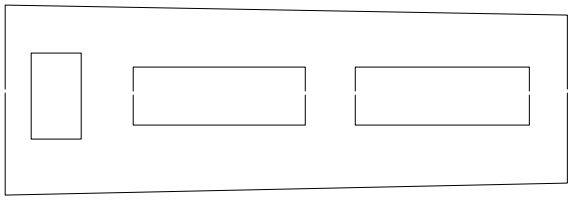
Lay the two Fuselage sides (Parts 1(2) and 2(2)) on the work bench ensuring that you have a left and right hand side. With a thin layer of epoxy or white wood glue attach the 1mm (1/32") ply doubler (Part 27(2)). Weigh down to ensure that the parts cannot 'curl' and to allow dry. Glue the reinforcement rails (Part 35 (2)) to the ply doublers, ensuring there is a 3mm gap to allow F1 to fit between the sides

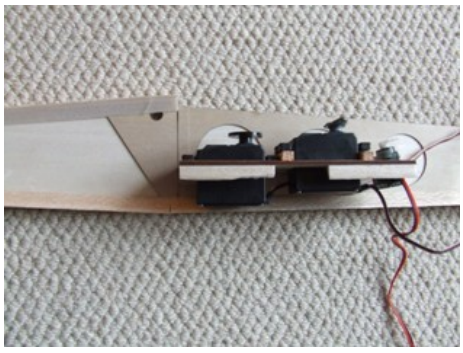


Using the 9.5mm (3/8") triangular fillet, glue with Cyano or white wood glue to the outer edge of the Fuselage shown hatched below, including over the ply reinforcement runners. Make cuts in the fillet to allow it to follow the bottom curve of the Fuselage.



Cut servo holes in F2 (Part 32) to suit the servos you have chosen for this model, note the small 9g hole is only required for the glow version, cut this area off for the electric. Carefully mark the position of F2 in the Fuselage to ensure that your chosen servos have the depth to fit, and the higher (front) servo fits below the wing seat. The rear of F2 lines up with the rear of the wing seat. The front servo sits on the two pieces of 6 x 6mm (¼ x ¼) spruce supplied in the hardware pack. These can be glued in place now or when fitting the servo later.

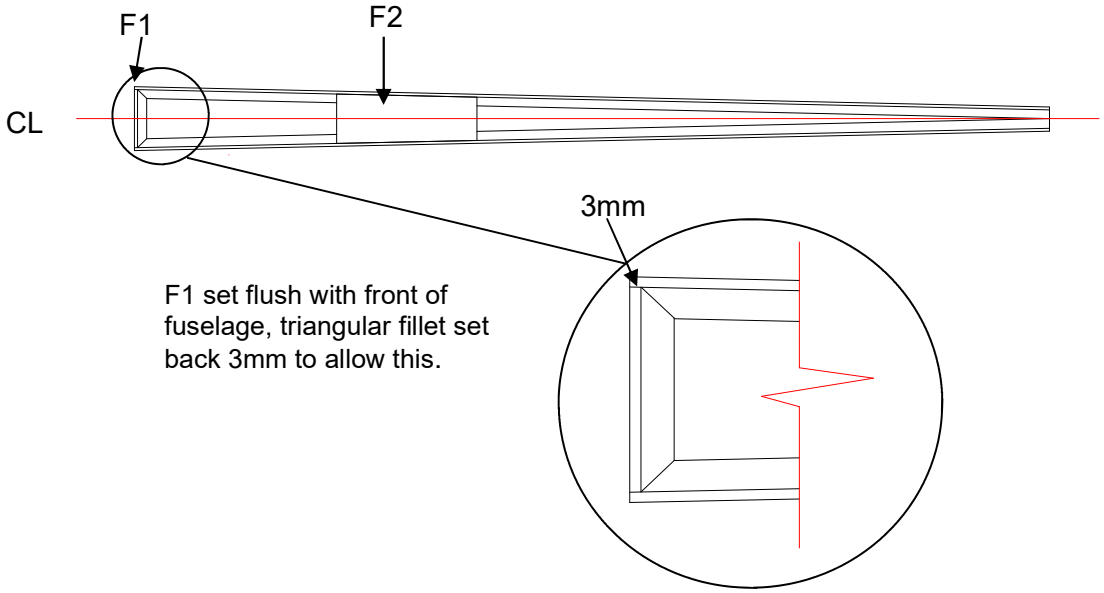




Glue the excess triangular fillet to the underside of F2 and dry fit between the Fuselage sides, ensure that F1 fits in the 3mm (1/8”) recess left at the front. If you are building the electric version carefully drill holes at the top and the bottom of the former to allow air to enter the Fuselage for cooling.

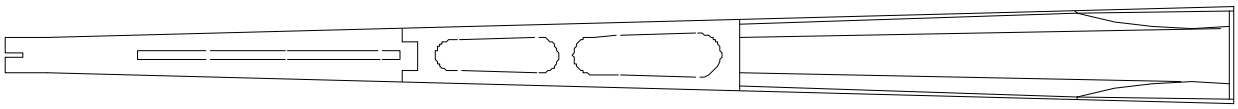
F1 should be placed with the pre-cut hole set towards the bottom of the Fuselage, once glued in place chamfer the top and bottom to follow the Fuselage sides.

With F1 and F2 in place the Fuselage sides should taper back so that the triangular fillet at the rear just touches. Once satisfied that the part fits correctly glue in place using epoxy. We have found this easier by gluing F2 to one side of the Fuselage first and allowing to dry before offering the other side and inserting F1. Ensure that F1 is 90° to the centre line of the Fuselage.

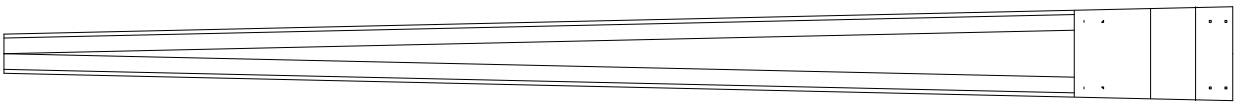


We have shown standard servos fitted in the Fuselage, but recommend that you use a good quality mini/micro servo to reduce weight. Ensure the mini/micro servo is of the same or better specification as a standard servo.

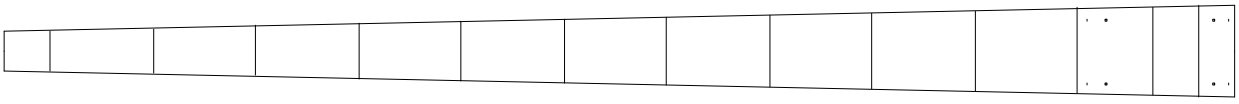
Once the epoxy has set, glue top two top decking parts together (Parts 21 and 24) and then to the Fuselage, ensuring the rear Fuselage remains square and the cut out for the Fin remains along the Fuselage centre line.



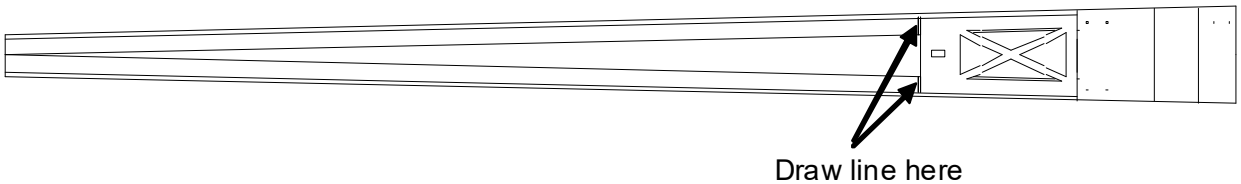
With epoxy glue the front ply (Part 29), centre balsa (Part 3) and rear ply (Part 30) undercarriage plates into position.



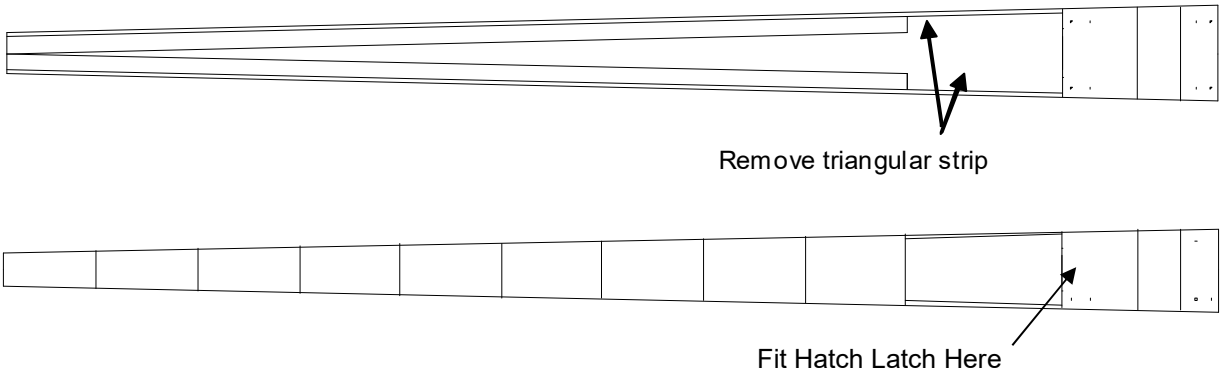
With the supplied the sheet of 3mm (1/8”) balsa plank the front top deck of the Fuselage. If you are building the **glow version** continue to plank the whole of the bottom. The planking grain should run from side to side to provide maximum strength.



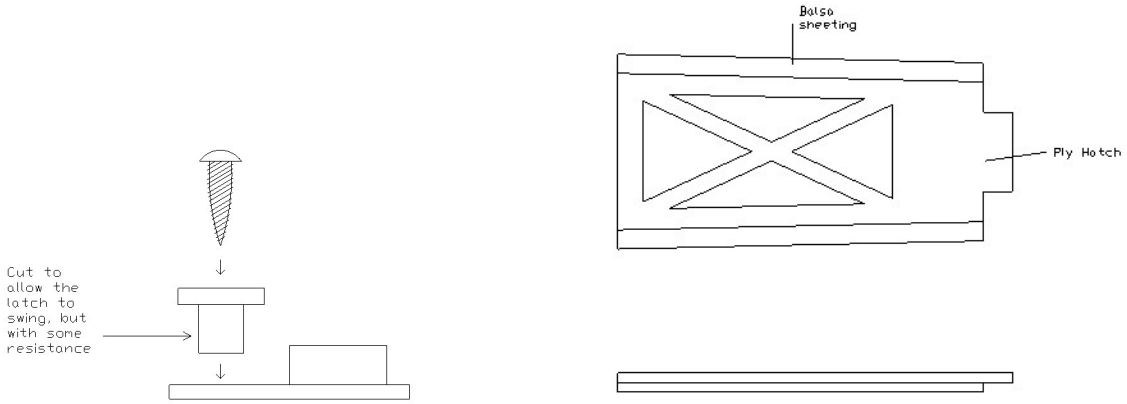
If you are building the **electric version** take the battery hatch floor (Part 28) and place the tab under the ply U/C mount and mark the ends as shown below.



Remove the section of triangular balsa, leaving the ply reinforcement runners in place, and plank with the 3mm (1/8”) sheet from this point to the back of the Fuselage.

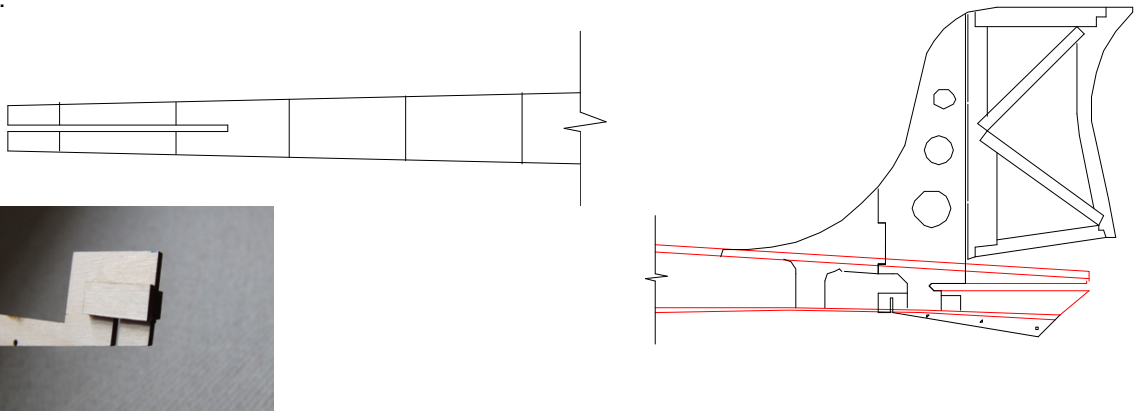


Plank the bottom of the hatch floor with 3mm (1/8") balsa except for the tab that fits under the U/C mount. Test fit the hatch latch by drilling a hole in the rear edge of the U/C plate as shown above. Cut the inner bush to allow the latch to swing with resistance once the screw is fully seated.



Shaping the Fuselage to shape rounding off the top and bottom decking and shaping the top deck at the front down to 1mm (1/16”) where it meets the wing. !!! **Warning**. Ensure that you are wearing an appropriate mask for shaping balsa and are in a well-ventilated area!!!

Lay the Tail skid (Part 34) on the bottom of the Fuselage and mark the distance from the rear, cut a slot 3mm (1/8”) wide to accept the skid along the centre line of the Fuselage. Slot the Fin in from the top and ensure that the parts mate within the Fuselage. Glue scrap pieces of ply either side of the Tail skid slot to prevent the Tail skid wire rotating as in the picture below. Ensure that they are not too large to slide into the Fuselage.

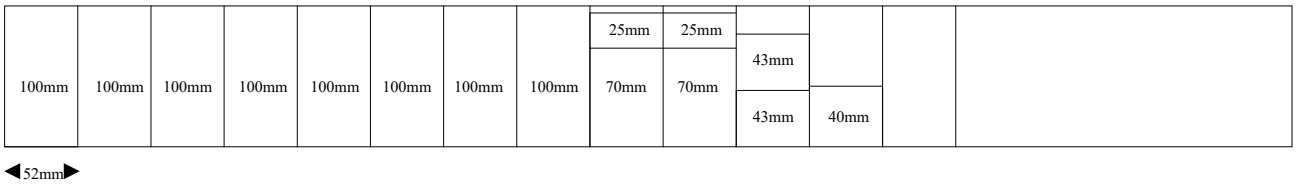


Adjust to suit before gluing in the skid with epoxy. **Do not** glue the Fin in at this stage. Ensure that the Tail Plane can fit into the Fuselage slot and the Fin slot without fouling.

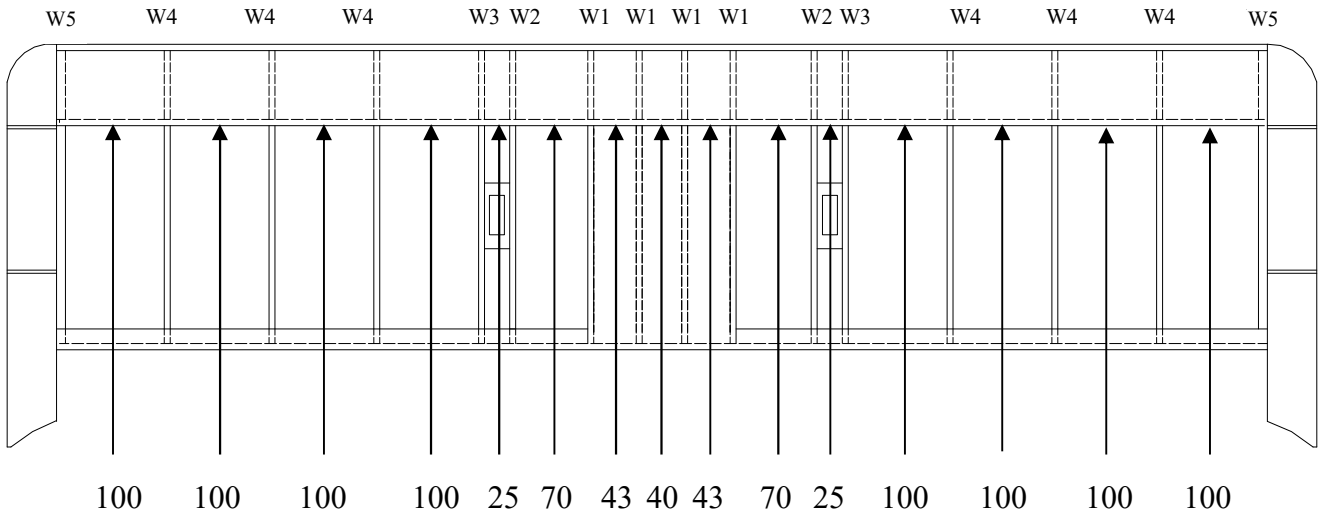
Wing and Aileron

We recommend building the entire wing with Aliphatic Wood Glue. It is generally fast setting and can be shaped at the same rate as balsa**.**

Cut each piece of webbing from the supplied sheet of 1.5mm x 100mm x 915mm (1/16" x 4" x 36") as per the spacing shown below, making sure that all the webbing is perfectly square. Each webbing piece should be approximately 52mm (2 1/16") high, for example cut 8 No. webbing pieces 100 x 52mm (4" x 2 1/16"), 2 No. at 25 x 52mm (1" x 2 1/16") etc.



The webbing should sit on the front of the spars, do not glue in place now, just use as a guide for rib spacing. Carefully cut the ribs from the Depron sheet.



Dimensions shown in mm

Pin the main and trailing edge spars ¼ 6mm x 6mm x 1220mm (¼" x ¼" x 48") to the surface. Use a straight edge to ensure that it is completely straight and both parts are parallel. Mark the centre of the spar and the centre of the centre webbing; pin the centre webbing to the spar and place each rib in turn working equally on both sides, separating each rib with a webbing piece previously cut to size as directed in the drawing above. Push the rib down onto the spar so that the rib is flush with the board. N.B. It is important that the bottom of the rib sits flush with the spar.





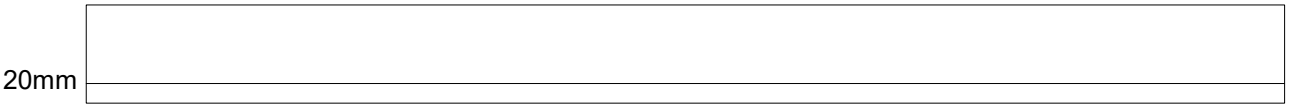
As you install W2 take a piece of paper and roll into a tube to carry the servo wires to the centre section, this is optional, but we Find this makes the installation look tidier. These need to be inserted as work proceeds as it is impossible to insert after all the ribs are in place. Once the tube is in position wrap it with Sellotape to seal the edge once in position.



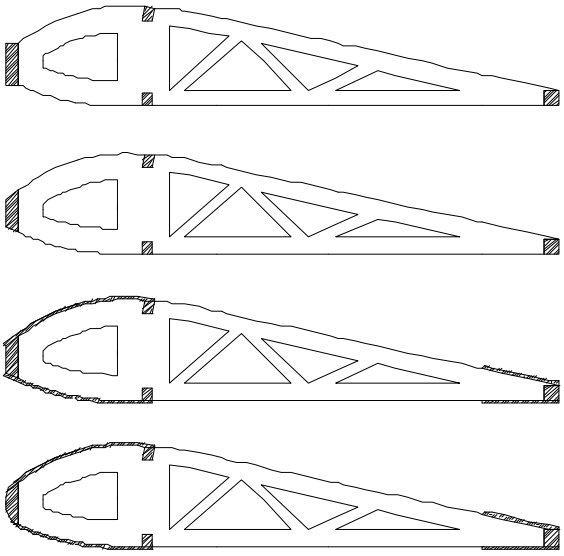

Continue to place the ribs, you may find that the final rib is approximately 3mm (1/8") short of the end of the spar, cut the excess spar off later. Ensure that you place the correct rib in the correct position as per the diagram above. Once dry, place the upper spar into position and glue in place. Glue the ribs in place, check to make sure that the ribs are all vertical and at 90°. Once dry, glue the webbing in place.

Glue the 6mm x 25mm x 1220mm (¼" x 1" x 48") leading edge (LE) strip on to the front of the ribs. Pin in place and allow to dry.

Cut the 1.5mm x 100 x 1220mm (1/16" x 4" x 48") leading and trailing edge sheet into two pieces each measuring 1.5mm x 80mm x 1220mm (1/16" x 3 ¼" x 48") and 1.5mm x 20 x 1220mm (1/16" x 3/4" x 48")



Chamfer the LE as shown below before gluing on the 1.5mm x 80mm x 1220mm (1/16" x 3 ¼" x 48") LE. The Sheeting on should run from the centre of the main spar to the LE, if it sits 2-3mm back from the LE this is fine as when you shape the LE it will remove this material anyway. The remaining 1.5mm x 20mm x 1220mm (1/16" x 3/4" x 48") is used for the Trailing Edge (TE). The LE sheet should be glued to the LE first checking the sheet bends to the centre of the spar, then when dry place glue on the ribs and spar pull back into position and allow to dry.



Un-pin from the board and repeat the sheeting process to the underside of the wing. Once completed cut off any excess spar, leading, trailing edge and sheeting, leave flush with the end ribs.

Take the 1.5mm x 75mm x 1220mm (1/16” x 3” x 36”) sheeting supplied and sheet across the 4 centre ribs to both top and bottom of the wing, glue to the ribs. Cut a hole in the underside of the sheeting between the two centre ribs to allow the servo leads to exit.





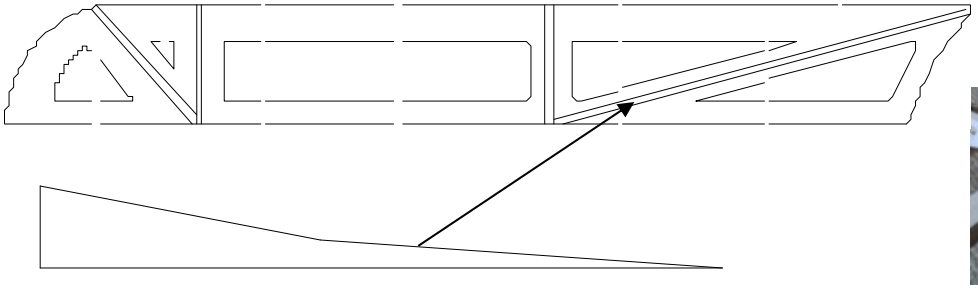
Cut the 1.5mm x 6mm x 915mm (1/16” x ¼” x 36”) capping strips to length and glue in place. Ensure good bond with the leading and trailing edge sheeting to prevent these pieces moving independently as this will cause problems when shaping, repeat to the bottom of the wing.

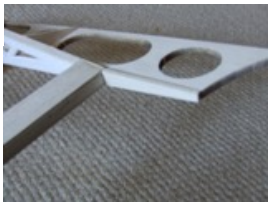


Take the servo mounting plates (Parts 31(2)) from the birch ply and cut holes to suit your chosen servos. Once satisfied the servo is a good fit, glue this piece into the wing. With scrap pieces of 9.5mm x 4.5mm (3/8” x 3/16”) glue packing pieces from the servo tray to the wing capping surface to allow provide a surface for the covering to Finish.



Take the two wing tip pieces (Part 9(2)) and glue onto the tips of the wing using foam safe Cyano or UHU Por. The tip should be lined up with the centre of the leading edge and the centre of the trailing edge. With some scrap 3mm (1/8") sheeting make the triangular fillet pieces to support the wing tip. We generally only install the supports to the upper side of the wing, but you may wish to support on both sides. Position the fillets as set out below. The TE fillet will have to be 'cranked' to allow the covering to follow the wing contour neatly.





Example of cranked TE fillet

Where the tip extends past the trailing edge of the wing make a fillet with scrap 1/8" (3mm) balsa as shown in the right-hand picture above.

Shape the leading edge roughly with a razor Plane before Finishing with shaping paper as shown in the diagram on page 11, continually checking the fit to the Fuselage.

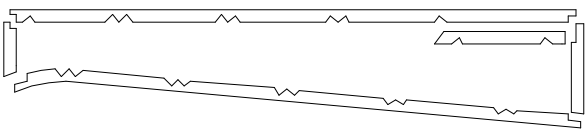
Shaping the entire wing to provide a smooth, blemish free surface ready for covering. !!! **Warning**. Ensure that you are wearing an appropriate mask for shaping balsa and are in well ventilated area.!!! Check the fit with the Fuselage as you go.

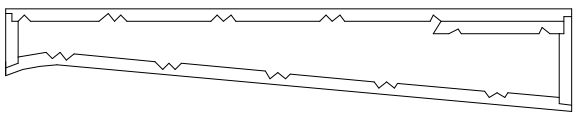
At this point if you would prefer you may cut off the front sheeting that passes over the wing and glue it onto the wing itself. In the event of a hard landing it is more likely to allow the wing to 'shift'. We have not done this with the prototype models and it is left to the builder's discretion.

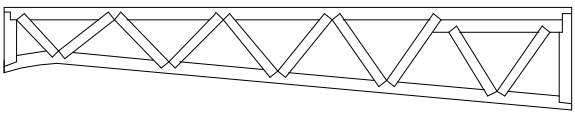
Glue the 1mm (1/32") ply doubler (Part 26) to the rear of the wing to protect the trailing edge when the rubber bands are fitted

Ailerons

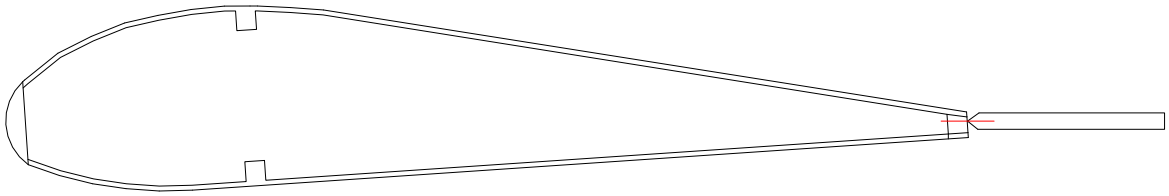
Take the five pre-cut parts (Parts 7(2), 12(2), 15(2), 16(2) and 17(2)) which form the ailerons, trial fit, ensure the tips are at 90° to the leading edge, fit the trailing edge, when satisfied glue with Cyano or white wood glue. With a supplied strip of 6mm x 9.5mm x 915mm (¼" x 3/8" x 36") cut to length to form the ten ribbing pieces, glue in place.







With a pencil mark the centre line of the leading edge and chamfer to a 45° angle with a razor Plane. With a sharp knife cut slots for four hinges 10mm in from either end and evenly spaced. Ensure that the ailerons sit flush with the top surface of the wing. Cut 10mm (3/8”) strips from the supplied Mylar hinge material and insert into the hinge slots, 50% in the Aileron and 50% into the wing.



Repeat the above stages for the second aileron.

Ensure that you get at least 45° free movement either way. **Do not** glue the hinges in at this stage! Cover both parts with your chosen covering first.

Shaping to provide a smooth, blemish free surface ready for covering. !!! **Warning**. Ensure that you are wearing an appropriate mask for shaping balsa and are in well ventilated area, we recommend shaping in free air (outside).!!!

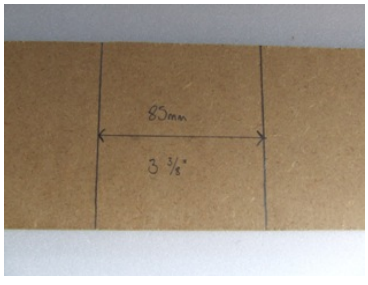
Covering

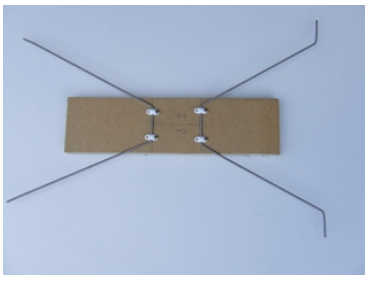
Before covering seat the wing, Tail Plane and Fin and make sure that all fit. Make any alterations as necessary with Fine shapingpaper and a block. Finally shaping all parts to provide a smooth, blemish free surface ready for covering. !!! **Warning**. Ensure that you are wearing an appropriate mask for shaping balsa and are in well ventilated area, we recommend shaping in free air (outside).!!!

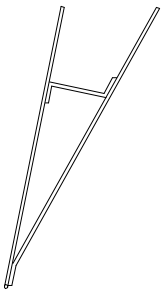
This is your chance to express yourself; unlike the ARTF models on the market you can now choose your own colour scheme. The prototype models were covered in Solarfilm or Profilm, but the choice is yours. Just make sure that you follow the manufactures recommendations when applying the film. We would recommend applying a surface sealant to the area around F1 so that the film adheres better in areas where it is likely to be exposed to glow fuel (glow version). We also recommend that you apply a glow fuel sealant to the radio compartment of the Fuselage. Follow the manufactures recommendations when applying. Ensure when you cover the model you do not introduce any warps, cover each section and evenly tighten the covering on both sides. Ensure when you have Finished covering all parts they are straight and true.

Tail Skid and Undercarriage

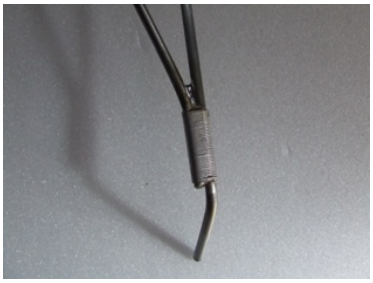
Draw two lines on a piece of scrap ply 85mm (3 3/8”) apart. Place the front leg and rear leg on each of the lines and screw down using the supplied 10swg saddle clamps and screws. Make any minor adjustments with pliers to make sure that the legs are parallel where they are to be bound.





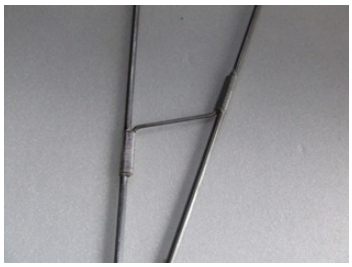


Clean the tops of the legs with sand paper or wire wool to remove any dirt or lubricants ready to solder. Pull the legs together so that they join as shown in the photograph. The U/C should also rake forward as shown in the diagram below. Bind together using tinned copper wire.

Heat the wire using a blowtorch and feed solder into the joint, ensuring that you flood the joint to make it strong. Clean off the excess with a damp cloth; **do not** touch the leg as it will be extremely hot. We advise wearing gauntlets at this point. Repeat for both sides. Once cool remove from the scrap ply. Save the clamps and screws.

With the two support pieces, offer these up to the main U/C legs and Find the point at which they best fit, make minor adjustments as before. Bind and solder as before. Repeat for the second side, ensuring that the supports are positioned symmetrically.



Once the Fuselage has been covered, line the undercarriage up with the centre of the two mounting plates. Ensure that it is placed square to the Fuselage. Place the saddle clamps over the wire screw into the pre drilled holes. Make sure the axles are at 90° to the centreline of the Fuselage. Minor adjustments can be made with pliers or mole grips, just ensure that you hold the undercarriage legs when doing this to prevent damaging the Fuselage.

Place your choice of wheel, we use 2” (50mm) wheel followed by 8swg collets. Ensure that the wheel rotates freely and tighten the second grub screw. Cut off any excess piano wire.



Take the pre-bent 2mm (16 swg) wire and attach to the Tail skid using cotton, looping through each of the pre-drilled holes several times before securing with Cyano. Ensure the Cyano penetrates through the cotton.



Final Assembly

If you have any queries about the Final assembly or any other part of the build, then please contact us at support@evolution-models.com where we will be happy to discuss your problem and send you a photo to two to illustrate our solution.

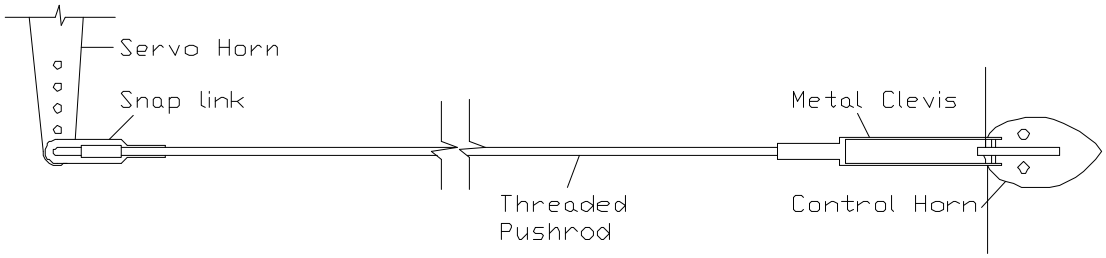
Wing

Take the fully covered wing and ailerons, glue the hinges 50% into the aileron using a thin Cyano and ensure that it penetrates the slots both top and bottom. Slot the hinges into the corresponding slots on the wing. Move the aileron full travel (min 45°) to ensure that there is no resistance and repeat the gluing process. Repeat this for the second aileron. Due to the large control surfaces we would recommend pinning the hinges. This is left to the builder's discretion.

Install the servos in to the wing and feed the wires through the tubes. Pull the wires out at the centre section where the sheeting was cut earlier. Drill pilot holes and securely screw the servos into place using the fixings supplied with the servo. Centre the servo and attach a single arm horn.

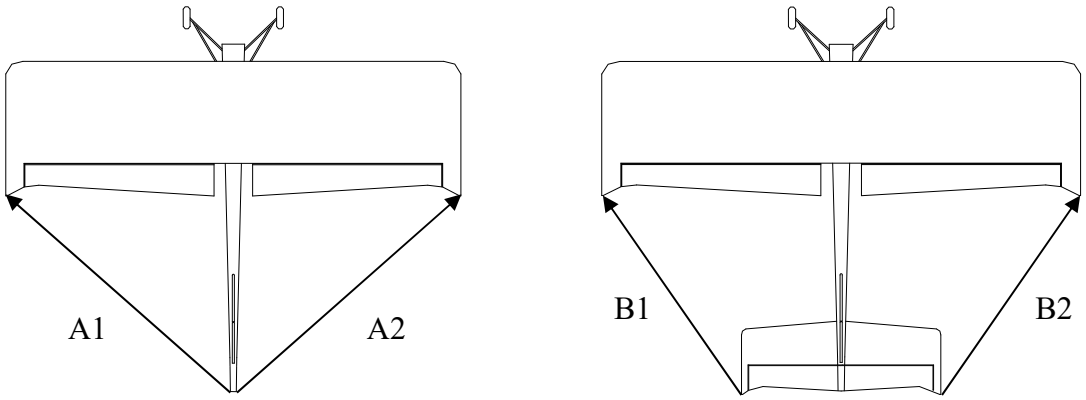
Lay a ruler on the wing lined up with the outermost hole on the servo horn running parallel with the ribs and mark the position on the aileron LE. Place the supplied control horn centrally on this mark. Mark the positions of the holes and drill two 1.5mm (1/16") pilot holes. Place the horn over the holes and insert 2 No. bolts through to the supplied backing pieces. Screw on the bolts and tighten the assembly to the aileron, making sure the horn remains at 90° aileron leading edge. Once satisfied that the horn is secured, cut off the remaining bolt thread and run some Cyano onto the thread to ensure the nut cannot be loosened.

Repeat this for the second aileron. With the supplied threaded rods, screw on a clevis to allow equal adjustment up and down the thread and connect to the horn. Mark the rod at the servo horn hole when the training edge of the aileron in line with the wing tip. Make a 90° bend in the wire a curt off the excess wire, fix to the horn using the swing keeper supplied.



Fuselage

Take the fully covered parts for the Fuselage and insert the 8mm (5/16") dowels provided. Glue in place with white wood glue or Cyano. Fit the wing to the Fuselage and hold in place with an elastic band so that it is firmly seated, but able to move for adjustment. With a tape measure check that the Fuselage is square to the wing as per the diagram. Ensure A1 = A2.



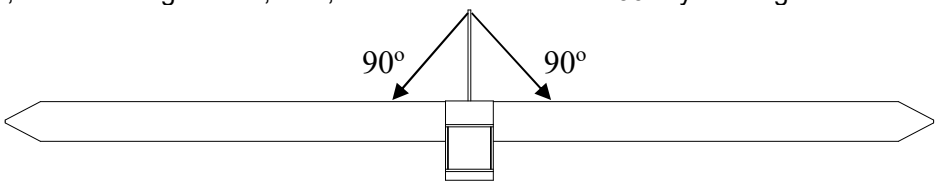
Insert the Tail Plane into its slot and check the measurement B1 = B2. Once satisfied that the Tail Plane is square, mark with a pencil both top and bottom along the edge of the Fuselage. Remove the Tail Plane from

its slot and carefully cut 1.5mm (1/16”) on the inside of the line to remove the covering film from both the top and bottom.

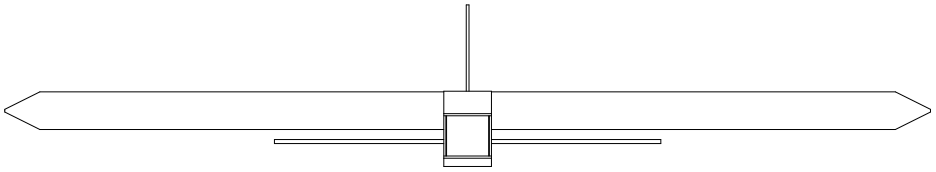
Take the Fin and insert into the slot. With a pencil mark along the Fuselage as with the Tail Plane, remove the Fin and remove the covering from 1.5mm (1/16”) below the line.

!!! **Warning**. Only cut through the film while undertaking the tasks above, **do not** cut into the balsa as this will weaken the Fin and may cause it to fail in flight!!!

Re-insert the Fin and make sure that the cut-out in the base of the Fin lines up with the Tail Plane slot. Insert the Tail Plane to confirm. One satisfied with the fit, glue the Fin into position using epoxy on the base where it joins to the Tail skid and Cyano or white wood glue at the junction with the top deck. Ensure that the Fin is vertical, with the wing seated; also, check that the Fin is at 90° by viewing it from the front.



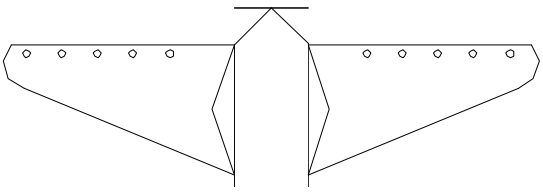
Glue the Tail Plane into position, apply the glue inside the slot, top and bottom, and with help carefully open the slot while inserting the Tail Plane and release the Fuselage to clamp back down. Only apply slight pressure so as not to break the rear of the Fuselage. When inserting the Tail Plane be careful not to get glue onto the covering. Make sure the Tail Plane is parallel to the wing by viewing from the front as before.



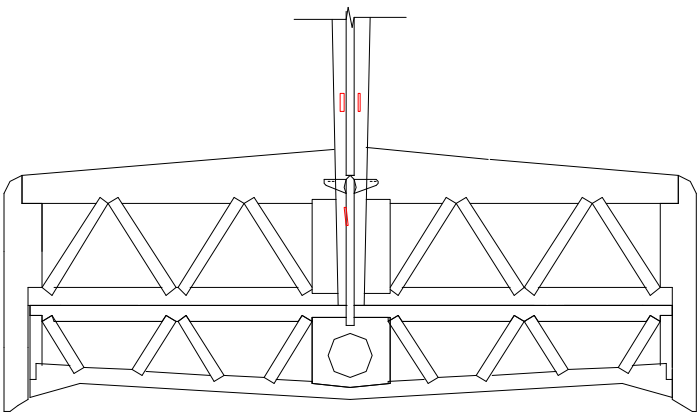
Take the fully covered Fuselage with Fin and Tail Plane fitted and glue the hinges 50% into the Rudder and Elevator. Glue using a thin Cyano and ensure that it penetrates the slots both top and bottom. Slot the hinges into the corresponding slots on the Fin and Tail Plane. Move the control surfaces full travel (min 45°) to ensure that there is no resistance and repeat the gluing process. Due to the large control surfaces we would recommend pinning the hinges, this is left to the builder’s discretion.

Fit the Elevator servo (rear servo), Rudder servo (front servo) and 9g Throttle servo (glow version) using the screws supplied with the servos, if you haven’t already, fit the 6 x 6mm (¼” x ¼”) spruce to the front servo. Pilot drill the holes first to prevent the ply and spruce splitting.

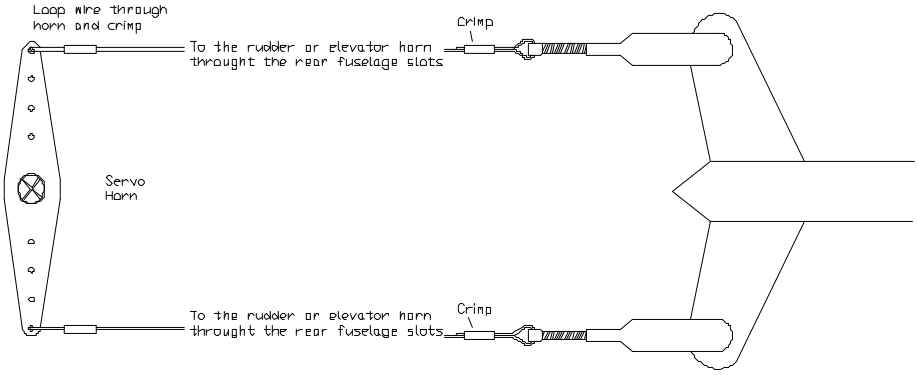
Using two horns from the hardware pack on both the Elevator and Rudder, install them as described earlier for the ailerons, except using a horn either side of the control surface. The Elevator horn is placed at the centre of the Elevator and the Rudder horns are placed at the bottom of the Rudder parallel with the bottom rail. Ensure that they are tight and sealed with Cyano as before. For those wishing to get larger Rudder movements move the horn back from the hinge point by approximately 12.5mm (½”).



With a Bradawl make holes for the closed loop system to exit the Fuselage as shown below. Start by making a hole at 90° to the surface, then increase the angle while twisting the Bradawl to about 5°. Make the holes in the positions as shown on the diagram. We have found it neater to insert tubes into the holes, and have used old pen inners (Biro) or excess Bowden outer glued in place with Cyano. Ensure Cyano does not enter the tube, or it will glue the cable fast. The hole for the upper Elevator closed loop cable will be placed centrally on the rear deck but needs to be inserted at an angle so that the cable can be run past the Fin post.



Make up the closed loop systems to the Elevator and Rudder as shown below.



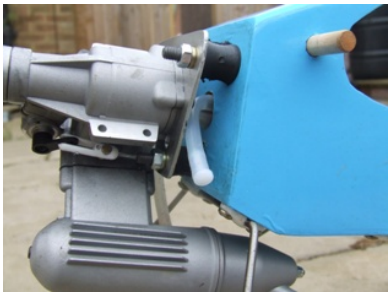
Ensure the crimps hold the wire tightly, place a drop of Cyano to make sure the wires cannot move.

GLOW VERSION

The following paragraphs are for those wishing to use a glow engine, for those wishing to use electric please step forward to the Electric Version. Within this section we can only provide a general overview as we cannot provide solutions for every set-up. Be sure that you read and follow the manufactures recommendations for all the components you are about to install.

Engine Mount

The choice of engine mounting system is left to the builder. For glow versions of the model we have used a rubber mounting system as pictured below. Ensure the engine is securely fixed to F1 using whatever method you prefer. Be sure to follow the manufacturer's recommendations when mounting and operating the engine.



Throttle Cable and Servo (Glow Version)

Mount the 9g servo for the Throttle (We recommend using a good quality servo for this application), so that the Throttle arm is closest to the side with the engine Throttle body. Make a 4mm (5/32") hole in F1 in line with the engine Throttle arm. Thread the supplied Bowden outer tube through F1 and cut to length to allow the servo full movement when the inner steel cable and clevis are fitted. Also, remember that the tank must

sit up against F1 and below the wing seat. The position of the Throttle cable must allow for this. The Bowden cable will fit along side that tank. Use scrap balsa or ply to fix it to the side of the Fuselage.

Put one of the supplied clevises on the end of the Bowden cable. Pass it through the outer tube from the engine into the radio bay and clip it onto the engine Throttle horn.

Clip the second clevis onto the servo horn and set the servo and carburettor to idle position. Mark the position of the clevis on the Bowden cable, allowing enough cable to go into the end of the clevis. Cut the cable and attach the clevis. Make sure that the servo opens to full Throttle and the trim can fully close the Throttle barrel. Adjust the horn position/horn hole used etc. to ensure the Throttle range is correct. Also, make sure that the servo is not made to work excessively. Ensure the route to your Throttle arm is a straight as possible.

Fuel Tank

Install the fittings as directed by the instructions supplied with the tank. The breather pipes should face up to the wider dimension of the tank. Cut the supplied fuel pipe to provide a feed pipe to the carburettor for filling the tank and pressure pipe from the silencer. We would also recommend fitting a fuel filter in-line.

ELECTRIC VERSION

Motor Mount

Mount the motor using the recommended motor mount ensuring that it is securely attached to the firewall, do not use screws, only use lock nuts, bolts and washers suitable for this application.

Electronic Speed Controller (ESC)

On the prototypes, we mounted the ESC under the Fuselage between the undercarriage mounts, this provided constant cooling which is essential to prevent the ESC from cutting out. Carefully drill holes through the bottom of the Fuselage for the wires to pass into the radio bay. Stick the ESC to the bottom of the Fuselage using double sided tape or hook and loop strips. **NEVER** program or alter the ESC settings with the propellor attached!!



Motor Battery

We would recommend using a Lithium Polymer (Li-Po) battery for this model, use extreme caution when using Li-Po batteries and **always** read the manufacturers or suppliers instructions when handling and charging this type of battery. The battery sits at the front of the Fuselage and can be moved forward or back to alter the centre of gravity (Explained later). Once the centre of gravity is achieved ensure that the battery is unable to move during flight or foul the servos.

Receiver and Battery Position

The battery and receiver are to be located between the servo tray and tank or flight battery. For the Electric version mount, as close to the servos as possible to allow maximum space in the battery compartment. Ensure that both components are isolated from airframe vibration and that they are not able to move when the model is in flight.

Control Throws

We only recommend setting the model up with sport flying throws unless you are an experienced flyer. Increasing the control rates will make the model extremely responsive!

For test flying and sports flying, set the control throws up as shown below:

Ailerons - 30mm Up and Down measured at the tip
Elevator – 30mm Up and Down measured at the tip
Rudder – 65mm Left and Right measured at the top

These control throws will provide docile flight characteristics, suitable for test flying. Once confident in the models performance increase the rates. At Evolution, we fly our display models with the following settings on the transmitter high rate settings:

Ailerons - 45mm Up and Down measured at the tip
Elevator – 40mm Up and Down measured at the tip
Rudder – As much as possible!

When you are content with the control setup, use some heat shrink tubing or excess fuel tube over the clevis to ensure that it cannot open.

Flap Mix

If your transmitter can mix in flaps, we have used this function to make the model loop and pitch much tighter. Flap is when the ailerons move in the same direction (up or down) together.

To set this mix up increase the Elevator movement until the model begins to screw out of loops with movement once this begins to happen back off the movement slightly. Repeat this with the flaps, with full up Elevator and full flap the model should be able to perform a tight loop without 'screwing out'. We highly recommend this mix as it makes the model more stable in loops and at slower speeds.

The flaps should be set as below:

Elevator up – Flaps (Ailerons) Down
Elevator Down – Flaps (Ailerons) Up



(Flap mix shown with high rates switched on)

Centre of Gravity (CoG)

Once you have completed the model, and all components, including receiver and batter have been installed check the balance of the model with the fuel tank empty. With a helper place a Finger under the wing to see where the CoG sits. The Fusion has a huge CoG range, but we recommend starting about 25mm (1") behind the spar. When you and your helper lift the model, it should balance on this point, if it does not then add weight to the Tail or nose to correct. If possible change the position of the Lipo, radio battery and receiver rather than adding weight. For the experienced pilot this balance point is the starting point, gradually push the CoG rearward to make the model more responsive, but less stable. On display models, we have used a CoG position at 50% of the cord!

Stickers

Carefully cut out the Stickers to suit your style, spray a little soapy water on to the film in the position you wish to place the sticker. Peal the backing off and carefully position over the model. Beginning at one end place the sticker onto the surface and smooth out any air bubbles as you proceed.

First Flight and subsequent flights

We would only advise that you fly your model from a recognised model flying site; we do not recommend flying from a park or public area. If you are an inexperienced flyer we would also recommend getting your model checked by an experienced pilot before the maiden flight. This model is designed for the experienced modeller in mind, although with the control movements reduced could be used, under instruction, as a trainer. Before every flight check the model for damage, check all controls surfaces, hinges and linkages etc are secure, if in doubt **do not fly**. Make sure you have enough wing bands to prevent the wing lifting in flight. After each flight check the model for any landing damage of flight stresses, never fly a model if you believe that it has been damaged or find any signs of fatigue. Always clean down glow models at the end of each flying session.

Contact

If there are any issues with you kit please contact us at the address below, please allow 24hrs for us to get back to you. Also contact us for any advice or help during your build, we are only too happy to help.

support@evolution-models.com

Safety & disclaimer

This Radio-Controlled model is not a toy. It can cause serious injury to the operator, public and property if misused or abused. Ensure that you read all the instructions supplied with this kit and instructions provided with the engine and radio control system or any other components purchased separately carefully. Also make sure that any parts bought separately are suitable for their application.

Evolution Models do not have any control over the final assembly of the model or material used for final assembly. No liability shall be assumed for damage resulting from the use of this product. By the act of using the final assembled product the user accepts all resulting liability.

We guarantee the kit will be free from defects both in material and workmanship at the date of purchase; this does not cover any parts damaged by use, misuse or modification. Evolution Models' liability will not exceed the original cost of the purchased kit.

This disclaimer does not limit or reduce Evolution Models' liability for death or personal injury caused by Evolution Models' negligence.