

Summer Breeze Mk2

2m Span Rudder Elevator Soarer for 4-8 Channel RC Equipment.

Designed by: Stan Yeo

Produced by: Phoenix Model Products

Introduction



The Mk2 Summer Breeze can be built as a basic Rudder Elevator Slope trainer or as a full house electric sports model satisfying both the 'rookie' slope flyer and accomplished sports flyer that enjoys building. For us at PMP there is as much pleasure to be gained from building as from flying. Not only must the model be a great flyer but it must also be structurally sound and a pleasure to build with the minimum amount of fuss enabling the modeller to produce a model that they will be proud of. The Summer Breeze meets this criteria. The kit comes with the option to build anyone of the six variants,.

Radio/Electrics Required

This will be determined by which version of the model you decide to build. Basically a 4/6 channel Transmitter/Receiver. Two standard servos and 4 wing servos (JX1171mg/JX1109mg) or equivalents. For electric versions a 3536/06 1300kv motor with 40A ESC using a 2200S LiPo.

Tools / Materials Required

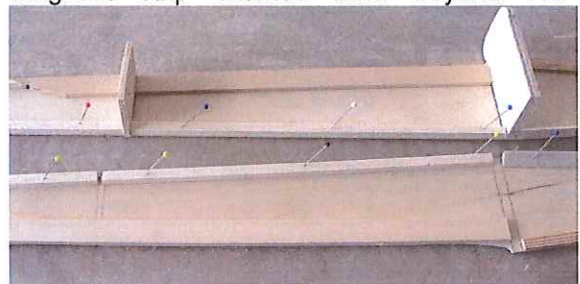
The tools required to build the Summer Breeze are a modelling knife with spare blades, a One Metre Straight Edge, a miniature David Plane, 180 grade Wet & Dry sanding block and soldering iron. 10mm thick Sundela is recommended for use as a building board (you can stick pins in it!). The glue used to build the model white PVA wood glue, thin Superglue (please observe safety precautions) and a small quantity of two part epoxy. We recommend using a polyester film for covering such as Oracover / Profilm or the thinner more economic version Easycoat.

Please Note for ALL wood joints use PVA wood glue unless otherwise stated

Building the Fuselage - Glider

1. Lightly sand the fuselage sides, top and bottom with 180 grade wet and dry to remove the 'release' agent. Remove dust with a small brush or vacuum cleaner.

2. Align the fuselage sides with the Wingseat and mark out the position of formers F2 & F3 on the inside of the fuselage sides ensuring there is a left and right side. Aligning with the Wingseat is to offset any variation in plan length due to changes in moisture content in the paper.
3. Cut slot for Rudder cable exit as indicated on plan (bottom of fuselage).
4. Tape fuselage side together and drill holes for Tailplane Bellcrank and cut actuating slot.
5. Using PVA (wood glue), glue spruce nose and wingseat strips to fuselage sides. Note wingseat strip extends back beyond F2.



6. Glue strip longeron super structure on the fuselage sides.
7. Lightly sand edges of fuselage side to prepare gluing surface to receive top and bottom sheeting.
8. Build Fin super structure on one Fuselage side.
9. Assemble Elevator control rod and install in fuselage along with Elevator Bellcrank. Anchor to fuselage side every 100-120mm using spare 6mm sq strip to form a bridge secured with Superglue.
10. Join fuselage at Fin taking care to ensure that the Tailplane piano wire rods are square to the fuselage in ALL direction both sides. Check for full and free movement of Elevator bellcrank.
11. Fit 1.5mm sheet to top of Fin.
12. Join fuselage sides (F2 & F3) together over the plan ensuring that it is both straight, square and not twisted! When glue has set fit F1 again carefully checking fuselage alignment.
13. Fit Rudder and control rods. Anchor to fuselage side every 100-120mm as per Elevator control rod. Before fixing control cables check control cable inners are not binding and move freely.
14. Fit Fuselage bottom front and back plus 10mm top nose sheet.
15. Carve out Noseblock to accept 90grms Nose weight. Approximately a further 60grms of nose weight will be required inside the nose area to achieve the correct Balance Point.
16. Sand the front 3mm ply former F1 flat and fit Noseblock.

17. Angle rear face of hatch to match front face of F2. Centrally position ply end face and Superglue in position.
18. Cut Hatch to length and slope end at front of hatch to match abutting face. Allow enough space between the front of the hatch for the two ply end faces plus enough to 'jam' a third ply plate (supplied) to hold the hatch in position whilst the 'front end' is sanded to shape. This gap is to allow for the thickness of the covering material fitting/removal.
19. After sanding front of fuselage to shape remove hatch and mark position of 3mm hatch retaining dowel.
20. Drill hole in hatch for retaining dowel and transfer position of dowel hole onto ply hatch locating plate.
21. Drill Hatch dowel locating hole in fuselage.
22. Mark position of hole for Hatch Latch on rear of F2. Tape Hatch in place and drill 1.5mm hole thro' F2 into Hatch.
23. Prepare Hatch Latch for fitting.
24. Fit ply Latch plate support.
25. Epoxy Latch assembly in place. Grease latch to avoid latch sticking.
26. Fit and hold wing in position and drill hole for wing retaining dowel brass tube (use drill long 3mm piano wire drill).
27. long 3mm piano wire drill.
28. Epoxy 6swg Brass wing dowel retaining tubes in place.
29. Using the wing, align the wing retaining nut plate, assemble and fit said plate.
30. Bolt wing in position and fit front and rear wing fairings.
31. Fit Rudder & Elevator servos as shown on plan.
32. Mount On/Off switch using switch plate provided.
33. Cut Mylar Hinges to size (12mm x 25mm). Trim corners to stop the digging in and roughen gluing surface with wet & Dry and hinge Rudder. Do NOT glue until model is covered.

Building the Fuselage – Electric

The instructions for building the electric version of the Summer Breeze follow those of the glider version up to the nose section.

1. Align ply fuselage sides with the drawing on the Electric Plan supplement and cut fuselage side to electric length.
2. Build the fuselage according to the instructions above.
3. Dry fit motor mount to F1 ply former to ensure correct alignment of Tee nuts for later fitting of the motor.

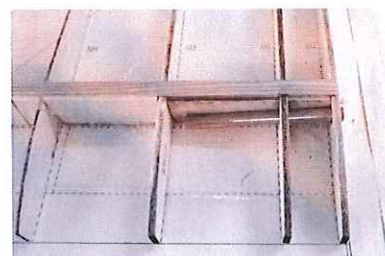
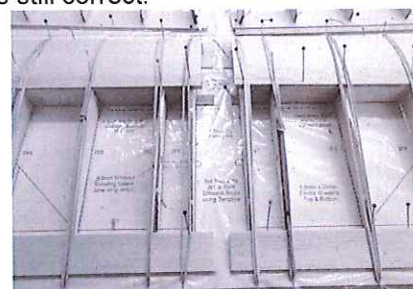
Tailplane

1. Both sides of the Tailplane are built together on the plan with the Tailplane bellcrank assembly in position to ensure the tailplane bellcrank & wires line up with bellcrank.

2. Pack up the Tailplane TE to align with the centre line of section.
3. Fit 0.8mm ply TP end plates and sand section to shape.

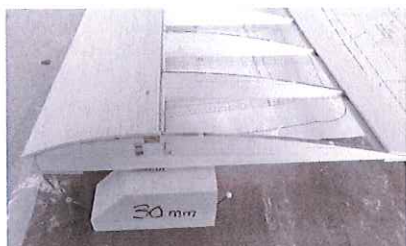
Wing Centre Panel

1. Pin a slightly over length 1.5x10mm Bottom spar in place and glue/pin Leading edge leading edge sheeting overhangs the rib ends by 3-4mm
2. Using 1.5mm scrap sheet to lift front edge of bottom LE sheeting to conform to rib profile.
3. Using the ply Rib Locator jigs and top mainspar glue Root and Tip panel ribs in position. Use 1.5mm dihedral Templates to set required root rib angle (polyhedral or flat wing). For Aileron wing pin 1.5x12mm strip to plan in front of Rear Spar. Pin a slightly over length 1.5x10mm Bottom spar in place and glue/pin Leading edge leading edge sheeting overhangs the rib ends by 3-4mm
4. Support ribs with modelling pins.
5. Glue remaining ribs in position using the top mainspar as a positioning jig.
6. Before the glue sets fit 3mm x 6mm spruce top spar. Adjust ribs for and aft as required to accommodate top spar. After fitting top spar check root rib angle is still correct.
7. Before the glue sets fit 3mm x 6mm spruce top spar. Adjust ribs for and aft as required to accommodate top spar. After fitting top spar check root rib angle is still correct.
8. Fit 1.5mm vertical spar bracing between
9. Chamfer joining edge of 1.5x25mm sheet top TE strip and glue in place.
10. Fit top LE sheeting. Use rubber bands to hold sheeting in position whilst the glue sets.
11. Before fitting Spoiler servo mounts check the servos are a snug and the mount.
12. Build opposite wing centre panel.
13. Lightly grease 6swg piano wire wing joiner to prevent sticking.
14. Dry assemble centre wing panels together using 6swg brass tubes and piano wire joiner
15. There is no centre panel dihedral on wings with Ailerons but there is **50mm** for Rudder Elevator only wings.
16. Prop up centre panel tips as required tall blocks under each panel tip rib push panels. Adjust contact faces as required.



17. Place 4mm scrap between the root ribs and pin together using modelling pins or clothes peg.
18. Push brass joiner tubes together so they meet in the middle of the 4mm gap.
19. After cross checking the dihedral is correctly set. Epoxy brass tubes wing with joiners in place. Lightly oil the wire wing joiner.
20. When epoxy has set lift panel from building board and add an epoxy bead to the underside of the brass tube joiners.

21. Fit top and bottom rear centre sheeting and 1.5mm rib capping strips.



22. Using a David

Plane and 180 grade Wet & Dry sanding block, plane / sand leading edge sheeting back to end of ribs.

23. Place Sellotape along leading edge joint to prevent excess glue going on the leading edge sheeting making it difficult to sand.

24. This best done by letting the tape



overhang edge of sheeting and trimming back with a sharp scalpel.

25. Glue leading edge in place. Use strips of masking tape to hold LE in position until the glue is dry.

26. Sand and shape leading edge.

27. Glue 1.5mm Ply rib end faces in position.

28. Fit 4.5mm hardwood locating dowels to wing root.

29. Chamfer edges of 0.8mm ply wing band protectors and glue in position.



30. Harden leading edge with Superglue around wing band area to protect it from damage by the rubber bands.

Tip Panels

1. Pin a slightly over length 1.5x10mm Bottom spar in place and pin and glue bottom leading edge sheeting in place. Note sheeting overhangs the rib ends by 3-4mm
2. Using 1.5mm sheet scrap lift front edge of bottom LE sheeting to conform to rib profile.
3. For Polyhedral wing pin 1.5x25mm TE strip in position.
4. For Aileron wing pin 1.5x12mm strip to plan in front of Rear Spar.

5. Using the ply Rib Locator jigs and top mainspar glue Root and Tip panel ribs in position. Use appropriate Dihedral Template Polyhedral/Aileron wing. Non Aileron to set required root rib angle. Ailerons 15mm, Polyhedral 100mm.

6. Support ribs with modelling pins

7. Glue remaining ribs in position using the top mainspar as a positioning jig.

8. Before the glue sets fit 3mm x 6mm spruce top spar. Adjust ribs for and aft as required to accommodate top spar. After fitting top spar check root rib angle is still correct.

9. Pin Leading Edge (LE) lower sheeting to the plan observing the rear location line and NOT the LE Strip line as before.

10. Using 1.5mm sheet scrap lift front edge of bottom LE sheeting to conform to rib profile.

11. Pin bottom 1.5mm x 10mm spruce spar in position along with the 1.5mm x 25mm bottom Trailing Edge (TE) strip.

12. Using a 'rib locator jig' to align the ribs fore and aft for top spar and vertical alignment glue ribs in position. Note that FOR Aileron use WA tip ribs. WA 5,6 & 7, are 3mm thick along with tip tip

13. This is to accommodate Aileron wing servo mounts.

14. it is important that you check the aileron servo is a snug fit in its mount.

15. Assemble and install servo mount in the wing whilst the glue is still to allow for adjustment.

16. Glue ribs in position. For tip panel root rib use Tip Dihedral Template to set rib at correct angle.

17. Before the glue sets fit 3mm x 6mm spruce top spar. Adjust ribs fore and aft as required to accommodate top spar. After fitting top spar check root rib angle is still correct.

18. Fit top 1.5mm TE strip. Again chamfering the join edge.

19. Fit 1.5mm vertical spar bracing. Note grain is vertical for strength and on both sides between W5 & W6.

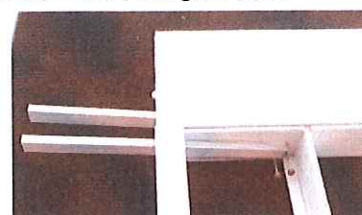
20. Pin Tip panel to building board front and back at the root rib W5 and at the front of the tip rib W11. Remove all other modelling pins.

21. To build 'Wing Washout' into wing tip panel place 5mm scrap under trailing edge at the rear of tip rib W11 and in place.

22. Fit top LE sheeting. Use rubber bands to hold sheeting in position whilst the glue sets.

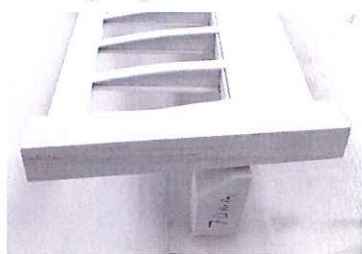
23. Fit 1.5mm rib capping

strips. Using a David Plane and 180 grade Wet & Dry sanding



block, plane / sand leading edge sheeting back to end of ribs.

24. Place Sellotape along leading edge joint to prevent excess glue going on the leading edge sheeting. This best done by letting the tape overhang and trimming back with a sharp scalpel.
25. Glue leading edge in place. Use strips of masking tape to hold LE in position until the glue is dry.
26. Sand and shape leading edge.
27. Fit and shape balsa block wing tips.
28. Build opposite wing tip.
29. Check 3mm x 6mm spruce tip braces are a comfortable fit in their respective wing panels.
30. Dry assemble Tip & Centre wing panels with centre panel, weighted, flat on the building board with 15/100mm dihedral blocks under end tip rib.
31. Check the two panels make a good joint. Adjust as necessary and glue together.
32. Centrally align the rear spruce brace on each inboard panel and mark its position with a pencil.
33. Glue spruces braces in position on the inboard panel ensuring they are aligned with each other.
34. Glue and re-assemble panels as before.



Wing Panel Finishing

Using fine (400) and medium (180) grade Wet & Dry finish sanding wing panels. Fill in any gaps /blemishes with light weight filler. Dents can be addressed by wetting the area and expanded them back out with a hot iron. Remove sanding dust with a soft brush and vacuum cleaner. Failure to do this will result in pimples when the covering is applied.

Covering & Finishing

1. The originals were covered in heat shrink film and this has proved more than adequate. Should you wish to cover in a different material please take into account any potential weight penalty that it may incur and puncture / tear resistance / repairability.
2. Give the complete model a final sanding with 320 grade Wet & dry. DO NOT use a sanding block on wing sheeting. It sand away material on top of the rib and weakens the wing.
3. Before covering vacuum the model to remove embedded dust to avoid 'pimpling' when covering.

4. Please follow the instruction for the covering material being used. Normal procedure is to tack the material at one end. Tack the other end and then proceed to gently stretch and tack along its length before sealing all along the edges and shrinking with a Heat Gun.
5. Fit controls, hinge rudder, carry out final adjustment to elevator neutral and balance the model including the wings (laterally). Balance Point 64mm +/-3mm behind the leading edge.
6. Set the control movements as per the plan i.e. Ailerons +/- 10mm, Rudder +/- 30mm Elevator +/- 8 deg. Use Tailplane Movement Jig. Fit the Tailplane with the Jig sandwiched between the Fin and Tailplane. The jig centre line should line up with the Tailplane in Neutral. The outer lines are for range of movement.
7. If using 2.4Ghz R/C equipment it is often recommended that you re-bind / pare the receiver to update failsafe settings. Please consult your equipment manual.



Flying

When satisfied, the model set-up and ready to go choose a suitable site and day to test fly Summer Breeze i.e. wind not too strong or too light. If you are an inexperienced flyer please get an experienced flyer to test fly the model and give you some flying tuition. If set up correctly very little trimming should be required. The Summer Breeze is capable of almost any manoeuvre that a non-powered rudder elevator model can be expected to perform. There are a number of articles on flying slope soarers on our website www.phoenixmp.com They include the basics of learning to fly, aerobatics, a discussion on landing techniques and more detailed information on model preparation.

Happy landings,

Stan