

# Cariba Mk2

63in Span Sports Aerobatic Slope Soarer for 4-6 Channel RC Equipment.

Designed by: Stan Yeo

Produced by: Phoenix Model Products

## Introduction



The Cariba is a follow-on from the Carrera in that it shares the same wing. We have always liked 'V' tail models since our days of flying 100S models and over the years have designed and built several. Whilst they can have a tendency to 'spin' in tight slow turns if tailplane area is a bit tight we have found them more efficient than cross tail models with the same fuselage. Construction of the Cariba features a ply sided fuselage with a fully sheeted built-up wing containing a servo in each wing allowing the ailerons to be used as Flapperons thus enhancing the aerobatic performance of the model. Most kit parts are either Laser cut or routed for greater accuracy. The Cariba is a delightful model to build and an even more delightful model to fly.

## Radio Equipment Required

The recommended radio equipment required for the Cariba is two metal geared servos i.e. Hitec HS82MG or the Ripmax New Power XL16HM or XL17HMB plus two standard size servos, a Square AA receiver battery and a 4/6 channel receiver. For Flapperons a 6ch Computerised transmitter 6ch receiver is required.

## Tools / Materials Required

The tools required to build the Cariba 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. The glues used to build the model are white PVA wood glue, some thin Superglue (please observe safety precautions) and a small quantity of two part epoxy. We recommend using a heat shrink polyester film for covering such as Oracover/Profilm or the thinner more economic version Easycoat.

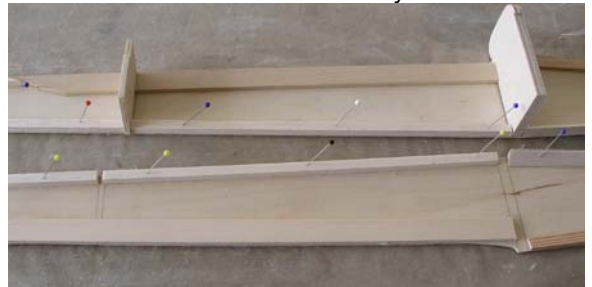
*Please Note for ALL wood joints use PVA wood glue unless otherwise stated*

## Building the Fuselage

1. Lightly sand the fuselage sides, top and bottom with 180 grade wet and dry to remove any '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 plan paper.

3. Cut slots for Ruddervator cable exits as indicated on plan (bottom of fuselage).
4. Using PVA (wood glue), glue spruce nose and wingseat strips to fuselage sides ensuring there is left and right side! Note Wingseat spruce strip extends back beyond F2.



5. Glue Tailplane triangular seat in place taking care both sides are symmetrical. *Check the seat forms a 120 degree angle!!*
6. Glue strip longeron super structure to the fuselage sides.
7. Lightly sand edges of fuselage sides to prepare gluing surface to receive top and bottom sheeting.
8. Cover plan with polythene.
9. Position fuselage over plan and glue F1 & F2 in position. Join fuselage at the rear. Take great care to ensure the fuselage is both straight and square!
10. When glue has set remove fuselage from plan and fit F1 again checking fuselage alignment.
11. Fit Ruddervator 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.
12. Tie cables together where they crossover at the rear. Seal knot with glue.
13. Fit Fuselage bottoms front and back.
14. Mark line of fuselage on underside of Hatch then fit 10mm top nose sheet.
15. Sand the front of F1 flat and fit Noseblock.
16. Fit balsa strips to underside of Hatch. Align them 1mm outside the lines previously drawn to allow for sanding.
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 and easy removal of the hatch in use.

19. After sanding front of fuselage to shape remove hatch and centrally 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 (use blunt end of glass headed pin).
21. Drill Hatch dowel locating hole in fuselage. If hole is slightly misaligned correct using spruce wedges.
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 holes for wing retaining dowel brass tubes (use drill described on plan).
27. Epoxy 6swg Brass wing dowel retaining tubes in place (photo shows Pzazz See plan!).



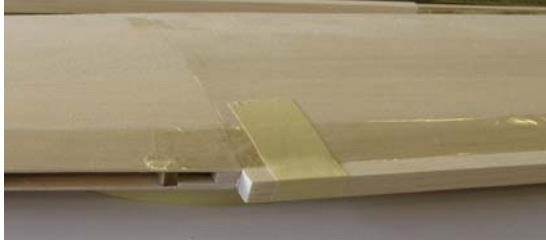
28. Mark and drill hole in wing for M5 Wing Bolt. Fit ply reinforcing wing Bolt plate.
29. Assemble wing bolt plate as per plan.
30. Using the wing, align the wing retaining nut plate, assemble and fit said plate. Use foam rubber to assist holding wing bolt plate in position.
31. Bolt wing in position and fit front and rear wing fairings.
32. Fit Rudder & Elevator servos as shown on plan.
33. Mount On/Off switch using switch plate provided. Bend 1.5mm switch operating wire to shape and dry fit. Remove before covering.
34. Draw two straight lines at a 120 degree angle on scrap paper, cover in polythene. Dry fit two halves of tailplane checking for good contact when together. Place PVA glue along TP join and pin tailplane to 'plan', hinge line down taking care to ensure TP is square to building board. Fit triangular TP joiner.
35. Place fuselage on flat surface and dry fit Tailplane. Pin in place and check distance of each TP back corner is the from the work surface and to a centre point on F2.
36. Adjust Tailplane seat as necessary and when satisfied glues in position using PVA.
37. Cut fuselage top to length. Angle at front is 45 degrees.

38. Bolt wing in position and fit front and rear wing fairings.
39. Shape Tailplane and Ruddervators.
40. Cut Mylar Hinges to size (12mm x 25mm). Trim corners to stop the digging in and roughen gluing surface with Wet & Dry.
41. Hinge Ruddervators but do not glue until model is covered.

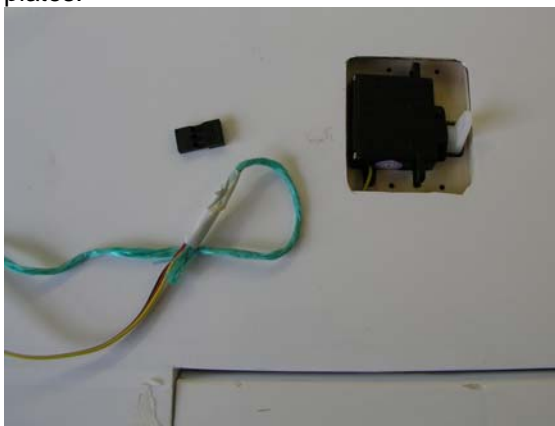
### **Building the Wings**

1. To protect the plan cover in either thin polythene or cling film.
2. Join front & back 1.5mm sheeting. Use metal straight edge to trim for a good joint. The sheeting has been Laser cut but may require further trimming due moisture changes in the wood. Sellotape them together along the joint. Hinge joint back and insert PVA glue. Place on flat surface and wipe away excess glue. Run Sellotape along top of joint. Weight down until glue set. Repeat for other three pieces.
3. Accurately align bottom sheet on plan. Note rear of sheet overhangs rear spar by 1.5mm.
4. Accurately mark position of mainspar on bottom sheet and using a straight edge glue and pin mainspar in place.
5. Elevate underside of sheeting at front and rear with scrap to conform with airfoil profile
6. Omitting W1 glue wing ribs in position.
7. Check assembly of servo mounts and the servo is a snug fit in the mount. Adjust as necessary.
8. Glue together Wing Servo Mount Assembly using PVA and before glue sets fit mount into servo bay between W4&5. Consult plan as they are handed i.e. there is a left and right hand! Push sides of servo mounts against W4&5 to make good gluing contact.
9. Using guide lines on plan glue ribs in place. For the servo bay ribs use servo mount for alignment.
10. Glue 6mm sq. strip onto front of Mainspar 1mm from the top. Ensure that it is a snug fit between ribs.
11. Build second Wing.
12. Trim and align root end of each wing panel. Sweepback on trailing edge of wing is 38mm (1.5ins). Glue panels together.
13. Glue 0.8mm ply floor panels in place.
14. Fit Spruce rear spar reinforcing strip. Ribs W1 ribs and 12mm sub-ribs W1A
15. Trim and fit 1.5mm top sheeting taking care to ensure that it is making contact with both the wing ribs and the mainspar. Use masking tape across ribs to support sheet whilst glue sets.
16. Using a David Plane / 180 grade Wet& Dry sanding block trim leading & trailing edge sheeting until level with the wing ribs. When satisfied place Sellotape along edge of sheeting top & bottom to minimise glue overspill. *Tip: Do not try to align Sellotape with edge of sheet but let it overlap and trim with a sharp scalpel.*
17. Carefully plane / sand both rear spar and leading edge to shape. *Tip: when using David Plane set blade at slight angle so that the cut is thinner on*

one side of the plane. It helps control thickness of cut.



18. Glue 0.8mm ply end ribs to balsa tips. Again there is a Left & Right! Roughly shape and glue tip in place taking care to align tip end rib with wing end rib.
19. Sand wing tips to shape.
20. Fit centre section trailing edge.
21. Shape Ailerons and cut to length. At this stage do not make allowance for 0.8mm ply ends.
22. Tape ailerons in position using Wing Tip as a reference. Check for twist.
23. Mark TE position on centre section trailing edge. Lightly draw a line across TE.
24. Shape centre section TE to shape using Aileron as a reference. When complete add 0.8mm end plates and mark position of aileron control horn.
25. Cut slot for aileron control horn. Needs to snug fit. Superglue in position AFTER covering.
26. Fit 0.8mm ply Wing Bolt washer. Give wing a final sand using 320 grade Wet & Dry.
27. Draw a line on underside of Ailerons to indicate extent of shaping required for down going Aileron relief. Shape ailerons and cut to length allowing for 0.8mm ply end plates.
28. Cut slot in Aileron for fibreglass control horn. Do NOT glue in position until Aileron is covered.
29. Fit centre wing fairing complete with ply end plates.



### **Covering & Finishing**

1. The originals were covered in Profilm/Oracover 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 thins the sheeting on top of the rib and seriously 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. Superglue Aileron PCB control horns in position.
6. Fit aileron servo output arms in centre position.
7. Hinge Ailerons using UV resistant clear adhesive tape and fit aileron servos.
8. Centre Aileron servos using transmitter sub trim and adjust Aileron pushrods. When satisfied tape servo covers in place.
9. Fit controls, hinge rudder, carry out final adjustment to elevator neutral and balance the model including the wings (laterally).
10. Set the control movement as per the plan i.e. Elevator +/- 10mm. Rudder +/- 15mm. Aileron Up 16mm Down 13mm. Up Elevator Flap Down 3mm. Down Elevator Flap Up 4mm. Landing Flap1 Up 6mm Landing Flap2 Up12mm. Balance point 105mm +/- 5mm from Leading Edge. Exponential is recommended for both Aileron and Elevator controls. Typically 30%. Landing flap will require up elevator to compensate for nose down attitude when deployed.
11. If using 2.4Ghz R/C equipment it is often recommended that you re-bind / pair 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 it i.e. wind not too strong or too light. If you are inexperienced on this type of model as a minimum get an experienced helper to launch the model. If set up correctly very little trimming should be required. The Cariba is capable of almost any manoeuvre that a non-powered model can perform including in the right conditions sustained inverted flight, inside and out side loops with rolls in the middle. The only real limitation is your flying ability and imagination! There are a number of articles on flying slope soarers on our website [www.phoenixmp.com](http://www.phoenixmp.com). They include basic aerobatics, a discussion on landing techniques and more detailed information on model preparation.

Happy landings,

*Stan*