

# Wallaby Mk2

49.5in Span Electric Sports Model 4/500w Motors & 4-6 Channel RC Equipment.

Designed by: Stan Yeo

Produced by: Phoenix Model Products

## Introduction



The Wallaby Mk2 is a 4/5 channel electric power sports aerobatic model of simple design that has a spritely performance and is a bundle of fun to fly. With a typical 4/500w 3536 size motor the Wallaby is a delight to fly and has for us brought back happy memories of the original 1981 design powered by a Fuji 25 IC motor. The optional flaps are an added bonus for those who like to play with different control setups! The Wallaby Mk2 is a very capable model and can perform all aerobatic manoeuvres expected is this type of model. The all wood easy build construction follows the now well proven path of other models in our range.

## Radio Equipment Required

The recommended radio equipment required for the Wallaby Mk2 is two metal geared micro servos i.e. Hitec HS82MG or the Ripmax New Power XL16HM or XL17HMB for the Ailerons/Flaps plus two standard size servos for the Rudder & Elevator with a 4/6 channel receiver. For Flapperon operation a 6ch transmitter and 6ch receiver is required.

## Electrical Power Train

The Wallaby requires a 3536 Brushless Motor rated at 400-500w and 1000 – 1300 Kv. A 50/60A Speed Controller (ESC) and a 2200 3S LiPo. The prototype used a 3536/06 1270Kv motor with a 60A ESC. 9x6in APCE propeller and a 2200mAh 3S 30C LiPo. With this set-up the Wallaby is more than adequately powered with typically flight duration of 10 minutes. If you use a different specification motor or a 4S battery then a different size propeller should be used. If you are unfamiliar with model electrics then please read the articles on our website [www.phoenixmp.com](http://www.phoenixmp.com).

## Tools / Materials Required

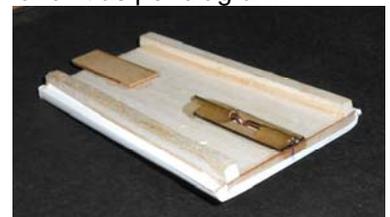
The tools required to build the Wallaby Mk2 are a modelling knife with spare blades, a 2ft /1 Metre Straight Edge, a miniature David Plane, 180 grade

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

*Please Note: PVA is the recommended glue for nearly ALL wood joints, particularly when building the wing. Also for maximum glue joint strength we recommend lightly sanding laser cut edges before gluing.*

## Building the Fuselage

1. Lightly sand the ply fuselage doublers with 180 grade wet and dry to remove the 'release' agent. Remove dust with a small brush or vacuum cleaner.
2. Using a **spirit** based contact adhesive such as Uhu or EvoStik glue the ply nose doublers in position ensuring there is a left and right side. Motor side thrust and down thrust is built in consequently the right side is shorter than the left!!!
3. Mark out the position of formers F2 & F3 on the inside of the fuselage sides ensuring there is a left and right side.
4. Cut slot for Rudder and Elevator cable exits as indicated on plan (Both underneath Tailplane).
5. Glue strip longeron super structure including triangular support strips in the nose, Wingseat and ply wing dowel washers to fuselage sides.
6. Lightly sand edges of fuselage side to prepare gluing surface to receive top and bottom sheet.
7. Join fuselage sides together over the plan ensuring that both are straight and square.
8. Before removing fuselage from plan fit spruce trailing edge back-stop, top 4.5mm sheet at front and rear of hatch and rear top sheeting.
9. Fit Rudder and Elevator control rods. Control rods exit fuselage on opposite sides. Anchor to fuselage sides every 100-120mm using scrap balsa. Superglue in place. Before fixing control cables check control cables are not binding and move freely. Tie and glue control rods together where they cross.
10. Dry fit Undercarriage to ply plate and drill 1.5mm pilot holes for saddle clamp screws.
11. Fit Fuselage bottom front and back including ply undercarriage plate using PVA glue.
12. Construct Hatch and fit as per diagram.
13. Lightly mark out centreline on tailplane ensuring it is square to the hinge line.
14. Glue



triangular strips to base of Fin and glue Fin to Tailplane ensuring it is perpendicular and **square**. If, when glue has set, it is not quite perpendicular to the Tailplane then slice the triangular strip on the acute angle (leaning towards) side and insert a thin cardboard wedge to correct any inaccuracy. Superglue wedge in place.

15. Glue Tailplane in place checking that it is both horizontal and the distances between hinge corners on tailplane to centre of F2 are equal.
16. Fit Rudder and Elevator servos.
17. Cut Mylar Hinges to size (12mm x 25mm). Trim corners to stop them digging in and roughen gluing surface with wet & Dry.
18. Hinge Rudder and Elevator control surfaces. Do NOT glue until the model is covered.

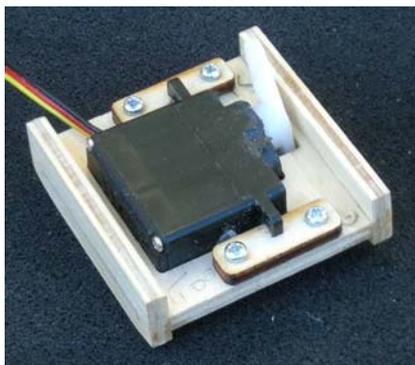
### **Building the Wings**

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 and pin to 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.



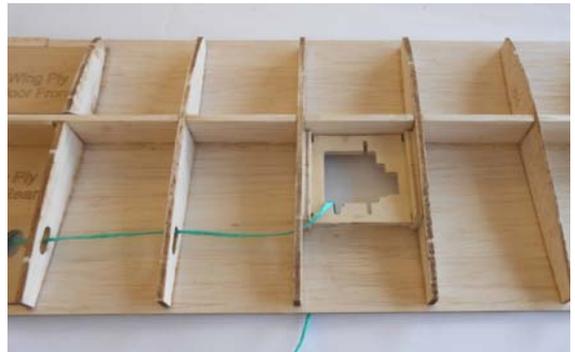
6. Omitting W1 glue wing ribs in position.
7. Glue 6mm strip to front of Mainspar 1mm from the top. Ensure that it is a snug fit between the ribs.

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. Build second Wing.
11. Trim and align root end of each wing panel. Note the mainspars are straight and not swept in either direction. Glue panels together.
12. Glue 0.8mm ply servo lead exit support washers in place and 1.5mm ply wing braces.
13. Fit W1A/B sub-ribs.
14. Thread a string through servo bay and ribs to aid final servo installation.



15. Plane / sand wing sheeting back to ends of ribs using David Plane and large flat sanding block.
16. Place Sellotape along sheeting edges to collect surplus glue. Tip: Do not try to align Sellotape with edge of sheet but let it overlap and trim with a sharp scalpel.
17. Fit 1.5mm top sheeting taking care to ensure that it is making contact with both the wing ribs and the mainspar. Tip: Use masking tape to help support sheeting whilst glue sets.
18. When glue is set remove Sellotape.



19. 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.
20. 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.
21. Sand wing tips to shape.
22. Fit centre section trailing edge.
23. Shape Ailerons and cut to length. At this stage do not make allowance for 0.8mm ply ends.
24. Tape ailerons in position using Wing Tip as a reference. Check for twist.

25. Using ailerons as a guide mark TE position on centre section trailing edge. Lightly draw guide line along TE.
26. Shape centre section trailing edge using Aileron as a reference.
27. Mark position of aileron control horn. 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 clearance for 0.8mm ply end plates and covering material.
28. When complete add 0.8mm ply end plates using Superglue to both Ailerons and Centre Section.
29. Cut slot for aileron control horn. Needs to snug fit. Roughen surface and superglue in position AFTER covering.
30. Give wing a final sand using 320 grade Wet & Dry.

### Covering & Finishing

1. The originals were covered in heat shrink film (Profilm/Oracover). 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 clean 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. Spray wing fairing and motor cowl to match your colour scheme (rattle can) (Hycote gloss white is a perfect match for white Profilm).
6. Fit aileron servo output arms in centre position.
7. Superglue

Aileron control horns in position and hinge Ailerons using Mylar strip supplied.



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 movements as per the plan i.e. Elevator +/- 10mm. Rudder +/- 30mm. Aileron Up 16mm Down 13mm. Full up Elevator, Landing Flap1 Down 6mm Landing Flap2

Down 12mm. Balance point 65mm +/- 5mm from Leading Edge. Exponential is recommended for both Aileron and Elevator controls. Typically 30%. Landing flap will may require elevator compensation to counteract any change in nose attitude when deployed. It is recommended that a pitch change check is carried out at a safe height!!

11. If using 2.4Ghz R/C equipment it is recommended that you re-bind / pair the receiver to update failsafe settings after set-up and before flying your Wallaby. Failure to do this has resulted in a number of serious accidents. Remember the Transmitter is first ON and last OFF!



12. A few simple rules for electrics. In flight it is normal for the battery / speed controller (ESC) to get warm but if it gets hot then the reasons could be insufficient cooling, too large a propeller or the battery / ESC of too low a specification. For the battery it could be due poor condition, too low a 'C' rating allied to lack of capacity. To avoid discharging the battery below the recommended voltage always land when you notice there is less power on full throttle. When landing in foliage cut the throttle immediately to avoid burning out the speed controller.

### Flying

When satisfied the model is set-up and ready to go choose a suitable site and day to test fly it i.e. wind not too strong or turbulent. If you are inexperienced please seek assistance for the maiden flight. The wing bands should be tight enough to stop the wing moving in flight yet allow the wing to move if model lands awkwardly. If set up correctly very little trimming should be required. The Wallaby Mk2, as previously mentioned, is a very lively model if set up with extravagant control throws and is capable of almost any manoeuvre that could be expected of this type of model including sustained inverted flight, inside and out side loops plus blink and miss rolls. The only real limitation is your flying ability and imagination!

Happy landings,

*Stan*

