MICRO THERMALISER

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 end 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 36” (915mm) x 16” (400mm) as a minimum.

On the CD you will find a full size plan which can be printed on a standard A4 printer in tiles and joined together. Using Adobe Acrobat select File then Print. In the print menu select poster which will bring up an overlap menu, press OK followed by print. This will print the plan on A4 paper with joining marks which can be taped together. The plan is not required to build the model, but some prefer to work this way.

Use plastic sheet or clingfilm to protect the plan or bench, this will prevent parts sticking to it

Do not snap the laser cut parts out of the holding sheets, always release by cutting the tabs. The laser is run at the highest speed possible to prevent a ‘V’ cut being formed and the wood charing. This occasionally means that in sections where the balsa is slightly harder the laser does not always penetrate full depth of the wood. Check and if required run a knife along the cut to ensure it releases for the sheet cleanly.

Read through the instructions before starting to build and understand each step before applying glue. These instructions are only a brief guide, the plan should provide adequate detail for an experienced builder to assemble the model.

Any glue detailed in the instructions is for guidance 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. **Always** read the safety instructions supplied with the glue.

Ensure that you are wearing an appropriate mask for sanding balsa and are in a well-ventilated area. We recommend sanding in free air (outside) and away from other people.

Take your time building the model to build a straight and strong model. This will ensure the model will fly well!

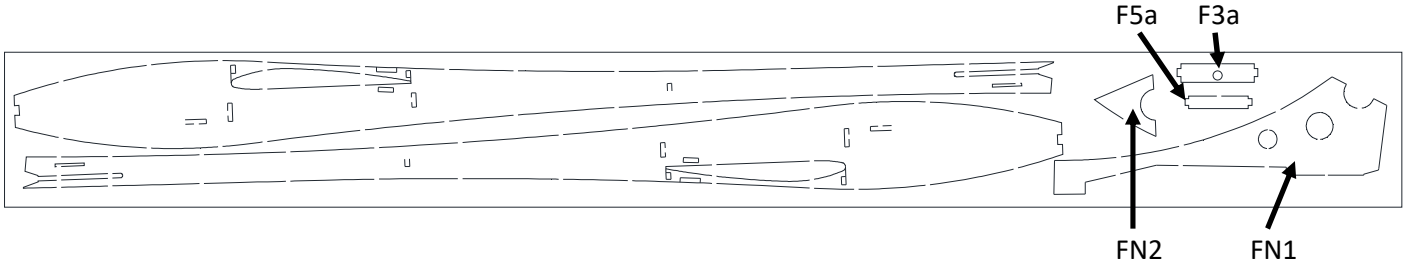
Enjoy. Building **is** part of aero modelling!

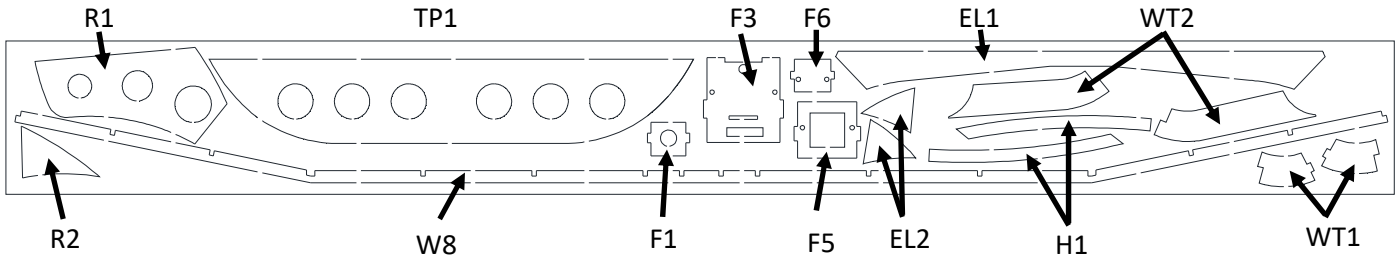
This radio-controlled model is **not** a toy. It can cause serious injury to the operator, public and property if misused or abused. Ensure that you read all the instructions supplied with this kit and instructions provided with the radio control system or any other components purchased separately carefully.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

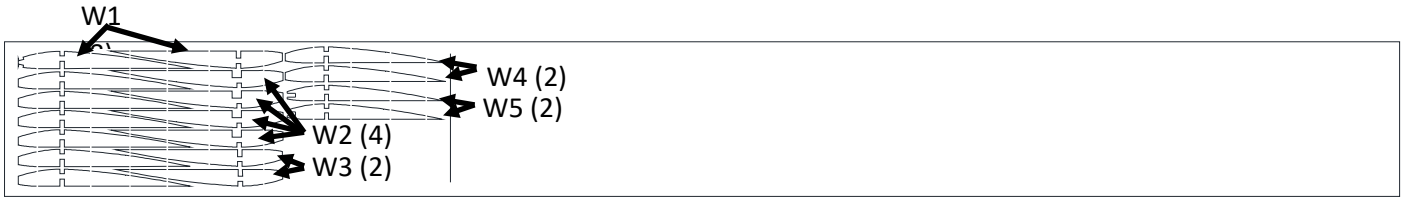
The kit contains small and potentially sharp parts, keep away from children.

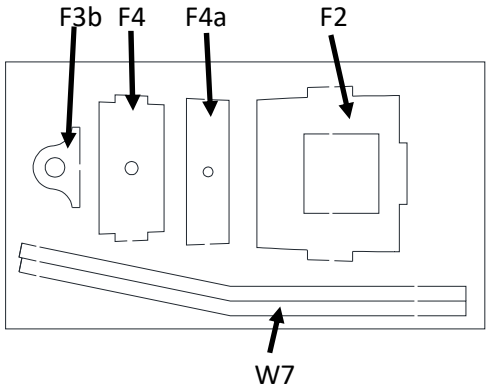
Additional Materials Required	**Recommended Tools**
Standard Thin or Medium Cyano Aliphatic White Wood Glue Epoxy Resin Heat Shrink Covering Material Radio Gear	Modelling Knife Razor Plane Set Square Sand Paper and Sanding Block Drill Drill Bits Building Board – Completely flat 915 x 400mm Min Bradawl Modelling Pins

Parts Identification









Wood Pack

Wing		
0.8 x 100 x 915	1/32 x 4 x 36	2
1.5 x 3x 915	1/16 x 1/8 x 36	2
3 x 3 x 915	1/8 x 1/8 x36	1
4.5 x 9.5 x 915	3/16 x 3/8 x 36	1
6 x 18 Dowel	1/4 x 3/4 Dowel	1

Hardware Pack

Snake Outer	2
18 SWG pushrods	2
Horns	2
Pushrod connectors	2
Control Horns	2
M3 Nut, Bolt and Washers	1
Mylar Hinge	1 Strip
Magnet and Washer	1

Pictures of the build have been provided on the on the CD. The pictures are numbered and correspond to the stages below. For example, Step 1 see the pictures labelled 1, 1a, 1b etc on the CD.

Fuselage

1. Insert the M3 captive nut into F4, ensure the nut in inserted on the underside of the plate, and epoxy in place

2. Glue F2 at 90^{o} to F3. Lay one of the Fuselage Sides flat on the bench and glue F3, F4 and F5 onto the fuselage side using the location tabs. F3 should be at 90^{o} to the sides, F2 will not touch the side at this stage. Also, glue F3a and F5a to the side in their corresponding tabs and be sparing with glue on these parts at this stage so not to stick them to F3 and F5. We would suggest not using a thin wicking Cyano as it may run to far and glue all parts together. The upper centre section of the fuselage will be made removable and stuck to the top of the wing.

3. Glue the second fuselage side to F3, F3a, F5 and F5a again being sparing with the glue to prevent the adjacent formers sticking together. Leave to fully dry.

4. Pull the front of the fuselage together and insert F1, also run glue along F2 ensuring that the fuselage sides are pulled in equally along the centre line. To check the sides are equally pulled together a line can be drawn along the bench and the centre of F3 and F5 pinned to the line. This will provide a datum line to ensure the fuselage is true.

5. Insert F6 into the location tabs and pull the back of the fuselage together again ensuring the sides have been equally pulled in along the centreline.

6. Run the snake outers provided from F3 to the exit slots at the rear of the fuselage. The snake runs through the holes in F3, F5 and F6. When they get to the rear of the fuselage they cross over to exit through the slots. Make sure the fuselage runs along the centreline before runnning some epoxy over the snakes inside the fuselage where they cross and exit to hold in position. Once dry cut the snakes flush with the outer fuselage side.

7. Pin the two hatch rails into position so that the pins can be removed from underneath once the tops sheeting has been installed. Start at the nose and sheet across the top of the fuselage. Sheet the fuselage in sections as follows using the excess 3mm (1/8”) sheet next to the laser cut ribs. This will allow the hatch sections to be remove later without cutting the sheeting:

    - F1 to the front of the hatch rails (approx.10mm (3/8”))
    - Over the hatch rails to, and including, F3 – use the glue sparingly so not to glue the rails to the fuselage sides and do not glue to the top of F3.
    - From F3a to F5a
    - From F5 to the tail

8. Once the glue has dried remove the pins and release the radio hatch. Run additional glue along the hatch rails where the glue was applied sparingly earlier.

9. Sheet the entire bottom of the fuselage using the scrap 3mm (1/8”) sheet.

10. Layer nine sections of 3mm (1/8”) balsa to form the nose and glue to F1 (alternatively, if you have any, five Layers of 6mm (¼”) balsa as shown in picture)

11. Fill the tab holes with a lightweight filler and then sand the entire fuselage, gently rounding off the edges including shaping the nose to a point.

12. Cut the wing hatch from the fuselage. Using a sharp knife cut down between the sheeting at F3/F3a and F5/F5a. Add additional glue to F3a and F5a where you were sparing earlier. Insert the small section of dowel into F3a and glue into position to allow 6mm (1/4”) to protrude into F3.

13. Glue the magnet into the hole in F3b and glue the assembly to F3. Glue the washer to the underside of the hatch so that when it is placed on the fuselage it makes contact with the magnet. Glue a tongue of scrap balsa or ply to the front edge of the hatch that will go under the front sheeting.

14. Cover the fuselage in your chosen covering.

Tail plane, elevator, fin and rudder

15. Glue Parts FN1 and FN2 together to form the fin, EL1 and EL2 to form the elevator and R1 and R2 to form the rudder.

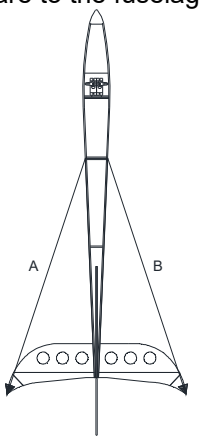
16. Round off the leading edge of the fin and tail plane.

17. Draw a line along the centre of the elevator and rudders leading edge and chamfer both edges to a 45° to a point.

18. Cut the supplied Mylar into 4.5mm (3/16") strips to make 4 hinges for the elevator and 3 for the rudder. Cut slots in each part (tail plane/elevator – fin/rudder) to accept the hinge. The bottom hinge of the rudder slots into the rear of the fuselage just under the elevator. Ensure both the rudder and elevator have free movement so that 45° is achieved each way.

19. Sand and cover the tail and control parts

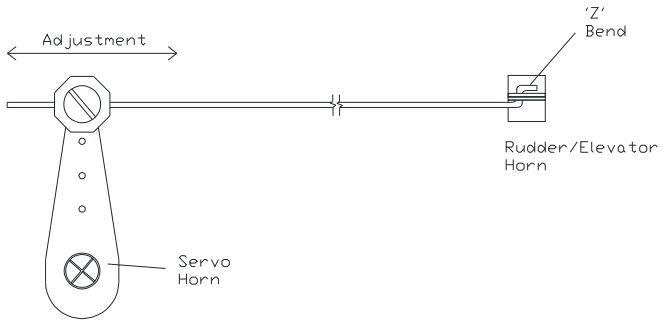
20. Offer the parts to the corresponding slots in the fuselage and ensure that the tail plane is horizontal and the fin is vertical (You may wish to do this once the wing has been completed and is seated on the model). Glue the tail plane and fin in position after removing any covering film where the parts touch the fuselage to ensure a strong joint. Ensure the Tail plane is square to the fuselage by measuring A and B as below and make sure they are equal.



21. Roughen the hinges with sand paper before re-inserting and gluing into position with a thin wicking cyano, again ensuring that free movement of 45° is achieved.

22. Install the servos into the servo tray (F2) using the screws provided. The pushrod connectors are installed through the horn (the hole may need to be made larger) and the nut is wound on to hold the assembly in place. Use Loctite or similar to prevent the nut loosening.

23. Cut or file the horns to remove the excess material as shown in the pictures. Attach the 18swg wire with the Z bend to the horn and slide through the snake feeding the wire through the pushrod connector. Make sure the servo horn is in its neutral position. Place the control horn on the elevator or rudder and mark the wire 10mm (3/8") past the push rod connector. Withdraw the wire and cut on the mark. Re-feed the assembly into the snake and fix the horn into position using the small nuts and bolts provided. Adjust the elevator and servo horn to be in the neutral position and firmly fix with the screw in the pushrod connector.



Wing

The wing is sheeted using the 0.8mm (1/32”) balsa, although thin the balsa is very easy to work with, should you wish to harden the balsa on completion of the wing it can be coated in sanding sealer prior to covering. The sheet is cut to form the Trailing Edge (TE) sheet, Leading Edge (LE) sheet, centre sheeting and cap strips. Two sheets are supplied, one for the bottom and one for the top surface. The wing is built in 3 bays (centre and two tips)



Bay 1 (Centre)

24. Glue the polyhedral braces W7 to the Main Spar W8. Pin the main spar onto the bench using a ruler to ensure it is straight.

25. Cut a strip of the 0.8mm (1/32”) balsa 16mm (5/8”) wide to form the TE. Slot ribs W1 and W2 over the spar placing the TE strip under the ribs so that it is approximately 1-2mm (1/16”) past the end of the ribs. Check the distance from the main spar to the TE strip on each end is equal. Pin the TE in place and begin gluing the ribs checking they are at 90^{o} using a set square to the main spar. Ribs W2 should be glued together in pairs before gluing to the spar. The TE sheet should only be glued to the first W2 rib, this will form the centre bay. The wing tips at the cranked section will be sheeted from the outboard W2 rib. See picture 25c where the edge of the centre section sheeting can be clearly seen.

26. Glue the strip of 1.5 x 3 x 915 (1/16 x 1/8 x 36”) between the inboard W2 ribs to form a false leading edge, cut and retain the excess for the tips later. Glue on the 4.5 x 9.5 x 915mm (3/16 x 3/8 x 36”) leading edge between the two inboard W2 ribs to the false leading edge and ribs and leave to dry.

27. Glue the 3 x 3 x 915mm (1/8 x 1/8 x 36”) top spar in place, cut at an angle, so that it overlaps onto the cranked section of the spar.

28. Cut a section from the 0.8mm (1/32”) sheet to form the LE sheet so that it fits between the LE and back halfway across the spar, Glue the sheet to the LE and False LE and leave to fully dry before bending back onto the centre of the spar. Also, install the TE 16mm (5/8) sheet. Should you need to make a join, ensure it is half way across a rib.

29. The centre section sheet spans across the 4 centre ribs. Once dry cut capping strips 4.5mm (3/16”) wide and glue to the top of the exposed ribs between the LE and TE sheets.

Bays 2 and 3 (Tips)

30. Unpin the centre section from the board and pin the cranked spar to the bench so that the centre section is in the air. Support with a block while you build the tip section. Install ribs W3, W4 and W5 as before. Repeat the process as above installing the False LE, LE, TE Sheet and LE Sheet. Note that the LE sheet tapers towards the tip. Ensure that the TE sheet extends beyond rib W5 by at least 40mm (1 ¾”) to pick up the tip later.

31. Glue WT1 and WT2 together to for the wing tip. Fit the tab into the corresponding hole in W5, trim to fit if necessary. Ensure the edge of WT1 is parallel with the edge of W5 if it is the tip will be approximately 35mm (1½”) offset from W5. Cut the TE sheeting flush with the tip and glue the sheeting centrally. Sand the tip to follow the TE sheeting.

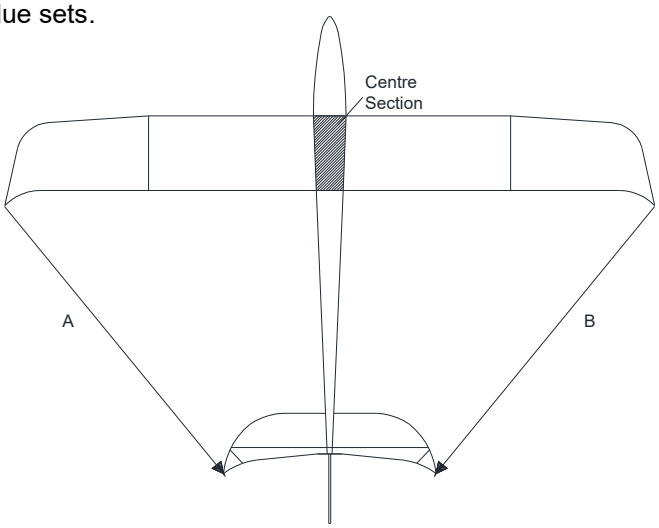
32. Repeat step 30 and 31 for the opposite tip

33. Once both tips have been completed unpin the wing from the board and drill/cut the hole through the top sheet where the wing bolt passes through F4a.

34. Sheet the underside of the wing using the 0.8mm (1/32”) sheet to reflect the sheeting on the top surface. The wing cannot be pinned down for this part of the build so you must ensure that you do not built any twists into the structure. Sheet the LE, centre section and capping strips as before. Minor twists can be taken out later with the covering as last resort, but try to ensure the wing is straight.

35. Now cover the wing, this must be completed carefully so as not to introduce any twists, which is very easy to inadvertently do. Cover the wing on both sides before shrinking the film and then shrink each side equally and very slowly. Any minor twists can be seen by holding the wing at arm’s length and looking at the trailing edge, you should be able to see if a wing tip has lifted or is drooping. By twisting the wing slightly past the point you wish it to be and adding a little heat to the covering should re-align it.

36. The wing is now to be seated on the fuselage. Remove the centre section of the fuselage and place the wing onto the main fuselage section. Place the fuselage centre section on top of the wing and bolt the assembly in place. Ensure the wing is square to the fuselage by measuring A and B as pictured below and make sure they are equal. Mark the edge of the fuselage on the wing and unbolt the assembly. Remove the covering material from the top of the wing in-board of the line that was just marked. Re-seat the wing on the main fuselage and then glue the top section to the wing. Re-bolt the assembly into place and ensure the wing is square before the glue sets.



37. Install your chosen receiver and battery. The prototypes were fitted with a 7.4v (2s) Lipo (regulated to 5v) or a 4.8v AAA receiver pack. The Specification of the servos provided in the kit are below - do not exceed the maximum voltage.

    Specs:

    Size : 21x12x22 mm / 0.74x0.42x0.78 in

    Voltage : 3v ~ 6v

    Weight: 9g / 0.39oz

    Speed : 0.12 sec/60(4.8V)

    Torque : 1.6kg-cm

    Working Temp : -30C~60C

    Gears: Nylon White type

Centre of Gravity (CoG)

Once you have completed the model, and all components, including the receiver and battery have been installed, check the balance of the model. We recommend starting on the main spar. When the model is lifted 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 radio battery and receiver rather than adding weight.

Control Movements

Rudder – 35mm each way at tip

Elevator – 10mm each way at tip

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. Before every flight check the model for damage, check all controls surfaces, hinges and linkages etc are secure. If in doubt **do not fly**. After each flight check the model for any landing damage or flight stresses. Never fly a model if you believe that it has been damaged or if you find any signs of fatigue.

Contact

If there are any issues with your 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

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