

**Ripmax**

# acro-wot<sup>Mk2</sup>

BY  
**CHRIS FOSS**



**A Chris Foss Design**

## Instruction Manual



### The Designer



Chris Foss outside his factory in 1990

# Chris Foss

The fascination of flight captured Chris's imagination early on in his life when he started building, from kits and plans, simple free flight gliders and rubber powered models. By his early teens, Chris was already experimenting with his own designs, several of which have been featured as constructional plans in various aeromodelling magazines.

It wasn't long before his fiercely competitive nature started to show itself, with Chris channelling his energies into competing at national level with his own high performance free flight gliders.

In due course, Chris became tempted by the affordability of simple and fairly reliable radio control equipment, so by 1967 he had already designed, built and flown his first radio controlled glider. By 1976 his career in the architectural profession came to an end when he decided to channel his knowledge and experience into a full time kit manufacturing business, 'Chris Foss Designs'. It soon developed into one of the UK's most successful and respected R/C model businesses, offering a range of stylish and quality products.

With the advent of reliable and advanced radio control systems, Chris was able to expand his competition flying with considerable success. His competition highlights include becoming 1977 British National Thermal Soaring Champion, 1986 British National Scale Champion, placing 4th at the 1986 World Scale Championships in Norway, placing 6th at the 1992 World Scale Championships in the USA, and winning both 1992 and 1993 'Radioglide' National Thermal Soaring Championships.

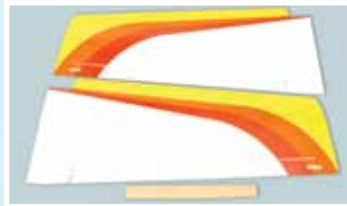
In the late 70s Chris joined the local gliding club and achieved his ambition to actually fly himself! A few years later he expanded into powered flight and qualified for his Private Pilot's Licence. By 2007 Chris had accumulated 2000 flying hours in a wide variety of light aeroplanes, including a vintage Piper Cub, Jungmann aerobatic biplane, various glider tow planes and his favourite, a Vans RV8 American aerobatic kitplane.



## Introduction

Congratulations on your purchase of the Acro Wot Mk2 ARTF - the first Almost Ready to Fly version of Chris Foss' classic low-winger. Its unbeatable combination of great looks and superb flying performance make it a must-have sports model!

Assembly is quick and easy, but before commencing construction, please ensure that you read these instructions in their entirety.



## Fitting the Canopy

### STEP 1

The pre-trimmed canopy is supplied ready to fit using your favourite method. The kit is supplied with four screws to retain the canopy, or you can use canopy glue (or a combination of both) if you prefer. If using canopy glue, carefully apply to the perimeter of the canopy and hold it place with strips of tape until the glue dries.



## Fitting the Ailerons and Joining the Wing

### STEP 2

The wings and ailerons are supplied with the hinges loose fitted, ready for installation. Remove both ailerons and ensure that the hinges are inserted mid-way in their slots. Using thin cyano, pour a couple of drops onto each hinge - above and below - ensuring the glue soaks into the hinge and the surrounding wood.



### STEP 3

Carefully slide each aileron into position, ensuring a gap-free hinge line. Make sure that each aileron lines up with the wing tips and that they are free to move through their entire travel. Centre each aileron between the root and tip so that there is an equal gap at both ends. Minimise any hinge gap, then carefully add a couple of drops of thin cyano to the top and bottom of each hinge ensuring that the glue does not run through the hinge line onto the bottom of the wing. Turn the wing over and drop more cyano onto each hinge from the other side.



### STEP 4

Locate the wing joining brace. Note the orientation - the top of the brace is straight and the bottom has a slight dihedral angle. Measure and mark a centre-line on the joining brace. Coat the inside of the corresponding slot in the wing panel and one half of the brace with rapid setting epoxy. Ensure that adequate epoxy is used to fully cover all surfaces.



### STEP 5

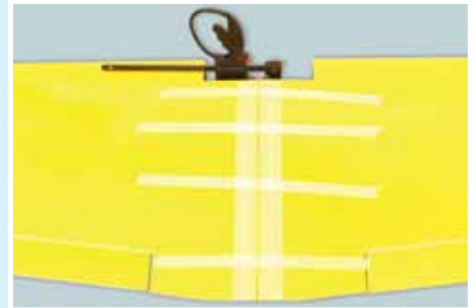
Insert the brace half-way into one wing panel using the centre-line as a guide. Wipe off any excess epoxy.



### Completing the Wing

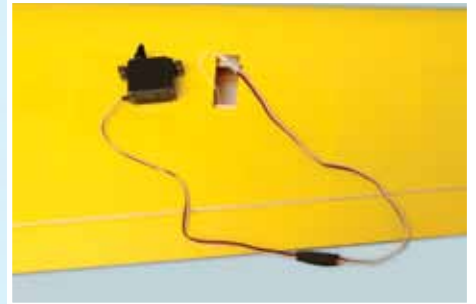
#### STEP 6

Protect the covering with masking tape, then spread sufficient epoxy over the opposite panel joiner slot, wing joiner and root rib. Bring the two panels together ensuring the epoxy fills the join. Wipe off any excess that squeezes out of the joint, then use tape to hold the panels together as the adhesive cures.



#### STEP 7

Prepare your aileron servos by connecting a suitable 300mm extension lead to each. It is a good idea to use a lead-lock, a turn of insulation tape or heatshrink tube over the joint for additional security.



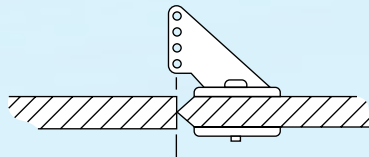
#### STEP 8

Pilot drill the servo mounts, then screw the aileron servos in position using the mounting screws, rubber grommets and ferrules supplied with your radio. Note that the output arms face towards the rear of the wing.



#### STEP 9

Prepare the aileron pushrods by screwing on a nylon snap link and fuel tube keeper. Locate the aileron control horns. They are screwed in position on the ailerons in line with the aileron servo's output arm. Align the row of holes in the horn with the hingeline. Mark and pilot drill two mounting holes then screw the horn to the aileron. The screws thread into the moulded horn plate on the top surface of the wing.



#### STEP 10

Do not overtighten the control horn mounting screws - you don't want to crush the aileron. Turn the model over and trim off any excess thread using side cutters. Note that we have fitted short lengths of fuel tube over the clevis to ensure it cannot open under flight loads.



#### STEP 11

Use a small length of tape to hold each of the ailerons at their neutral position while you complete the aileron linkages. Ensure that both aileron servos are centred. With the pushrod connected to its horn, mark the position the control rod passes over the servo's output arm. Bend the pushrod up at 90° at this point.

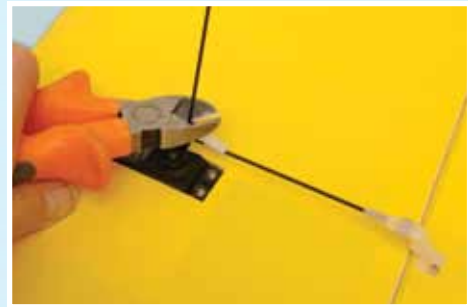


## Acro Wot - Instructions

### STEP 12

Slide the aileron servo horn over the wire and re-fit to the servo. Snap a moulded keeper onto the pushrod to retain it as shown.

Trim off the excess pushrod wire using side cutters. Repeat the procedure for the second aileron in exactly the same way.



### STEP 13

Adjust the pushrods to ensure that the ailerons are centred with the aileron servos at their neutral position. Test to ensure that both ailerons move freely across their entire throw.



## Installing the Undercarriage

### STEP 14

Locate the aluminium main undercarriage, wheels and wheel mounting hardware (axles, washers, nyloc nuts and collets). Pass the axle through the undercarriage leg, slide over a washer, followed by the nyloc nut. Tighten the nyloc nut, then repeat for the second axle.



### STEP 15

Slide the wheel onto the axle and retain using a collet. File or grind a flat on the axle where the point of the grub screw contacts to reduce the risk of it slipping. Ensure the wheel spins freely and tighten the grub screw securely. Repeat for the other wheel.



### STEP 16

Locate the undercarriage mounting bolts and washers. Screw the undercarriage in place noting that the undercarriage legs rake forward. Use a drop of threadlock on each for security.



### STEP 17

Install the tailwheel on its axle and retain with a collet. Ensure the wheel spins freely and that the grub screw is tightened securely.

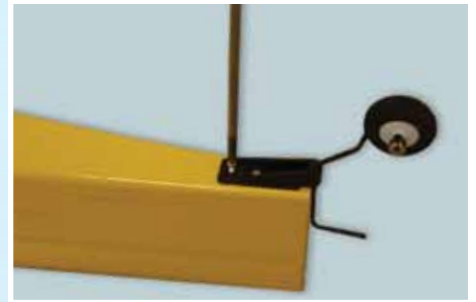




## Acro Wot - Instructions

### STEP 18

Screw the tailwheel assembly in position with the tailwheel wire in line with the rear of the fuselage.



## Fitting the Tail and Fin

### STEP 19

Using a sharp knife, carefully remove the film from the slot in both sides of the fuselage where the tailplane will mount. Trim away the covering to expose the slots for the elevator pushrod and rudder closed loop exits.



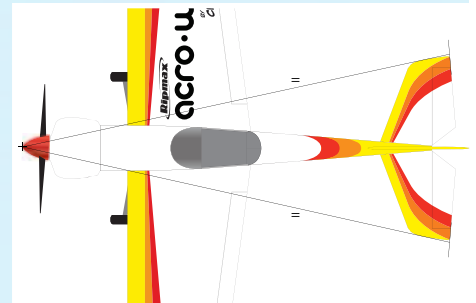
### STEP 20

Carefully remove the film from the slot in the top of the fuselage where the fin will mount.



### STEP 21

Slide the tailplane into its pre-cut slot in the rear of the fuselage. Ensure that it is square to the fuselage and centred in its slot using a long ruler or string as shown in the diagram on the right. Mark the tailplane on the top and bottom where it enters the fuselage using a soft, water-soluble pen.



### STEP 22

Remove the tailplane and cut away the covering from just inside the marked lines to give a film-free surface for the glue to bond. **IMPORTANT:** Ensure that only the film is cut - not the tailplane - as this will seriously weaken the structure.



### STEP 23

Slide the fin into its pre-cut slot in the top of the fuselage. Ensure that it is pushed down far enough to touch the top of the tailplane. Mark the fin on both sides where it enters the fuselage using a soft, water-soluble pen.



### STEP 24

Remove the fin and cut away the covering from just below the marked lines to give a film-free surface for the glue to bond. **IMPORTANT NOTE:** Ensure that only the film is cut - not the fin - as this will seriously weaken the structure.



### STEP 25

With the covering removed, the fin and tailplane are ready to be installed. If necessary, use a warm covering iron to ensure the edges of the film are firmly adhered.



### STEP 26

Now loosely position the elevator joiner at the rear of the tailplane slot. This is an important step as it is almost impossible to fit after the tailplane is installed. Slide the tailplane in position.



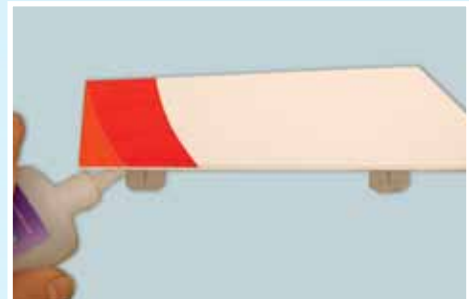
### STEP 27

Check that the tailplane is correctly aligned and square to the fuselage. Glue in position using cyanoacrylate glue (cyano). Alternatively, if using epoxy, use masking tape to protect the covering (removing it as soon as you are satisfied with the alignment and before the epoxy cures). Any excess epoxy can be wiped from the model before it cures using methylated spirit or methanol.



### STEP 28

Insert two hinges in each elevator half, ensuring they are located mid-way in their slots. Using thin cyano, pour a couple of drops onto each hinge - above and below - ensuring the glue soaks into the hinge and the surrounding wood.



### STEP 29

Apply epoxy to one elevator half in the slot where the wire joiner will be fitted. Use a scrap of piano wire to force adhesive into the hole as shown. If you wish, protect the rear of the tailplane from the epoxy with a couple of strips of masking tape.



### STEP 30

Now slide the first elevator into position ensuring that the joiner enters hole in the elevator and both hinges enter their pre-cut slots in the tailplane. Ensuring a gap-free hinge line and a 1mm gap between the elevator and tip, add a couple of drops of thin cyano to the top and bottom of each hinge. Make sure that the glue does not run through the hinge line onto the bottom of the tail.



### STEP 31

Repeat for the second elevator. Apply a small strip of tape to hold each elevator half centred while the epoxy on the joiner cures.



### STEP 32

Using white wood glue, epoxy or cyano, glue the fin in position ensuring that the base is coated with adhesive. Ensure the fin is firmly pushed down in its slot so that its base is in contact with the tailplane. Make sure the fin is at right angles to the tailplane and allow the glue to dry.



### STEP 33

Insert two hinges into the rudder, ensuring they are located mid-way in their slots. Using thin cyano, pour a couple of drops onto each hinge - from above and below - ensuring the glue soaks into the hinge and the surrounding wood.



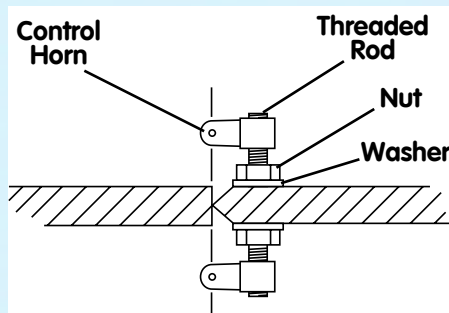
### STEP 34

Locate the pre-drilled hole in the rudder for the closed loop horn and pierce the film on both sides using the tip of a needle file or sharp knife.



### STEP 35

Assemble the closed loop horn from the hardware supplied as shown.





## STEP 36

Apply epoxy to the slot in the rudder where the tailwheel wire will fit. Now slide the rudder into position ensuring that the tailwheel wire and both hinges enter their pre-cut slots/hole in the fin/rudder. Ensure a gap-free hinge line and a 1mm gap between the rudder counterbalance and tip of the fin.



## STEP 37

Now add a couple of drops of thin cyano to both sides of each hinge. Make sure that the glue does not run through the hinge line onto the other side of the fin.



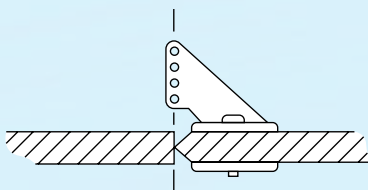
## STEP 38

Locate the factory assembled elevator pushrod and slide it into position from the radio bay and out through the exit slot. It may help to use a scrap length of snake inner to help guide the pushrod through the exit.



## STEP 39

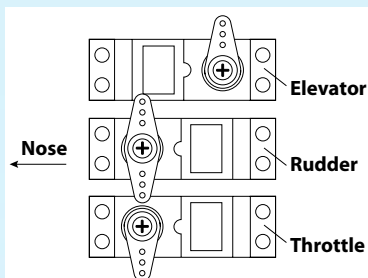
Now screw a nylon clevis onto the elevator end of the pushrod as shown. Mark and pilot drill two mounting holes in the underside of the elevator then screw the horn to the elevator. The screws thread into the moulded horn plate on the top surface of the wing.



## Radio Installation

### STEP 40

Install your servos in the pre-fitted servo tray as shown. Note the orientation of the servo outputs. Use the mounting screws, rubber grommets and ferrules supplied with your radio.



### STEP 41

Cut the supplied single piece of closed loop wire into two equal lengths, then fit a clevis and locking nut onto the closed loop adaptor. Now loop one piece of the closed loop wire through the adaptor, and slip the brass tube supplied over the join. Securely crimp with pliers. Repeat for the second length of wire. For additional security we recommend a drop of cyano is used on each crimp.



## Acro Wot - Instructions

### STEP 42

Now connect one of the clevises to the rudder servo and feed the wire out through the corresponding slot in the rear of the fuselage. Use a scrap length of snake tube to help. Repeat for the second wire, connecting this to the other side of the servo horn. Check that the wires are routed clear of - and not wrapped around - the elevator pushrod.



### STEP 43

Now make up the rudder ends of the closed loop. Slip brass tubing over the wires. With the servo and rudder centred and ensuring that both wires are tight without being stretched, crimp the brass tube and add a drop of cyano to secure. Use a short length of fuel tubing over each clevis for additional security.



### STEP 44

With the elevator and servo centred, mark the point that the pushrod passes the servo output arm. Use a wrap of masking tape on the rod to make marking it easier. Form a 90° bend in the pushrod at this point using a pair of pliers.



### STEP 45

Slip the bent pushrod through the servo horn and fit a moulded swing-in keeper. Now trim off the excess length of wire and test the operation of the elevator.



## Four Stroke Engine Installation

### STEP 46

Screw the engine mount onto the bulkhead as shown noting the orientation of the mount. Use the supplied mounting screws and washers - the captive nuts have been factory installed in the bulkhead. Both two stroke and four stroke engines can be installed using this mount.



### STEP 47

Place your engine on the mount. Adjust its position until the distance from the front of the prop driver to the rear of the mount is 120mm. Mark the positions of the engine mounting bolts.



### STEP 48

Holding the engine steady, mark the position of the mounting holes on the mount as shown.



### STEP 49

Remove the engine and drill four clearance holes through the engine mounting beams to suit the bolts supplied.



### STEP 50

Prepare the fuel tank for fitting by assembling the tank stopper with the feed, vent and fuel pipes. Ensure the clunk tube length is cut to allow the clunk to move around the tank without catching on the tank's base. Fit the assembled tank bung and tighten the retaining screw. Take care not to over-tighten this screw. Test that the tank is leak-proof.



### STEP 51

The tank is installed in its bay via the radio bay. Fit and identify your fuel tubes, then feed the tank into position, drawing the fuel tubes out through the hole in the centre of the firewall.



### STEP 52

Screw the engine to the mount using the four bolts, washers and nuts supplied. Locate the throttle pushrod outer sleeve. Install the tube through the bulkhead and secure with a drop of cyano. Form a 'Z' bend in the throttle pushrod. Fit to the carburettor throttle lever and slide the pushrod into its outer. To do this, you will need to temporarily remove the throttle lever from the carburettor.



### STEP 53

Prepare your throttle servo horn by assembling a pushrod connector as shown. Slip the connector onto the pushrod and refit the servo control horn.





### STEP 54

Adjust the length of the linkage so that mid-throttle stick position corresponds to the carburettor being open 50%. Tighten the screw in the connector and adjust the high and low throttle positions.



### STEP 55

Connect the fuel line to the engine, pressure to the exhaust (if using exhaust pressure) and block the vent line.



### STEP 56

Trim the fibreglass cowl to clear the engine and silencer. The cowl should just overlap the front of the fuselage. Carefully measure the positions of the cowl mounting blocks and transfer these measurements onto the cowl. Pilot drill the cowl and retain with three self tapping screws, one top centre and one each side. Fit your propeller and spinner. The model is complete and ready for final installation - see Step 56.



## Two Stroke Engine Installation

### STEP 57

Place your engine on the mount. Adjust its position until the distance from the front of the the prop driver to the rear of the mount is 120mm. Mark the positions of the engine mounting bolts.



### STEP 58

Holding the engine steady, mark the position of the mounting holes on the mount. Remove the engine and drill four clearance holes through the engine mounting beams to suit the bolts supplied.



### STEP 59

Prepare the fuel tank as shown in Step 42. The tank is installed in its bay via the radio bay. Fit and identify your fuel tubes, then feed the tank into position, drawing the fuel tubes out through the hole in the centre of the firewall.



### STEP 60

Screw the engine to the mount using the four bolts, washers and nuts supplied. Locate the throttle pushrod outer sleeve. Install the tube through the bulkhead and secure with a drop of cyano. Form a 'Z' bend in the throttle pushrod. Fit to the carburettor throttle lever and slide the pushrod into its outer. To do this, you will need to temporarily remove the throttle lever from the carburettor.



### STEP 61

Prepare your throttle servo horn by assembling a pushrod connector as shown in Step 45. Slip the connector onto the pushrod and refit the servo control horn. Adjust the length of the linkage so that mid-throttle stick position corresponds to the carburettor being open 50%. Tighten the screw in the connector and adjust the high and low throttle positions.



### STEP 62

Connect the fuel line to the engine, pressure to the exhaust (if using exhaust pressure) and block the vent line.



### STEP 63

Trim the fibreglass cowl to clear the engine and silencer. The cowl should just overlap the front of the fuselage. Carefully measure the positions of the cowl mounting blocks and transfer these measurements onto the cowl. Pilot drill the cowl and retain with three self tapping screws, one top centre and one each side. Fit your propeller and spinner. The model is complete and ready for balancing and setting up the control throws.



## Final Installation

### STEP 64

Cut a suitable aperture and fit your radio's switch to the left hand side of the fuselage.



### STEP 65

Connect and install your receiver in the radio bay with plenty of shock absorbing foam. Temporarily install your radio's battery in the radio bay. Its final position is determined after balancing the model.



## Acro Wot - Instructions

### Control Throws

For initial flights, we recommend the following control throws - each measured at the widest point of the surface:

Elevator:	12mm up 12mm down
Rudder:	Maximum possible each way
Ailerons:	6mm up 6mm down

### Balancing the Acro Wot

The Centre of Gravity (C/G or Balance Point) should be 83mm +/-6mm (3-1/4" +/-1/4") back from the leading edge of the wing at the root. This should be measured with the fuel tank empty. Support the completed model under the wing either side of the fuselage at this point and add weight or adjust the position of the radio battery in its bay as necessary to achieve a slightly nose down attitude. A model that is not correctly balanced will not perform as it should and, at worst, be unstable or unflyable, leading to damage to the model or injury to yourself or others. Do not miss out this step in completing your Acro Wot!

For best performance, the model must also balance laterally. Support the Acro Wot at the base of the fin leading edge and the crankshaft (with the prop and spinner removed) and add weight to the left hand wingtip to counteract the offset weight of the side-mounted engine.

### Pre-Flight checks

- Completely charge your transmitter and receiver batteries before flying.
- Carefully check your model over to ensure that all screws are tight and everything is well bonded.
- Double-check the Acro Wot's Centre of Gravity.
- Check the control surfaces for both the correct throw and direction. Ensure that each surface moves freely, without any binding.
- Check the receiver aerial(s) are correctly installed.
- Ensure the wing bolts are tight.

While the Acro Wot is not suitable as a first model, it does make an excellent first low-wing model with reduced control throws and an engine from the lower end of the range. In this case, we recommend that your completed model is checked over and test flown by a competent pilot first. Subsequent flights should also be supervised, and assisted where necessary, by an experienced pilot. Always fly the Acro Wot in a safe location at a recognised club.

For further information on flying in the UK, please contact:  
British Model Flying Association (BMFA)  
Chacksfield House,  
31 St Andrews Road,  
Leicester. LE2 8RE.  
Tel: (+44) 116 2440028 Fax: (+44) 116 2440645  
[www.bmfa.org](http://www.bmfa.org)

### Flying the Acro WOT

Chris Foss has managed to take one of the UK's most popular low wing sports models and make it even better! The new Mk2 version not only has an improved appearance, it has a breathtaking performance too! Its light weight and exceptional power to weight ratio means that the Acro Wot has the perfect balance of control; authoritative, but not twitchy and a well-mannered stall when really pushed. With reduced control throws, and engines at the lower end of the power range, it is the ideal first low-winger and suitable for those wishing to progress onto a fully aerobatic model. But with the recommended throws it will perform all advanced aerobatic manoeuvres with loops, rolls, flicks and spins being well within its repertoire. Limitless vertical performance is available with engines at the top end of the recommended range - perfect for the most demanding pilot.

### Spare Parts and Service

Spare parts are available for the Acro Wot ARTF from all Ripmax stocked model shops. In case of any difficulty, any product queries, or to locate your local Ripmax stockist, please write to the address below or visit [www.ripmax.com](http://www.ripmax.com)

*Always fly responsibly and safely.*

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