ASSEMBLY MANUAL

SEAGULL MODELS

BOOMERANG 40

BALSA BUILD UP KIT

MS: 27K

NOTE: Specifications and contents subject to change or improvement without notice.

Laser-Cut
Balsa and Plywood Construction Kit

Specifications:

Wingspan----------155 cm.
Wing area----------3950 sq.cm.
Weight----------2.6 - 2.8 kg.
Engine----------0.40 - 0.46 cu.in -2 stroke
Recommended R/C----------4 channels minimum.
Flying skill level----------Sports Trainer.
Electric conversion: ---------Optional.

INTRODUCTION.

Thank you for choosing the **BOOMERANG 40 Build Up Kit by SG Models**. The Boomerang 40 was designed with the beginner to intermediate sport flyer in mind.
It is a trainer airplane which is quick to construct and easy to fly.
The airframe is conventionally built using balsa, plywood to make it strong, yet the design allows the aeroplane to be kept light. You will find that most of the cutting out work has been done for you already. It comes complete with a motor mount, hardware kit and hinges.
The **BOOMERANG 40** is simply a joy to build and fly.

- **This instruction manual is designed to help you build a great flying aeroplane.**
- **Please read this manual throughly before starting assembly of your BOOMERANG 40 KIT.**
- **Use the component pictures on page 4 to indentify all parts before you start assembly.**

WARNING.

Please be aware that this aeroplane is not a toy and if assembled or used incorrectly it is capable of causing injury to people or property. WHEN YOU FLY THIS AEROPLANE YOU ASSUME ALL RISK & REPONSIBILITY.

If you are inexperienced with basic R/C flight we strongly recommend you contact your R/C supplier and join your local R/C model Flying Club. R/C Model Flying Clubs offer a variety of training procedures designed to help the new pilot on his way to successful R/C flight. They will also be able to advise on any insurance and safety regulations that may apply.

ADDITIONAL ITEMS REQUIRED.

- .40-.46 2-stroke engine.
- Min. 4 channel radio with four servos.
- Film covering
- Glow plug to suit engine.
- Propeller to suit engine.
- Protective foam rubber for radio system.
- Silicone fuel line.
- Stick-on weights for balance (If necessary).

TOOLS AND SUPPLIES RECOMMENDED.

- Thick cyanoacrylate glue.
- 30 minute epoxy.
- 5 minute epoxy.
- Hand or electric drill.
- Assorted drill bits.
- Modelling knife.
- Straight edge ruler.
- 2mm ball driver.
- Phillips head screwdriver.
- 220 grit sandpaper.
- 90° square or builder's triangle.
- Wire cutters.
- Masking tape & T-pins.
- Thread-lock.
- Paper towels.
- Hobby heat iron for covering

KIT CONTENTS.

FUSELAGE COMPONENTS

- (1) Laser cut fuselage components.
- (1) Throttle pushrod & tube.
- (1) Servo tray.
- (1) Motor mount.
- (1) Rudder pushrod.
- (1) Elevator pushrod.

WING COMPONENTS

- (1) Laser cut wing components.
- (1) Aluminium wing tube.

TAIL SECTION COMPONENTS

- (1) Laser cut stabilizer and rudder.
- (1) Laser cut horizontal stabilizer with elevator.

HARDWARE PACK

- Includes hinges, horns, screws, fuel tank, landing gear wire, straps, wheels, wheel collars, spinner, glue, sanding block.

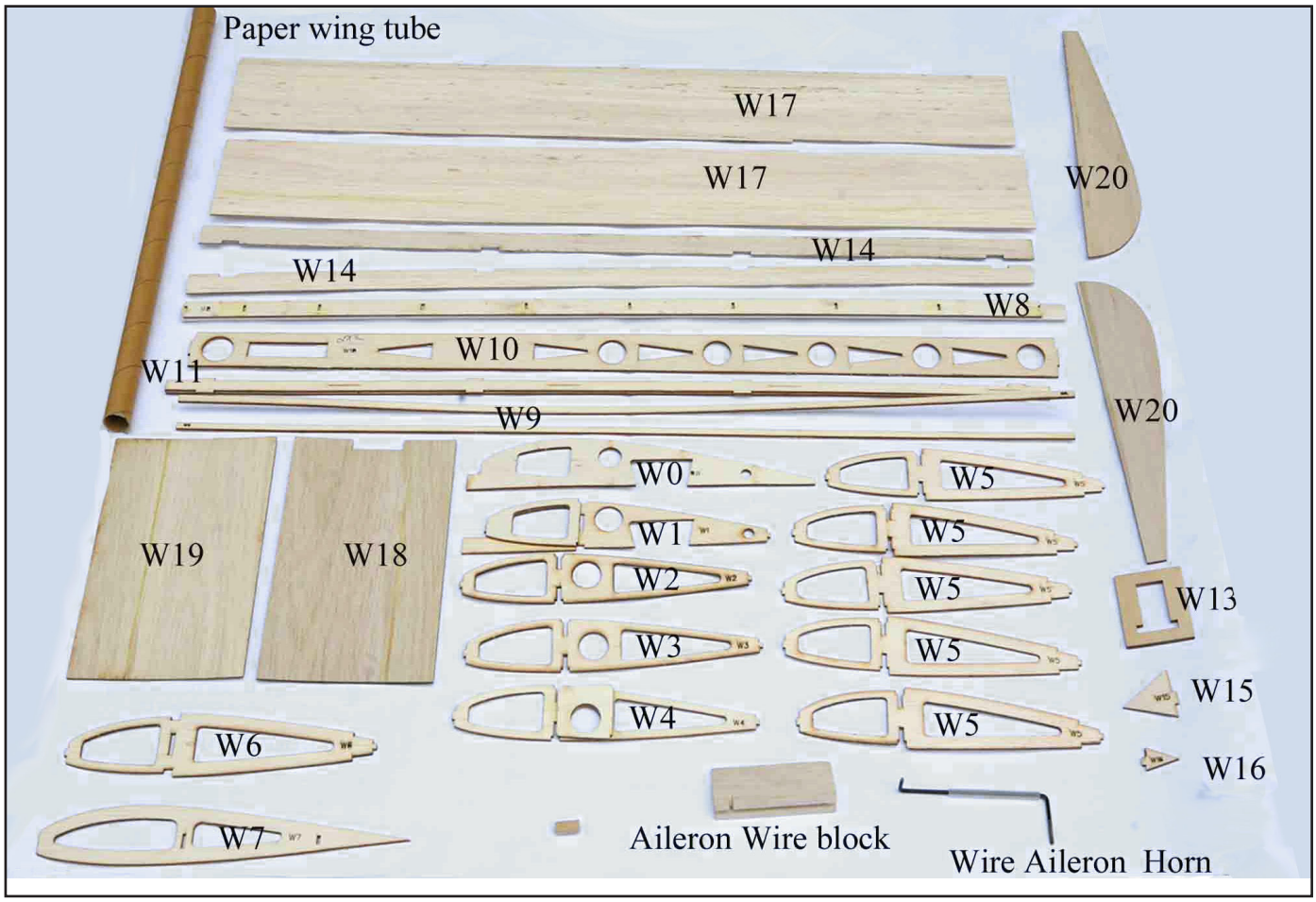
NOTE: Specifications and contents subject to change or improvement without notice..

TIPS FOR GETTING STARTED

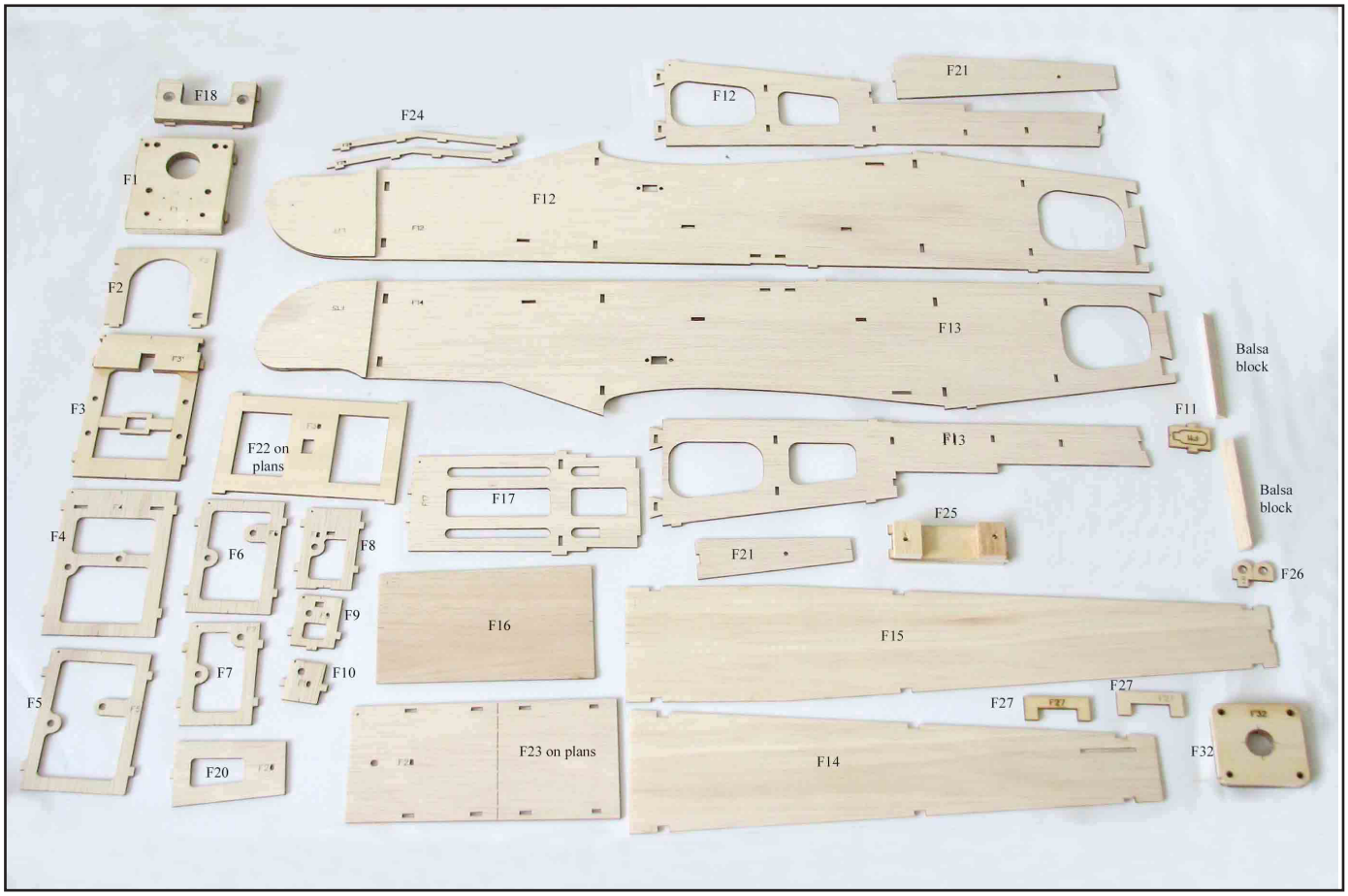
- Set yourself up a building table or bench with a flat surface big enough to assemble the wing and fuselage. Preferably a table or bench with a wood surface that you can stick building pins into. **NOTE: Check with your parents or partner that it is ok FIRST!**
- Lay out the included plans on the work table and secure it to the work table with pins or tape.
- If you want to keep the plans clean for future use, you can cover them with plastic cling wrap or a sheet of clear plastic before you get started.
- Identify the components required for each step using the plans and component pictures on page 4.
- Take your time and test fit components before gluing.
- Place over plans to help with alignment and pin in place where possible.
- Make sure the components are held in the correct position prior to adding glue. **NOTE: This is particularly important when using fast acting glues like CA (Cyno Acrylate).**
- Allow the glue to set completely before moving assembled components
- Once you get familiar with the process and to get the strongest airframe, you may want to tack the components together with CA first (and uses accelerator for an instant set), the go back over the joins with white wood glue and make a gusset of glue. (This kit includes a complementary bottle of white wood glue).
- Do not apply too much white glue, just a thin film is enough.
- **Build it light to fly well - Don't build it heavy, thinking it will survive a crash.**
- When sanding balsa, use a light touch as balsa is a strong but very light timber and it would be very easy to sand too much away.
- Be very careful when handling sharp hobby knives and blades, you do not want to cut yourself.
- If you get glue on your hands, make sure you clean it off immediately, for your own safety and to prevent glue getting onto surfaces that it shouldn't.
- Tackle the build in small steps, completing each one before moving onto the next. In no time at all the build will be complete and you will be able to show it off to your friends.
- If you are unsure how to proceed at any stage, stop and reread the instructions or seek help from an experienced modeller or from your local hobby shop.

Good luck with your build and after reading the rest of the instructions, your are ready to start.

WING COMPONENTS.



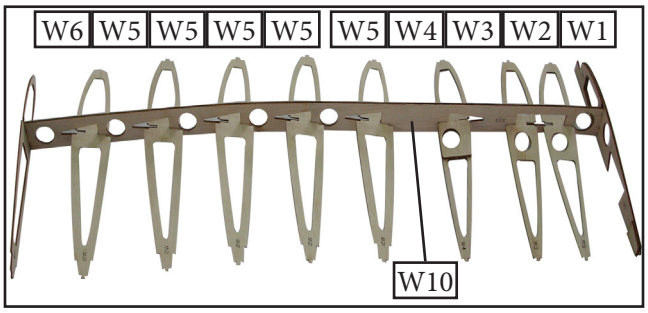
FUSELAGE COMPONENTS.



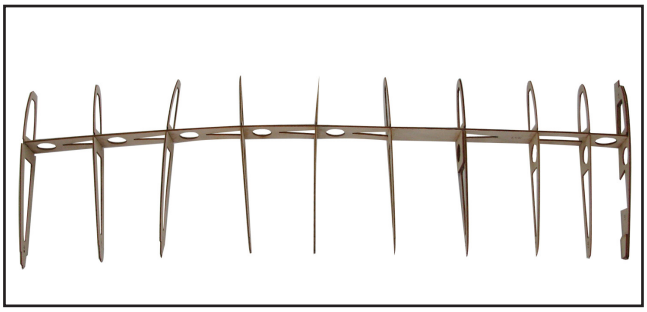
WING PANEL CONSTRUCTION.

This section shows you how to construct one half of the wing. Repeat the instructions for the other half.

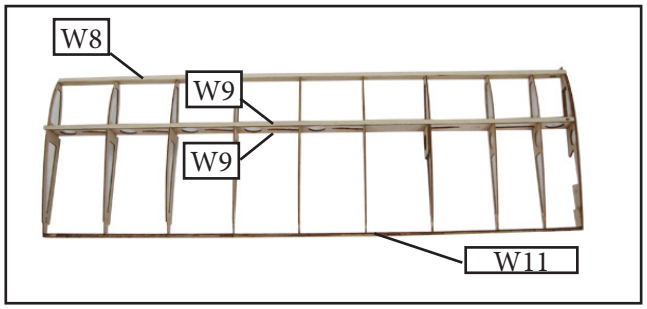
1) Locate plywood Main Wing Spars W10 and ribs W1 ~W6.
Slide the ribs into their corresponding positions.



2) Rotate each wing rib so they are sitting upright, perpendicular to the building board.

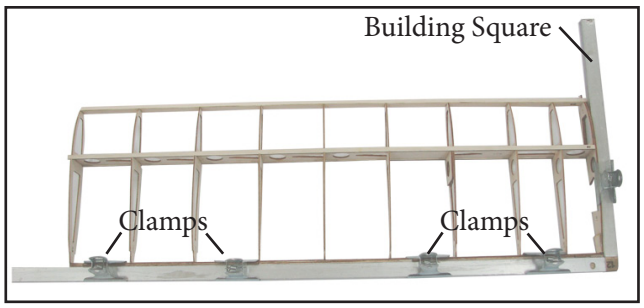


3) Locate and position the plywood leading edge spar W8, the trailing edge spar W11 and spar caps W9 (x2).

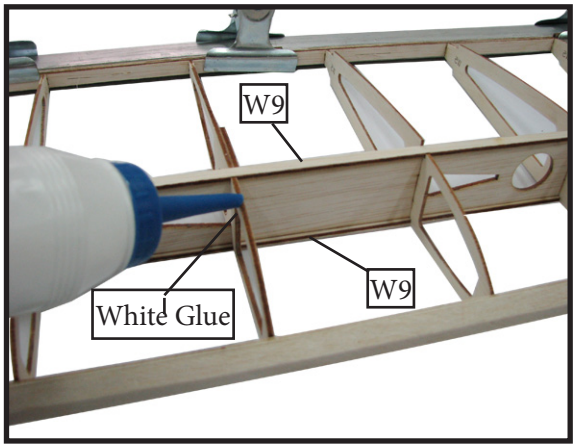


4) Use a building square and a number of clamps to hold the wing structure while you spot glue it with CA.

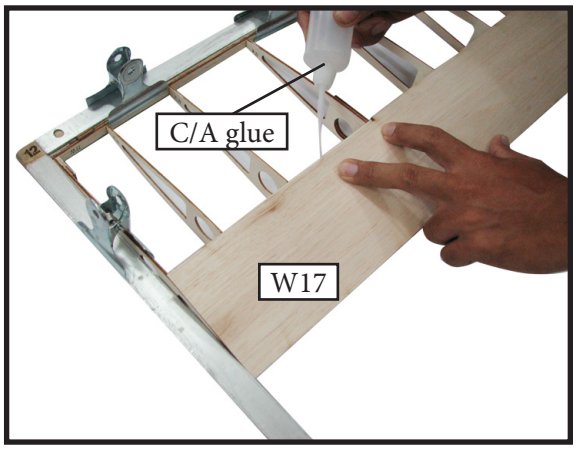
NOTE: Make sure each join is positioned correctly before you apply a drop of CA. CA dries very quickly when two pieces of wood come together.



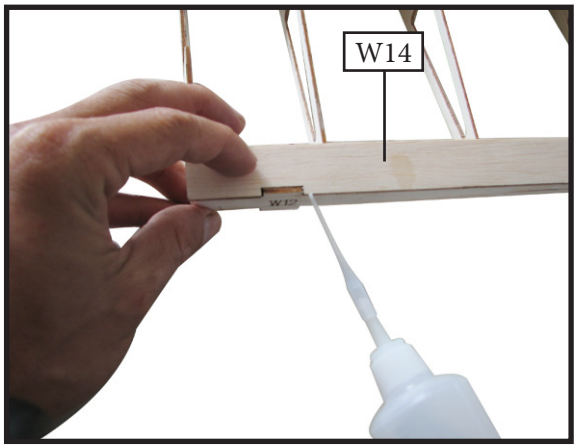
5) After the CA has set, go back and re-glue every join on the wing panel with white glue.
Use white glue to secure the leading edge balsa block in position.



6) Locate the leading edge sheeting W17 (x2).
Fix the bottom sheet first securing with CA then going back over each join with white glue.
Turn the wing panel over and apply plenty of white glue to each rib edge, forward of the wing spar.
Position the sheet in place then use CA to tack the sheet onto the spar caps and leading edge working you way around the entire sheet.

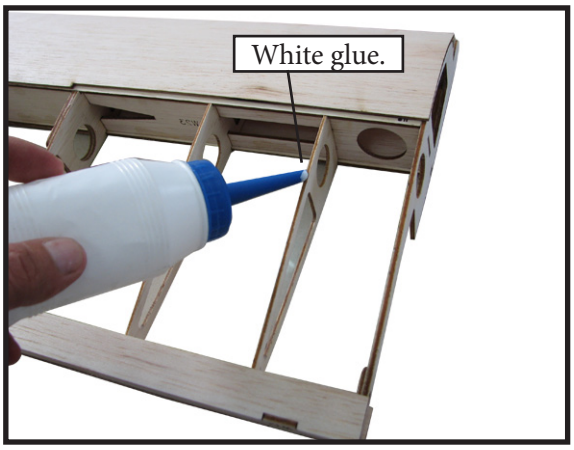


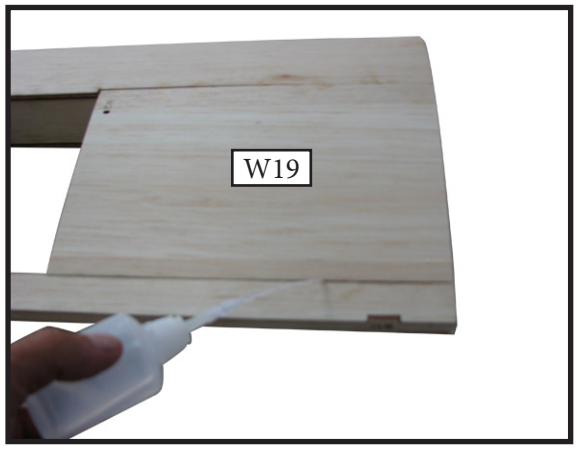
7) Locate the trailing edge sheeting W14 (x2).
Use the same method as in (6) to secure the trailing edge sheeting.



8) Your wing panel should now look like this.

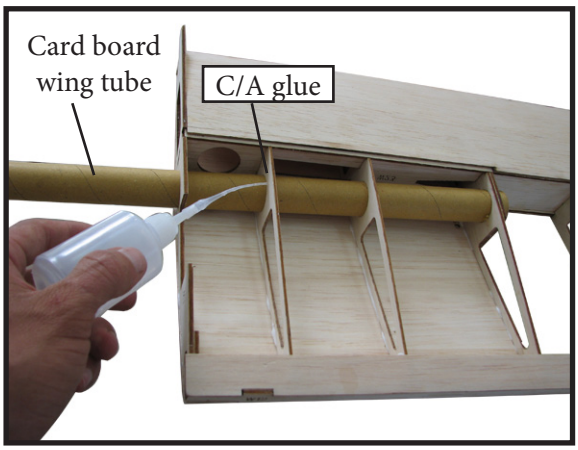
9) Locate the centre panel sheeting W19.
This is fitted to the top of the wing panel using the same method as in (6).

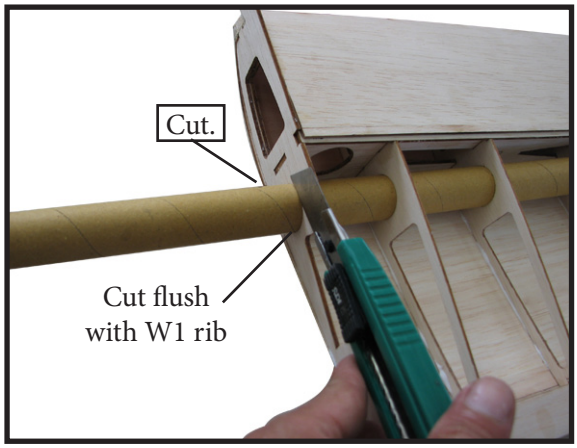




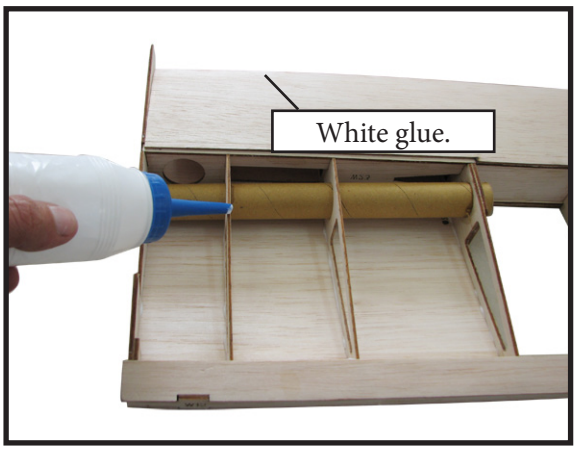
10) Your wing panel should now look like this.

11) Insert the cardboard tube into wing panel 10mm past W4. Tack glue in place with CA then apply white glue liberally to each join.
Cut the cardboard tube flush with the outside of W1.

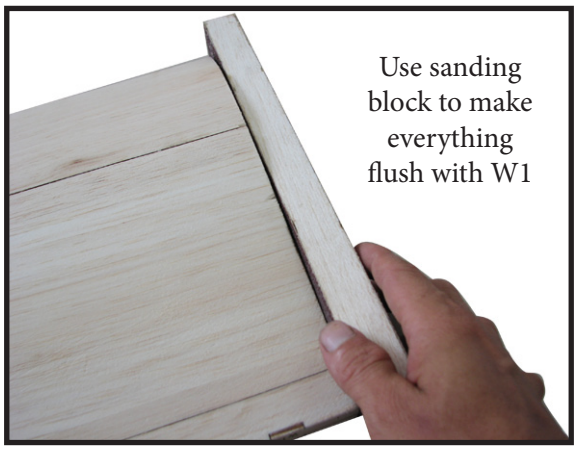


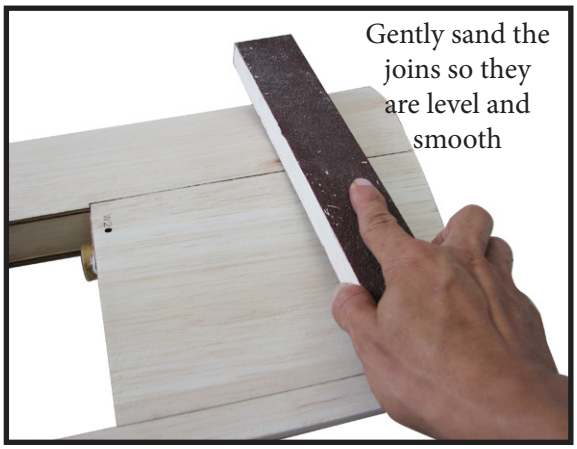


12) Locate the centre panel sheeting W18.
This is fitted to the bottom of the wing panel using the same method as in (6).
Line up W18 with the cut out in W1.
(Later when the two wing halves are joined together, this is where the aileron servo will be located.)



13) Carefully saw off any overhang material, then block sand the root ends of the spars, leading edge, and trailing edge flush with the pre-angled wing rib.
Use a large sading block and sand slowly to keep the end of the wing panel straight and true.
NOTE: Try not to sand into wing or round off the end ribs. Keep it square!.



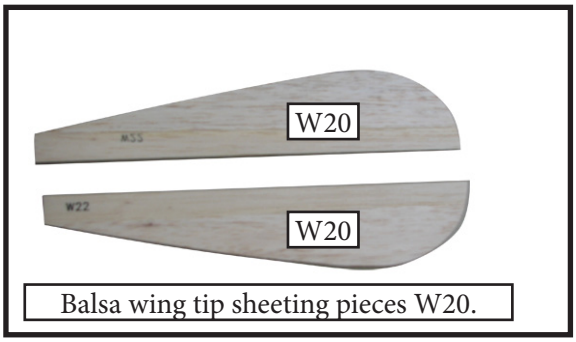


14) Now you can go back to the start and create a mirror image of the first wing panel.

NOTE: Be very carefully to make a left hand and right hand wing panel (not two left or two right panels which would be very embarressing.

INSTALLING THE WING TIP.

15)



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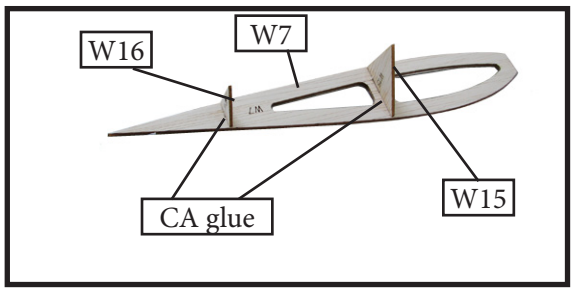

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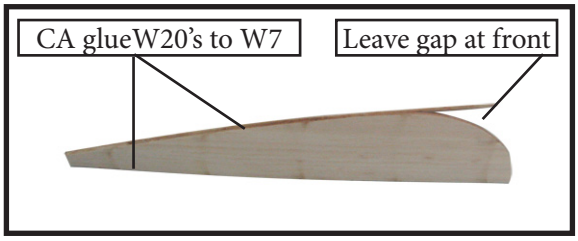

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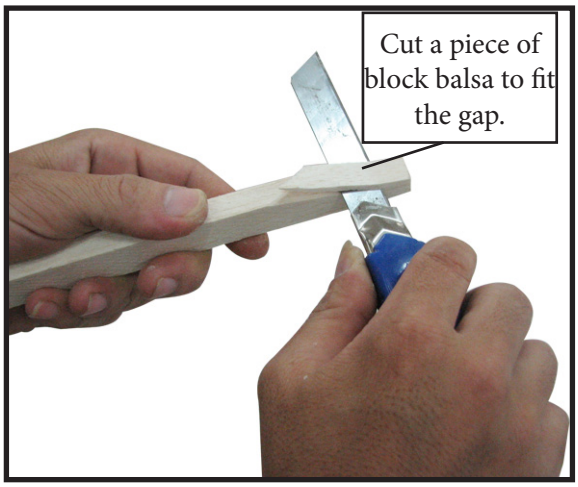

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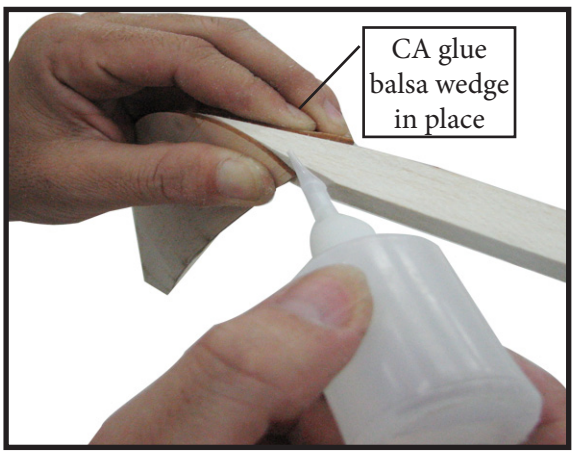
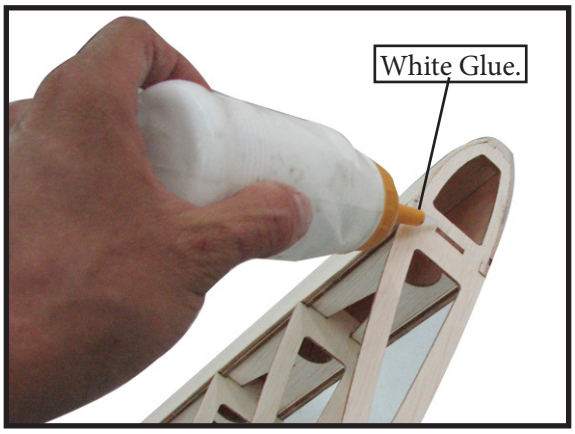


20) Cut off over-hanging wedge and use sanding block to smooth out any mismatched joints. Again, keep it square to the rib face.

21)



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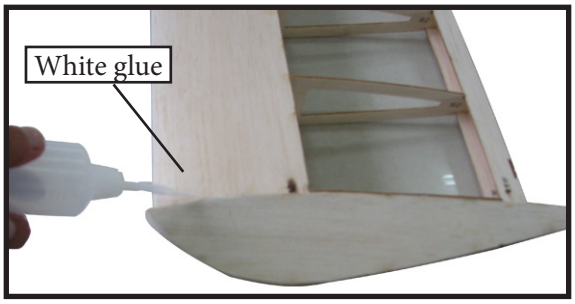

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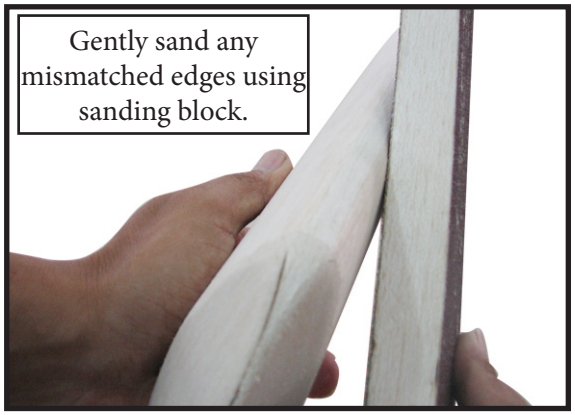
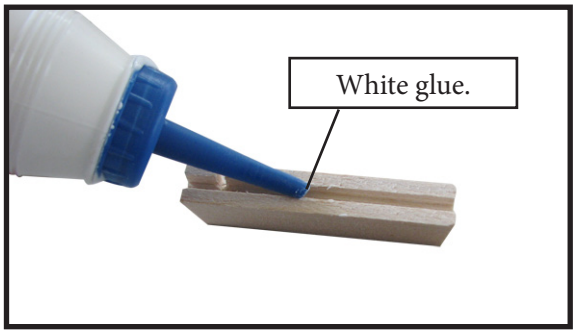


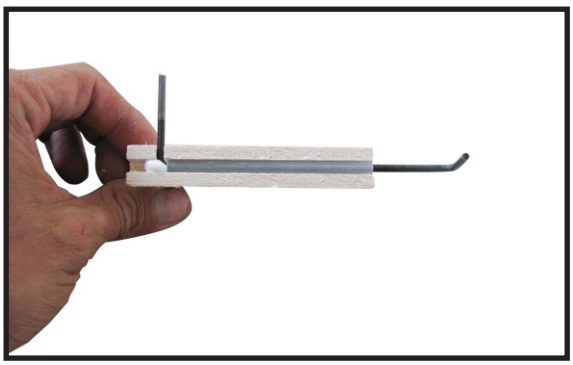
24) Finished wing tip.
Now create a mirror image on the other wing panel.

AILERON INSTALLATION.

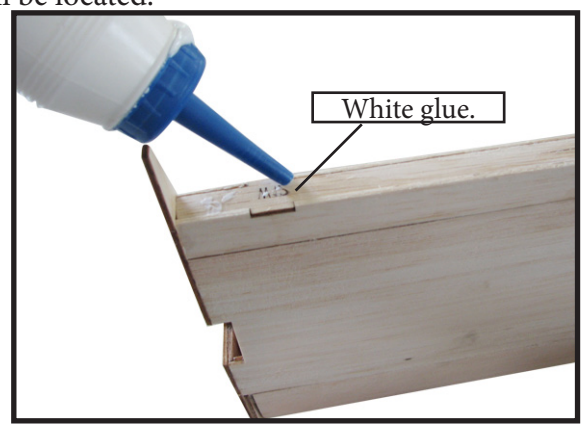
25) Locate the two Aileron Wire blocks and aileron wires with plastic hinge tubes.
TIP: Put a couple of drops of light machine oil down the inside of the platic hinge tubes to prevent white glue from sticking the wire to the inside of the tube. Clean the outside of the plastic tube before gluing so it sticks.

26) Test fit the Aileron Wire, then remove. Apply white glue to the slot in the Aileron Wire block, then press the Aileron Wire into position and wipe away any excess white glue.
Repeat for the other Aileron Wire block.

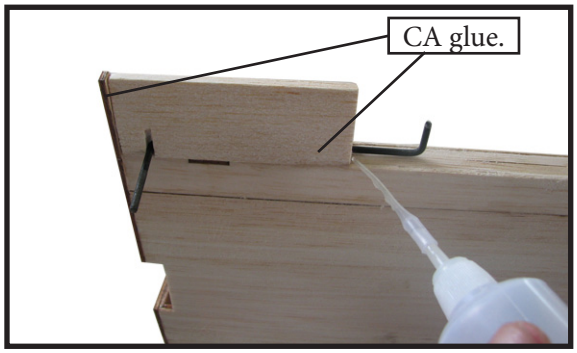




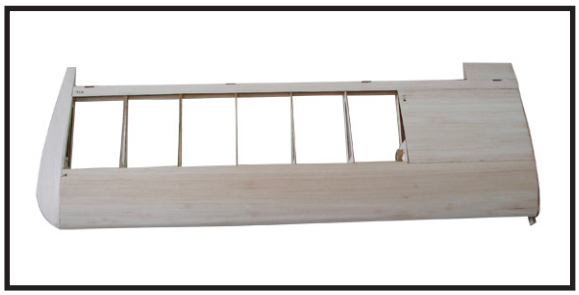
27) Apply white glue to where the Aileron Block will be located.



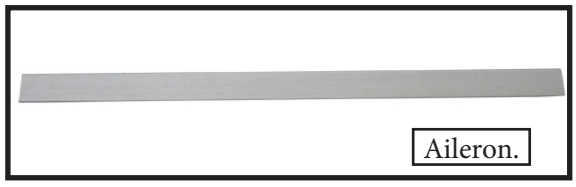
28) Position the Aileron Block and secure in place with CA glue. Repeat for other wing panel.

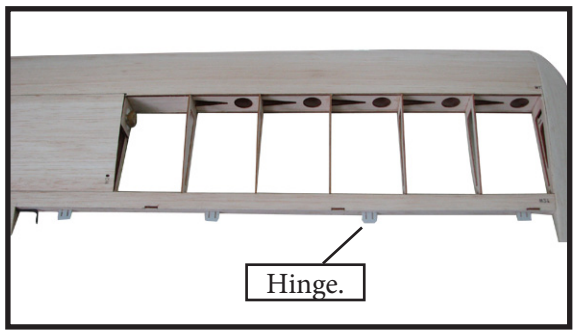


29) Your wing panels should now look like this.



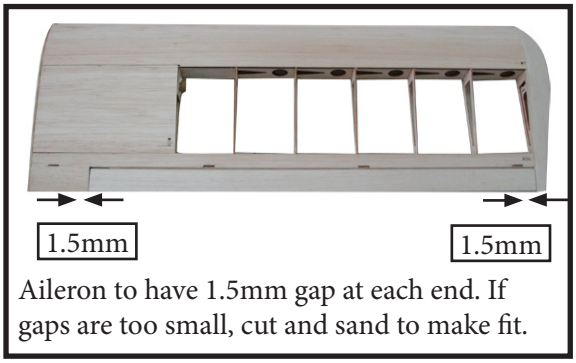
30) Locate the aileron and check that all the slots have been cut.
Check that all the slots have also been cut in the wing panel.
Test fit the hinges by inserting a a single easy hinge halfwway into each slot in the trailing edge of the wing.
Place a pin through the hinge
to prevent the hinge sliding into the wing.
NOTE: DO NOT GLUE THE HINGES IN AT THIS TIME !





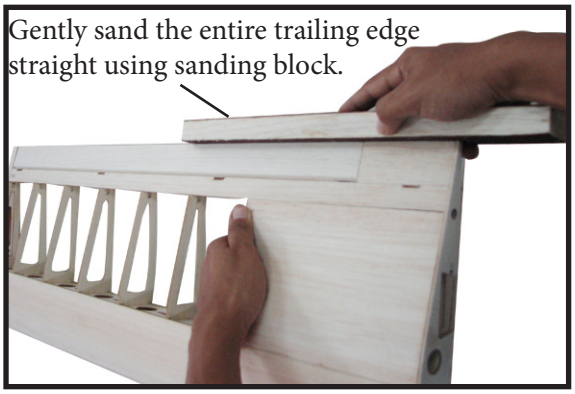
31) Now carefully slide the aileron onto the exposed half of the easy hinges, and onto the exposed arm of the torque rod, all at the same time. You will find it easiest to slide the ailerons onto the hinges at angle, one hinge at a time, starting from the tip end, instead os trying to push it straight onto the hinges at once.
ONCE AGAIN, DO NOT GLUE THE HINGES IN AT THIS TIME.

32)



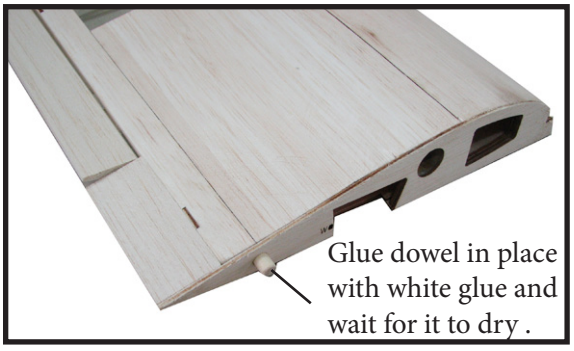
Aileron to have 1.5mm gap at each end. If gaps are too small, cut and sand to make fit.

33)



TEST FIT THE WING PANELS.

34)



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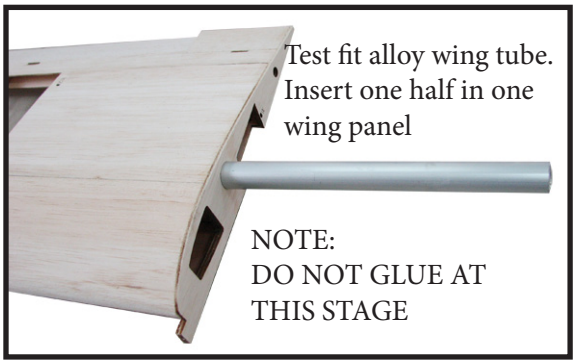

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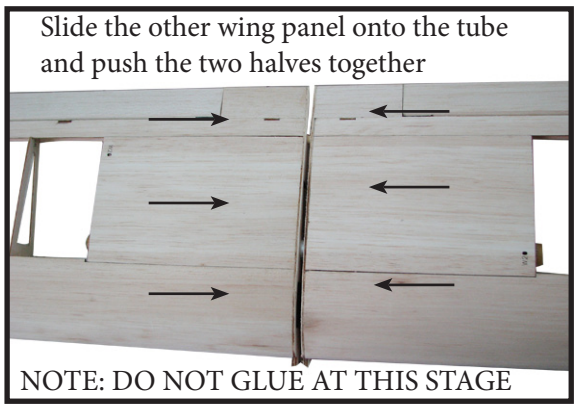
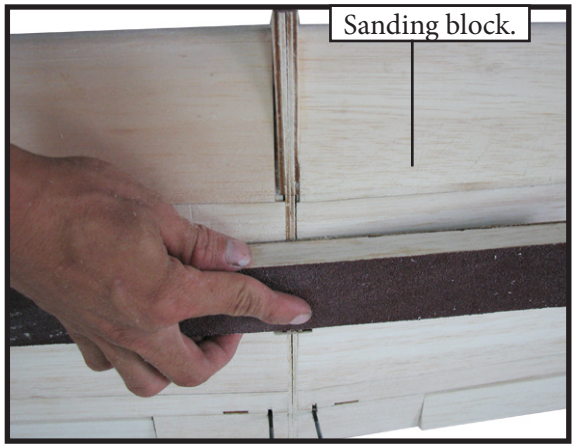


37) Gently sand over the hole for the aileron servo using sanding block to make it square to the wing. Do not take away too much balsa, just make it square.



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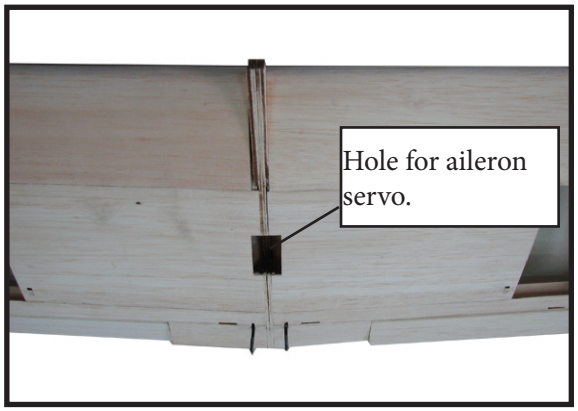
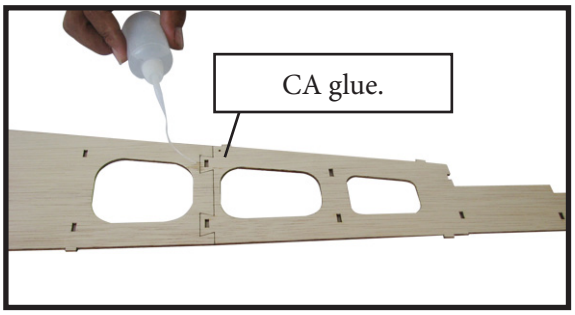
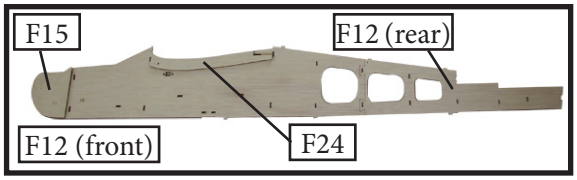


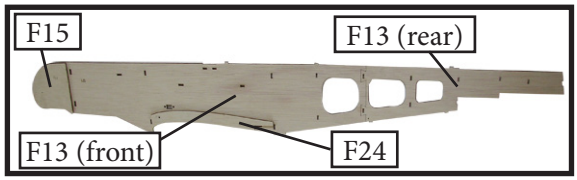
FUSELAGE CONTRUCTION.

39) Locate and assemble fuselage front F12 and fuselage rear F12.
Lay flat on plastic surface an apply CA glue.
Wipe off any excess glue before it dries so that there won't be a glue lump at the joint.
Repeat for the other fuselage side using F13 Front and F13 Rear..

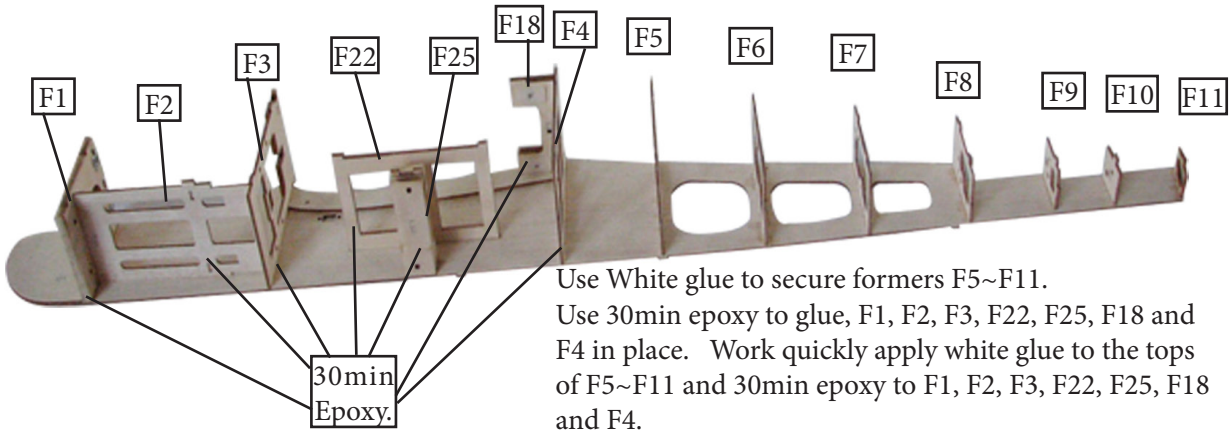


40) Locate the nose doublers F15 and wing seat doublers, use white glue to secure.
Allow glue to set before proceeding.
Make sure you have assembled them as shown below so that you end up with both a left and right fuselage side.



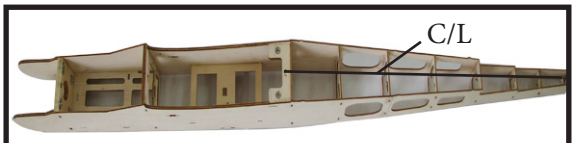


41)



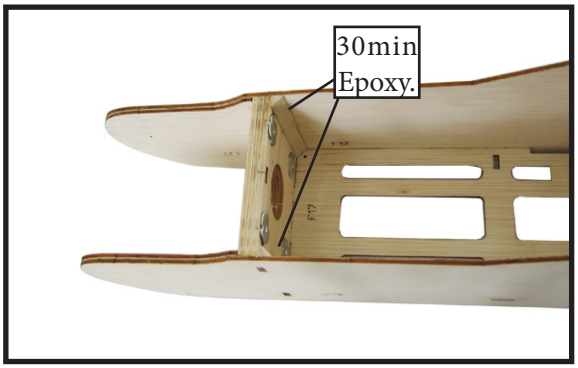
Use White glue to secure formers F5~F11.
Use 30min epoxy to glue, F1, F2, F3, F22, F25, F18 and F4 in place. Work quickly apply white glue to the tops of F5~F11 and 30min epoxy to F1, F2, F3, F22, F25, F18 and F4.
Place the other fuselage side in place and hold in place with rubber bands or masking tape wrapped around the fuselage in several places. Make sure the fuselage is straight down the centre line.
(Use the plan, make sure F3, F4 and F18 are square to the fuselage sides)

42)Before glue dries, check the fuselage is square down the centreline. Then leave to set fully.

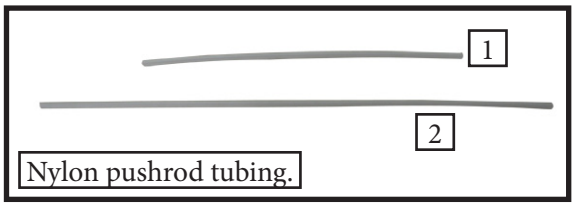


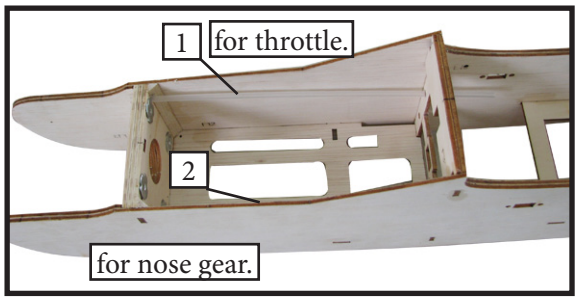
NOTE: F1 is deliberately offset to the right to provide "right thrust" so the plane will fly straight.

43) Two pieces of Balsa Triangle stock are provided to reinforce the firewall-to-fuselage joint. Cut notches in the Balsa Triangles where necessary to clear the blind nuts and pushrod holes, and then glue the Balsa Triangles in place on back of fuselage former using 30min epoxy.



44) Two pieces of Nylon pushrod tubing are provided for making the outer sleeves of the elevator and rudder pushrods.





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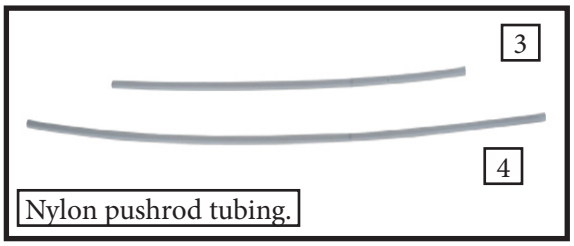
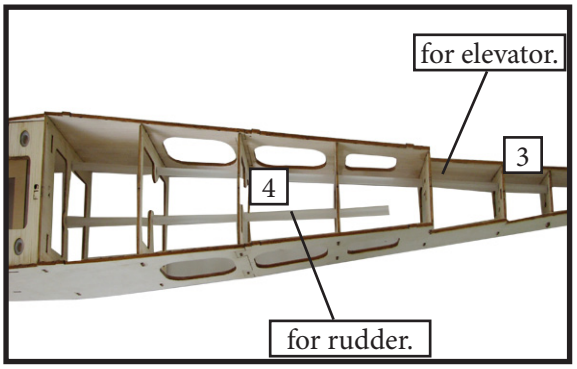
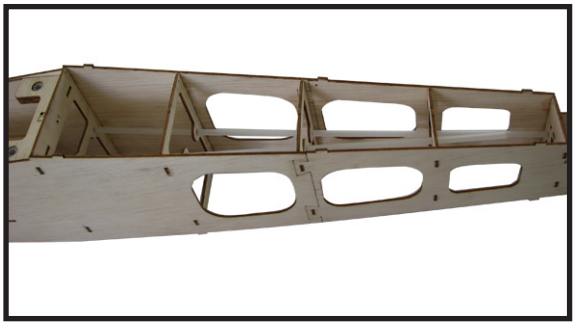
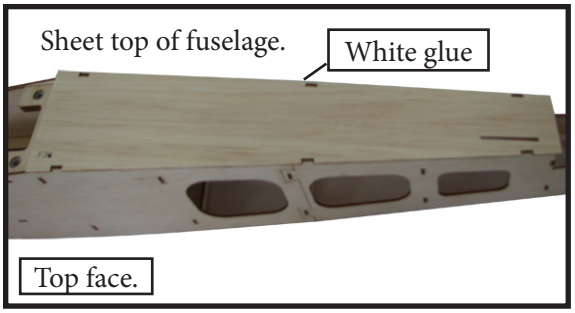


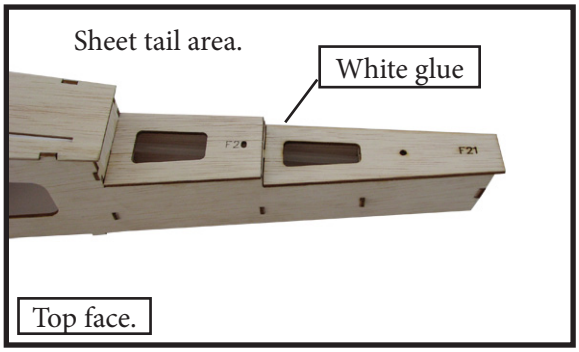




46)



47)



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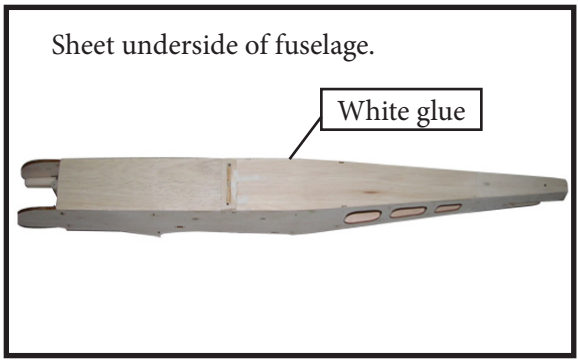
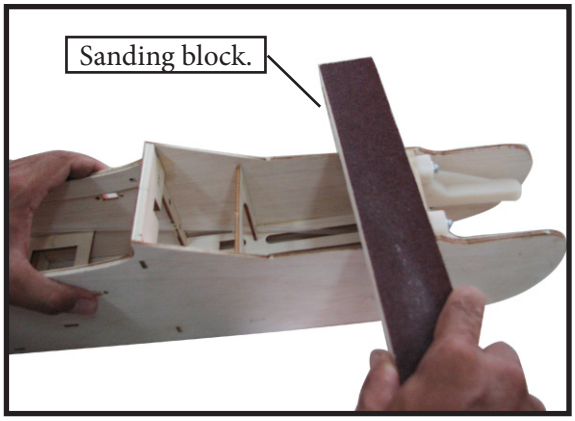
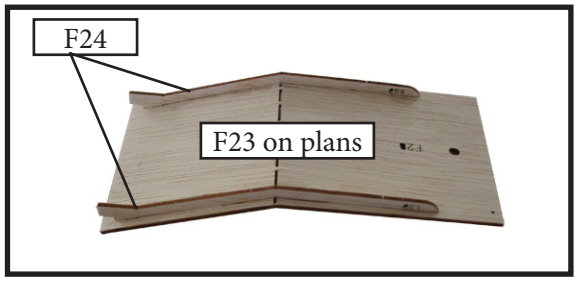


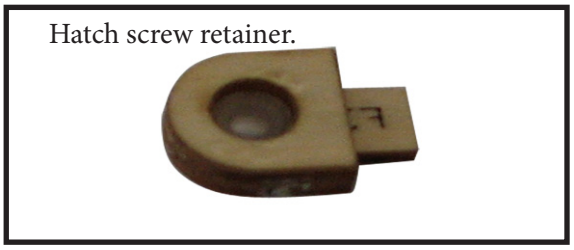
49) Carefully block sand the hatch area to remove any bumps, glue spots, or mismatch between the fuselage sides, the doublers, and the top of former fuselage.
Be careful not to sand a curve in the fuselage sides which would cause an unsightly gap when the hatch is installed.

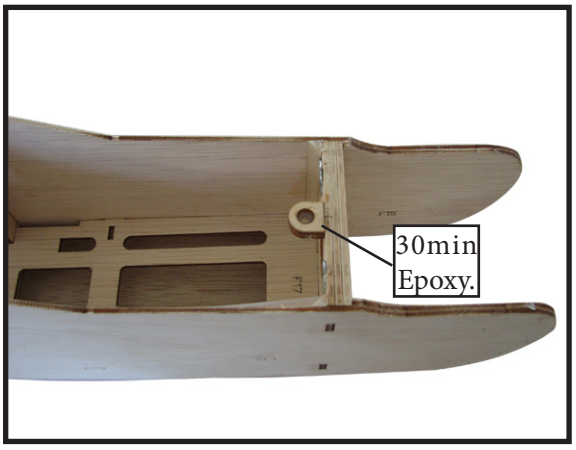


50) Locate the die-cut plywood hatch. Inspect both side and choose the best looking side for the top. Also locate the side braces/hatch retainers F24

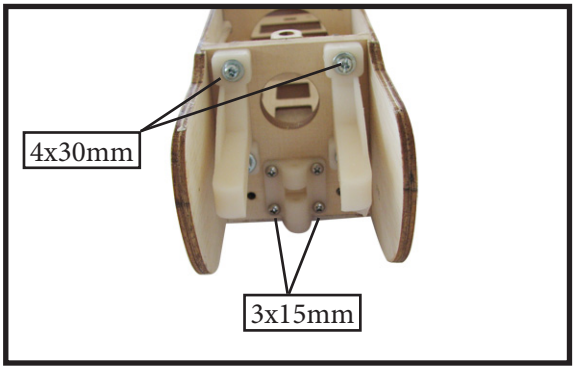


51)





52) Install engine mounts and nose wheel mount with screws provided.



STABILIZER AND ELEVATOR.

53) Sand the leading edges of the horizontal stabiliser and the elevator then use a hobby knife to cut slots in the trailing edge of the horizontal stabiliser and leading edge of the elevator.

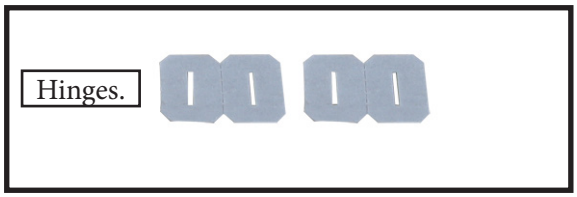
Make sure the slots are cut on the centre lines of the trailing edge of the horizontal stabiliser and the leading edge of the elevator. So that the elevator will work correctly without binding.

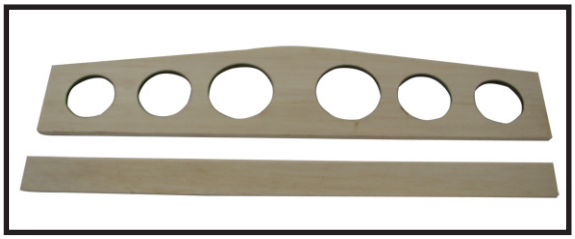
Also make sure the slots are deep enough to allow half the hinge to be inserted into the slot.

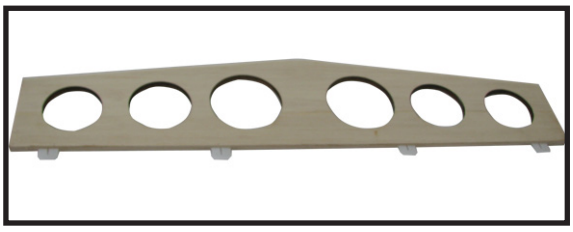
After all the slots have been cut, insert a single hinge halfway into each hinge slot in the stabilizer (or fin, or wing, as the case may be).

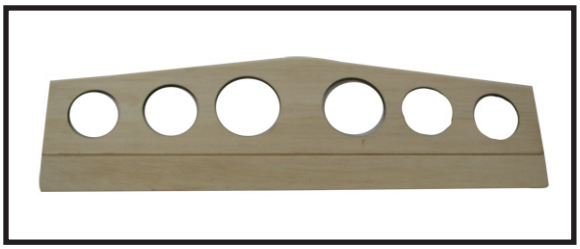
If the hinge is difficult to push in, re-insert the knife and move it back and forth in the slot a few more times and then try again.

NOTE: DO NOT GLUE THE HINGES IN AT THIS TIME!





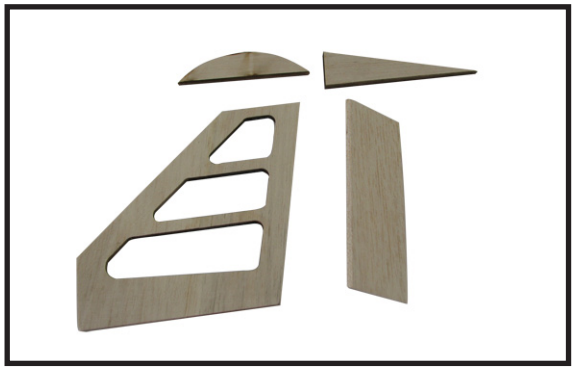


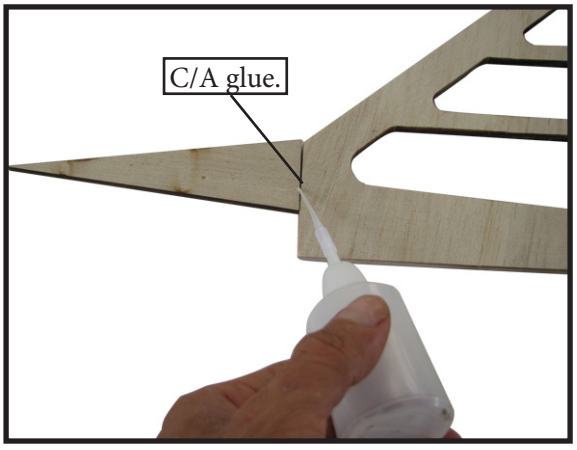


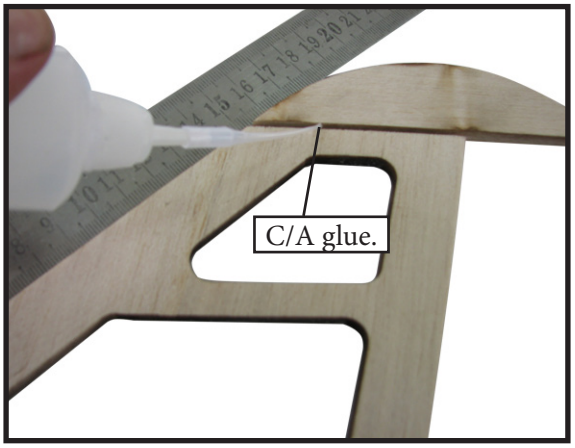
FIN AND RUDDER.

65) Using ruler as a guide, carve and sand the front of the leading edge to a round shape.

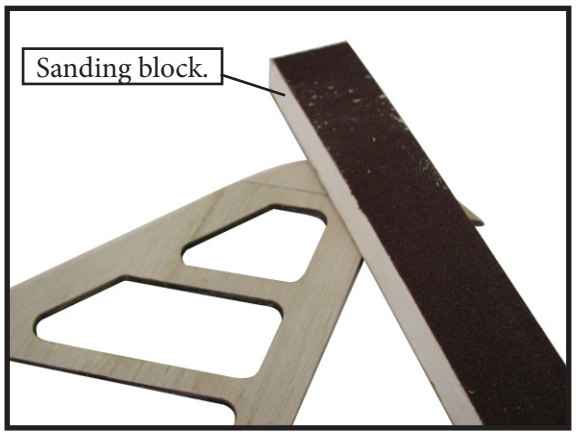
NOTE : Leave the trailing edge, top end, and bottom of the Fin flat and square.



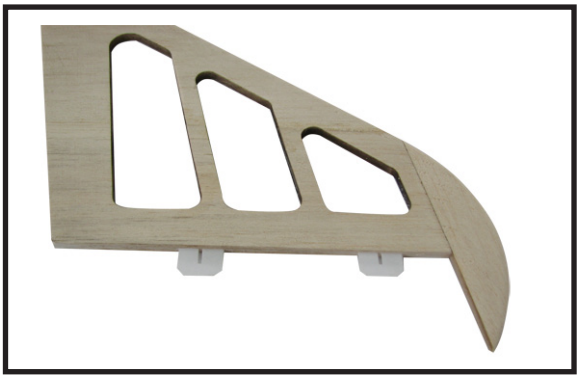


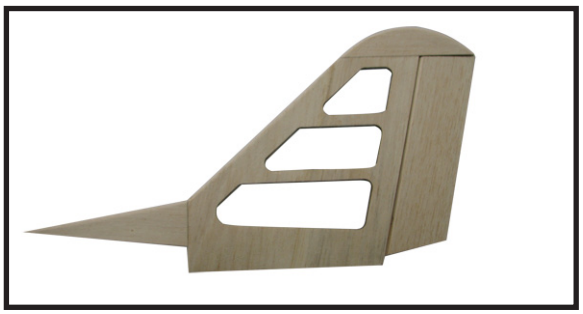


66) Lay the fin flat on the building board and lightly block sand the entire structure just enough to smooth out all the glue joints. Do this to both sides of the fin.
Also using the sanding block, round the leading edges of the Fin and the Rudder



67) Cut slots for the hinges in the fin and rudder. Then set the Fin and Rudder aside for covering.
NOTE: DO NOT GLUE THE HINGES IN AT THIS TIME!

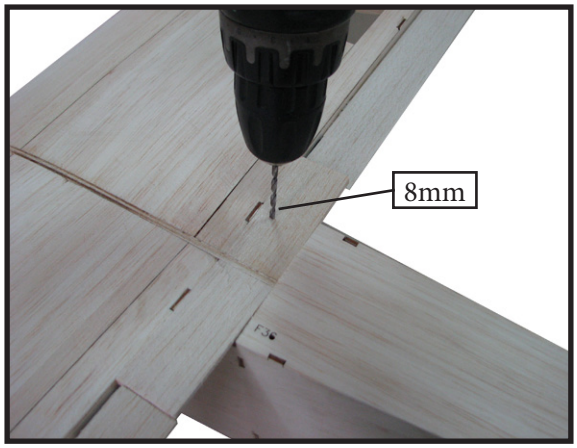


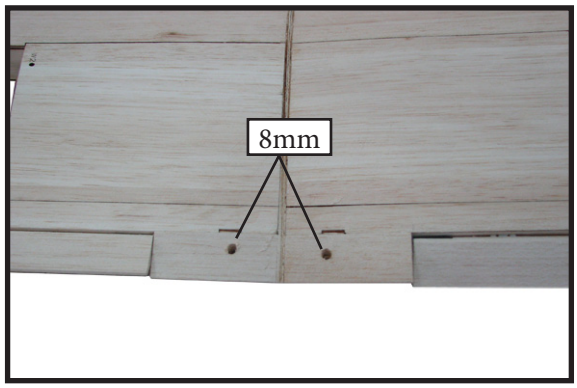


68) Using sanding block once more for both fin and rudder.

FIT WINGS TO FUSELAGE.

69) See below pictures.

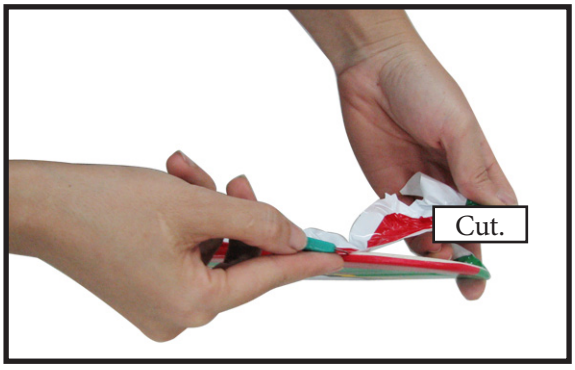


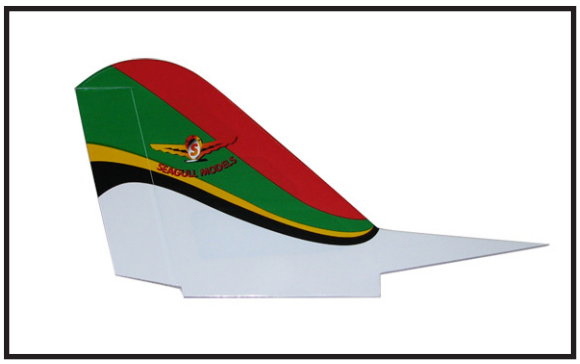


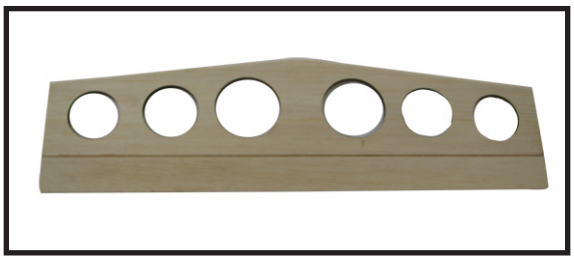
COVERING THE BOOMERANG.

NOTE : Always be careful when trimming excess covering material off the wood parts that you don't "score" or cut into the wood.
Scoring a critical structural component of the airplane could seriously weaken its strength and possibly cause an in-flight failure.
You can cover your Boomerang Kit in any colour or brand of film you like. Keep the colour scheme simple if you are new to covering.
The following pages show the Boomerang being covered with slightly sticky, factory printed film in the Seagull factory, you do not have to reproduce this, so be creative and come up with your own scheme.
Follow the instructions for the type and brand of film covering you choose.

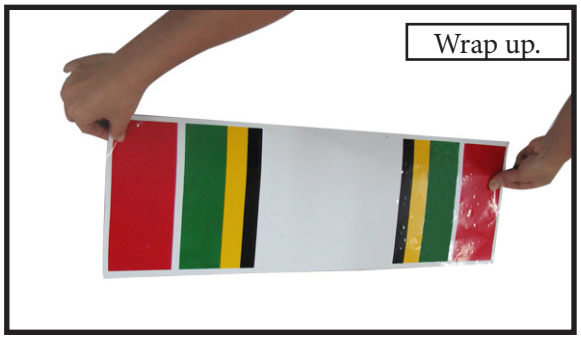
1) <u>COVER THE VERTICAL STABILIZER.</u>

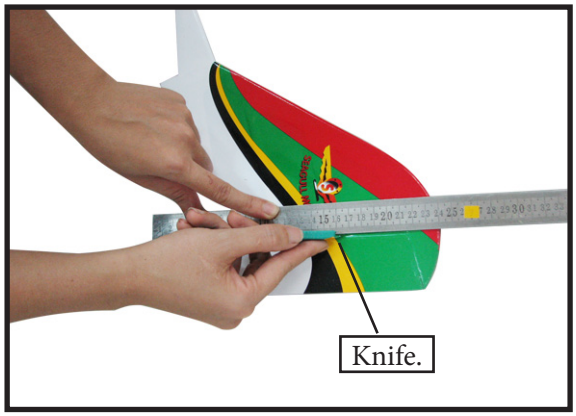


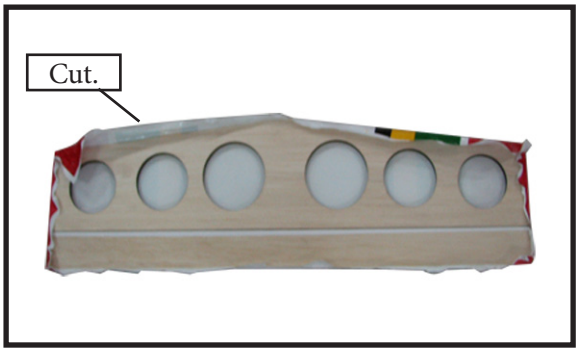


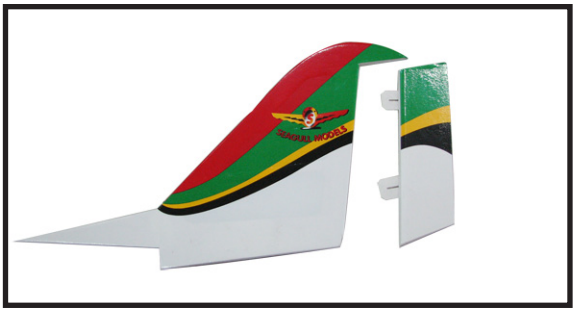


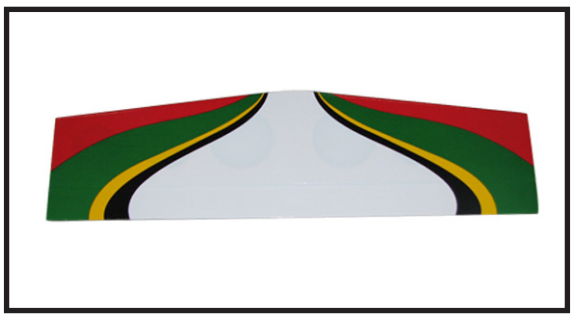
NOTE : When applying covering to an open structure, like this Fin, you should completely adhere the covering to all the outside edges of the structure first. Then go back and shrink the middle of the covering tight.





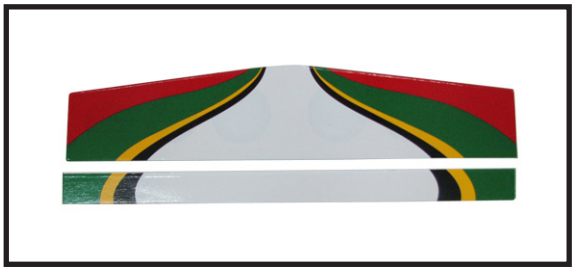


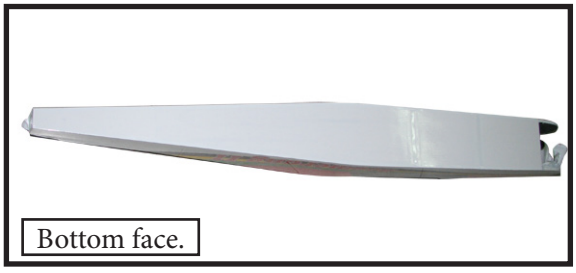




2) COVER THE HORIZONTAL STABILIZER.

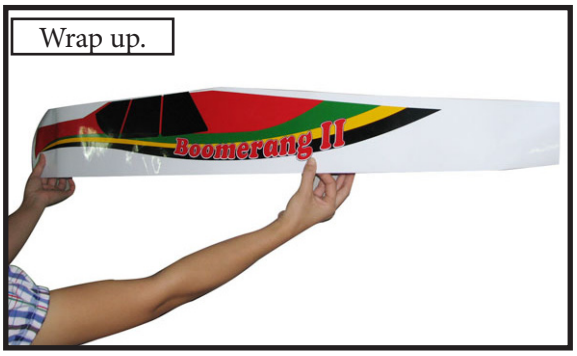
Covering the horizontal stabilizer is virtually the same as covering the vertical stabilizer.

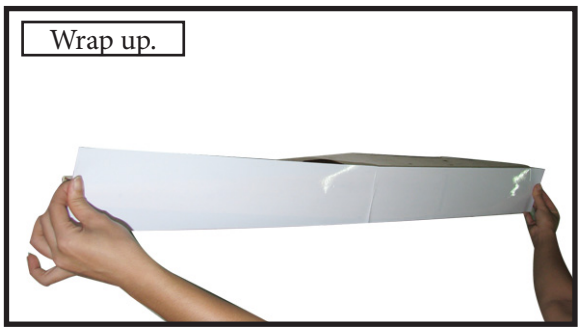


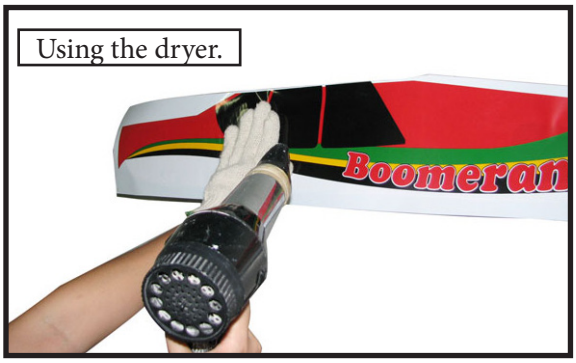


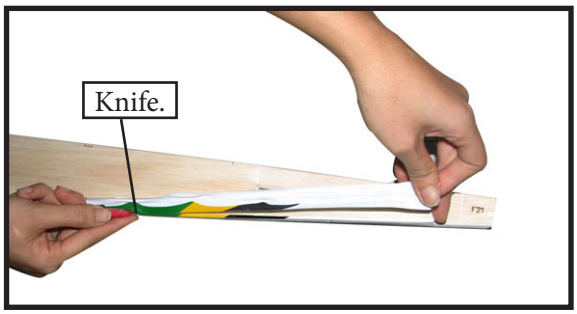
Bottom face.

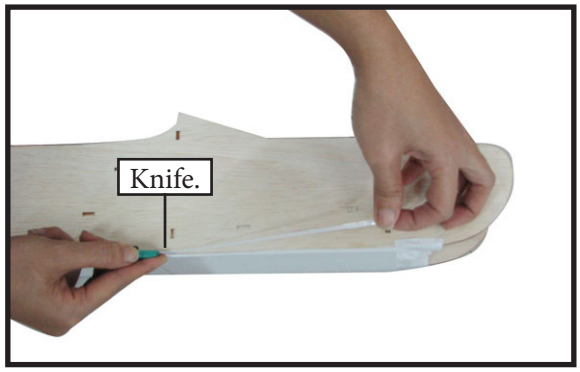
3) COVER THE FUSELAGE.

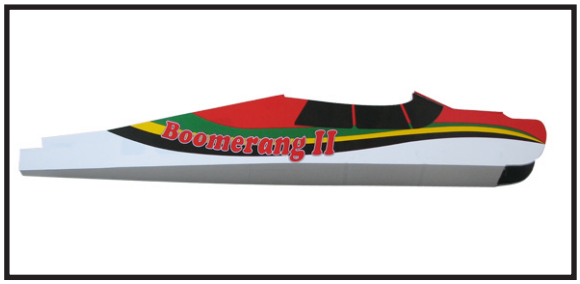






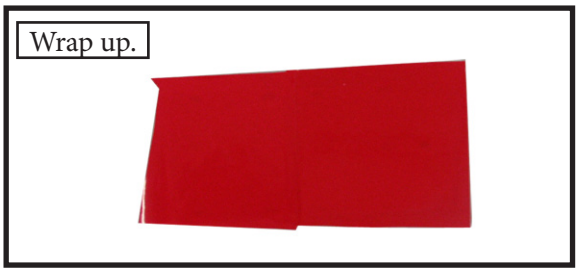




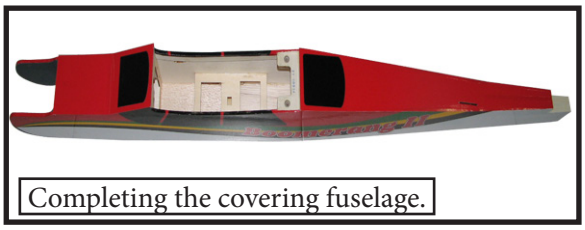


4) COVER THE HATCH.

Start by applying an oversize piece of covering to the top of the hatch. Then turn it over and cut out the corners of the excess covering to make it easier to wrap and seal the covering around the edges



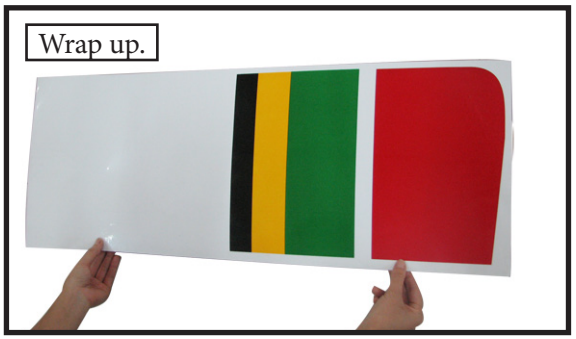
Wrap up.



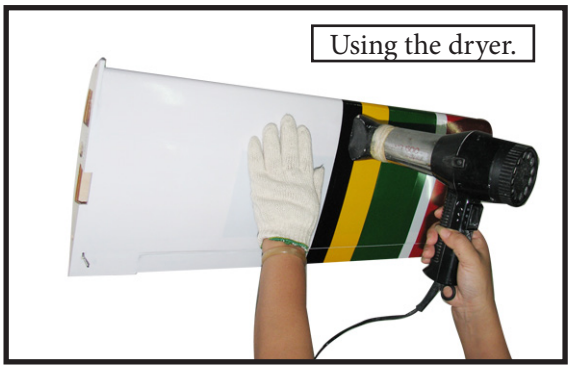
Completing the covering fuselage.

5) COVER THE WING.

Repeat the process as for covering the horizal stabilizer.

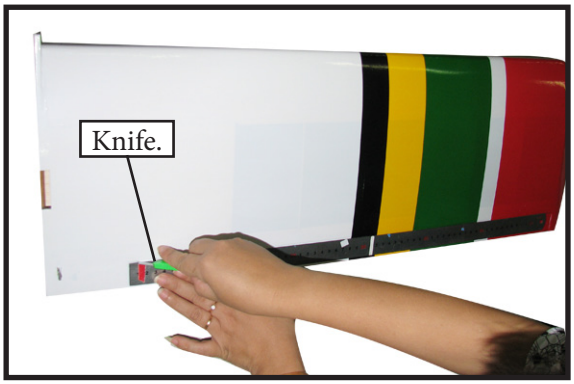


Wrap up.



Using the dryer.

Top face.



Knife.

Using iron.

Completing the covering wings.

FINAL ASSEMBLY

NOTE :

To avoid scratching your new aeroplane we suggest that you cover your workbench with an old towel. Keep a couple of jars or bowls handy to hold the small parts after you open the bags.

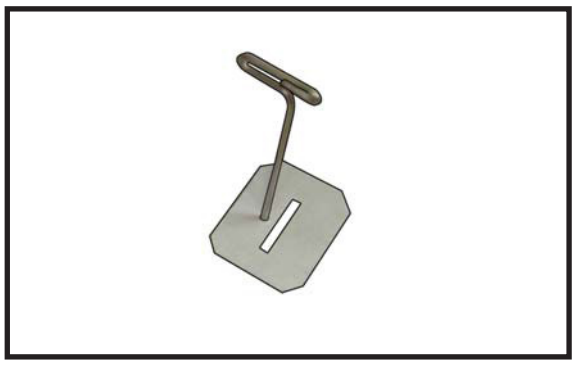
Please trial fit all parts. Make sure you have the correct parts and that they fit and are aligned properly before gluing! This will ensure proper assembly as the Boomerang 40 is made from natural materials and minor adjustments may have to be made.

The paint and plastic parts used in this kit are fuel proof. However, they are not tolerant of many harsh chemicals including the following: paint thinner, cyano-acrylate glue accelerator, cyanoacrylate glue de-bonder and acetone. Do not let these chemicals come in contact with the colours on the covering and the plastic parts.

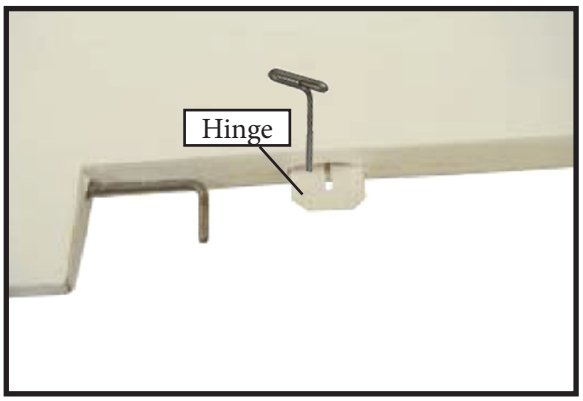
HINGING THE AILERONS.

Note : *The control surfaces, including the ailerons, elevators, and rudder, are hinged. It is imperative that you properly adhere the hinges in place as per the steps that follow using a high-quality thin C/A glue.*

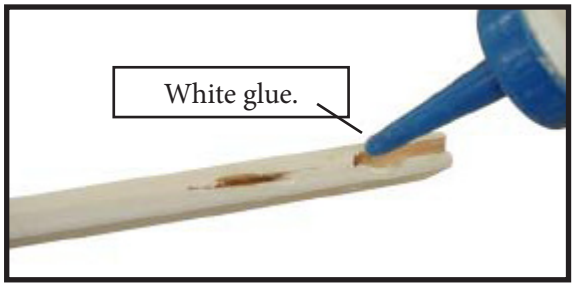
1) Carefully remove the aileron from one of the wing panels. Note the position of the hinges.



2) Remove each hinge from the wing panel and aileron and place a T-pin in the center of each hinge. Slide each hinge into the wing panel until the T-pin is snug against the wing panel. This will help ensure an equal amount of hinge is on either side of the hinge line when the aileron is mounted to the aileron.

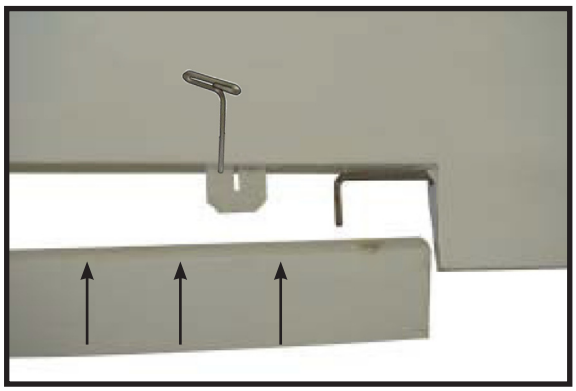


3) Slide the wing panel on the aileron until there is only a slight gap. The hinge is now centered on the wing panel and aileron. Remove the T-pins and snug the aileron against the wing panel. A gap of 1/64" or less should be maintained between the wing panel and aileron.



4) Deflect the aileron and completely saturate each hinge with thin C/A glue. The ailerons front surface should lightly contact the wing during this procedure. Ideally, when the hinges are glued in place, a 1/64" gap or less will be maintained throughout the lengh of the aileron to the wing panel hinge line.

NOTE : The hinge is constructed of a special material that allows the C/A to wick or penetrate and distribute throughout the hinge, securely bonding it to the wood structure of the wing panel and aileron.



5) Turn the wing panel over and deflect the aileron in the opposite direction from the opposite side. Apply thin C/A glue to each hinge, making sure that the C/A penetrates into both the aileron and wing panel.

6) Using C/A remover/debonder and a paper towel, remove any excess C/A glue that may have accumulated on the wing or in the aileron hinge area.

7) Repeat this process with the other wing panel, securely hinging the aileron in place.

8) After both ailerons are securely hinged, firmly grasp the wing panel and aileron to make sure the hinges are securely glued and cannot be pulled out. Do this by carefully applying medium pressure, trying to separate the aileron from the wing panel. Use caution not to crush the wing structure.

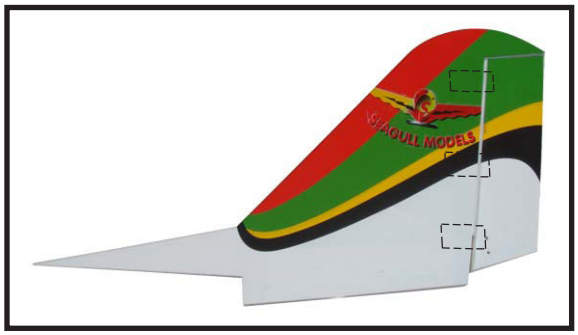
Note: Work the aileron up and down several times to "work in" the hinges and check for proper movement.

HINGING THE ELEVATOR.

Glue the elevator hinges in place using the same techniques used to hinge the ailerons.

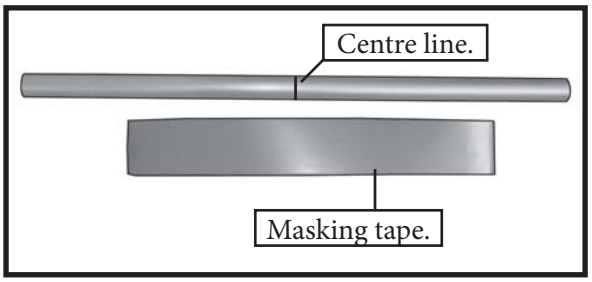
HINGING THE RUDDER.

Glue the rudder hinges in place using the same techniques used to hinge the ailerons.

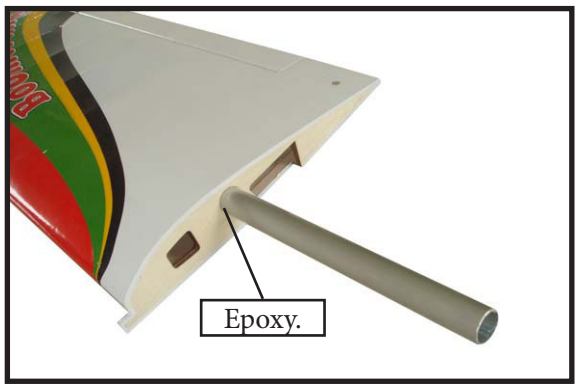


WING ASSEMBLY.

Note : *We highly recommend using 30 minute epoxy as it is stronger and provides more working time, allowing the builder to properly align the parts. Using fast cure epoxy when joining the wing halves could result in the glue drying before the wing halves are aligned properly which may result in failure of the wing centre section during flight.*



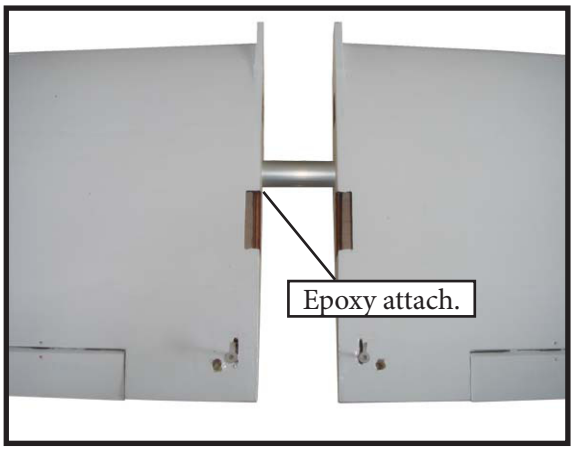
Test fit the wing tube into each wing half again. It should slide in easily up to the centreline that you drew.



Remove the wing tube when satisfied it fits into each wing half. Coat one half of the wing tube with 30 minute epoxy. Next, pour some epoxy into the cardboard tube in one wing panel. Spread the epoxy inside the cardboard tube, then slide the wing tube into wing.
Clean up any excess epoxy with paper towel and rubbing alcohol and allow to fully set.

Carefully apply masking tape around the top and bottom edge of the root rib of each wing half to protect them from damage caused by epoxy.

Mix a generous amount of 30 minute epoxy. Coat the exposed half of the wing tube and the remaining wing cardboard tube as well as both root ribs with epoxy.



Slide the two wing halves together and carefully align them at the leading and trailing edges. Wipe away any excess epoxy using paper towels. Use masking tape wrapped around the centre section to hold the halves in place until the epoxy cures.

7) When the epoxy has cured, carefully remove the masking tape from the wing.

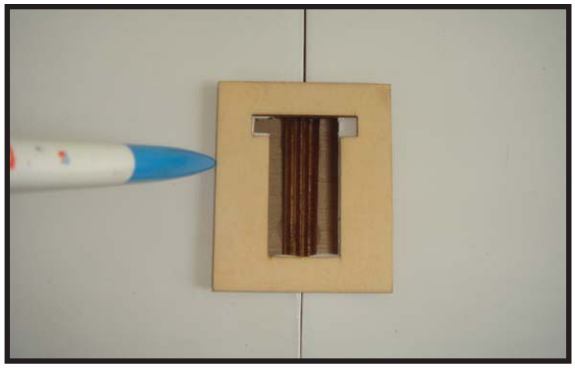
INSTALLING THE AILERON SERVO MOUNT.

1. Install the rubber grommets and brass collets onto the aileron servo. Test fit the servo into the aileron servo mount.

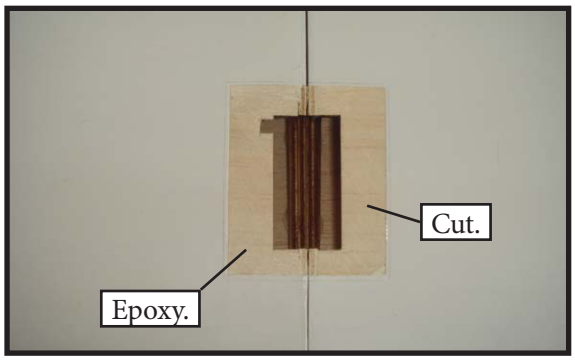
⚠ *Because the size of servos differ, you may need to adjust the size of the precut opening in the mount. The notch in the sides of the mount allow the servo lead to pass through.*

2. Remove the aileron servo. Place the mount onto the wing, aligning the cutout in the mount with the cutout in the wing.
The two notches in the mount should face the leading edge of the wing.

3. While holding the servo mount firmly in place, trace around it using a pen.



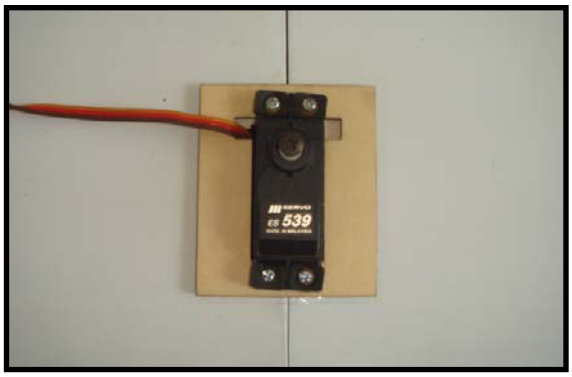
4. Remove the mount, and using a modelling knife, carefully remove the covering from inside the outline you drew.



5. Using 5 Minute Epoxy, glue the servo mount into place.
Remove any excess epoxy using a paper towel and rubbing alcohol.
Use pieces of masking tape to hold the tray in place until the epoxy fully cures.

INSTALLING THE AILERON SERVO.

Install the aileron servo into the servo mount, with the output shaft towards the leading edge of the wing, using the wood screws provided with your radio system. Drill 1/16" pilot holes through the mount before installing the screws. This will prevent the wood from splitting.

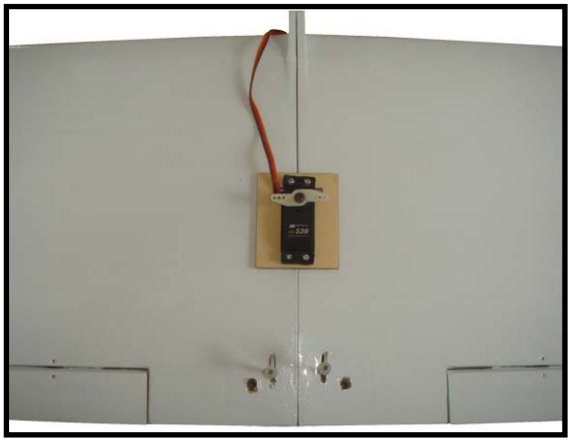


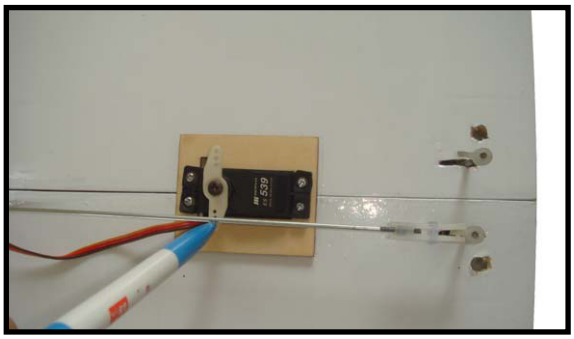
INSTALLING THE AILERON LINKAGE.

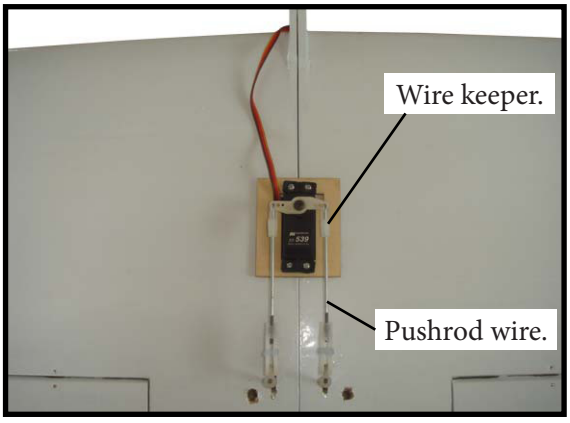
1) Thread one nylon adjustable control horn onto each aileron torque rod. Thread the horns on until they are flush with the ends of the torque rods.

2) Thread one nylon clevis at least 5/16" onto each of the two threaded wires.

3) With the aileron servo centered, install the servo arm onto the servo. The arm should be installed so it is parallel with the trailing edge of the wing.





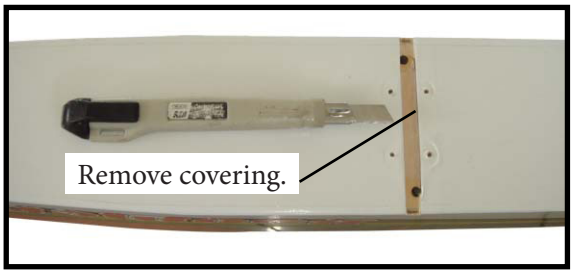


4) Slide the pushrod wires following picture above.

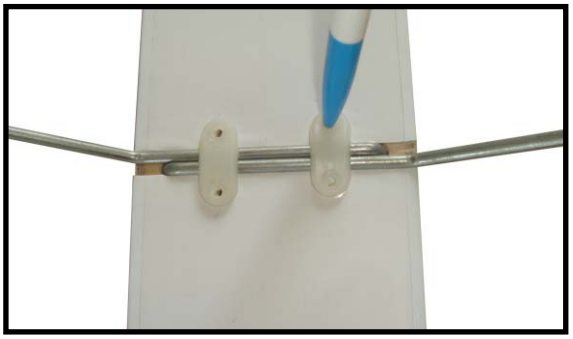
5) With both the aileron servo and the ailerons centered.
Tighten the set screws on the connectors.

INSTALLING THE MAIN GEAR WIRES.

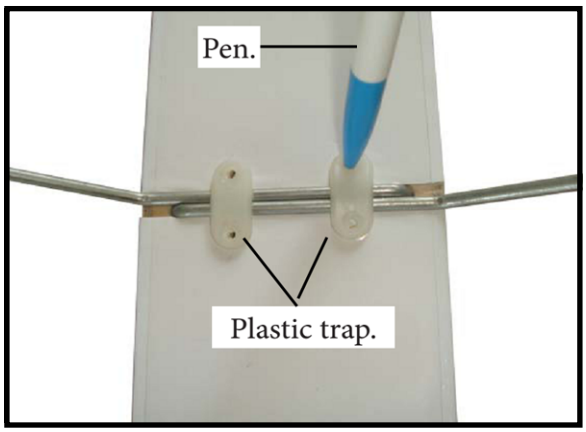
1) Using a modelling knife, remove the covering from over the two main gear mounting slots located in the bottom of the fuselage.



2) Using the two landing gear straps as a guide, mark the locations of the four 3mm x 12mm mounting screws onto the fuselage surface.

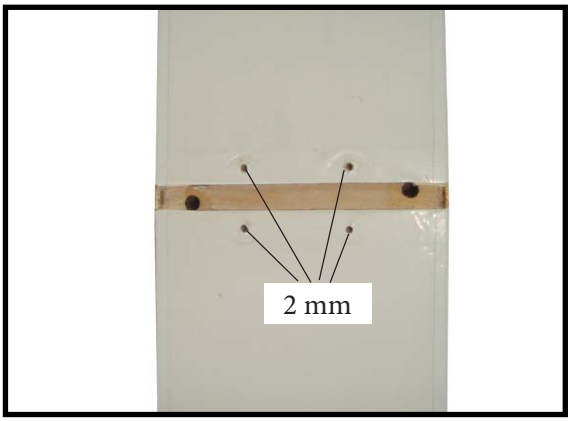


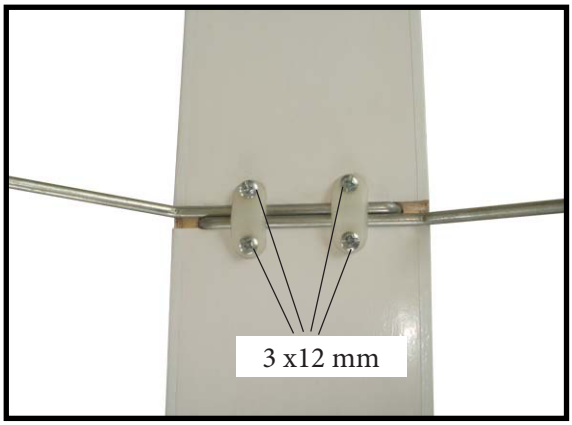
3) The landing gear wire is held in place using two nylon landing gear straps and four 3mm x 12mm wood screws. The straps should be located equal distance from the inside and outside ends of the wire.



4) Insert the main gear wire into the mounting slot.

5) Remove the two straps and the gear wire. Drill four 3/32" pilot holes into the fuselage for the wood screws.

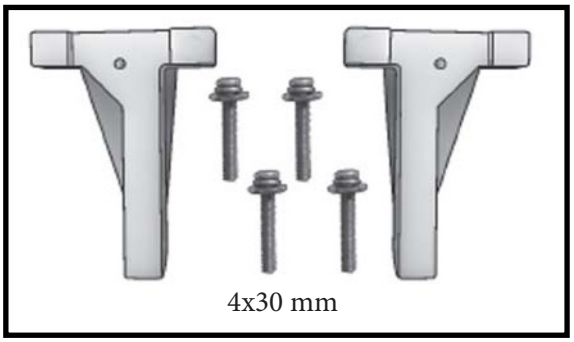




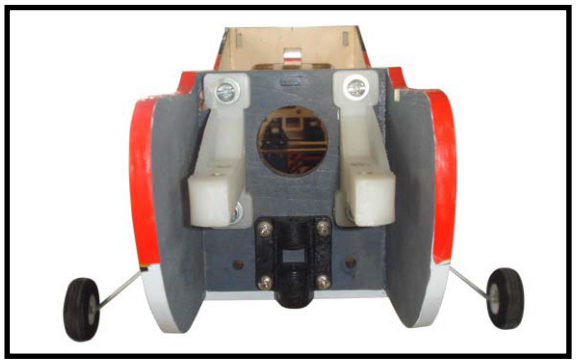
INSTALLING THE NOSE GEAR WHEEL.

ENGINE MOUNT INSTALLATION.

1) Locate the items necessary to install the engine mount included with your model.



2) Use four 4x30mm head bolts and four 4mm washers to attach the engine mount rails to the firewall. Tighten the screws . Make sure to use threadlock on the screws to help prevent them from vibrating loose.

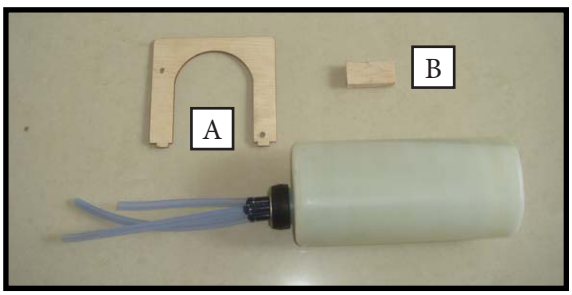


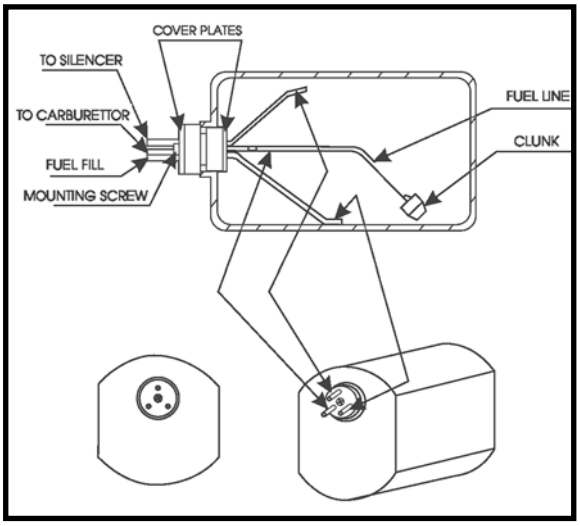
INSTALLING THE STOPPER ASSEMBLY.

1) Using a modelling knife, carefully cut off the rear portion of one of the two nylon tubes leaving 1/2" protruding from the rear of the stopper. This will be the fuel pick up tube.

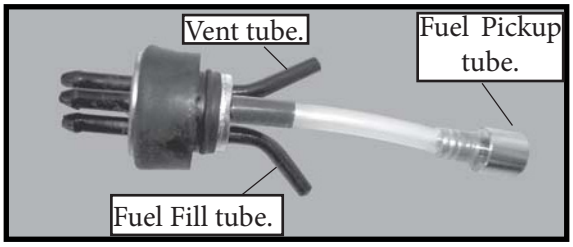
2) Using a modelling knife, cut one length of silicon fuel line (not included) to 2-1/4" long.
Connect one end of the line to the weighted fuel pickup and the other end to the nylon pickup tube.

3) Carefully bend the second nylon tube up at a 45° angle. This tube is the vent tube.





4) Carefully heat the vent tube using a heat gun or lighter to permanently set the angle of the tube.

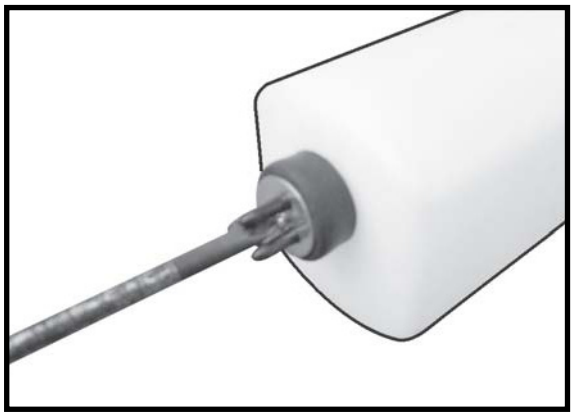


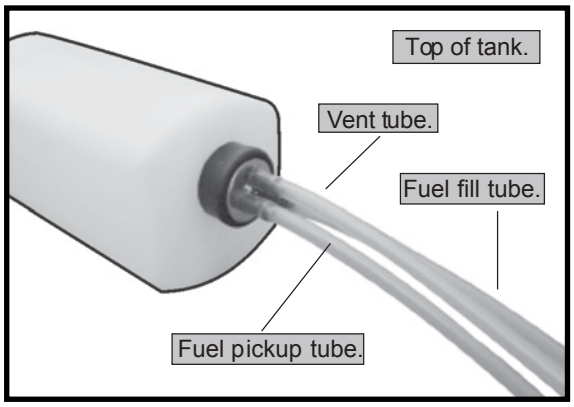
When the stopper assembly is installed in the tank, the top of the vent tube should rest just below the top surface of the tank. It should not touch the top of the tank.

5) Test fit the stopper assembly into the tank. It may be necessary to remove some of the flashing around the tank opening using a modeling knife. If flashing is present, make sure none falls into the tank.

6) With the stopper assembly in place, the weighted pickup should rest about 3/8" away from the rear of the tank and move freely inside the tank. The top of the vent tube should rest just below the top of the tank. It should not touch the top of the tank.

7) When satisfied with the alignment of the stopper assembly tighten the 3mm x 20mm machine screw until the rubber stopper expands and seals the tank opening.
Do not overtighten the assembly as this could cause the tank to split.

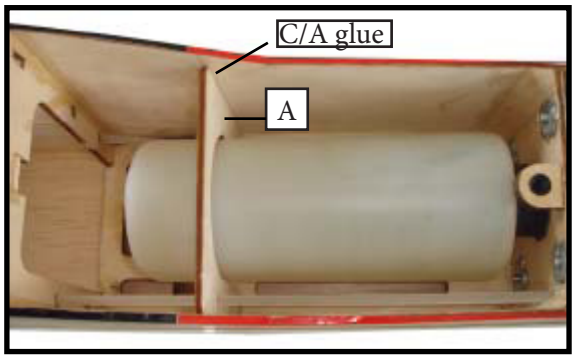




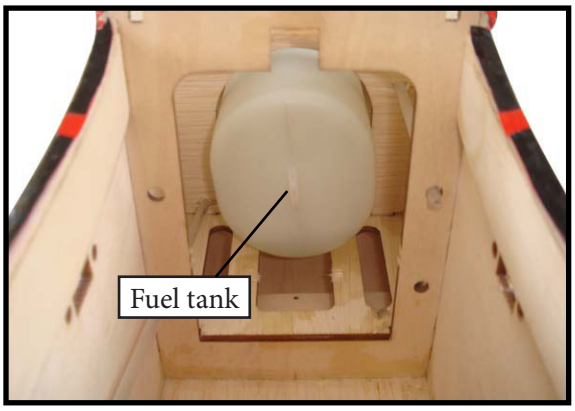
INSTALLING THE FUEL TANK.

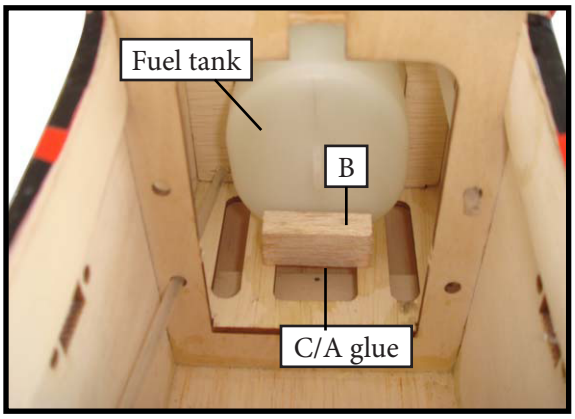
You should mark which tube is the vent and which is the fuel pickup when you attach fuel tubing to the tubes in the stopper. Once the tank is installed inside the fuselage, it may be difficult to determine which is which.

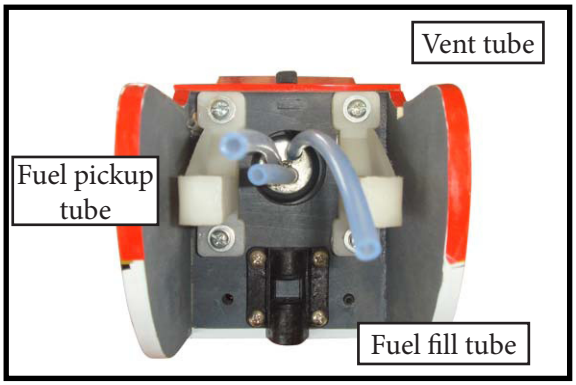
1) Slide the fuel tank into the fuselage. Guide the lines from the tank through the hole in the firewall.



2) Use balsa plywood to help prevent moveable from transferring to the fuel tank as shown.





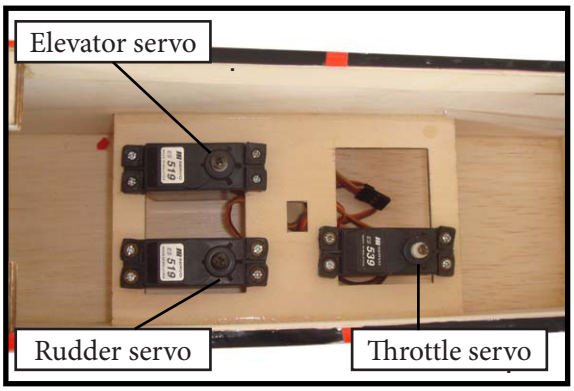


INSTALLING THE FUSELAGE SERVOS.

Because the size of servos differ, you may need to adjust the size of the precut opening in the mount. The notch in the sides of the mount allow the servo lead to pass through.

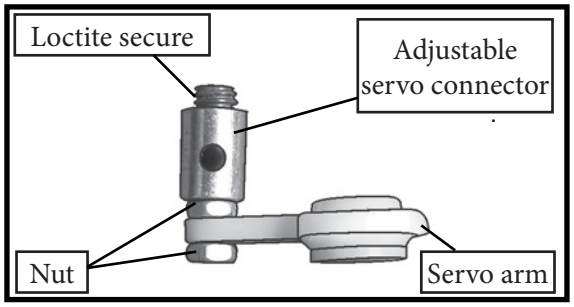
1) Install the rubber grommets and brass collets onto the throttle servo. Test fit the servo into the aileron servo mount.

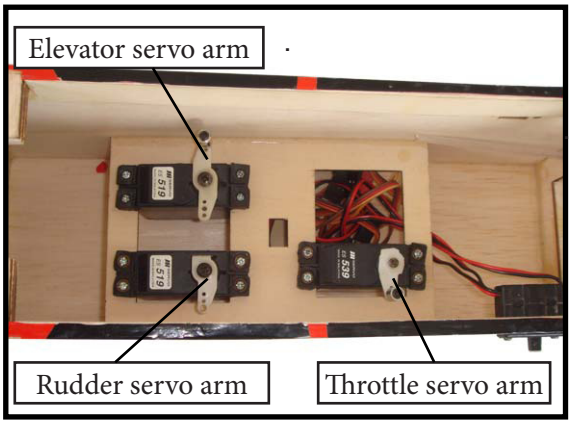
2) Secure the servos with the screws provided with your radio system.



THROTTLE SERVO ARM INSTALLATION.

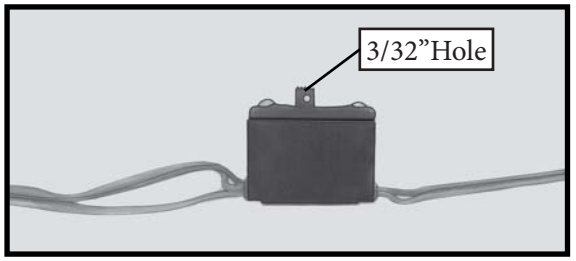
Install adjustable servo connector in the servo arm as same as picture below:

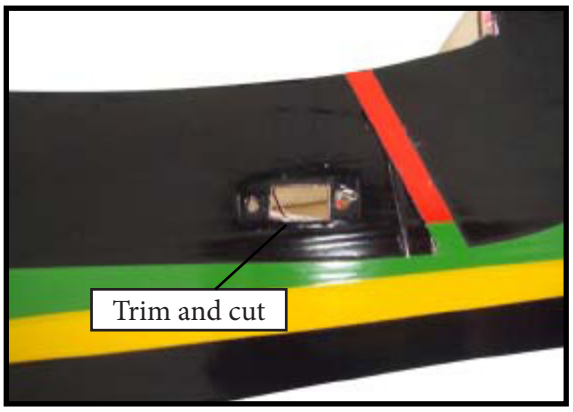


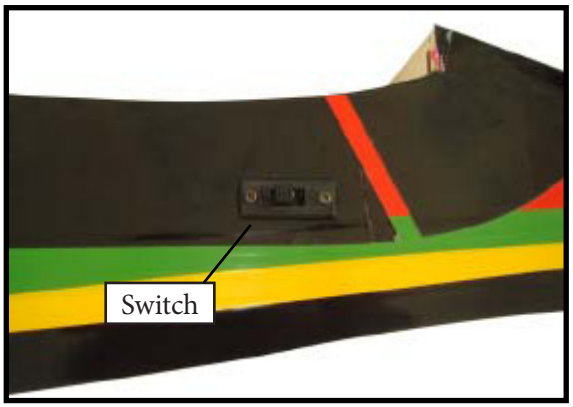


INSTALLING THE SWITCH.

Install the switch into the precut hole in the side, in the fuselage.



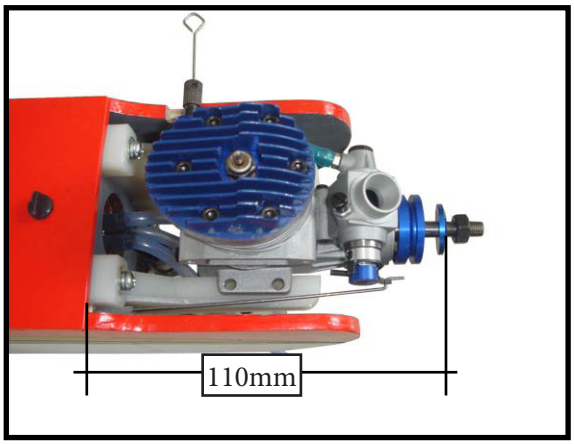




MOUNTING THE ENGINE.

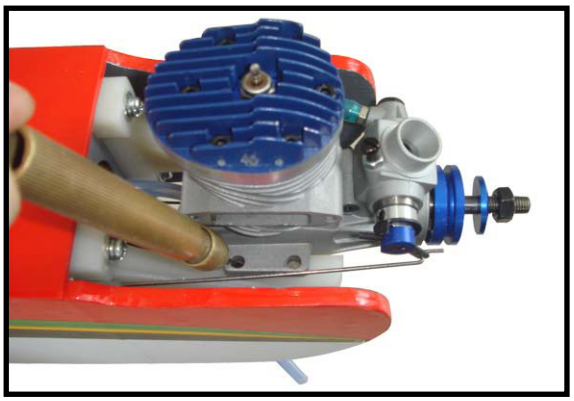
PARTS REQUIRED

1) Install the pushrod housing through the predrilled hole in the firewall and into the servo compartment. The pushrod housing should protrude 1/4" out past the front of the firewall. Make a Z-Bend 1/4" from one end of the plain wire pushrod.

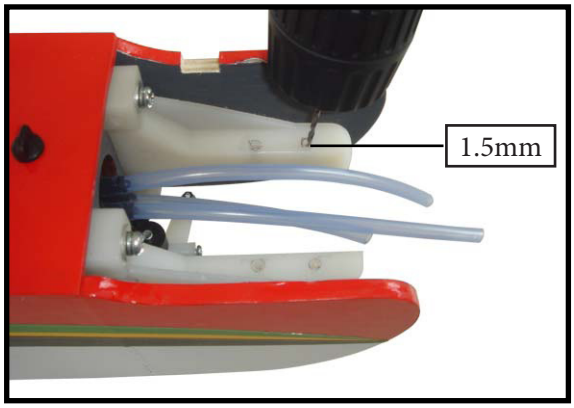


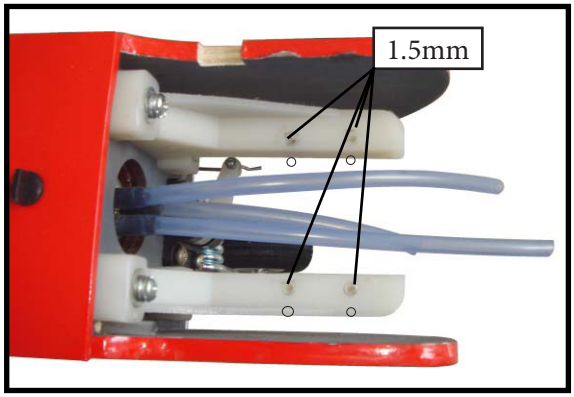
2) Place your engine onto the engine mount. Adjust the engine is centered of the edges of the engine case.

3) When you are satisfied with the alignment, mark the locations of the engine mounting.



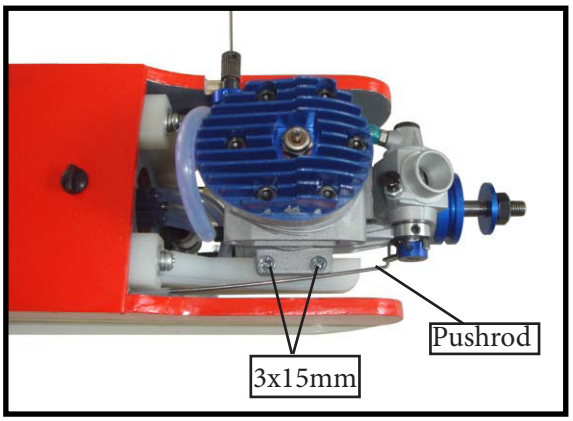
4) Remove the engine. Using an drill bit, drill the mounting holes through the engine mount at the four locations marked.

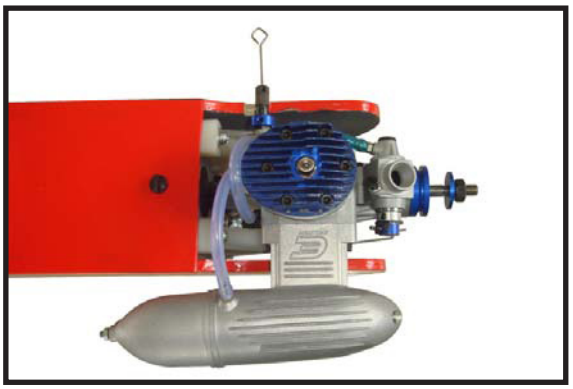




5) Bolt the engine to the engine mount using the four machine screws. Double cheek that all the screws are tight before proceeding.

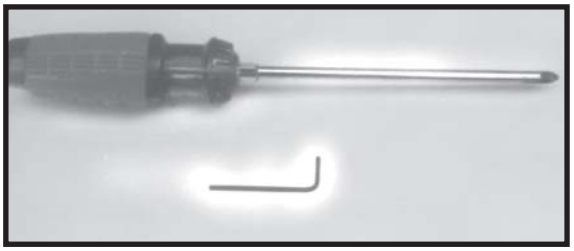
6) Attach the Z-Bend in the pushrod wire to the throttle arm on the carburetor. You will need to remove the throttle arm from the carburetor to be able to attach the Z-bend. When complete, reattach the throttle arm to the carburetor.
Pushrod wire.
1.5mm





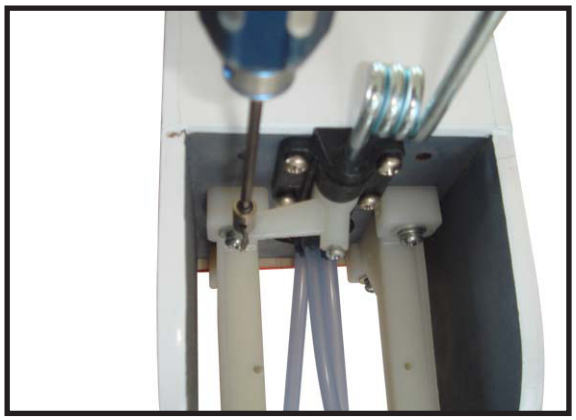
NOSE GEAR INSTALLATION.

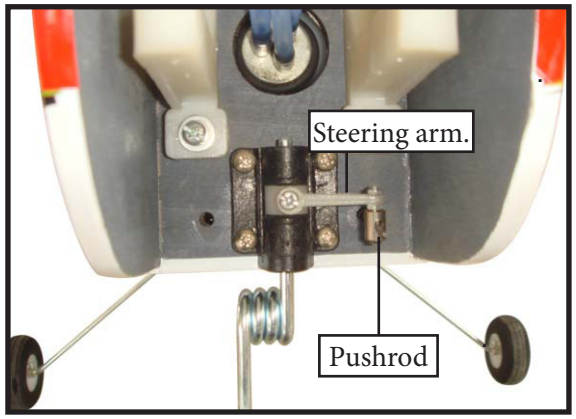
TOOLS REQUIRED



Installing steering arm as follow.

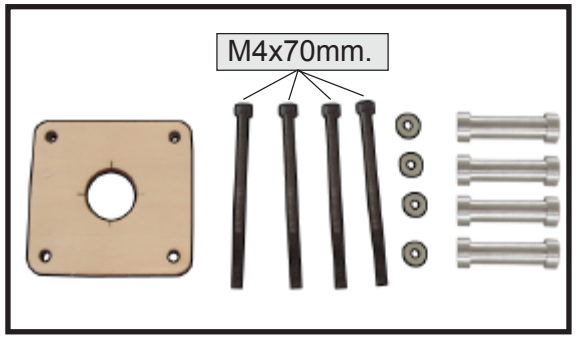
Adjust the nose gear steering arm until the arm is parallel with the fire wall.





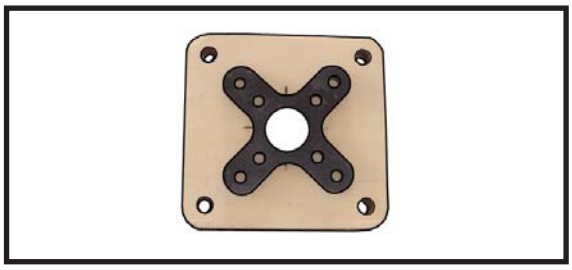
ELECTRIC POWER CONVERSION.

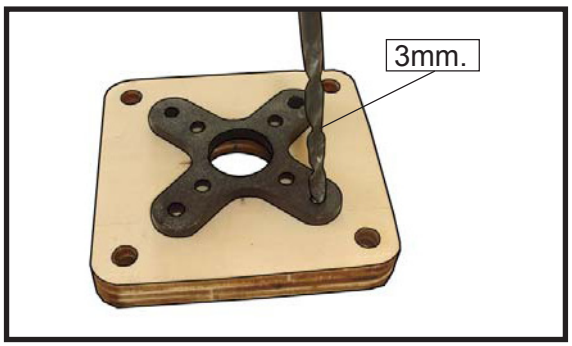
1) Locate the items neccessary to install the electric power conversion included with your model.

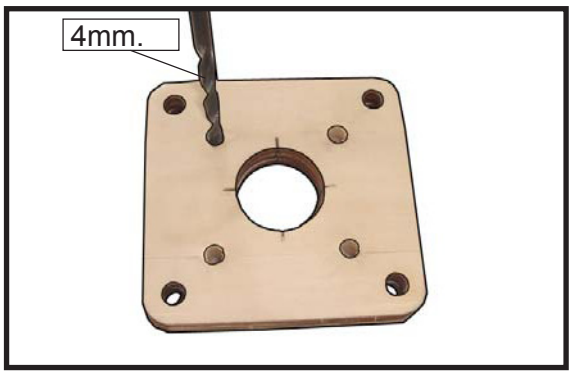


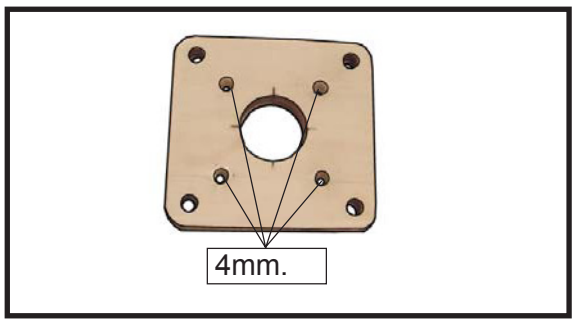
-Model size: .40-.46 size models
-Motor: 46 (925 watt)
-Propeller: 12x8 - 14x10
-ESC: 60A
-Lipo Batteries: 4S - 5S

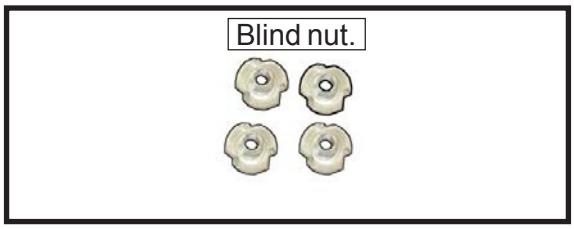
2) Attach the electric motor box to the firewall suitable with the cross lines drawn on the electric motor box and firewall. Using epoxy and balsa stick to secure the motor box to the firewall.
Please see pictures below.

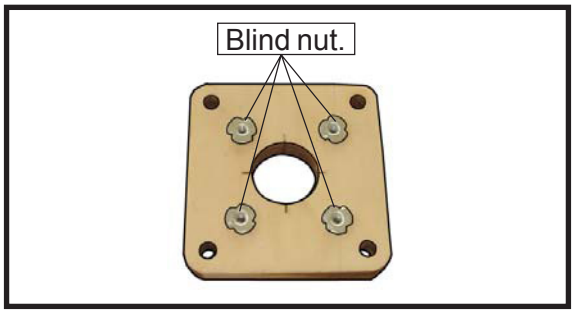


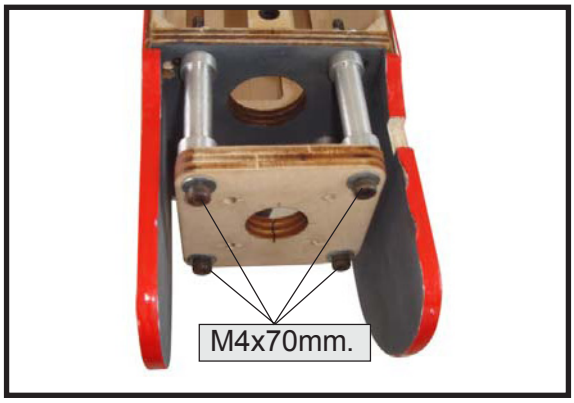


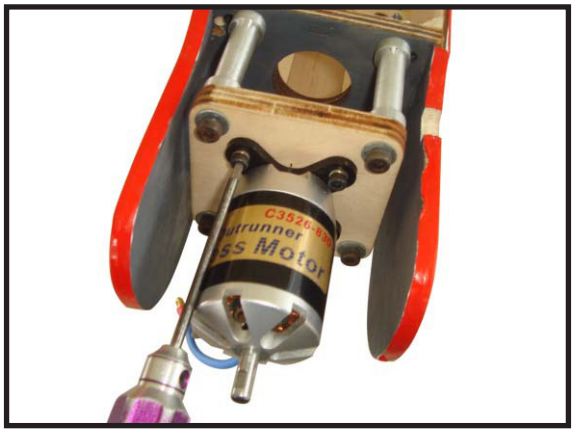


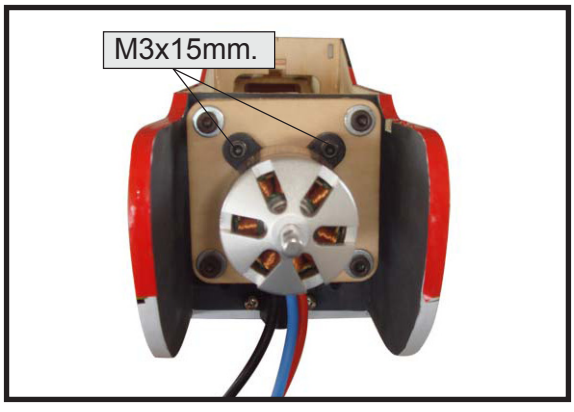


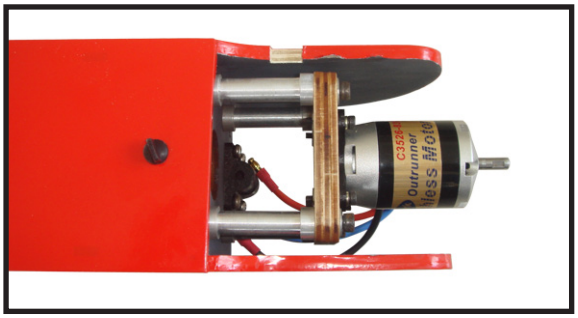


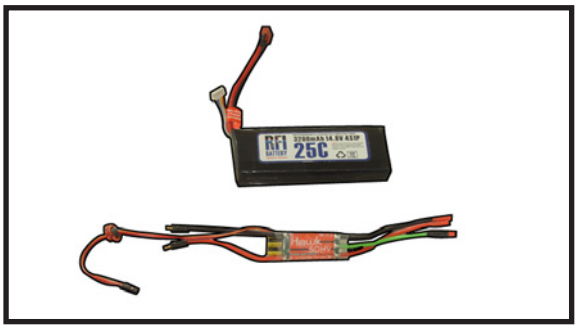


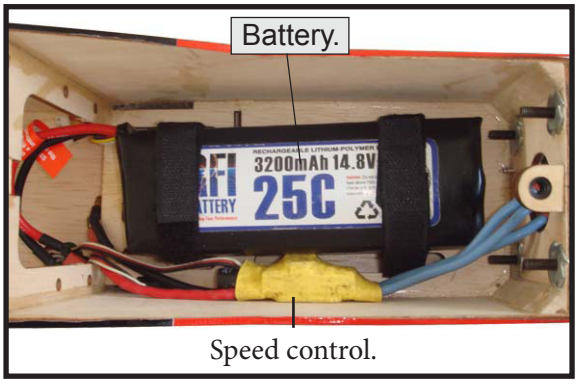


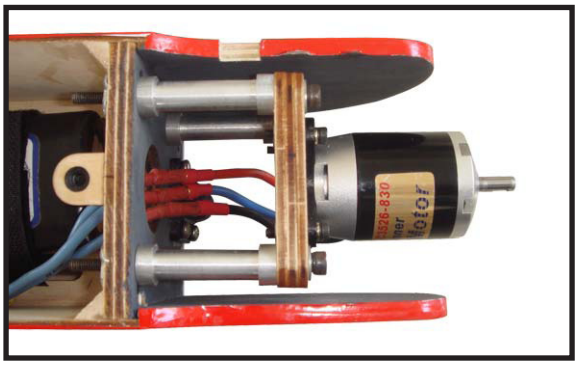








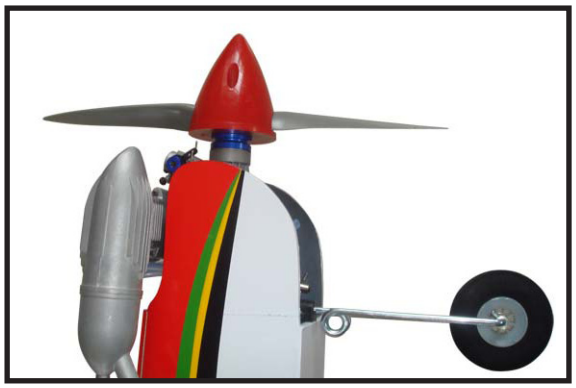




INSTALLING THE SPINNER.

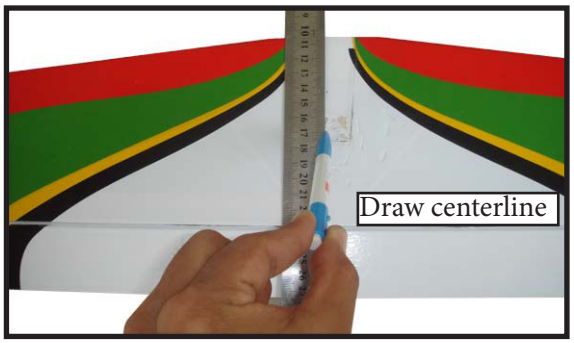
Install the spinner backplate, propeller and spinner cone. The spinner cone is held in place using two 3mm x 12mm wood screws.

The propeller should not touch any part of the spinner cone. If it does, use a sharp modeling knife and carefully trim away the spinner cone where the propeller comes in contact with it.



HORIZONTAL STABILIZER.

1) Using a ruler and a pen, locate the centerline of the horizontal stabilizer, at the trailing edge, and place a mark. Use a triangle and extend this mark, from back to front, across the top of the stabilizer. Also extend this mark down the back of the trailing edge of the stabilizer.

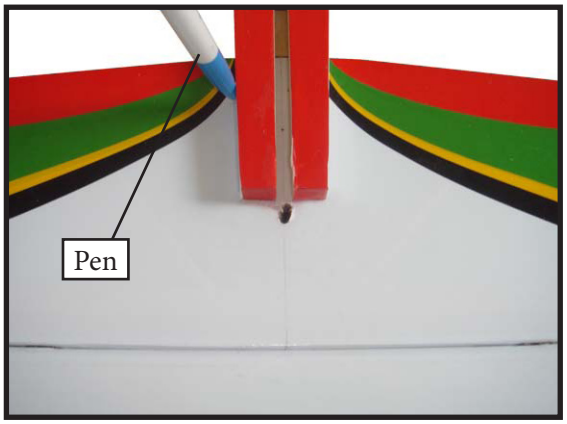


The top of the stabilizer does not have the hinge pins exposed.

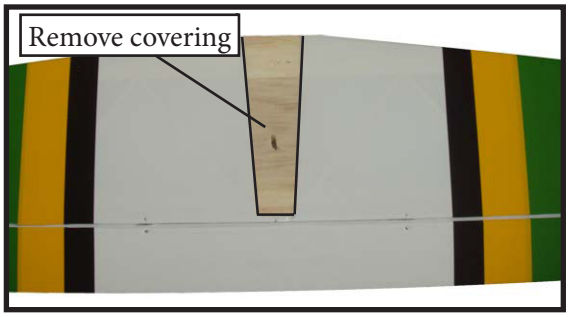
2) Using a modeling knife, carefully remove the covering from over the vertical stabilizer mounting slot in the top of the fuselage.

3) Slide the stabilizer into place in the precut slot in the rear of the fuselage. The stabilizer should be pushed firmly against the front of the slot.

4) With the stabilizer held firmly in place, use a pen and draw lines onto the stabilizer where it and the fuselage sides meet. Do this on both the right and left sides and top and bottom of the stabilizer.



5) Remove the stabilizer. Using the lines you just drew as a guide, carefully remove the covering from between them using a modeling knife.



When cutting through the covering to remove it, cut with only enough pressure to only cut through the covering itself. Cutting into the balsa structure may weaken it.

6) Using a modeling knife, carefully remove the covering that overlaps the stabilizer mounting platform sides in the fuselage. Remove the covering from both the top and the bottom of the platform sides.

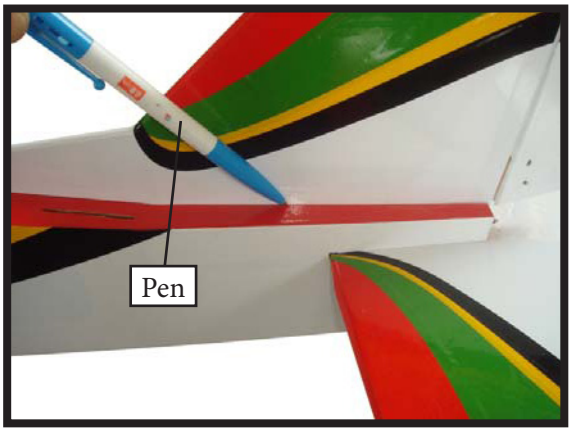
7) When you are sure that everything is aligned correctly, mix up a generous amount of 30 Minute Epoxy. Apply a thin layer to the top and bottom of the stabilizer mounting area and to the stabilizer mounting platform sides in the fuselage. Slide the stabilizer in place and realign. Double check all of your measurements once more before the epoxy cures. Hold the stabilizer in place with T-pins or masking tape and remove any excess epoxy using a paper towel and rubbing alcohol.

8) After the epoxy has fully cured, remove the masking tape or T-pins used to hold the stabilizer in place. Carefully inspect the glue joints. Use more epoxy to fill in any gaps that may exist that were not filled previously and clean up the excess using a paper towel and rubbing alcohol.

VERTICAL STABILIZER INSTALLATION.

1) Slide the vertical stabilizer into the slot in the top of the fuselage. The bottom edge of the stabilizer should also be firmly pushed against the top of the horizontal stabilizer.

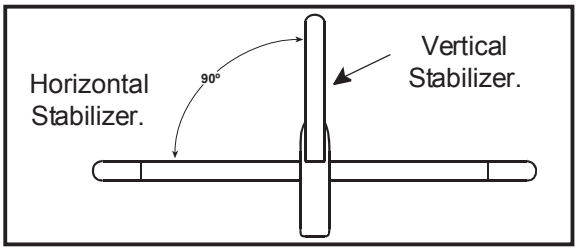
2) While holding the vertical stabilizer firmly in place, use a pen and draw a line on each side of the vertical stabilizer where it meets the top of the fuselage.



3) Remove the stabilizer. Using a modeling knife, remove the covering from below the lines you drew. Also remove the covering from the bottom edge of the stabilizer and the bottom and top edges of the filler block. Leave the covering in place on the sides of the filler block.

⚠ *When cutting through the covering to remove it, cut with only enough pressure to only cut through the covering itself. Cutting into the balsa structure may weaken it.*

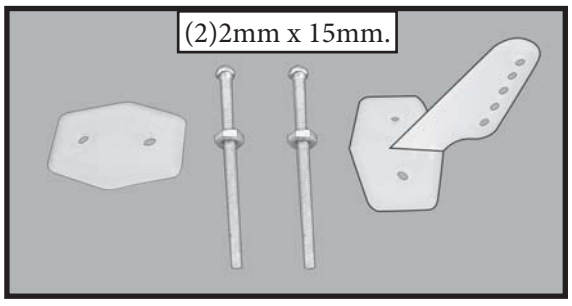
4) Slide the vertical stabilizer back in place. Using a triangle, check to ensure that the vertical stabilizer is aligned 90º to the horizontal stabilizer.



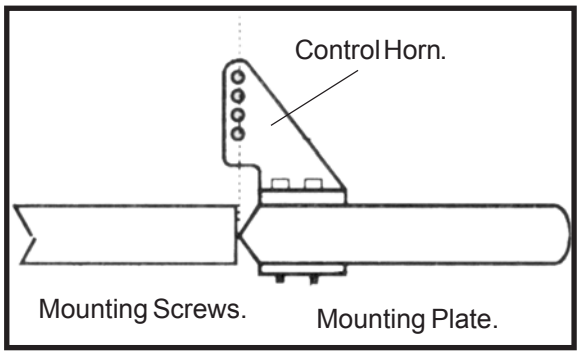
5) When you are sure that everything is aligned correctly, mix up a generous amount of 30 Minute Epoxy. Apply a thin layer to the mounting slot in the top of the fuselage and to the sides and bottom of the vertical stabilizer mounting area. Apply epoxy to the bottom and top edges of the filler block and to the lower hinge also. Set the stabilizer in place and realign. Double check all of your measurements once more before the epoxy cures. Hold the stabilizer in place with T-pins or masking tape and remove any excess epoxy using a paper towel and rubbing alcohol. Allow the epoxy to fully cure before proceeding.

CONTROL HORN INSTALLATION.

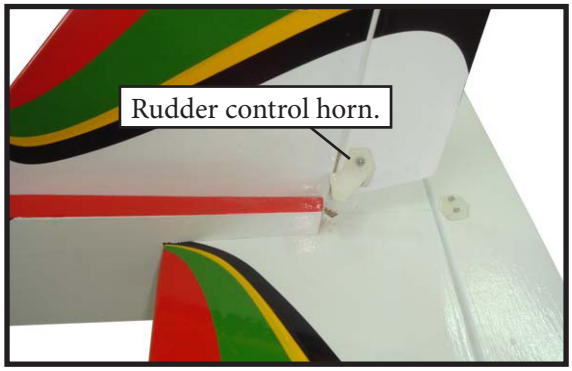
1) Locate the two nylon control horns, two nylon control horn backplates and four M2 x 15mm machine screws.



2) Position the elevator horn on the bottom side of elevator. The clevis attachment holes should be positioned over the hinge line.

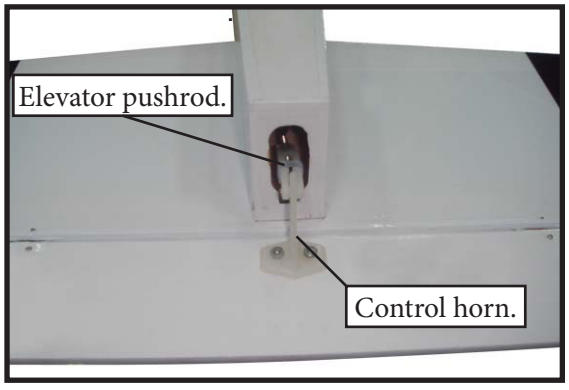


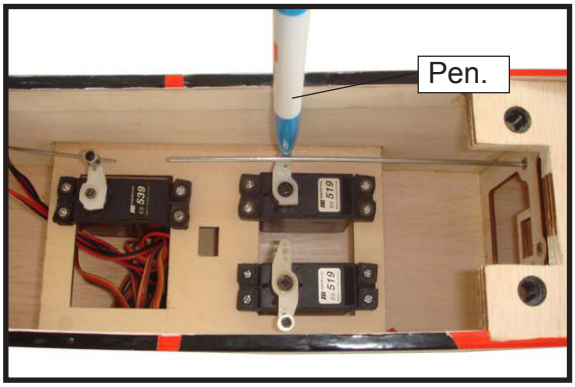
3) Using a 1.5mm drill bit and the control horns as a guide, drill the mounting holes through the elevator halves.

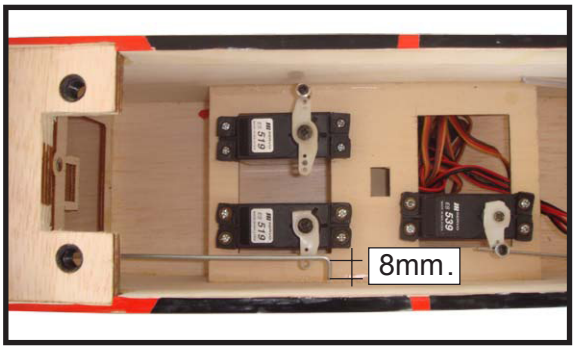


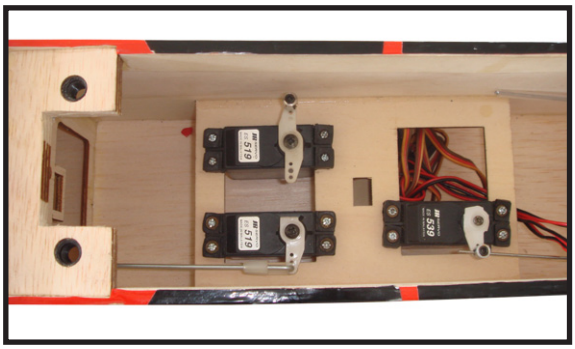
4) Install the rudder control horn using the same method as with the elevator control horns.

ELEVATOR PUSHROD HORN INSTALLATION.

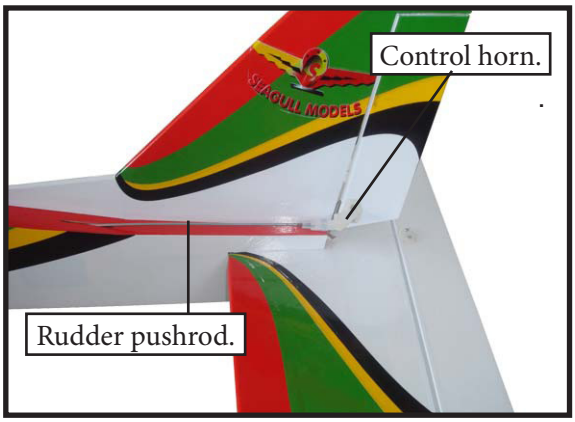


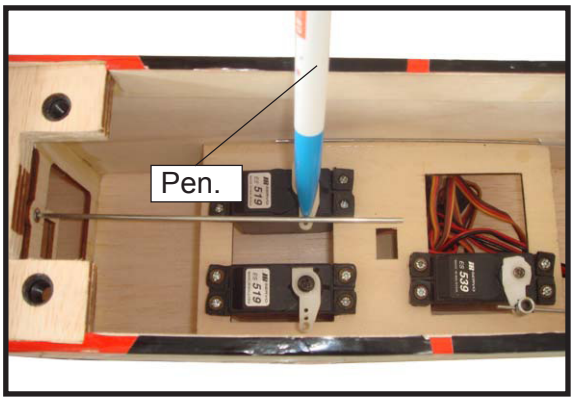


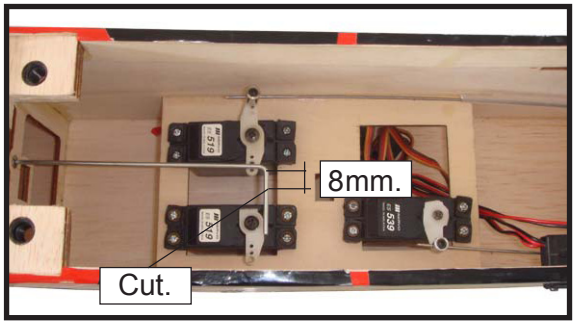


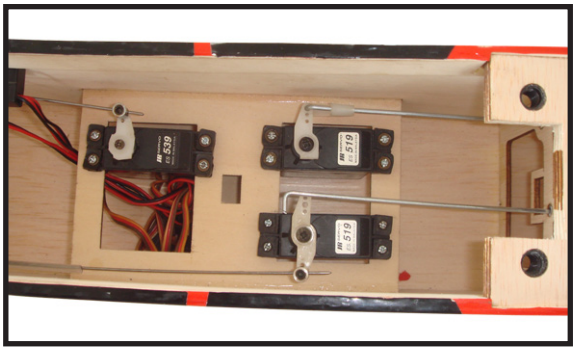


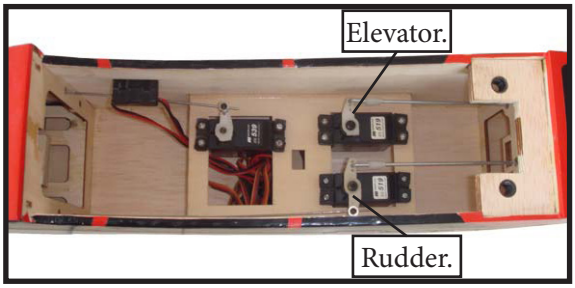
RUDDER PUSHROD HORN INSTALLATION.









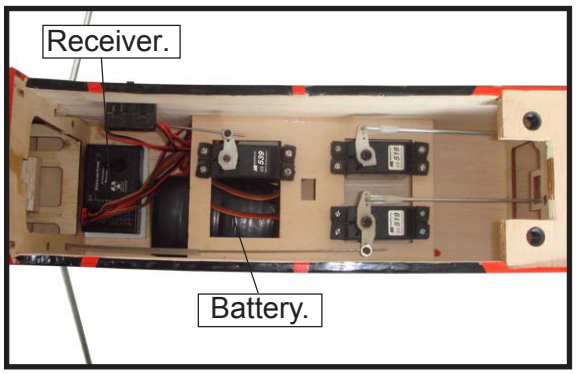


INSTALLING THE RECEIVER AND BATTERY.

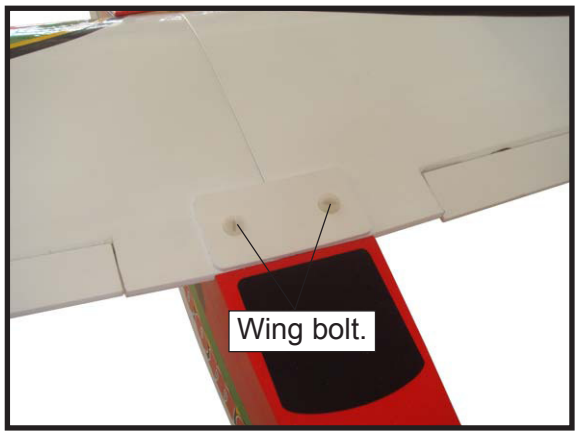
1) Plug the five servo leads and the switch lead into the receiver. Plug the battery pack lead into the switch .

2) Wrap the receiver and battery pack in the protective foam rubber to protect them from vibration.

3) Route the antenna in the antenna tube inside the fuselage and secure it to the bottom of fuselage using a plastic tape.



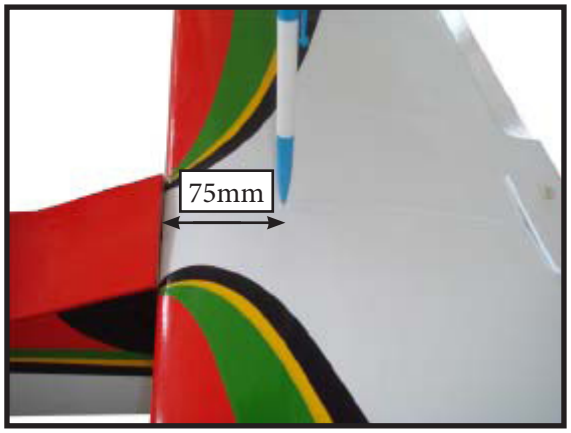
ATTACHMENT WING-FUSELAGE.



BALANCING.

1) It is critical that your airplane be balanced correctly. Improper balance will cause your plane to lose control and crash.

THE CENTER OF GRAVITY IS LOCATED: <u>75 MM</u> BACK FROM THE LEADING EDGE OF THE WING AT THE WING ROOT
(where the wing meets the fuselage).



2) Mount the wing to the fuselage. Using a couple of pieces of masking tape, place them on the top side of the wing **<u>75mm</u>** back from the leading edge of the wing at the wing root.

3) Turn the airplane upside down. Place your fingers on the masking tape and carefully lift the plane. Accurately mark the balance point on the top of the wing on both sides of the fuselage.
The balance point is located **<u>75 mm</u>** back from the leading edge of the wing at the wing root. This is the balance point at which your model should balance for your first flights.
Later, you may wish to experiment by shifting the balance up to 10mm forward or back to change the flying characteristics.
Moving the balance forward may improve the smoothness and arrow- like tracking, but it may then require more speed for take off and make it more difficult to slow down for landing.
Moving the balance aft makes the model more agile with a lighter and snappier ”feel”.

In any case,please start at the location we recommend .

With the wing attached to the fuselage, all parts of the model installed (ready to fly), and empty fuel tanks, hold the model at the marked balance point with the stabilizer level.

Lift the model. If the tail drops when you lift, the model is “tail heavy” and you must add weight* to the nose. If the nose drops, it is “nose heavy” and you must add weight* to the tail to balance.

***If possible, first attempt to balance the model by changing the position of the receiver battery and receiver.**

If you are unable to obtain good balance by doing so, then you must add weight to the nose or tail to achieve the proper balance point.

(Use “stick on lead weights” to acheive the correct balance.)

CONTROL THROWS.

1) We highly recommend setting up the **Boomerang 40** using the control throws listed at right. We have listed control throws for both initial test flying/sport flying and aerobatic flying.

2) Turn on the radio system, and with the trim tabs on the transmitter in neutral, center the control surfaces by making adjustments to the clevises or adjustable servo connectors.
The servo arms should be centered also.

3) When the elevator, rudder and aileron control surfaces are centered, use a ruler and check the amount of the control throw in each surface.
The control throws should be measured at the widest point of each surface!

INITIAL FLYING/SPORT FLYING

Ailerons:	9mm up	9mm down
Elevator:	9mm up	9mm down
Rudder:	12mm right	12mm left

AEROBATIC FLYING

Ailerons:	12mm up	12mm down
Elevator:	15mm up	15mm down
Rudder:	25mm right	25mm left

DO NOT USE THE AEROBATIC SETTINGS FOR INITIAL TEST FLYING OR SPORT FLYING

4) By moving the position of the adjustable control horn out from the control surface, you will decrease the amount of throw of that control surface. Moving the adjustable control horn toward the control surface will increase the amount of throw.

FLIGHT PREPARATION.

Check the operation and direction of the elevator, rudder, ailerons and throttle.
A) Plug in your radio system per the manufacturer's instructions and turn everything on.

B) Check the elevator first. Pull back on the elevator stick. The elevator halves should move up.
If it they do not, flip the servo reversing switch on your transmitter to change the direction.
C) Check the rudder. Looking from behind the airplane, move the rudder stick to the right.
The rudder should move to the right.
If it does not, flip the servo reversing switch on your transmitter to change the direction.

D) Check the throttle. Moving the throttle stick forward should open the carburetor barrel. If it does not, flip the servo reversing switch on your transmitter to change the direction.

E) From behind the airplane, look at the aileron on the right wing half. Move the aileron stick to the right. The right aileron should move up and the other aileron should move down. If it does not, flip the servo reversing switch on your transmitter to change the direction.

PREFLIGHT CHECK.

1) Completely charge your transmitter and receiver batteries before your first day of flying.

2) Check every bolt and every glue joint in the **BOOMERANG 40** to ensure that everything is tight and well bonded.

3) Double check the balance of the airplane. Do this with the fuel tank empty.

4) Check the control surfaces. All should move in the correct direction and not bind in any way.

5) If your radio transmitter is equipped with dual rate switches double check that they are on the low rate setting for your first few flights.

6) Check to ensure the control surfaces are moving the proper amount for both low and high rate settings.

7) Check the receiver antenna. It should be fully extended and not coiled up inside the fuselage.

8) Properly balance the propeller. An out of balance propeller will cause excessive vibration which could lead to engine and/or airframe failure.

We wish you many safe and enjoyable flights with your BOOMERANG 40 BALSA BUILD UP KIT.