

SERENITY 2.5M Assembly Manual



Kit Contents

- ❑ - Fiberglass Fuselage Pod with Canopy
- ❑ - Tapered Carbon/Glass-composite Tail Boom
- ❑ - Pre-sheathed and Shaped 4-segment Wing
- ❑ - Pre-sheathed and Shaped V-tail halves w/hinged elevators
- ❑ - Carbon Wing Tip Joiners 6 x 100mm (4)
- ❑ - Wing Bolt M4 stainless (2)
- ❑ - V-tail Mount Set (1)
- ❑ - V-tail Mount Plate (1)
- ❑ - Triangle Top V-tail Joiner (1)
- ❑ - V-tail mounting screw M3 (2)
- ❑ - Nylon retainers for the V-tail mounting screws (2)
- ❑ - V-tail retainer -composite w/M3 nuts (1)
- ❑ - V-tail Control Horns Set (2)
- ❑ - Control Horns for the Ailerons and the Flaps (4)
- ❑ - Pushrod wire for Aileron and Flap (2)
- ❑ - Light weight Pushrod set for elevators (2)
- ❑ - Fiberglass cloth.
- ❑ - Glider Drawing

Recommended Tools and Supplies:

- ❑ - Hobby Knife (blade #11)
- ❑ - 5 Minute Epoxy (#A0201).
(use for joining the wing panels and tail)
- ❑ - 20 Minute Finishing Epoxy (#A0209)
(use for fiberglassing the joints)
- ❑ - CA adhesive (#A0101).
- ❑ - Masking tape
- ❑ - Pliers
- ❑ - Drill
- ❑ - Drill Bits: 2mm, 4mm, 6mm
- ❑ - Soldering Iron
- ❑ - 1 meter ruler
- ❑ - Flexible metal ruler (Approximately 200mm long will be easiest to use)
- ❑ - Covering Trim to customize the color scheme.
- ❑ - 2 x 24" and 2 x 36" servo wire extensions (#H00X24 & H00X36)
or 100 Inches of Servo Wire to make your own extensions
- ❑ - Universal wing servo covers (#A0031)
- ❑ - Clear lacquer (DEFT)

If this is your first model, please seek the advice of other experienced modelers prior to assembly and flight. An internationally recognized nonprofit sanctioning organization for modeling is the Academy of Model Aeronautics. They can provide club, field, and liability insurance information. Contact them

for information at:

AMA
5151 East Memorial Drive
Muncie, IN 47302-9252
(800) 435-9262
Fax: (765) 289-4248
Internet:
www.modelaircraft.org

Check the Items Needed, Tools and Supplies, and Contents sections. Verify the contents of the kit and your supplies before continuing. If you have any other problems or questions, please contact customer

service in the U.S.A. at:

Customer Service
1122 Ginger Ave.
Billings, MT 59105
(406) 545-4118
Email:
gliders@arthobby.com
Visit us at
www.arthobby.com

Note: Please test fit all parts before beginning assembly.

The glider has a complete 3 view assembly drawing separate to this manual.

Please refer to this drawing during assembly. This drawing is the latest information about the glider and should be the primary source for measurement and placement questions.

Notes about the finishing wing surfaces:

We recommend using a clear lacquer to finish wood surfaces of the wing.

Please remember that the wing is a foam core and some paints may attack the foam internally.

Wing Assembly

1. Remove the wing segments from their protective foam.
2. Sand the balsa wing tips to shape. Only round the top. Leave the bottom of the tip the shape of the wing foil. Try to make the tips match as closely as possible. PHOTO 1

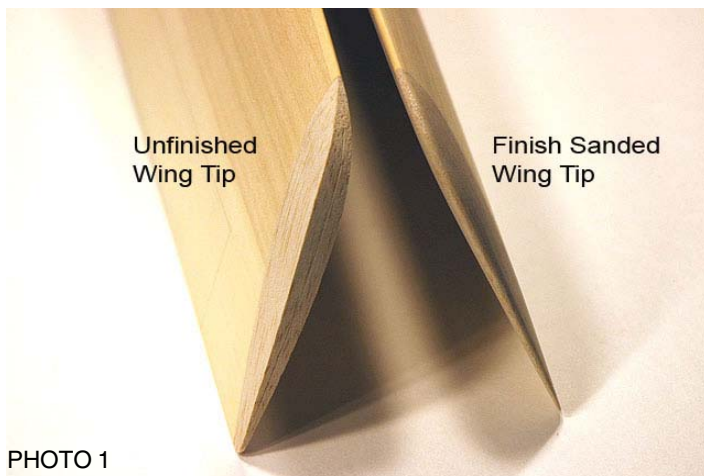


PHOTO 1

Find the light fiberglass cloth and cut four ~35 - 40mm wide strips from it. PHOTO 2

3. Lightly sand the meeting surfaces of the wing center panels and outboard panels.



PHOTO 2

4. Apply the 40mm wide glass cloth strip to each panel face. Use 20 Minute Finishing Epoxy to adhere the glass cloth strips to the panel face. PHOTO 3

Do NOT use polyester resin as the resin will attack the foam core.

2.



PHOTO 3

5. After epoxy has cured cut off excess cloth and sand finish using 400-grid sandpaper, than cut through it to expose the holes for the Carbon fiber rods and the cable canals.

6. Glue the four (100mm) carbon fiber rods in the outboard wing panels, with the exposed ends projecting out 50mm. PHOTO 4

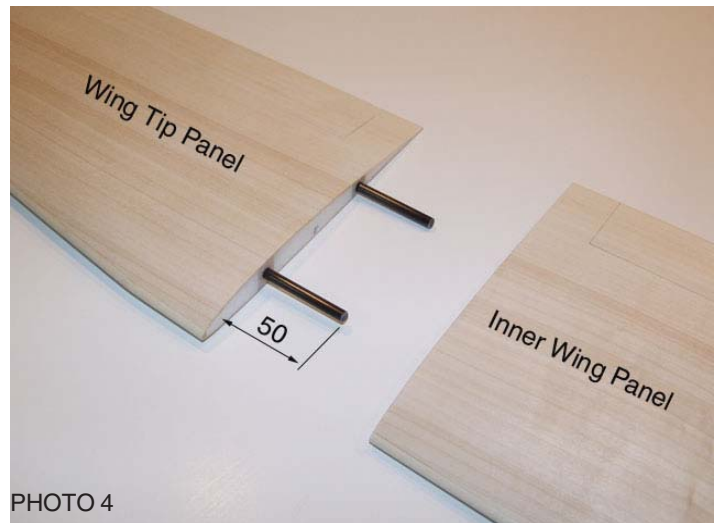


PHOTO 4

Joining the Wing Center Panels

1. Hold the wing center panels together with masking tape. Mark the bottom side root of the wing 40mm and 160mm back from the leading edge.

Also mark the position of the wing servo wire cannals on the bottom side of the wing root .

2. Find the two hardwood blocks. Place the blocks on the wing root foam surface. Center each block on the mark you made. Mark the block width on the wing root foam and draw the wing contour line on the block.

3. Remove the masking tape. Cut out cavities 20mm deep in the wing foam cores to accommodate the blocks. PHOTO 5

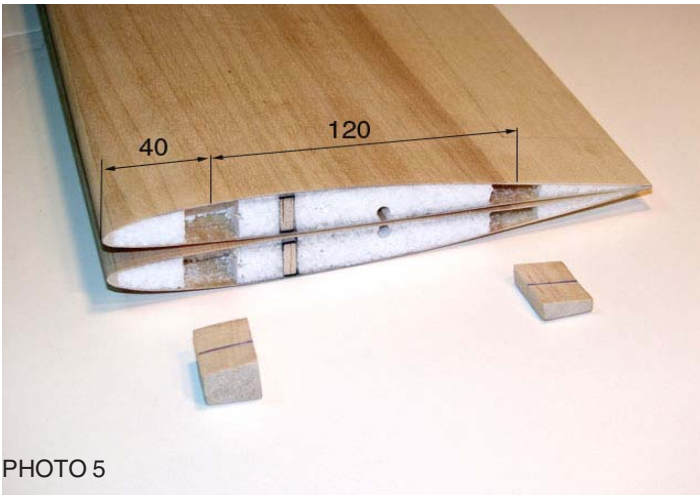
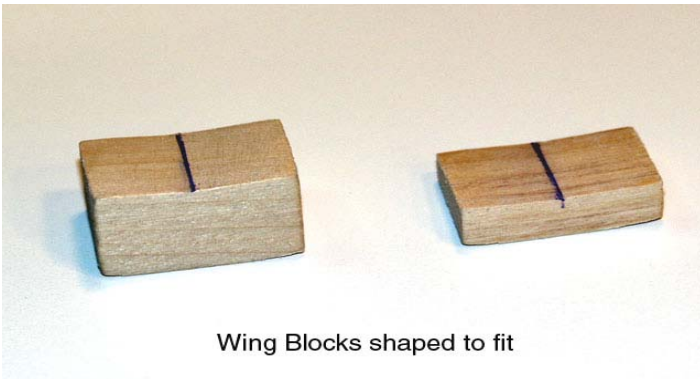


PHOTO 5

The blocks will carry the wing mounting screws.

4. Shape the blocks before installation and test fit. PHOTO 6 & 7
Use sandpaper and/or a knife and/or a rotary tool to completely fit the blocks to the wing's contour.



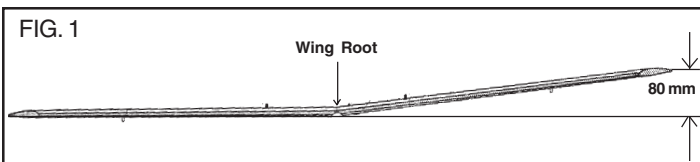
Wing Blocks shaped to fit

PHOTO 6



PHOTO 7

5. Lay the wing right center panel flat on the table. Take the left wing center panel and join with its wing tip panel. Hold down both center panels together at the roots and raise the left wing tip 80mm from the table surface. FIG 1



Serenity v.11/2005

To achieve a proper fit, the root of each wing half must be sanded at a slight angle to fit.

6. After sanding the wing root surfaces trial fit the blocks once again. It may be necessary to make adjustments to the wing blocks.

7. Lay down wax paper to protect your work bench.

8. Once satisfied with the fit, glue the blocks in place and wing center panels together. Use 5 Minute Epoxy and hold the wing panel in place.

Wipe away any excess epoxy.

Make a wood support or use books to hold the tip at its proper height.

9. Allow the epoxy to cure (at least 30 minutes) then clean the joint.

10. Cut two strips 35mm wide from heavy weight glass cloth, and two strips 50mm wide from medium weight glass cloth (supplied in the kit). PHOTO 8

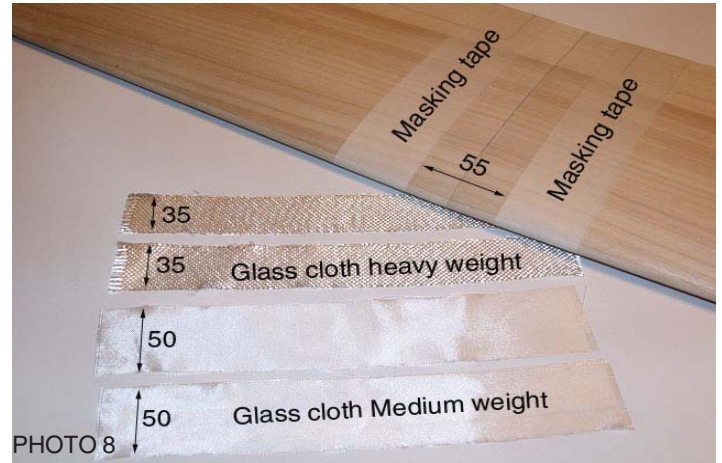


PHOTO 8

The cloth will reinforce the wing, top and bottom, around the wing joint at the root.

To help hold the glass in place while the epoxy resin is applied, first apply C/A glue to the glass at the leading edge. Then pull the glass smooth and apply C/A glue to the glass at the trailing edge.

11. To keep the resin from spreading too far, apply masking tape to the wing ~2mm away from the cloth's edge. PHOTO 8.

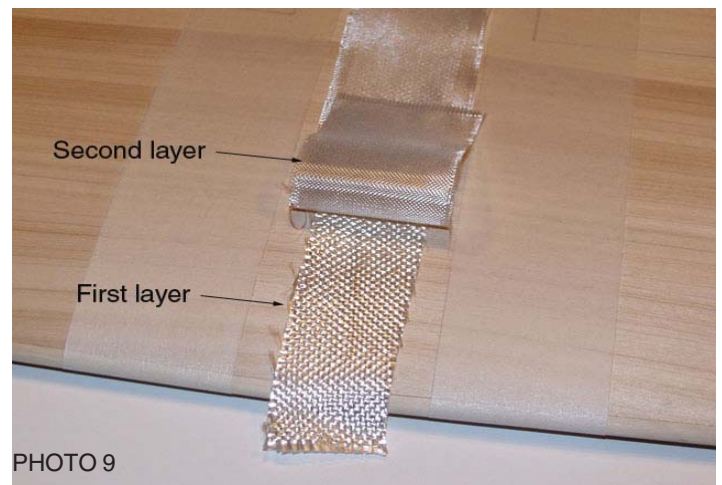


PHOTO 9

12. Mix a moderate portion of 20min.epoxy and using a small paint brush or spreader stick apply the epoxy to the bottom of the joint.

13. Lay prepared strips of glass cloth over the joint. First lay the heavy cloth then the medium wider strip over PHOTO 9.

14. Use small piece of paper towel, fold a few times together and dab the glass cloth.

15. Dabbing will allow the epoxy to completely saturate the cloth and adhere to the wood wing surface, it will also remove excess epoxy and smooth the joint.

(change new piece of the towel if needed)

16. Repeat steps 11-15 and apply reinforcing cloth to the top of the joint.

17. Once the epoxy has set, remove the masking tape. Apply fresh masking tape 2mm past the end of epoxy.

18. Use 400 grid sand paper and sand the joint smooth if needed.

Do NOT sand away the wingsheeting where the glass ends. This will weaken the wing and could cause failure.

Wing Servo and Control Surface Installation

Refer to glider drawing and check the marking of the aileron and flap location on each wing.

1. Cut the aileron and flap from the wing.

First cut both ends of each aileron and flap. We recommend using a fine balsa saw to make those cuts. Use hobby knife with #11 blade and metal ruler as a cutting guide to cut the ailerons and flaps from the wing. It is very important to make perfectly straight cuts.

2. Because the ailerons will be hinged on the upper wing surface, the leading edge of each aileron will need to be sanded at an angle to allow the aileron to deflect down. The flaps will be hinged on the lower wing surface.

3. Use hinge tape (or silicone hing) to attach the ailerons and flaps to the wing.

4. The wing flap servo bays 40mm x 35mm are located 320mm from the wing root, and 100mm from the trailing edge.

5. The wing aileron servo bays 40mm x 35mm are located 775mm from the wing root, and 90mm from the trailing edge. Please use Hitec HS-85 servos for the ailerons, and HS-85MG servos for the flaps or similar wing servos. Make an exact cut in the bottom of the wing for the servos. Align the servo so that the output arm is aligned with the aileron or flap.

6. Run servo wire through the wing (music wire can be used to help pull the wire through) Hardwire the servo wire extension to the servo. There is simply no room for the servo plug. Be very careful to keep the polarity correct and each wire insulated.

7. Connect the servos to the receiver. Turn on the radio and center the servos. Check for proper servo movement. Use your servo reversing switches on the transmitter if the servo moves in the wrong direction.

8. Install control horns on the ailerons and flaps directly back from the servo arm. The horns should be positioned with the holes forward and aligned over the hinge line. Use a small dab of epoxy or CA to permanently secure the horns in position.

9. Place the servos in the center of servo bays, lock the ailerons and flaps in a neutral position securing both ends of each control surface to the wing's trailing edge with a piece of tape. Now measure distances between servo control arms and aileron, and also the flap control horns, according to these measurements make two sets of short pushrods from the supplied wire (we suggest making "Z" bend on both ends).

10. Connect the pushrods first to the aileron and flap horns, then to the servo arms, after that install the servos in servo bays with a small amount of silicone sealer.

11. To cover the servos you can use Art Hobby's universal wing servo covers (#A0031).

Mounting the Wing

1. Place the wing properly on the fuselage wing saddle, then use a sharp pointed pencil to mark the wing's trailing edge on the fuselage.

2. Remove the wing, then measure the distance between the marked line and the center of the two threaded holes in the wing saddle.

3. Place the wing upside down and transfer both measured distances onto the center of the wing joint.

4. Using 4mm drill bit, drill the hole in the marked position.

Remember that the hole has to be drilled in an angle to match the angle of the wing bolt screwed into the fuselage.

5. Find the M4 stainless wing bolt.

6. From the top side of the wing open the holes properly to fit in the nylon seats for the wing bolts. Trial fit the the seats, insert the wing bolts, and screw the wing to the fuselage.

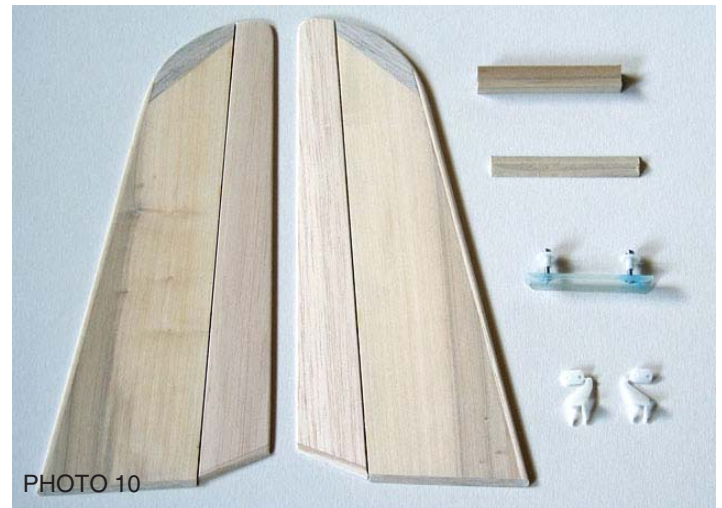
If satisfied with the fit, remove the wing and permanently glue wing bolt seats in place. Use 5 Minute Epoxy

V-tail Assembly

The V-tail can be glued permanently to the boom with use of the mounting plate or it can be made removable.

1. Find the V-tail stabilizer halves and the mounting plate set.

PHOTO 10



The plate and triangle are pre-cut to the correct angle of 105 degrees. All tail pieces: the mounting plate, two V-tail halves, and triangle interlock together.

2. The mounting plate and triangle are a little bit longer, so both pieces have to be cut to fit. At the back it should be aligned with the hinge line. The front should match the stabilizer.

3. After cutting the front and the back of the mounting plate and triangle, they should be sanded to shape. PHOTO 11

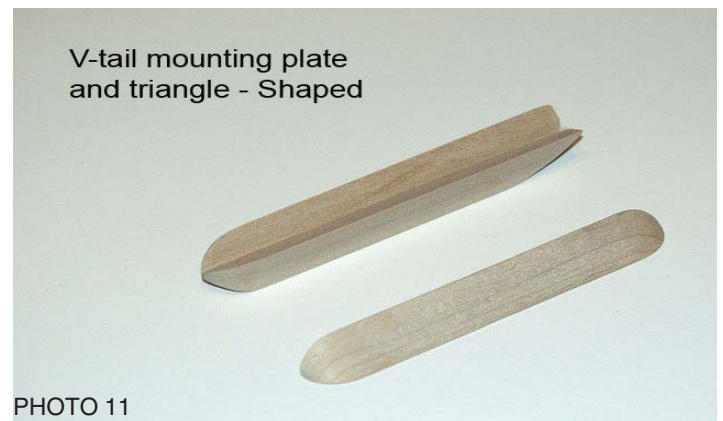


PHOTO 11

4. The bottom part of the V-tail mounting plate has a round shape to fit the boom. But to make a perfect fit to the boom we recommend wrapping the tail part of the boom with sand paper, and making a few strokes with the plate to achieve perfectly fitted saddle for the taper tail boom. PHOTO 12.



PHOTO 12

5. Trial fit the plate to the boom and mark its position on the boom. Clean the marked surface of the boom with sand paper. PHOTO 13.



PHOTO 13

6. Use 5 min. epoxy and glue the plate to the boom. PHOTO 14.



PHOTO 14

7. Find V-tail stabilizers and trial fit together. Check the V-Tail angle, it should be 105 degrees.

8. Glue both of the V-tail stabilizers together. You may wish to block the stabilizers to hold the correct angle. Do not allow the parts to be twisted. Once satisfied with the fit, join the stabilizers with CA adhesive.

9. Glue the triangle joiner between stabilizers. PHOTO 15

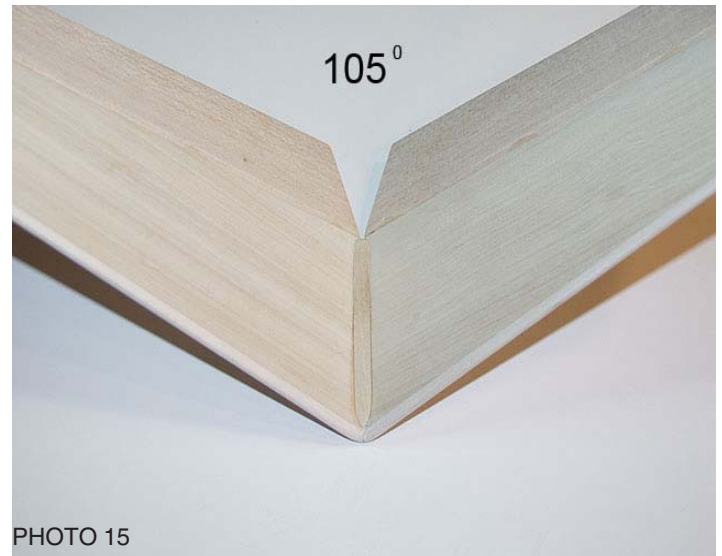


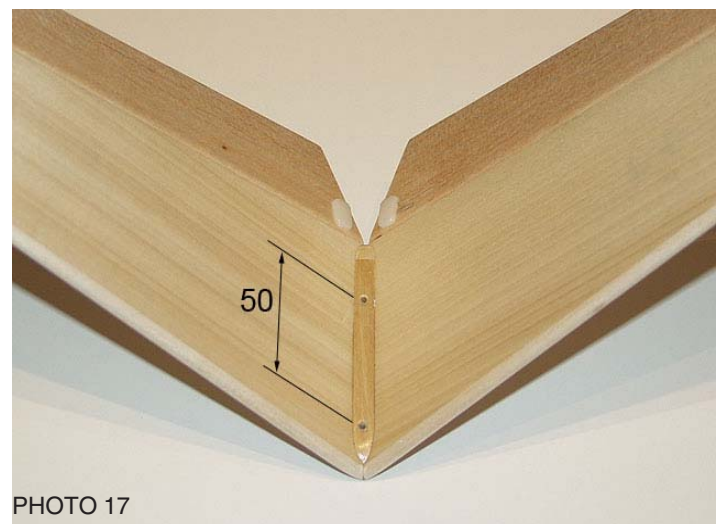
PHOTO 15

10. Now mask the V-tail and reinforce top and bottom of the joints with a strip of lightweight glass cloth using the 20 Minute Finishing Epoxy. PHOTO 16



After epoxy cures smooth the joint with fine sand paper to ensure good fit to the V-shape saddle of mounting plate.

11. Mark position for the V-tail mounting screws. PHOTO 17



12. Place the V-tail in its position on the mounting plate and drill two holes through the V-tail and plate with the boom.

13. Now the composite mount, insert it in the boom and trial mount the V-tail with two M3 screws. PHOTO 18



PHOTO 18

14. If everything fits, remove the V-tail and enlarge the two holes and place in the two nylon retainers. Use a small dab of epoxy or CA to permanently secure the retainers in their positions.

Installation of V-tail Control Horns

1. Find the control horns. Cut the backplate from the horns, use them as templates to mark placement of the holes.
2. Drill holes for the horn locating pins.
3. Mount the horns securing them with the backplates. Use a small dab of epoxy or CA to permanently secure the horns in their positions. PHOTO 19

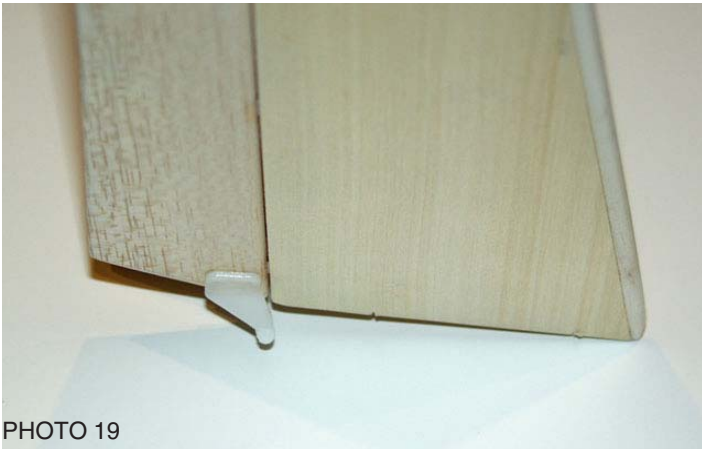


PHOTO 19

Tail Boom, Pushrods & Radio Installation

To prevent excess weight we suggest using "Z" bends at both ends of the pushrod wire.

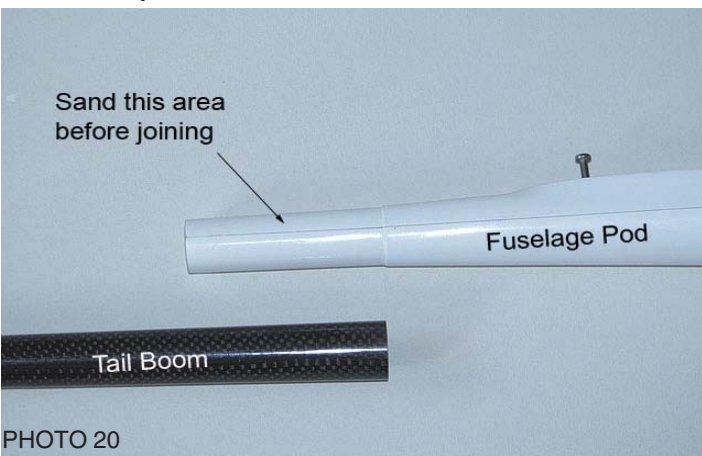


PHOTO 20

1. Clean the joiner tip of the fuselage pod with sand paper. PHOTO 20

Trial fit the boom with the pod and check the alignment.

2. Install the elevator and rudder pushrod housings and pushrods. Once the pushrod placement is finalized, glue the housing tubes with epoxy inside the boom to prevent flexing.

Do not attach the housings inside the fuselage pod yet.

3. Trial connect the boom to the pod, then fit your radio gear in the pod to find the best placement.

Try to position your radio components far forward to achieve proper balance and to minimize use of nose weight. Use glider drawing as a starting point. PHOTO 21

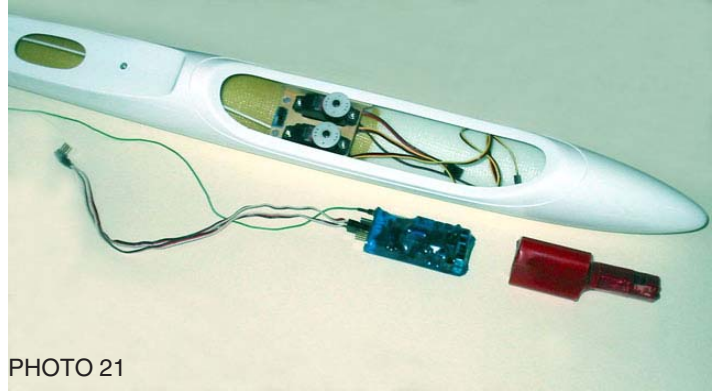


PHOTO 21

4. Once proper radio position has been find,lize, glue the boom in place using 5 Minute Epoxy. Look along the fuselage from the nose while the glue is still soft, and rotating tail boom align tail with the wing very carefully before epoxy cures.
5. Glue the pushrod housings to the inside of the fuselage pod in one or two spots.
6. Place the control surfaces and radio gear in neutral. Make "Z" bends in the pushrod wires ends, then connect the pushrods to the servo arms. Now mount the servos inside the pod.
7. Before flight, double check balance and control throw direction for free and proper movement.
8. Try some hand launches and straight glides over a grass field before high launching the glider. This is a good time to adjust control throws and final balance.

Starting control throws:

AILERONS: 15mm UP, 10mm DOWN, 17 - 26mm CROW

SPOILERON: 26mm UP (break)

FLAPS: 7mm TOWING, 20 - 26mm CROW

ELEVATORS : 8 degrees in each direction

RUDDER: 7 - 12 degrees

Balance Point

The completely assembled glider must balance level when raised at the marked "C.G" point under the wing roots, a tolerance of 2mm back and forward from the marked position is permissible.

It is important that the glider is balanced properly. Balance the SERENITY ~90mm back from the leading edge of the wing at the center section.