

CURSOR ASSEMBLY INSTRUCTIONS

INTRODUCTION

The Cursor is designed primarily as a competition pattern aircraft. The Cursor was designed for a generation of 2 stroke engines no longer widely available but there are good options on the current market or you can always search the auction sites for a YS 61. Planet Hobbies sells the beautiful NovaRossi line of engine at reasonable prices. If you are willing to spend a little more up front, a JETT 90 or 100 would be an excellent choice for the Cursor. Construction of this kit should not prove difficult for anyone having previous experience with fiberglass and foam kits. If this type of construction is new to you, it is recommended that you seek the help of an experienced builder in your area. Most modelers have their own “tried and true” methods of construction; the recommendations included in these instructions are intended as guidelines, and not as the only way to get the job done. We recommend that you read through the instructions, and study the plans to familiarize yourself with the building sequence and options before starting construction.

GENERAL INSTRUCTIONS

The fiberglass parts in this kit are epoxy; only epoxy glues should be used as an adhesive. Areas to be bonded should be thoroughly sanded with 80 or 100 grit paper to remove surface glaze, or a weak bond will result. T-88 or an equivalent slow curing epoxy is recommended for areas where maximum strength is required.

Dremel carbide burrs are recommended for making cutouts in the fiberglass.

A polyester body filler generically referred to as Bondo is recommended for blending the seams on the fuselage and for filling surface imperfections. This filler may be applied directly to sanded epoxy or over top of primer.

For best performance the Cursor should be as light as possible. A finished weight of 8 pounds or less is possible with a painted fuselage and Ultracoted wings and stab.

FIREWALL AND ENGINE INSTALLATION

The firewall is ¼” plywood and a soft mount is recommended.

1. Cut out fuselage as necessary to install motor mount and engine, a template is provided on the plans.
2. Sand the area where the firewall will be attached.
3. Drill and tap motor mount for your engine.
4. Place the motor mount inside the fuselage opening and install engine on mount.
5. Make up a spacer from 1/16” balsa sheet and tack glue the spacer to the back of the spinner back plate, the spacer should be the same diameter as the spinner.
6. Install the prop and spinner on the engine.
7. Stand the fuselage on its tail and align the spinner with the nose ring. Securely glue and/or tape the spinner in place. The assembly should be fastened firmly enough to permit turning the fuselage over and standing it on the spinner.

8. Trial fit the firewall by dropping it on the motor mount. It should lay easily on the mount without requiring any pushing. This prevents bulges in the fuselage caused by the pressure of the firewall edges. At this time you may wish to locate and drill the holes for the throttle cable and the fuel lines.
9. Re-check the spinner alignment and rotate engine so that the glow plug will be in the center of the belly pan and secure engine alignment with masking tape.
10. Tack glue the firewall in place against the motor mount with 5- minute epoxy. The firewall may now be permanently glued in place with filled epoxy or T-88 and glass cloth.
11. Turn the fuselage back on its tail and spot glue the motor mount to the firewall using C.A. or epoxy glue.
12. After the glue has cured, unbolt the motor from the mount and carefully cut the spacer loose from the fuselage. Remove the engine from the fuselage and drill the mounting holes through the mount into the firewall using a long drill bit. In a pinch you can sharpen a piece a 1/8" music wire as a temporary drill.
13. Install blind nuts and coat exposed areas of the firewall with a thin coat of T-88. NOTE: You can reduce the viscosity of T-88 and also reduce the set up time by warming the epoxy with a heat gun.

CANOPY and BELLY PAN INSTALLATION

1. The canopy and belly pan are secured by tongue and slot fasteners fabricated from 1/8" lite-ply, you will need to fabricate 10 sets, see the plans for details.
2. Epoxy 1/8" lite-ply blocks at locations indicated on the plans. Drill a 1/8" hole at the required location and counter sink for a 4-40 socket head screw
3. Epoxy tongues inside the flange of canopy and belly pan to line up with fuselage blocks. Cut slots for tongues to extend into fuselage. Drill through the hole you drilled in the last step and install a 4-40 blind nut. As an alternative, you could use nylon bolts and tap the wood for the thread size you use. Strengthen the lite-ply with CA if you choose to tap the wood rather than use blind nuts. The advantage of nylon bolts is they are less likely to loosen from vibration
4. Cut the cooling air intake at the front of the pan using the opening size shown on the plans and trial fit the belly pan on the fuselage.
5. Mark and cut opening for engine glow plug and needle valve.

RUDDER CONSTRUCTION

1. Sand foam core and vacuum thoroughly.
2. Sheet rudder with 1/16" balsa and add 1/4 " balsa frame on top and sides, bottom will be a shaped piece of balsa to match the contour of the fuse. Bevel the leading edge to allow at least 30 degrees travel each direction.
3. Drill hole for 5/16" dowel with a piece of sharpened brass tube and epoxy dowel flush with surface.
4. Drill the dowel for a 4-40 screw and epoxy screw in place. Clip off screw head and thread on plastic horns for rudder cables.
5. Cut slots for 4 hinges. Put the rudder assembly aside for now, the fuselage tail post and rudder is not installed until the horizontal stabilizer is in place.

HORIZONTAL STABILIZER CONSTRUCTION

1. The wing and stab use the same techniques for construction. We recommend sheeting the stab first since a mistake here will be less costly to correct than on the wing. Virtually everything but epoxy and some contact cements will dissolve the foam. Avoid using any thinner near the cores. If you are not familiar with the technique of sheeting cores using epoxy we recommend you enlist the aid of an experienced builder in your area, it is very easy to add a lot of unwanted weight if this step is not done correctly.
2. Locate a flat surface on which to sheet the cores. The bench must be capable of remaining true with 80 pounds of weight on it. Don't assume your bench is flat, check with a straight edge. The cores have been cut on a billiard table slate and weighted during the cutting operation. Because of the nature of the foam some bowing may occur. This bowing will disappear when the core is weighted down on a flat surface.
3. Keep the cores in the blocks from which they were cut, mark them to avoid mixing them up.
4. Lightly sand the cores to remove the fuzz and vacuum thoroughly.
5. Glue up sufficient matched 1/16" Balsa to cover the surface of the core. Trim sheeting to be flush at the trailing edge and allow approximately 3/16" overhang at the leading edge, root, and tip.
6. At this point you can decide whether you want to slice off approximately 3/16" of the foam at the trailing edge to allow the sheeting to butt together, or cut off the trailing edge after the core is sheeted and add a piece of 1/4" square balsa and sand to contour. Either method works well. Don't try to get a razor edge at the trailing edge, a blunt trailing edge 3/32" to 1/8" thick makes for a softer feel around neutral when flying.
7. Make up a squeegee from 1/32" plywood or use a flexible body filler squeegee and file small notches in the tool about 1/2" apart. This will apply the epoxy in a manner similar to floor tile cement leaving ridges of epoxy every 1/2 inch.
8. Mix up a small batch of T-88 epoxy resin and apply a thin coat to the balsa only.
9. Line up the sheeting on the core and place back in the original blocks.
10. Place the block on the table with the faced side down. One side of the block has been wire cut and will be smoother, this side goes against the bench. In the case of the wing the dihedral is pre-cut and the bottom of the wing goes down.
11. Make sure everything is aligned and place a piece of 3/4" plywood or particle board slightly larger than the block on top of the stack.
12. Now add weights to the board, books or milk jugs filled with water work nicely. Distribute the weight evenly. Approximately 30 pounds will do for the stab and 80 - 90 pounds for the wing.
13. Inspect for bowing or twisting of board or foam - use a good metal straight edge on each side and ends and double check. Take your time and insure everything is straight before you leave. Playing cards or poster board shims can be used to correct areas where the sheeting is not down tight or a slight bow is evident. Sometimes redistribution of the weight is necessary. Do one surface at a time until you get the hang of it.
14. Allow assembly to dry at least 24 hours then remove stab and trim left and right halves to exact matched size — especially the chord at root and tips.
15. Lay out elevator on the stab with a fine line marker and mark allowance for the 1/4" balsa frame shown on the plans. Cut out the elevator using a bandsaw or jigsaw if possible. You can also layout the areas to be cut on both sides of the stab and cut through from each side with an Xacto knife.

16. If you are going to use the type of elevator horn shown on the plans drill a 5/16" hole at this location and glue in a piece of dowel. Sand dowel to elevator contour and drill for a 4-40 bolt
17. Sand the stab and elevator with a long sanding block and glue on the 1/4" facing and end caps with Titebond or equivalent glue. Insure the surfaces are straight, it helps to draw a line on the 1/4" facing to insure the surface doesn't bow during the gluing operation.
18. Glue on and shape the leading edges and tips. Trim and sand facings. Bevel the elevator leading edge to allow at least 15 degrees travel each side of center. Use a long block for sanding.
19. Glue the stab halves together with 5 minute epoxy, checking alignment carefully. The stab joint should be reinforced with 6 oz. Fiberglass cloth and epoxy.
20. Mark and cut hinge locations, use 4 hinges per surface.
21. The stab should now be ready for installation.

WING CONSTRUCTION

1. With the exception of the landing gear, the wing construction uses the same techniques for sheeting and framing the control surfaces as the stab. Therefore, we will not repeat the instructions for the sheeting process.
2. Make the recess in the foam for the 1/4" plywood and balsa wood landing gear plates. Epoxy the plywood gear plates to the foam, then epoxy the balsa gear plates flush with the surface of the foam. Of course, you may have your own techniques for the landing gear. There are many variations -rails, plywood box, carbon fiber angles, etc.
3. Sheet the wing, frame the ailerons, install the leading edge and tips using the same procedures as the stab. We strongly recommend a strip of carbon fiber tape along the high point of the wing, top and bottom as you apply the sheeting. See plans for detailed location.
4. Cut out a recess for the aileron servo on the bottom of each wing, glue in mounting rails, and install the servo so the control wheel just protrudes above the surface. Section AA on the plans should make this clear. The opening may be covered with Ultracote, or a thin plywood hatch as desired.
5. Cut out the sheeting above the landing gear plate to allow installation of the retract mechanism.
6. Tunnels for the aileron wires and the landing gear linkage, or air lines may be made by heating a length of music wire. Place the wing half back in the lower block. Cut 2 pieces of scrap wood to the height you want the hole and space them a short distance from the wing root. They will support the wire and keep the hole parallel with the bench. Heat the end of the wire with a candle and carefully melt a hole to the desired location. Re-heat the wire as necessary.
7. Once you have both wing halves completed, it is time to join the wings.
8. The dihedral has been pre-cut in the foam cores for you. This allows you to join the wings in the foam blocks. Double check to insure one core is 1 3/8" higher from your building surface than the opposite side
9. Tape the top wing shucks together at the center and lay a piece of wax paper across shucks. Once you are satisfied, you may proceed with joining the wing halves.
10. When you are joining the wings you will need to use a slow dry epoxy and a 5 minute epoxy. Mix up some 5 minute epoxy and put on the root of each core. Wipe excess epoxy off and make sure you get the cores pressed tightly together. Align cores in wing blocks and allow to dry over night.

11. The next step will be to mount the wing to the fuselage. The prototype used 4 ¼-20 nylon wing bolts to hold the wing in place.

12. You will need to cut a flat on the center leading edge of wing to fit wing saddle. Cut this flat approximately as shown on plans, allowing ¼" all around for balsa facing. Trial fit the wing to the fuselage.

13. Epoxy the plywood wing mounting blocks to the fuselage as shown on the plans. Align the wing in the fuselage saddle. Drill holes for ½" hardwood dowels with sharpened brass tubing. Cut dowel to length and center drill for a ¼" bolt. Epoxy dowels in place. Note: An alternate method is to use hollow Fiberglass arrow shaft in place of dowels.

14. Re-check wing alignment and drill through dowels into the plywood wing mounts; install blind nuts and bolt wing to the fuselage using ¼-20 nylon bolts.

15. With the wing on the fuselage and all retracts installed, adjust the length of the gear wires to match the plans. This plane was designed in the 2 stroke era, if you choose to use a modern 4 stroke requiring a larger diameter prop, you may need to extend the gear legs.

16. Remove the wing and cut out the wheel wells. Allow at least ¼" clearance between the wheel and the wheel well. If desired, the wheel wells may be lined with 1/16" balsa

17. The next step is to cut the pipe channel in the wing if you plan to use a tuned pipe. The pipe channel should be about deep enough to allow 3/16" clearance between the pipe and the foam. We recommend taking a piece of 80 grit sandpaper and wrapping it around a round tube or glass jar with a diameter of 2" to 2-1/4". Sand pipe cutout to fit your tuned pipe. Once you have it to shape, sand channel with some 220 grit paper to get a nice smooth surface. It is very important to have a smooth surface.

18. Once this is done, you will need to glass the center section of the wing. We recommend 6 ounce glass cloth for this procedure. Use a 5" wide piece on the top of the wing. On the bottom, you will use 3 layers of 6 ounce cloth. The first layer will be 5", the second will be 4", and the third layer will be 3".

19. Brush a coat of slow dry epoxy on the wing approximately 5" wide at the center of the wing. Brush this epoxy into the foam and wood thoroughly. Let this epoxy stand for about 15 minutes. Then put your first layer of cloth on. At this time you want to get a good bond between the Fiberglass and the foam. Try to keep all air bubbles out. Once you have worked this layer down, brush a little extra epoxy on and add the second layer, and then the third layer. It is very important to keep a good bond between all surfaces. Work the cloth down where needed. Don't rush this procedure, it takes about one hour. Be sure the 3-1/2" and the 3" wide layer of cloth don't extend too far fore and aft. There is only enough clearance between the fuse and the pan for the wing and one layer of 5" cloth on the top and the bottom of the wing.

HORIZONTAL STAB INSTALLATION

1. The stab is located on the fuselage by using the template on the plans. Cut out the template or make a copy and use it to locate slot location on both sides of the fuse. Cut slots for stab and for control rod/pull cable exits.
2. At this point you should have a completed stab and an opening in the fuselage. Cut a ¼" balsa tail stiffener from the plan template and glue in plan location. The rudder post should be temporarily installed and held with masking tape.
3. Slide the stab in position, block the fuselage level, and check stab alignment by measuring from the stab tips to the wing tips, the stab tips to the bench, and using your trusty eyeballs.

4. When you're satisfied the alignment is correct, tack glue the stab to the fuselage with dabs of 5 minute epoxy. Attach to tail stiffener as well. Of course I'm sure you roughed up the glass both on the inside and the outside of the fuselage.
5. Remove the rudder post and glue the stab permanently with epoxy. Don't get carried away with the glue unless you think you need a lot of tail weight. A few pieces of glass cloth on the inside are sufficient. Form a small fillet on the outside of the fuselage using epoxy and microballoons.

RUDDER INSTALLATION

1. Epoxy the 3/8" balsa tail post to the fuselage, hold in place with strips of masking tape until the glue has cured.
2. Shape a fin extension from basswood and epoxy to the fuse above the rudder.
3. Hinge the rudder to the tail post and fair in the balsa skins and lower rib with a sanding block.

EQUIPMENT INSTALLATION

1. Size the fuel tank to your particular requirements, a 12 ounce tank is sufficient for the old FAI pattern. For sport or practice you may want to use the larger tank shown on the plans. To place the tank as far back as shown on the plans it will be necessary to use an engine with a built in pump or add a Perry fuel pump.
2. Cut a fuse stiffener/throttle servo mount from 1/8" lite-ply and epoxy in position shown on plans. Be sure you have completed all your wing/canopy/belly pan mounting before you glue the stiffener in place, it can be difficult to work around once it is permanent.
3. Sullivan cables were used for the rudder linkage on the prototypes.
4. The elevator pushrod is a Fiberglass arrow shaft. Refer to the plans for the details.
5. Receiver and battery pack location of course is dependent on center of gravity requirements.
6. Use an extension on the rear of the tuned pipe to route the exhaust outside the opening at the rear of the belly pan.

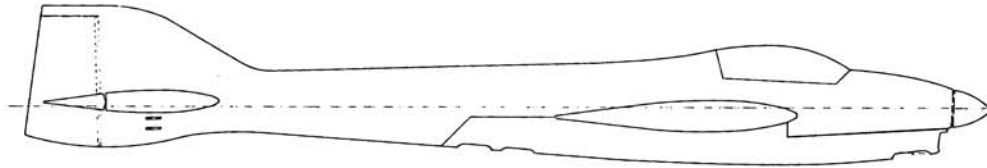
FINISHING

1. Prepare the fuselage for paint by sanding the fuselage thoroughly with 320 grit sandpaper to remove gloss. Fill imperfections in the glass and the seams where necessary with a polyester body filler.
2. Automotive primer is recommended as a base for painting.
3. To keep the weight down, it is recommended that the wings, stab, and rudder be covered with Ultracote or equivalent film.
4. Seal the gap on the ailerons with Ultracote or tape applied to the lower surface.
5. After the painting is completed, wipe a thin coat of silicone on the belly pan flanges. This will eliminate vibration and chafing.

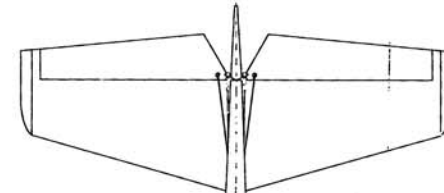
FLYING

1. Check that the balance point is where the plans show. The CG should be located 7-1/4" aft of wing leading edge at the fuselage. Measure from the true leading edge, **NOT** the slot you cut in the wing so it fits the wing saddle. After a few flights, you can experiment by moving the center of gravity and adjusting the control throws to suit your flying style.
2. Be sure to check the lateral balance as well. If one wing is heavy add clay to the other wing and see what happens, once you have it flying right you can add the weight permanently to the wing tip by concealing some lead or nails under the Ultracote.

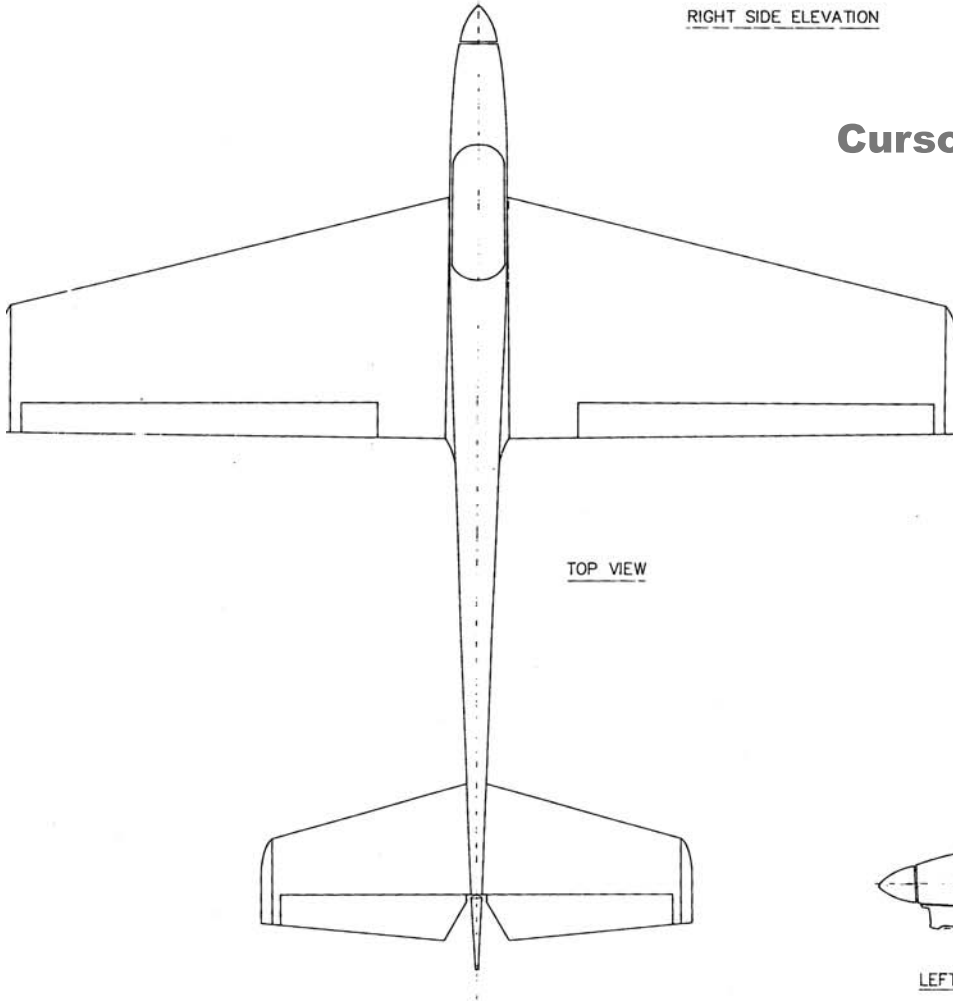
3. It will typically take many flights to trim the plane out perfectly. If you are new at this game, hopefully you'll have an experienced flier to assist you.



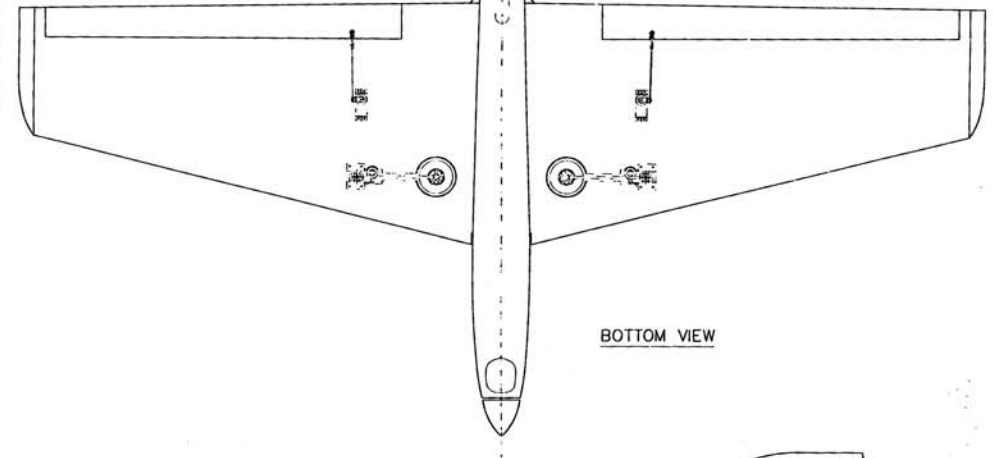
RIGHT SIDE ELEVATION



Cursor



TOP VIEW



LEFT SIDE ELEVATION

BOTTOM VIEW