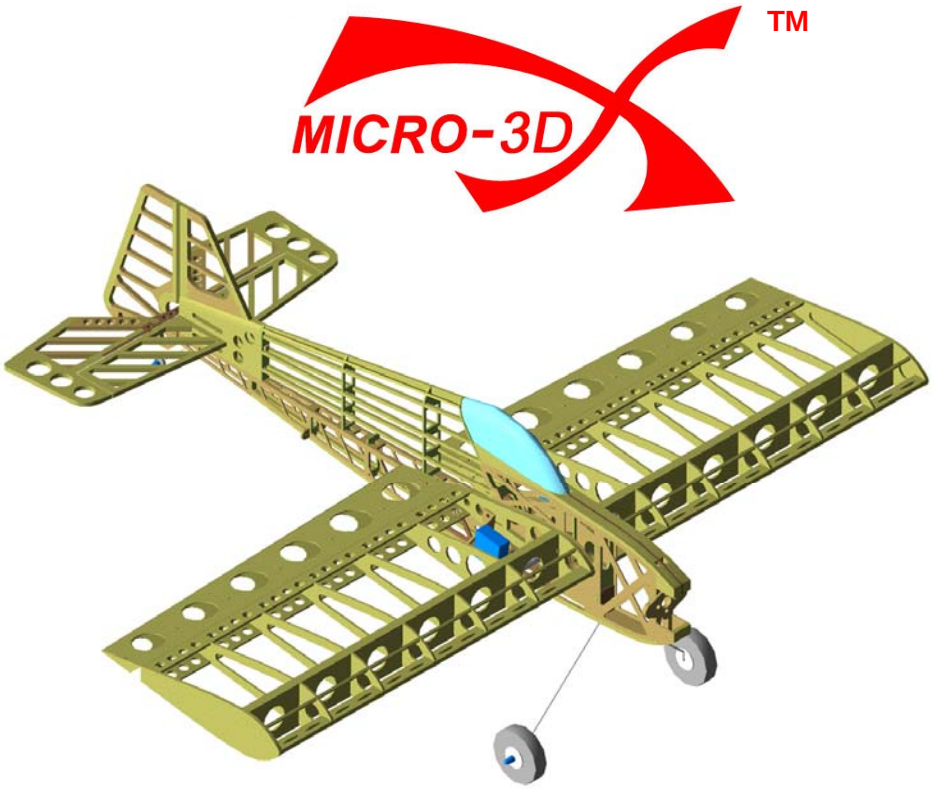
Millennium RC presents… **Build Kit**



Flying weight: Under 7oz. (with recommended setup)
Wing Span: 22 in.
Wing Area: 132 sq. inches
Wing Loading: 7.63 oz./ sq. ft.
Length: 19.5 in.

Introduction:
The Micro3DX™ Build Kit (developed by James Karpy) is a high quality lasercut kit designed for the more advanced builder and pilot. This aerobatic plane can handle the wind fairly well and is capable of 3D maneuvers as well as sport flying. All hardware needed to complete the airframe is included.

Adult supervision recommended for children 15 and under. R/C Airplanes should be flown following safety guidelines provided by the AMA (Academy of Model Aeronautics).

CAUTION: This is not a toy!

Recommendations:
1. Read through all steps before starting assembly.
2. Keep wooden parts in their sheets until needed. Inspect to make sure there are no broken or missing parts.
3. Check off each completed step to help keep from losing your place.
4. Cover the work table with plastic wrap to protect from glue.

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Micro3DX™ Build Kit Assembly Instructions Rev. 1

List of Provided Kit Parts:

1. 4 balsa sticks 3/32x3/32x24”
2. 3 balsa sticks 1/16x3/32x24”
3. 5 sheets 1/8” balsa laser cut parts
4. 8 sheets 1/16” balsa laser cut parts
5. 3 sheets 1/32” balsa laser cut parts
6. 6 sheets plywood laser cut parts
7. 2 Micro control horns
8. 2 1.5” Mini Lite wheels
9. 1 Mini tail wheel
10. 2 Micro wheel retainers
11. 2 Mini quick-links
12. 2 1-foot pieces of .031” piano wire for push rods, aileron linkage and tail gear
13. 1 Preformed wire landing gear
14. 1 Vacuum molded plastic canopy
15. 1 Aluminum wing tube 7/32” x 4.5”
16. 1 Carbon wing guide pin .125” x 1”
17. 2 Carbon rods 1mm x 12” for push rods
18. 4 inch black 1/16” shrink tubing for push rods
19. Double-stick foam servo tape
20. 4 #0 - ¼ sheet metal screws (Servos & wing adjustment)
21. 2 #1 – ¼ sheet metal screws (Motor)
22. 1 #2-56 blind nut (Wing lock)
23. 1 #2-56 5/16” machine screw (Wing lock)
24. Magnet and washer (to hold down canopy hatch)

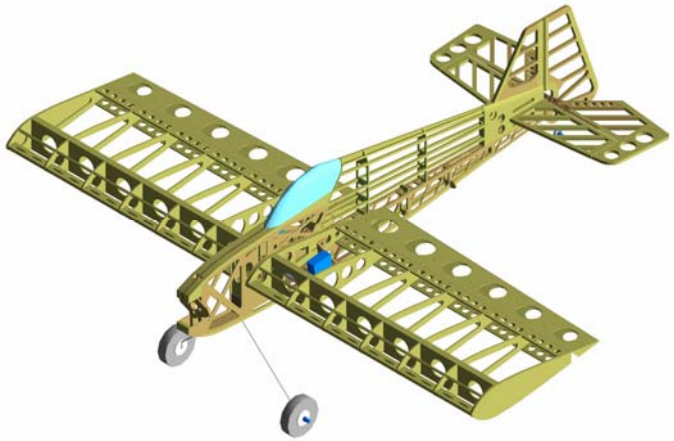
Additional Items Required:

1. Cyanoacrylate or CA Glue (thin and thick)
2. Clear canopy glue or Elmer’s white glue
3. Hobby knife
4. 220-grit sandpaper
5. 12” Sanding block
6. Hinge tape (recommend 3M Scotch ™ ¾” Transparent Tape)
7. Clear wide packaging tape or laminate for plans
8. Ruler
9. Square
10. Razor saw
11. Hand drill or small drill with #56 (.046”) drill bit.
12. 1/16” drill bit.
13. Micro screwdriver set
14. Wire cutters
15. Needle-nose pliers
16. Micro-receiver (recommend Castle Creations Berg 4L, Spektrum AR6100E or AR6300)
17. Motor (recommend Hacker or Shulman Aviation Fury A10-7L brushless outrunner motor)
18. Speed control (Castle Thunderbird 9 or equivalent)
19. Propeller (as recommended by motor manufacturer)
20. Four servos (less than 6 grams each, Recommend Dymond D47, JR S185, Spektrum DSP60 or Hitec HS35)
21. Battery (recommend 2-cell lithium polymer battery, 450-730 mAh) Please adhere to manufacturer’s safety guidelines.

Check out the Micro3DX build thread on R/C Groups with full-color pictures and instruction updates.
http://www.rcgroups.com/forums/showthread.php?t=945066

Disclaimer:

Millennium R/C assumes no responsibility for any accident or injury to persons or damage to property.



IMPORTANT:
DO NOT GLUE UNTIL INSTRUCTED TO DO SO!

Fuselage Assembly

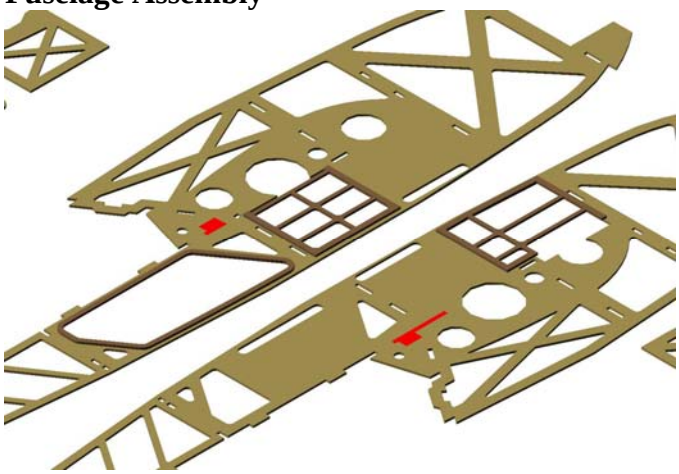


Fig 1: Glue hatch jambs to fuselage A and B halves. Hatch jambs must be centered so they create a rim for the hatch door. *Caution:* Test fit surrounding formers before gluing hatch jambs in order to prevent obstructions. This step can be completed anytime before step 22.

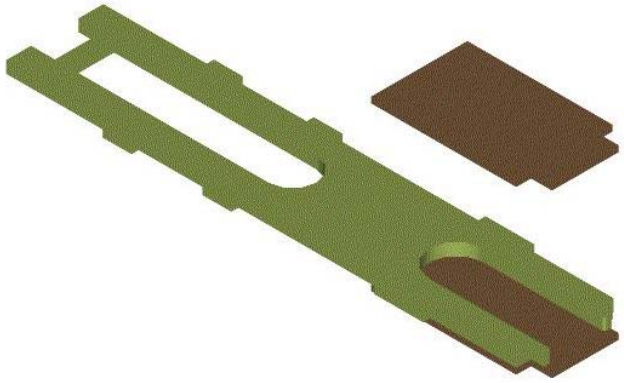


Fig 2: Glue the two F1B parts to F1. *Caution:* Do not use excess glue as this can prevent the landing gear from fitting in the socket.

Fig 3: Glue the square reinforcement block to the bottom of the main fuselage former. Install 2-56 blind nut. Note that the main fuselage former is marked side A and side B to match the fuselage sides. Glue the two F11 pieces into place.

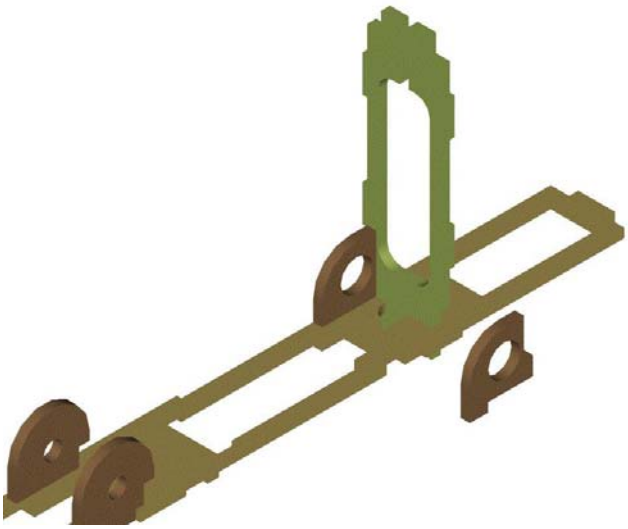


Fig 4: Install F2 and two F12 formers. Square them with the main fuselage former and glue in place.

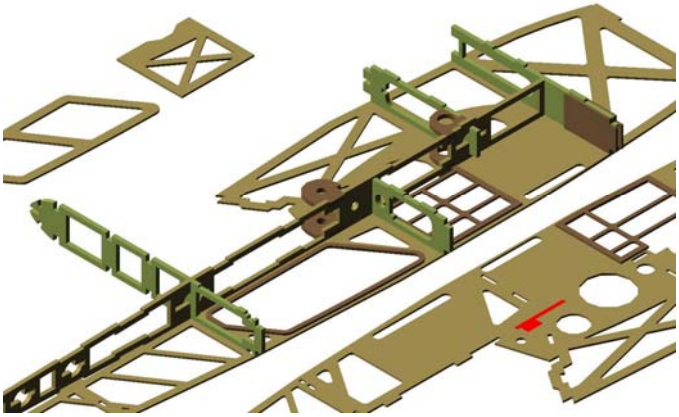


Fig 5: (**No Glue**) Install F3 and F5 into the main fuselage former. Install the assembly into fuselage side B.

Fig 6: Bevel bottom edge of F4 45° and glue magnet in place.

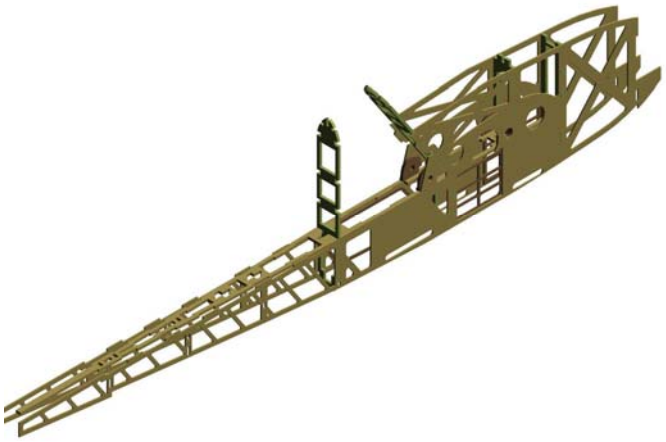


Fig 7: Install F4 and side A of the fuselage. Square and glue with thin CA. Do not glue sides to the main former past F5 yet.

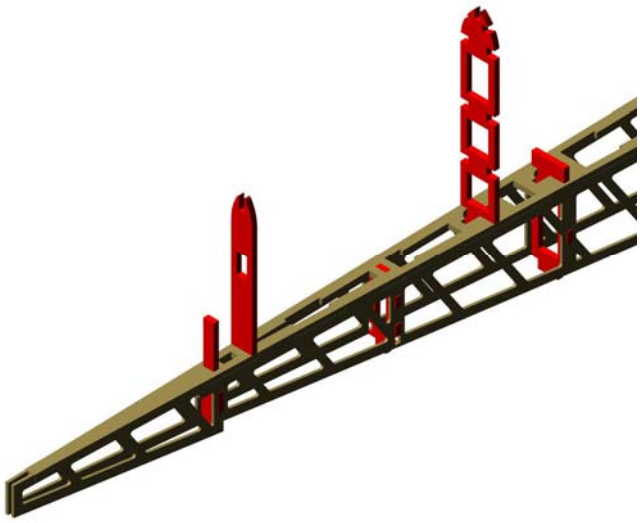


Fig 8: Install remaining formers square and glue with thin CA.

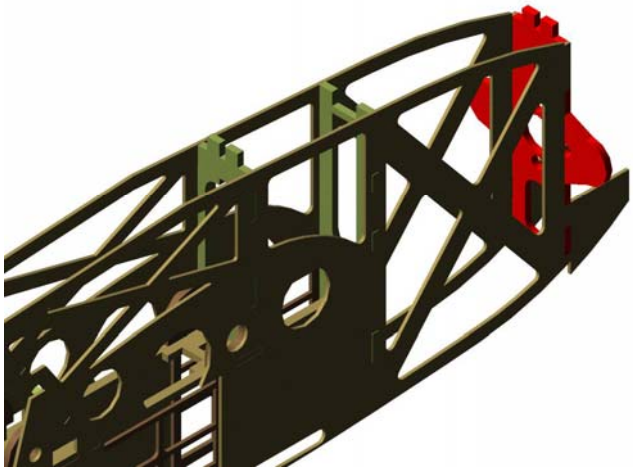


Fig 9: Glue firewall into place. Reinforce with medium CA.

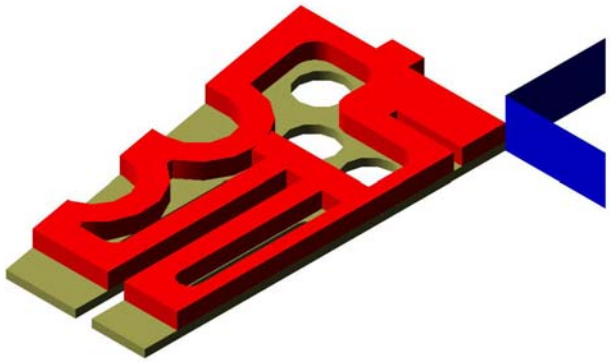


Fig 10: Assemble and glue tail mount frame: T1-T6 pieces. Glue frame to tail mount side as marked in balsa. Frame should square-up to the bottom and leading edge of the tail mount side.

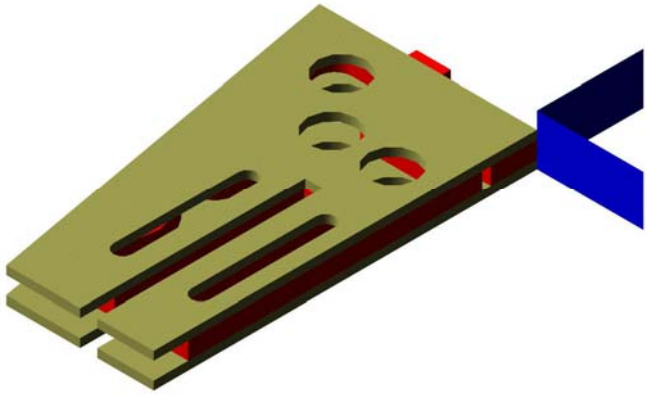


Fig 11: Glue opposite side to tail mount frame. Take extra care to square parts.

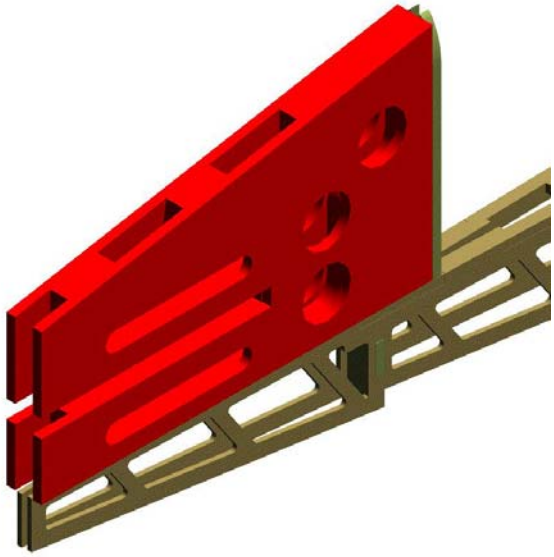


Fig 12: Glue tail mount to fuselage. *Note:* A 1/8” slot should continue from the top trailing edge of the tail mount to the bottom trailing edge of the fuselage. Use a piece of scrap 1/8” balsa to aid in aligning the tail mount to the fuselage. Make sure you do not glue the scrap piece to the assembly.

Fig 13: Trim F4 stringer sockets to match fuselage sides.

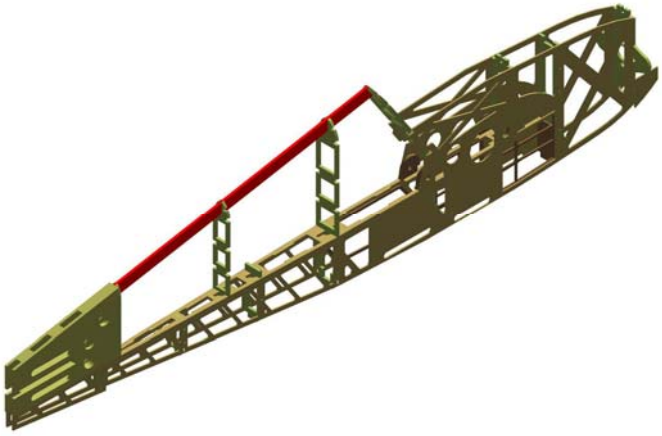


Fig 14: Install main fuselage stringer. See balsa sheet 9.

Fig 15: Cut the 2 long stringers that are installed on the bottom edge of the fuselage first.

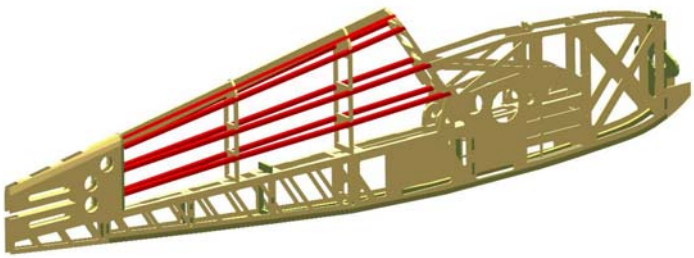


Fig 16: Cut to fit 6 3/32" and 2 3/32" x 1/16" square stringers. Glue in place.

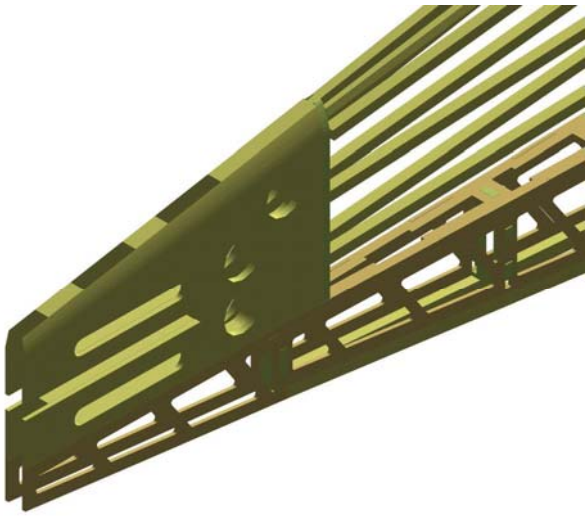


Fig 17: Block sand tail mount so that it blends with the fuselage. Keep a piece of scrap 1/8" balsa in the trailing slot. Do not oversand the trailing edge of fuselage. Avoid sanding top surface of tail mount so vertical stab position is not modified. Sand smoothe the entire fuselage.

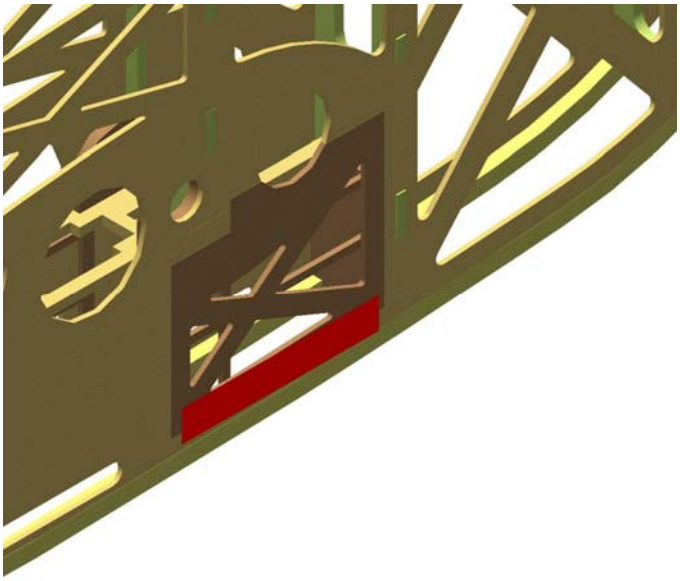


Fig 18: Use a strip of transparent 3m tape to make a sub-hinge on the 3 servo hatches. From this point on, use caution when gluing parts to the fuselage. Open the hatches so you do not glue them shut. Do not cut the webbing under the hatches until the fuselage is covered.

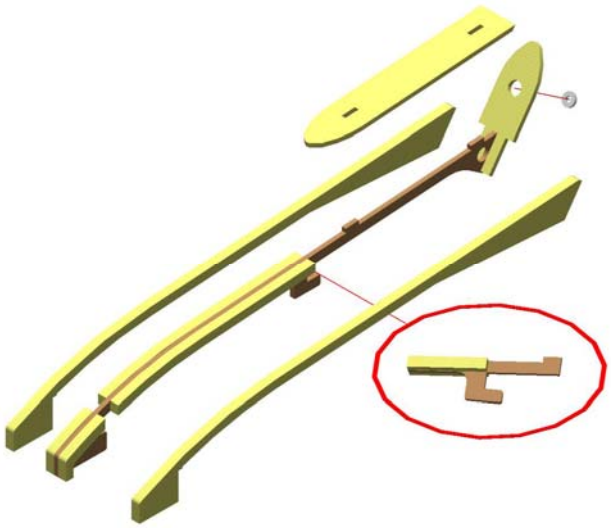


Fig 19: Assemble the main hatch. Tack-glue the parts while they are sitting on the fuselage. Glue the washer into place. Some fitting may be required. The washer should be flush with the back side of the head rest.

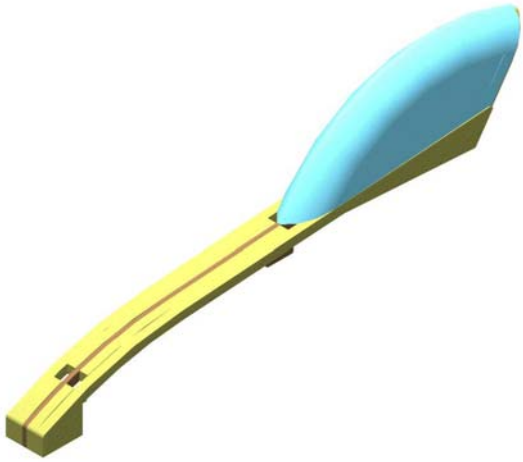


Fig 20: Cut out the clear canopy, be sure to follow the cut lines. Some trimming may be necessary. Install the canopy after covering the hatch. Use clear canopy glue, not CA.

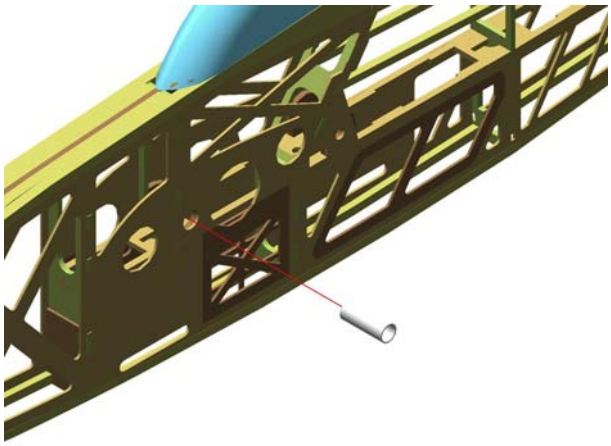


Fig 21: Cut a 9/16" long tube from the provided aluminum tubing. Glue it into place so that it is flush with the fuselage sides. Some sanding may be required. You can cut the tubing with an X-acto knife by rolling it on a smooth surface. Use the X-acto blade to remove the burs from inside edge of the tube after cutting.

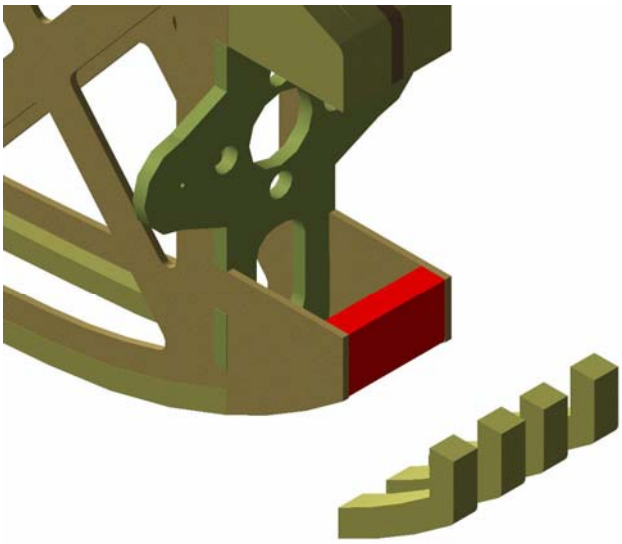


Fig 22: Stack and glue the four 1/8" nose filler pieces and glue in place. Sand flush with fuselage sides.

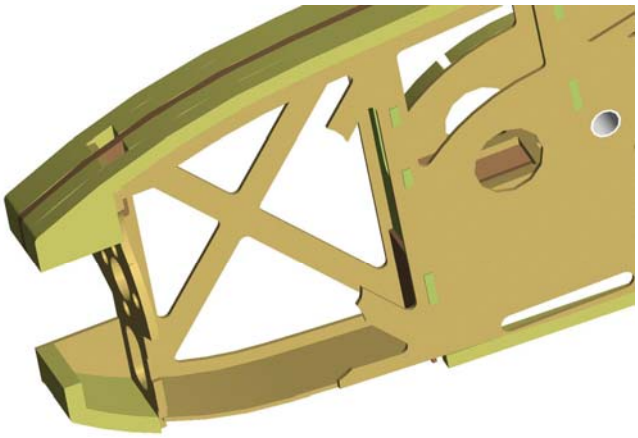


Fig 23: Install battery compartment floor.

Main Wing Assembly

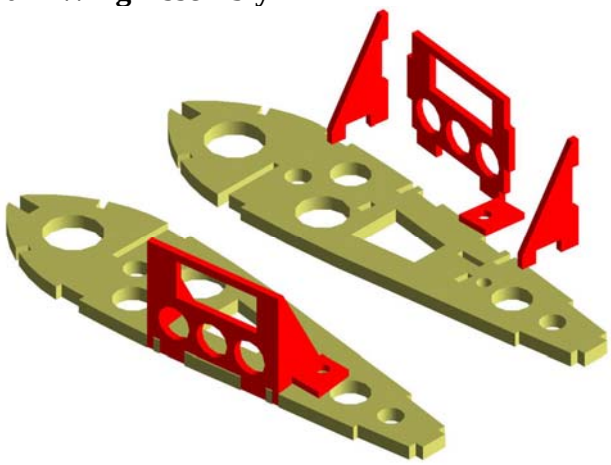


Fig 24: Choose the aileron servo mount that best fits your servo. Servo mounts are marked for the four recommended servos. Assemble the aileron servo mounts and glue them to the center ribs (W1a and W1b). Be sure to build them as a left side and right side. Glue W9 into place. W9 hole should align with hole in W1.

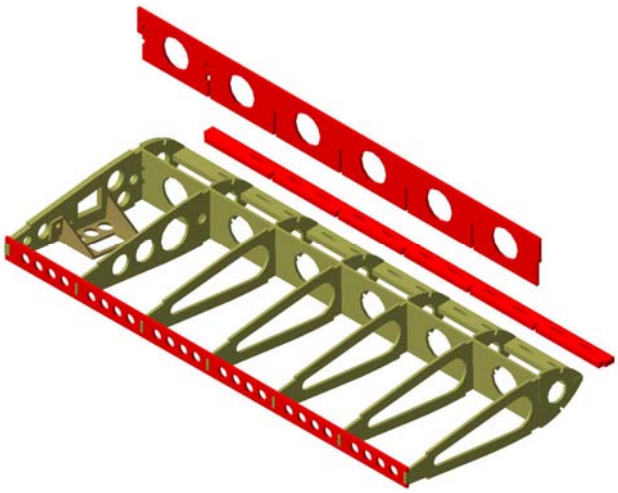


Fig 25: **(No Glue)** Insert the ribs into the main spar crutch. Be sure to install the correct rib in the correct location. Ribs are numbered 1-7. Rib number 7 is installed at the wing tip. Insert the leading and trailing edge pieces. Square the trailing edge piece to the two end ribs and tack glue the trailing edge corners only. Square the leading edge piece to the end ribs and tack glue at the leading edge corners. Do not glue anything else at this time.

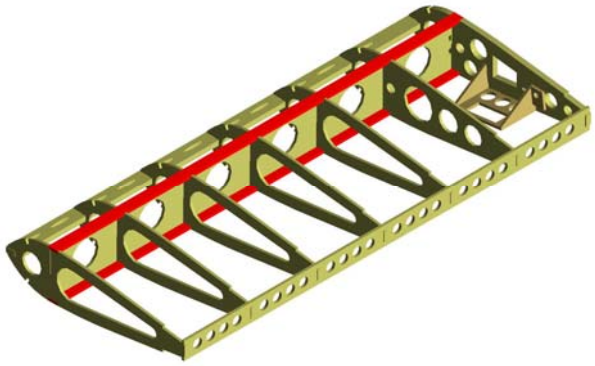


Fig 26: Insert top and bottom spar caps. Stretch a piece of transparent 3M scotch tape over the caps end to end. The tape will prevent you from gluing the wing to your work surface. Set the wing on a flat surface and use a straight edge to put pressure on the upper spar cap. Glue with thin CA all joints in the spar.

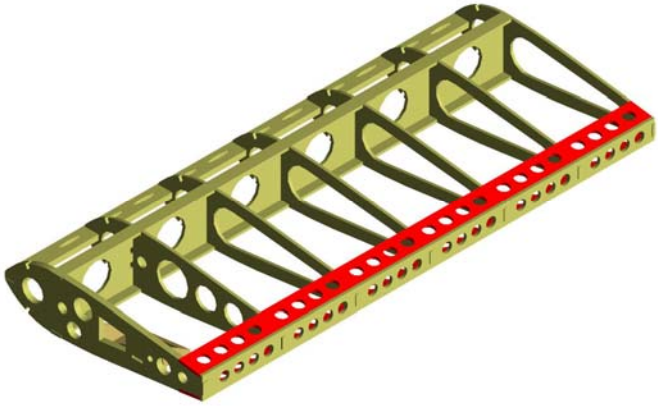


Fig 27: Install, square and glue the trailing edge caps.

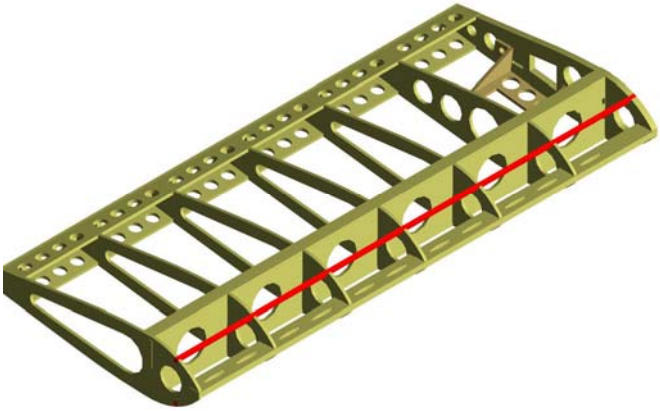


Fig 28: Insert and glue 3/32”x1/16” stringers. Sand all pieces that protrude beyond W1 and W7 flush.

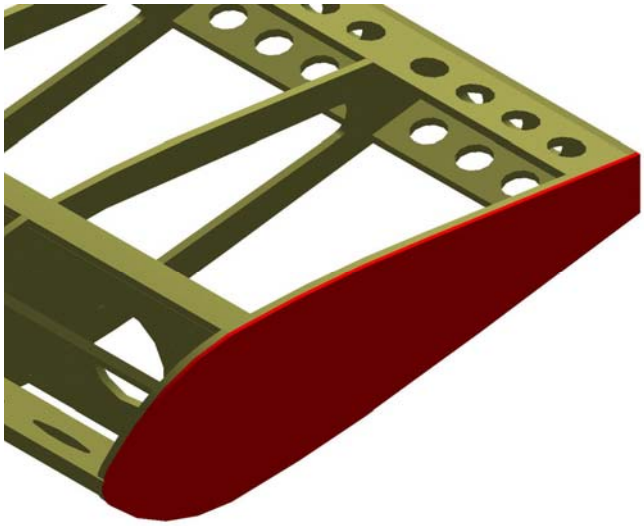


Fig 29: Glue end caps. Some overlap should be visible. After glue dries, sand flush with Rib 7.

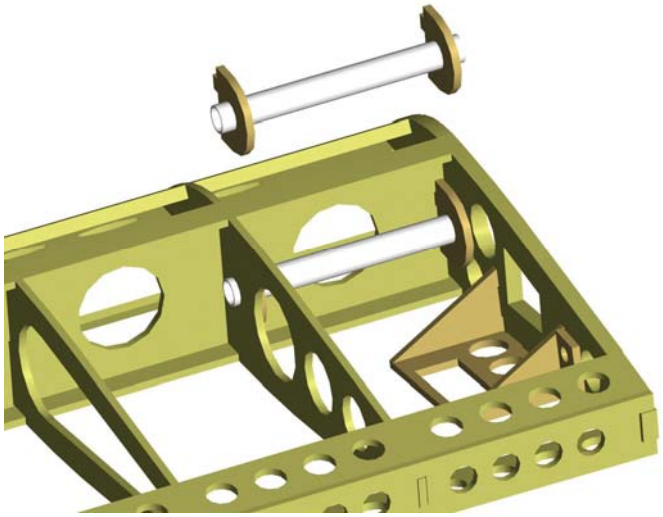


Fig 30: Cut remaining aluminum tubing in half. Each piece should be approximately 2". Install with two W8 pieces. Take extra care that the tube is straight.

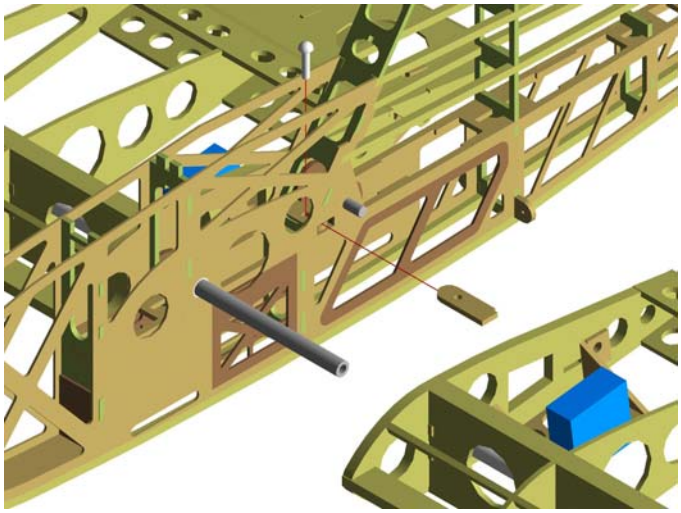


Fig 31: Temporarily install the carbon wing guide-pin in the fuselage. It is a good idea to taper the ends of the pin before installing. Install wing lock tabs into the fuselage, one over the other using provided #2-56 screw. *Note:* The slots in the wing are offset, be sure to match the tabs to the wing. Slide the wings into place and tack glue the tabs to the wings. Let the glue dry then remove the wing and finish gluing the tabs. Avoid applying glue where it will affect sliding the wing into the fuselage.

Block sand the entire wing. Sand trailing edge pieces flush with the ribs and each other.

Ailerons Assembly

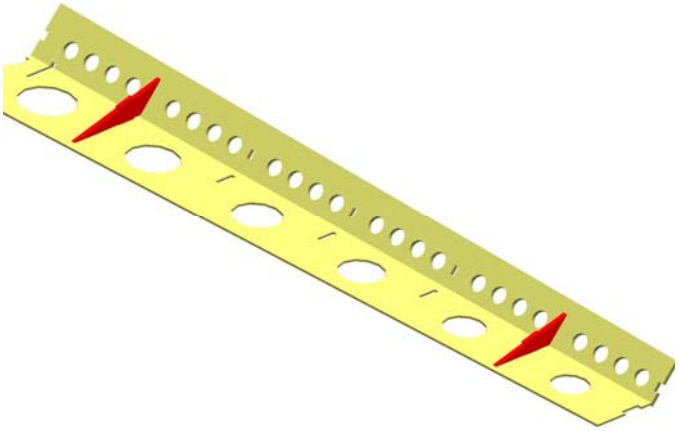


Fig 32: Organize the aileron parts so the left and right orientation can be identified. Aileron ribs are numbered 1-7 with 7 being placed at the wing tip. Line up the notches in the aileron leading edge and the bottom aileron sheet. The leading edge should slightly overlap the bottom sheet. Tack glue W2b and W6b in place. Take care to keep the aileron bottom sheet straight and the ribs square to the bottom and leading edge.

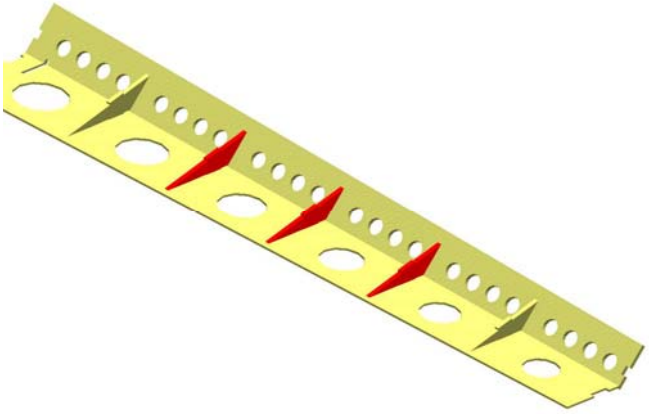


Fig 33: Tack glue W3b-W5b to leading edge only. Take care to keep the aileron bottom sheet straight and the ribs square to the bottom and leading edge.

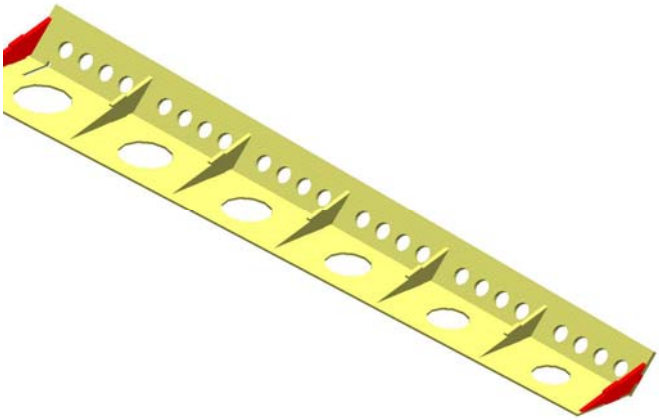


Fig 34: Glue W1b and W7b in place.

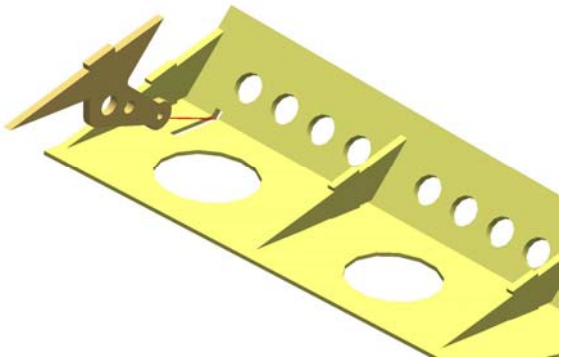


Fig 35: Glue plywood control horn in place. Take care to keep the aileron bottom sheet straight and the ribs square to the bottom and leading edge.

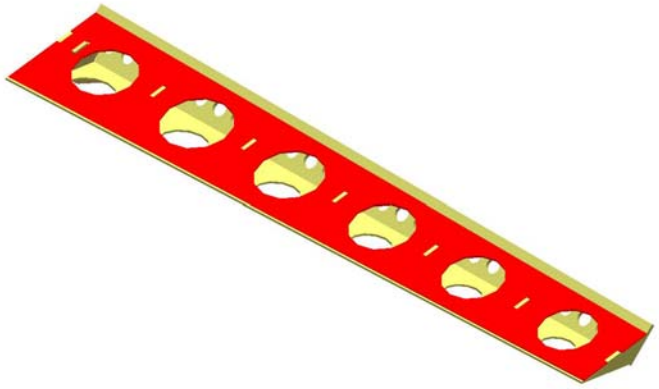


Fig 36: **(No Glue)** Install top aileron sheet. Place a piece of ¾" Scotch tape the full length of the aileron on the bottom sheet at the trailing edge. The tape should hang halfway over the edge. Flip the aileron over with the sticky side of the tape up and the control horn hanging over the edge of the table. Use a straight edge tool to pinch the top and bottom sheets together at the trailing edge. Do not apply excessive pressure. The tool should be ¼" from the trailing edge. Glue the trailing edge with thin CA. The tape will keep the part from sticking to the work surface. Glue all joints at this time. Glue ribs through holes in top and bottom sheets. Saturate the control horns with thin CA glue.

Block-sand the leading edge so that it is flush with the bottom and top sheet. The angle of the top and bottom sheet should continue on the leading edge.

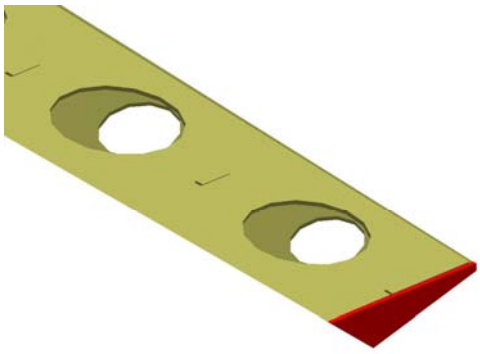


Fig 37: Glue the end cap in place. Sand the cap flush with the aileron surfaces.

Vertical and Horizontal Stab Assembly

Fig 38: Protect the plan ***(see Full Page Picture on Page 13)*** with transparent packing tape. Layout the parts and butt glue them with medium CA. Sand top and bottom flush after the glue has dried.

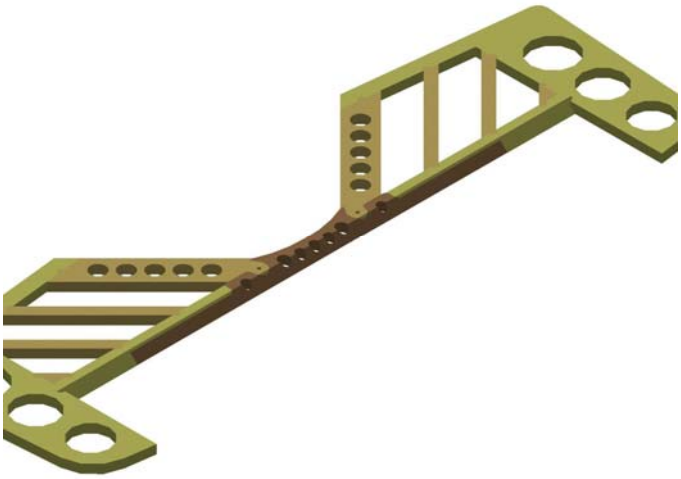


Fig 39: Bevel the leading edge of the elevator 45 degrees on the bottom side only.

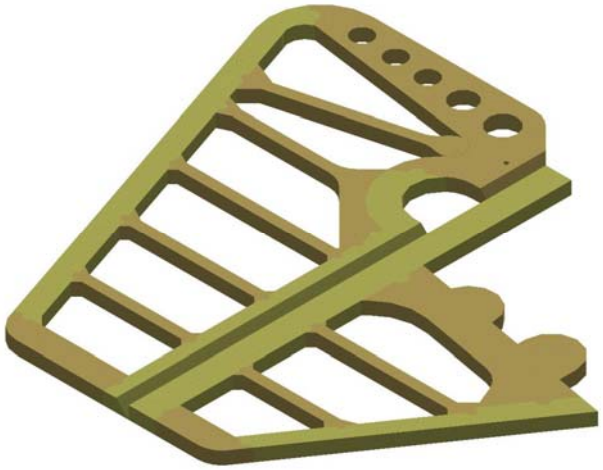


Fig 40: Bevel the leading edge of the rudder 45 degrees on one side only.

Covering

Use light model covering only, such as Ultracote Lite, Oralite, Solite or Midwest Coverlite. Do not use Monokote or Regular Ultracote.

Cover the fuselage with the servo hatches installed and closed. Cover directly over the Scotch tape hinge. After covering is complete, cut hatch doors left, top and right side. Keep the covering on the bottom edge of the hatch to act as a hinge. Cover the wing, ailerons and stab pieces.

Final Assembly

Apply taped hinges to all control surfaces with 3M clear Scotch tape.

The Micro 3DX has 3 hatches that can be used for the rudder and elevator servos. It is a good idea to line up your servos and do a "dry run servo fit" to ensure that you know how the servos will fit and that the locations you choose allow the plane to be balanced properly.

RUDDER AND ELEVATOR SERVOS

Start out by centering your servos. Mount a single sided arm on servo. Remove grid from servo hatch that you are going to use. **Hint** you may want to remove loose labels from servo before applying the provided foam tape. Apply foam tape to servo. Tuck wire from servo into plane before placing servo in plane.

Fig 41: Position your servo. Center servo arm on servo arm slot located on the opposite side of your servo hatch. Hold servo up so tape does not stick. When servo is in position press down on servo while holding the outside wall of the fuselage to ensure you do not break the fuselage. Install second servo in the same manner.

RUDDER AND ELEVATOR LINKAGE

Fit the carbon pushrods into pushrod guides before removing them from the sheet. Push the carbon back and forth to ensure it operates smoothly. Enlarging the hole may be necessary on push rod guides. If so, use a small drill bit to enlarge them. Remove elevator and rudder push rod guides from plywood sheet. Sand them smooth if so desired

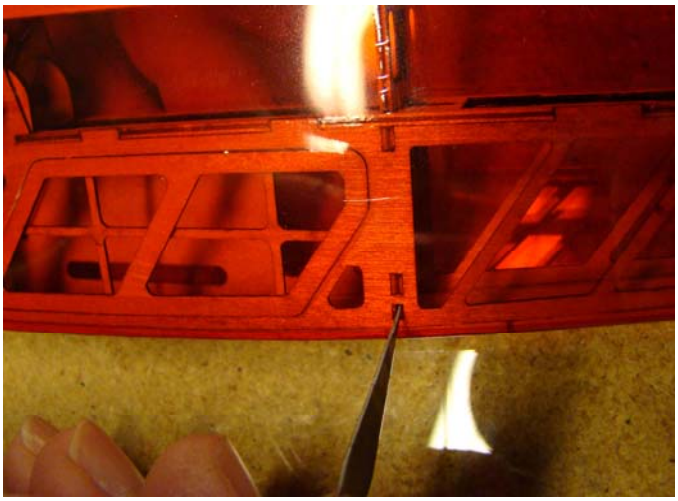


Fig 42: Remove covering from four push rod guide sockets on fuselage. Cut four 1" pieces of shrink tubing.

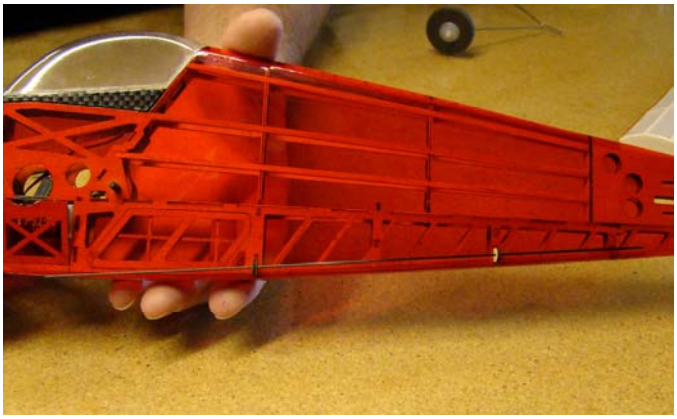


Fig 43: Take the shorter carbon rod and put it on the left side of the aircraft (side with servo mounted closest to tail section) and install with no glue. Cut a 2 ¼" length of piano wire and put a small z-bend in it.

Fig 44: Assemble as shown with 1" overhang on shrink tubing. Pull back. Apply CA glue then apply heat to the shrink tubing. Repeat for other side, with longer push rod. **Note** Push rod guides are still NOT glued. Take push rods and set them aside.

Slide wing tube into wing sockets and temporarily install wings.

Use a fresh razor blade and remove covering from area where fuselage will be glued to vertical and horizontal stabs on both sides. **Do not glue yet.**

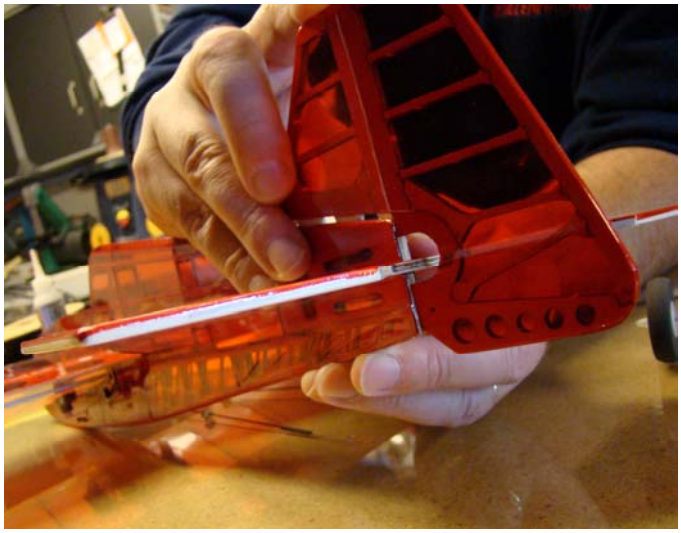


Fig 45: Insert vertical stab and align horizontal stab so it is square with vertical stab. Center the horizontal stab with fuselage. Measure from a point on the tip of the horizontal stab, not the elevator, to a point on the wing tip. Both sides should be equal. Make sure that the horizontal stab is square to the vertical stab and glue both in place with thin CA. Check that the horizontal stab and main wing are on parallel planes. If the fuselage is twisted, twist it in the opposite direction while removing the wrinkles in the covering with a heat gun or iron.

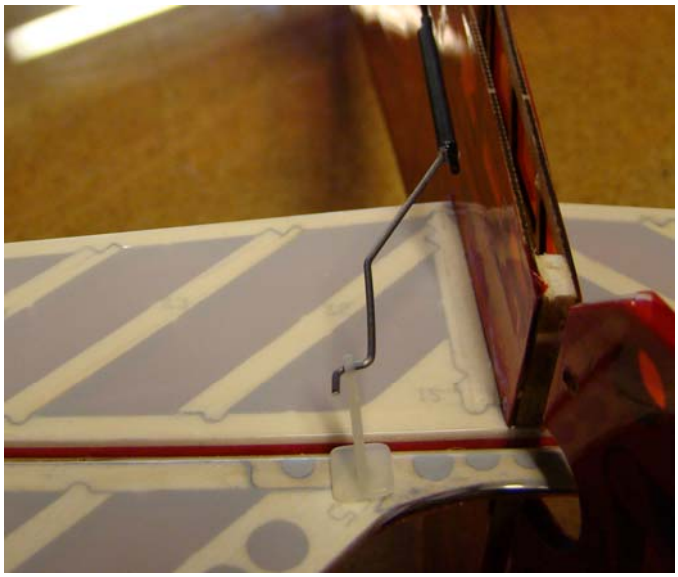


Fig 46: Temporarily install the elevator control horn. Slide a 1" piece of shrink tubing over the push rod. Bend a piece of wire as shown and fit it to the pushrod so the elevator is neutral and the servo centered. Glue the wire to the carbon pushrod. Remove the entire pushrod assembly from the plane and heat the shrink tubing until it is tight. Reinstall the assembly and glue all parts.

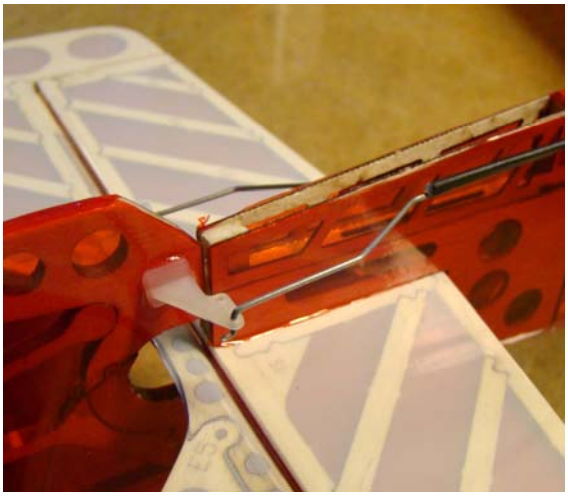


Fig 47: Install rudder pushrod using the same procedure.

WING SERVOS AND LINKAGE

Install aileron servo. Feed wire through wing. Use the provided 0 x ¼" screws to mount servo. **Note** Do not try to use screws provided with servo. They may be too big. Center your servo and install your servo arms with the arm pointed towards fuselage. Repeat for other wing.

Install quick-link onto aileron control horn facing fuselage side of the wing. You will need to drill a 1/16" size hole in the control horn. Make a z-bend in provided .032" piano wire. Cut wire ¼" past quick-link.

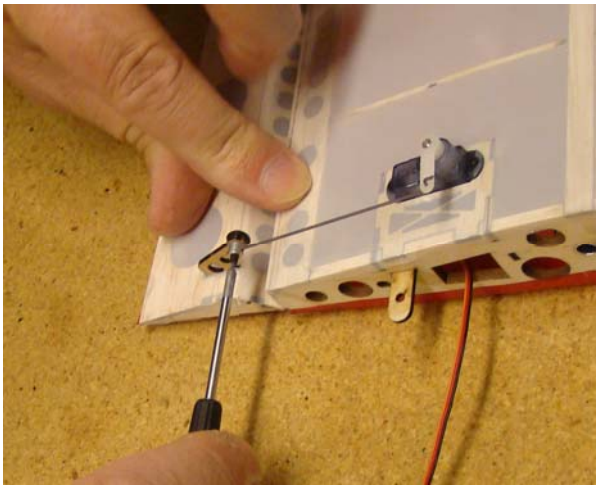


Fig 48: With the wing flat on table tighten the quick link screw but be careful not to over tighten it. It is aluminum and you could strip the quick link. Repeat on other wing.

MAIN LANDING GEAR

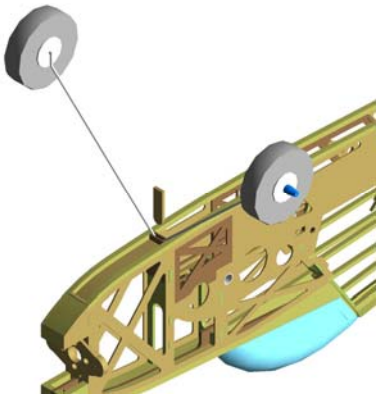


Fig 49: Install the wheels using the provided wheel retainers. Insert the gear into the socket on the fuselage. Use plywood part F1A to wedge the gear in. Some sanding of F1A will be required to make it fit. Do not glue the gear in place as this will make repairs difficult.

TAIL GEAR

Fabricate a tail gear from .032" piano wire. Drill a pilot hole in the front end of the tail gear slot which is in the bottom of the fuselage. (Refer to drawing on Page 13).

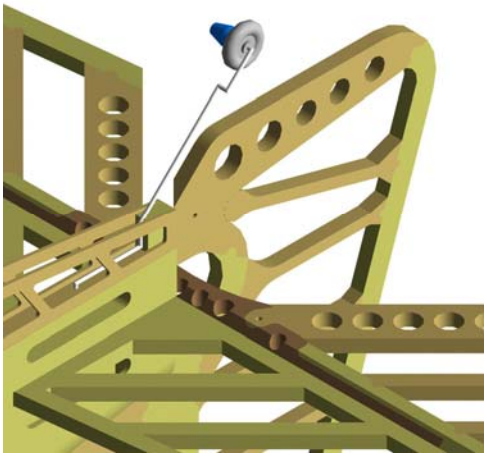


Fig 50: Mount the tail gear with medium CA glue.

MOTOR

Feed the motor leads through the bottom hole of the motor mount so that the wires run along the bottom of the battery compartment. Mount the motor to the motor mount with provided #1 ¼" screw. Down thrust is designed into the model. Right thrust may be added as needed. Connect the ESC route wires so they do not obstruct battery.

CG

The balance point for the Micro 3DX is 2" – 2.5" from the leading edge of the main wing. 3D pilots will want the CG closer to 2.5" while sport pilots will want to be closer to 2". The CG can be changed by repositioning RC components.

RADIO SETUP

Set all control throws to maximum. Use 60% at low rate.

FIRST FLIGHT

Set controls to low rate for first flight and trimming. Take off from the ground or have someone hand launch for you. The model should liftoff at 60% throttle. Land the model under managed throttle. Do not shut the motor down for landing. Flaps are also effective on this model. Set flaps to 35% for landing.

SUPPORT

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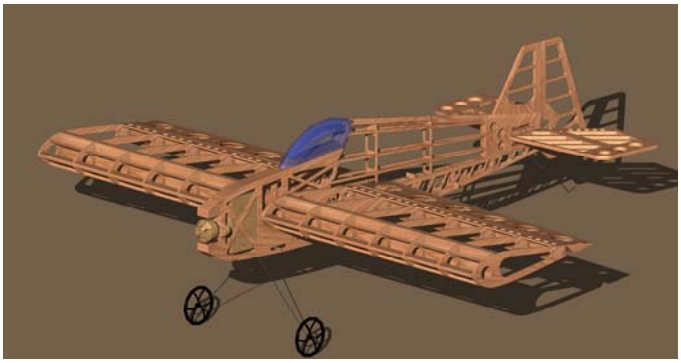
Sales@millenniumrc.com

More detailed motor and radio configurations may be available on our RCGroups build thread and on our website.

RCGroups Build thread:
http://www.rcgroups.com/forums/showthread.php?t=945066

In the event that you damage your model, Millennium R/C offers partial repair kits for your convenience. Repair kits are reasonably priced in order to make it affordable to repair your model.

ENJOY YOUR NEW MICRO3DX FROM MILLENNIUM R/C!



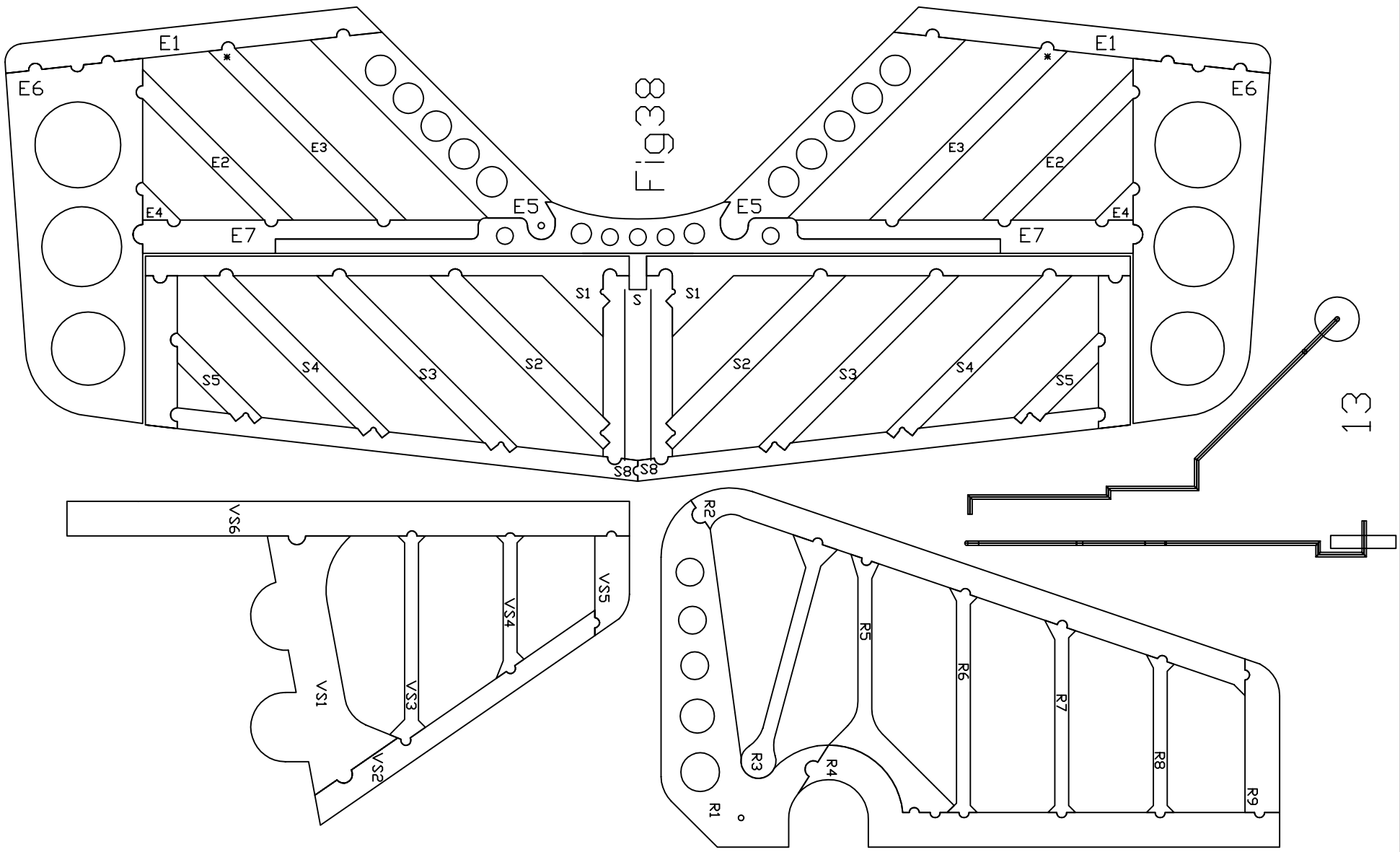

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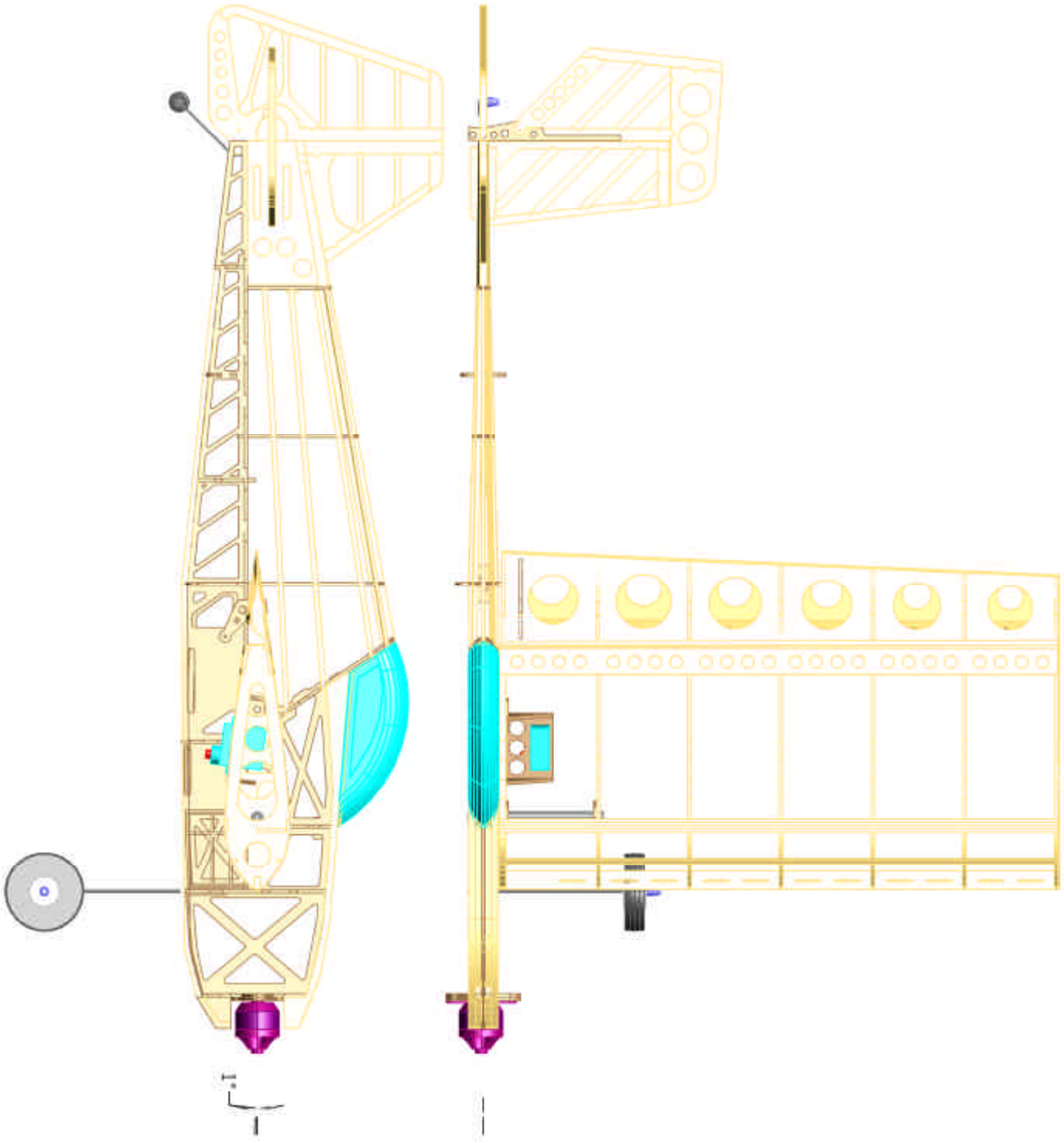
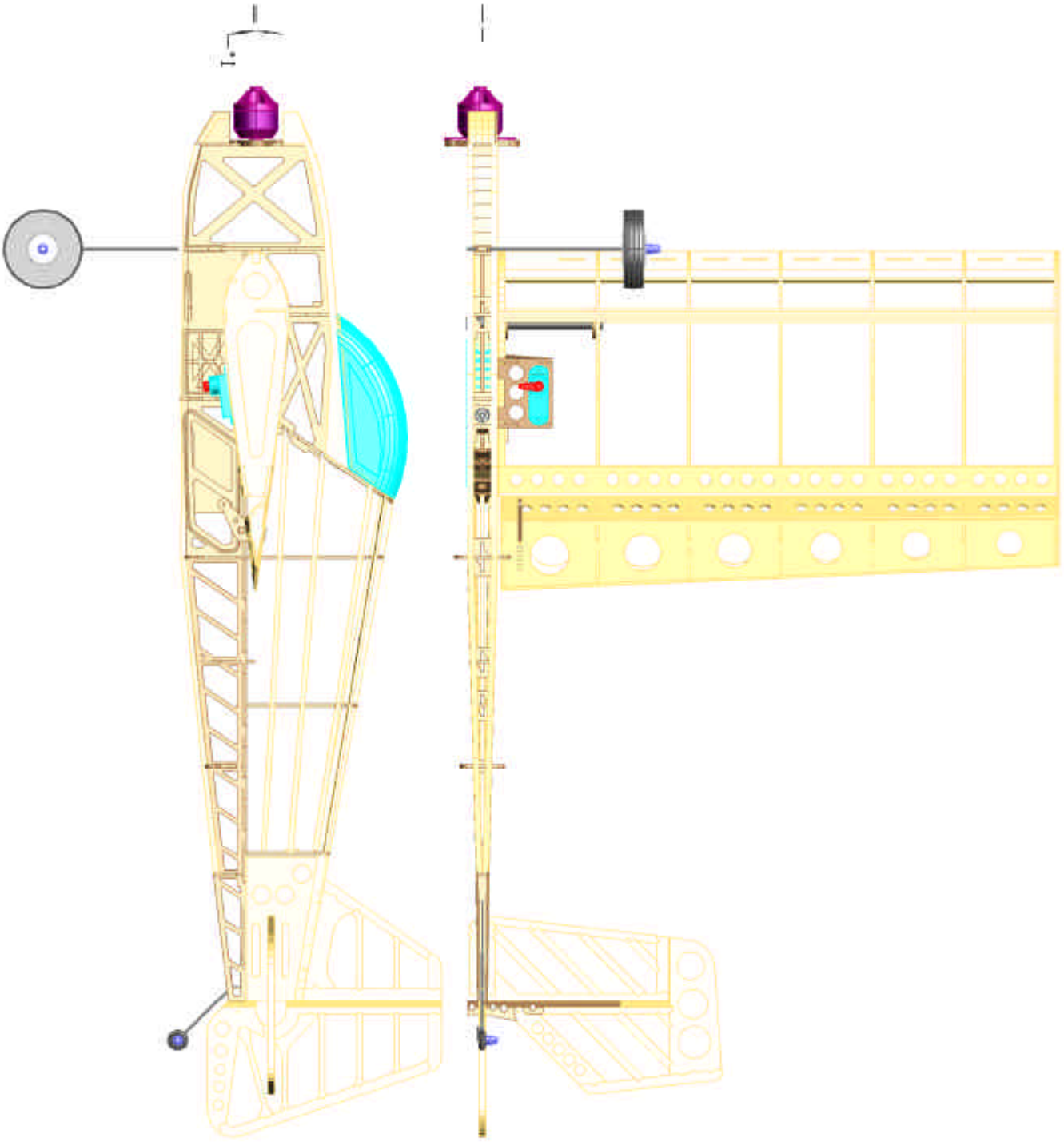
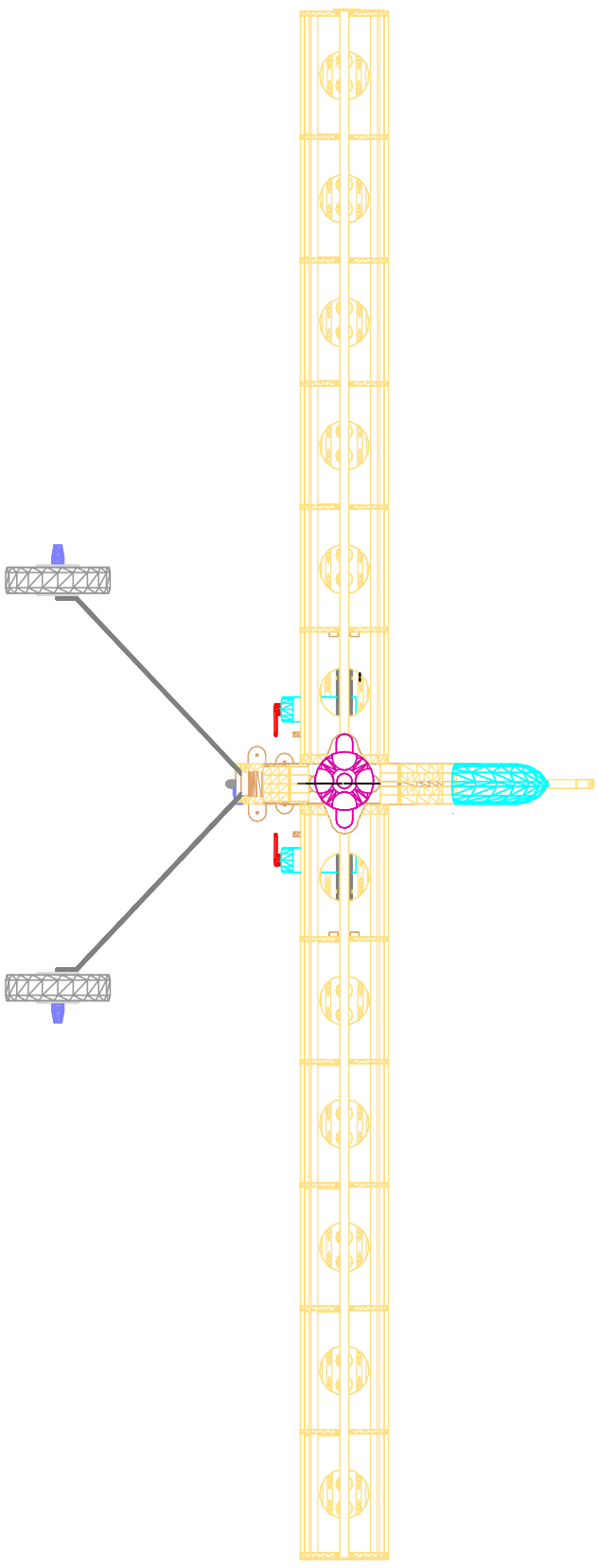
Fig38



Micro 3DX Bottom/Side view



Micro 3DX Front view