Little Baron

Indoor Fokker Dr I Tri-plane

Construction Manual





Designed by Peter Stapleton
'pmjass' on rcgroups.com
Little Baron RC Groups Thread

Wingspan: 27 in
Wing Area: 276 sq in

Length: 23 in
Flying weight: 6 to 8oz

Kit #DMRC0001D by:
Digital Millwork
8038 E. Brown Rd
Lowell, AR 72745
www.digitalmillwork.com
Sales@digitalmillwork.com

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Digital Millwork Deluxe kits are very complete requiring only your radio, battery, and chosen propulsion system.

Items included in kit:

- CNC Cut white Depron Foam, balsa and ply parts
- Carbon Fiber pushrods
- Control horns
- Carbon fiber rods for undercarriage construction
- Wheels
- Velcro for battery/radio mounting
- Instruction manual on CD-Rom
- Printable graphic files of insignia and pilot

Items needed to complete deluxe kit:

4 Channel Receiver and 3 Servos:

Servo cutouts are sized for GWS Pico servos, usa a small 4 channel receiver such as GWS pico, Berg microstamp etc.

Recommended motors and ESC:

Mounts are included for IPS mount, spindle mount, front collar or rear flange mount.

Brushless motor recommended for 3D performance.

Brushed:	GWS IPS 'S1' (IPS-DX2BB-1XCS) GWS ICS 100 Electronic Speed Control or similar Prop: GWS 8060 SF
Brushless:	CD rom size brushless motor such as Len's RC 17 or 25 turn or AXI 2204 series Castle Creations Phoenix 10 ESC or similar Prop: GWS 8040 DD

Battery:

Small 7.4V Lithium Poly battery in 700mah to 1320 mah range

Glue:

Odorless Medium CA and foam safe accelerator plus Contact Cement, Hot melt glue, or Gorilla glue

Tape:

Control services can be hinged with clear packing tape, Medex tape or with hinges of your preference.

Other common building supplies including: 1/8" drill bit, straight edge, scissors, sand paper, hobby knife, small square, pins etc.

Note: This is Little Baron manual version 1.0. Before beginning construction, you should check for an updated manual on the Digital Millwork website: http://www.digitalmillwork.com .

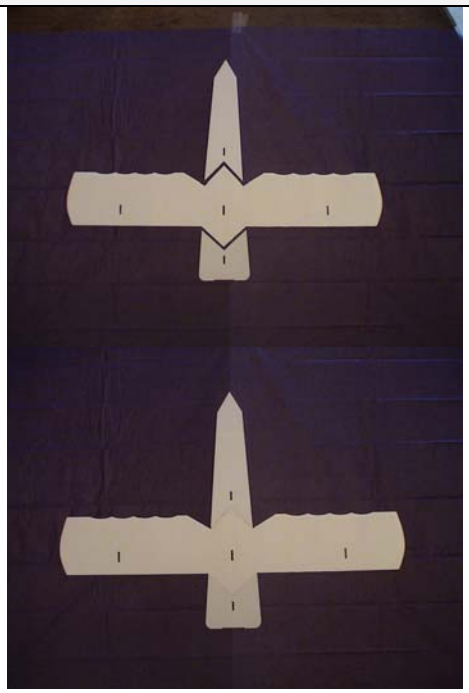
Manual Revision History:

3/15/05 ver 0.9 to version 1.0

- Added brushed motor information to specs
- Changed recommended starting C.G. to 1 1/8th inch back on middle wing
- Added note to apply packing tape to aileron surfaces to reduce flex for outdoor flight.

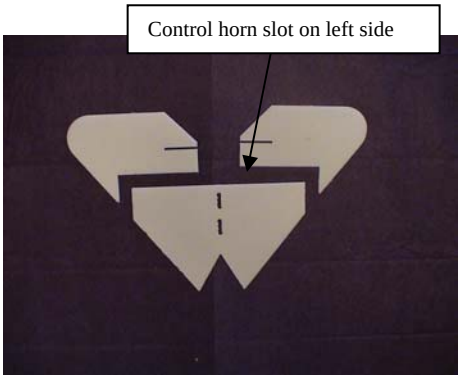
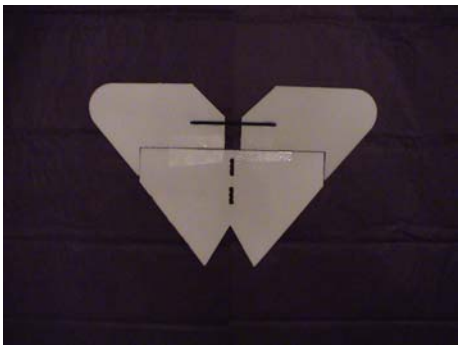
Indoor Fokker DR I Construction:

Step 1: Upper Fuselage

Wing and Fuse assembly	
o On a flat surface, glue middle wing to fuselage front and fuselage rear.	

Note: Painting your Fokker

This manual does not detail the painting of your aircraft as everyone has their own preferences. You may want to paint the parts before or during assembly or you may want to wait till it's complete. Be sure to test your paint on a scrap piece of foam to make sure it's foam safe. Many of the spray type paints will eat foam if sprayed from too close of distance. You may want to consider using a water based acrylic craft paint or even Sharpie markers. There are many threads on rcgroups.com on foam finishing techniques. As this is a lightweight indoor model, be sure not to add to much weight when finishing your aircraft.

Hinge Elevators to stabilizer	
o Hinge the two elevator pieces to the stabilizer. The elevator control horn slot should be on the left elevator when looking from the top rear of the elevator assembly. To use tape hinges, sand a 45 degree angle on the bottom side of the front of the two elevator pieces. With the stabilizer on the edge of your work table, hold the elevator piece at it's maximum downward angle of 45 degrees and tape to stabilizer. Repeat for other elevator half. Flip the assembly upside down and hold each elevator piece downward at it's maximum throw of 45 degrees and tape following the contour of the sanded area. Repeat for other side. For better tape adherence, you may want to coat the foam surface where the tape will be with a thin layer of contact cement. Going over the applied tape with a covering iron on a low setting also seems to improve adherence.	
o Glue the supplied 2 3/4" 1.5 mm carbon tie rod between the elevator pieces making sure both the elevators are flat on a solid surface.	
o Glue completed elevator/stabilizer to wing and upper fuselage assembly from Step 1.	

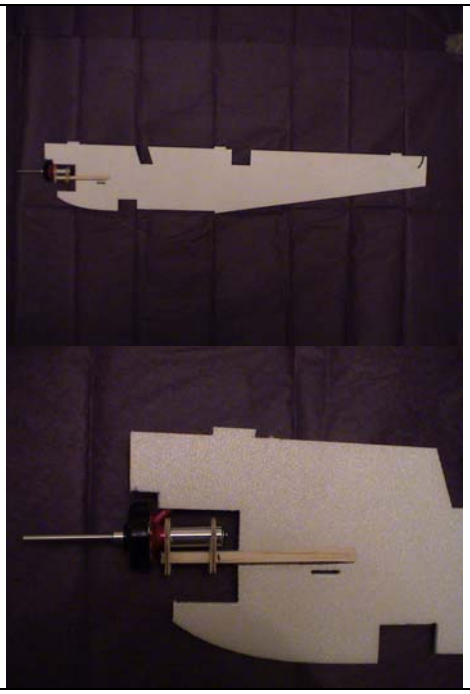
Step 2: Lower Fuselage

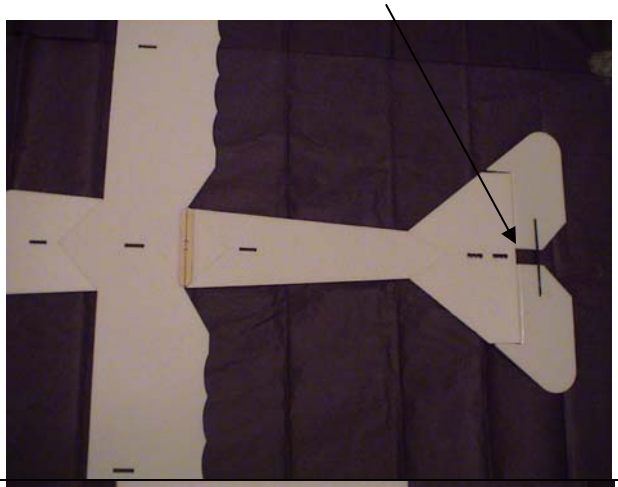
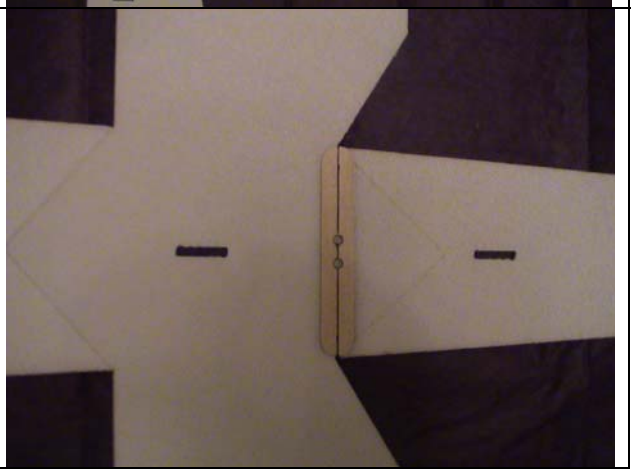
The kit comes with mounts for 4 different styles of motors:

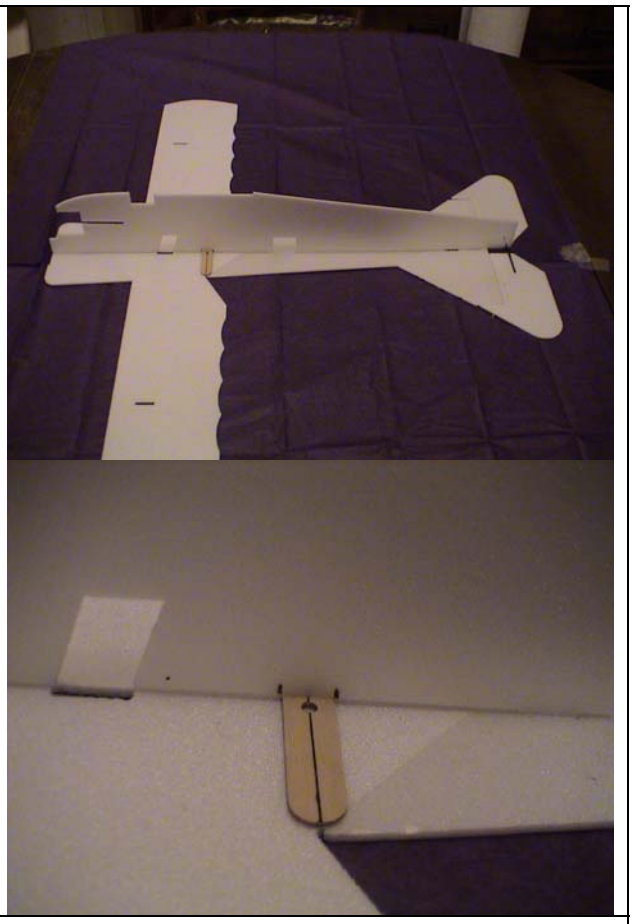
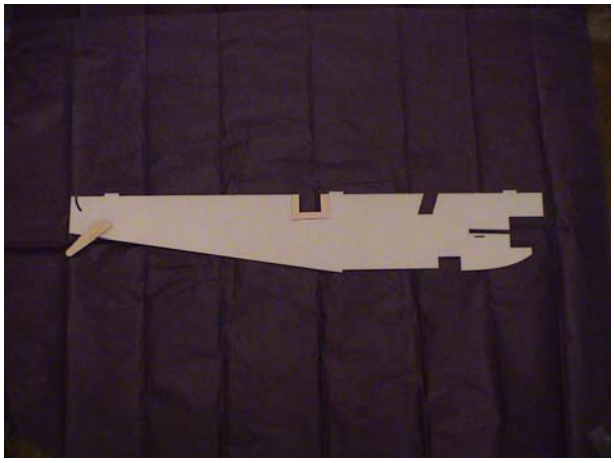
- IPS Stick Mount
- Spindle Mount
- Rear Flange Mount
- Front collar mount

See step 9 for mount details

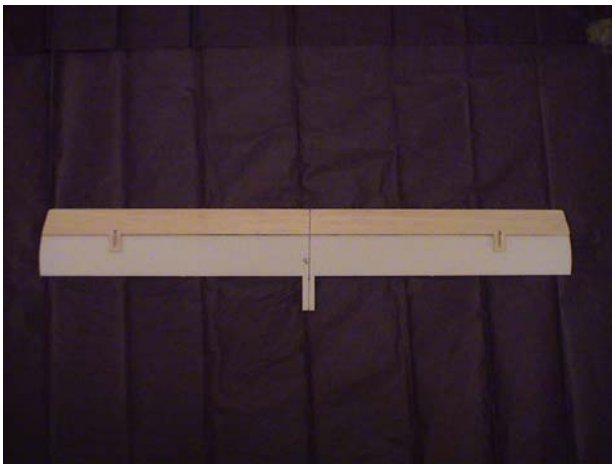
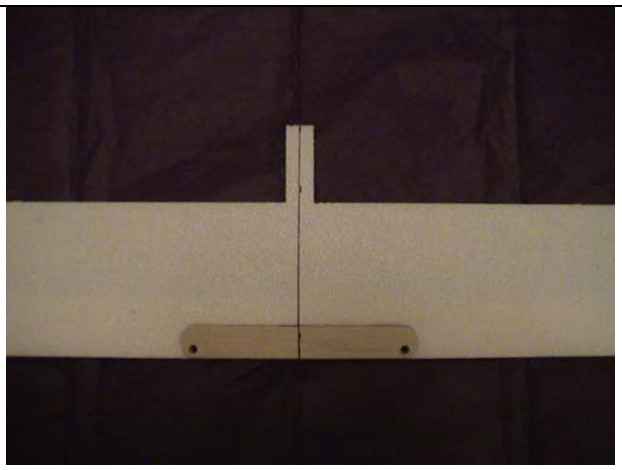
- Choose the mounting type that fits your motor and test fit it and your motor in the fuselage profile. If your motor does not fit in the cutout provided, mark and cut the fuselage profile to fit.

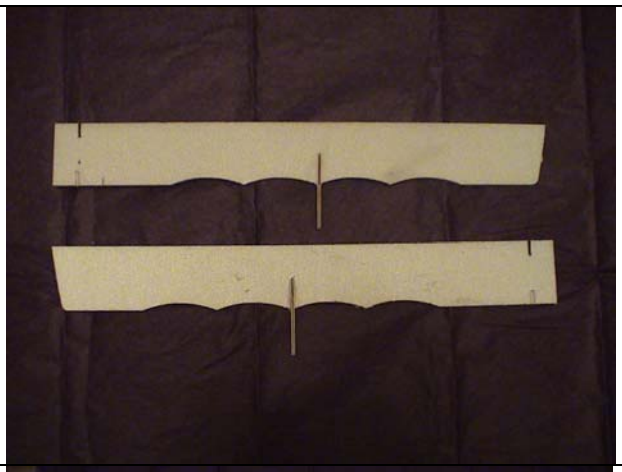
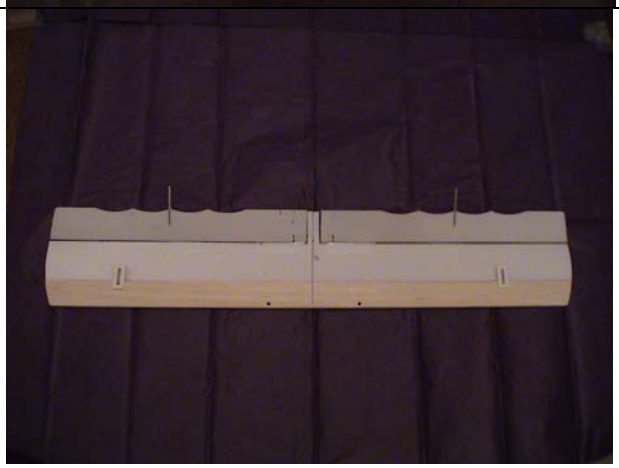


o Turn the upper fuselage assembly completed in step 1 upside down.	The elevator control horn cutout will be on the right side when looking at assembly from rear when upside down. 
o Mark the center lengthwise of the medium (2 3/4") plywood undercarriage mount. o Glue the medium plywood undercarriage mount to the bottom of the fuselage/middle wing assembly so that the centerline of the mount aligns where the middle wing joins the fuselage.	

o Hold the profile in place and mark where the undercarriage mount will be and cut out profile to clear mount.	
o *If you are not using GWS pico servos, check servo fit. If you need to enlarge the servo mounting hole do so now and modify the plywood servo reinforcement or make a new one from balsa to fit your servos.* o Glue the rudder/elevator plywood servo reinforcement in place on the top of the fuselage profile. o Glue the tailskid onto the marked location on the fuselage profile. Tailskid can be glued on either side of the fuselage.	

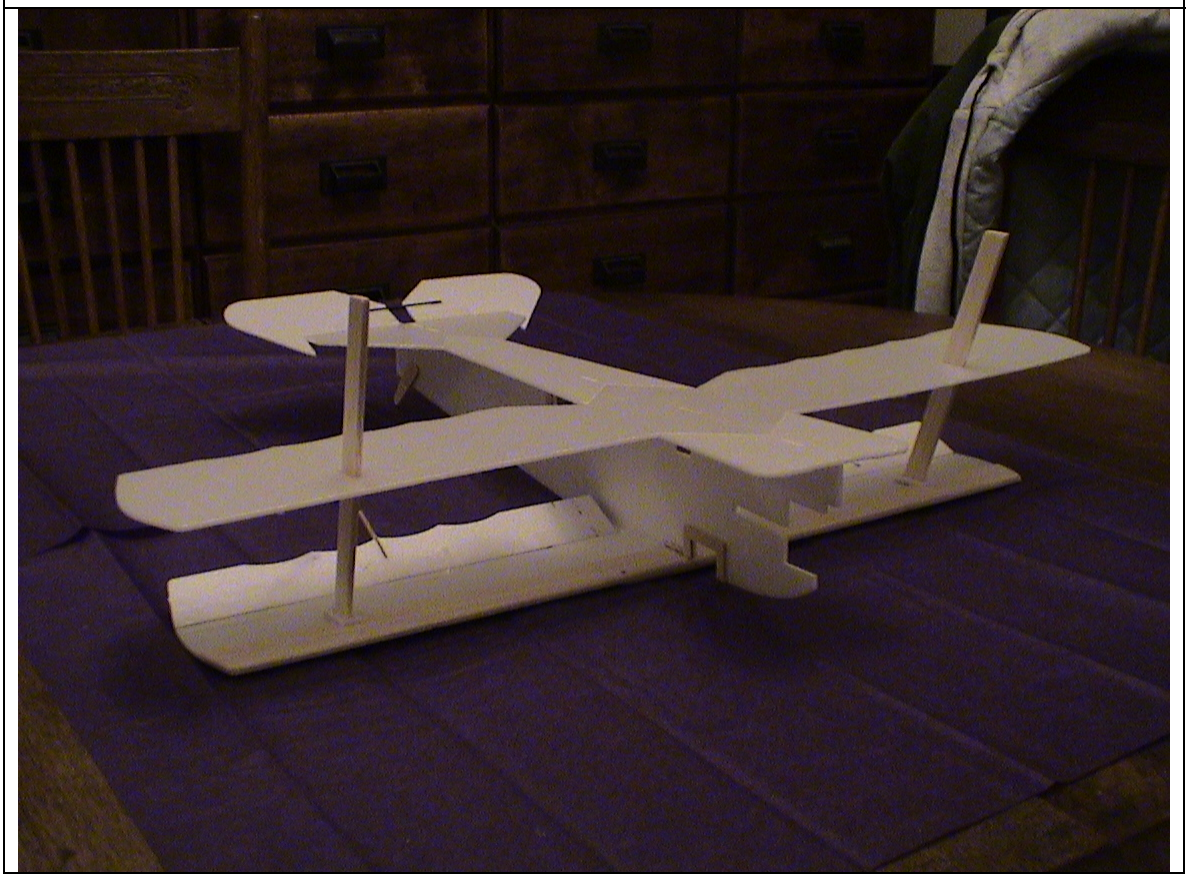
o Glue the fuselage profile into place. Tabs in the fuselage profile will fit into slots in the upper fuselage assembly. Use your square to set the fuselage profile perpendicular to the upper fuselage/wing assembly.	

Step 3: Lower Wing Preparation	
o Use a pen or Sharpie to lightly mark the centerline on both the upper and lower surface of the bottom wing. (the upper surface has the strut locations marked.) o Glue the balsa leading edge to the front of the upper surface of the lower wing. Make sure the cutouts in the balsa leading edge line up with the rectangular strut marks in the wing. Round the balsa leading edge with sandpaper if desired.	
o Locate the large plywood undercarriage mount (3 7/8") and mark it's centerline width ways. o Flip the wing upside down and glue the large plywood undercarriage mount so that it is centered on the front of the wing with the holes in the mount toward the front of the wing.	
o Glue two of the foam strut supports over the rectangular holes on top of the balsa leading edge on the top side of the wing.	*Need photo – there is a photo in step 6 of foam strut supports on upper wing. Check webste www.digitalmillwork.com for manual updates.*

o Glue the long set of plywood aileron linkage horns (1 ½" x 3mm) into place on the bottom ailerons. *(The bottom ailerons are the smaller ones)*	
o Using tape hinges as in Step 1 or your preferred hinging method, attach the lower ailerons to the bottom wing. *Don't forget to make a left and right side one.* *Optional:* You may want to apply a layer of packing tape on each side of the ailerons to stiffen up the control surface, particularly if you expect to fly outside in light wind. The tape can be applied now or after painting.	

Step 4: Lower wing attachment

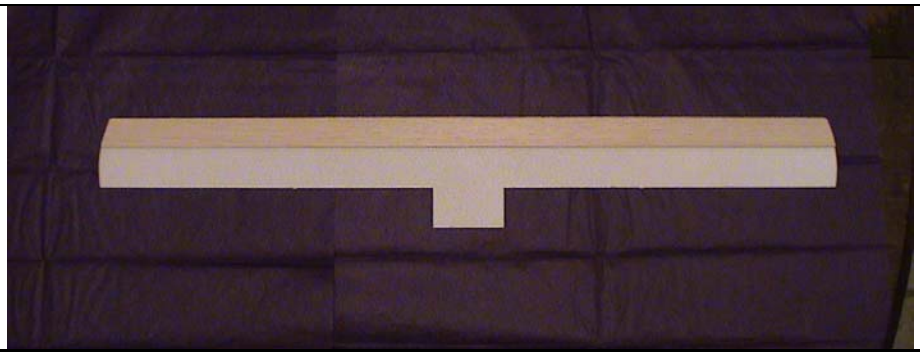
- Align the fuselage profile on the bottom wing and check fit.
- Push the two long struts carefully through the center wing/fuselage assembly. (The struts lean forward)
- Using centerline drawn on lower wing in previous step, glue lower wing to bottom of fuselage profile.
- Position the long struts into the holes in the balsa and foam reinforcements on the bottom wing and glue to bottom wing only. The bottom of the strut should sit flat on the surface of the lower wing inside of the balsa cutouts.
- Using your ruler, position the center wing on both struts so that it is parallel to the bottom wing and glue to struts. (Place a couple 1/16 scraps of plywood under the bottom wing beneath where the struts attach when measuring to make up for the 1/16th L.G. mount under the center portion of the wing.)



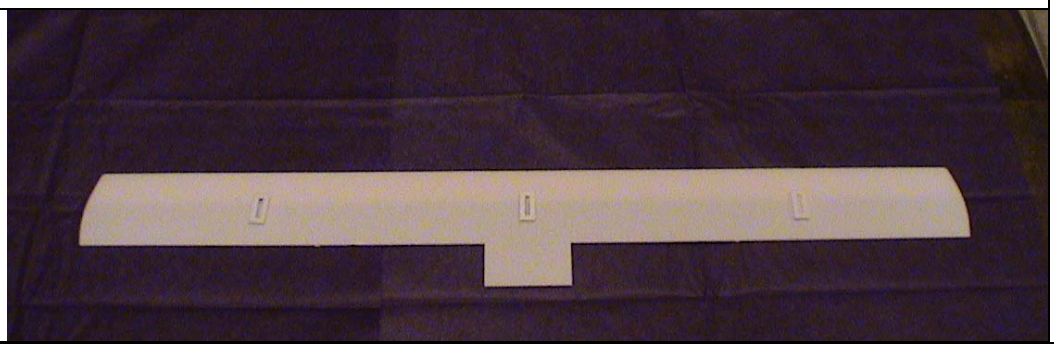
Step 5: Fuselage top assembly	
o Align in center of upper fuselage and glue the cockpit cutout on top of the upper fuselage. Be sure the center strut hole is lined up.	
o Glue the gun deck in front of the cockpit. Make sure center strut hole is aligned. o Glue the rear deck behind the cockpit. o Glue the center strut into the fuselage assembly. o Round nose with sandpaper if desired.	

Step 6: Upper Wing Preparation

- Glue the balsa leading edge to the top front of the upper wing. Round the leading edge with sandpaper if desired. . *(The top of the wing does not have the strut locations marked on it*).



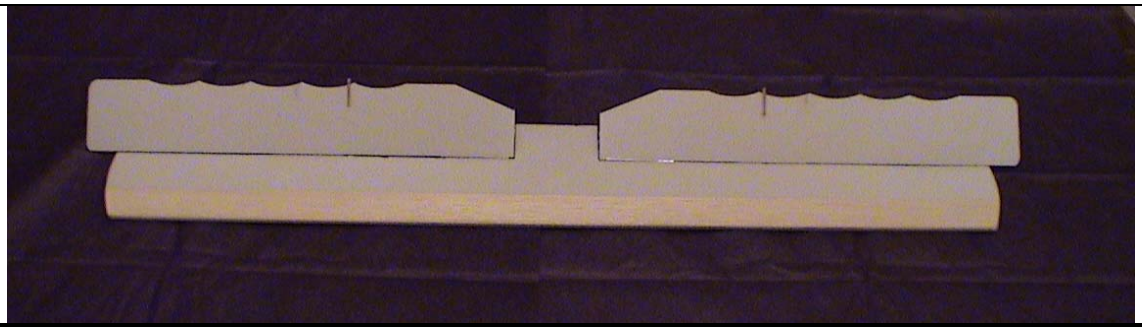
- Flip the wing over and glue three foam strut supports over the marked rectangles.



- Glue the short set of aileron horns (13/16”) into place on the top ailerons.

- Using tape hinges as in Step 1 or your desired hinging method, attach the ailerons to the top wing.

Optional: You may want to apply a layer of packing tape on each side of the ailerons to stiffen up the control surface, particularly if you expect to fly outside in light wind. The tape can be applied now or after painting.



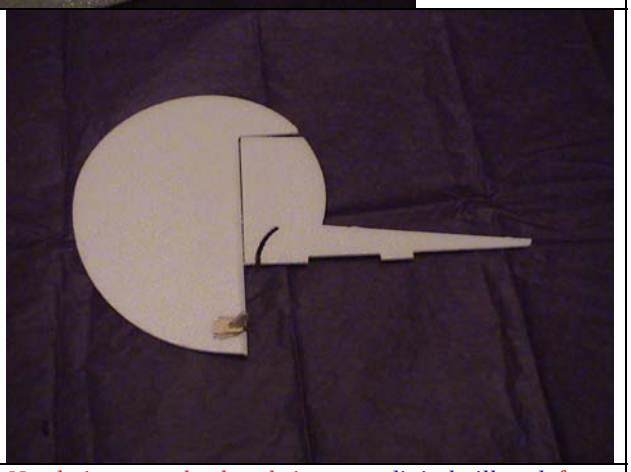
Step 7: Top Wing attachment	
o Glue the top wing into place on the struts making sure it is parallel with the bottom and middle wings.	

Step 8: Rudder

Note: The supplied plywood control horns are 2 pieces to provide more surface area in contact with the foam control surfaces. Slide the two pieces together and glue with CA, then glue into place in the slots provided in the control surface.



- Using tape hinges as in step 1 or your preferred method, hinge the rudder to the vertical stabilizer.
- Install the control horn on the right side of the rudder.



- Glue the rudder to the fuselage.
- Add hinges to bottom of rudder after assembly. Be careful not to interfere with elevator operation.

Need picture – check website www.digitalmillwork for updated manual.

Step 9: Motor Mount

- If you had to cut the fuselage profile to fit your motor in Step 2, mark and cut the front fuselage doublers to fit. Two sets of doublers are provided, the solid ones are used for a front collar type engine mount and the cutout ones are for mounts using the IPS stick (IPS, spindle, or rear flange mount).



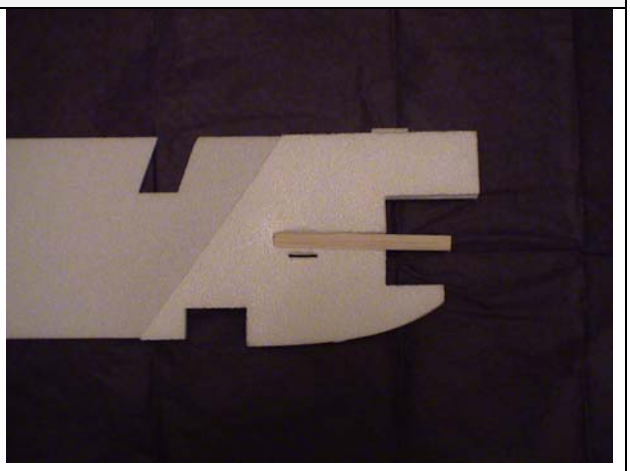
- Install the motor mount type you selected:

IPS mount

- Glue the cutout fuselage doublers into place on either side of the fuselage.

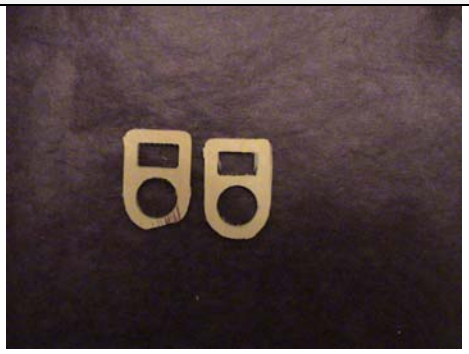
- Test fit the IPS mount stick into place and mark the length needed to properly position your motor so that the propeller will clear the front of the fuselage.

- Cut the stick to length and glue into place allowing slight right thrust by making the rear of the mount stick flush with the surface of the left doubler and the front of the stick flush with the surface of the right doubler.



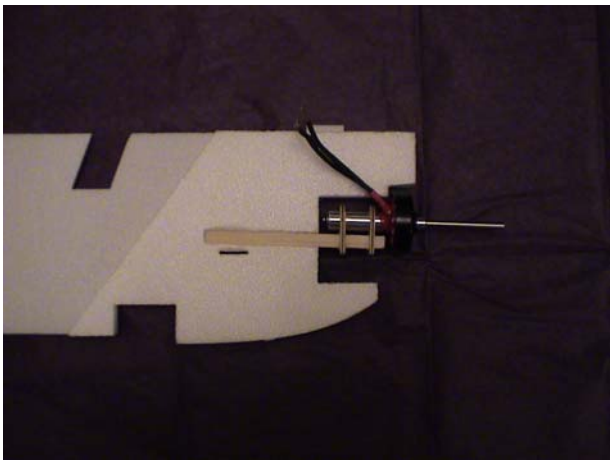
Spindle Mount

- Glue the cutout fuselage doublers into place on either side of the fuselage.



- Fit the spindle mount adaptors onto the IPS mount stick and place your motor in the adaptors.

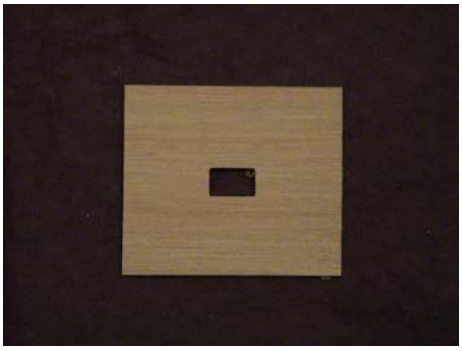
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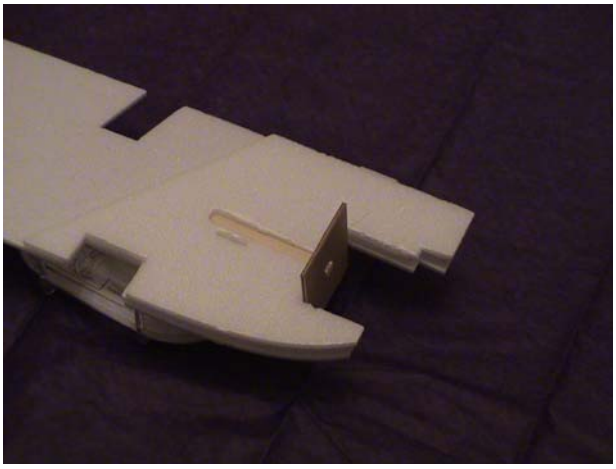


- Cut the stick to length and glue the spindle adaptors onto the stick and the stick into place. Allow slight right thrust by making the rear of the mount stick flush with the surface of the left doubler and the front of the stick flush with the surface of the right doubler.

Rear Flange Mount

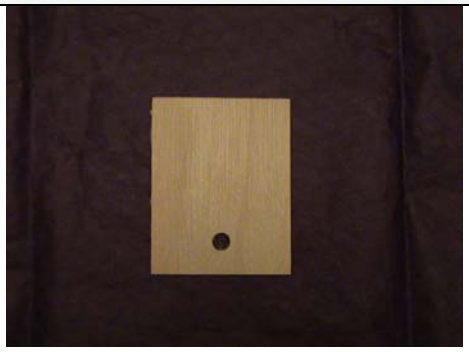
- Glue the cutout fuselage doublers into place on either side of the fuselage.
- Slide the rear mount plywood plate onto the IPS mount stick and test fit the stick into the fuselage.
- Slide the mount plate back until your motor fits properly and mark the IPS mount stick at the front of the mounting plate.
- Cutoff the IPS mount stick and glue into place in fuselage. Allow slight right thrust by making the rear of the mount stick flush with the surface of the left doubler and the front of the stick flush with the surface of the right doubler.
- Test mount your motor to the plate and cut off excess material on the mounting plate.
- Glue the mounting plate onto the IPS stick.





Front Collar Mount

- Glue the solid fuselage doublers onto either side of the fuselage.
- Test fit your motor in the hole provided in the plywood collar mount and enlarge if needed.
- Make any fuselage cutout needed to clear motor.
- Glue the Mount to the front of the fuselage allowing for a slight bit of right thrust





All Mounts

- Mark the center of the small ply undercarriage mount and glue into place through front fuselage doublers.
- Install your motor when ready.

Need Picture – undercarriage mount goes in slot in picture above – just below motor mount. Pictures in Step 12 show it in place. Check website www.digitalmillwork.com for updated manual.

Step 10: Upper/Lower Aileron Linkage

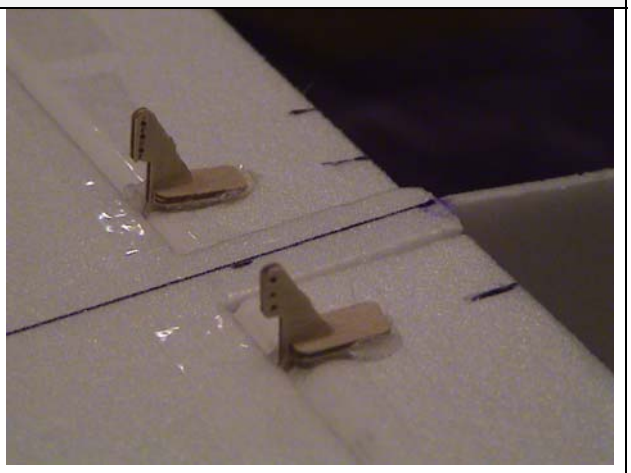
- Tape the upper and lower ailerons in their neutral position.
- Using a 3/4” piece of the supplied 10” long heat shrink tubing, attach one of the supplied z bend wires to each of the 6 1/4” 1.5mm Carbon Fiber aileron rods. The z bend should be about 1/2” from the end of the CF rod. Shrink the tubing, then apply a drop of CA to permanently attach the wire to the CF rod.
- Place the z bend on the CF rod into the upper aileron control horn.
- Slide a 3/4” piece of shrink wrap onto the aileron CF rod and place another z bend wire in the lower aileron control horn. Place the lower z bend on the bottom of the CF rod and slide the shrink wrap over it.
- Adjust the lower z bend so that the ailerons are both in their neutral position and shrink the tubing. Apply CA to hold permanently.
- Repeat for ailerons on other side.





Step 11: Control Horns

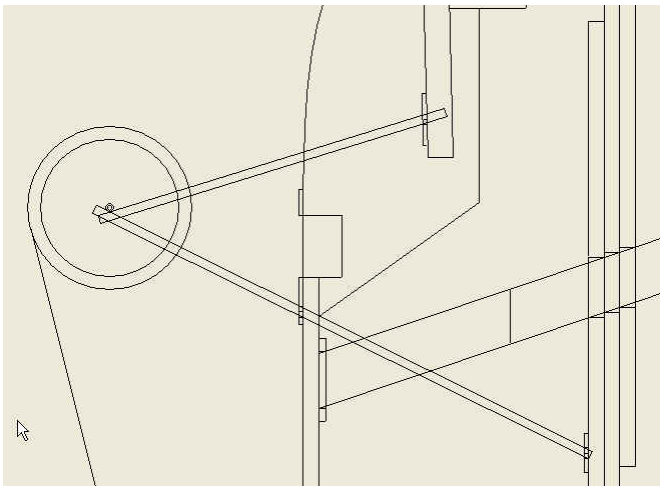
- Install the supplied plywood control horns in the slots cut in the elevator and lower ailerons. The control horns are 2 pieces to provide support over a wider area of the control surface. Glue the upper support piece into the control horn and glue horn into slot in control surface.



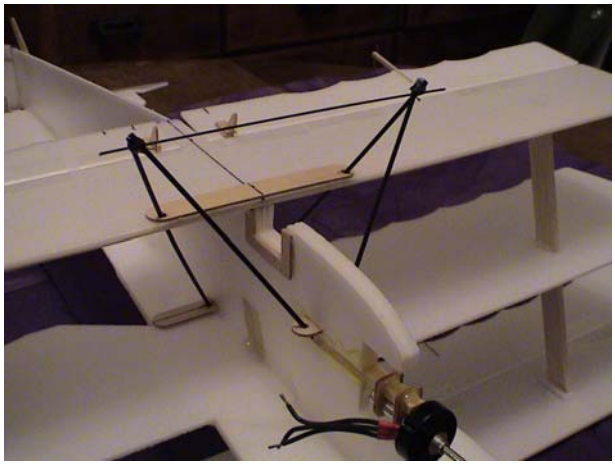


Step 12: Undercarriage

- Use a 1/8” drill bit or punch to extend the holes for the landing gear in the ply reinforcement on the bottom of the lower wing on through the foam and balsa of the lower wing so the 2mm Carbon Fiber landing gear rod can be pushed through the wing. These need to be drilled at an angle so that the 6 3/8” 2mm CF rod can go through the lower wing to the plywood reinforcement beneath the rear of the middle wing.



- Slide the 6 3/8 pieces of 2mm CF rod through the holes in the landing gear reinforcement on the lower wing to the holes in the plywood reinforcement beneath the lower wing.



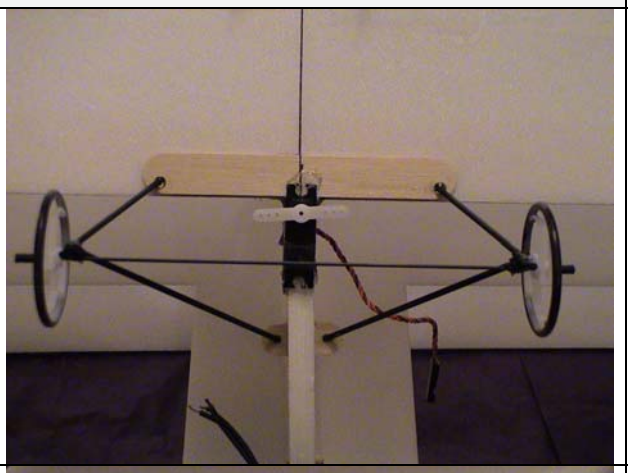
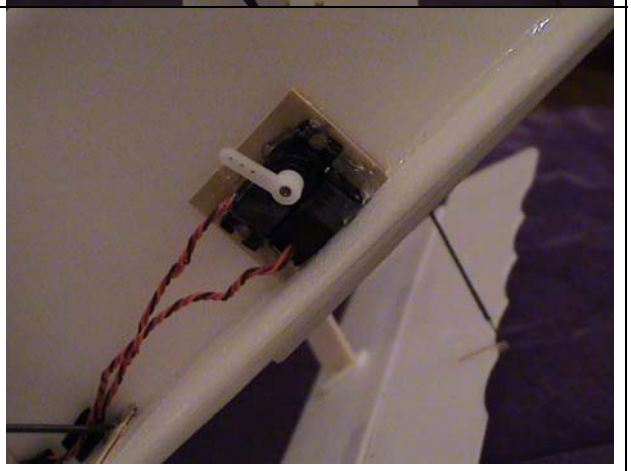
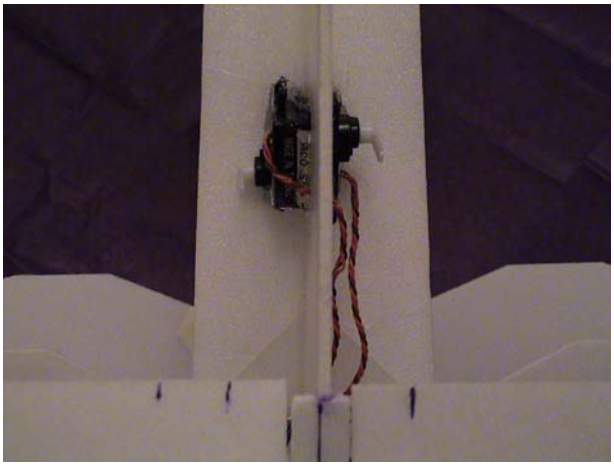
- Place the 4 3/8” 2mm CF rods into the plywood reinforcement installed just behind the motor mount.

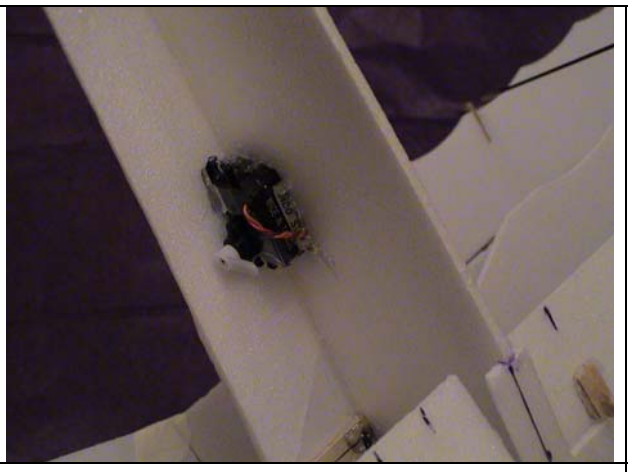
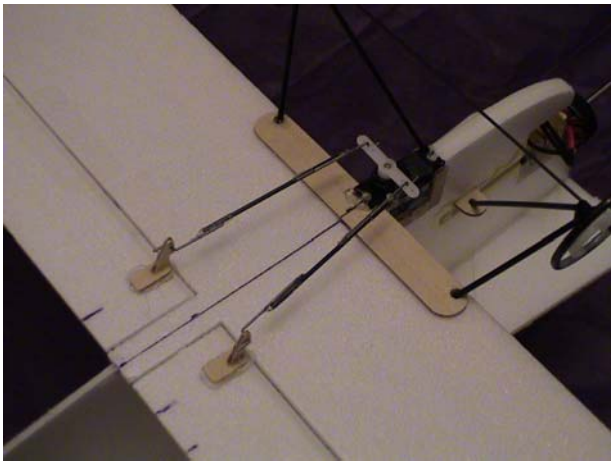
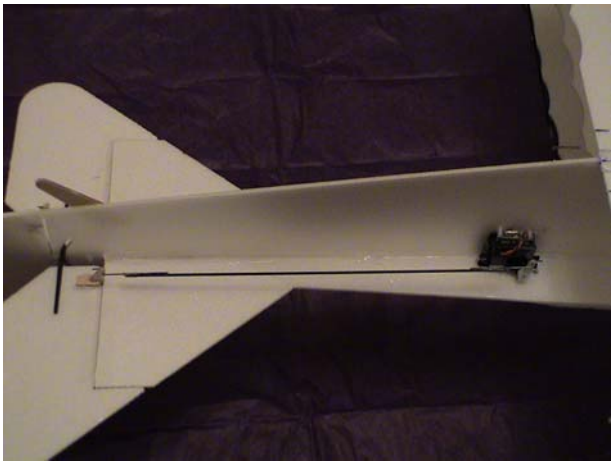
- Use the supplied black thread to tie the ends of the CF rods together . The short front rod should be inside of the longer rear rod. Use a drop of CA to hold together.



- Place the 6” 1mm CF rod in front of the assembled 2mm rods in the V where the 2mm rods join as shown in the drawing. Tie in place using supplied thread on both sides and adjust so that there is equal distance on each side. Wrap with thread and glue with CA.

o Place supplied wheels on the 1mm rod and hold in place by shrinking a small piece of the supplied 1/2 “ long small diameter heat shrink tubing on the end of the axle. o Set plane on wheels and adjust so aircraft sits level, and then glue the 2mm rods to all plywood reinforcements.	

Step 13: Servo Installation	
o Install the aileron servo in the fuselage front of the lower wing using hot glue.	
o Install the rudder and elevator servos in the fuselage below the cockpit using hot glue. The rudder servo should be installed with the control arm facing the right side of the plane *(the pilots right)* and on the bottom, and the elevator servo facing left and on the top. *Do not mount the servos flush with the surface or the elevator control arm will this the rudder servo. Center the servos in the fuselage so the top of the rudder servo is even with the bottom of the elevator servo.*	 

	
o Power up servo's and make sure they are in their center position.	
o Build two aileron pushrods using the supplied 2" 1.5 mm CF rod, z bends, and shrink wrap as outlined in step 11 above.	
o Build and install Elevator pushrod using the 8" 1.5mm CF rod.	

o Build and install Rudder pushrod using the 8 3/4” 1.5mm CF rod.	

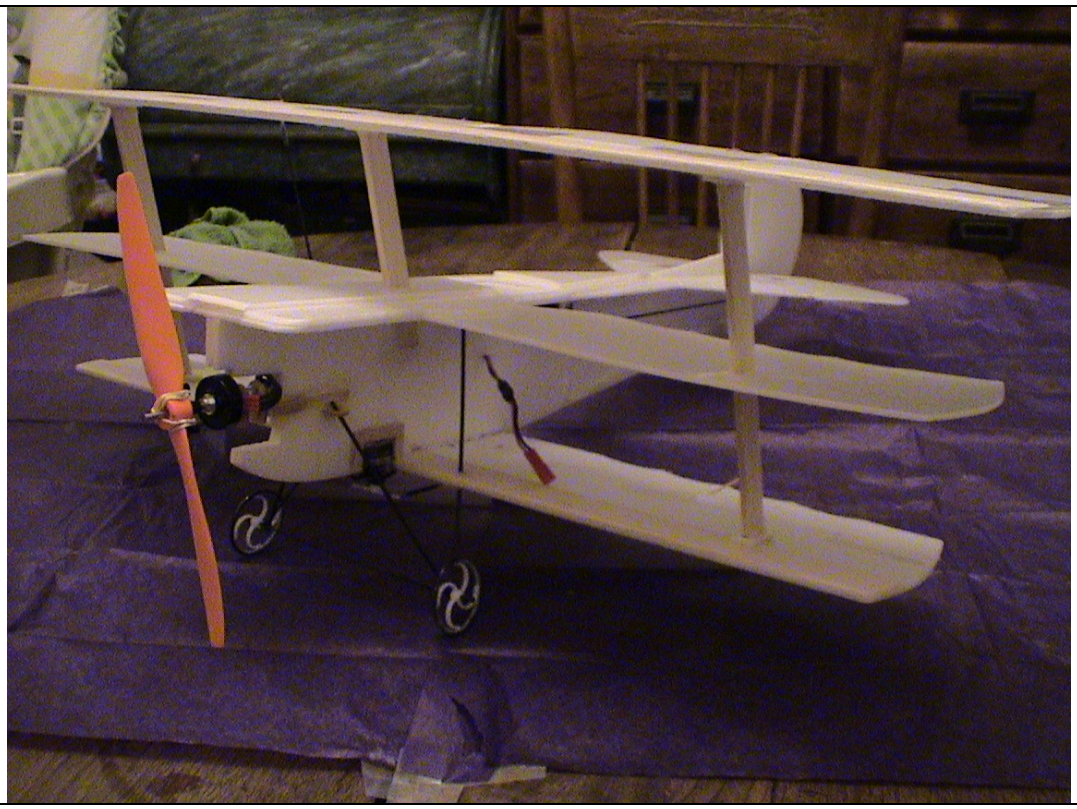
Step 14: Radio, Battery and ESC Installation

- Temporarily mount your receiver, battery, and ESC on fuselage using tape. Adjust their position to get your center of gravity where you want it. The suggested starting point for the C.G. is 1 1/8" back from the leading edge of the middle wing. Once you've located the proper position for the battery and receiver, mount the receiver and ESC using hot glue or Velcro.

- Mount the battery using a strip of Velcro so that you can move the battery forward or back to change your Center of Gravity to get desired flying characteristics.

- Finish your radio and motor hookup and you're ready to fly. Drop us an email and let us know how you like it.





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Questions, Feedback Etc:

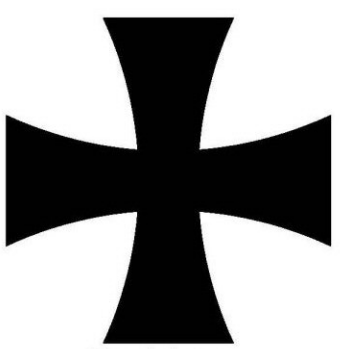
Please feel free to contact us at sales@digitalmillwork.com with questions, comments, suggestions for improvement and the like. We'd love to see pictures of your aircraft and hear about the motor/prop used and will use your comments to help us improve the quality of our kits.

When the inevitable crash happens, contact us and we'll do our best to help you out with replacement parts.

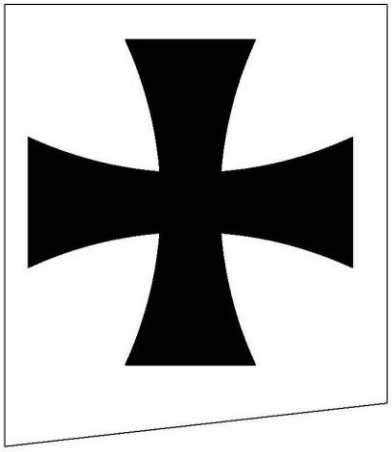
If you'd like to kit an aircraft of your own design or cut a quantity of an aircraft for a club build function, Digital Millwork can help with precision CNC cutting of foam, balsa, and ply components at very reasonable costs. We will also consider kitting and marketing your design on a per sale royalty basis.

Insignia: These Insignia as well as outline versions are also in the insignia directory on the CD.





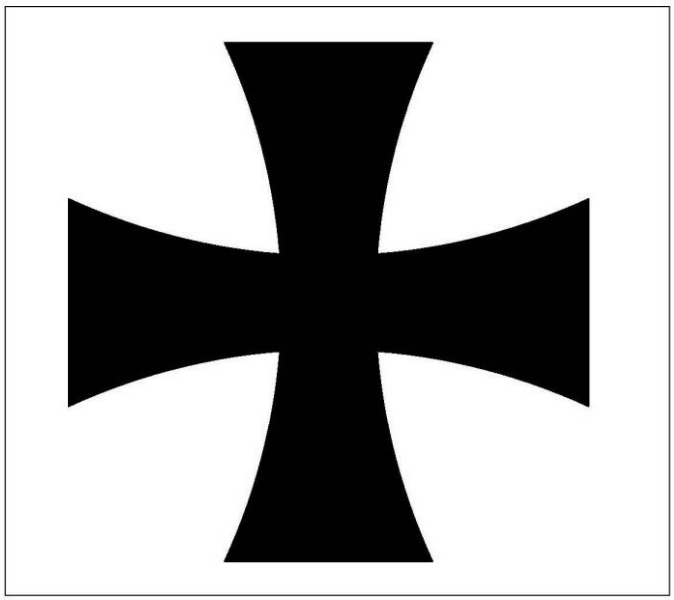
Rudder



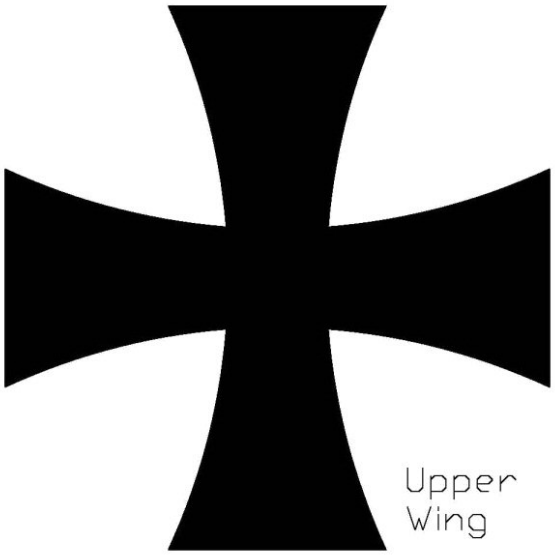
Fuselage



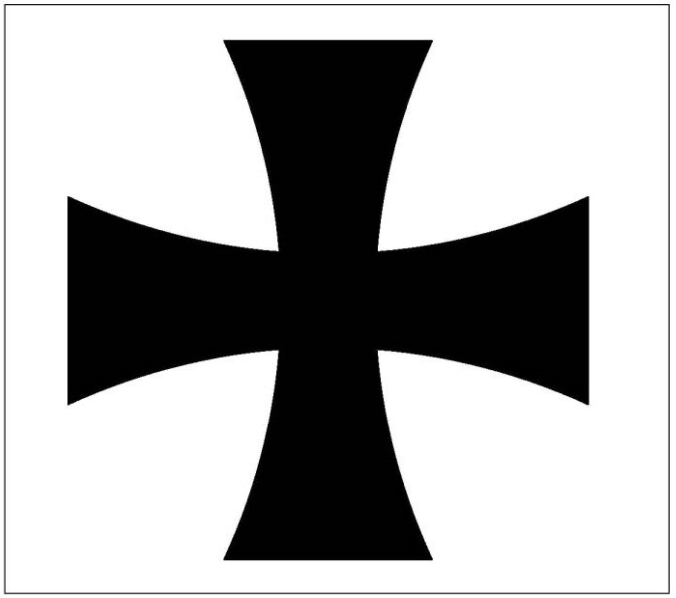
Upper Wing



Lower Wing



Upper Wing



Lower Wing

Machine Guns – Cut out and roll into tube.

